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- | | |
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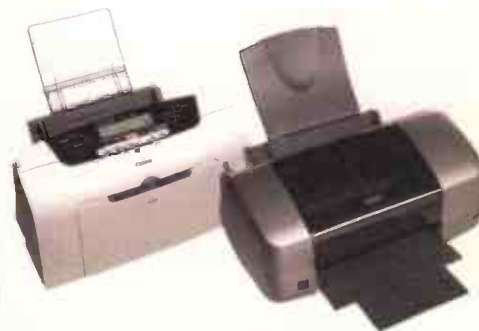


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Work, play or watch movies on the go with one of these low-price portables

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A bevy of colour printers from £49 to £244 to output your photos, text or a mixture of the two



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The pros and cons of Wifi – we show you how to navigate around them

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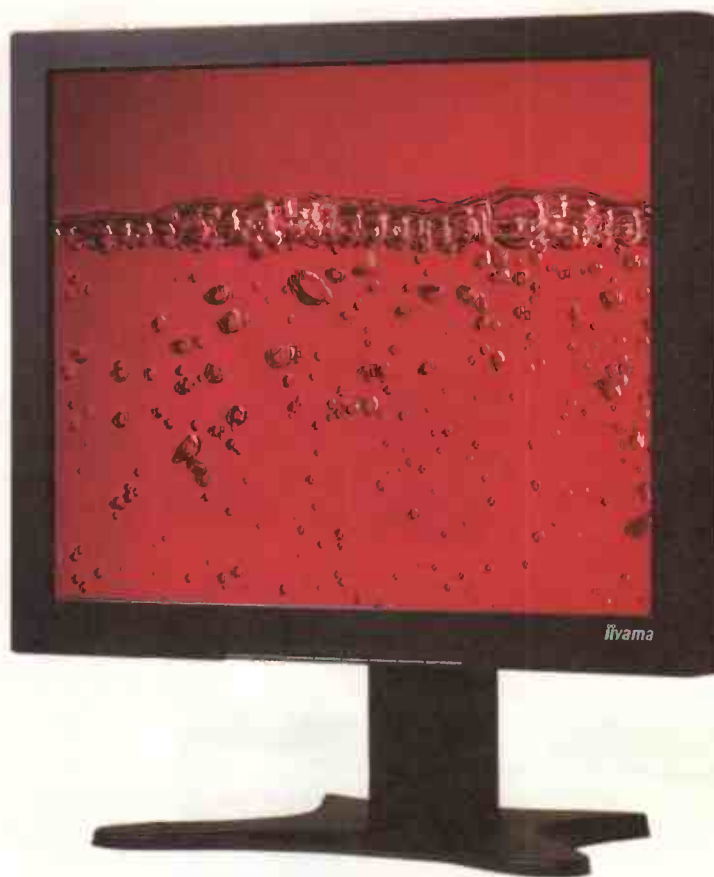
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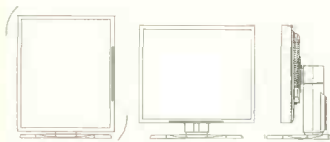
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We must tackle Wifi gridlock now

As wireless technology grows more popular, the problems just get bigger, says Dylan Armbrust

There are lots of things in our industry that are over-hyped. It's a common problem really, and one, I'm reluctant to admit, that the IT media can be guilty of perpetrating. In fairness, our crime of over-hype tends to be based upon an over-abundance of passion for new technology. We see something truly innovative, visualise the potential and end up singing its praises. Naturally, because it's new, the downsides haven't been fully sussed out, even by the developers of the said technology themselves, and in the course of time the frustrations and weaknesses begin to appear.

This is currently the situation for the budding wireless technology community and the ever-growing body of home and business users. This year, in my view, could be deemed 'the year Wifi went mainstream'. Not only has the faster 801.11g standard been ratified, making it more appealing to a wider audience, but wireless kit itself has become either incredibly affordable or is already being integrated into everyday devices, such as PDAs or notebooks. Just take a look at this month's Reviews section or our Budget notebook group test (page 109) and you can't help but see a bit of a wireless revolution going on.

And it's this very fact, the growing ubiquity of wireless, that we have to watch out for. Not because it's a bad technology, which it isn't, but because it's becoming such a popular technology.

As the world, our businesses, and now even our homes become part of one huge, interconnected network, we can now free ourselves from the drudgery of having to install network wiring (hurrah!) But we are beginning to see warning signs that not all is wonderful on the wireless front. Aside from the usual caveats that it's still a fairly new technology, we may find that we'll soon get too much of a good thing.

The complete failure, nay fiasco, of the wireless network at Microsoft's recent Tech Ed event in Barcelona (see News, page 18), due to heavy use, mixed standards and heavy background noise, is just one example of what could be facing us on a daily basis if we don't spot the trouble on the horizon and do something about it.

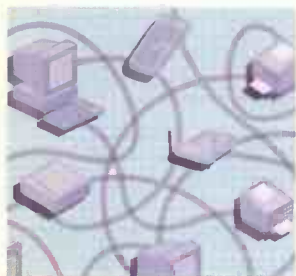
And the trouble I'm talking about is wireless congestion and sharing in general. The Tech Ed event showed that, while Wifi looks great up front, there are some important issues that users need to be aware of before they embrace the technology. While we in the UK are still at the early stages of adopting wireless technology, it's an important issue for us to think about and, if you are thinking of making use of wireless at home or the office, preparing for too.

It's entirely possible that we could find ourselves in a few years with our ad hoc wireless network systems abounding, in a sort of strange Wifi gridlock, where each system is inadvertently hindered, blocked, squeezed or cancelled out by the other. The fact is that there are only so many channels available to the Wifi community.

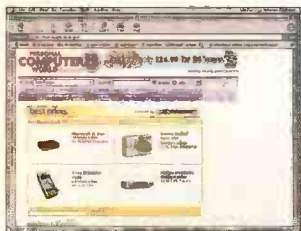
Knowing what the pros and cons are beforehand can save you some pain, time and, more importantly, money, and we can help you with that. Check out our feature Wireless worries on page 97 if you want to find out more about the weaknesses of wireless and how to navigate around them.

New PCW Best Prices

This month see the introduction of PCW's Best Prices service, our new online shopping service run in partnership with Pricerunner, the UK's best comparative online shopping site. If you're on the lookout for the best deals around, whether it's for PCs, peripherals or more, check out www.pcw.co.uk/bestprices.



>> **Wireless worries**
How to navigate round the limitations of wireless – page 97



>> **Best prices**
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'We are beginning to see warning signs that not all is wonderful on the wireless front'

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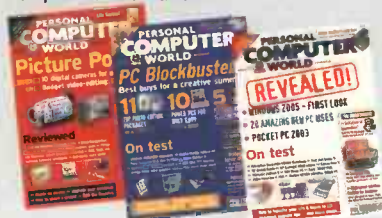
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Results explained

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



Adobe Photoshop 6.0.1 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 6.0.1, 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

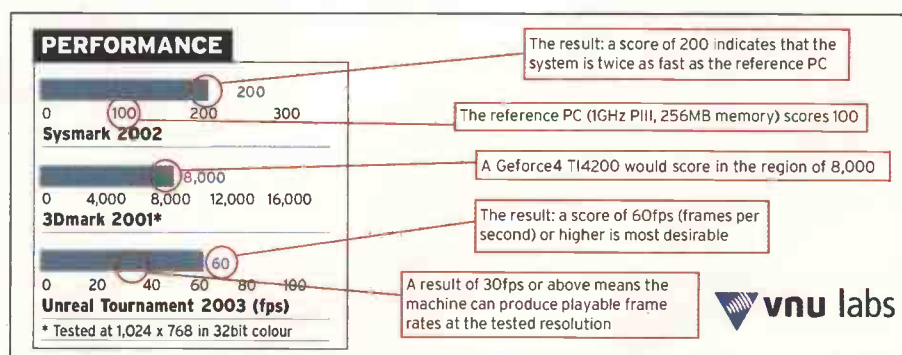
with Full Scene Anti-Aliasing (FSAA) and at 1,280 x 1,024, both in 32bit colour and textures, set to loop three times.

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

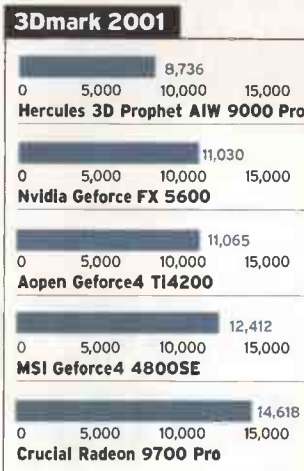
Run at its default settings of 1,024 x 768 and 32bit colour depth, this update to 3Dmark 2001 will only fully run on DirectX 9 compliant cards. As there are currently precious few of these in the market, this will not be replacing 3Dmark 2001 as our standard graphics test. However, it will be tested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



vnu labs



Unreal Tournament 2003 is used to test real world DirectX performance



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

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 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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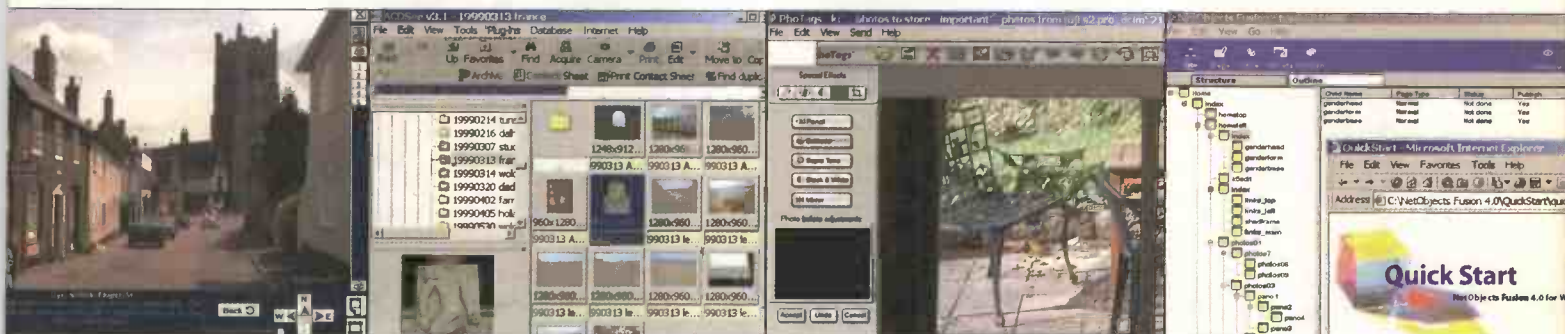


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September Cover Disc

Turn to page 268 for more details >>

You get six full programs this month - turn to the pages at the back for details



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Turn to p268>

Netobjects Fusion 4

Fusion 4 has everything you need to build, publish, manage and promote your website, without the need for code. Add database access features for online product catalogues, or use built-in components to add ecommerce functionality.

Turn to p268>

Acronis True Image Deluxe

This drive imaging software lets you create complete snapshots of your entire hard disk drive or individual partitions, with computer data, applications and operating systems which can be restored on the same or different PC in Windows, without the need to reboot. With Acronis True Image Deluxe you can completely protect yourself from fatal software or hardware failure.

Turn to p268>

ACDSee Powerpack 3.1

This program is related to the ACDSee v2.43 which was included on the disc last month. The main difference between ACDSee and ACDSee Powerpack is the inclusion of two extra full programs, which can also be bought separately. Fotocanvas is a deluxe version of the Photo Enhancer photo-editing software, while Fotoangelo is an application and plug-in for creating photo slideshows and screensavers.

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Sawmill 5

Sawmill is a powerful and flexible log file analysis tool available for every major platform. It analyses over 700 log file formats, including files produced by web servers, proxy servers, firewalls, mail, VPN and virus control servers, databases, streaming media servers and FTP servers.

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Taxcalc Lite 2003

The easy way to complete your tax return and then file it online.

Turn to p269>

Essentials

25 top tools

A selection of great utilities including: Ad-Aware 6, AVG Antivirus 6, Winzip 8.1, Media Player 9, Opera browser 7, DivX 5.05, DVD Genie 4, Morpheus 3.1 and more.

On the DVD-Rom

Red Hat Linux 9

Red Hat 9 combines the latest technology from the open-source community in one easy-to-use operating system, ideal for home computing and technology enthusiasts. It's stable, powerful and easy to install. The installation discs are supplied in the form of three ISO image files, which you will need to burn to CD-R.

Turn to p270>

PLUS

More than 70 great utilities and add-ins. We've scores of product group test reviews and workshops from past issues of PCW in Acrobat pdf format. Also included are some of the latest playable games demos - this month: Next Generation Tennis, Colin McRae Rally 3, Fire Chief, Breed, Indycar Series and Ghost Master.

USING THE COVER DISC

The PCW cover disc uses a web-browser style interface, but you'll need to have MS Internet Explorer 5 or later to take full advantage (using the dedicated PCW browser option). If you use Netscape, Opera or an older version of IE, you can still browse the disc using your own browser, and install programs by clicking the INSTALL buttons. However you will be presented with the usual download/run dialogue box (see the Support section in the disc menu). NOTE: 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 September 2003 cover disc
ABT, 306 St Mary's Lane
Upminster RM14 3HL

quoting reference 'PCW Vol 26 No 9'.

PROBLEMS INSTALLING/RUNNING THE SOFTWARE > Check the support page on the disc, or check the manufacturer's site.

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Focus on



We told you so!

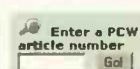
We warned in April 2001

that 11b Wifi wouldn't scale up without interference problems unless transmit power was controlled. Now those problems are happening. See page 18

Analysis

- 20 Man who cracked the Xbox
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(It might, if it is running NT or Windows 98)

PCW numbers



You will see references in some stories to PCW numbers. These point to further information. Just go to www.pcw.co.uk and put the number in the box shown here.

IE is dead, long live 64bit

Two events pushed the IT industry into one of its periodic tectonic shifts last month, changing the landscape for both hardware and software. Apple launched a powerful new Mac, the G5, putting 64bit computing onto the desktop for the first time. And Microsoft signalled the end of Internet Explorer, which will merge into the next-generation Windows operating system.

The G5 (see page 19) will help Apple defend its strongholds in graphics and publishing houses, where PCs have made inroads. But it could also accelerate the adoption of 64bit desktop PC processors like AMD's Athlon64, which is due to launch this autumn. Intel's 64bit Itaniums and AMD's 64bit Opteron, which have been out for some time, are designed for high-end workstations and servers.

Both the G5 and AMD's 64bit chips run 32bit code natively. But it needs to be recompiled or run in slow emulation on the Itaniums – though a new 32bit execution layer is to be released at the end of this year.

Intel is rumoured to have a Plan B, in case 64bit processing does take off at the desktop, in the form of a 64bit Pentium that can run either 32bit or 64bit code. In truth, none of today's workaday PC applications will benefit from a 64bit processor, though this could change as

An exercise bike that hassles you to go faster was among devices cited last month to show uses of embedded Windows XP. See www.exertris.co.uk



voice and pen interfaces become more sophisticated. The wide 64bit address space could find a mainstream use sooner in diskless solid-state PCs running in multi-gigabyte memory too large for 32bit chips to address comfortably. These are feasible at today's Ram prices, but they will become more viable with emerging static Ram that does not need constant refreshing.

The reverberations of the IE move, signalled by IE program manager Brian Countryman, could also take time to work through. Microsoft was criticised during the US Department of Justice anti-trust trial when it said that the browser should be part of the OS; but in design terms this was one of its better arguments.

There is no point in separating the system you use for exploring and using your local resources, from the one using the global resource that is the Internet.

The competitive issues are another matter and they are already beginning to work themselves out. They cast a new light on AOL-Time Warner's £455m deal with Microsoft in May, settling claims over the Netscape browser and giving AOL long-term access to Explorer technology.

Apple has also covered its tracks by launching its own browser (page 19) as Microsoft announced that it is dropping the Mac edition of Explorer.

Microsoft spent a fortune developing Explorer and it now wants to make money from the technology. Not so much from the software, but also by selling music tracks and other digital material which will be accessed by applets like the Media Player.

A Microsoft executive told PCW's Tim Anderson at the Tech Ed developers' conference: 'We think of the browsing capability as being built into all our applications and products, not just the operating system.'

But the move could backfire on Microsoft, because a browser update will force users to buy a new operating system. This could widen the market for third-party browsers such as Netscape or Opera. **Clive Akass**

Iomega trumps with triple-standard DVD burner

Iomega has launched a drive supporting all three rival DVD burner formats, signalling what may be a resolution of the long-simmering dispute. Sony seemed to have settled matters last year with the first DVD burner to support both the DVD+R and DVD-R formats. But Panasonic refused to admit defeat for its older DVD-Ram which, it argued, has unique

advantages. It cannot be played on standard players, but it supports far more rewrites than its rivals and can be addressed like a hard disk, making it useful for PC applications. DVD-Ram is also being used in timeshift TV recorders because the drives can play and record at the same



time. But the disks cost more than the others.

Iomega has played little part in the DVD dispute, which has been more a scrabble over royalties than technology. It is unlikely to match the impact of its out-of-the-blue launch of the Zip drive, which offered high-capacity,

low-cost removable storage at a time when most drives packed less than 1GB.

Staff at Iomega's stand at Cebit New York, where the triple-standard Super DVD drive was launched, expected other companies to produce similar products. The device, which also burns CDs, will ship in Europe shortly. The US price is \$329 (£197). www.iomega.com



Mix Windows and Linux on your servers

We explain how to run a cross-platform network – see page 104



Accounting software

With tax return deadlines looming, one of these packages could help – see page 139



Supercomputing on the Grid

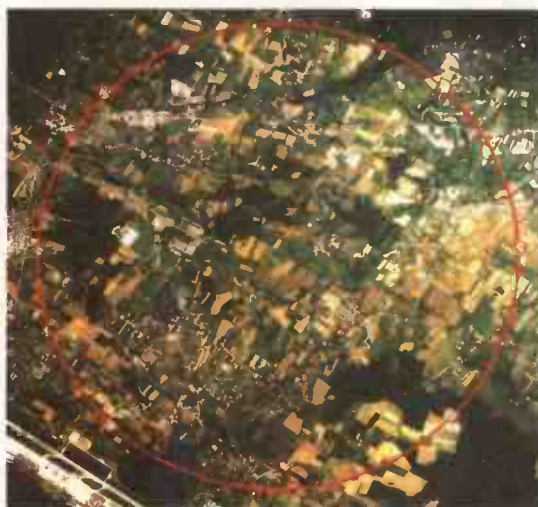
The launch of the Grid, which has been billed as the next-generation Internet, was due shortly after we went to press.

The Grid will link 10 laboratories across the world, including the Cern particle physics lab near Geneva where Tim Berners-Lee invented the web. Within four years it is expected to link tens of thousands of computers. Where the traditional web is used to distribute information, the Grid is used to distribute computing power...

almost precisely analogous to the electricity grid.

The initial aim is to help scientists process the billions of gigabytes generated by experiments like those at Cern's particle accelerator (pictured). But grid computing could eventually bring supercomputer power to a handheld PDA.

It makes little difference as far as the user is concerned: you give your machine a problem



Faster path – the route traced by the particle accelerator at Cern

with 266Mbps/sec using standard TCP. By aggregating 10 channels they achieved 8.6Gbytes/sec – that is, two DVD movies per second.

Fast TCP works by feeding back traffic information and pushing through big chunks of data where lines are clear. It's good only for large files but could be used, say, for video-on-demand.

Caltech's Cheng Lee said it was possible to get efficiencies of 90 per cent – that is, average 900Mbps/sec over a 1Gbit link. 'The performance depends on a number of factors, such as bandwidth, latency and the amount of data,' Lee said that in theory the system should not crowd out other web users. But she added: 'There are still issues that need to be resolved before we can give definite answers.'

and it hands you an answer. But the processing may be done by machines across the world.

Work on the next-generation net has already had results that could have a wide impact. Data rates over existing infrastructure were tripled by researchers at Cern and California's Caltech simply by tweaking protocols. They averaged 923Mbps/sec using a so-called Fast Transfer Control Protocol (TCP) compared

Bluetooth gets more friendly

A new Bluetooth version 1.2 standard, expected to be ratified in November, introduces adaptive frequency hopping to reduce interference with Wifi sharing the same 2.4GHz band. It includes measures to make it easier to use and to ensure different makes will work together.

Products supporting 1.2, which was unveiled at the Bluetooth Worldfest in Amsterdam, are not expected to ship until next March. Navman (www.navman-mobile.com) showed its

GPS 4400 (right), a voice-navigation system for use with a Bluetooth-enabled

Pocket PC device. It will sell for around £379 inc VAT.

Plantronics showed its M3000 Bluetooth headset offering eight hours of talk time and 200 hours on standby with its headset. Cambridge Silicon Radio showed a low-cost single-chip that can Bluetooth-enable devices, and TDK had a Blu2I range that is designed to allow hardware vendors to add Bluetooth to existing products.



£25m MI5 Internet spy centre opens

A £25m Internet surveillance centre, based at MI5 headquarters, has gone live. The National Technical Assistance Centre (NTAC) acts as an intermediary between Internet Service Providers (ISPs) and law enforcement agencies for intercepting and reading emails and web traffic.

The centre will act as a clearing house for the various agencies, dealing with what is expected to be thousands of requests a year.

Analysis of the data will still be in the hands of the police and other eligible authorities.

PCW number 1141554

How to beat web spies – page 29

PCs give singers the right tone

New software is being used to help singers develop their voices. It allows singers and their teachers to gauge how well they are using techniques for pitch, clarity, power and tone.

'While I don't believe a computer can teach someone to sing, it can provide meaningful and easily understandable feedback for both teacher and student,' said Professor David Howard, who developed the software with the media engineering research group at York University.

PCW number 1141569



Er... I guess that means you've cracked that high note

Home spam

Spammers are hijacking home PCs to avoid curbs on junk mail, according to email specialist Messagelabs. They use viruses to plant a Trojan applet, which allows intruders to access the host PC remotely and use it to send out spam at no risk.

They are hard to spot because only a few spam mails are sent from each PC, said Messagelabs' chief information analyst Paul Woods. 'Home users with always-on... connections are targeted because corporate PCs are better protected.'

Spam emails account for the workload of five out of 21 mail servers, say analysts Radicati.

PCW number 1141508

Crowd control proves difficult

Wifi fiasco shows need for politeness and policing on the airwaves. Guy Kewney reports

Microsoft has been instrumental in some groundbreaking development in networking. It was unsuccessful development, alas, in the form of a very large, very public wireless network that conspicuously failed.

The venue was Microsoft's Tech Ed event, held this year in Barcelona, which showcases Microsoft's latest technology to leading software developers from Europe and much of the rest of the world. Profiles don't get much higher.

To celebrate the event's tenth anniversary, Microsoft got together with HP and Proxim to install the largest wireless net we've seen. They did the same with only a couple of glitches last year, but used only the basic 802.11b standard and gave out cards to people who were mostly using Ipaqs.

This year they decided to support the three standards: 802.11a, b and g. And they had to cope with around 4,000 users with a variety of client devices – and even with their own mini Wifi networks, competing with the official one.

As is so often the case when things go wrong, there was more than one source of the problems. Several faults, each potentially the basis of a doctorate paper, were detected.

The strangest was a rogue device roaming around and periodically emitting a faulty



It's hard to be heard over the noise of 4,000 people chattering...

packet that crashed an access point. 'We spent much of the first day convinced that it was a faulty batch of power supplies. Proxim... said that it really couldn't be anything else,' said the system administrator.

'Eventually we tracked the MAC address of the network card and blocked it; and the problem went away.' But other problems remained.

The wired net's 30Mbits/sec capacity was being used almost to capacity; but the wireless never got above 7Mbits/sec because the users were unable to get

performance. It was thought this was due to co-existence problems with 802.11b and 11g, which use the same 2.4GHz band – users in 11a areas were unaffected. Eventually, this was discounted. A wireless scanner revealed a high level of RF pollution: the background noise from 4,000 clients was deafening, just as it is hard to be heard against the noise of 4,000 people chattering.

Making the cells smaller did not help, and neither did making more cells: an all-night session changing the network from 70 to 90 nodes, including

some extra 11a ones, simply resulted in more crashes – even at 11a nodes.

Bang went the background interference theory – but it seems to be a problem that needed solving, and a White Paper on the subject can be expected.

Hours before what was supposed to have been a triumphant end-of-show press conference explaining how the wonderful network was created, the organisers were shaking their heads. As the network manager put it: 'When we find out what is causing it, we'll probably kick ourselves, but right now, none of us has a clue.'

The experience (and similar wireless debacles, like the one at Cebit earlier this year) will probably lead to calls to the IEEE to revise 802.11b standard to include Transmit Power Control, which Europe insisted that the US write into 802.11a standard to limit this type of interference. 'If equipment reduced the power it uses when close to the access point, the background noise would reduce to nothing, by comparison,' said the system manager.

One abiding lesson is that users of unlicensed frequencies have to co-operate. The root problem is social, not technological, in the same way that road traffic congestion can't be solved without agreement among road users.

● See also *Wireless worries* – p97

SIMple answer to making payments on the move

The day when notebooks have built-in SIM cards is getting closer. Mobile phone companies could be banks if they had any money. But they don't, so they are trying the next best thing by transmuting into credit card companies, using the phone SIM as the identity module for transactions – and taking a cut of anything you buy.

The idea has been around for a couple of years but has been

hampered by the multiplicity of operators: if you used Vodafone you couldn't buy things from a shop using mmo2 payments.

Simpay, the commercial name of the Mobile Payments Services Association (MPSA), is a bid to get round this. It was founded by Orange, Telefonica Moviles, T-Mobile and Vodafone, who hope to sign up lots of others.

Jim Wadsworth, who was seconded from Vodafone

to Simpay, said the scheme had to do more than simply add cost to a transaction. Simpay aimed to open up markets that aren't readily accessible today. 'For example, someone from Spain comes to London looking to buy last-minute theatre tickets and registers with Ticketmaster. They'd get an SMS alert saying 'You can buy now'. And if this customer were to buy 300 euros

worth of tickets for that night, that adds significant new traffic.'

Simpay won't say what its cut will be, apart from 'less than five per cent'. It will probably settle for around two per cent.

Simpay could let SIM-equipped notebooks or PDAs make payments. Wadsworth thinks users would be happy to pay extra for the 'privilege', which might cast doubt on his judgement. Time, as they say, will tell.

Apple raises 64bit stakes

Apple has won the race to put 64bit chips on the desktop. The Power Mac G5 will launch at speeds of 1.6GHz, 1.8GHz and 2GHz, with chipmaker IBM predicting a 3GHz variant within 12 months. That's no mean feat when you consider that each one has squeezed over 300 metres of wiring and 58 million transistors into just 118mm square. Its forerunner, the G4, contained just 33 million.

The scale of 64bit computing is hard to grasp. Apple's description is that if you could fit the 32bit address space of the G4 on the back of a postcard, the 64bit G5's would cover all 22 square miles of Manhattan island. That is a jump from 4GB to a theoretical 18Exabytes (18 billion billion bytes). With two floating point units and the capacity to process 10 simultaneous instructions, the G5 gives developers plenty of room for expansion.

So how has Apple stolen the march on Intel and AMD? Tom Boger, UK director of PowerMac, puts it down to the PowerPC instruction set. Put together in 1991, it was built from the ground up with 64bit computing in mind, so existing 32bit apps will run on



With the Power Mac G5, Apple has won the 64bit computing race

the new G5 without adaptation – though Apple says they will run faster with optimisation. We are unlikely to see the same on the X86 platform where the instruction set will have to be either extended or dumped altogether.

The Power Mac G5 itself is a brushed aluminium behemoth with handles on the top and bottom and four cooling zones under the hood. The temperature of each zone is controlled independently by

nine fans spinning at a tenth of the speed of regular PC fans. The front and back of the casing is 35 per cent perforated, providing for a straight-through airflow, which should keep the internals relatively dust-free.

The front-side bus (FSB) runs at 1GHz, with an unprecedented 8Gbytes/sec transfer rate on the single 1.6GHz and 1.8GHz processor models, and 16Gbytes/sec on the dual 2GHz. Upgrades are a screw-free affair; a single latch on the rear opens the casing, while a system of internal levers frees the optical and Serial ATA drives. That much power doesn't come cheap, though, with the single processor tipping the scales at £1,549 and the dual 2GHz topping £2,299. Both prices exclude a monitor.

It was perhaps no coincidence that Apple chose *The Guardian's* archive building as the UK launch venue. The paper announced at the end of June that it is switching to MacOS X (see below), and from the overpriced Quark publishing suite to Adobe Indesign. Whatever the cost of Apple's latest hardware, then, the future looks increasingly rosy for the only real PC alternative.

Nik Rawlinson

Linus back at Linux helm

Linus Torvalds has taken full-time control of Linux at a time when the open-source operating system faces its worst turmoil since he launched it as a student in Finland. Its future is not in doubt, but a claim by SCO that it owns some of the Linux kernel has created a lot of uncertainty and could take months or longer to resolve in the courts.

Torvalds' move from chipmaker Transmeta to the Open Source Development Lab (OSDL), where he will devote himself to developing the Linux kernel, does not appear to be connected with the dispute.



The OSDL is a non-profit consortium dedicated to accelerating Linux adoption. Torvalds will co-ordinate a distributed team of thousands of developers around the world.

'It feels a bit strange to finally officially work on what I've been doing for the past 12 years but, with the upcoming 2.6.x release, it makes sense to be able to concentrate fully on Linux,' he said.

'The OSDL is the perfect setting for vendor-independent and neutral Linux development.'

The move was welcomed by George Weiss, research director at analyst Gartner. He said: 'The computing market is still questioning how far and how fast Linux can go as an enterprise-ready platform. With Torvalds at the OSDL, many will be looking for leadership from the lab for answers to those questions.'

Backers of the OSDL, founded in 2000, include Fujitsu, Hitachi, Hewlett-Packard, IBM and Intel. OSDL chief executive Stuart Cohen said: 'The addition of Torvalds' perspective and guidance to the lab will enhance our value to all three of these groups.'

www.vnnet.co.uk

Panther packs video messaging

Apple upped the pace by announcing a revision to OS X, slated for an end-of-year release. Codenamed Panther, it incorporates iChat AV, a video-based extension to the AOL messaging client, and the Safari browser, which clocked up five million beta downloads.

With improved handling of multi-document applications, it sports enhanced mail tools, and the Finder now has a brushed-metal finish. Quizzed on the look, senior line manager for OS X, Chris Bourdon, explained that it elevated the Finder to the same level as Apple's other products, including Safari and iTunes, both of which have the same metallic interface.

A column of most commonly used folders has been added to file dialogues, much like the Save dialogue in Office XP, and file names can now be colour-coded for easy identification. Under the skin, it offers XP-style user switching, and file shredding that meets US Department of Defense requirements. Potentially contentious may be the addition of a file vault for on-the-fly 128bit encryption and decryption.

System requirements have yet to be announced, although Bourdon assures it will run on existing G3 iBooks and retail at £99 ex VAT, matching the price of the current release.



Nik Rawlinson File names can be colour coded for easy identification

Huang verdict

Bunnie Huang risked jail cracking Microsoft's Xbox. His book on it was effectively banned. And the jury is still out on just what you can do with your own property. Clive Akass reports

You might think that when you buy a PC, DVD player or TV that you have the right to do what you like with it. Not so. In the US, under the notorious Digital Millennium Copyright Act (DMCA), you can land yourself in jail by tampering with anything that might be construed as protecting intellectual property – even if your reasons are legitimate.

In Britain, under pending legislation, it will be illegal only if you are demonstrably trying to do something illegal such as pirating copyright material.

But the issues are so new and complex that UK officials drawing up the legislation admitted last year that even they did not know its full implications (see *PCW* October, 2002). It should have passed into law last December, implementing a European Directive, but has been delayed for further consideration. The uncertainty here and in the US is itself having an effect, which is how I came to spend part of a brief holiday last month reading what is in effect a banned book.

Hacking the Xbox, by Andrew 'Bunnie' Huang, was commissioned by US publisher John Wiley, who dropped it for fear that it might fall foul of the DMCA and Microsoft. Huang, the first person to bypass the security system on Microsoft's Xbox game console, published the book himself*.

He is careful to put both sides of the argument, pointing out that pirates forced the demise of Sega's Dreamcast console, and positioning himself as a hacker in the original sense of someone who enjoys tackling difficult technical problems for their own sake.

In fact, he is not a typical hacker even in that sense. Huang worked on the Xbox while a graduate student at the prestigious Massachusetts Institute of Technology, and his results were published as an

official MIT paper. Without the power of MIT behind him he could have been in big trouble.

The Xbox is basically a 733MHz PIII-class PC that has been tightly constrained to run only games created or licensed by Microsoft. It is a loss leader, sold well below cost price – Huang reckons Microsoft has to sell 10 games per box to start making money. Before the DMCA there would have been nothing to stop you adapting the Xbox to run any PC software, including Linux.

There would be little point, anyway, if your aim were simply to get a cheap PC, because more powerful models are available at much the same price if you factor in the cost and hassle of adaptation. But the Xbox presents an almost irresistible challenge to hackers.

Cracking the Xbox

Huang's book is part digital-electronics DIY manual (including soldering tips), part legal discussion, and part narrative. There are points at which it could have benefited from some Wiley editing; but his account of how he cracked the Xbox is fascinating and his

perseverance is awesome. At one point he even dunked the Xbox chips into fuming acid in a bid to read the logic from the bare silicon.

It turned out that Microsoft put a dummy initial sequence in the boot Rom and hid the real code in the Nvidia-made custom southbridge chip.

Huang built a daughterboard round a Field Programmable Gate Array (an electronically configurable, cheap alternative to a custom-built chip) and glued it to the Xbox board to read the hypertransport bus, which carries decrypted data. He had to arrange the data so that it made sense, partly by feeding chunks through a disassembler until he got meaningful code.

By comparing this with the encrypted Rom code, he and his online allies decided that a 128bit cipher called RC4/128 was being used. This meant a key had to be buried in that hypertransport data stream.

Huang then adapted an RC4 decryption program to use successive chunks of the data stream as a trial key. The output of each was analysed on the assumption that a false decrypt would be statistically 'white',

with a roughly even distribution of values. Much to his surprise, he got a positive result almost immediately. Huang now knew enough to get the Xbox Rom to run anything he wanted,

Microsoft redesigned the security system when the news broke (leaving Nvidia to pick up the bill for unused version 1.0 chips, according to Huang). Astonishingly, the new system was cracked within a day by British hacker Andy Green, again with the aid of online allies.

Xbox 'mod' chips are now readily available in some countries, though in May a US man was sentenced to five months, with a \$28,000 fine, for selling them. Microsoft has threatened to withdraw the Xbox from Australia, where courts concluded that the chips could have legitimate uses.

On the security front, the lessons to be learnt are old ones: that a system is only as strong as its weakest link; and that the more complex a system is, the more holes it is likely to have.

Huang argues that the industry needs 'ethical' hackers to discover and report those holes, so systems become more secure with time – just as there are virus writers who explore vulnerabilities to improve defences rather than to attack.

The issues are not restricted to hardware. Given a blanket ban on unauthorised decryption, Microsoft would need only to copy-protect its Word format to prevent PDA vendors offering a rival, file-compatible editor.

It remains to be seen if the industry will swallow its self-righteousness and recognise where legitimate anti-piracy measures become monopolistic restrictive practices. And it may take a test case or two to reveal where the British courts will draw that line.

*** *Hacking the Xbox* will be sold by No Starch Press. The price was unknown at the time of going to press. See www.hackingthexbox.com for an update.**



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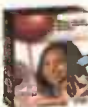
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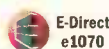
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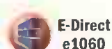
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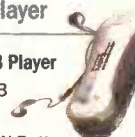
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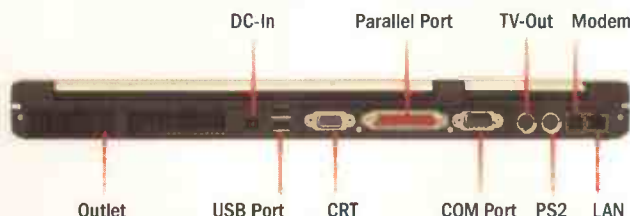
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Cebit dips its toe into the US

Europe's top computer show, Cebit, tried to gain a foothold in the US last month, and looked about as successful as Comdex was when it failed to establish a regular show in London.

Attendees at Cebit New York appeared to be fewer than the expected 40,000. But it may be too early to write off the show, which was restricted to business IT, and for which the class of attendees is more important than the number.

Comdex owner Key3media hit trouble last year and went into Chapter 11 protection. The day after Cebit New York opened, it announced that it had emerged from bankruptcy and was relaunching under the name Medialive International.

Small projector

Infocus showed what may be the smallest digital projector yet. The 0.9kg LP120 measures 5.21 x 9.37 x 24.77cm – small enough to pack into a handbag. It uses a new microlamp and Philips UHP Backmirror technology. It offers 1,024 x 768 XGA resolution and a 2,000:1 contrast at 1,100 lumens. It will ship in the UK this summer for an estimated £1,999 ex VAT. For more projectors see our mini round-up on page 60.

www.infocus.com



Thin trend

One trend at Cebit was Windows thin clients, which act as a front end to a remote PC. Microsoft's smart displays have shown how viable these can be with fast processors and Wifi networks. Unlike the smart display, not all are restricted to an XP host and CE client. Computer Lab (www.computerlab.com) showed models with a variety of host and client software including Linux.

Gigabyte showed five models, including the low-drain (40w) Ta-1 and Ta-2 built round a Via C3 chip. www.gigabyte.com.tw

Sahara Palms take on .Net

Handspring showed off its new phone-enabled Treo 600 PDA in London last month, but was saying little about its incestuous takeover by Palm, which in a roundabout way gave birth to it. The 600, which is thinner and slightly smaller than the first Treo, is Handspring's most elegant design to date, intended to give the PDA more of a mobile phone-like feel.

It includes a quad-band phone and is being tipped in the US as a worthy rival to the Sony Clie, which also uses the Palm operating system. But Palm's interest in Handspring stems more from the fact that Treo will be sold in the UK (from this autumn) by Orange. Palm needs Handspring's knowledge of European cellular operators.

Palm was remarkably slow getting into wireless, perhaps because its major innovators left after the company was bought by US Robotics (later bought by 3Com). They included Jeff Hawkins, who designed the original Palm Pilot and went on to co-found Handspring.



The new Treo 600... designed to make the PDA more like a phone

Palm devices now all face being squeezed by feature-rich Microsoft-powered models such as HP's Ipaqs and Dell's Axim in a Microsoft-dominated world where IT managers don't like the hassles of mixed environments.

Microsoft, with its .Net strategy, is also poised to lock

mobiles into a web of services that rival devices will be able to use only at a basic level.

Dave Nagel, head of Palm's soon-to-be-hived-off software arm Palmsource, still claims 60 per cent of the US corporate market compared to Microsoft's 30 per cent. He chose Cebit New York to publicise how he plans to keep things that way.

He announced a string of new alliances (see box below) and revealed that PalmOS 6.0, codenamed Sahara, which is due out next year, will incorporate a new Mobile Business Architecture (MBA) aimed at making mobiles even more enterprise-friendly.

He said MBA will have four modular 'frameworks' covering messaging, device management, information management and security. Each MBA framework (a curious choice of words, as Microsoft's mobile client architecture is called the .Net Framework) will have an open programming interface to allow third-parties to extend it.

He boasted that Palms are already better than Microsoft handhelds at synchronising with Microsoft desktops; and he told how a client epitomised the security concerns of corporate users by describing a PDA as a '\$250 device carrying \$250,000 worth of data'.

Nagel cited the Treo 600 as a precursor of a new secure Palm-driven mobile world, explaining that it allows you to destroy its data remotely if it gets lost. He said: 'Sahara is being rewritten from the ground up to provide security at the deepest levels of the operating system.'

IBM helps Palm the enterprise

Palmsource and IBM are to co-develop a set of advanced tools to help create applications for connected enterprise mobiles using standards like XML, Simple Object Access Protocol (Soap) and Web Services Definition Language (WSDL). Palmsource will also partner with Visto to develop an enterprise-class email client for the Palm OS. Also announced were deals with Novell and Novell partners Nexic and Notify Technology to introduce and promote tools for mobile management and messaging. Novell says its Zenworks enables an entire system of desktops, laptops, PDAs and multiple server platforms to be centrally managed.

Quiet Via powers one-box radio station

Via showed designs built round its Epia mainboards – including the one-box radio station (right). Russell Johnson, selling the setup for \$2,200 (£1,320), said the Via kit was chosen because it was so quiet. Recorded content can be scheduled to let one person run a 24-hour service via web streaming or a satellite feed.

Also on show was a \$399 (£240) Onebox Media Centre

supporting timeshift TV, slideshows, video and audio. See www.oneboxmc.com.

Still more versatile is the tiny \$399 (£240) Mini-box M-100, a driveless PC that can be used for anything from a firewall to a web server. It has a small LCD screen and 14-key pad to allow manual configuration. Details are at www.mini-box.com.



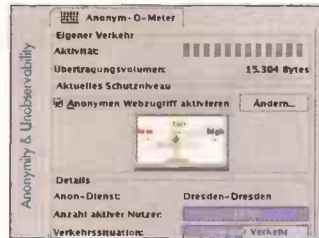
Johnson with his one-box station – see www.worldvibrations.com

How to defeat web spies

It seems that even while the security services explore new ways to spy on our online activities, universities are finding ways to defeat them.

A system from Germany's Dresden University of Technology can stop net-traffic monitors from eavesdropping on you, and stops companies and others from tracking you with a view to sending spam.

All you need is a Java program called Jap, downloadable from



anon.inf.tu-dresden.de. This encrypts all outgoing traffic and sends it through three servers, called Mixes, each of which strips off a layer of encryption.

The idea is that a traffic spy could not match a packet going into a Mix with its outgoing version. Each Mix is run by a different authority, so trust does not rest with a single institution.

The designers are looking for partners willing to run a Mix. They say the system could be used for drug and medical advice services, online voting and political chat rooms. But they admit that it could also be used by criminals.

● A green prize for IT, if such a thing exists, should go to another German institute, the Technical University of Darmstadt. It showed a design environment, built around a 3D Cad system, that integrates a lifetime ecological audit for any product under development.

The designers say that only a preventative approach at the design stage can be effective in ensuring that products are environmentally sound.

www.sfb392.tu-darmstadt.de



Credit this

US operator Nextel and Motorola were showing this Creditel Powerswipe device that would allow a taxi driver, say, to verify a cashcard payment via a mobile phone.

Motorola showed a similar wraparound shell which reads barcodes over a cellular link.

www.creditelcorp.com

Zone Alarm 4.0

Zonelabs showed the new version 4.0 of its Zone Alarm web security package. It includes new privacy tools and costs \$49.95 from www.zonelabs.com.

See your office PC from a PDA

A utility called GotomyPC could be seen as either a threat or a promise by IT managers. It is said to allow secure access to any machine a corporate network without a VPN – and without necessarily having your company's permission.

You stick a 1.4MB app on to a host PC, and any Java-enabled device, including a PDA, can act as a remote front end to it over an encrypted link via secure servers. The service costs \$19.99 (£12.03) a month or \$49.95 (£30.05) a year; a three-month trial is available at www.gotomypc.com. UK-based servers will be installed shortly.

Vigor Broadband Routers

- Broadband sharing routers for ADSL, cable-modems (NTL/Telewest), ISDN2e or BT Highway/Midband
- Firewall facilities to increase system security
- VPN (Virtual Private Networking) with PPTP/IPSec
- UPnP Support for Microsoft multimedia applications
- Network Address Translation, DHCP and DNS Proxy
- Easy configuration/monitoring from your browser
- Optional built-in Wireless Access Point
- Built-in 4-Port 10/100BaseT Ethernet switch
- Features vary with each model, so see website for the full specification on the complete range and an in-depth explanation of all of the features available

	Cable	ADSL	ISDN	Wireless
Vigor 2104P	•			
Vigor 2300	•			
Vigor 2200X	•		•	
Vigor 2200WP	•		•	•
Vigor 2200We	•		•	•
Vigor 2600		•		
Vigor 2600We		•		•
Vigor 2600X		•	•	
Vigor 2600W		•	•	•

Check web site for explanations of compatibility for each model.

VoIP

Coming soon, the Vigor2600V - an ADSL router with added Voice over IP (VoIP). Two phone ports on the back enable you to use your ADSL connection to make regular voice calls to another Vigor2600V or any other compatible VoIP device or PC software, hence making the most of your ADSL line. For more details, visit www.draytek.co.uk

VPN

The Vigor router ranges supports VPN - Virtual Private Networking - enabling you to link private networks via the internet, using industry standard IPSec/3DES encryption, providing both flexibility and cost savings over traditional remote office and teleworker linking methods.

Available from

SEG

0870 745 8550
www.seg.co.uk

www.draytek.co.uk

Dealer enquiries welcome

Specification subject to change. *Varies with model.

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BRILLIANCE



Has your PC had its chips?

Microsoft has stopped support for Windows 98 and NT4 Workstation – and moaning won't do anything to block the increased security risks. Martin Veitch explores your options

Microsoft's support for Windows 98, 98 SE and NT4 Workstation ended on 30 June and if you use any of them you should think about the implications. In the unlikely event that you bought extended support for 98 and SE, you can get some help until mid-January, but even for you there will be no hotfixes if new security vulnerabilities arise.

Microsoft is at least doing a better job than it was in letting people know about its plans to turn off the life-support system. Last October it introduced a Support Lifecycle policy that 'provides consistent and predictable guidelines' at a product's launch on how long it will be supported. Support Lifecycle covers most Microsoft products, whether bought via retail or through business licensing, and includes current and future releases. Windows releases typically have five years of mainstream support; products such as Money and Encarta, that are updated annually, tend to have three years. Microsoft puts an asterisk next to the word mainstream because you can pay for warranty cover and hotfix support beyond that period.

Online support in the form of Microsoft's Knowledgebase articles, troubleshooting tools and FAQs are available for at least eight years after product release. Microsoft says that: 'Many customers can quickly resolve their issues without contacting Microsoft directly.'

But online support is not going to be for everybody, and end-of-life strategies (the industry term for terminating sales and support of products) can affect even users who feel they are doing a pretty good job supporting themselves.

The main problems will involve the age-old issue of drivers, particularly in getting new hardware to work with old software. Every generation of Microsoft operating system has



It may still be doing the job but, er... don't you think it's time for an upgrade?

encountered problems with every previous generation of software and peripherals. USB, the plug and play standard, and more unified OS code bases and programming interfaces have helped, but it is a sure bet that new printers, mice, scanners, digital cameras and software applications and utilities will have their battles with a discarded version of Windows.

Security threats

Security is a growing threat, as many third-party utility vendors follow Microsoft away from old Windows versions. Graham Cluley, senior consultant at UK anti-virus specialist Sophos, noted: 'If Microsoft is not supporting users on old versions... then it is not supporting independent software vendors either. That is a problem for any developer of software that interacts with the operating system.'

Sophos supports versions of Windows all the way back to Win 3.1. But only one Symantec product, the aging Norton Antivirus 2001 7.0, supports

Win 95. And a Symantec spokesman said: 'Due to the rapidly evolving nature of security threats, Symantec encourages users of older versions of its security software to upgrade in order to get the most up-to-date protection.'

Then there is the loss of security patches. You could be vulnerable to a plethora of nasties, from scripting attacks to spyware. That's bad enough for standalone users but potentially calamitous for home or small-business networks, where just one old OS can bring the lot crashing down.

'[Once] my attitude was to keep the old OS for as long as possible but with security the way it is today my feeling is to replace it if you can,' said Simon Moores, an industry expert who has run Microsoft user groups.

Many users will take to the chat rooms, railing against the Microsoft evil empire for forcing them into expensive upgrades. But that is not going to solve your problems.

Buying a new operating system may mean buying a new

PC, because it can be impracticable or more expensive to upgrade an old one to be powerful enough to run it. Just £500 buys you a fully loaded system that is going to run the latest games, spreadsheets, development tools and presentations faster than you can on your aging, state-of-the-art-in-those-days beige box. A little more and you can get rid of the old CRT monitor and replace it with a lovely, flat LCD screen.

Even recent machines may require more memory, a bigger hard disk, or a processor and motherboard transplant, to run a newer version of Windows. Simon Williams runs through your options, and gives full instructions, in his article on upgrades starting on page 84.

Swapping systems

The final option is to sit tight but ring-fence your vulnerable system. A spokesman for Conchango, a consulting firm that has had generations of experience in new versions of Windows, says that most businesses are swapping out older NT4 Server systems that run key tasks and isolating those that remain, so they will not interfere with others in the event of a failure. For smaller home networks, the analogy might be to use the older system as a standalone workstation.

Otherwise staying with a discontinued version of Windows is taking a risk. Nobody likes moving off a system that is running smoothly but if you have cash to spare, it might be better to jump now rather than fall later.

● Windows Desktop product Lifecycle Support:

www.microsoft.com/windows/lifecycle/desktop/consumer/default.msp

Kingston Technology guide to upgrading memory:

www.kingston.com/tools/umg/default.asp



>> Smart bundle

Evesham is bundling its Evolution 2600Si PC with a Viewsonic V150 Airpanel smart display for £1,999 inc VAT. The PC has a 120GB drive, 512MB of Ram and a DVD-player-cum-CD burner. The display can double as a standard monitor and a remote pen-driven front end to the PC. www.evesham.com

>> USB pre-amp

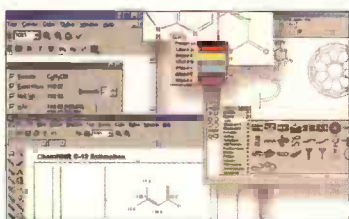
Terratec has launched a new USB-based version of a pre-amp and software designed to transfer music from records and cassettes to a PC for storage as wav or MP3 files. The Phone Pre-amp Studio hardware can cope with three input levels; bundled software allows you to strip out crackling and static. It costs £89.99 inc VAT. www.terratec.co.uk

>> Backup boost

Powerquest has launched desktop and enterprise editions of its Powerquest V2i Protector 2 backup and disaster recovery package. This extends its Virtual Volume Imaging (V2i) to desktop and laptop systems, and cuts the backup and recovery times. www.powerquest.com

>> Chemical view

The latest Chemdraw version 8 structure-drawing package, from Cambridgesoft, is now available from Adept Scientific. New features include a function for formally deriving a new name from a structure. www.adeptstore.co.uk



View Word on the phone

Office documents can be viewed with all formatting preserved on any Java-enabled device including a mobile phone, according to the UK developers.

Ultrair Office, from Quickstone Technologies, uses a Windows Explorer-style interface with an integrated viewer supporting document types such as Microsoft's Word, Excel and Powerpoint, plus Acrobat pdf and image formats.

Fonts, tables and images appear as they would in the real document, says Quickstone.

An Ultrair applet sits on your office machine, which must be running either a Windows 2000 server or XP Professional, and reduces images to graphical 'tiles' which can be sent to your client device via a cellular or Wifi hotspot link.

Log on to your network using your usual standard Windows user name and password, and you can disable remote access if your machine is stolen. An added security advantage is that no data is stored on the device. There is also a range of encryption and authentication

options. Patent-pending technology is used to compress and send only required portions of a document to your device on demand.

Documents are displayed in a choice of resolutions and colour depths, and a wordwrap facility helps you read documents on small screens. Files can also be faxed or emailed from your mobile.

Ultrair Office costs £299 ex VAT for a five-user licence.

www.quickstone.com

• See Your Office machine on a PDA – page 29.

Interactive big screens come wall recommended

Canada-based Smart Technologies won a best-of-category award for its Digital Vision Touch (DVIT) interactive screen technology at Cebit New York (see pages 28 and 29).

DVIT provides a resistive surface on which you can write with a finger, but pens and erasers are supplied. Whiteboards, for use with your own projectors, range from £895 for 40in, to £1,495 for a 60in

A transparent overlay for a 42in plasma screen costs £2,700, or £6,195 bundled with an 42VP4 NEC screen. All prices are ex VAT. www.smartboard.co.uk



WD plugs its new Serial ATA connector

The standard connector for the new Serial ATA (SATA) link, which is set to replace the tangle of ribbon cables in PCs, is too loose and too weak, according to a leading disk drive manufacturer.

'It can break off with a pressure of just 6lb and the cable can pulled off too easily,' said Ian Keene, European business manager for Western Digital (WD).

WD has proposed a new connector that encapsulates the power and data leads into the same wide plug, with two extra plastic lugs to give it more strength. It is fitted on WD's latest 7,200rpm Caviar drive, which comes in capacities of between 120GB and 250GB. Prices weren't available at the

time of press, but SATA drives typically cost up to 15 per cent more than equivalent IDE models, and a 250GB Caviar IDE costs around £200.

'Prices will drop as Serial ATA begins to be adopted by the big PC manufacturers,' said Keene. 'At the moment it is only being used at for high end machines, or by smaller PC builders who are quicker to adopt new technology because they need to differentiate themselves.'

The Caviar also includes a non-SATA disk connector to deliver power. 'A lot of people who will be buying this will have machines still using the old plug,' Keene said.

The Caviar drive, which is actually an IDE model with a

bridge conversion chip, can also be used with standard SATA plugs. But WD is hoping that its new connector will be incorporated into the standard. 'We are offering it free and hope other manufacturers will take it up,' said Keene.

Via has just launched a new Via VT8237 southbridge chip that it says should help bring SATA and Raid storage into the mainstream. SATA offers speeds of up to 600Mbytes/sec – far higher than the ribbon cables.

• Dealer Ideal has reinstated three-year warranties on entry-level hard drives of all makes, just months after key manufacturers Maxtor, Seagate and Western Digital reduced their cover to one year.

Hand player timeshifts TV

The French-designed AV300 portable media centres are something of a luxury but show what can be put into a portable product. At heart they include a DVD player and a hard disk for storing MP3 audio, movies – and (this is what makes them really different) TV programmes stored in MP4 format.

All this in a case the size of a paperback (11.2 x 8.2 x 3.1cm), weighing 350g, and with a 3.8in, 320 x 240 screen. The device can download MP3 or MP4 tracks from a PC using a USB2 or Firewire link, and takes a standard analogue or digital feed from a TV. It will also timeshift TV so that you can

'pause' a live programme and continue watching it while the rest is still recording.

There are 20GB and 40GB versions, and the rechargeable

Top: The 40GB AV340 with the TV adaptor plugged in. Below: The 20GB version with the optional camera attached



Lithium-ion batteries last for a claimed seven hours of audio playback and four hours of video.

The 20GB model with TV adaptor costs £549.99, or £699.99 with a plug-in camera; the 40GB model is £50 extra. Details are at

www.archos.com.

Less expensive is Adaptec's new Videoh DVD media centre, which has a 125-channel, cable-ready TV tuner, mpeg-1/2 encoding hardware and remote control. The USB version costs a suggested £179 inc VAT, and the PCI version is £159. More info at

www.adaptec.com.

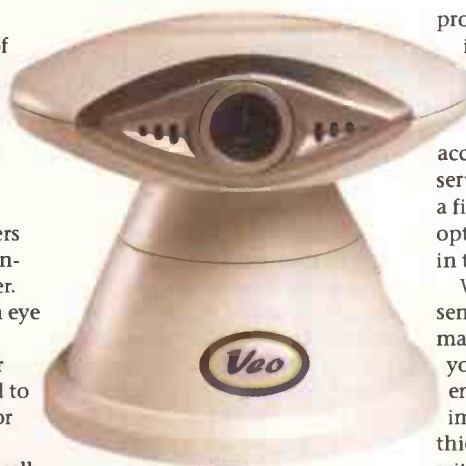
Your home need never be out of sight

The Veo Observer network camera, which raised a lot of interest when it was previewed at Cebit earlier this year, has finally been launched in Britain, and we received one just too late to make our review pages.

You may recall that it offers remote viewing with full pan-and-tilt control via a browser. This means you can keep an eye on the kids across a home network, or use any browser from anywhere in the world to check whether your house or office has been burgled.

The Observer, which will sell at major outlets for an expected £129 inc VAT, looks like an ordinary web camera but with a slightly larger base, and has a network jack at the back instead of the usual USB. There is also a plug for a mic and a socket for an optional motion sensor.

For your average small network with a router doling out local IP addresses, the basic setup is about as simple as you can get. You plug the Observer



The Veo Observer gives you full pan-and-tilt viewing of your home or office from any browser

into a spare network port and the local node number appears in a tiny LCD window on the camera. This gives you your local address (usually 192.168.0.x, where x is the node number).

Point a local browser at this address and you have password-

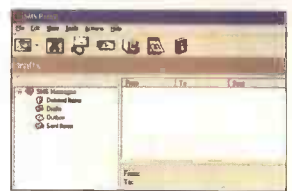
protected access, with an interface in a choice of six European languages.

There is also provision for multiple cameras. Global access is trickier, unless your service provider has given you a fixed IP address, but the options are clearly explained in the manual.

We did not get a motion sensor to try – it looks like you may have to order that – but you can set it to trigger an email bearing the current image, so you can tell if it is a thief or a cat. The camera comes with a mounting bracket that also holds the sensor, and the fact that it does not need to be attached to a PC makes it easier to site than a standard webcam.

You may have your concerns about the proliferation of surveillance cameras, but there is no doubt they will be a major application of the web – especially with powerful devices like this reaching consumer price levels.

www.veo.com



>> SMS deal

Bulk SMS can be a powerful tool for some businesses if you use the right software. It is particularly suitable for agencies and other businesses with a dispersed workforce, because it can save making lots of phone calls. Rather than ringing round if a job comes up, you can send one message asking anyone who is available to call.

A £49.95 utility called SMS Press allows you to do this and comes with 500 SMS credits, so that the software is virtually free. It is, of course, a way of reselling SMS, and there is a choice of cut-price deals. Check it out on www.dynamark.com.

>> Recovery aid

A toolset called Zero Assumption Recovery (ZAR) v.7.3 claims to make it easy to recover data from an accidental disk reformat, virus attack or glitch. It gathers all available data, and then tries to rebuild the file structure. ZAR runs under all versions of Windows, and costs \$99 (£59) from www.z-a-recovery.com.

>> Virgin splurging

Virgin Mobile is offering £35 free airtime on phones costing more than £79 and bought from www.virgin.com/mobile before 28 August.

>> Flash move

Juice Software's Cool Menu FX is a Windows-based tool for building Flash and Java menus on websites. It costs \$44.95 (£26.90) for either the Java or the Flash versions; and \$64.95 (£38.90) for the dual version. www.juice-ware.com

>> Icon do it!

Shell Labs has launched version 2.0 of its Iconchanger, which helps you design your own icons and assign them to your chosen target applications and files. It costs \$19.95 (£11.94) from www.shelllabs.com.



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



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

Letters

Windows 2005 bias? >

I was disappointed with your preview of 'Windows 2005' in your last issue (August 2003). It was so heavily biased in favour of Microsoft, I wondered whether you had to promise you would be positive in order to get the exclusive; or whether you were afraid of being critical in case you don't get them in future. It is not 'the operating system we will all be running come 2005', and it is silly to talk about the date 'when we will be junking our XP installations'. I for one have stayed with Windows 98 because, despite some stability problems (which don't seem



Where's all my screen area gone? Windows 2005 takes up too much space for some

to have been ironed out by later versions of the OS, according to things I have heard), I don't want a bloated and over-complicated OS. The new Windows seems to be extending this trend – the Start menu and sidebar are horrendous forms of screen clutter. Run a web browser and yet more of the screen is cut away with buttons, menus, scroll bars, status bars, header bars – and I end up with less screen area than with my last PC and smaller monitor.

You are wrong to say that the battle over product activation has been won, since it is the main reason I would never use an OS requiring it, and I am disappointed that PCW has ceased to be critical of the concept. It sets a precedent and before long we will probably see forced registration of expensive graphics packages and office suites, then other software companies will be emboldened to use it too. We'll then come to a day where reinstalling all your software on a new (or upgraded) PC requires lots of reactivations, making a time-consuming task unnecessarily more complicated.

Finally, many people have got XP installed on a new PC, so haven't had to bother with activation much – they will probably become more vocal later on

The author of the Letter of the Month will win a Canon Smartbase MPC200 multifunction device.

Aimed at the home and small office user, the MPC200 offers direct photo and regular printing capabilities, plus copying and scanning. Worth

£199, this model, which has a footprint of 396 x 413mm, offers up to 14ppm mono printing and prints and copies in colour at 10ppm.

Meanwhile, the scanner has a maximum

resolution of 600 x 1,200dpi.

For more information on Canon products, go to www.canon.co.uk or call 0800 616 417.

Canon



when the intrusive process rears its head. I thought it was supposed to be us telling PCs what to do, not the other way round? The Palladium rights management integration is just likely to mean that the PC

Letter of the month

Think laterally with XP Media Centre >

It is with interest that I read the preview of Windows XP Media Center Edition, as featured in the July 2003 issue. It seems to me that Microsoft has missed the point with this product.

While it seems to be a very worthwhile and useful product, it looks like it might fall by the wayside, like many before it, as it's being promoted in the wrong way. XP Media Center is coming at the issue from the point of a PC bolting on to existing TVs and set-top boxes, as is quite logical.

However, it would surely make sense to embed this type of operating system into a widescreen plasma TV, because you could put all the useful XP bits either side of a 4:3 aspect ratio TV image for the majority of the viewing, thereby making it useful. While this could be done by a PC sitting by the side plugged into it all, you would ideally need a TV that supports the high-resolution HDTV (high-definition television) in order to make it work properly.

It makes sense, then, simply to market the TV with all of this included in the short run. Decent sound is a good reason to have an external amp, but since it's fundamentally a PC, outputting all this as a Dolby stream would be easy (and a good niche market for the Nforce). Consequently, you'd end up with

a TV with integrated DVD drive (both read and write), that has a hard drive for video recording and operating system storage. You make this package HDTV for the resolution and the extra refresh rate, and then market it.

That package would sell pretty well, so long as it was as cheap as comparable packages lacking the Microsoft element. Microsoft has already shown with the Xbox's loss-making pricing scheme that it is prepared to take a short-term hit for long-term gain – surely this would be the very best integration of the various technologies Microsoft has to offer?

Tom Bond

David Weeks from Microsoft replies >

In response to your letter from Mr Tom Bond regarding Windows Media Centre, Windows Media Centre is more than just TV. First and foremost Windows Media Centre is a fully featured PC, with no sacrifices to current functionality. The launch of Windows XP put a tool in consumers' hands that made it easier for them to do everyday tasks like surfing the web, creating music play lists, authoring home videos and storing digital photos. Windows XP Media Center Edition builds on these technical advances and takes them a stage further by delivering consumers an exciting entertainment experience from anywhere in the room via remote control, including Music, Photos, Videos, DVDs, Television and PVR (personal video recording) footage.

(and software companies) have even more control over what I can't do with my PC.

And the 'new file structure' sounds horrible. Once more we lose control – Windows won't let us choose where files go, so music files will now be 'stored in the music library' – but I want to be the one who says where they go. I like all my data – music, emails, favourites, documents – to be on a separate drive or partition that can be backed up quickly and easily. What nonsense to try and change that.

I'll be sticking with Windows 98 for some time to come – I have a pile of excellent games that will take me years to play through – but will also be looking into other options now, if what your article describes is going to happen. If that is the future, then I'll be creating a dual-boot Linux/Windows 98 PC this weekend.

Karl Drinkwater

Mark Walsh replies > In no way was there any bias towards Microsoft within the review. Microsoft was not even aware that the article was being published until the magazine hit the shelves, and even if it was, that would not have had any bearing on the result of the review.

All the 'screen clutter' referred to can easily be switched off to give you more workable desk space; however, we do approve of having these options available. Everyone works a different way, so making different working methods available is very healthy.

I am a Windows XP lover, as well as an OS X lover, most of all because they make using a PC or Mac simpler, quicker and more intuitive for those with little or no technical knowledge. As such, Windows 2005 will not be an OS for all, but certainly for most.

Kewney smiles... honest! >

Guy Kewney is a great writer and I have been reading his informative articles in a number of magazines, including early PCWs, for many years. His 'Don't shoot the instant messenger' column in the August 2003 edition was no exception.

I was surprised to read, though, the implication that he sometimes smiles – is it true?

Frank Everett

Dylan Armbrust replies > Yes, amazingly it's true, although you wouldn't be able to tell from his serious-looking photo.

One person's spam >

I run a website and receive around 100 emails a day. Many of these I don't want, and most of them I can delete without even opening, a matter of seconds for each one, so 10 minutes a day is the most I spend



The daily frustration of deleting unwanted and pornographic spam is getting worse

removing spam from my machine. It takes about the same time as binning the junk mail that comes through my letterbox. Like postal junk mail, sometimes there are offers there that interest me; that is why people send it in the first place, to give information about products you may want. I also find occasionally in these communications some useful source of information on the web, web marketing, web scams etc, about which I pass on warnings to my own readers.

I guess most people would say spam is anything that they don't want in their mailbox – and this can include items from areas they have subscribed to. Many companies now use the web to send customers product updates on purchases made, and these can frequently become seen by the recipient as spam, even though they comply with all likely changes in the law at UK, European and international level. Even the famed double opt-in will not prevent legitimate business communications becoming spam to someone somewhere who has forgotten they signed up for it – the hysteria around this is becoming a definite threat to both free speech and the viability of business on the web.

In truth, one person's spam is another person's delight.

Patrick Goff

X-rated pictures >

The daily 'Nigerian' scam I can live with. I can cope with former suppliers that persist in emailing me. Unsolicited mail is not automatically evil. Advertisements of any sort are unsolicited communications and are accepted as part of the modern life.

I can even routinely add every offending domain name I come across to the 'barred' list on my local mail server. But does anyone know of any 'OPR' software? Optical Porn Recognition, that is. Because more and more of the porn spam does not contain text as such, but simply graphics.

I am not the sort of person to be shocked or distressed by porn mail, but my wife might seriously be worried at some of the mail appearing in my Inbox. As it is, I have

to cope with the occasional email that gets filtered out by primitive spam filters that don't like my name!

Dick Laine

Sue spammers via ISPs >

I think that all ISPs should charge their customers 10 per cent of their subscription to set up a unified legal fighting fund to sue spammers. I also think the Government should legislate to force ISPs to install equipment to trace and sue spammers and, if possible, bankrupt them. If the ISPs set up this joint fund and operation and sued the spammer on behalf of all ISPs this would save a lot of money. Ultimately it is up to the ISPs to install filters on their network and stamp out this scourge of spam.

Paul Hanson

X marks the spot for me >

As an 'OS X lover', I am not offended when Mark Walsh claims that Windows is the best – just amused.

Michael May

Dial up ADSL >

My ISP allows me 20 hours per week dial-up usage for only £8.99 a month. However, connections between 1am and 7am do not count, so they're free. Now, thanks to PCW October 2002's recommendation of 'Download Accelerator' (page 89) I am now able to schedule 1am downloads as I surf.

I am able to get movie trailers, .Net framework, latest video players and large database backup files from my work, all without annoying everyone else in the house by hogging the phone line – it's like ADSL!

David Lee

Dylan Armbrust replies > Glad we could help David. Check out this month's CD for the latest utilities, plus six free full programs.

Disc...overy >

It is not often I look at magazine cover discs because, with a few exceptions, they contain second division software. However, your August disc has proved a life saver.

My Windows 98 system failed to close, and switching off meant restart was either in the Bios setup or with Scandisk running. In either case startup completed as usual. Other problems then appeared which I attempted to check with Norton, but it had vanished.

To cut a long story short, I had received an email containing Bugbear which had disabled my virus protection. Turning to your disc, I attempted to install Norton AV only to be told that a previous version (which had vanished) should be uninstalled first. Giving up and turning to McAfee, this installed, updated and ran without problem, detecting seven locations for Bugbear, two of which it deleted, cleaning five others.

Moral – keep your protection up to date, my NAV was two months old. So thank you for your lifesaving act!

J Baker

Innocence.

Recreated by up to 1.2 million colours*.

The pink of a child's cheek. Almost every last shade, recreated in a photo that resists fading for up to 73 years**.

www.hp.com/uk/create

HP Photosmart 7550, 7-ink printing system.



= everything is possible



*Based on using default settings, HP premium plus photo paper and the colour and photo pens combined.

**On HP premium plus photo paper, based on testing performed by Wilhelm Imaging Research, Inc.



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The scandal of rural broadband

Guy Kewney deplores the saga over Internet access in villages that has made the UK a laughing stock

I smelled something whiskery and long-tailed in the rodent family when I saw the map of the UK, as viewed through the eyes of Government employees splitting up the country into 'rural broadband' franchises.

You can't get ADSL in most small towns; there's no requirement for BT or cable companies to provide it. If they think there's not enough business, they don't have to install the kit. Fair enough, except the Government amuses itself by talking about 'making Britain a leader' in this, and refers to the Internet as an essential utility.

Three years ago, the DTI announced it would use wireless 'to promote early and effective competition for the provision of broadband access services' – and the technology would use the vacant 3.4GHz wavebands.

Then the map appeared, showing these rural franchise areas: Greater London, Severnside, Midlands, Northern, Tyne-Tees, and Central Scotland. In other words, the rolling countryside of Glasgow, Edinburgh, Newcastle, Middlesbrough, Manchester, Birmingham, Cardiff/Swansea and, of course, the quaint village of Londonium on the Thames.

Once those are cut out of the map, there are some sprawling, awkward but essentially valueless areas, like 'South East' which encircles London; or 'North West, Yorkshire, and North Wales', surrounding Manchester and Liverpool.

If you were trying to provide broadband to rural areas, and struggling with inappropriate technology (for example, Invisible Networks uses Wifi networking to link small towns into commercially viable franchises), you might wonder what on earth was the point of running yet another broadband franchise into metro areas. They already have cable, DSL, and fibre.

The Government has put up money for people who are out of the reach of BT and the cable companies. If you can show the market has failed to provide, grants are available.

Ingenious companies such as Invisible Networks found that if they bought a leased line and signed up around 200 subscribers, they could use Wifi technology to spread the data. With care, an 802.11b transceiver can link villages up to eight miles apart; and Wifi masts on roofs then take broadband to individual subscribers. But it's hardly ideal.

Where it falls down is in the finance. Companies such as Invisible factored in the grant when making their business proposals. But if you go to the Government with a proposal from a commercial organisation, obviously, the market hasn't failed, so no grant.

Technically, Wifi isn't ideal either. If someone puts up a Wifi transmitter of their own, on the same channel, in the

same area as your rural transmitter, you can't stop them. It's licence-exempt; anybody can do it. You can even use a 2.4GHz floodlight at hundreds of watts; no Wifi will work for hundreds of yards around it. Entirely legal.

The advantage of 3.4GHz is that it will be licensed. Only the operator will be allowed to use that spectrum. It will also travel further and run faster. A mast 'from water tower to water tower' will carry 60Mbits/sec over a distance of 25 miles or more, reliably; a broadcast mast could serve 30 villages with 2Mbits each.

So was this the purpose of 3.4GHz? It quickly became apparent that the Government didn't care what the 3.4GHz franchise was used for, as long as the Treasury made some money out of the auction. None of the 12 companies that bid for franchises was asked whether they had any ambition 'to promote early and effective competition for the provision of broadband access services'.

The eventual winner was Pound Radio, a Hong Kong-owned organisation. It isn't required to provide broadband access, nor to allow other companies to pay to use its franchise to do so.

According to people inside the Broadband Stakeholders Group, the word on the street is: 'The 3.4GHz spectrum will be used to provide a way of setting up 3G phone masts without having to lay cable.' (No comment from Pound Radio or its owners at the time of going to press).

Several disappointed bidders that were doing rural broadband, approached the Minister in charge, Steven Timms, and received no reply by press time.

Pound Radio paid several million pounds for its franchises. It is owned by PCCW, a gigantic company with revenues of HK\$120b and over 10,000 employees; it has no urgent need to use this new spectrum, nor any obligation to do so, let alone use it for rural broadband provision.

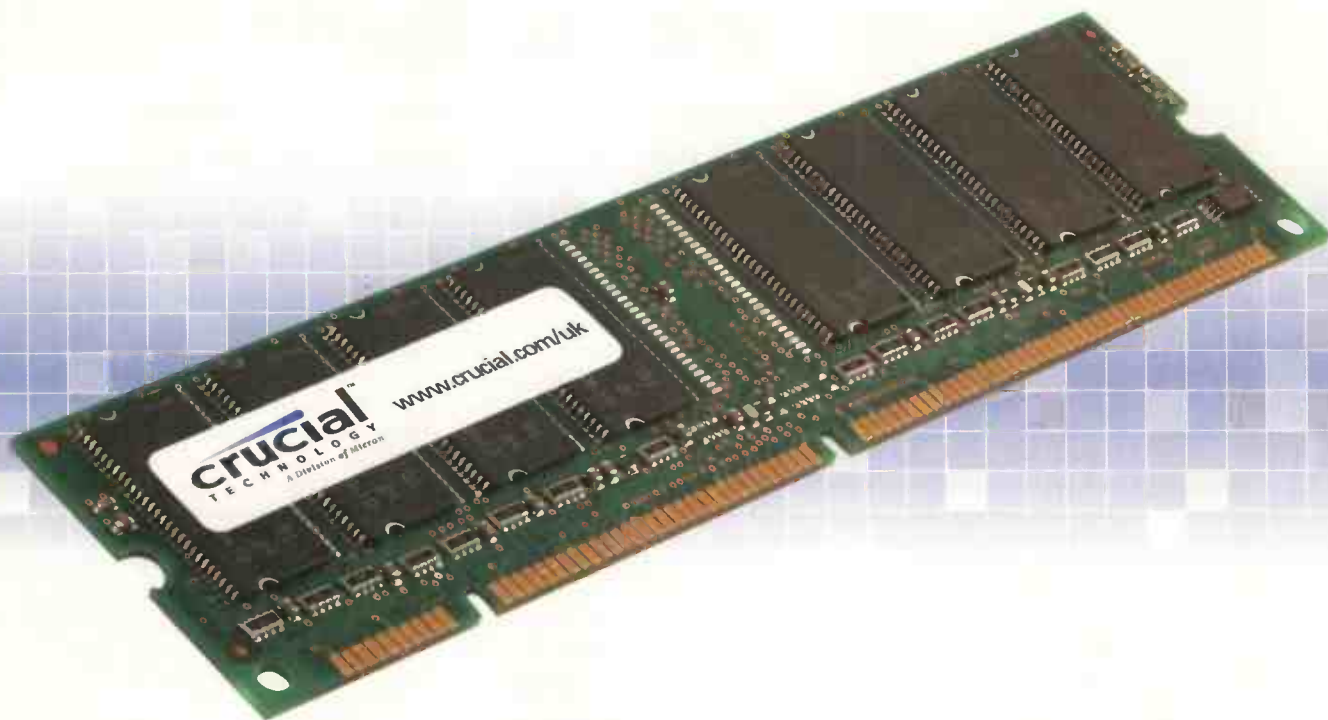
One thing is clear: mobile data, not voice, is where the money will be spent in future. But the Government seems determined that its priority must be to keep the 3G bubble inflated. If this means 3G is the only broadband that remote areas ever see, at the high prices which 3G data will cost, that seems an acceptable trade-off.

Perhaps, by the time you read this, Timms will have announced some kind of compromise, or released a new bit of spectrum for rural broadband. If he has, then his ambition of being a 'world leader' is still possible to fulfil.

If he doesn't, it will be one of the most stupid scandals in the long saga of ignorance, indifference and sheer obstructive penny-pinching that has made tourists mock the UK as the 'world lagger' in Internet technology. And rightly so.

'The 3.4GHz spectrum will be used as a way of setting up 3G masts without laying cable'

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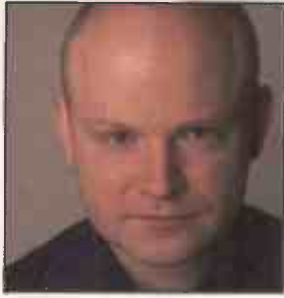
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Seeking a little more definition

Gordon Laing asks why it is still virtually impossible to get access to high-definition video in the UK

If you've watched a DVD movie recently, you'll no doubt have marvelled at its excellent picture quality. Well, it's hard not to, with the industry as a whole assuring you it's the best thing since sliced bread. While considerably superior to VHS and a significant improvement over Laserdiscs, it's easy to be blinded by hype and forget that even mighty DVD pales compared to high-definition (HD) video, something that has been available for some time.

Well, available to select consumers in the US and Japan anyway. Back in the UK it looks like we're locked into standard definition content for the time being. Or are we? Believe it or not, HD content could make a surprise appearance in the UK after all, and not by the traditional route of tape, disc or broadcast. The unlikely Trojan horse in this story is the PC running Windows Media 9.

While most people will use Windows Media 9 (WM9) to compress audio files, it's also surprisingly good at delivering HD video. First, its efficient compression system allows HD video to be delivered on existing media or even over the Internet. Second, instead of requiring special players, HD WM9 can be viewed using standard PC equipment.

Capacity is a serious issue for HD video. If you're using traditional mpeg2 compression, you'll need at least 25GB for a two-hour HD movie, which is way beyond conventional DVDs. There are currently only two consumer formats with sufficient capacity to deliver HD using mpeg2 with decent playing times: the recently released Blu-ray DVD format in Japan, and JVC's D-VHS tape in America. Both are primarily used for recording local HD broadcasts, but D-VHS also uniquely offers prerecorded HD content.

Before Hollywood would release HD movies on D-VHS, JVC had to invent additional encryption called D-Theater. Now 34 movies are available. Admittedly there's only one VCR equipped to decode D-Theater (and it's only sold in the US), but there's no denying the movies look superb.

While mpeg2 can deliver the goods, it requires high-capacity media, whereas WM9's more efficient encoding allows it to squeeze an entire HD movie onto an existing dual-layer DVD-Rom. This is what Artisan Entertainment has done with new DVD releases of *Terminator 2* and the musical documentary *Standing in the shadows of Motown*, where the second disc features an HD version in WM9 format. Seeing *T2* on sale as an import at PlayUSA.com for just £16.99 including delivery, I simply couldn't resist.

However, the requirements for playing these DVDs is daunting to say the least. We're all used to software

claiming it will run on overly modest systems, but the *T2* Extreme Edition DVD heads in the opposite direction towards fantasy PC specifications. Read it and weep: the recommended system requirements are a 3GHz processor with 512MB of Ram and a 128MB AGP 8x graphics card. And to see the full benefit of this particular HD video, you'll also need a 1,600 x 1,200 display.

Before I could see whether my 2.6GHz P4 could cope, I had an even tougher challenge. The HD content on this DVD is only licensed for viewing in North America, and Artisan enforces this with more than just regional coding. When you first try to play the title, your PC has to go online to retrieve a licence, and if it sees a UK-based IP address, you'll be rejected. The solution is to hide behind a friendly North American proxy server, but even then Artisan's licence management rejects common anonymous servers.

After hours of trying different public proxy servers I found one which fooled the system into delivering a licence, and the movie started playing. Or should I say jerking, as my system really wasn't up to it after all.

Fortunately it seems that the most crucial component for HD WM9 is a 128MB graphics card, and after fitting one I achieved smooth playback even on a slower 2GHz system.

It looked fantastic – with tons more detail than the accompanying standard definition DVD. I went searching for more HD WM9 content. Microsoft's website (www.microsoft.com/windows/windowsmedia) has several three-minute HD WM9 clips for

download at around 80MB each.

Unfortunately for UK enthusiasts, Artisan has the last laugh. Its strict *T2* licence expires every five days and needs renewing online, but sadly my friendly proxy server was no longer playing ball. The insistence to go online for a new licence every five days, even if you reside in North America, is way over the top, as well as being potentially flawed.

It's a shame the first taste of commercial HD WM9 content has been soured by over-zealous content protection. It only takes a glance at the clips on Microsoft's showcase to see it's really on to something and, while purists may argue high bit-rate mpeg2 discs are the long-term answer to consumer HD, such prerecorded content could be years away for the UK. The fact is, modern PCs owned by many people offer an alternative right now.

I salute the techies at Artisan and Microsoft for producing these DVDs, but the legal departments have rendered their work virtually unusable. This is a pity as WM9 could be one of the few means by which people outside North America and Japan might enjoy HD video today.

'It's easy to be blinded by hype and forget that even DVD pales compared to high definition video'

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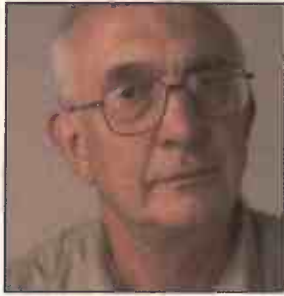
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If it ain't broke, don't upgrade it

AOL 8 may be a tempting upgrade, but be cautious about making the conversion, warns Barry Fox

Upgrading software is like flying a Jumbo jet. Once the plane is belting down the runway it is too late to do anything other than take off.

The bugs in PC software only bite after it has been installed. Usually a bad upgrade can be uninstalled and the original re-installed. And Windows Restore can help roll back the clock.

The hidden trap springs if the new version uses a new data structure. There will be a free conversion program that reliably converts a database, address list or email filing cabinet from old format to new. But providing a reverse conversion tool would be an admission that the new version software may not be better. DIY reverse conversion, by squirting the data through a neutral format like Comma-Separated-Variable Ascii, is very risky.

Many of us now use several PCs, so we need to be able to carry data files from one to the other. If new and old versions of software are not compatible, all the software on all the PCs must be upgraded.

So always back up the old data to a safe file before an upgrade. The old program can then be reinstalled and the data restored. But this only works if problems with the new version are immediately apparent. If it takes a few days or weeks to discover the downside, data added during the discovery period will be lost.

A few years ago, AOL bought Compuserve, and encouraged Compuserve subscribers to upgrade to a new service called Compuserve 2000.

CS2000 (with domain name cs.com) was very similar to AOL (aol.com) and quite different from Compuserve Classic (compuserve.com). When I upgraded from Classic to CS2000 I hit problems and found that AOL had made reversing the switch well-nigh impossible. So I warned people not to make the change from Classic to 2000.

That advice was vindicated when AOL killed off CS2000 and made subscribers switch to AOL. Once CS2000 shut down, it became impossible to read old CS2000 mail (unless it had been previously exported to AOL files). Mail to the old cs.com addresses was only temporarily forwarded to the new AOL equivalent. People often wonder why I have not replied to emails that were lost in the cs.com black hole.

TV adverts now promise 'AOL 8 is here - it's everything you want'. The change from AOL 7 to 8 brings back memories of the change from Compuserve Classic to 2000.

Previous versions of AOL (5, 6 and 7) have been similar, allowing data to be shared easily between different versions on different PCs. Just copy the Organise and Download folders from the AOL program folder (in the Windows

Program Files folder). AOL's helpline recommends using older versions, such as AOL 5, on older PCs, which grind into slow motion when asked to handle AOL 7.

Without warning, AOL seems to have changed the file structure for AOL 8. So if one PC is running AOL 7 or earlier and the other is running AOL 8, it is no longer possible to share Organise and Download folders.

Says AOL: 'This is not a use of AOL we have officially supported'.

I say, when upgrading to AOL 8, choose the option to 'Copy' files from the old to the new version, not 'Move'. Also, make safety copies of the Organise and Download folders, for example drag and drop to a CD-RW. (CD-R copies can cause problems because Read-only attributes are added). That way you will find it easier to revert if necessary.

I installed AOL 8 on two Dell XP PCs (desktop and laptop) and a few days later both PCs refused to boot, repeatedly giving the same Blue Screen Of Death (BSOD) error message 'Page fault in non-paged area - NV4_disp.dll'. Safe Mode start and Restore could not help. I had to roll

back each PC by restoring from full system Ghost backups, and then reclaim lost email from AOL's online storage. This wrecked my life for several days.

I have now reinstalled AOL 7 and both PCs are working again. Is it coincidence that both PCs failed in the same way?

Says AOL: 'There is a known problem with Windows XP and the file that is mentioned.' See <http://support.microsoft.com/?kbid=325730>, it suggested.

This says that the NV4_disp.dll/BSOD problem is triggered by some simulator games, none of which I have ever used. Is it possible that AOL 8 is a similar trigger?

Says AOL: 'So far we have not seen this issue arise in member services. However, we are always keen to ensure that every base is covered in terms of bugs.'

I say, perhaps my BSOD experiences were just an unhappy, Sod's Law one-off. But maybe AOL has hidden nasties for PCs with Nvidia graphics chipsets. All I know is that I am back with AOL 7, and a much happier bunny. And AOL can never say it was not warned.

Yes, I know I am missing the opportunity AOL 8 offers to send automated out-of-office replies. But I am not advertising to burglars when I am away, or telling spammers that mine is a live address worth spamming.

Why do I pay a lot to use AOL? Because it's a relatively bombproof system that works well all round the world, and I don't like Outlook. That's why I feel especially sad when AOL fixes things that weren't broken and, in doing so, breaks them.

'A reverse conversion tool would be an admission that the new version may not be better'



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Time for Internet Explorer to retire?

Nik Rawlinson laments the stagnation of Microsoft's web browser, and asks if its journey is over

Has Microsoft given up on the web? It was late to the party and, like the proverbial pooper, it seems to be bailing out before it gets too drunk, falls asleep in the corner and someone shaves off its eyebrows.

To start with, it has ceased development of its Mac-based Internet Explorer. There is talk of its agreement with Apple is coming to an end and prompting a bout of towel throwing, but I suspect that the great strides made by the Newtonian hardware manufacturer on its own Safari browser may have had more than a little to do with it. No great loss, you may say – Apple is relatively small fry on the desktop, compared to Windows at least.

But look at its PC offering. Internet Explorer for the PC – currently on version 6 – has barely changed in the past two years. It's older than even Windows XP and, if we're already seeing leaked code of Longhorn, XP's heir apparent, we should surely be seeing far more from a comparatively simple product line. Beyond a service pack and the occasional patch through Windows Update though, it has sat pretty, going nowhere and being overtaken by almost every other browser on the market. There's probably a superhighway joke in there somewhere – overtaking and all that – but I'll spare you the agony.

In my opinion, Explorer is one of the least flexible and useful browsers going, and one on which I gave up many months ago.

Sure, it's got some good back-end stuff. Most people can understand its security settings and it is highly configurable – behind the scenes. But what good would a film be if behind-the-scenes catering and crew were first class, but what appeared on the screen wasn't worth watching?

So, what's wrong with the world's favourite browser? First and foremost it's the lack of tabs. Perhaps to the rain-soaked developers of leafy Redmond, a tab is still a high-caffeine hit that was the mainstay of overnight coding sessions in the mid-1980s. To the rest of us browser defectors, though, it's the main reason we'll never go back to Internet Explorer. Tabs let you open multiple sites in a single window and then click back and forth between them. It's almost impossible to use Google properly without them.

And while we're on the subject, where is the Google integration? Opera and Safari have Google search boxes built in, while Netscape and Mozilla let you prowl directories from the address bar. Explorer gives it the royal brush off – if it can't find the site you're looking for

it drags out some suggestions from MSN Search. It's not what one would call an elegant solution to a common problem. Perhaps those rumours of Microsoft looking to set up a Google competitor had some merit after all.

The Google engineers have partly remedied this uncomfortable situation by developing a Googlebar plug-in that adds search and navigation features to the Explorer interface, at the cost of browsing-window real estate. If you're still running at 800 x 600 it's a sacrifice you shouldn't have to make.

Applying skins is a two-click operation in Mozilla and Netscape – not so with IE – and with both being multi-platform releases, using an architecture that has standardised across Windows, Mac OS and Linux, I have confidence in building my life around a standard calendar plug-in, aggregator plug-in, sidebar configuration, email package, address book... the list is endless. If one day I finally make the switch lock, stock and clichéd smoking barrel away from the Windows platform then I'll just carry on working with familiar tools and have nothing new to learn.

To be fair, there is an FAQ for running the Unix release of Explorer, but have you ever seen it? More to the point, have you ever seen the software to which it relates, or know anyone who runs it?

So why is Microsoft still sporting the flares of the browser world when the rest of us have moved on to skinny-fit drainpipe jeans? Times have moved on, and the net is no longer something we

simply browse, devoting a whole window to each page.

Perhaps it's something to do with the fact that IE is so closely married to a lot of Microsoft's products. Money, Picture It and even Windows Update rely on its underlying technology to run, and perhaps messing with its insides might be cause for concern on Microsoft's other development teams. What would happen if the introduction of tabs killed Encarta stone dead, or stopped us getting Windows hot-fixes the moment they were released?

Has Microsoft painted itself into a corner it now cannot escape? If so, fine. There is nothing wrong with Explorer per se – it does what it says it will, and it does it well – it just doesn't do half the things I expect of a modern browser.

As such, I'm happy to leave it there, chugging away in the background as it helps sort out my accounts, edit my holiday snaps or keep my PC bug-free. Just don't expect me to use it to explore the Internet, the way Microsoft would like me to.

'There's nothing wrong with Explorer, it just doesn't do half the things I expect of a browser'

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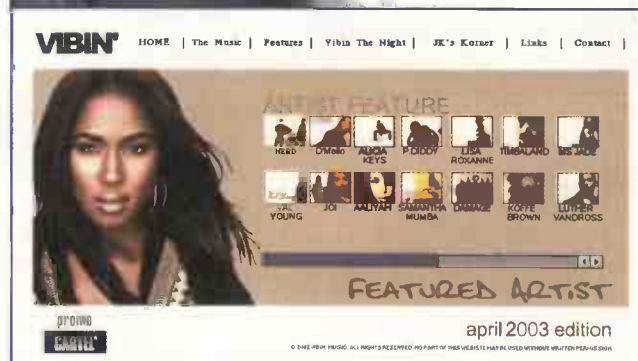
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Reviews

EDITED BY MARK WALSH

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

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EXCLUSIVE



PAGE 56

One of the first new media adaptors for streaming music and photos

EXCLUSIVE



PAGE 54

The Compaq NC4000 is HP's first Centrino-based notebook for the mobile business user

EXCLUSIVE



PAGE 57

Canon has achieved excellent image quality with plenty of features in its Powershot G5

In spite of my shameful preference of Windows XP, there has been, and always will be, a part of me that wants a pretty Mac sitting in my office. For not only is OS X a beautiful piece of engineering, but now that Apple is the first to bring 64bit computing to the consumer market, it makes us Wintel users look a little shabby.



The IBM-manufactured Power 4 970 chip that the G5 uses is the first 64bit chip to be aimed squarely at the desktop market. Granted, you could put an Opteron or an Itanium chip in a PC and, with a little bit of luck and nifty engineering, make it work for you, and the fastest graphics chip you'll find in an Apple is ATI's 9600 Pro, but the G5's technical dominance doesn't stop at its processor.

The G5 is also the first to have PCI-X, or PCI Express, which runs at 2Gbytes/sec (traditional PCI slots run at 266Mbytes/sec), as well as being more than twice as fast as an AGP 8x slot. And on paper, it will run 32bit applications faster than its Wintel cousins. This is because, due to some ingenious forethought, the PowerPC instruction set was programmed to run on 64bit chips as well as 32bit from the start, so your old applications will run as they would on your old G4, if not faster.

However, the rest of the specification is slower than an Intel 3GHz PC, in particular the memory clock speed (333MHz as opposed 400MHz), and a 3GHz P4 system can be bought for £1,200, which is £1,000 less than the most powerful G5 – but the kick-ass power of 64bit surely makes up for this.

Granted, it shouldn't always be a case of 'my bit's bigger than yours', but it is disappointing that the only way Windows or Linux users can get 64bit is by spending £3,000 on an Itanium-based workstation; G5s will start at just £1,549 after tax. It's also a worrying sign that the forefather and inventor of X86 technology, IBM, has essentially jumped ship in favour of Apple.

On a positive note, AMD's Athlon64 has fantastic potential, as it is based on the massively powerful Opteron, but this is a few months away. Rather surprisingly, there aren't any rumours about Intel, the company with the 90 per cent PC market share, joining this consumer foray.

We'll be delving into the G5 properly next month. But in the meantime, bring on Athlon64. Please.

Mark Walsh



HP Ipaq 2210 PDA

A powerful Pocket PC with an impressive range of features – see page 62



Portable projectors

A mini round-up of seven projectors – see page 58



GPRS HANDHELD

RIM Blackberry 7230

This lightweight device makes it easy to keep in touch on the move

The first edition of the Blackberry came along over 18 months ago and was a purely corporate-orientated device, as it could only be run through dedicated servers that cost over £3,000 a pop. This time around, RIM has chosen to use T-Mobile's GPRS connection to open up this simple email and phone device to the masses. It has also added a colour screen and even the option for a game or two.

Looking like a short, chubby PDA, the Blackberry is still quite light and is operated solely through the jog dial on the right-hand side. You open a program by pressing in the dial, and if there is more than one option, a screen will appear presenting a list of all possible functions. This can be frustrating at times, particularly to PDA users who are more familiar with a touch screen and a bit more intuition from their handheld. However, the aim is to keep things as simple as possible, and this is precisely what RIM has done.

The interface is roughly similar to Palm's, in that all programs are listed on a main menu; just scroll to one to open it. Email and text are treated in a very similar way and are even stored in the same place, and there are tone and vibrate options for call and message alerts. The most useful view is in the Mail program: all calls, text and emails are listed in chronological order.

The 7230 can be linked to your PC via USB and contacts, and any other information can be downloaded using Active

Sync. RIM is not willing to reveal the clock speed of the Arm processor inside its device, but it is unlikely to be particularly fast, as we found it freezing momentarily when we asked it to perform some basic functions. One other flaw became apparent when we turned it off for as little as a day, and the majority of our emails were bounced back as the server storage space had been exceeded. Also, the device itself comes with 16MB of storage space and

will start to delete the earliest emails automatically unless you tell it to do otherwise.

On the plus side, setting up the device to receive email was very simple – you choose a user name, password and email address and you're ready to go. All phone and email charges are included on one bill: see T-Mobile's website for specific pricing structures.

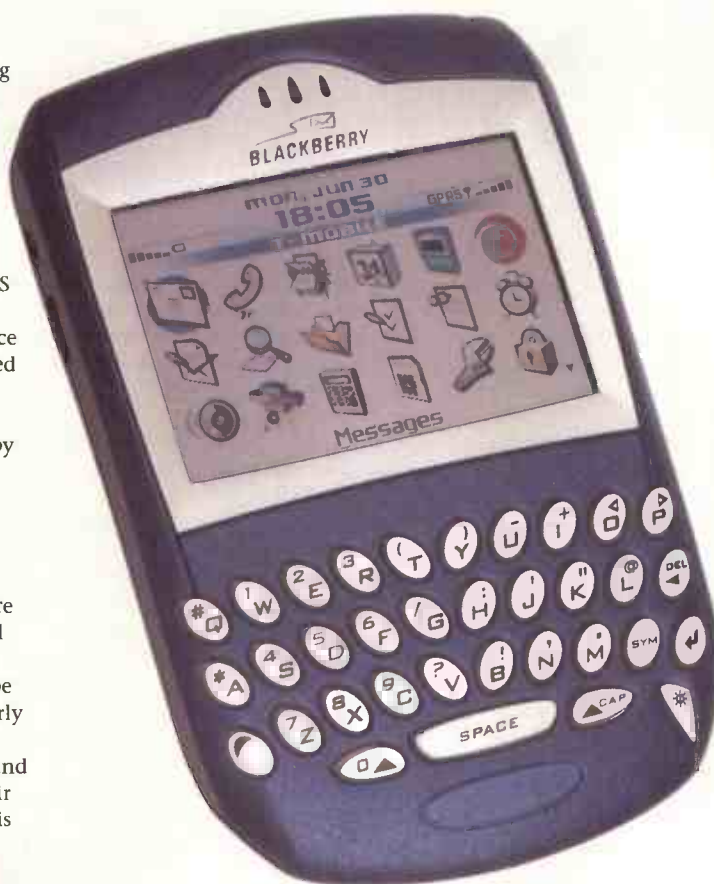
The Qwerty keyboard is one of the best we've seen on a handheld; the buttons are as large as they can be and raised

off the surface just enough to be easy to navigate around. There's also a phone shortcut button on the top, but even with the large keys, we found it quite time consuming to type in a number that is not in the address book, as there are a number of screens you need to go through before you can dial the number. The best advice is to store every number you can think of.

Using it as a phone was a pretty comfortable experience, though we found the earpiece far too small, and it was hard to keep it in the right place when on the move. The screen is hardly special but more than adequate for its needs. Battery life is very good, as it lasted a long weekend away from a charger before it ran out of juice. RIM quotes four hours of talk time; our tests showed it to be close enough to that, although the 10-day standby time is a little generous.

At under £200, the Blackberry is an excellent device that will appeal to those who want a simple way of keeping in touch anywhere, any time. However, it is no speed demon in any sense.

Mark Walsh



DETAILS

PRICE £199 (£169.36 ex VAT) with contract

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

T-Mobile www.tmobile.co.uk

SPECIFICATIONS

Arm processor • 16MB Flash memory, 2MB S-Ram • Triband – 900, 1,800 and 1,900MHz GSM/GPRS networks • Backlit Qwerty keyboard • 136g • 74 x 20 x 113mm (w x d x h)

PROS Ease of use; triband

CONS Occasionally slow

VERDICT

Simple to use and lightweight, this is a superb device for keeping in touch. However, it is quite slow and time consuming

PERFORMANCE

FEATURES

VALUE FOR MONEY

OVERALL

★★★★★

★★★★★

★★★★★

★★★★★

WIDESCREEN CENTRINO NOTEBOOK

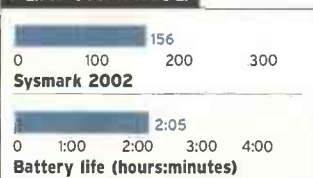
HP CX7000

You get a good screen and loads of ports



The phenomenon of widescreens on notebooks continues with this 15.4in model from HP. The screen on the CX7000 is an excellent example, giving a clear, bright and even image. It is slightly let down by the graphics chip that runs. The Mobility Radeon 7500 from ATI is no speed demon when it comes to gaming, but its two-dimensional output is beyond reproach and its power consumption is low enough for the CX7000 to last for over two hours in our battery test. HP says by the time the product is released, it will have a brand new ATI 64MB 9200 mobile chip, which should enhance the 3D output and hopefully not grossly decrease its battery life.

At the core of the notebook is a 1.5GHz Pentium M and 512MB of memory, which earned it a very respectable 158 overall in Sysmark. A 40GB hard disk and DVD/CD-RW combo drive caters for your storage needs, though we would have expected a DVD writer given the notebook's price tag.

PERFORMANCE


The chassis is sturdy and pretty good looking, with a bevy of ports, a sturdy keyboard and responsive touchpad. It also comes with three USB2 ports, Firewire, S-Video, modem, Ethernet (wired and 802.11b) and an SD (Secure Digital) card slot at the front.

The CX7000 has a lot going for it, but sadly it's overshadowed by the Hi-Grade (right), as that is slightly better featured but more importantly quite a bit cheaper. However, the HP notebook is still worthy of consideration.

Mark Walsh

DETAILS

PRICE £1,942.28 (£1,653 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP www.hp.co.uk

SPECIFICATIONS

Intel Pentium M 1.5GHz processor • 512MB memory • 40GB hard disk • DVD/CD-RW drive • ATI Mobility Radeon 9200 graphics • 15.4in WSXGA TFT screen • Modem, Ethernet (10/100 wired and 802.11b wireless)

PROS Screen; features

CONS More expensive than the Hi-Grade

VERDICT

Well stocked and good looking, but slightly pricey

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

WIDESCREEN DESKTOP REPLACEMENT

Hi-Grade M6700

Great value – and you get a wide screen too



The use of widescreen on a notebook is highly underrated. Far from being just a better way to watch a DVD (although that is a bonus), the advantage of having enough room for two documents side by side can only be appreciated when you start using it.

Hi-grade's 'Apple-a-like' M6700 chassis is a prime example, with a good graphics chip and a great screen. It also now comes with a 1.5GHz Pentium M processor, 512MB of memory, all for under £1,400 ex VAT.

Performance in Sysmark 2002 was 165, not bad for a Centrino, and enough to be able to run anything other than high-end rendering. Hi-Grade has chosen Nvidia's 5200 Go graphics chip, which lets you run DirectX 9 games without draining the battery too much. It's not a high-end chip, though, so its 3Dmark 2001 score is good but not that impressive, at 5,294. There's also a 60GB hard disk and a slot-loading DVD-RW drive.

As mentioned before, the 15.4in screen is excellent. While

not quite as sharp as the HP (left), watching a film on it is a pleasure, and it's also good on text and photo editing.

The ivory-coloured keyboard is large, well organised and good to the touch; the touchpad feels good to use too. The 6700 chassis comes with three USB ports, a mini Firewire, modem, wired and wireless Ethernet, serial, parallel, infra-red and a PC Card slot. There are also CD player controls on the front.

It's hard to fault this notebook; while graphics performance may not be on par with some others, anyone wishing to play games seriously should not be using a notebook anyway.

Mark Walsh

DETAILS

PRICE £1,643.83 (£1,399 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Hi-Grade

www.higrade.com

SPECIFICATIONS

Pentium M 1.5GHz • 512MB of memory • 60GB hard disk • DVD-RW drive • Nvidia Geforce FX 5200 Go graphics • 15.4in WXGA TFT screen • Windows XP Home • 352 x 260 x 30mm (w x d x h) • 2.7kg • 3yr on-site warranty

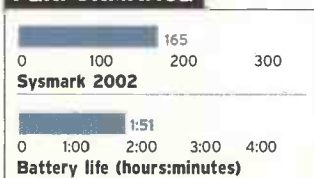
PROS Widescreen; performance

CONS Graphics chip could be better

VERDICT

Best-value desktop replacement

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

PERFORMANCE


BUDGET GAMING PC**Mesh Matrix 2400+ TFT**

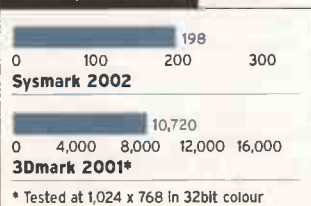
Decent graphics and a feature-packed PC



The recent graphics card war has led to a sharp decline in the cost of a mid-range card, which means that it costs far less to buy a strong gaming system than it did six months ago. The Mesh Matrix 2400+ is an ideal example of this, as it comes with ATI's Radeon 9600 Pro card, as well as a decent 17in TFT monitor for under £800 before tax.

The core components of an Athlon 2400+, 512MB of memory and an Nforce2, give a good if not outstanding score of 198 in Sysmark, and this comes with a 60GB hard disk. The Matrix 2400+ also comes with a floppy, DVD-Rom drive and fast CD-RW; more than enough given the cost.

The Asus Nforce2 motherboard comes with a host of features including six USB2 ports, two Firewire ports (both on an external bracket) and an S/PDIF. Mesh has used its onboard six-channel sound. This keeps the cost down, and the sound quality of the Nforce2 chip is way above the norm for an onboard chip.

PERFORMANCE

When it comes to graphics, there's little to complain about here. The Radeon 9600 Pro managed 10,720 in 3Dmark 2001 and whacked out 56.8 fps in Unreal Tournament. While this pales in comparison to the ATI's 9800, as well as Nvidia's 5600 and 5900 cards, it will last for a good couple of years before you'll need to upgrade. The Sharp TFT doesn't have the best screen quality, but it fits in with the rest of the system. However, we'll never be convinced about the beige on Mesh's case.

Mark Walsh

DETAILS**PRICE** £938.83 (£799 ex VAT)

BEST PRICE & PRODUCT INFORMATION Mesh Computers
www.meshcomputers.com

SPECIFICATIONS

AMD Athlon XP 2400+ processor • 512MB of PC2700 memory • 120GB hard disk • 52x CD-RW • 16x DVD-Rom • Connect 3D 128MB Radeon 9600 Pro graphics card • 17in Sharp LL-T17A3-B TFT monitor • Nforce2 onboard sound • Creative Inspire 5300 speakers • Windows XP Home

PROS Great features for under £950**CONS** Screen output quality**VERDICT**

The quality of the screen aside, this is an excellent PC: fast and feature-packed

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

17IN NOTEBOOK**Acer Aspire 1700+**

It's heavy but loaded with features



Weighing over 7kg, notebooks don't come much larger than this. The Aspire 1700 uses primarily desktop components in a huge chassis that combines a 3GHz desktop processor with a 17in TFT screen.

The 3GHz chip is of the Northwood B variety, so has a 533MHz front-side bus (FSB), and is coupled with 512MB of DDR memory on a Sis M650 chipset. Performance is not quite on a par with desktop PCs using the same processor and memory, but is pretty decent nonetheless, giving 244 overall in Sysmark 2002.

Despite the large screen, there's not much to shout about on the graphics front, as they run on the embedded Sis M650 engine and scored just 1,183 in 3Dmark 2001. The screen is pretty good quality, running at 1,280 x 1,024, and is bright and clear even to the edges.

As you'd expect from a beast like this, it's laden with nearly every accessory and port you need. There's a CD-RW/DVD combo drive and a floppy; the chassis is so big that the two can

comfortably sit on top of each other. There are also four USB ports, two Firewires, network, modem, serial and parallel, a PS/2 port and S-Video and VGA-outs. We were slightly surprised by the lack of Compact Flash or Secure Digital card reader though.

Battery life is quoted at one and a half hours, which is correct give or take a few minutes and more than enough considering you wouldn't want to carry this around very much. The size is the real concern but, if you treat this like a compact, stowable PC, it's convenient as well as good value.

Mark Walsh

DETAILS**PRICE** £1,291.33 (£1,099 ex VAT)**BEST PRICE**

www.pcw.co.uk/bestprices
PRODUCT INFORMATION

Acer www.acer.co.uk**SPECIFICATIONS**

Intel Pentium 4 3GHz processor • 512MB DDR memory • 60GB hard disk • CD-RW/DVD combo drive • Sis M650 graphics chip • 17in 1,280 x 1,024 TFT screen • Windows XP Pro

PROS Fast; screen size**CONS** Size and weight**VERDICT**

Huge but well stocked, this is a niche product that will be ideal for those with little office space

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

PERFORMANCE

SILENT PENTIUM 4 PC

Armari Canterwood PC

You don't have to sacrifice performance for peace and quiet



For PC manufacturers and users alike, a high-performing silent PC is something of a holy grail. There's nothing worse than watching a DVD movie on your PC when the soundtrack is replaced by the shriek of a processor cooler, chipset or case fan.

In most cases, however, being able to hear a pin drop while your PC is running means compromising performance. A slower CPU needs less cooling, which means a smaller heatsink fan can be used, and if the components inside the case are not at risk of overheating then there is no need for a case fan.

Armari's T875HT Super-Q, on the other hand, uses the latest Pentium 4 3GHz Canterwood processor, and proves that with careful selection of components and a tidy installation you can combine high-end performance with near-silent operation.

The Armari is powered by a 3GHz Pentium 4 partnered with 1GB of PC3200 (DDR400) memory that has been installed in such a way as to enable the Intel i875 chipset's dual-channel memory capability. Sysmark

performance is excellent, with a score of 290. 3D results from the Parhelia are less impressive, at 8,343, though this is to be expected from a card that is not focused on 3D performance.

By using an aluminium case that helps to dissipate heat effectively, half the battle with cooling the system core is already won. Armari has housed its system in one of the best cases around – CoolerMaster's ATC-220C. Sound-proofing pads have been added to both side panels and line the base of the case to deaden any noise caused by case vibration, which is already fairly low.

The stars of the show, however, are the Armari case and processor fans. Their blades produce a noise level of only 21dBa (acoustic decibels) – a normal case fan produces in excess of 26dBa. The all-plastic fans are rubber-mounted to reduce noise further and these mounts absorb static, protecting internal components from electrical damage.

The Chieftec power supply uses a single cooling fan, and to prevent vibration noise, there are rubber dampers between the

supply and the case surface on which the fan is mounted.

Instead of the usual jumble of data cables and power leads, Armari has used rounded IDE cables, which have been tightly bundled together, as have the power leads. This may seem trivial, but even a small improvement to the airflow inside the case means that the case fans need not spin so fast, another aid to noise reduction.

By using an Intel D875PBZ motherboard, Armari has done away with the problem associated with the chipset fan, because the board uses a passive heatsink – albeit a very large one – in place of an active fan. As it's an Intel board, you get the standard Canterwood feature set, which offers an impressive range of features including

integrated Pro/1000 Gigabit Ethernet, two Serial ATA ports, which can be configured for Raid 0/1, and support for up to eight USB 2 ports. The T875HT uses all these, with six ports on the rear I/O panel and two in the front panel of the case.

While the 185.2GB Hitachi Deskstar 180GXP hard disk isn't rubber mounted, Deskstars have always been among the quietest hard drives. The optical drive is a perfect choice for those who can't make up their minds which format to use. Sony's DRU-510 supports DVD-R/-RW and DVD +R/+RW.

As the T875HT is aimed at the workstation market it comes with a 128MB Matrox Parhelia graphics card with another Armari fan for cooling. The monitor is a 19in Mitsubishi Diamond Pro 930SB BK Diamondtron and Creative's I-Trigue 3300 speakers are powered by its Audigy 2 sound card. We found this inclusion strange as it's a consumer product. Nevertheless, it's an excellent card.

This is an expensive PC but you get high-quality components for your money.

Simon Crisp

DETAILS

PRICE £2,520.38 (£2,145 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Armari

020 8993 4111 www.armari.co.uk

SPECIFICATIONS

Windows XP Pro • Pentium 4 3GHz (800 FSB) • 1GB PC3200 DDR400 memory • Intel D875PBZ motherboard • 185.2GB hard drive • Sony DRU-510AX DVD-R/-RW DVD +R/+RW • Matrox Parhelia 512 graphics card • 19in Mitsubishi Diamond Pro 930SB monitor • Creative 2.1-channel speakers

PROS Very quiet; well built

CONS Expensive

VERDICT

Armari proves you can build a high-performance, silent system

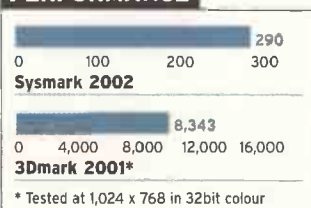
PERFORMANCE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

PERFORMANCE



"Quite possibly the best PC we've ever seen"

PC Advisor, May 2003



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PENTIUM 4 2.8GHZ PC

Sony RS226

It's a looker, but can it rival other systems?



The RS226 is a high-performance PC and we expect to pay a premium for a Sony system. But it seems the company has its sights on the Eveshams and Meshes of the world when it comes to good-value desktops and has driven the price down considerably.

The case is compact and looks roughly like the new G5 cases from Apple, though it lacks the front-mounted USB and Firewire ports we see on the current flock of cases. There are six USB and two Firewire ports at the back.

The micro-ATX motherboard has three of the four Dimm slots spare, and three PCIs, two of which are free. A 2.8GHz Pentium 4 sits next to 256MB of DDR memory. The PC could not complete the Internet content creation side of Sysmark, but did gain 154 points in office productivity which is in line with similar PCs we've tested.

Graphics come from an Nvidia Geforce FX 5200 card that achieved 6,622 in 3Dmark 2001. That's not groundbreaking, but its DirectX 9 compliance does

make up for it. The monitor is the classy 15in Sony X52. Not only does it match the PC box as well as the keyboard and mouse, but its output is also excellent. The keyboard is compact but reasonably comfortable to type on, and the mouse is more comfortable than we expected, given its diminutive stature.

Coming with a 120GB hard disk, a CD-RW and a separate, dual format writer DVD drive, the only real downfall is the lack of decent sound, as it's not only onboard, but the speakers are also pretty poor.

Mark Walsh

DETAILS

PRICE £1,350 (£1,149.43 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Sony www.sonyeurope.com

SPECIFICATIONS

Intel Pentium 4 2.8GHz processor • 256MB of memory • 120GB hard disk • CD-RW • DVD+-RW • Nvidia Geforce FX 5200 graphics • Sony SDM-X52 15in TFT • Onboard sound • 3w stereo speakers • Windows XP Home

PROS Compact; well featured

CONS Poor sound

VERDICT

It's undeniably good looking, but the RS226 pales in comparison to similarly priced desktops

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

PERFORMANCE

DID NOT COMPLETE
0 100 200 300
Sysmark 2002

6,622
0 4,000 8,000 12,000 16,000
3Dmark 2001*

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

ATHLON XP 2600+ PC

Evesham Axis 2600+ SK

A well-balanced system at the right price



If you change your mobile phone fascia almost as often as your socks, then you'll appreciate the fact that the Evesham Axis 2600+ comes with a choice of two clip-on silver and black front panels. Both feature cutaway sections revealing the blue glow from the four LEDs on the Akasa brushless case fan mounted on the inside of the front panel, which also helps to reduce system noise.

The lockable system case opens to reveal a spacious interior that lets plenty of air flow around the system core. A green plastic funnel channels heat directly from the fan squatting over the Athlon XP 2600+ processor to a vent on the side panel, and there are more vents on the back panel.

Of the three Dimm slots on the Leadtek motherboard, two house 256MB modules of DDR SD-Ram system memory and a 120GB Maxtor hard disk sits in one of three 3.5in drive bays; another houses the floppy disk drive. Just above is a 52-speed Sony CD-RW drive and DVD multiride that writes to -RW and +RW formats.

With an ATI Radeon 9600 graphics card in the VGA slot, the Evesham achieved a decent 3Dmark score of 9,045 and 64.6fps in Unreal Tournament. Its overall Sysmark score was 227.

A modem card and three-port Firewire card occupy two of the five screw-free PCI slots and the backplate of a third is occupied by an S/PDIF bracket coming off a header on the motherboard.

You'll find the usual ports and sockets at the rear including four USB2 slots – two more are on the front panel – and a DVI socket.

Emilie Martin

DETAILS

PRICE £1,173.83 (£999 ex VAT)

BEST PRICE & PRODUCT

INFORMATION Evesham

0870 160 9500 www.evesham.com

SPECIFICATIONS

Windows XP Home • Athlon XP 2600+ 1.92GHz • 512MB of DDR SD-Ram • Leadtek Winfast K7NCR18D Pro motherboard • 120GB hard disk • Sony 52x 24x 52x CD-RW • ATI Radeon 9600 graphics card, 128MB DDR-Ram • Philips 17in LCD TFT • Creative 5.1-channel speakers • Pinnacle Studio 8 • Ability Office 2002 • 2yrs on-site, 1yr RTB warranty

PROS Price; DVD multiride; LCD

CONS Graphics performance

VERDICT

A well-balanced, well-priced PC

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

PERFORMANCE

227
0 100 200 300
Sysmark 2002

9,045
0 4,000 8,000 12,000 16,000
3Dmark 2001*

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



Alternative.

"Exactly what a great desktop replacement should be" Computer Shopper, May 2003



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• includes 512K cache • supports Enhanced
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External USB floppy disk drive (optional) • Li-ion
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• mini-PCI for wireless card • ports: external VGA
monitor, 4 x USB 2.0, parallel, IEEE1394, TV-out,
IR, line-out (with SPDIF), mic-in • Dimensions:
332 x 285 x 30.5-34.5mm • weight: 3.4kg
• Microsoft® Windows® XP home edition
• Microsoft® Works v7 • 2 years collect and
return warranty with accidental damage.

Latest Awards

UltiNote M6600	UltiNote M6600	UltiNote M6600	UltiNote M6600	Hi-Grade
PCW Editor's Choice April 2003	Computer Shopper HIT! May 2003	PC Advisor Gold June 2003	PC Advisor Recommended July 2003	Most Improved Notebook Brand of the year 2002 PC Advisor

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Professional for Mobile Computing

Hi-Grade PCs use genuine Microsoft® Windows®.
www.microsoft.com/piracy/howtotell

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Hi-Grade

Technology with a human face

CENTRINO NOTEBOOK

IBM Thinkpad T40

Quality components and good battery life

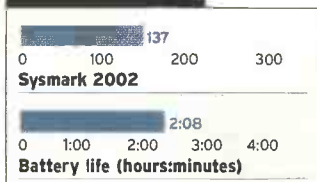


The IBM Thinkpad T40 is a 1.3GHz Centrino notebook that weighs 2.2kg, and has the killer IBM chassis and world-class keyboard that we admire so much.

The specification talks about 'Titanium composite top and bottom covers' but, to our eyes, they are high-quality black plastic mouldings that contain the usual Centrino hardware. That means you get Intel 802.11b wireless Lan in addition to one of the slower Pentium M processors, at 1.3GHz. It also comes with 256MB of PC2100 DDR memory – we would have preferred to see more. The screen is fairly small at 14.1in and has a resolution of 1,024 x 768 which is unimpressive today, although it's perfectly acceptable for office work.

The 3Dmark 2001 score for the ATI 7500 chip is barely up to gaming standards, and the display quality is unexceptional, which is surprising for an IBM. However, this is no drawback for a business notebook; text is perfectly legible and the screen is evenly lit.

PERFORMANCE



Our tests showed battery life to be just over two hours – impressive given its size.

There are relatively few ports unless you use the accessory docking station, but all the essentials are there, including two USB, 10/100 Lan, modem and two PC Card slots. The chassis is cool and, as there is no exhaust heat to speak of, the T40 is nearly silent in operation.

You always pay a premium for IBM notebooks, but you do get high-quality components. Performance is a real letdown here, though.

Leo Waldoock

DETAILS

PRICE £1,679 (£1,429 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

IBM 0800 169 1458 www.ibm.co.uk

SPECIFICATIONS

Windows XP Pro • Pentium M 1.3GHz • 256MB memory • 40GB hard disk • 8x DVD-Rom, 24x CD-RW • Intel 855PM chipset • Radeon 7500 graphics • 14.1in 1,024 x 768 TFT • Lotus SmartSuite Millennium • 2.2kg • 311 x 255 x 27mm (w x d x h)

PROS Keyboard; battery life; weight

CONS Expensive; slow in Sysmark

VERDICT

Gorgeous looks and lightweight but too expensive

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

CENTRINO NOTEBOOK

HP Compaq NC4000

Slim and lightweight for the business user



Slim and stylish, the NC4000 is HP's first Centrino-based notebook for the mobile business user. It's light, at just 1.6kg and, while it lacks an optical drive, it does come with a great screen and a decent battery life.

Running on a 1.5GHz Pentium M processor and 256MB of memory, the 4000 should run reasonably fast, though sadly we couldn't get Sysmark to run in the time we had. Graphics are nothing to speak of, as it uses a rather antiquated ATI chip, but this is good enough for office use and even the odd DVD. However, as mentioned before, there is no optical drive – you can only get one by using the multi-bay docking station. We feel the chassis is thick enough to have accommodated one.

Our test model's chassis was not a final build, but was nevertheless made of pretty sturdy black plastic. There are two USB2 ports, modem, S-Video out, headphone and wired Ethernet, as well as the built-in 802.11b wireless. There's also an SD (Secure Digital) slot at the front.

The keyboard has been shrunk to fit, but is still pretty easy to type on, though some of the buttons were squashed. The 12in TFT screen is bright and clear even when removed from mains power. Battery life was pretty good, lasting for just under two hours in our tests.

Two things let this notebook down: the lack of CD drive and the reasonably high price. With better featured models around, some of which are slimmer, this isn't the best ultraportable Centrino notebook we've seen. However, it seems fast and has a decent battery life, both of which put it pretty high in the league.

Mark Walsh

DETAILS

PRICE £1,87.65 (£1,598 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP www.hp.co.uk

SPECIFICATIONS

Windows XP Pro • Intel Pentium M 1.5GHz processor • 256MB memory • 40GB hard disk • ATI Radeon graphics chip • 12in TFT screen

PROS Battery life; screen; size

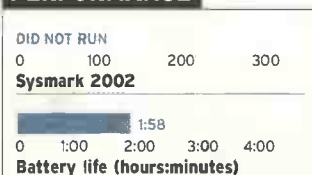
CONS No optical drive

VERDICT

The lack of optical drive means this is not the best around, but it's certainly a decent contender

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

PERFORMANCE



DESKTOP REPLACEMENT**Multivision Solus 1020**

Heavy, price and performance are good

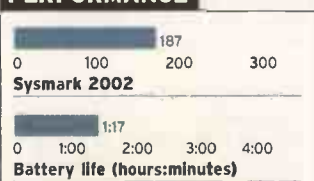


Encased in a smart matt black chassis with a silver trim, the Multivision Solus 1020 is an attractive desktop replacement notebook powered by an AMD Athlon XP 2500+ processor. This is partnered with a 60GB Hitachi hard disk and, as the Mobility Radeon 9000 graphics card has 64MB of dedicated memory, you are left with the full 512MB allocation of DDR SD-Ram system memory.

As well as a Panasonic slot-load DVD/CD-RW multiride, which also supports DVD-Ram, is an MP3 player with silver controls on the front of the notebook, along with an LCD status panel.

The range of storage is supplemented by a Type II PC Card slot, located just next to the mini Firewire port, Lan and power sockets on the left-hand side of the unit.

The Solus managed a score of 187 in Sysmark, 7,273 in 3Dmark and 49.2fps (frames per second) in Unreal Tournament. Battery life of one hour and 17 minutes might be disappointing in a notebook, but you're unlikely to want to lug this 3.3kg heifer far.

PERFORMANCE

Two fairly quiet speakers sit just under the bright 15in LCD TFT screen, which has decent viewing angles. The keyboard has some flexibility, and features large, well-spaced keys in sensible positions – apart from the Insert and Delete keys under the right-hand Shift key, which are easy to press accidentally while typing.

A VGA slot is at the rear of the unit next to the parallel and two USB2 ports, with a modem socket, single PS/2 slot and TV-out socket on the right-hand side.

Emilie Martin

DETAILS**PRICE** £1,102.15 (£938 ex VAT)**BEST PRICE & PRODUCT INFORMATION**

Multivision 0870 066 0885

www.multivision.co.uk**SPECIFICATIONS**

Windows XP Home • Athlon XP 2500+ 1.86GHz • 512MB of DDR SD-Ram • 60GB hard disk • 1x DVD-R, 1x DVD-RW, 2x DVD-Ram 16x 8x 24x CD-RW • Mobility Radeon 9000 graphics, 64MB of memory • 15in LCD TFT • 3.1kg • 328 x 283 x 26.5mm (w x d x h) • 2yr C&R warranty

PROS Price; performance;

DVD/CD-RW multiride

CONS Portability**VERDICT**

Great value and performance

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

CENTRINO NOTEBOOK**Packard Bell Easynote T**

Specs with a business user in mind



Compare the test results of this 1.3GHz Centrino Packard Bell Easynote T with the 1.3GHz IBM T40 (page 54), and you'll be struck by the similarities in both Sysmark 2002 and battery performance. They differ purely in 3Dmark 2001, as the IBM uses ATI graphics while Packard Bell has opted for the full Centrino setup with the integrated Intel 855 chip. As a result, 3D graphics performance is nothing to write home about, but Centrino is aimed at business users rather than gamers, so the specification is appropriately minimal.

The sleek chassis only has a single PC Card slot, but there is a mini Firewire port and three USB2 ports, as well as 10/100 Lan and modem to go with the wireless 802.11b Callexico card that is part of Centrino.

The chassis feels very solid and the keyboard has no noticeable flex, while the keys have a good feel and the layout is good. We were surprised at how well the touchpad works, as the mouse buttons are flush

in the surface of the chassis, and look as though they might have caused problems.

The screen was average, though both text and pictures were satisfactory, and the viewing angle was adequate. The speakers are integrated in the corners of the screen where they aim the audio directly at you, but they sounded tinny and weak.

The overall feel of the Easynote T is very good and, though it comes with Windows XP Home edition, it is well suited to business users.

Leo Waldoock

DETAILS**PRICE** £1,399 (£1,190.64 ex VAT)**BEST PRICE**www.pcw.co.uk/bestprices**PRODUCT INFORMATION** Packard Bell www.packardbell.co.uk**SPECIFICATIONS**

Pentium M 1.3GHz processor • 256MB DDR memory • Hitachi 30GB hard disk • 16x CD-RW DVD combo • Centrino 855GM chipset • Intel 855 graphics, 32MB shared memory • 14in 1,024 x 768 TFT screen • Windows XP Home • 2kg • 316 x 274 x 27mm (w x d x h)

PROS Battery life; keyboard; ports**CONS** Integrated Intel graphics

offer poor 3D performance

VERDICT

A decent Centrino notebook well suited to business users

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

PERFORMANCE

WIRELESS DIGITAL MEDIA ADAPTOR

Linksys Wireless-B Media Adaptor

One of the first adaptors for streaming music and photos

An increasing number of people have growing music, photo and video collections on their PCs, but it's not always desirable or convenient to play them in the office or back bedroom. Most people would prefer to play them in the lounge, especially using existing TV and HiFi systems, but few would tolerate a noisy, ugly PC in their front room.

While some enthusiasts solve this catch-22 with good-looking, silent PCs, a more elegant solution involves new set-top box media adaptors that connect to your TV and HiFi, then simply stream the photos, music and video from your PC over wired or wireless Ethernet networks.

Over the next year, we can expect to see a great number of these adaptors, with varying capabilities, from both consumer electronics giants and traditional IT manufacturers. One of the first is the Linksys Wireless-B Media Adaptor, costing £129 ex VAT and operating with PCs running Windows XP only.

Unlike some forthcoming products, the Linksys Wireless-B Media Adaptor won't handle video and is designed to play photos and music only. It can decode MP3 and WMA audio files, M3U and ASX collections, along with jpeg, tif, gif and bmp images. As its name implies, these can be streamed over an 802.11b wireless network, but there's also a 10/100 port for wired Ethernet connections. Multiple adaptors could be connected to the same network if desired.

Connection to your TV is with either composite or S-Video, while audio is delivered through a pair of stereo RCA jacks; sadly there's no RGB video or digital audio outputs. Linksys supplies AV cables but, since they end in separate connectors, Scart users will need to provide their own adaptor plug.

EXCLUSIVE



The device itself is a smart-looking compact box, about the size of a thick paperback book, which can either stand vertically or lie horizontally; the adjustable antenna on the rear should be pointed upwards for the best reception. It's powered by an external mains adaptor and operated by an infra-red remote control.

In order to stream media to the device, you must first install the supplied Media Manager utility on your PC. You'll also need to have the Windows .Net framework installed, but this is on the CD as well, saving you a lengthy download.

The Media Manager utility specifies which folders should be available to the device and defaults to My Pictures and My Music. These can later be changed or supplemented, although obviously your PC has to be left powered-up to act as a server. As new files or folders are added, the Media Manager pauses to create an updated content library database; given 20 songs and 10 photos, this

one-off process took around five minutes using a 1GHz Celeron.

The second step is configuring the device itself. If you're using a wireless connection, you must manually enter the SSID and operation mode, along with its channel and encryption key if necessary. This is considerably easier using the supplied PC utility and a temporary wired link rather than the TV interface; Linksys supplies an Ethernet cable which can be removed after the wireless settings have been configured.

Once configured, the device reboots, finds the required services and is ready to use after around 25 seconds; during operation it runs silently. The TV interface is clear and simple, offering Music, Pictures or Help. Navigating each option with the remote is simple, although there's often a slight pause with each key press.

Like PC media players, the artist's title and track name can be displayed, and you can also view photos or run a slideshow while listening to music. Images

can be zoomed-in up to four times and scrolled around, although this execution is a little sluggish compared to connecting a camera directly.

All in all, it works pretty well, and it's certainly useful to be able access your PC's photo and music collection from a friendly silent device without a noisy computer or network cables in sight. That said, this is the first of many forthcoming media adaptors, some of which additionally boast support for Divx and mpeg video files. Future DVD players may also stream photos and music.

It all depends on what you want to stream, how much you want to spend and how long you want to wait. If you only want to stream PC-based photos and music to your TV and HiFi, then the Linksys Wireless-B Media Adaptor will do it today and isn't bad for £129 ex VAT. But not-so-early adopters or those wanting video should wait and see how the market develops.

Gordon Laing

DETAILS

PRICE £151.58 (£129 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Linksys 0870 041 6624

www.linksys.com

SPECIFICATIONS

IEEE-802.11b • 10/100 Ethernet •

Formats: MP3, WMA, M3U, ASX, jpeg,

gif, tif, bmp • Composite video,

S-Video, stereo RCA jacks • 5 x 16 x

19cm (w x d x h) • 370g • 1yr warranty

PROS Streams digital photos and

music to your TV and HiFi over

wired or wireless network

CONS Doesn't handle video files;

Windows XP only

VERDICT

Quick, silent and easy to access, it works well, but doesn't handle video and, as it is the first of many, it may be worth waiting

PERFORMANCE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

HIGH-END DIGITAL CAMERA

Canon Powershot G5

Image quality and features are great in this 5megapixel camera



Last September, as its rivals were launching the first 5megapixel cameras, Canon surprised many by sticking with 4megapixels for its Powershot G3. Now with the launch of its G5, Canon's made the move to 5megapixels in its prosumer 'G' range.

With its 5megapixel sensor, the G5 delivers images with 2,592 x 1,944 pixels, which contain sufficient detail to produce good-looking 13 x 10in inkjet prints. Like most new 5megapixel cameras, Canon has opted for a 1/1.8in sensor, which physically measures the same as 4megapixel chips. With smaller pixels, this chip could suffer from worse electronic noise, but our results show the G5 keeps it under control.

The G5 offers three levels of Exif 2.2-compliant jpeg compression and four resolutions. The default Fine setting produces files of around 1.5MB each. If you have the space, select the superior Superfine mode with 2.8MB files that are virtually artefact-free. A 12bit losslessly compressed Raw mode is also available, although like all Raw files, you'll need to use the supplied software to process them into jpegs or tiffs.

Canon supplies a 32MB Compact Flash (CF) card, which will squeeze in around 21 or 11 images in Fine or Superfine jpeg modes, and the G5 also works with IBM's Microdrive.

There's a 4x optical zoom lens, with a 35mm equivalent range of 35-140mm and bright focal ratio of f2.0-3.0; the closest focusing distance in macro mode is 5cm. During its four-second power-up, the lens extends 2.5cm and prods off the lens cap if you've forgotten to remove it. There are three optional lens attachments: wide angle and teleconverters with 0.7x and 1.75x magnifications, and one that improves close-ups.

The G5 has a relatively large brick-like design, but there's no denying its superb solid build-quality. Image composition is with the optical viewfinder or a flipout and twist 1.8in colour screen. Not only is the screen sharp and bright, but the twisting mechanism feels well made, not to mention allowing easy composing at tricky angles.

On the top is an LCD status panel packed with shooting information, alongside a hotshoe capable of handling Canon EX Speedlight flashguns. The built-in

flash offers a number of modes, including slow-synchro and a rear-curtain option. The main mode dial offers Auto, Program, Manual, Aperture and Shutter Priority, along with three scene presets, two custom modes, stitch-assist for panoramas and a movie mode to capture up to three minutes of 320 x 240 video at 15fps (frames per second) with sound. There are 46 shutter speeds from 1/2000 to 15 seconds (but no bulb), and 13 aperture settings. Burst mode captures up to seven Superfine jpegs at 2fps, while sensitivity runs between 50 and 400ISO. A timelapse mode can shoot 2-100 pictures at intervals of one to 60 minutes.

Images are transferred with a USB1.1 port. It doesn't need a driver if you are using XP or OSX, and it supports direct printing; there's also a TV output. The lithium-ion battery recharges in the camera body.

If any of this reminds you of the G3, you'd not be far wrong. With the same body, lens and main features, the G5 is essentially a higher resolution version of its predecessor, but this is no bad thing as the G3 was probably the best-quality 4megapixel camera we've tested.

Canon has ensured the new sensor is perfectly at home, and the combination of excellent metering, low compression (in Superfine mode), 50ISO sensitivity and the improved Digic processor delivers smooth images, bereft of noise but packed with detail. Particularly impressive was its handling of tones, revealing subtle shades where lesser cameras would record saturated white.

Lens quality is also excellent, although in some conditions there's a little colour fringing at wide-angle, but nothing worse than its rivals. Like the G3, the G5 has no live histogram and a maximum sensitivity of 400 ISO. The 320 x 240 movie mode is also dated compared to the 640 x 480 of newer models, and its chunky body is beginning to look relatively hefty.

The G5 has sufficient features to keep most enthusiasts happy and image quality that's as good as any 5megapixel camera we've tested. You should also check out Sony's Cyber-shot V1 and Nikon's Coolpix 5400, though.

Gordon Laing

DETAILS

PRICE £679 (€577.87 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Canon 08705 143 723,

www.canon.co.uk/digitalcameras

SPECIFICATIONS

5megapixels, 2,592 x 1,944 recorded pixels • 4x optical, 4.1x digital zoom •

35-140mm focal length (35mm equiv)

• Flash modes: On, off, red-eye, slow-

synchro, rear-curtain • 1.8in LCD •

32MB CF I/II • 12.1 x 7.4 x 7cm (w x d x

h) • 410g • USB 1.1 • 1yr warranty

PROS Image quality; great control

CONS Size; no live histogram

VERDICT

Decent photographic controls and image processing, but it's hefty and missing the gadgetry of its rivals

PERFORMANCE ★★★★★

FEATURES ★★★★★

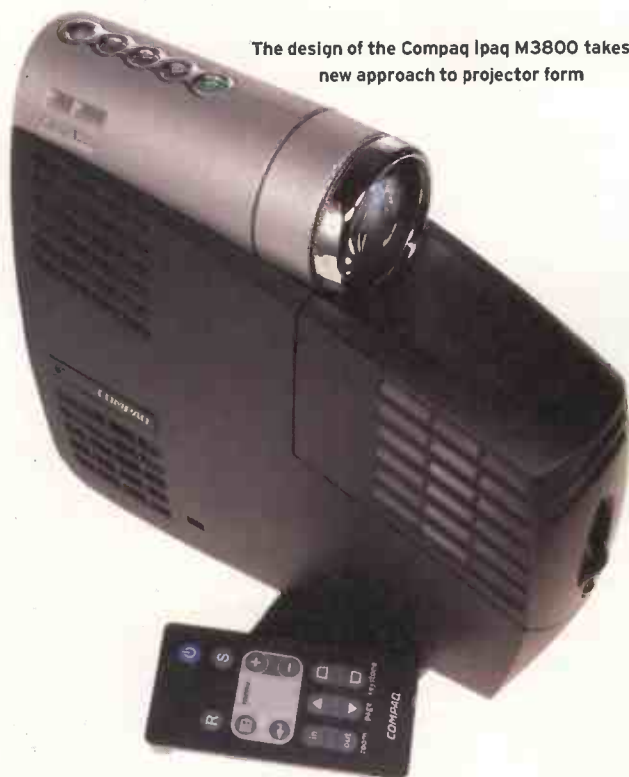
VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

MINI ROUND-UP

Compact projectors

Portable projectors are lighter and brighter than ever. We select seven star performers



The design of the Compaq Ipaq M3800 takes a new approach to projector form

Portable projectors are getting smaller, lighter, brighter and cheaper. In this mini-round-up we've picked out seven models which all have something different to offer. All these projectors are small and light enough to carry around with a notebook PC without causing unnecessary arm strain.

If stylish good looks and rock solid picture quality top your list of priorities, the Compaq Ipaq MP3800 won't disappoint, but if you're looking for a projector that will hook up to anything from a DVD player to an old VCR, then the Hitachi CP-X327 with its multiple input ports would be a better option.

The Epson EMP-735 is an exciting new development in projection technology, offering wireless connectivity via an 802.11b PC Card adaptor that slots into the front. Because of bandwidth limitations it's

limited to static presentations – wireless video is still a long way off – but the potential for multi-cast presenting and the convenience of presenting from any PC on a wireless equipped network is something that will interest many organisations.

Two of the four projectors use Texas Instruments' DLP (Digital Light Processing) technology, a wafer with thousands of hinged micromirrors to produce the image. DLP produces superior image quality, particularly with video and, until recently, DLP projectors were substantially more expensive. But in recent months LCD and DLP prices have begun to converge and only a few pounds separate the LCD Hitachi CP-X327 and the DLP IBM ILM30.

Compaq MP3800

The Compaq Ipaq MP3800 is an XGA resolution microportable DLP projector which exemplifies

the 'form follows function' design philosophy: it performs admirably and looks stunning. Compaq/HP has turned the usual projector form on its side, with the silver lens barrel sitting atop a tall thin black box housing the lamp, DLP array, fan and electronics.

This is more stable than you'd think and gives the projector a slight height boost, aided by an extending foot, useful for low projection platforms such as desks. By removing a small panel on the base, you can also attach it to a tripod.

At 1.6kg, it's not the lightest projector here, but it is compact enough to carry along with a laptop comfortably – providing you find something more suitable to put it in than the massive aluminium flightcase HP sent the review model in.

Like the Hitachi CP-X327, the MP3800 has two-axis digital keystone correction, which further facilitates easy setup in awkward environments, and the OSM (on-screen menu), which can be accessed from the top-mounted illuminated buttons or the tiny but limited remote, is child's play.

Picture quality is first rate and we could find nothing to fault in the Ipaq's display. The 150w

lamp produces a claimed 1,300 Ansi lumens producing a bright, well-contrasted and saturated image which was viewable at short projection distances with the room lighting on.

Regrettably, the MP3800 owes its clean looks in part to the lack of connectors. Aside from the power socket, the only two connectors are an analogue RGB and DVI, which means you can forget about connecting anything other than a computer. This is a shame because, while it's clearly not aimed at the home cinema market, being able to connect up your TV or DVD player after a long day hoofing it with your Powerpoint presentation is something even the most hardened road warrior looks forward to.

Epson EMP-735

The otherwise unremarkable Epson EMP-735 has one very clever trick up its sleeve: it's wireless. In place of a VGA cable, there's a PC Card slot at the front, which takes an 802.11b wireless adaptor. Using the supplied Easy MP software, the projector can then receive wireless video from another PC with a wireless adaptor, or from any networked PC via a wireless access point.

The Epson EMP-735's greatest advantage is its wireless connection



Aside from one less cable to connect, the obvious advantage of this setup is that any networked PC can be quickly configured to provide a projected presentation and, with several projectors on the network, a presentation can be beamed simultaneously to several locations within range. Alternatively, the wireless adaptor can be replaced with a memory card doing away with the need for a PC connection.

Wired connections include analogue RGB, composite video, S-Video and audio, and there's a USB connector for remote mouse control. The remote is a tiny credit card-sized thing that you're unlikely to want to use to control the mouse, particularly if you're operating in wireless mode.

Setup, whether wired or wireless, was fairly effortless. The EMP-735 can automatically make sensor-based digital keystone adjustments to compensate for the projector's tilt angle, and this works well assuming the screen is at a 90° vertical angle.

Picture quality was very good, the only criticism being that the blacks weren't quite black and, despite the quoted 2,000 Ansi lumens output, the image lacked punch, particularly where there was a lot of extraneous light.



The Hitachi CP-X327 is an excellent choice if you need several ports

The wireless connection works pretty well for static images – Powerpoint presentations and Excel charts, for example – with no more than a fraction of a second's delay. But don't expect to be able to watch DVDs on a wireless connection – the bandwidth isn't nearly sufficient.

Hitachi CP-X327

Terms such as portable, ultraportable and microportable are used loosely by projector manufacturers. Hitachi calls the CP-X327 an ultraportable and, at 2.7kg, it's by no means a

heavyweight, but compared with 1.1kg models like IBM's ILM300 there's no denying its large size.

Why opt for the CP-X327 when you can have something half the size? In a word, connections. The CP-X327 positively bristles with ports. There are two analogue RGB inputs with a through-port on RGB-1 so you can connect a monitor at the same time as the projector. Composite video and S-Video ports you'd expect, but there are also component video connectors

making this an excellent choice for anyone using A/V equipment with component video outputs. USB and serial ports provide mouse functions from the remote control.

It's unusual these days to find a projector that doesn't offer straightforward plug and play setup, and the X327 is no exception. The projector automatically logs on to the video signal, and the OSM is simple to navigate. We liked the fact that keystone correction was possible in both horizontal and vertical planes, so you can correct for distortion caused by the projector's location at one side of the screen as well as above or below it.

Image quality was very good and, at shorter projection distances, the Hitachi performed very well even in a brightly lit room, its 150w lamp pumping out a convincing 1,500 Ansi lumens. Colours were bright and well saturated and text reproduction very sharp, but video was a touch on the soft side. We also noticed a tendency for tones to compress in the shadows, and blacks were less than solid. The native resolution is XGA with a maximum scaled possible input of 1,280 x 1,025.

Table of features



MANUFACTURER AND PRODUCT	COMPAQ IPAQ MP3800	EPSON EMP-735	HITACHI CP-X327	IBM ILM300 INFOCUS LP70 TOSHIBA TDP-P5	NEC LT260
Price inc VAT (ex VAT)	£2,348.83 (£1,999.99)	£3,730.62 (£3,175)	£1,823.60 (£1,552)	From £1,828.63 (£1,556.28)	£2,999.99 (£2,553.18)
Best price	www.pcw.co.uk/bestprices	www.pcw.co.uk/bestprices	www.pcw.co.uk/bestprices	www.pcw.co.uk/bestprices	www.pcw.co.uk/bestprices
Product information	www.hp.co.uk	www.epson.co.uk	www.hitachidigitalmedia.com	www.ibm.com/pc/europe www.toshiba.co.uk www.infocus.com	www.nec.co.uk
Technology	DLP	LCD	LCD	DLP	DLP
Lumens/Lamp power (w)	1,300/150	2,000/150	1,500/150	1,100/120	2,100/220
Contrast ratio	450:1	400:1	350:1	450:1	1,300:1
Native resolution	XGA	XGA	XGA	XGA	XGA
Aspect ratio	4:3	4:3	4:3	4:3	4:3
Connections (in and out)	RGB (D-sub) M-DA, audio	RGB (D-sub), composite video, S-Video, audio, USB	RGB-in x2, RGB-out, S-Video, USB composite & component video	M-DA, S-Video, composite video, audio	2 analogue RGB input sockets, RGB-out, S-Video, composite
Remote	✓	✓	✓	✓	✓
Weight (kg)/dimensions (mm) (w x d x h)	1.6/7 x 12 x 18	1.9/27.6 x 19 x 7	2.7/29.5 x 23.7 x 8.75	1.1/19.5 x 15.5 x 6.5	2.9/260 x 275 x 92
Lens zoom ratio	1.2:1	1.16:1	1.2:1	1.25:1	1.2:1
SCORES					
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

The Hitachi isn't the quietest projector we've tested, but there is a 'whisper mode' which reduces the noise output from 39dB to 33dB. The price you pay for this is a slight dimming of the image, but the only time noise is likely to be a problem is in a small room, in which case projection distance will be short and the dimming hardly noticeable.

IBM ILM300

IBM's ILM300 is manufactured for IBM by Infocus and is in fact identical in all but colour to the (grey) Infocus LP70; you'll also find it rebadged as the (silver) Toshiba TDP-P5 projector. As there is so little to choose between them, all three projectors win our Recommended award, although it is worth noting that the IBM is the cheapest option.

At 1.1kg, the ILM300 is about as small and light as they come. Finished in IBM's trademark black, it comes with a micro carry case which accommodates the projector, remote and cables to connect to a PC or video player.

The PC connector is the now standard M1-DA that can connect to either a digital or analogue PC graphics port. An M1-DA-to-analogue cable, with an integral USB connector which provides remote mouse operation, is also supplied.

Native resolution is XGA (1,024 x 768), but the ILM300 can cope with resolutions up to 1,280 x 1,024, with a slight deterioration in quality that is especially noticeable with text. In practice,

reducing the display resolution is a better compromise. Generally, picture quality was excellent with sharp text, good tonal gradation, rich blacks and none of the problems associated with DLP.

Setup is straightforward with the ILM300 locking onto the incoming signal and producing a steady image that needs no more adjustment. Onboard controls allow access to the OSM and buttons are provided for volume and digital keystone correction.

The remote features a laser pointer and a trackball which, in the dark, is much easier to operate than the diskpad control found on many projector remotes. The lens has a zoom ratio of 1.25:1 providing a minimum throw distance of just under 7ft, and making this model a good choice for confined or difficult projection environments.

Two factors mitigate against microportables: heat and noise. Heat generated by the 120w lamp and other components in this confined space is hard to dissipate. IBM has cracked this problem without resorting to a fast, noisy fan, and the ILM300 stays fairly cool even in prolonged operation while generating no more than 32dB.

NEC LT260

The LT projector series to which the LT260 belongs comprises NEC's most portable models, but this model nevertheless weighs in at a robust 2.9kg, making it the heaviest projector on test here.

Like the Hitachi CP-X327, however, the NEC, which is built



The NEC LT260 has clean, clear picture quality that is hard to fault

around DLP technology, offers a comprehensive range of sockets and slots at the rear of the unit in exchange for that extra weight. There are two analogue RGB input sockets, so you can present from two different laptops in meetings, and an analogue RGB output socket, so you can hook up the projector to both your PC and a monitor. This way you needn't watch the surface onto which you are projecting to see the image. There are also audio-in and -out sockets, composite and S-Video sockets and USB input and output connections.

You also have the option of purchasing a wireless Lan card that slots into the PC Card slot so you can hook up a wireless-enabled PC or laptop without placing constraints on where you can locate the projector.

The navy blue control panel mounted on the matt silver casing puts a range of buttons at your fingertips, including dedicated menu, enter, cancel, 3D reform, on/standby, auto

adjust and source controls as well as four navigational cursors. Sadly, the 3D reform button simply acts as a shortcut to the relevant submenu on the basic settings menu rather than an automated keystone or cornerstone correct function. These adjustments have to be made manually and, while the horizontal and vertical keystone axes are displayed as sliding scales with assigned numerical values, the cornerstone settings feature no scale or value range so it's hard to keep tabs on your adjustments.

Picture quality was hard to fault with the kind of rich blacks and clean whites you'd expect from a DLP projector. Colours were slightly more muted than an LCD projector would produce, but that's to be expected, and contrast and areas of tonal gradation were well reproduced.

Native resolution is XGA (1,024 x 768) and the 220w lamp throws out 2,100 Ansi lumens, offering a projection distance range of 1.18-24.6m.

The projection angle of the LT260 can be adjusted using a single retractable foot placed centrally on the panel housing the lens and, while it seems flimsy, provides robust support.

Conclusion

While all the projectors have their merits, the Infocus manufactured models take the crown, as they are the lightest and have close to the best image quality. We recommended the model in its IBM jacket when it cost over £3,000, so this price drop makes it almost irresistible. But shop around before you take the plunge, as price differences can be up to £200. See www.pcw.co.uk/bestprices for the cheapest prices.

Ken McMahon & Emilie Martin

With its superb performance, IBM's 1.1kg ILM300 easily deserves our recommendation



The Infocus LP70 (top) and the Toshiba TDP-P5 share the Recommended award with IBM, as they are virtually identical to the ILM300



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POCKET PC

HP Ipaq 2210

Impressive features and a superb screen



The 2210 is one of three new devices from HP to use Pocket PC (PPC) 2003. Two of these are simply upgrades of the 1910 (reviewed in our May 2003 issue) and the 5450 (PCW June 2003). The 2210, however, has a completely new chassis and comes with all the features you'd expect from a mid-range PDA, and more.

The 2210 is meant to eventually replace the 3900 series, HP's most popular PPC. First off, it's quite a bit smaller, yet has more features. The most impressive addition is an SD (Secure Digital) I/O slot that sits just in front of the well hidden Compact Flash (CF) slot. This makes the 2210 the only PPC to have more than one card input.

It's quite a bit smaller than the 3900, and on the whole looks great. However, the rubberised black sides look a little out of place in the sleek silver body, but do stop it from slipping around in your hand.

The screen is a transfective model, similar to the 1910. It's therefore superb: evenly lit to the edges, clear as crystal and perfectly viewable in sunlight.

The five navigational buttons are very easy to use. In particular, the five-way trackpoint in the middle is very responsive – we almost preferred using this to the stylus, which was long and sturdy enough.

The 2210 uses an Intel Xscale 400MHz chip and has an impressive 64MB of SD-Ram. Battery life was good, lasting for more than eight hours of pretty heavy usage.

The price tag on the 2210 is quite steep, but then you do get a lot for your money. However, be certain that you really need all the extras that are provided by the 2210, and that are lacking in lower cost models such as the 1910, before you fork out the additional cash.

Mark Walsh

DETAILS

PRICE £369 (£314.04 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP www.hp.co.uk

SPECIFICATIONS

Pocket PC 2003 • Intel Xscale 400MHz processor • 64MB SD-Ram • 3.5in transfective TFT screen • SD slot • CF slot • 144.2g • 76.4 x 15.4 x 115.4mm (w x d x h)

PROS Very well featured; great screen

CONS A lot to pay for the extra features

VERDICT

A compact, powerful PPC that will suit those who need all the mod cons

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

17IN TFT MONITOR

Teco Relisys TL775

Image quality is good and the price is right



The TL775 is a relatively slick-looking unit with a wide silver bezel into which two stereo speakers are mounted in the bottom corners. Between these, and under the 17in LCD TFT display panel, four control buttons, including an auto settings button, menu/enter button and left and right cursors, are arranged in a circle around a power button. The disc into which the buttons are set is backlit with LEDs that flash yellow when the monitor is in standby mode or shine blue when it is on.

The menu/enter button calls up the OSM (on-screen menu), which is logically laid out with tabs denoting different settings groupings, including brightness, audio, colour, tools, screen adjustment and an exit icon. Intriguingly, there is a sixth tab for text settings that is completely inaccessible. The colour settings sub-menu allows you to set the monitor to sRGB (Standard Red Green Blue) or adjust red, green and blue levels using sliding scales with numerical labels.

Having laid out the OSM in such a logical manner, it is a shame Teco has not included a button that lets you move back up a level in the OSM. This means that you have to scroll through all the options in each menu level until you reach the exit icon when you're ready to quit.

The cursor buttons give fast access to the speaker volume controls, but once adjusted you have to exit the OSM again.

The TL775 performed well, with even screens of solid colour right into the corners and blacks were fairly rich. Good contrast levels and the ability to deal with a wide colour gamut meant that images were vibrant and lifelike.

At the rear of the panel, which can be tilted but is not height-adjustable, there is one DVI port, and an analogue-to-digital converter cable is included.

Emilie Martin

DETAILS

PRICE £334.88 (£285 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Relisys www.relisys.co.uk

SPECIFICATIONS

17in diagonal • 1,280 x 1,024 resolution • LCD TFT • DVI input (analogue-to-digital converter cable supplied) • 6.5kg • 444 x 215 x 426mm (w x d x h) • 250cd/m² • 500:1 contrast ratio • 140degree horizontal and vertical viewing angles

PROS Analogue and digital signal input

CONS OSM navigation

VERDICT

A small price to pay for good image quality and DVI input

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

3.1MEGAPIXEL CAMERA

Kodak CX6330

You'll get great output from this camera



The CX6330 is the top-of-the-range model in the Kodak point-and-shoot series, and is built around a 3.1megapixel CCD sensor capable of capturing images at sizes of up to 2,034 x 1,524 pixels. Lower resolution settings stretch down to 1.1megapixel.

All these settings can be accessed via the simple on-screen menu (OSM), which is easy to navigate using the four-directional cursor control, at the back of the unit; it has an 'OK' point in the centre to make selections. You'll also find the exposure settings and orientation sensor controls here.

A dial mounted on the top of the unit allows you to choose between action, night scene, landscape and macro modes, as well as an auto shooting mode and video capture mode, with which you can take movie clips at 320 x 240 pixel resolution. Flash modes can be changed using the dedicated button sitting next to the self-timer control sitting above the clear, bright 1.6in LCD display.

The 3x optical/3.3x digital zooms are controlled using a rocker button at the back of the camera, which gives rather jerky movement, and the lens has a 37-111mm focal length rating (35mm equivalent). This model has a macro mode range of 13-70cm when the zoom is

set to wide angle, or 22-70cm set to telephoto.

The Kodak produced good shots in our tests in a range of lighting conditions, reproducing colours faithfully and capturing detail well, even into the corners of the image. Images were lifelike and vibrant and the CX6330 captured even tricky textures and reflection well.

This camera is powered by two AA batteries and connects to PC or Mac via a USB cable or dock. You can supplement the 16MB of memory with MMC (Multimedia Card) or SD (Secure Digital) cards, which are not included.

Emilie Martin

DETAILS

PRICE £199.99 (£170.20 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION Kodak 0870 243 0270 www.kodak.co.uk

SPECIFICATIONS

3.1megapixel resolution • 3x optical/3.3x digital zoom • 37-111mm focal length (35mm equiv) • On, off, auto, red-eye, fill flash modes • 1.6in LCD • 16MB memory • 175g • 102.5 x 38 x 65mm (w x d x h) • USB dock • 1yr warranty

PROS Price; image quality

CONS Jerky zoom

VERDICT

A point-and-shoot camera that produces great results

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

3MEGAPIXEL WEBCAM

Creative PC-Cam 880

Resolution is good, but it's not cheap



The latest in a long line of detachable webcams that thinks it's a digital camera has a new trick; it will happily write its saturated images to SD/MMC (Secure Digital/Multimedia Card) cards or 16MB of internal memory. It takes 3megapixel pictures, has a 1.6in screen on the back and a 4x digital zoom.

But don't get too excited about that top resolution – it's actually interpolated from a 2.1megapixel Cmos sensor, which would explain the disappointing results. In general they were either burnt out or saturated, depending on the lighting, and the focus was none-too-clever either. On a more positive note, it is easy to use, with a range of dropdown menus controlling resolution, flash and more fundamental white balance and exposure settings.

There is the now de rigueur self-timer and an option to review images on the integrated screen, but while these are commendable assets you have to acknowledge that the underpowered hardware has trouble keeping up with the tasks it is asked to perform. After taking a picture at maximum resolution you have to wait 12 seconds for it to write before you regain control. When you consider it will squeeze between 17 and 112 photos into its internal memory, depending on

quality, you'll see how taking more than just a few can quickly become a chore.

The software is the same as on previous Creative cameras – PC-Cam Center for downloading images and PC-Cam Monitor for setting up a live webcam, along with an Arcsoft suite for creating calendars and cards, and performing minor edits.

We can't recommend this camera for anything other than general use. Images are woolly and colours are not entirely true.

Nik Rawlinson

DETAILS

PRICE £129 (£109.79 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Creative

<http://store.europe.creative.com>

SPECIFICATIONS

2,048 x 1,536 max resolution • 4x digital zoom • Auto/off flash modes • 1.6in LCD • Secure Digital/ Multimedia Card slot • 16MB memory • 98 x 32 x 66mm (w x d x h) • USB connection • 2yr warranty

PROS High resolution; versatile hardware menus

CONS Image quality; expensive

VERDICT

Form factor, storage slot and menus are spot on. But the output quality isn't all that good

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



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- v92 56k Internet ready modem
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Axis 2400+KD with LG L1510S TFT

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Model shown: Axis 2400+KD with 15" LG TFT flat panel monitor

Evolution 2600+KF



E-CODE: EV1077-02

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- 512MB DDR RAM (PC2100) (2x256MB)
- 80GB 5400rpm UDMA100 hard drive with buffer
- Intel Extreme 2D/3D graphics
- 17" (16" visible) Evesham EZ Flat (CRT) monitor
- 16x DVD-ROM drive
- CD-RW drive (52x24x52) with BURN-Proof technology
- v92 56k Internet ready modem
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3 YEAR WARRANTY AS STANDARD

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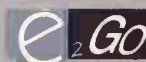
With all Axis, Evolution, Quest II and e-style systems, we supply a 3 year warranty as standard.

Axis, Evolution and e-style systems have 2 years on-site with a 3rd year return-to-base warranty (parts and labour)

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- 128MB DDR ATI Radeon 9600 graphics with TV-out & DVI
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- Creative Inspire 5.1 5300 speakers
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What Laptop & Handheld PC, Gold Award, May 2003

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- Built-in smart card reader (See feature below)
- Built-in aerial for wireless
- Ports - up to 4xUSB2.0, Firewire, Parallel, VGA
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- Dimensions - 332mmx285mmx30.5mm (39.5mmx)
- Microsoft® Windows® XP Home

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Processor	Intel Celeron 2.4GHz	Intel Pentium 4 2.6GHz 2.66GHz	Intel Pentium 4 2.8GHz	Intel Pentium 4 3.06GHz with Hyper-Threading
DDR RAM	256MB	512MB	512MB	512MB
Hard Drive	30GB	40GB	60GB	80GB
Screen Size	14" 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	£999inc VAT (£850.21 ex VAT)	£1099inc VAT (£935.32 ex VAT)	£1249inc VAT (£1062.98 ex VAT)	£1399inc VAT (£1190.64 ex VAT)
	VY1140-02	VY1142-02	VY1145-02	VY1120-02

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MULTIFUNCTION DEVICE

Lexmark X1150

Slow, but great value and output quality



For a device that offers print, scanning, copying and fax functions, the Lexmark X1150 is a pretty compact unit and surprisingly light, weighing in at just 4.5kg.

A flap on the top surface of the unit folds up to act as a 100-sheet capacity paper input tray and has a pinch-and-slide paper size guide to help align blank pages as they are fed into the printer. Meanwhile, at the end of the print process, pages appear in the exit tray that slides out of the front of the unit and can hold just 25 sheets at a time.

The X1150 crawled through our tests, churning out a 10-page mono-text test document at a rate of just four and a half pages per minute (ppm) and our 10-page pdf at just over 1ppm. It reproduced 10 pages of mixed content at 1.9ppm but, while it took a total of eight minutes and 18 seconds to print our test photo, output quality was impressive given the price of the unit.

Text was fairly crisp and clearly legible down to 4pt, and areas of shading in our mixed content document and test pdf were evenly rendered with only some very slight banding.

The entire top surface of the X1150 opens to reveal the flatbed scanner employing CIS technology rather than a CCD sensor. No doubt this helps keep down the size of the X1150.

There are just five buttons on the printer body – one for power, and four keys to control paper feed and one-touch colour or mono-copy and scan functions. The Lexmark software offers a good range of features and is extremely easy to use. The most interesting features can be found in the 'Creative Tasks' menu, which has a basic OCR package to turn printed text documents into editable text format. There is also a proprietary Lexmark photo editor, featuring basic image editing tools.

Emilie Martin

DETAILS

PRICE £79 (£67.23 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Lexmark 0870 727 2100

www.lexmark.co.uk

SPECIFICATIONS

4,800 x 1,200dpi print • 600 x 1,200dpi, 48bit scanning (optical) • Thermal inkjet printing/CIS scanning • 4.5kg • 445 x 308 x 163mm (w x d x h) • Compatible with Windows 98/Mac OS 9.2.2 or higher • USB2 • Optional wireless/Ethernet print ports

PROS Price; output quality

CONS Very slow

VERDICT

Very slow, but the output is good and it's great value

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

MULTIFUNCTION DEVICE

Samsung SCX-4016

Well-performing, speedy mono all-in-one



With so many colour inkjet-based all-in-one devices around, digital printer-copiers based on mono laser technology have begun to look outdated. Not so with Samsung's SCX-4016, which slices through everyday tasks in the modern small office with considerable style.

Attractive in its white and grey two-tone case, the SCX-4016 is compact and lightweight for a multi-functional device containing a laser printer. As usual, the A4 scanning plate is hidden under a lid on top, the lid raising at the hinges to accommodate thick originals. Up to 250 sheets can be loaded into the input cassette at the front which closes flush with the unit and bears a paper level indicator. Printed sheets drop face-down into a catch tray above. There is a single-sheet bypass or multipurpose feeder halfway down the front of the case, and a corresponding face-up output exit at the rear.

A control pad in front of the scanner lets you trigger copies independently of your PC. The buttons are small but there are few enough to make it simple. A toner reduction button, saving up to 40 per cent of toner without impacting print quality, is a great idea. As this is a mono laser, consumables are long-lasting and easy to

replace. The toner and imaging drum are supplied as a combined unit so anyone can install it without help.

Performance is good: we easily achieved 14ppm for printing and digital copying. Print quality is impressive too, offering you a choice of three copy settings to maximise results for text, mixed and photo originals. All that really lets down the SCX-4016 is its cheap 24bit scanner, which is fine for mono copies but not so hot for PC-hosted colour scanning.

Alistair Dabbs

DETAILS

PRICE £293.74 (£249.99 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Samsung

www.samsungelectronics.co.uk

SPECIFICATIONS

600 x 600dpi print & scan (up to 4,800dpi interpolated) • Mono laser printing • 16ppm print speed • CCD, 24bit • 11.7kg • 474 x 436 x 353 mm (w x d x h) • MFP Driver, Smarthur, Anypage Lite OCR • USB1.1, parallel • Toner cartridge £57.58 (£49 ex VAT), 3,000-sheet life at 5 per cent coverage

PROS Fast performance; handling

CONS Mono prints; colour scanner

VERDICT

A fast and affordable all-in-one

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

MULTIFUNCTION DEVICE**HP PSC 2175**

If photography is your game, this is for you



The latest in a seemingly unstoppable line of printer-scanner-copiers, HP's PSC 2175 stirs up the mix of high-quality input and output by adding special support for digital camera cards. It's hardly an office workhorse, but it sits comfortably in a home office where a family can get hold of it too.

Looking almost identical to the other PSC 2100 series devices, it features an A4 scanner built on top of a photo-quality inkjet printer. The scanning plate is covered by a lid which raises up at the hinges to accommodate thick originals. To the right of the lid is a control pad with a two-line LCD status display and big, rubberised buttons with similarly big labels, so you can't go wrong. Paper is loaded into a 100-sheet input tray at the bottom, and printouts delivered to a tray immediately above it.

You can of course use the HP PSC 2175 as a conventional printer and 48bit scanner, but you don't even need to switch on your PC to use it as a colour copier or digital photo processor.

To process photos, you just plug your digital camera card into one of the four slots at the front, print off an index sheet, mark with a pen the shots you want and at what size, and scan the sheet back in to instruct

the machine what to print and how. Photos can be printed at 4,800dpi as opposed to the usual 1,200, and are excellent given the 2175's price.

It's not a speedy machine though – a plain paper colour copy can take one and a half minutes, while Word documents chug through at around 4ppm – but it is very simple to use. If you like to fiddle with scanner drivers, you might even find the PSC 2175 too simple for your taste. But in terms of usability, no-one does it better than HP.

Alistair Dabbs

DETAILS

PRICE £199 (£169.36 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

HP 08705 474 747 www.hp.co.uk

SPECIFICATIONS

1,200 x 1,200dpi printing, 1,200 x 2,400dpi scanning • Thermal inkjet • 18ppm black only, 13ppm colour speed • CCD, 48bit scanning • 8.85kg • 463 x 400 x 220 mm (w x d x h) • Iris OCR and HP Director software • USB2 • 4 camera card slots • Black ink cartridge £17.20 • Tri-colour cartridge £24.17

PROS Scan, copy and print quality

CONS Rather slow in all tasks

VERDICT

A brilliant printer for home users interested in photography

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

LASER PRINTER**Samsung ML-1510**

Want to trade in your inkjet? Check this out



The squat, boxy ML-1510 from Samsung has a two-tone turquoise and light-grey chassis, and hooks up to a PC via USB. A paper input tray that can hold up to 250 sheets at any one time slides out of the front of the unit and features a paper supply gauge so you can easily check how much paper is left in there before you start a lengthy print job. Just above this is a manual-feed, face-up paper input slot for other media or thicker paper, with a sliding paper guide.

The front panel of the unit folds down to give access to the innards of the printer, where the toner cartridge lurks. The cartridge clicks in and out of the cartridge cradle, so installation and removal is straightforward.

The 50-sheet capacity output tray is moulded directly into the top of the unit and features a fold-down paper support.

There is a single button on the entire printer chassis to turn the unit on or off, alongside two LEDs, which show on line/error and toner save status. At the back of the unit is a fold-down paper exit flap to simplify the paper path of less flexible media along with the power socket and USB port.

Samsung rates the print speed of the ML-1510 at 14ppm and in our tests the printer lived up to this claim, producing our 10-page text document and

10-page pdf at a rate of 14.2ppm in both cases. Our 10-page mixed content document printed at exactly 14ppm and our test photo at 3.1ppm.

Text was reproduced very crisply and was legible right down to 2pt, while large 72pt characters were solidly rendered with smooth outlines. Areas of shading in our pdf and mixed content documents were fairly even, with some evidence of very minor banding – this was also true of our test photo. Contrast between areas of light and shade was also accurately reproduced.

Emilie Martin

DETAILS

PRICE £149.99 (£127.65 ex VAT)
BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Samsung 0800 138 5182
www.samsungelectronics.co.uk

SPECIFICATIONS

250-sheet input/50-sheet output trays • 14ppm quoted print speed • 600 x 600dpi resolution • Single toner cartridge • 1.6p per page • 2MB of memory • USB • 7kg • 348 x 335 x 193mm (w x d x h) • Toner life 3,000 sheets at 5 per cent coverage

PROS Speed; output; compact

CONS Few controls on the chassis

VERDICT

An ideal choice for home users

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

PENTIUM 4 MOTHERBOARD

Via PT800

An excellent value low-cost board

PREVIEW



EXCLUSIVE

Given last year's legal wranglings, it's a surprise to see a new Pentium 4-based Via chipset. For those who missed it, Via and Intel were locked in lawsuits, with Intel claiming Via had broken patents, and Via countering with anti-trust allegations.

Thankfully, all that has been settled, and Via can release its low-cost Pentium 4 chipset with an 800MHz front-side bus (FSB). We looked at a reference sample from Via – retail models should cost from £69 from companies such as MSI and Jetway.

The board we saw had the usual features – AGP, five PCI, four USB2 ports plus modem and Ethernet. Six-channel sound comes from Via's Envy24PT chipset, a slimmed-down version of the excellent 24bit sound chip featured in Terratec and M-Audio sound cards.

The one thing that separates this from Intel's chipsets is the single-channel memory structure. Intel's 865 and 875 chipsets (codenamed Springdale and Canterwood respectively)

use dual-channel memory, which enhances performance, particularly in games and video and image-editing software.

However, performance in Sysmark showed no signs of this having any effect, as it gained a very impressive score of 300 overall. This is 25 points behind the fastest P4 board we've seen (from DFI), but it's still a huge score. However, it did take a hit in our 3Dmark 2001 test, earning 14,658. This puts it at the bottom of the pile in our motherboard group test. That said, it's still a very good score, and the price is very appealing.

Mark Walsh

DETAILS

PRICE From £69 (£58.72 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Via www.via.com.tw

SPECIFICATIONS

Socket 478 support (with 800MHz FSB) • Three DDR Dimm slots (single-channel 400MHz FSB) • AGP, 5 x PCI • 4 x USB2 • Modem, Ethernet

PROS Fast; low cost

CONS Graphics are slightly slower than the competition

VERDICT

It may not be the best graphics performer, but this Pentium 4 chipset is excellent value

PERFORMANCE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

PERFORMANCE



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

BAREBONES SYSTEM

Soltek Qbic Mirror

A good case waiting for a performance PC



The Qbic EQ3701M Mirror's attractive case is built entirely from good-quality aluminium with a brushed aluminium cover, mirror-finished front bezel and drive bay covers, so you may not want to hide this one.

The heart of the Qbic is one of Soltek's own motherboards, the SL-B7A-F. This is a Socket A board that supports FSB (front-side bus) speeds of 200/266 and 333MHz, allowing most AMD processors to be used. It also provides support for up to 2GB of dual-channel DDR memory in two Dimm slots.

Using an Nforce2 graphics chipset, the board also comes with an AGP 8x/4x interface so you can upgrade instead of relying on the integrated Geforce4 MX graphics solution. The MCP2-T southbridge supports ATA133 hard disks, Lan, USB2, Firewire and six-channel audio.

To find out exactly what that means, you need only look at the rear panel of the Qbic to see the sheer number of ports provided. There are two PS/2 and two VGA ports, single serial and Lan ports, two Firewire and two USB2 ports, a single S-Video port and finally three audio ports – it's no wonder there's no space left for a parallel port. But it doesn't stop there; the front panel contains another two USB2 and two audio ports and

single S/PDIF and Firewire ports. However, it's not as well stocked as the MSI Mega PC we reviewed last month (*PCW* August page 66), although that is more expensive at £292.58 inc VAT.

To keep case noise to a minimum, there are passive heatsinks on the northbridge and southbridge chips and a single quiet case fan. Because the Qbic system is made of aluminium, the whole case is a heatsink, so it is very unlikely to overheat.

Simon Crisp

DETAILS

PRICE £234 (£199 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Soltek www.soltek.com.tw

SPECIFICATIONS

Socket A compatible • Nvidia Nforce2 chipset • Two Dimm slots • AGP 8x • PCI • 2 x parallel • 2 x PS/2 • 2 x VGA • Serial • 3 x Firewire • 4 x USB2 ports • Lan • S-Video • S/PDIF • Six-channel audio • Ethernet

PROS Build quality

CONS The size of the case means it's awkward to build a system

VERDICT

Soltek's Qbic is a well-built case with a well-featured motherboard, which allows for a high-performance system to be built in a very small space

FEATURES ★★★★★

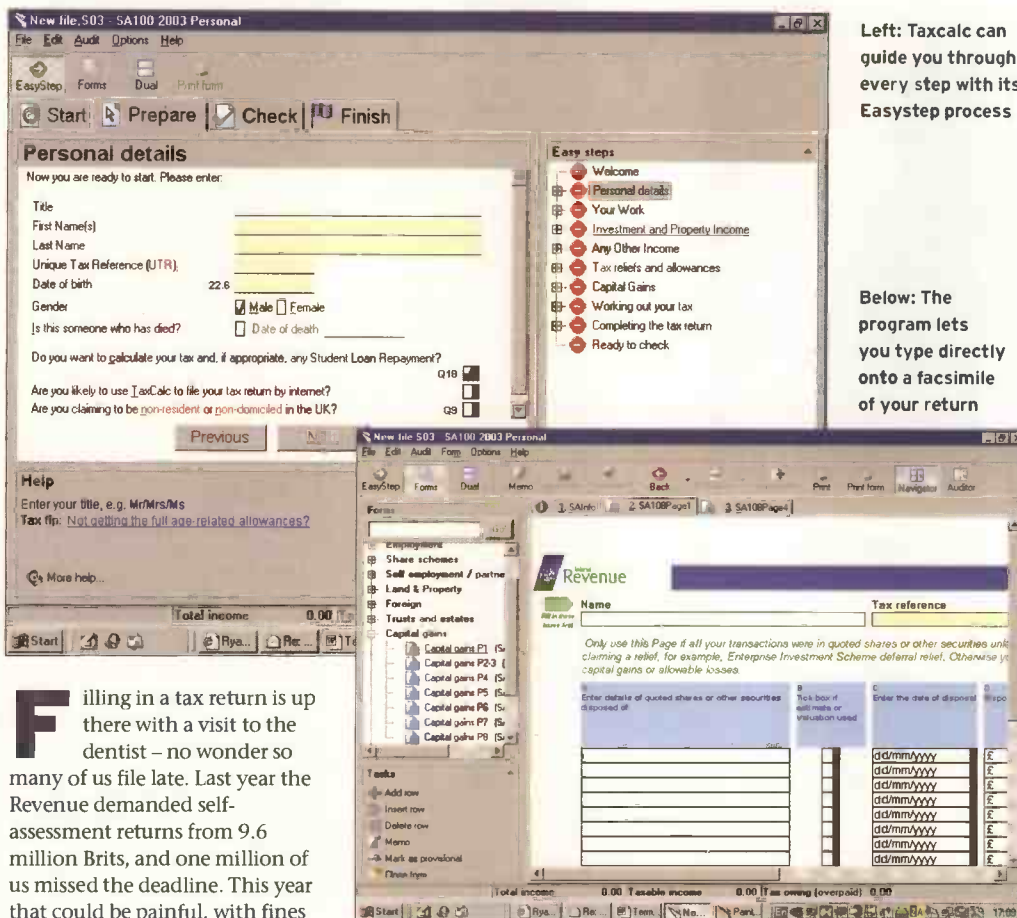
VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

TAX SOFTWARE

Taxcalc 2003

Simple software to help with that dreaded task – completing your tax return



Left: Taxcalc can guide you through every step with its Easystep process

Below: The program lets you type directly onto a facsimile of your return

Filling in a tax return is up there with a visit to the dentist – no wonder so many of us file late. Last year the Revenue demanded self-assessment returns from 9.6 million Brits, and one million of us missed the deadline. This year that could be painful, with fines of £60 for every day you are overdue. While Gordon Brown may rub his hands at £60m a day for starters rolling into the Exchequer, we suggest you get organised.

Intuit has a high financial profile thanks to its Quicken and Quickbooks personal finance and accounting software. Taxcalc has a similar pedigree, tried and trusted over the years. For £20 the latest version will do the return for you – the company even guarantees that you can file in 30 minutes or your money back.

There is a choice of approaches. Number 1 is the intuitive 'Easystep' option, with Taxcalc walking you through things; or you can type direct into a facsimile of the return. Not sure what information is relevant? Features such as the job-related expenses and

subscriptions checklists will get you up to speed. And because there will be relevant information from last tax year, such as employment and National Insurance details, importing the previous year's files has been made straightforward.

Filing on time is one thing, filing accurately another. A vast number of us make mistakes on our returns. And that matters. Rule One of income tax: if you underestimate your liability they'll claw it back and fine you; if you overpay you'll never find out. Why are we so sure? Because, shockingly, the Revenue itself miscalculated an astonishing 500,000 tax returns last year. So before you file, use the program to check your return with the appropriate Revenue rules for either electronic or paper filing – Taxcalc now

supports Filing By Internet (FBI). Another guarantee here – if the program gets it wrong and earns you a penalty, Intuit will pay.

Handy extras include around 50 money-saving tips (though we find the 'tip of the day' feature a little silly in a program you're going to open once, use intensively and then, ideally, never open again), and there's free online and telephone technical support. We found the split-screen approach easy to navigate, there's password protection, and it will do the job for the most arcane of tax jobs, including fiendishly complex capital gains tax (including taper relief), share schemes, trusts, land and property, foreign income, partnership income and self-employment.

It's also good for those treated differently under UK tax law,

such as Ministers of Religion and Members of Parliament. In short, whoever you are and however complex your tax affairs, Taxcalc 2003 promises to do the job. And because tax law has a habit of getting tweaked throughout the year, the software automatically updates via the Internet (you have to be online obviously).

There's not much to the core program, but that's fine as its only job is to walk you through the return, double- and cross-checking your figures as you go, and then produce a total (either liability or rebate) at the end. This can be especially useful for self-employed taxpayers, as the total updates as you go. You can input different data and see the effect it has on your overall bill, seeing the marginal changes of putting in more days at the end of the taxable period, for example.

Intuit claims 37 per cent of users earned a rebate last year. And the software lets up to four people compile returns, so you could use it for the family, or club together with friends. For a whisker under £20 it will save you hours, could avoid a fine, and may well earn you a rebate.

John Rennie

DETAILS

PRICE £19.99 (£16.49 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Intuit 01628 590 800

www.taxcalc.com

SYSTEM REQUIREMENTS

Windows 95/98/2000/NT/ME/XP • 300MHz processor • 16MB of Ram (32MB recommended, XP 128MB) • 40MB of free hard disk space • SVGA graphics (screen resolution 800 x 600 or greater, 256 colour) • Two-speed CD-Rom drive

PROS Great value for money

CONS Only really useful once

VERDICT

This piece of software will make tax much less painful

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

DATA IMAGING

Powerquest Drive Image 7

Keep data safe with this impressive tool



The interface makes Drive Image easy to use when you want to back up or restore your hard drive, and you can copy one drive to another too

After a brief flirtation with using the year as a model code, Powerquest has reverted to its old ways and called its latest imaging software Drive Image 7. This version is built on the same code used in Powerquest's professional V2i Protector software, and runs only on Windows 2000 Pro SP2 and Windows XP PCs. However, inside the box you'll also find the previous version Drive Image 2002 which is compatible with Windows 95, 98 and ME, and lets you create partitions where you save your drive's image.

When using Drive Image 2002 you could capture images of applications and data, but not of your active Windows partition. The major change with Drive Image 7 is that you can capture everything including the system partition while it's in use. You no longer make recovery floppies as version 7 doesn't work in Dos at all, instead being entirely Windows-based.

Another change is that the .pqi file format for images has now become .v2i and the interface is very similar to V2i. You can tell Drive Image 7 to ignore bad sectors, where previously a corrupt disk could stop the whole process in its tracks.

Regular backups can be made to another partition, to removable media or over a network, and if necessary the image can be broken into 640MB chunks to fit on to CD.

The imaging system is ideal for copying the entire contents of a hard disk, for instance when upgrading to a new hard disk. We tested this by migrating from a single ATA100 drive to a striped Raid array of Serial ATA drives, and the transition was flawless.

Leo Waldoock

DETAILS

PRICE £39.99 (£34.03 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Powerquest www.powerquest.com

SYSTEM REQUIREMENTS

Windows XP/2000 SP2 • Pentium processor • 256MB of Ram

PROS Easy to make complete or partial images which can also be sized to fit CDs

CONS You need Windows 2000 or XP for the best features

VERDICT

An impressive tool that will help keep your data safe

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

COMPRESSION

Winzip 9 beta

BETA

A good compression utility just got better

You may wonder how you can improve upon a simple utility for zipping and unzipping software archives. But Winzip, the leading compression utility for Windows, keeps getting better—we looked at a beta of version 9.

Winzip 9's principal improvement involves data security. The software features advanced 128bit and 256bit AES encryption, so you can create virtually uncrackable archives. Encrypting files is simple – turn on the Encrypt option when creating an archive and enter your password. You, or the person you're sending the archive to, will need Winzip 9 to unlock these archives.

The other major change is to the file format, which supports 64bit extensions. This means archives, which were previously limited to 4GB and could contain a maximum of 65,535 files, are now constrained only by the user's hardware.

A heavyweight compression method, 'enhanced deflate', could save a lot of disk space. The only disadvantage is that files take longer to compress, but you can still choose from a range of faster compression methods.

Various smaller improvements have also been made, particularly

in terms of the interface when using Winzip in Classic mode. Dialogue boxes contain Windows 'places bars' so you have easy access to your desktop and documents folder, and the Extract dialogue has been redesigned. Novices can switch to Wizard mode, to be walked step-by-step through tasks.

This is beta software, so you may want to wait until the full version is released later in the year. However we didn't come across any problems.

Mark Heaton

DETAILS

PRICE \$29 (£17.48) (free upgrade for registered users)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Winzip software

www.winzip.com

SYSTEM REQUIREMENTS

Windows 95/98/NT4/2000/ME/XP

PROS Advanced data encryption; supports larger archives

CONS Encryption not compatible with earlier versions/other utilities

VERDICT

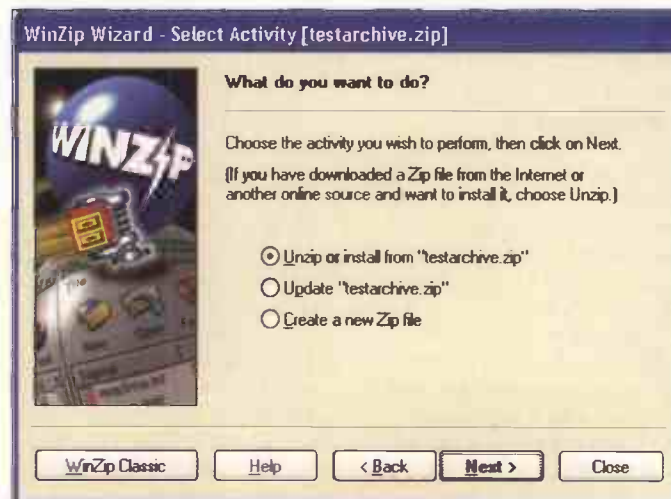
A solid upgrade to an already impressive product

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★



The Winzip Wizard in version 9 makes it very simple for novice users to create or extract archives

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P4I865PEA

CPU: Pentium 4 (478 pins)
 Chipset: Intel® 865PE/ICH5
 FSB: 800/533/400MHz
 Memory: Dual Channel DDR400/333/266
 Form Factor: ATX/5PCI/1AGP 8X
 Onboard: 5.1 Channel Audio (6CH, Bracket Cable optional)
 USB/1394: 5xUSB2.0 (4x onboard, 4x optional), 2x1394a (optional)
 QDI Innovations: Hyper-Threading Detector, Pro-StepEasy,
 Pro-RecoveryEasy*, Pro-LogoEasy, SpeedEasy, BootEasy,
 BIOS-ProtectEasy, Pro-UpdateEasy
 * QDI will supply updated BIOS later on.

P4I865GA

CPU: Pentium 4 (478 pins)
 Chipset: Intel® 865G/ICH5 (integrated Intel® Extreme Graphics 2)
 FSB: 800/533/400MHz
 Memory: Dual Channel DDR400/333/266
 Form Factor: ATX/5PCI/1AGP 8X
 Onboard: 5.1 Channel Audio (6CH, Bracket Cable optional)
 USB/1394: 5xUSB2.0 (4x onboard, 4x optional), 2x1394a (optional)
 QDI Innovations: Hyper-Threading Detector, Pro-StepEasy,
 Pro-RecoveryEasy*, Pro-LogoEasy, SpeedEasy, BootEasy,
 BIOS-ProtectEasy, Pro-UpdateEasy
 * QDI will supply updated BIOS later on.

P4I865PA

CPU: Pentium 4 (478 pins)
 Chipset: Intel® 865P/ICH5
 FSB: 533/400MHz
 Memory: Dual Channel DDR333/266
 Form Factor: ATX/5PCI/1AGP 8X
 Onboard: 5.1 Channel Audio (6CH, Bracket Cable optional)
 USB/1394: 5xUSB2.0 (4x onboard, 4x optional), 2x1394a (optional)
 QDI Innovations: Hyper-Threading Detector, Pro-StepEasy,
 Pro-RecoveryEasy*, Pro-LogoEasy, SpeedEasy, BootEasy,
 BIOS-ProtectEasy, Pro-UpdateEasy
 * QDI will supply updated BIOS later on.

QDI COMPUTER (UK) LTD.

2/F, Seymour House, 186 High Street
 Slough, Berkshire SL1 1JS
 Tel: (44) 1753 486004 Fax: (44) 1753 550885



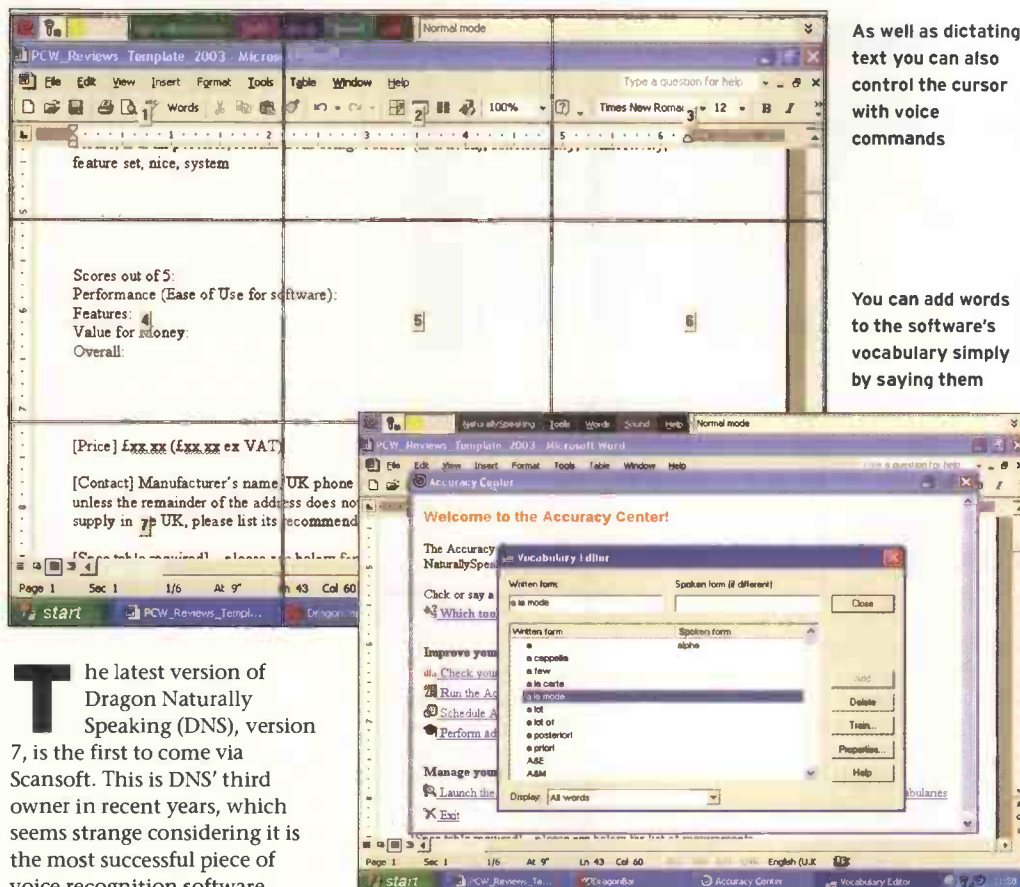
www.qdigrp.com
 www.qdieurope.com



VOICE RECOGNITION

Scansoft Dragon Naturally Speaking 7 Preferred

DNS is way ahead of the competition with its most accurate recognition yet



As well as dictating text you can also control the cursor with voice commands

You can add words to the software's vocabulary simply by saying them

The latest version of Dragon Naturally Speaking (DNS), version 7, is the first to come via Scansoft. This is DNS' third owner in recent years, which seems strange considering it is the most successful piece of voice recognition software. Scansoft claims this release has an improved engine, and has thrown in some new features to make it easier to dictate to your PC. It's now designed not just for dictating letters and other text documents, but also for controlling your PC.

Once the software is installed the first thing you have to do is configure it to your voice. The setup wizard makes you read a passage of text, using the supplied microphone if you wish, so your PC learns your voice.

The 14 training exercises take about half an hour to complete, and centre around performing simple tasks such as dictating into a text box and using commands from throughout the software. First it shows you the task, and then it gives you an example to try. It can be quite patronising at times, but those unfamiliar with the software may find this kind of handholding welcome,

particularly when compared to reading a heavy manual.

In general, the output is very accurate, but voice recognition is and never will be perfect (words such as 'to' and 'two' are nearly impossible to distinguish), and there are times when it makes rather odd mistakes on very simple words. On the plus side, DNS7 allows you to make textual corrections both through voice commands and by manual intervention. However, when you've finished it's worth re-reading it to check for missed and incorrect words.

Another handy feature is that you can select text and then play it back in order to check for errors. And, unlike some speech software, this reads back to you in your own voice which, although fun, is a little disconcerting. You can also transfer audio files from your

PDA or digital voice recorder and it will transcribe them for you.

Sadly, DNS7 cannot adopt the vocabularies that have been set up in office applications, but it can learn new words through your manual corrections or if you input them directly using the Accuracy Centre. A vocabulary optimiser analyses your documents and learns the words you use most often, adding them to your vocabulary profile.

As well as dictating text, you can use the software for more general commands. It supports applications such as the complete Microsoft Office suite, along with Internet Explorer. Support isn't just for Microsoft applications though: apps such as Lotus Notes and Corel Wordperfect are also catered for.

In addition to opening applications and dictation, the

software can be used to control the cursor. This is done by launching a grid feature on the display, which splits the screen into nine numbered sections. You then select the grid square that you want and that in turn is split into a further nine smaller squares, and so on until you get what you want. It's rather painstaking and it's unlikely you'll be using this feature much, but it is good for those with physical disabilities who can't make the most of a mouse.

On the whole DNS7 is easy to use, but that's not to say it doesn't make mistakes, as certain words continually cause it problems. However, to get the most out of it you really need to spend some time training both the software and your own voice.

The biggest problem with using this software is not its recognition of words – as it manages this well – but the fact that you are talking to a PC. This can feel a little unnerving and, if you are using it in a crowded office, you may feel a little strange. If you would rather talk than type it's good fun and reasonably accurate, though £150 is quite a high price to pay.

Henry Tucker

DETAILS

PRICE £149 (£123 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Scansoft 0118 963 7464

www.scansoft.co.uk

SYSTEM REQUIREMENTS

500MHz processor, 256MB memory,

Windows 95 and above, NT4 and

above, 260MB hard disk space, 16bit

sound card or built-in sound chip

PROS Ease of use; headphones;

accuracy ahead of the competition

CONS Cursor control is frustrating

VERDICT

Greater accuracy makes this

the best speech recognition

software available

EASE OF USE ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

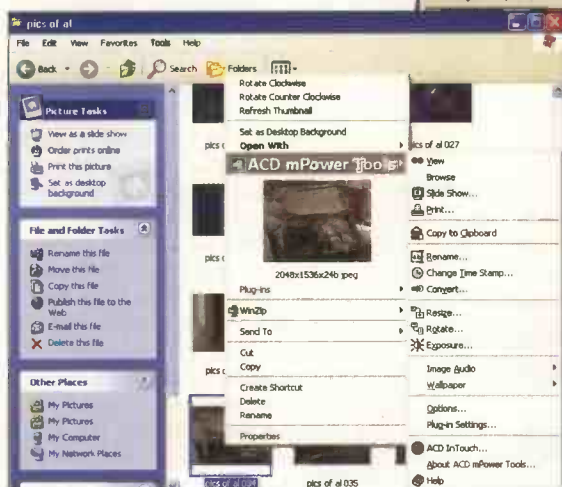
OVERALL ★★★★★

PHOTO-EDITING SUITE

ACDSee Photo Master Suite

A wide range of versatile image management tools

Below: Right-clicking on an image in Windows Explorer gives you instant access to all Mpower Tools' image management functions



Above: Use Fotoslate to create photo albums or simply to print multiple photos on a single sheet

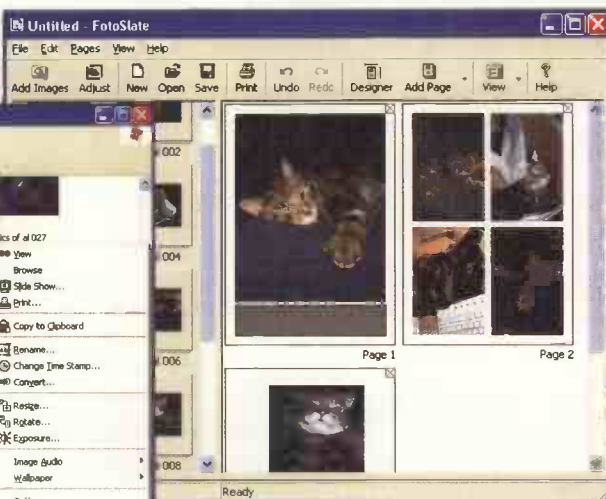


Photo Master Suite is a new software bundle for digital photographers from ACD Systems, the makers of ACDSee. The idea behind the package is to provide a complete set of tools for anyone who works with digital photos. The result is a bit of a mish-mash of products that provides a wide range of useful tools for anyone working with digital images, but not in a particularly intuitive or integrated manner.

The suite comprises three applications, two designed by ACD itself. The third is a fully blown image-editing package: the well-regarded Corel Photo-Paint 11. Photo-Paint 11 is normally only available as part of the Coreldraw Graphics Suite, which sells for well over £300.

It's a complete and feature-packed image-editing application with advanced features such as wrinkle-smoothing, dust and scratch fixing and batch-editing functions: you won't find many of these even in Photoshop Elements 2.

The interface is professional yet simple: the majority of the screen is given to the image, and editing options are organised around the screen in a logical manner. Photo-Paint 11 may not be as advanced

as the complete Photoshop, but it is widely regarded as one of its better challengers.

The first of the ACDSee tools is Mpower Tools. It's a utility for simplifying the tasks of finding and organising the photos on your hard drive. Not actually an application as such, it is really a sort of extension to the way in which you would normally work with pictures in Windows.

There are two ways of working with Mpower Tools. The first is by using the Mpower Mediabar, which gives you instant access to the media files on your hard drive. It works with video and audio files too, but you'll find it most useful for photos. The Mediabar can be docked to any edge of the screen and, if you set it to auto-hide, it will disappear when not in use and automatically reappear when you hover your mouse over the appropriate edge. The Mediabar displays thumbnails of your images at a user-defined size, which you can then easily import into your favourite image-editing application, such as Photo-Paint, simply by dragging and dropping.

There are tools for searching for the appropriate file and displaying any relevant metadata

that may be associated with an image, and it's very easy to navigate through all the media on your hard drive. However, we were very surprised that Mpower Tools didn't provide any direct method of acquiring images from your digital camera or scanner. Admittedly, if you have one of these products, you'll have the necessary software anyway, but it would have been useful to have this built into Mpower Tools. Instead it just works on the assumption that all your media is already on your hard drive.

The Media Tools menu provides access to the rest of Mpower Tools' functions, but there is an even easier way to use these. Mpower Tools is fully integrated into Windows so you can access all its functions except for the Mediabar directly from within Windows Explorer. When you right-click on any media file, the contextual menu displays a preview of the file along with an Mpower Tools menu. This provides instant access to most of the tasks you'd normally want to perform on an image, such as resizing, rotating, adjusting the exposure and creating a slideshow. In addition, the software comes with a

number of plug-ins for performing more complex tasks, such as creating a contact sheet, generating an HTML photo album, sending a picture as an email or sending your collection of pictures into Fotoslate. This task is the only bit of integration between the packages in this suite that we could find.

Fotoslate 2.0 is a simple-to-use printing package, designed for printing photo albums with creative layouts. You just import the photos you want to print, by using Mpower Tools, clicking the Add Images button, or dragging and dropping. You then create your photo album page by page, selecting your layout from a wide range of templates, such as 2-up with captions, 9-up, single photo and so on. Alternatively you can create your own layouts using the Template Designer. Photos can easily be rearranged on the pages, and if you double-click on an image, a rudimentary image editor appears where you can crop, rotate, colourise or apply filters such as blur and despeckle.

Mark Heaton

DETAILS

PRICE £69 (£59.57 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

ACD Systems

www.acdsystems.com

SYSTEM REQUIREMENTS

Pentium II 200MHz • 64MB of Ram (128MB recommended) • 205MB of free hard disk space • 1,024 x 768 display • Windows

98/NT4/ME/2000/XP

PROS Versatile image management tools; value for money

CONS Poor integration between different products in the suite; can't acquire images from digital camera

VERDICT

Has a wide range of invaluable tools, but is hard to get to grips with as it feels like three separate products

EASE OF USE

★★★★★

FEATURES

★★★★★

VALUE FOR MONEY

★★★★★

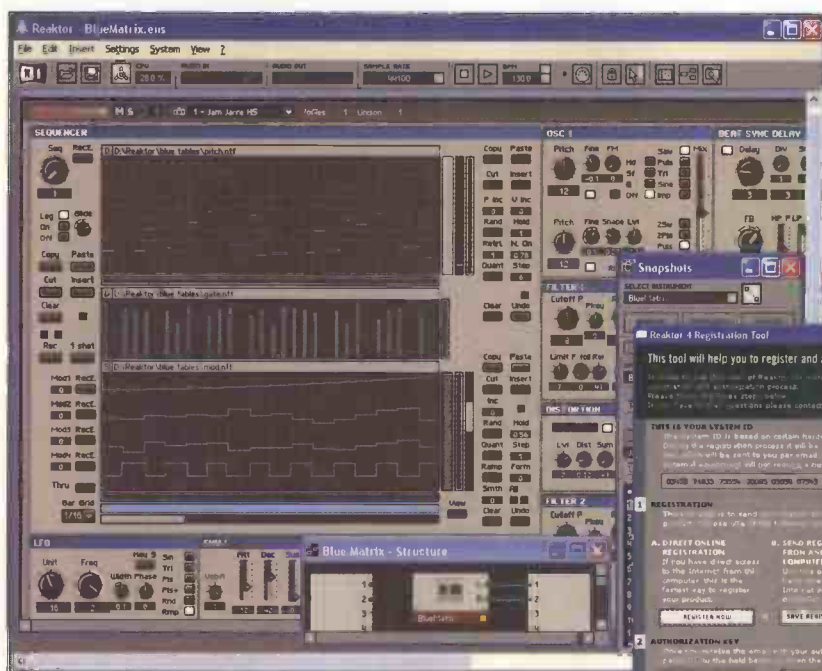
OVERALL

★★★★★

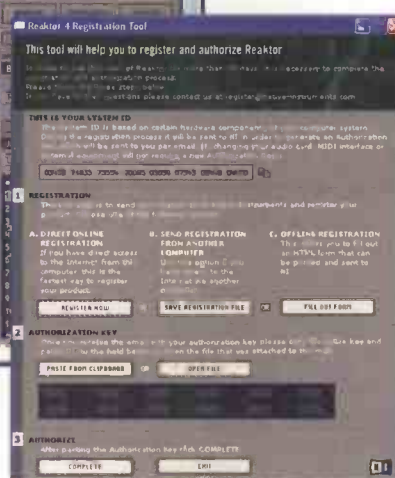
SOFTWARE SYNTHESISER

Native Instruments Reaktor 4

Packed with features, this program is music to sound engineers' dreams



Ease of use has been improved in this version of Reaktor (left), but its registration process is far from simple (below)



Native Instruments' (NI's) Reaktor 4 is a sound engineer's dream, as it's a fully configurable, modular software synthesiser. This means that, unlike the very successful Reason from Propellerheads, each instrument can be built from the ground up, for example starting with an oscillator and adding as many or as few features as you wish.

Installing Reaktor 4 is simple, and arranging your audio and MIDI outputs is pretty painless. However, it does require a very complicated product activation very similar to Windows XP. You have 30 days before you need to register, and when you do, the product takes a snapshot of your PC's configuration (including CPU, OS and startup disk), and sends it to NI which in turn sends back an activation code. NI's website insists it's 'not at all complicated', but we wholeheartedly disagree.

On the plus side, NI has got rid of the USB dongle, but if you upgrade, you'll need it to load instruments or libraries from previous versions, then save them to the Reaktor 4 format.

Reaktor searches for VST Plug-ins at startup, and a DXI plug-in so it can be used with Cakewalk's Sonar and Fruityloops.

This version expands even further on what was a huge offering. There are 30 prebuilt instruments, from drum pattern sequencers to simple (and very complex) synthesisers. All these can be expanded to suit your needs – adding an extra effect is a case of wiring it in to the desired place using the Structure window. Once registered, you will gain access to the User library section of NI's website, where over 1,200 libraries are available for download.

NI has put considerable effort into improving ease of use and streamlining your instruments. First, the Browser window combines the search and disk operations you would normally find in the File menu (which is still there if you prefer it) with some of the Structure menu's functions, such as the Ensemble's input/output wiring. Having the most commonly used functions in one place speeds things up considerably,

though it may take a while for previous Reaktor users to adapt.

Managing snapshots of your settings is easier, as it now has its own window. You can have up to 16 banks, each with 128 snapshots and all snapshots are listed and can be edited from here and, most interestingly, you can morph between snapshots, with a transition time of up to 60 seconds.

The Sample Map Editor gets its own window too, and samples can be chronologically arranged using either the graphical or list views. Finally, besides the number of new modules that have been added (there are far too many to list), modules can now be Dynamic, and so will create new inputs and outputs should they be needed. This means that you don't have to have multiple instruments performing the same functions just to have the number of inputs you need. Hybrid modules are ones that will reconfigure themselves

from being an audio module to an event module automatically, which saves time.

These improvements not only make creating an instrument more fun and less time consuming, but also reduce CPU usage – according to Reaktor's CPU monitor, we very rarely needed more than 50 per cent of our processor's power.

However, that's not to say Reaktor isn't hard to get to grips with; it is and always has been baffling from the start, and dealing with its intricacies can be tedious. The excellent manual guides you through assembly and handling outputs well, though you may find it's weeks before you've mastered what it can do and assembled your own instrument.

This is not the sort of program you can jump straight into and make sweet soul music, or anything other than tuneless drivel for that matter. However, as an engineer's tool, it's superb, giving more flexibility than we knew what to do with. Be warned though, it's not for the fainthearted.

Mark Walsh

DETAILS

PRICE £349.99 (£297.86 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Native Instruments

www.nativeinstruments.com

SYSTEM REQUIREMENTS

700MHz processor • 256MB memory

• 300MB hard disk space • Windows

98 onwards

PROS Unlimited potential

CONS Tricky to get to grips with

VERDICT

Complex and hard to get used to, Reaktor 4 should be reserved for the most experienced of music software users. However, this is such a brilliantly featured high-end soft synth that it's hard to resist

EASE OF USE ★★★★★

FEATURES ★★★★★

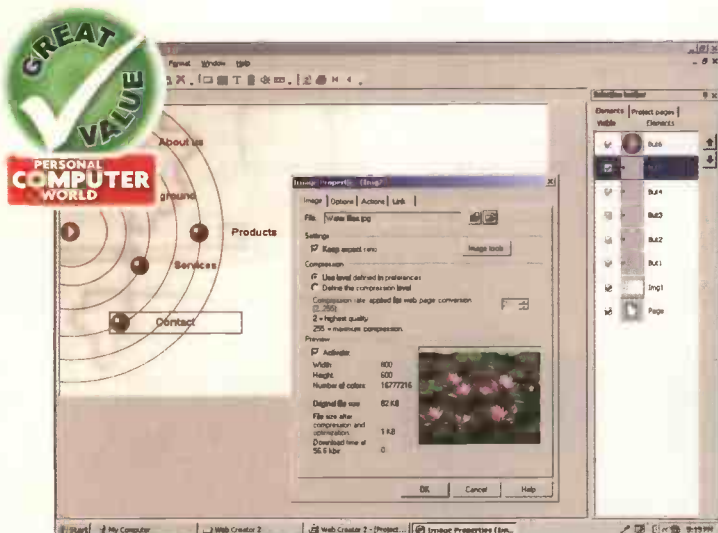
VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

WEB EDITOR

Web Creator 2

Get your website up and running in an hour



Live up your website by uploading images which you can then reposition with ease, and you can add buttons, sound and more

Web Creator 2 is a basic web-publishing tool aimed at the novice user with little or no experience.

Installation is pretty simple, although you do have to install the Microsoft .Net framework on which the application is based – this is contained on the program disc. Given the target market, it's a shame there aren't more instructions. It would have been helpful if the program launched into a dialogue box inviting you to name your website project, rather than leaving you to create a new project from the Edit menu on the main toolbar.

Once you've done this, however, the rest is child's play. There are over 150 basic page layout designs in the templates library or you can start from scratch. The library is thematically classified and the templates feature graphic or generic motifs. While they won't win you any awards for innovative design, the templates are handy to get you started.

You are then faced with the main project window featuring a shortcut toolbar across the top, and two panes – a project pane and a selection pane. These are for switching between different projects or components of the project you are working on.

Repositioning elements on your webpage is a simple drag and drop affair and you can create new elements such as buttons and text boxes, or upload images and sound clips using the shortcuts.

For more advanced settings, double-click on an element to bring up a new properties window, and when you're done, the program even helps you upload your website to an FTP server with the aid of a wizard.

Emilie Martin

DETAILS

PRICE £20 (£17.02 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Mindscape 01293 651 300

www.mindscape.co.uk

SYSTEM REQUIREMENTS

Windows 98 or higher • Min 233MHz

Pentium II processor • 64MB of Ram •

100MB of free hard disk space • 8x

CD-Rom drive • 16bit sound card

PROS A doddle to use; price

CONS Few advanced features

VERDICT

Everything you need to get a simple website up and running in under an hour, and great value too

EASE OF USE

FEATURES

VALUE FOR MONEY

OVERALL



OPTICAL CHARACTER RECOGNITION

Readiris Pro 8

Accuracy has been improved in this version

While Iris claims the new edition of this optical character recognition software is up to 35 per cent more accurate than the previous version, improvements in recognition only really come into play if you deal regularly with highly complex page layouts. Show Readiris Pro 7 a scanned page of printed text and it will interpret the raw characters just as ably. Where Readiris Pro 8 truly excels is in processing documents that contain a mix of images, tables, text and font styles and sizes.

The wizard-based interface is designed to aid beginners but in reality hinders recognition of more complicated documents. The system will automatically figure out the correct orientation of scanned pages and is adept at correcting the smallest skew, but its attempts at following the flow of multi-column text are poor. Better results are achieved using the program's zoning tool to highlight areas requiring recognition manually – Readiris managed close to 100 per cent recognition accuracy with our test documents in this way.

Show the program a page of script, however, such as joined-up characters, and recognition performance tails off. This is not

unusual, as no OCR package can deal with the irregularity in such documents, but it highlights the limitations of the technology.

Other additions include recognition of read-only pdf files and an option to output scanned documents as Wysiwyg (what-you-see-is-what-you-get) HTML, retaining the original layout and content. We tried this latter feature on a number of scans and were impressed.

Scott Colvey

DETAILS

PRICE £99.99 (£85.09 ex VAT)

BEST PRICE

www.pcw.co.uk/bestprices

PRODUCT INFORMATION

Widget 0800 138 1639

www.irislink.com

SYSTEM REQUIREMENTS

Windows XP/ME/2000/98/NT4/95,

Intel Pentium (or equivalent), 32MB

Ram (64MB recommended), 110MB

hard disk space

PROS Wizard-based interface;

HTML output

CONS Disappointing results on

complex pages

VERDICT

Great OCR but the price tag is

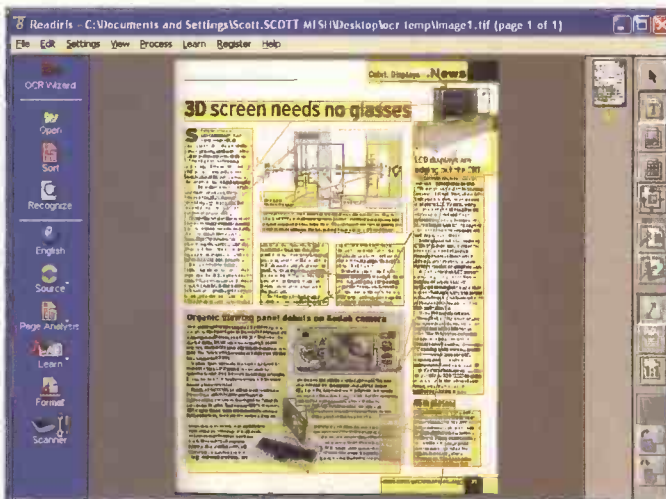
fanciful for such a niche product

EASE OF USE

FEATURES

VALUE FOR MONEY

OVERALL



Readiris Pro 8 is good at scanning and processing documents with a mix of images, tables and text, but not so good at recognising handwriting

Visual Basic .Net

Get to grips with the latest version of Microsoft's Windows programming language



Microsoft created Visual Basic, its programming language for Windows environments, around Basic, which has been on the scene since the 1960s. Early versions of VB lacked some of the more advanced features of C and C++, but its clearer syntax and easy form creation earned it a central place in Windows development.

The launch of Microsoft's .Net initiative provided the catalyst for an overhaul of Visual Basic, and it has emerged a more mature language with a truly object oriented approach offering greater opportunities for code re-use. Whether you have worked with earlier versions of Visual Basic or consider yourself a novice, there are plenty of handbooks that will help you get to grips with the latest version of this programming language, and this month we've rounded up three of the best.

Visual Basic .Net

The 'Read less – learn more' strapline used by all the titles in the Hungry Minds series hints at the more hands-on approach this book takes to learning. After a quick introduction to the features within Visual Basic, this book launches into 13 chapters, each offering a set of explanations outlining various aspects of programming. Each of these explanations follows

the same two-page format, with a quarter-page introduction, an example that includes four screenshots to illustrate the point, and an 'advanced' section for those who want to go one step further. This approach works well, covering complicated topics, including networking, dynamic link libraries and SQL Server access, with surprising depth.

Unfortunately, the chapters do not have introductions, which makes it hard to see where one topic ends and another begins – a page of introductory text would help set the context for the chapter. Partly because of this, the book only really provides an overview of the more complicated aspects of Visual Basic programming.

This book is the only one in this round-up to provide an accompanying CD-Rom featuring full code listings. The other two books reviewed here offer additional resources online, but a local copy is useful. An ebook is also provided, enabling you to perform searches in Acrobat.

Beginning VB.Net

If you favour a more traditional approach, *Beginning VB.Net*, second edition may be a more appropriate choice. It includes a significant amount of background information,

including a discussion of the nature of programming and an overview of the wider .Net framework. There is also a useful walkthrough for installing Visual Studio, and an explanation of how the suite is organised.

Each of the 19 chapters starts with an introduction, following the best traditions of public speaking by telling the reader what they are about to be told, delivering the message and then summarising the information they have been given. There are exercises along the way that take you step by step through the process of writing out each piece of code. Questions at the end of each chapter aim to consolidate what you've learnt.

Complicated topics are left for later in the book and more advanced features, including web services and database access, are also included.

Visual Basic .Net Unleashed

The alarmingly named *Visual Basic .Net Unleashed* is aimed at the intermediate-level programmer. Like *Beginning VB.Net* it introduces the Visual Studio environment and includes an extremely useful section describing the process of writing macros in Visual Studio to automate repetitive tasks. There is also quite a lengthy comparison between Visual

Basic version 6 and .Net, which is handy for anyone with experience of Visual Basic.

There are four main topic-based sections – introducing Visual Basic .Net, advanced object-oriented programming, user interface design and building web services – which are split into 20 chapters, each with its own introduction and summary. The tone is more discursive than that of the other books reviewed here, with less emphasis on tutorials and exercises, but it includes many useful features such as line numbering in example code listings.

Your choice of handbook will depend on your existing level of knowledge of earlier Visual Basic versions. If you're just brushing up your programming skills, *Visual Basic .Net Unleashed* will help acquaint you with the new features of the latest version. If you're dipping your toe in the water for the first time, *Visual Basic .Net* will give you a comprehensive grounding in the basics, while *Beginning VB.Net* is a good tool for consolidating and building upon a basic knowledge of the language.

Tim Smith

DETAILS

TITLE Visual Basic .Net

PRICE £21.99

AUTHOR Richard Bowman

PUBLISHER Hungry Minds

ISBN 0-764536-49-4

RATING

★★★★★

TITLE Beginning VB.Net

PRICE £31.99

AUTHOR Richard Blair, Jonathan Crossland, Matthew Reynolds & Thearon Willis

PUBLISHER Wrox

ISBN 1-861007-61-2

RATING

★★★★★

TITLE Visual Basic .Net Unleashed

PRICE £36.50

AUTHOR Paul Kimmel

PUBLISHER Sams

ISBN 0-672322-34-X

RATING

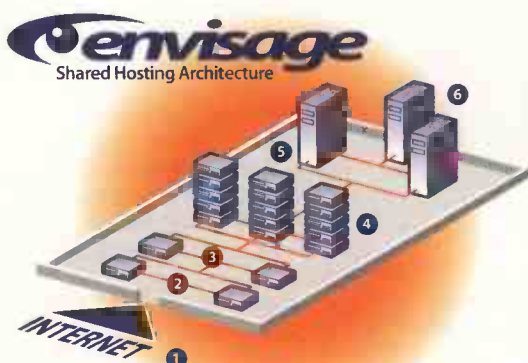
★★★★★

100%

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- Ideal for business critical websites
- 100% uptime guaranteed

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- 2 Internal Firewall - Second protective shield
- 3 Load Balancers - Efficiently distributes traffic across server clusters
- 4 Redundant Web Servers - Ensures delivery of site contents if one server fails
- 5 Network Storage - Independent storage optimising server performance
- 6 Disk Backup - Routine backup storage to prevent data loss



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Business account at a glance

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Our award winning online control panel is the industry leading tool for managing and provisioning your services. You can control everything from the web - from setting up domains, email, databases, installing FrontPage Extensions and more!

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Password Protected Folders on your sites
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FOR THE LATEST,
BEST PRICES

ENTRY-LEVEL PC

Systemax Inspire 3127

REVIEW June 2003, p51 RRP £821.33

(£699 ex VAT) **PRODUCT INFORMATION**

Systemax 0870 7297 366 www.systemaxpc.co.uk

An Nvidia Nforce2 motherboard shows its performance, with an Athlon 2500+ and a Geforce FX5600 Ultra graphics card. A 19in monitor makes this an amazing bargain for an entry-level system.



MID-RANGE PC

Evesham Axis 2600+ SK

REVIEW September 2003, p52 RRP £1,176.83

(£999 ex VAT) **PRODUCT INFORMATION**

Evesham 0870 160 9500 www.evesham.com

Evesham is offering looks as well as performance with this well-balanced system. An Athlon 2600+ with 512MB of Ram and an ATI Radeon 9600 provide a solid backbone.



HIGH-END PC

Hi-Grade Ultis PV4 GPW02

REVIEW February 2003, p109 RRP £1,410

(£1,200 ex VAT) **PRODUCT INFORMATION**

Hi-Grade 020 8532 6123 www.higrade.com

Backing up the 2.8GHz CPU and 512MB of Ram inside this PC is a massive 160GB Raid array and a Geforce4 Ti4800. A front-mounted unit takes various memory cards and features USB2 ports.



FULLY FEATURED NOTEBOOK

Hi-Grade M6700

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 M6700 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-TRIMP

REVIEW August 2003, p47 RRP £1,799

(£1,531 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 2002, 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.



FLAT-PANEL MONITOR

CTX PV722E

REVIEW May 2003, p69 RRP £449 (£382.13 ex VAT)

PRODUCT INFORMATION CTX 01923 810 800

www.ctxeurope.com

CTX has updated the previous model in this range with a powered USB2 hub and a detachable speaker section. The display performance is good with excellent viewing angles. A pivot mode is also included.



17IN CRT MONITOR

NEC-Mitsubishi Diamond Pro 750SB

REVIEW October 2002, p61 RRP £163.33

(£139 ex VAT) **PRODUCT INFORMATION**

NEC-Mitsubishi 08701 201 160 www.nec-mitsubishi.com

The 750SB is pretty much infallible as far as 17in monitors go. It's very compact, reasonably good looking and has fantastic image quality, but it's the price that really stunned us – it's amazingly cheap.



19IN MONITOR

CTX PR960F

REVIEW June 2002, p125 RRP £319

(£271.49 ex VAT) **PRODUCT INFORMATION**

CTX 01923 810 800 www.ctxeurope.com

Excellent image quality, as well as a USB hub, make this 19in monitor more than worth its £319 asking price. Although this display is a little on the large side, it does have both VGA and BNC inputs.



PDA

Palm Tungsten T

REVIEW January 2003, p61 RRP £299

(£254.47 ex VAT) **PRODUCT INFORMATION**

Palm 018 974 2700 www.palm.com/uk



The first device to adopt Palm OS5 is also one of the best PDAs around. It features Bluetooth, the screen is almost without fault and it's the fastest PDA we've ever laid our hands on.

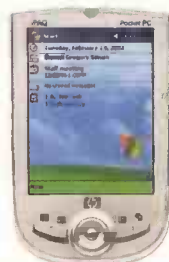
POCKET PC

HP Ipaq 1910

REVIEW May 2003, p72 RRP £199

(£169.36 ex VAT) **PRODUCT INFORMATION**

HP 0845 270 4222 www.hp.com/uk



This may be the smallest Pocket PC available, but no compromises have been made in its capabilities. The screen is excellent under all conditions. There is an SD slot and 64MB of Ram.

MULTIFUNCTION DEVICE

Lexmark X1150

REVIEW September 2003, p66 RRP £79

(£67.23 ex VAT) **PRODUCT INFORMATION**

Lexmark 0870 727 2100 www.lexmark.co.uk



Good output quality and low price make up for slow print speeds. This is a compact device which doesn't sacrifice paper handling qualities, and has some good features.

SCANNER

HP Scanjet 4500c

REVIEW February 2003, p125 RRP £129

(£109.79 ex VAT) **PRODUCT INFORMATION**

HP 08705 474 747 www.hp.co.uk



Once again, HP shows that it can combine good hardware with great software. The scanner has plenty of shortcut buttons and won't keep you hanging around for scans to finish.

LASER PRINTER

Epson EPL-5900

REVIEW April 2003, p179 RRP £304.33

(£259 ex VAT) **PRODUCT INFORMATION**

Epson 0800 220 546 www.epson.co.uk



Excellent photo and text quality, backed up by exceptional ease of use, put the EPL-5900 at the top of the list. It may not be much to look at but it's a speedy worker that's ideal for the small office.

INKJET PRINTER

Canon i470D

REVIEW September 2003, p126 RRP £179

(£152.34 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.

WEBCAM

Philips Touchcam Pro PCVC-740K

REVIEW March 2002, p139 RRP £54.04

(£45.99 ex VAT) **PRODUCT INFORMATION**

Philips 0800 169 8430 www.philips.co.uk



This is a brilliant webcam that can be used for high-resolution still snaps, or 60fps video at 640 x 480. It is even capable of text recognition, with the help of Xerox's Pagecam technology.

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 £199.99

(£170.20 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.

LOW-END SPEAKERS

Creative Inspire 6700

REVIEW December 2002, p59 RRP £99.99

(£85.10 ex VAT) **PRODUCT INFORMATION**

Creative <http://europe.creative.com>



These 6.1 speakers are great sounding, and not too bad to look at either. They are also capable of 'upmixing' a 5.1 signal to a 6.1 one, as well as having one of the lowest signal-to-noise ratios around.

ATHLON MOTHERBOARD

Gigabyte 7VXP-A Ultra

REVIEW August 2003, p116 RRP £108.10

(£92 ex VAT) **PRODUCT INFORMATION**

Gigabyte 01908 362 700 www.gbt-tech.co.uk



This board from Gigabyte is packed full of features. There are extra IDE and Serial ATA connectors, and enough back brackets to fill a case without any extra cards.

PENTIUM 4 MOTHERBOARD

Abit IC7-G

REVIEW August 2003, p118 RRP £161

(£137.02 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 Serilnel adaptor for parallel hard drives.

DIGITAL VIDEO CAMERA

Sony TRV33E

REVIEW July 2003, p142 **RRP** £800 (£680.85 ex VAT)

PRODUCT INFORMATION Sony 0870 511 1999

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.

GRAPHICS CARD

Gainward Powerpack Pro/450 TV

REVIEW August 2002, p118 **RRP** £43.09

(£36.67 ex VAT) **PRODUCT INFORMATION**

Gainward www.gainward.com



Geforce MXs mean great value for money. This card has a single VGA and a TV-out in addition to good performance. However, there isn't any extra software beyond the Nvidia drivers.

VIDEO-EDITING CARD

Hercules All-in-Wonder 9000 Pro

REVIEW March 2003, p74 **RRP** £178.44

(£151.86 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.

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.

DVD-RW

NEC Multispin ND-1100

REVIEW July 2003, p71 **RRP** £126.02

(£107.25 ex VAT) **PRODUCT INFORMATION**

NEC 0870 106 3225 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

Asus CRW-5224A

REVIEW October 2002, p116 **RRP** £44.58

(£37.94 ex VAT) **PRODUCT INFORMATION**

Asus www.asus.com



Optimised for quiet and error-free performance, the CRW-4816A stands out from the crowd. This model is now only available as a 52x speed version, but has Nero and a 2MB buffer as before.

OFFICE SOFTWARE

Ability Office

REVIEW April 2003, p194 **RRP** £48.29 (£41.50 ex VAT)

PRODUCT INFORMATION Ability 020 7231 6310

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.

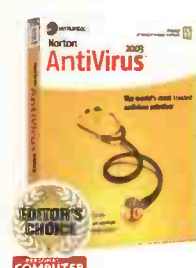
ANTI-VIRUS SOFTWARE

Symantec Norton Anti-virus 2003

REVIEW August 2003, p140 **RRP** £39.99

(£34.03) **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 MX

REVIEW December 2002, p153 **RRP** £359

(£305.53 ex VAT) **PRODUCT INFORMATION**

Macromedia 0800 169 8216 www.macromedia.com/uk



A very powerful web-editing suite supporting most server technologies and integrates with other Macromedia products. Dreamweaver needs effort, but the results are worth it.

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

Zone Labs Zonealarm Pro

REVIEW February 2003, p73 **PRICE** £49.95

(£32 approx) **CONTACT** Zone Labs

www.zonelabs.com



Building on the success of the free version, Zonealarm Pro offers more security but keeps the easy-to-use interface. However, support is limited to email and it is only available online.

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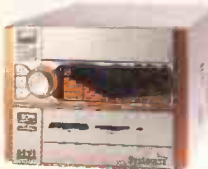
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- **PROCESSOR** Intel® Pentium® 4 2.66GHz 533FSB
- **MOTHERBOARD** MSI SiS 651
- **MEMORY** 512MB PC2700 333DDR
- **HARD DRIVE** 120GB Ultra DMA 100 7200rpm
- **DVD/CD-ROM** Systemax 52x24x52 CDRW & 16x DVD combo drive
- **MONITOR** 17" CTX black LCD S700B
- **GRAPHICS CARD** MSI NVIDIA® GeForce™ FX 5200 Personal Cinema 128MB AGP8X TV-Out/DVI/TV Tuner/PVR Inc remote
- **SPEAKERS** Videologic ZXR-550 5.1 surround sound
- **SOUND CARD** On-board 5 channel digital
- **EXTRA SOFTWARE / HARDWARE** LCM Graphic Equalizer display, AM/FM radio, MP3/CD playback with remote control, 6-in-1 media card reader, 2x On-board IEEE1394 Firewire ports, On-board 56K V90 modem, Optical SPDIF-in port, Front facing microphone in & headphone ports, On-board 10/100 Fast Ethernet, Ability Office, Logitech Cordless Optical Solution, Microsoft® Windows® XP Home, 3 Years Hardware On-site Warranty

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SYSTEMAX INSPIRE 3185

PART NO: BR70909

- **PROCESSOR** AMD Athlon™ XP 2800+ 333FSB with Quantispeed™
- **MOTHERBOARD** MSI K7N2 (nVIDIA® nForce2™) • **MEMORY** 512MB PC2700 333DDR
- **HARD DRIVE** 120GB Ultra DMA 100 7200rpm • **DVD/CD-ROM** Systemax 16x DVD-ROM drive & Systemax 52x16x52 CD-RW drive • **MONITOR** 17" CTX LCD S700
- **GRAPHICS CARD** ATI All-in-Wonder 9200SE 128MB AGP8X TV-out/DVI inc remote
- **SPEAKERS** Creative Inspire 4400 Speakers • **SOUND CARD** nVIDIA® SoundStorm™ 5.1 Dolby Digital • **EXTRA SOFTWARE / HARDWARE** On-board 10/100 Fast Ethernet, On-board IEEE1394 Firewire port, Systemax wheel mouse, Systemax deluxe keyboard
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SYSTEMAX TRAVELBOOK® 4540

PART NO: BR70414

- **PROCESSOR** Intel® Pentium® 4 2.8GHz 533FSB • **MEMORY** 512MB PC2100 DDR266
- **HARD DRIVE** 60GB Ultra DMA 100 • **DVD/CD-ROM** DVD/CD-RW combo
- **OPERATING SYSTEM** Microsoft® Windows® XP Home • **MONITOR** 15" SXGA+ TFT colour display • **EXTRA SOFTWARE / HARDWARE** Cyberlink Studio, Symantec Norton Anti-Virus 2003, Ability Office, SiS645DX chipset motherboard, Optional external USB 3.5" 1.44MB floppy drive, ATI Mobility Radeon 9000 M9 64MB DDR graphics, 5.1 channel support & built-in dual stereo speakers, 1x PCMCIA Type II, 1x InfraRed port, 1x S-Video out port, 4x USB 2.0 ports & Firewire™, Internal 56K fax/data modem & 10/100 Ethernet, CD control panel, 12-Cell Li-ion battery & AC adaptor, 2 Year Hardware collect & return Warranty • **EASY PAY PLAN FINANCE OPTION AVAILABLE**

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SYSTEMAX INSPIRE 3165

PART NO: BR70908

- **PROCESSOR** AMD Athlon™ XP 2500+ 333FSB with Quantispeed™ • **MOTHERBOARD** MSI K7N2G (nVIDIA® nForce2™) • **MEMORY** 256MB PC2100 266DDR • **HARD DRIVE** 120GB Ultra DMA 100 7200rpm • **DVD/CD-ROM** Systemax 52x24x52 CD-RW & 16x DVD combo drive • **MONITOR** 15.1" CTX LCD • **GRAPHICS CARD** On-board nVIDIA® GeForce 4 MX440 + 8x AGP slot • **SPEAKERS** Creative SBS-250 speakers
- **SOUND CARD** MSI S-Bracket for On-board 6 channel digital sound • **EXTRA SOFTWARE/ HARDWARE** On-board 10/100 Fast Ethernet, Microsoft® Works Suite 2002, On-board IEEE1394 Firewire port, Systemax wheel mouse, Systemax deluxe keyboard
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SYSTEMAX INSPIRE 3230

PART NO: BR70911

- **PROCESSOR** AMD Athlon™ XP 3000+ 400FSB with Quantispeed™
- **MOTHERBOARD** MSI K7N2 (nVIDIA® nForce2™) • **MEMORY** 1GB PC2700 333DDR
- **HARD DRIVE** 160GB Ultra DMA 100 7200rpm • **DVD/CD-ROM** Sony DVD±RW drive • **MONITOR** 17" CTX LCD S700 • **GRAPHICS CARD** MSI nVIDIA® GeForce™ FX 5900 128MB AGP8X TV-Out / DVI • **SPEAKERS** Videologic ZXR-750 7.1 surround sound • **SOUND CARD** nVIDIA® SoundStorm™ 5.1 Dolby Digital
- **EXTRA SOFTWARE / HARDWARE** On-board 10/100 Fast Ethernet, Systemax 3.5" 6-in-1 media card reader, Creative Muvo™ 64MB MP3 player, On-board IEEE1394 Firewire port, Lexmark X1150 All-in One (Print/Scan/Copy), Systemax cordless keyboard & mouse
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DIY upgrades

WORDS: SIMON WILLIAMS ILLUSTRATION: DAVID ANGEL

The progress of technology in the PC industry never seems to falter, and there's always some new piece of kit that makes tomorrow's PCs infinitely better than today's. In many cases, though, you don't need to buy a completely new computer to benefit from these advances. Adding a new processor, graphics card or more memory can make a radical difference to an existing computer.

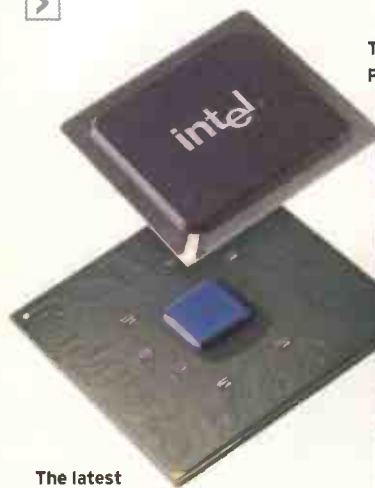
But how radical, exactly? Are we talking 10 per cent, 50 per cent or 200 per cent improvement? And how much is it going to cost? If it costs £500 for upgrades, wouldn't it be better to spend £700 or £800 for a completely new PC?

What you really need is a breakdown of the costs and likely benefits of upgrading, and that's just what we're going to give you here. We'll look at each of the main parts of a PC that are worth upgrading and indicate the advantages and disadvantages of each, and we'll go further than that by quantifying those advantages to indicate how much faster or how improved an upgraded PC will be, in comparison with a PC platform from three years ago.

It's not all about raw performance, though. We'll also be looking at the extra facilities you can add to a PC with sockets, slots, sound and speakers. Recent innovations such as USB2, Firewire and Bluetooth can revitalise an old machine and put it back at the heart of an entertainment system in the home. Rewritable DVD drives can make semi-professional video editing a reality and an LCD monitor can claw back valuable space on a crowded desktop.

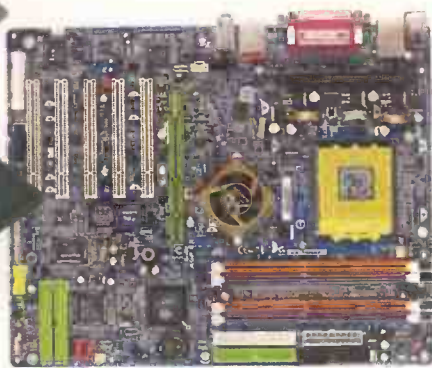
Finally, we'll explore the various customisations you can carry out on a PC, to make it run cooler and quieter and look less like every other beige box on the block. Without spending a fortune, and with the aid of just a pair of tin snips and a fluorescent tube, you too can have the PC equivalent of a '69 Chevy with a hemi-head and a set of 18in slicks. Let's go cruising.

Does it make more sense to buy a new PC or upgrade some key components? Simon Williams reveals the true cost benefits of upgrading your system



The latest 3GHz Pentium 4 supports an 800MHz front-side bus, and others will follow

The latest system boards for Athlon XP and Pentium 4 include Serial ATA, onboard sound and many extras



Motherboard and processor

The motherboard and processor are two major PC components that need to be considered together, since it's often the case that you can't upgrade the processor without fitting a new system board as well. Although it may be possible to use a processor similar to the one already fitted, this is only likely to give you a marginal performance boost. Also, if the PC is over a year old, it may be difficult to buy a faster processor that will fit your existing system board.

If you're going to fit a new system board, your first choice is whether to buy one for an Intel Pentium 4 or for its main rival, AMD's Athlon XP. For the fastest raw performance, you'd have to take the Pentium 4 route, as the 3GHz chip, with its 800MHz front-side bus (FSB), is faster than anything else currently on the market. The processor itself will cost you about £340 and a suitable system board from a manufacturer like Asus will add around £160 to this.

Fit both system board and processor, and the Sysmark rating will climb to something around 325, though this increase is partly due to other factors, such as the graphics card and memory. So, upgrading the processor in a typical mid-range three-year-old PC to a top-of-the-range chip today should provide a performance increase of around 460 per cent.

At an economy level, you could go for an AMD Athlon XP 2200+, which will give you a Sysmark rating of about 195, still nearly three times as fast as the Pentium III 800. It will cost you around £110 with a suitable system board.

What about the complexity of installing a new motherboard? It's certainly not as simple as fitting extra memory or even adding a hard drive, but the procedure isn't that complicated. If you feel uneasy about doing the job yourself, there are plenty of dealers, or perhaps the original supplier of your PC, who may undertake the work for you.

In outline, you open the case, remove all the expansion cards from their slots at the back of the system board, unplug all the cables connected to the board, undo the screws holding it to the case and remove it. Reverse the whole procedure to fit the new board. If you're running Windows XP, you may need to reactivate the operating system with Microsoft, because of the changes to your PC's specification.

In replacing the motherboard in your PC you gain a lot more than compatibility with a modern processor. The new board should have the latest support chipset, offering faster access to memory and graphics card, all the new connection standards and connectors for updated equipment, such as fast Serial ATA (SATA) hard drives.

Replacing the system board and processor will typically cost you between £110 and £500 and is one of the most expensive combinations to update, the punch per pound is only fair (see graph below), but it does affect every program you run on your PC. This is an important consideration because unlike, say, a graphics card, where the main benefit is for games and other graphics applications, with a processor upgrade you'll see as much performance boost in your Internet browsing as you do in Half Life.

Graphics card

If your interests lie in using your PC for leisure, either to play games or for creative work such as digital photography or video editing, a very important component is the graphics card. Graphics performance has increased dramatically in the past two or three years and a new graphics card can re-energise a tired PC, even with a comparatively slow main processor.

You'll see most of the benefit of a new graphics card on 3D applications, and almost exclusively with games. Although there's some improvement in 2D performance which you need for DVD playback and video, you're really paying your money for smoother games.

What performance increase?

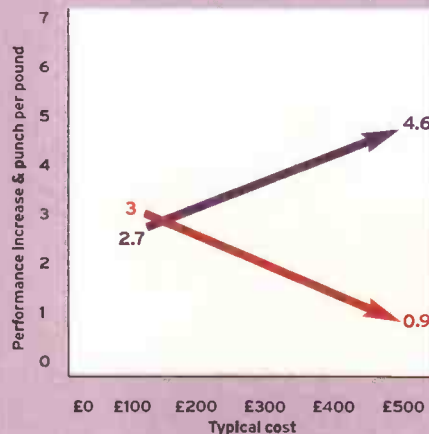
For each of the key components in a PC, we've looked at the likely performance increase you'll gain and the cost of fitting the upgrade. By dividing the first by the second and multiplying it by 100 we've produced a 'punch per pound' rating (performance increase/upgrade cost x 100 = Punch per pound index), so you can see at a glance which upgrades are the most cost-effective.

We did our tests on a three-year-old system using an 800MHz Pentium III, which produces a Sysmark 2002 rating of 71. The fastest Pentium III ever made is a 1.4GHz and the motherboard in this machine won't take a chip faster than 1GHz. To make any dramatic improvement, you'd have to change both the system board and the processor sitting in it.

The graphs on the right show the performance increase over our test PC compared with how much you could spend on an upgrade, and the punch per pound, again compared against cost.

Key: — Performance increase
— Punch per pound

System board and processor



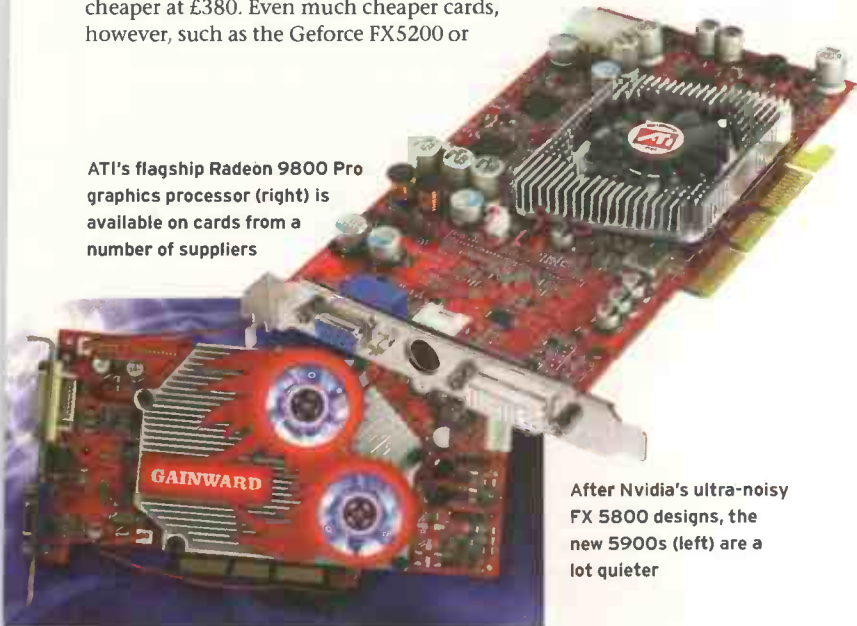
If you like to play the latest releases, you'll really notice the difference in two main areas. The frame rate – measured as frames per second (fps) or number of complete updates of the screen per second – drops as the complexity of a scene increases. You're aiming to keep the frame rate above 30fps, even in the most complex stages of a game, which may mean it's topping well over 100fps when less is going on.

The other key area is picture quality, which breaks down into: the resolution of the picture (that is, the number of dots it contains); the number of polygons used to draw complex surfaces such as a human face; and the sophistication of textures used to simulate surfaces such as walls and floors.

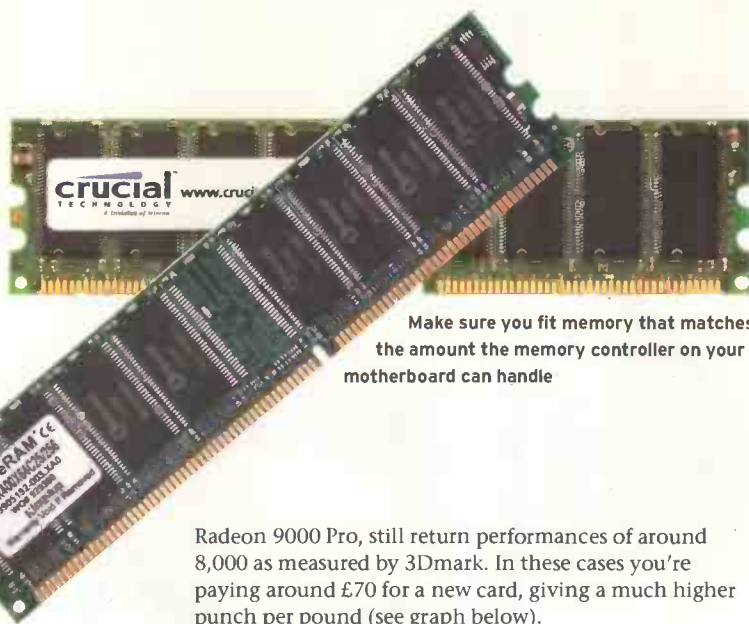
Moving from a graphics card that was considered close to state-of-the-art three years ago – Nvidia's GeForce2 GTS – to a card occupying the top slot today – a GeForce FX5900 Ultra or ATI Radeon 9800 Pro – will double or triple frame rates. This results in 3Dmark 2001SE indexes moving from 2,800 on the GeForce2 GTS up to around 18,000 on either of the new cards.

This kind of graphics technology doesn't come cheap, with the GeForce FX5900 Ultra costing typically £400 and the ATI Radeon 9800 Pro coming in only slightly cheaper at £380. Even much cheaper cards, however, such as the GeForce FX5200 or

ATI's flagship Radeon 9800 Pro graphics processor (right) is available on cards from a number of suppliers



After Nvidia's ultra-noisy FX 5800 designs, the new 5900s (left) are a lot quieter



Make sure you fit memory that matches the amount the memory controller on your motherboard can handle

Radeon 9000 Pro, still return performances of around 8,000 as measured by 3Dmark. In these cases you're paying around £70 for a new card, giving a much higher punch per pound (see graph below).

As with most of the core components in a PC, the graphics adaptor can't be considered on its own. For one thing, it's dependent on the speed of the AGP bus. The AGP bus is the connection between the processor and the graphics adaptor and can be rated at 1x, 2x, 4x or 8x. If you buy a new graphics adaptor for your PC, rated at 4x or 8x AGP, it will still only run at 1x or 2x, if that's all your motherboard can manage. The AGP bus will always run at the slowest rating in the system.

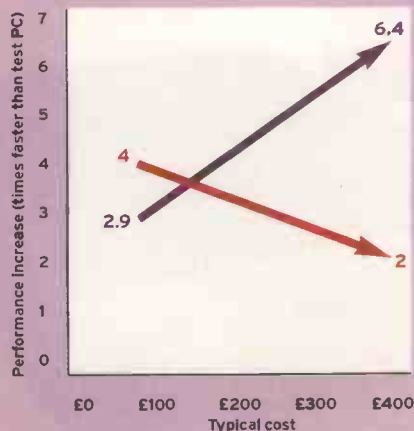
Fitting a new graphics card is straightforward and involves no more than unplugging the monitor from the old card's back panel, removing the retaining screw and lifting the old card out of its slot. Push the new one into place, refasten the screw, plug in the monitor and you're there – just a few minutes' work.

Memory

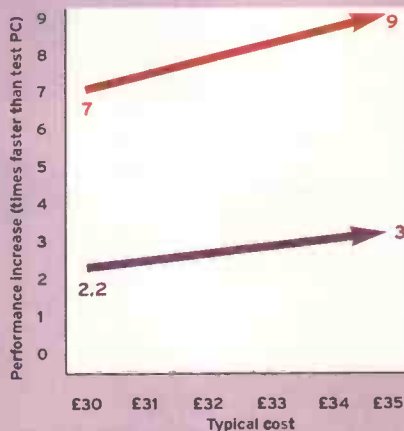
There are two distinct ways of upgrading the memory in your PC. You can simply add more to the existing complement by plugging in an extra memory module of the same type. However, if you're upgrading your system board, you should go for new memory. The advantage of new memory is that it will have substantially higher bandwidth than you would find in a three-year-old PC. In other words, it will run faster.

The bandwidth of the memory in your PC is not just a function of the memory chips themselves, but also depends on the memory controller, which is part of a PC's

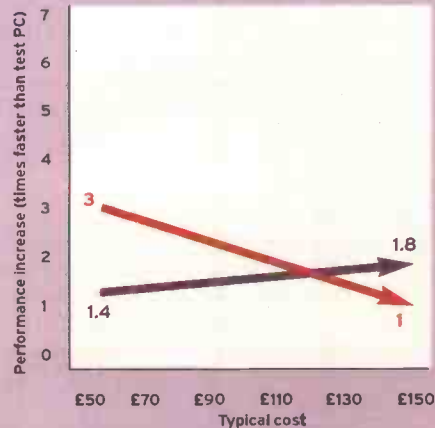
Graphics card



Memory

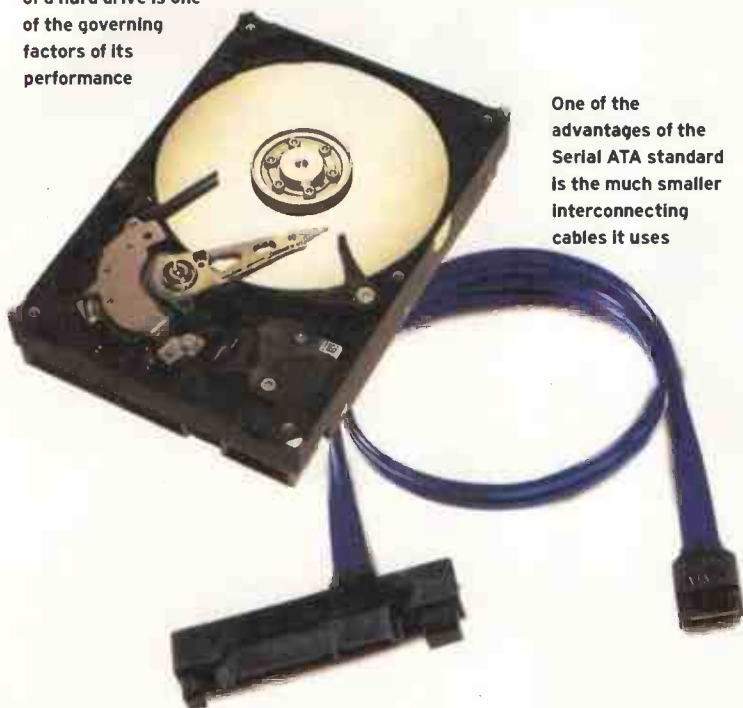


Hard drive





The rotational speed of a hard drive is one of the governing factors of its performance



One of the advantages of the Serial ATA standard is the much smaller interconnecting cables it uses

chipset. In the same way, there have been improvements in processors, and new chipsets include improved memory controllers and increased speed for the memory bus. Although it will work, there's no point in fitting memory with a higher bandwidth than is supported by the chipset on your system board – you won't see the extra performance of the memory.

A technique called double data rate (DDR) effectively doubles the amount of information that can be transferred to and from memory during each processor clock cycle. DDR memory is found in nearly all new PCs. You can take advantage of the improved performance in an existing PC by installing a new motherboard with an up-to-date chipset that supports DDR.

The memory in our test machine, 128MB of SD-Ram running at 133MHz, has a bandwidth of about 950Mbytes/sec according to the Sisoft Sandra benchmark. Upgrade to 333MHz of PC2700 DDR memory and you're looking at a bandwidth of about 2,050Mbytes/sec, while 400MHz PC3200 DDR can produce up to 2,900Mbytes/sec.

Although memory prices have stopped falling at the rate they did last year, new memory is still a cheap upgrade. A 256MB module, probably the minimum size you should fit as an upgrade, will cost around £30 for a 333MHz stick and £35 for one which can run at 400MHz. See the graph for the performance increase and punch per pound.

Hard drive

The main reason to upgrade your hard drive is not so much to improve performance, but to give yourself more storage room. While there have certainly been speed improvements in the design of hard drives in the past three years, these generally won't give you the kind of overall performance boost that upgrading the processor or graphics card will.

The main performance improvements have been increased spindle speed, the rotational speed of the disk

platters inside the drive and, recently, the move from parallel to serial connection. The latest SATA drives use smaller, neater cables and have a theoretical data transfer rate of 150Mbytes/sec.

The maximum throughput from drives with a parallel interface is 100Mbytes/sec, but three years ago you would be lucky to have had a drive with a throughput of more than 66Mbytes/sec fitted to your PC. Therefore, there is a potential performance increase of around 230 per cent. With that in mind, if you're thinking of switching to a serial hard drive you'll need to fit a new motherboard with support for this standard.

Using Sisoft Sandra 2003 again, the 20GB Quantum Fireball P drive in our three-year-old test PC delivered 16.3Mbytes/sec, where an ATA100 device produced 23.3Mbytes/sec and a Serial ATA150 drive managed 29.5Mbytes/sec, not quite double the throughput. The reason these figures are much lower than the theoretical maximums is that these measured figures are sustained transfer rates, where the headline figures above are peak numbers for so-called burst transfers.

Certain types of application gobble up hard drive space like there are no days left in the week. These include storing digital music, high-resolution digital photographic images and most especially digital video. Good-quality video needs about 80MB of storage per minute of programme, so an hour's worth could occupy 5GB. If you're editing substantial sections of a video, storage requirements will be a lot higher, so you should think of buying a hard drive of 60GB or more for this kind of work.

Unlike upgrading your processor, when you add a hard drive to your system you don't have to remove your old one (unless you're switching from parallel to serial connections). A 60GB hard drive will cost you around £55, while a 160GB SATA device runs to about £150. In the punch per pound graph, we've assumed you're changing the motherboard in your PC for a new processor and therefore haven't added the cost of the board to the high-end hard drive figure.

DVD rewriters

Most PCs built in the past five years are fitted with CD drives, many of them with CD-RW and DVD drives, too. With a DVD drive, you have the versatility to play DVD movies and run DVD-based applications. With a CD-RW



When buying discs to use with your DVD rewriter, make sure you get the right format for your drive



There are several competing formats of DVD rewriters on the market, though DVD+RW is currently the most popular

you can read and write most kinds of recordable and rewritable CD media.

Now, though, you can go one step further with a DVD rewriter. These devices will write to 4.7GB recordable and rewritable DVD discs. This means you can record video up to approximately two hours on a single disc. DVD rewriters are also compatible with most CD-RW and CD+RW formats, so you have the facilities of a CD rewriter, too.

Fitting a DVD rewriter is very simple, as long as you have a spare 5.25in bay in your PC. Remove the blanking plate from the front of the PC, slide in the drive and connect power, data and audio cables to the sockets on its back panel. If you already have two CD or DVD drives fitted to your computer, you may need to disconnect one and replace it with the DVD rewriter.

Just to complicate matters, there are two rival groupings for rewritable DVDs. The DVD+RW standard is supported by Dell, HP, Mitsubishi, Philips, Ricoh, Sony and Yamaha, giving it a headstart. This standard is directly compatible with most standalone DVD players, so is very flexible.

Hitachi, Panasonic and Pioneer support the alternative standards of DVD-RW and DVD-Ram, with DVD-Ram being the closest equivalent to DVD+RW in terms of the number of rewrites – around 100,000 – you can make to a single disc.

Typical prices of DVD+RW and DVD-Ram drives range from £130 to £270, depending on specification and manufacturer. Blank DVDs will set you back at least £5 a go.

Sockets and connections

A PC that's three years old or more is unlikely to have the latest connection sockets. On a new PC, you'll find four or more USB connections, probably to the faster but

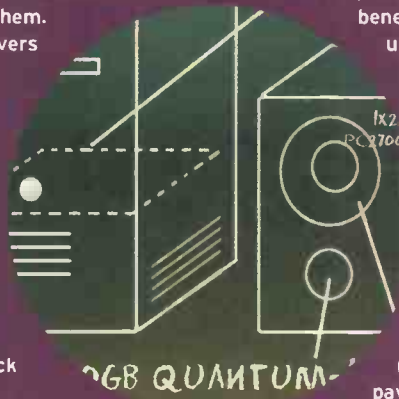
Save money with updated drivers

There is a route you can take to upgrading your PC which involves no money at all. Most of the key hardware components in your PC have corresponding software drivers, which enable the operating system on your PC to work efficiently with them. The software drivers are normally maintained by the manufacturers of the hardware and the first thing you should do, before investing in hardware upgrades, is check your drivers.

The best places to go are the websites of the appropriate hardware manufacturer. Most companies offer drivers in their support sections and it's a comparatively simple job to download the files and install them. Getting the

latest drivers has the double benefit of ensuring the hardware is running as well as its makers intended and, possibly, removing unwanted 'features'.

Graphics cards are the most likely components to benefit from an update to their drivers. Because of the complexity of graphics hardware and the wide variety of games that can be run on them, card manufacturers pay constant attention to their software drivers and frequently update them to squeeze the best possible performance out of the hardware. If you upgrade your graphics card, still check for new drivers, as those in the box may be several months old.



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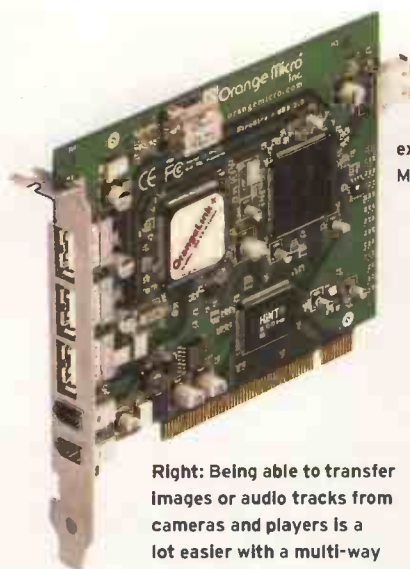
www.smcdirect.com/kingston.asp

or



www.pcupgrader.com/kingston.asp





Left: Adding the latest connections to an older PC is simple with combo expansion cards such as this Orange Micro unit

Right: Being able to transfer images or audio tracks from cameras and players is a lot easier with a multi-way card reader



backwards-compatible USB2 standard. There are also likely to be several Firewire sockets and possibly slots to take memory cards out of digital cameras or MP3 players.

You can add all of these to an older PC by buying and fitting expansion cards. As an example, Orange Micro produces a £110 combo expansion card with three Firewire and two USB2 sockets, all on one backplate (pictured above). A quick trawl through the sites of web suppliers such as www.dabs.com or www.simply.co.uk will turn up generic alternatives, too.

There's no specific performance improvement attached to these extra sockets, but the facilities they offer for connecting external equipment could well make your PC a lot more useful at little extra cost. The kind of things you can connect to a USB2 socket range from printers and scanners to external drives and MP3 players. Firewire sockets are ideal for connecting digital video cameras.

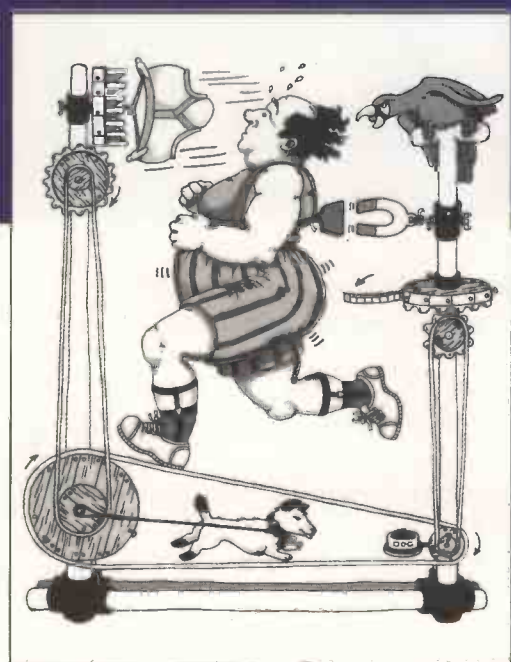
With nothing more than a Firewire card, costing £50 or so, and a copy of a video-editing package, such as Scansoft's Videowave or Ulead's Video Studio, you can upload video from your digital video camera, edit it and save the results onto your hard drive. If you also upgrade your PC with a DVD rewriter, you can save the result onto a disc which can then be played on any DVD player.

Multi-way memory card readers enable you to slot in Smartmedia, Compact Flash (CF), Memory Stick, Secure Digital (SD) and Multimedia Cards (MMC), so you can easily transfer images and recordings from virtually any digital camera or MP3 player. You can get versions that plug into a USB socket or fit directly into a 3.5in drive bay.

Monitor

The graphics card is only half the battle in getting a decent picture out of your PC. Three years ago your choice may have been limited to a conventional CRT monitor with a curved face, unless you were prepared to pay over £500. Now, though, several PC suppliers claim that over 80 per cent of their new systems are supplied with LCD screens.

Even if you can't run to an LCD as an upgrade – they still attract a substantial price premium – you can now buy a conventional monitor with a truly flat glass face. Either of these options will greatly improve the clarity and detail of the picture you see on the screen. The LCD solution also offers considerable space-saving opportunities on your



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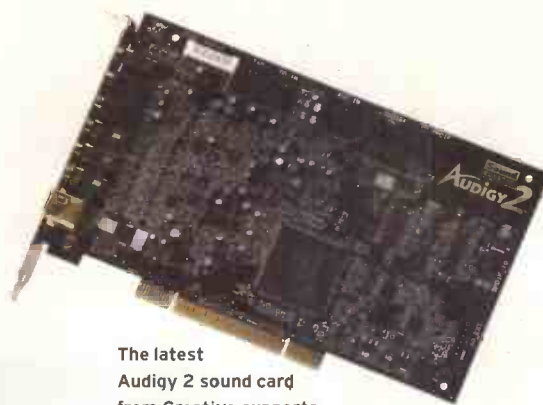
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Do you buy new or upgrade?

The decision whether to buy new or upgrade an existing PC usually depends on how extensively you would need to upgrade your current computer to bring it up to spec. It is also worth bearing in mind that buying new means you end up with two PCs rather than one. You could always pass old machines on to a deserving cause – such as children, a local school or a charity.

The table below shows that going for a moderate performance increase, using components which are no longer cutting-edge, is much more cost-effective. You can end up with an improved PC offering considerably better performance and specification for around four-fifths of the cost of a new PC. At the upper end, you'd be better off buying new, as leading-edge components all attract hefty price premiums.

	LOWER PRICE LIMIT	UPPER PRICE LIMIT
Processor	£60 (Athlon XP 2200+)	£340 (P4 3GHz)
Motherboard	£50 (MSI KM2M combo)	£160 (Gigabyte P4-8INXP)
Graphics card	£70 (ATI Radeon 9000 Pro)	£400 (Geforce FX5900 Ultra)
Memory	£30 (256MB PC2700 DDR)	£70 (512MB PC3200 DDR)
Hard drive	£55 (60GB ATA100)	£150 (160GB Serial ATA150)
Rewritable DVD	£130 (Philips DVD+RW)	£270 (Sony DVD+RW)
Monitor	£200 (LG 19in Flat CRT)	£600 (Sony 18in LCD)
TOTAL	£595	£1,990
NEW PC	£700	£1,500



The latest Audigy 2 sound card from Creative supports 6.1 sound, with three channels at the rear

When running games or movies the acoustic 'environment' is often as important as the fidelity of the sound itself. The more speakers you have reproducing sound from different directions, the closer the sound will be to reality, or at least the reality created by the movie or game.

In the past year, the number of channels available for sound has increased from five to six. Whereas before you had left, middle and right frontal sound and two speakers at the rear for atmosphere, there's now a centre speaker at the back, too, to help position sounds coming from behind you.

The key exponent of 6.1 sound – the .1 being the system's bass channel, which is omni-directional – is Creative. The market leader's Audigy 2 sound card and recently released Inspire 6700 speaker set take full advantage of this new system and have improved signal-to-noise ratio over the earlier Audigy system. This latest sound card and speakers will cost you about £170 (£85 + £85).

If you currently have a 2.1 sound system – stereo with a sub-bass unit – you can more or less improve your sound system for free by choosing the right motherboard. Many new boards incorporate 5.1 sound as standard, so you'll only need to invest in speakers. A suitable set, such as Videologic ZXR-550s, will set you back under £70.

Keyboard and mouse

The cheaper keyboards and mice often supplied with PC systems can do your hands and wrists physical harm, particularly if you spend a lot of your time each day typing. An upgrade to both is potentially better for your health than any other change you might make to your system.

There is some evidence to suggest that so-called 'natural' keyboards, where the main Qwerty keys are split into two blocks for left and right hands, improve the ergonomics of typing and reduce unpleasant complaints, such as Repetitive Strain Injury (RSI).

Both Microsoft and Logitech produce split keyboards of this type and have them in corded or cordless versions. The advantage of a cordless keyboard is freedom on the desk and the ability to easily use the keyboard on your lap.

desktop, which can be a big bonus in a cramped environment.

If you're considering an LCD as an upgrade and you are also fitting a new graphics adaptor, try and select models that include digital connectors. Since a graphics card works digitally and has to convert its signal to analogue to run a conventional monitor, many LCDs have analogue inputs and then convert the signal back to digital for display. You will see a cleaner, more exact picture if you connect from the digital output of a graphics card to the digital input of an LCD monitor, thus skipping two conversion processes.

Conventional CRT monitors come in 15in, 17in, 19in and 21in varieties. Bear in mind that these measures are across the screens' diagonals and are measured at the extremes of the tube, rather than from the corners of the viewable picture. The most popular LCD sizes are 15in, 17in and 18in, although you can get bigger ones. These measurements are the exact size of the LCD picture, so an 18in LCD may have a bigger viewable area than a 17in CRT.

Both types of monitor are continuing to fall in price and you should be able to pick up a flat-faced, 19in CRT monitor for around £200, though an equivalent 18in LCD could cost you £600.

Sound system

The sound your PC produces is governed by the sound card (or the sound chip on the motherboard) and the speakers connected to it. Most PCs are concerned as much with playing games and showing movies as they are with reproducing music, so multi-channel, multi-speaker systems are common.



LCD monitors, although expensive, take up a lot less space on the desk and consume less power

Split keyboards, which force you to use your left hand for half the keys, can help relieve RSI





Cordless mice are marginally easier to use than those with cords, but a bigger advantage is an optical model, which doesn't use a ball and roller mechanism to measure its movement. An optical mouse has no moving parts and nothing to clog up with dust and dirt from your desk. Prices of good-quality keyboard and mouse sets start at about £35 and rise to £80 for a pair with all the trimmings.

Recommendations

One thing you should have noted from the descriptions of these various upgrades is how many of them are dependent on fitting a new motherboard. You need to do this not just to fit a modern processor, but also to take advantage of improvements in memory performance, SATA hard drives and many of the new sockets for connecting peripherals.

You don't, of course, have to do everything at once. Although it makes sense to upgrade motherboard, processor and memory in one go, there's no need to deal with the drives, monitor or sound system at the same time.

Extreme PC

So far we've looked at upgrades that improve the performance or facilities offered by your PC. There are other things you might want to do for it, though, which come under the heading Extreme PC or PC Modding. The bells and whistles mentioned here cover three main areas of improvement to your computer: reducing heat, cutting noise and improving looks.

If you want to get the most out of your processor and its supporting hardware you may want to tweak the

Specialist coolers can help your PC to run faster



clock rates at which it runs. This is called overclocking and, while it may mean you get improved performance from standard components, it certainly means your PC will generate more heat.

Ultra cool

There's a whole raft of accessories designed to keep your PC running cool. They're particularly important for overclockers, as overheating is the main enemy of running a processor fast. A standard heatsink or fan, generally known as a cooler, is fine for a processor run at its specified clock rate, but if you want to run it above this, it will overheat and possibly break down if no extra cooling is provided.

Fitting a specialist cooler, which can dissipate more heat than a standard one, brings the temperature back down and safeguards your overworked chip. There are a number of different designs of cooling device, from fancy heatsinks made with copper vanes, to cunning designs involving high-performance fans. With the right choice of heatsink and fan, you should be able to reduce the temperature of a processor by up to 15°C. Prices on specialist coolers run from £25 up to more than £50.

Heatsinks are rated by the amount of heat they can dissipate, and fans by the amount of air they move. Fitting fans could hardly be simpler, since in most cases it means simply screwing them to the case or the heatsink. Replacing the heatsink on a processor is a little more complicated, as the spring-clips that retain them can be awkward to remove.

One of the key factors when improving the cooling in a PC is to get the airflow right. Since warm air naturally rises, it's best to suck in air at the bottom of the case and blow it out at the top, but the airflow from case fans and from those on processor and

chipset are likely to be at right angles, so the total airflow picture can be complex.

Below: Sites such as Extreme Case can help you to customise your PC

The screenshot shows the 'EXTREMECASE' website with a navigation menu on the left listing categories like Cases, Case Mod Parts, Sound Cards, Motherboards, Power Supplies, Processors, Cooling Fans, Video Cards, Monitors, Hard Drives, Memory, CD, CDRW, DVD, Keyboards, and Miscellaneous. The main content area displays several product listings with images and prices, such as 'Bubble Silver' case for £62.99, 'Nest Blue' case for £39.99, and 'CCFL Cooling Fan' for £15.99. There are 'ORDER NOW' buttons next to some items.

The screenshot shows the 'PC-Memory-Upgrade' website. It features a header with logos for Buffalo, OC, and Kingston. The main content area lists various memory modules for sale, including 'SPECIAL CompactFlash 128MB' for £38, 'PC3200 and PC3500 Dual Channel memory', and 'to stack Kingston memory'. There are also links to 'Special offers' and 'Contact Us'.

Left: Check out PC-Memory-Upgrade for PC components

The screenshot shows 'The Overclocking Store' website. It features a header with logos for various brands. The main content area displays a product listing for '[OCS] 802 Type A - Full Midi-Plus' chassis, with a price of £39.99 ex. VAT and £46.99 inc. VAT. There is a 'Buy Now' button. The page also includes a 'Product Information' section and a 'Your Support is Simple' section.

Above: You can find an excellent range of overclocking components such as heatsinks and fans at The Overclocking Store



Where to buy upgrade kit

These are the sites you should browse around for the components and equipment described in this feature. While there are plenty of other suppliers, those listed here have good to excellent selections of upgrade components and offer competitive prices.

Many of the specialist overclocking and custom case sites include forums and FAQs which offer plenty of extra, valuable information. Other sites, like www.overclocking.com and www.extremeoverclocking.com provide reviews of new kit and advice on how to use it. Overclockers.com highlights individual enthusiasts' radical cooling projects. How about utilising a 1959 Prestcold fridge as a cooling unit to run a 1.8GHz Pentium 4 at nearly 3GHz!

General PC components – processors, motherboards, graphics cards, memory, hard drives, CD/DVD drives, monitors, sound cards:

Crucial – www.crucial.com/uk, 0800 013 0330

Dabs.com – www.dabs.com, no telesales (UK)

Maplin – www.maplin.co.uk, 0870 264 6000

PC-Memory-Upgrade – pc-memory-upgrade.co.uk, no telesales (Ireland)

Simply Computers – www.simply.co.uk, 0870 727 2160

Overclocking gear – heatsinks, fans, cables, rated processors, cases:

Directron.com – www.directron.com, no telesales (US)

Overclockers UK – www.overclockers.co.uk, 0870 443 0880

The Overclocking Store – www.theoverclockingstore.co.uk, no telesales (UK)

Custom case components and paint jobs:

Extremecase.com – www.extremecase.com, 010 630 734 2003 (US)

FashionPCs.com – www.fashionpcs.com, 0034 96 622 5784 (Spain)

Smooth Creations.com – www.smooth-creations.com, no telesales (US)

Stealthy quiet

PCs may be useful tools, but in many cases they're far from quiet. The culprits are those same fans that help to cool hot processors, chipsets and graphics cards. Fans are naturally noisy as their entire purpose is to move air around and the main ways to reduce noise are to slow them down or eliminate them entirely.

A couple of recent PC designs are completely fanless, but there's a performance hit in this approach which is often unacceptable. When you need the best of both worlds, the answer is to use larger fans and run them slower. To move the same amount of air and make less noise, you simply use a fan with bigger blades to do the job. Suppliers such as The Overclocking Store and Overclockers UK can supply a wide variety of different fans, though not all PC cases come pre-drilled for the larger models.

As well as fitting larger, slower fans and introducing thermostats to existing fans to slow them down when things are running cool, you can fit acoustic foam on the inside of your PC's case. This noise suppressor can be quite effective at reducing the overall noise produced by a PC and is very easy to fit. It's usually self-adhesive and all you need is a pair of scissors to trim it to size.

Custom looks

Let's face it, the main reason for modifying a PC is to make it different from the run-of-the-mill beige box. You can buy special cases made from plastic, aluminium or steel in a complete spectrum of different colours. Try www.etremecase.com or www.theoverclockingstore.co.uk for a good selection. There are even completely transparent, acrylic cases, though it has to be said these are not much good for radio frequency shielding. Custom cases range from around £40 up to £200.

If the idea of transferring all your PC's hardware into something new and more visually exciting doesn't appeal, you can modify your existing case with a pair of tin snips, some clear acrylic sheet and a few fluorescent lights. If you're happy to drill new holes in your case, cut sections out of it and spray it in colours other than cream, there's little to stop you creating a PC that you can guarantee will be unique.

A browse around sites intended for overclockers or case modifiers reveals tools for adding transparent panels to the side of your PC's case and fitting lights inside it. You can buy fans fitted with LEDs that flash when the blades rotate, cables that glow in ultraviolet light and UV tubes to make them do just that. Lights inside your PC can either shine steadily or be activated by sound, in the same way as a hard drive or CD whirring into action. Prices vary, but a simple LED fan will cost about £10 and a kit to cut a window will set you back under £30, including the pre-cut acrylic and a nibbling tool.

There are bubble tubes using different coloured LEDs to provide a mock 1950s jukebox effect and even miniature water tanks to attach to a window in your PC's side panel, so you're looking at your PC's internals through the bubbles.

In the same way Californian roadsters were modded in the 1960s, right through to *2 Fast and 2 Furious*, showing off the insides of your computer can become quite an obsession. While it does little for either the performance or the functionality of your PC, it'll do a lot to impress more conventional PC owners.



Above: perk up your PC with a new case, such as the Mitron Perspex case from www.overclock.co.uk

Below: The Radiance X case is one of a range from X-case, makers of part- and fully built custom PCs





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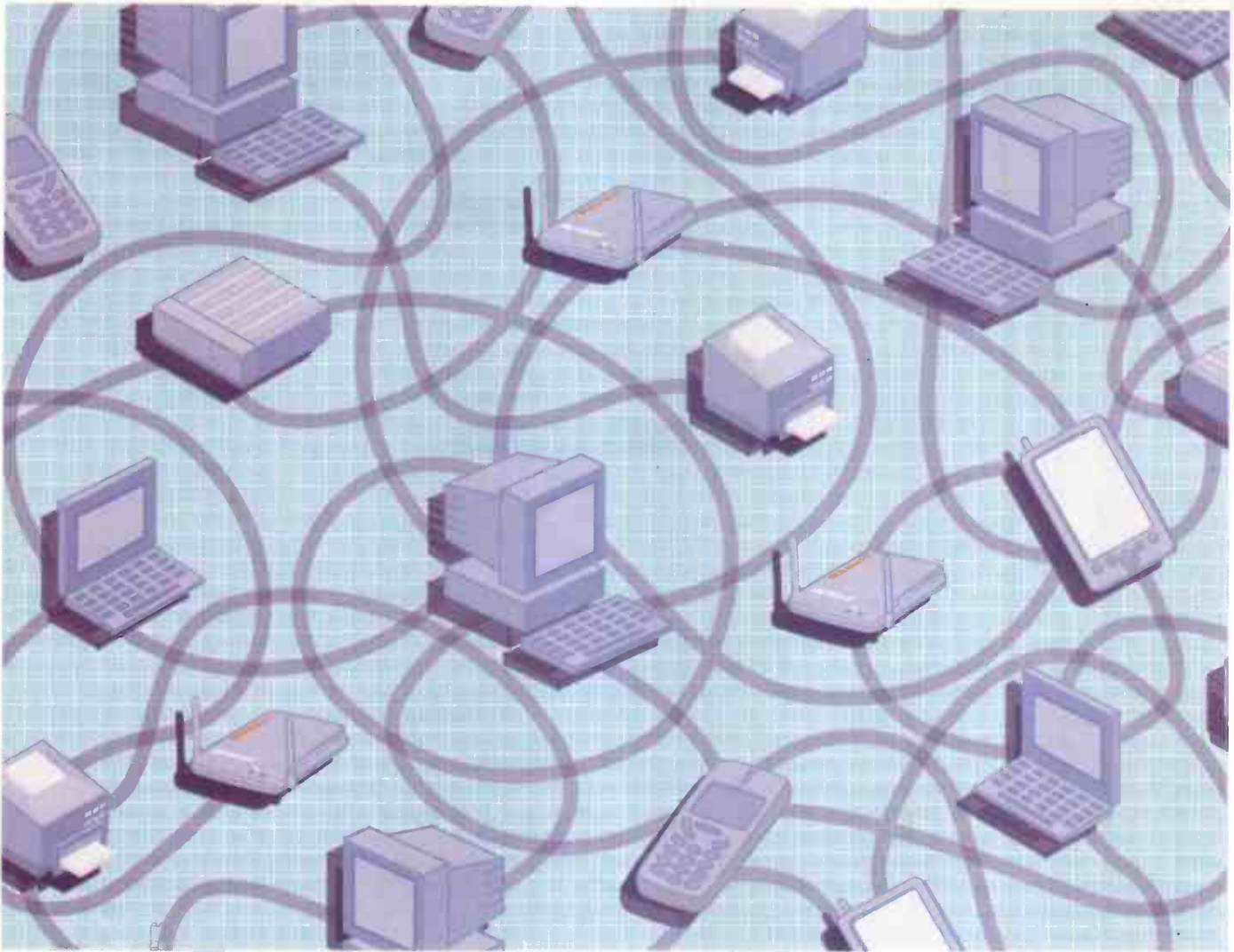
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Wireless worries

WORDS: GORDON LAING

Whether you're new to the wireless world, or just looking for some answers, we explain the limitations of Wifi and how to navigate around them

Few technologies in recent times have generated quite as much interest as wireless networking, and justifiably so. During a period of overhyped technologies, it's refreshing to find one that genuinely delivers unique and compelling services to both consumers and businesses at every level.

Like all technologies though, wireless networking isn't perfect. While deserving much of its recent backslapping, there are a number of important issues every existing or potential wireless user should be aware of.

Beyond the most common issues of standards, compatibility and security, there are increasing concerns over interference and congestion with other networks or devices sharing the same radio frequencies. Head out on the road, and a whole raft of additional

issues arise, including the safety of public hotspots, and whether your kit will operate or even be legal while abroad.

Then there's raw performance. Building a wireless network may be as easy as fitting an Access Point, but where should it be located for the best results, and what happens if you want to extend your coverage? Theoretical speeds may also look sufficient on paper, but in practice is wireless really suitable for applications such as streaming high-quality audio and video?

There are certainly plenty of issues to consider, but rest assured we've got the answers to these and more over the following pages. We'll explain what to look out for and, most crucially, how to solve both common and obscure wireless worries, allowing you to relax and make the most of this impressive and enjoyable technology.





Standards and compatibility

Before worrying about performance, security and interference, the first wireless issue you may experience is plain and simple incompatibility. Over a few short years, the original 802.11 wireless Ethernet standard has enjoyed a raft of extensions, each identified by a lower-case letter tagged on the end. Some refer to entire physical layers designed for networking, while others specifically enhance security, quality of service and interoperability. The crucial thing, though, is that certain combinations may work together, while others won't.

Third-party certification may aim to simplify compatibility concerns, but introduces additional terms and branding. Finally, manufacturers eager to gain a competitive edge may release products based on a new standard while it's still in draft form. It's potentially confusing, so here's a brief compatibility overview of the main standards and certifications in common use.

There are currently three physical layer standards for wireless networking called 802.11a, 802.11b and 802.11g. The first, and most widespread, is 802.11b, operating on a frequency of 2.4GHz and delivering a maximum speed of 11Mbps/sec.

In theory all devices conforming to the 802.11b standard should work together, but offering additional reassurance is the independent Wifi Alliance with its own compatibility and certification process. Products sporting the Wifi badge are assured to work together. Note 802.11b+ refers to a technology which claims to double data rates to 22Mbps/sec. For this to work, the relevant devices must all support 802.11b+.

The second wireless physical layer standard is 802.11a, operating at a frequency of 5GHz and offering speeds up to 54Mbps/sec. Since 802.11a operates on a different frequency to 802.11b, they are simply incompatible. 802.11a devices won't work on an 802.11b network and vice versa.

Again, while all devices conforming to the 802.11a standard should work together, the Wifi Alliance has also begun certifying them, with a new extended badge differentiating products designed for different frequencies. Offering some relief to those wanting to use both types of networks though, dual-band equipment is now available, supporting both 802.11a and 802.11b.

The third and latest wireless physical layer standard is 802.11g, matching the 54Mbps/sec speed of 802.11a, but operating on the same 2.4GHz frequency of 802.11b – this gives 802.11g the unique advantage of being backwards compatible with 802.11b. In theory, an 802.11g device should work on an 802.11b network and vice versa, although to enjoy 54Mbps/sec, both the device and network need to support 802.11g.

Intel's Centrino logo can be used on notebooks featuring an Intel Pentium M processor and 855 chipset and an Intel-integrated wireless network connection. The first Centrino notebooks support 802.11b only, although dual-band 802.11a/b are expected in the near future, followed by additional support for 802.11g



The extended Wifi capabilities label identifies the device's operating frequency and speed. Look out for extra tickboxes indicating support for 802.11g and WPA security soon

The official 802.11g standard was completed in June 2003, but numerous products based on an earlier draft specification have already been on sale for some months. While each supplier has offered assurances of compatibility with the final 802.11g specification (or upgrades if they don't), it's too early to tell if there are any serious concerns for early adopters.

In our own tests with draft 802.11g equipment, we measured similar speeds to 802.11a, and confirmed compatibility with 802.11b devices. Unfortunately, once an 802.11b device was connected to our draft 802.11g network though, it forced all draft 802.11g devices to operate at the slower 802.11b speeds.

Despite being a recognised problem, several 802.11g manufacturers now claim this has been fixed. One solution involves building access points with two antennas, but until such products or those conforming to the final specification are tested, we can't comment. Early adopters of draft 802.11g equipment may wish to contact their supplier for information on possible updates, although if they're exclusively using 802.11g devices, they should be fine.

With the specification now finalised and officially ratified by the IEEE, we should soon know what 802.11g is truly capable of, warts and all; Wifi certification will follow soon after. Suffice it to say we will keep you updated with all the news and test results. In the meantime, users interested in supporting the maximum number of standards should consider new tri-mode/dual-band products supporting 802.11a, b and g.

Finally we should mention Intel's Centrino brand, which can be applied to notebook computers featuring a Pentium M processor, Intel 855 chipset and an Intel integrated wireless network connection. The first Centrino notebooks employ 802.11b, although we can expect dual-band 802.11a/b in the near future, and 802.11g support probably added in the new year.

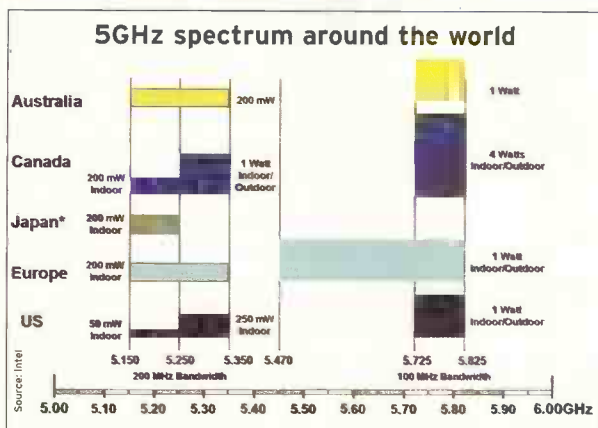
Larger enterprise users may additionally be interested in products with Cisco-compatible extensions, which assure compatibility with Cisco's wireless security suite. Centrino notebooks and products based on new Atheros chipsets already support Cisco-compatible extensions.

Frequencies and regulations

In the previous section we said all devices conforming to the same physical layer standards should work together – so one 802.11b device should work with another 802.11b device and so on. One potentially large fly in the ointment, though, is how radio resources have been split up worldwide, with countries often using different regulations or reserving certain frequencies for non-public use.

Consequently, while all devices conforming to the same physical layer standard and originating from the same country should work together, taking them abroad may be an entirely different matter. A wireless globetrotter could find themselves abroad with equipment that simply doesn't work or





Wireless networking standards operate at a range of frequencies and, depending on regulations, this may vary between international regions or have gaps. This diagram represents the ranges used by 802.11a around the world. While described as a 5GHz technology, the actual range in operation typically runs between 5.150 and 5.825GHz. The lower band between 5.150 and 5.350GHz is most commonly used by portable devices. Japan currently only allows half the range compared to most other regions; this translates into fewer available channels and greater potential congestion.

may even be illegal. This is clearly a big issue for anyone using corporate, domestic or public wireless networks, while on holiday or business travel.

To discover which products can work together and whether they're allowed in certain countries, you must delve into certified frequency ranges and radio channels. In doing so, the broader capabilities, potential congestion and ultimate capacity of various standards are revealed.

802.11b and 802.11g are described as operating on a frequency of 2.4GHz, but their range potentially runs from 2.412 to 2.484GHz. This range defines 14 radio channels, but the full number are only certified for use in Japan. ETSI (European Telecommunications Standards Institute) regions in Europe have certified 2.412 to 2.472GHz for 802.11b and g, allowing channels 1 to 13 to be used. North America and Spain are the most restrictive, allowing a range of 2.412 to 2.462GHz with channels 1 to 11.

Consequently you can use channels one to 11 in any of these regions, but 12 and 13 are only certified for ETSI Europe and Japan, while 14 is for use in Japan. Wireless kit bought in various regions should conform to that region's regulations, but check the specs to see if it was designed for use elsewhere. We've recently reported US-spec cards being sold in the UK for instance (News, August 2003).

In practice for 802.11b and 802.11g, channel selection is rarely a problem. The channel is set on an access point, after which all clients configure themselves. The only potential problem is if, say, a European access point has been set to channel 12 or 13, preventing a US client from connecting. The worst case scenario is a Japanese access point set to 14, blocking everyone apart from local clients.

We can only hope public hotspot and corporate network administrators stick to channels one to 11 for international compatibility. There are additional issues with 802.11b and 802.11g channels in terms of congestion, which we'll discuss later.

What is 802.11a?

802.11a is described as operating at 5GHz, but its actual range potentially runs in three bands of 5.15-5.25GHz, 5.25-5.35GHz and 5.725-5.825GHz. Each band defines four channels, making 12 in total, although the upper band is expected to be used for higher-power applications only, such as inter-building connections.

North America has approved use of all 12 channels, although only the first eight are really applicable for general use. Europe has been slower to approve, as much of the 5GHz spectrum is already used for satellite, radar and military applications.

The UK, Germany, Finland and Netherlands have agreed to allow low-power operation in the first eight channels, although most of the rest of Europe, along with Japan, are limited to the first four channels of the lower band only. This situation is subject to change as regulations are updated.

Understandably concerned with potential radar and military conflict, Europe has set two further regulations for 802.11a equipment. Dynamic Frequency Selection (DFS) senses existing broadcasts in the spectrum and automatically avoids them, while Transmit Power

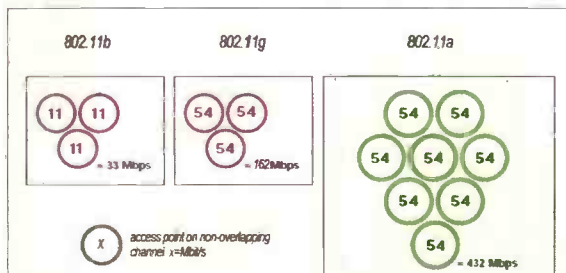
Control (TPC) adjusts the signal power depending on proximity of devices and essentially prevents them from unnecessarily shouting at each other.

DFS and TPC are now mandatory for 802.11a equipment in Europe but not in North America, although to ensure international compatibility, we believe all future 802.11a devices will support them both. Until DFS and TPC become a standard part of 802.11a though, potential global users should look out for products labelled with 802.11d (to automatically configure clients to access points worldwide) and 802.11h (which takes the stricter European regulations on 5GHz networking onboard).

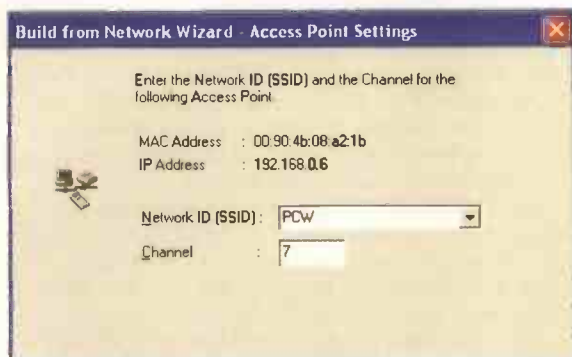
Congestion and interference

Perhaps the biggest technical issue facing day-to-day wireless networking is interference, either from nearby wireless networks or devices sharing the same radio frequencies.

The 2.4GHz frequency is particularly congested, with 802.11b and 802.11g networks sharing the same radio



The 802.11b and 802.11g specifications may have 11 to 14 channels depending on country regulations, but only three of them are non-overlapping and non-interfering. This means no more than three access points can work together without interference. In contrast 802.11a supports up to eight non-overlapping channels in the US, UK and parts of Europe. With up to eight access points working together without interference, 802.11a therefore has a significantly higher capacity than 802.11b or 802.11g



resources as Bluetooth, microwave ovens, cordless phone systems, baby monitors and wireless video senders. In the presence of other 2.4GHz devices, the performance and range of 802.11b and 802.11g networks could both be reduced. Similarly, wireless networks could impact on other 2.4GHz devices. Wireless video senders seem particularly at risk, often suffering from audio and video interference in the presence of 802.11b or 802.11g networks. One solution is to try changing the channel on which your access point or device is operating, but if this doesn't work, you will either have to switch off the conflicting device or swap it for one operating at a different frequency.

'Today a wireless network can be up and running faster and more cheaply than ever'

Careful channel selection is also essential to avoid interference between nearby Wireless Access Points. While you may believe the 11 to 14 channels of 802.11b and 802.11g provide plenty of scope, each one overlaps with the next. In fact to eliminate interference, you should select 802.11b/g channels numbered as many as five apart. Consequently 802.11b and 802.11g are limited to just three non-overlapping channels: 1, 6 and 11.

If you have an 802.11b/g network with more than one access point, ensure each is set on a different non-overlapping channel. The same applies to other 802.11b/g networks in range, such as a neighbour or adjacent office. Consequently to maximise your performance and range you must co-operate with neighbouring networks to avoid using conflicting channels.

802.11a is superior in terms of congestion and interference. First, its 5GHz frequency range doesn't interfere with 2.4GHz devices, although it's worth pointing out that 5GHz wireless video senders already exist in Japan. Second, unlike 802.11b/g, each of its channels are non-overlapping, which means North American and some European users can use up to eight nearby access points without interference. Again, each 802.11a access point should be set to a alternative channel though, whether it's on the same or different network.

Adoption of TPC (mandatory for 802.11a in Europe) also ensures each device is only using as much power as it needs to communicate, thereby being more considerate to neighbouring networks.

To extend the range or number of users on a wireless network, connect additional access points to the network hub. Each additional access point should use the same SSID Network ID, but be set on different, non-overlapping channels to avoid interference

Performance, speed and range

The prospects of cable-free networking open up all manner of possibilities, but to avoid disappointment it's important to understand any performance limitations. In terms of speed, most Ethernet networks tend to perform at roughly half their quoted maximum due to protocols and other overheads, and wireless is no different.

802.11b may be described as offering 11Mbps/sec, but from our tests you should expect around 4.5Mbps/sec at best. Similarly, the 54Mbps/sec maximum of 802.11a and 802.11g works out nearer 20Mbps/sec in real-life apps, although we've measured it operating as slow as 10Mbps/sec even under good conditions. Depending on your wireless kit, you may also experience a further reduction in performance with WEP (Wired Equivalent Privacy) encryption activated. In our tests with some budget 802.11b access points, we've experienced 10 to 20 per cent performance hits using 64 and 128bit encryption respectively.

While initially disappointing, it's clear all 802.11 standards are more than sufficient for sharing broadband connections, which typically offer speeds of only half a megabit. In terms of file sharing, 802.11a and 802.11g enjoy a three to five times speed advantage over 802.11b, although at best they're still around three times slower than a common wired 100Mbit connection.

While faster file transfer is undeniably good, realtime applications such as audio and video demand specific levels of sustainable performance. Music fortunately shouldn't pose a problem for any wireless network, with typical MP3 rates requiring just 128Kbits/sec. Indeed there should be sufficient bandwidth on 802.11b to deliver multiple audio streams simultaneously.

Unmodified bitstreams from a DVD, though, average around 5Mbps/sec and can often peak at 8Mbps/sec, making it unsuitable for 802.11b. Re-encoded material is far more common, with typical videos re-authored to fit on a CD usually requiring no more than 1Mbit/sec.

That said, you shouldn't necessarily expect a smooth ride. Additional users accessing the network will share the available bandwidth, reducing your personal allotment and potentially disturbing your video. Certainly until the 802.11e quality of service standard becomes available during the following year, wireless networking could cause frustration for streaming media. To play safe we'd recommend anyone wanting to stream video to go for 802.11a or 802.11g, unless they've got modest bit rates and are also likely to be the only user.

In terms of range, figures are dependant on surroundings and normally work out much lower than theoretical maximums. Each installation varies, but during indoor tests with budget 802.11b access points we've measured ranges of around 10m while maintaining maximum speed, or 20m at half speed.

Deployment and expansion

In theory you can place an access point anywhere to build a wireless network, but some locations work much better than others. For the best range, position your access point roughly in the middle of the desired coverage area and high on a wall away from any physical obstructions. Also consider hidden joists and what's behind walls, as nearby metal sheets, tanks or girders can impact wireless range.





If your access point is built into a wireless router, you may not have to mount the entire thing on a wall – many support external antennas which can be easily positioned.

Every access point has a maximum operating range and number of simultaneous users, but if you need to increase either, simply add extra access points to your network. The use of multiple access points on a single network is known as roaming.

Multiple access points on the same network must share the same SSID name, but be set to different non-overlapping channels to avoid interference.

While the vast majority of access points support roaming (using multiple brands too), we've come across a handful which do not, so buy carefully if you anticipate future expansion. You may also want to look out for the recently ratified 802.11f standard, which ensures interoperability between access points from different manufacturers.



Keeping secure

The radio waves that transport wireless networking data can easily penetrate walls and be received by snoopers. Consequently, unless you live in the middle of nowhere or don't care about your data, then security is in order.

802.11a, b and g all offer encryption using the WEP system. While reasonably effective at keeping out basic snoopers, WEP is widely considered to be inadequate against anything more serious; indeed many believe it's discouraging larger corporates from adopting wireless.

During the next year WEP will be replaced by a security amendment known as 802.11i. In the meantime the Wifi Alliance has taken a subset of 802.11i and created Wifi Protected Access (WPA), which offers better security than WEP and is being offered on new products or as firmware updates on others – a WPA update is already available for Centrino notebooks. But WPA version 1 products are unlikely to be upgradeable to the full 802.11i specification when it arrives – if you want the full security of 802.11i, you'll probably need to buy new equipment.

Worried corporates can, however, implement additional security measures by connecting users through Virtual Private Networks (VPNs). This seems the safest way to use public hotspots, many of which do not use encryption.

Many wireless networks, such as the one in the screenshot, right, do not employ any kind of encryption or security. Here you would need only the SSID network name in order to connect. If WEP encryption were enabled here, a key would need to be entered into the greyed-out area

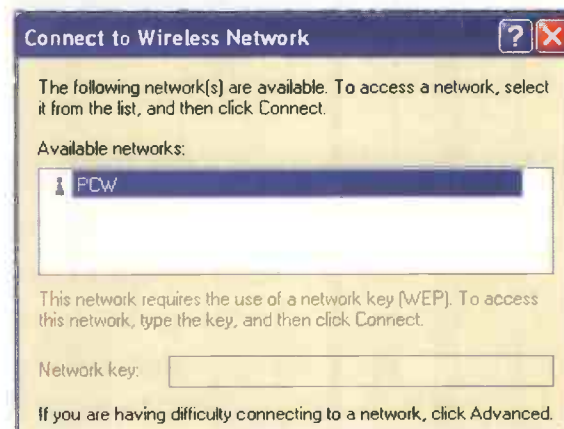
Cautious users of non-encrypted wireless networks may wish to avoid submitting sensitive data such as personal or credit card details until they return to a known cabled environment. Finally, if you're connecting to someone else's network, it's probably wise to have anti-virus software running.

Be cable-free

Wireless networking may suffer from its fair share of technology issues, but none are insurmountable – with a little planning you can enjoy a smooth-running cable-free environment. The technology may be evolving, but today a wireless network can be up and running faster and more cheaply than ever.

802.11b is a mature technology with sufficient bandwidth for sharing broadband and linking computers across a home or small office. 802.11g is now finalised, offering increased speed for file transfer or high-quality multimedia streaming. And finally with recent European approvals, 802.11a is ready to deliver both high performance and capacity on less-congested frequencies. Best of all, new tri-mode client cards can talk to all three.

Wireless technology also has a great future ahead, with high-speed, short range technologies like Ultra Wide Band set to replace USB cables in three or four years. But in the meantime and, despite its faults, wireless remains one of the most exciting technologies around.



Wireless at a glance

Standard	802.11a	802.11b	802.11g
Maximum speed	54Mbps/sec	11Mbps/sec	54Mbps/sec
Approx average speed	20Mbps/sec	4.5Mbps/sec	20Mbps/sec
Theoretical range outdoors at top speed	30m	120m	50m
Theoretical range indoors at top speed	12m	60m	20m
Operating frequency	5GHz	2.4GHz	2.4GHz
Total channels in UK	8	13	13
Non-overlapping channels	8	3	3
Users per access point	64	32	32
Typical price of wireless adaptor	£99 ex VAT	£49 ex VAT	£59 ex VAT
Typical price of budget access point	£299 ex VAT	£79 ex VAT	£99 ex VAT
Compatible with	802.11a	802.11b and 802.11g	802.11b and 802.11g
Officially ratified	✓	✓	✓
Wifi certification process	✓	✓	Expected second half 2003

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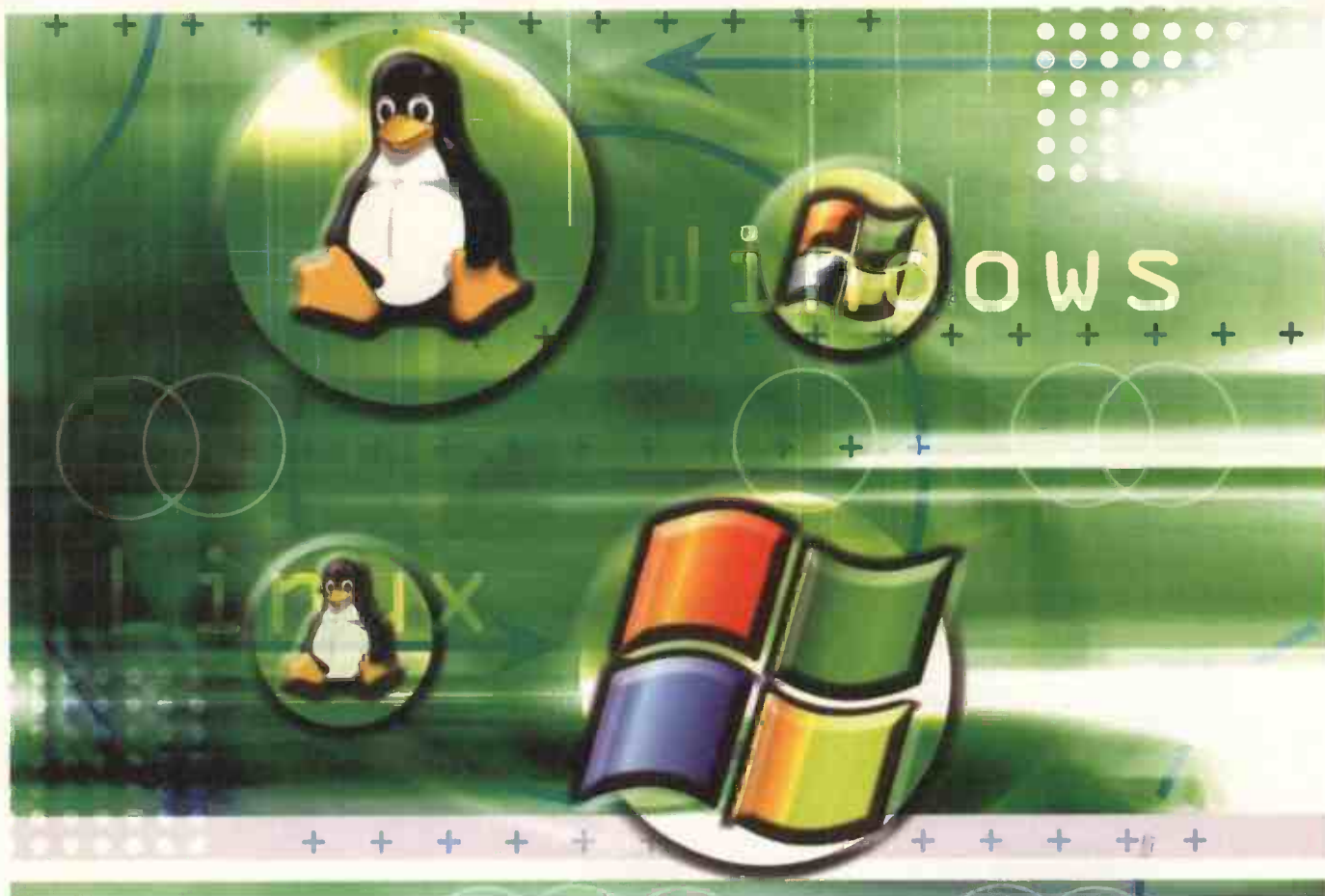
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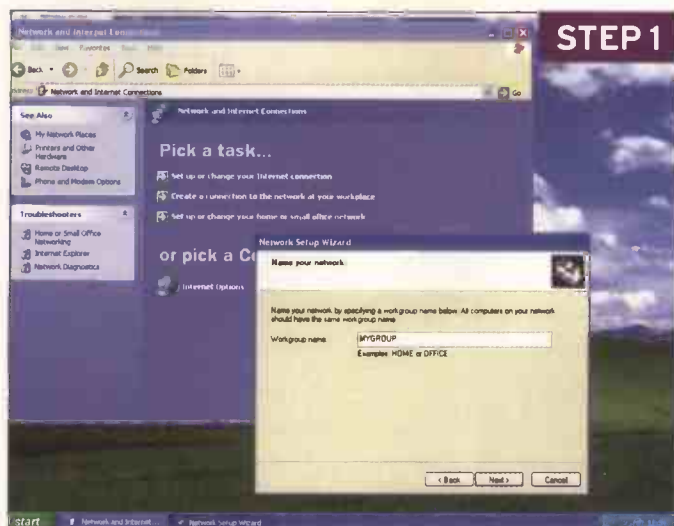
Take your partner for the Samba and solve the problems of running Windows XP and Linux on your network

There's no question that Windows is the most popular desktop operating system, but many people are switching to or experimenting with Linux as an alternative. On top of that is the large number of users running server software on top of Linux, often alongside Windows. It's not always a case of one or the other, though, and, while lots of us choose to dual-boot a single PC between the two operating systems, just as many have a small two- or three-PC home network running a mix of both Windows and Linux full-time. Linux, such as Red Hat 9 which you'll find on this month's cover DVD, runs well on older hardware – an old Pentium II will perform surprisingly well on the desktop, and remarkably well if it's only running typical server software like email, web and database servers. As ADSL usage increases, Linux is also a

popular choice for security; it has one of the best firewalls built in, and lets other PCs on the network share an Internet connection efficiently and safely.

In the past, running different OSs led to problems transferring files. Each system – Windows, Unix, Novell – had its native networking protocols and struggled to work together. Linux can speak all these languages without the need to email files or – perish the thought – use floppy disks.

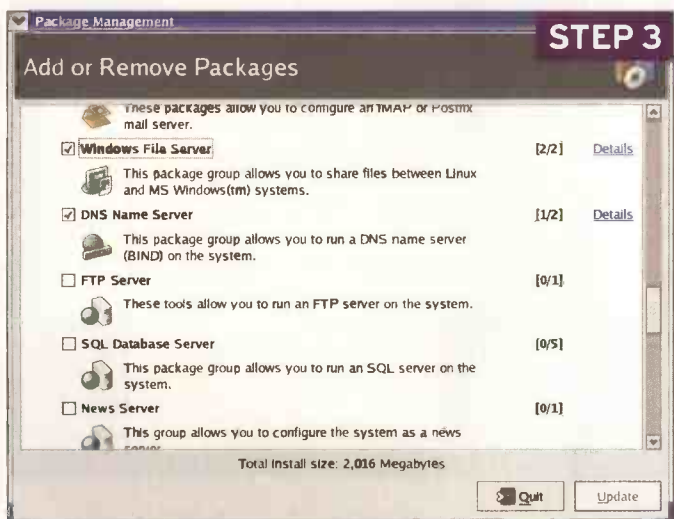
The system Windows uses for file sharing is known as Server Message Block (SMB); every version of the operating system from Windows for Workgroups through to Windows XP uses it. The open-source implementation of SMB under Linux is called Samba, and in this workshop we're going to get Windows XP and Linux talking to each other using Samba over a simple TCP/IP network.



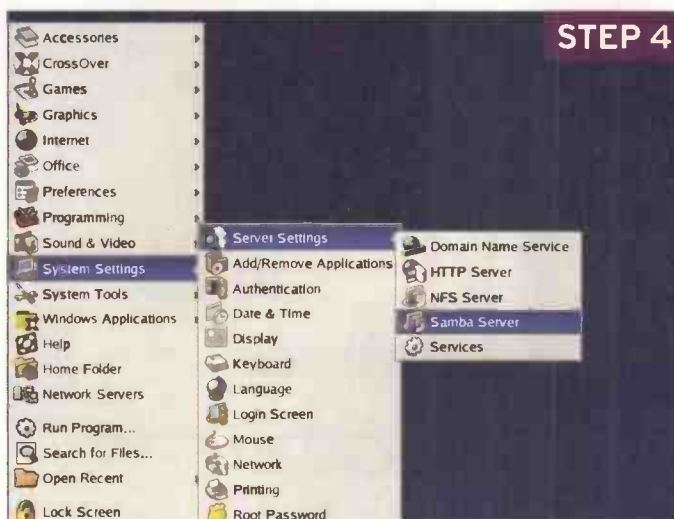
We're setting up a Windows network, so let's start with the Windows configuration. The PCs on the network need to be contained in a logical area called a workgroup, so the first thing to do is decide on a name. It really doesn't matter a great deal what it is, so we will use 'Mygroup'. To set up the workgroup, Windows XP must be configured for networking, so open up the Control Panel and select 'Set up or change your home or small office network' to run the Network Setup Wizard, and enter the details as appropriate. The final step of the wizard asks you to create a disk – just skip this section as it's redundant here. At the end, Windows will probably need a reboot before the changes take effect.



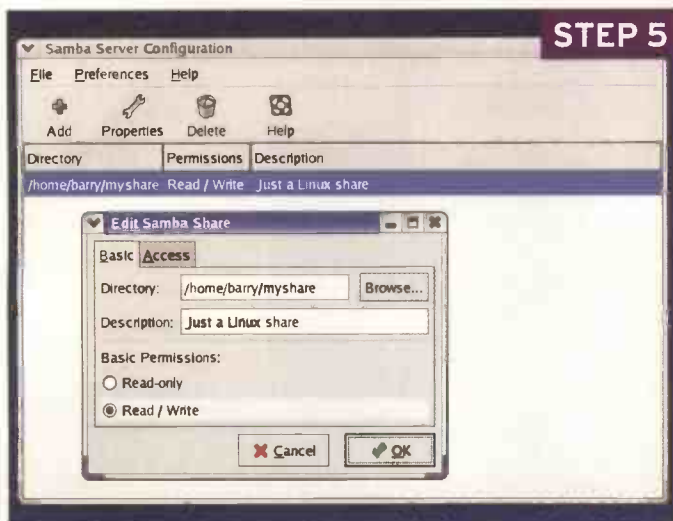
You need to set up a user on Windows with a password before you can access files between different machines on the network; Windows needs to send user and password information to the other machine to get share access. In order to make life a lot simpler, use the same username on both operating systems, but make sure you don't choose a name with a space as this isn't supported under Linux. Change your username and set the password under the Control Panel applet, and then log in to Windows with the new ID to make sure everything works. If you run the Task Manager (press Control & Alt & Delete), the running processes should now be listed under the correct username.



Before setting up any Windows shares it's time to configure Linux to be part of the Windows network. We will use Red Hat Linux 9 as the example here, although any distribution can be used in its place. First up, the software to support SMB needs to be installed; as mentioned earlier, this is called Samba. Installing software on Red Hat is done through the System Settings menu: run the Add/Remove Software applet, and make sure that 'Windows File Server' is ticked. Scroll down through the window and check that the Samba configuration tool is also ticked. If they're already selected, just exit out. Otherwise, you'll need the installation CDs to add the new software. No reboot is necessary.



Now the software is installed, let's get it configured. Run the Samba Server tool from the Settings menu. Select 'Server Settings' from the Preferences menu and set the Workgroup to the same used for the Windows machine. The description can be anything you like. Now select 'Samba Users' to configure the user details. Samba uses its own authentication method and doesn't rely on the normal Unix password file. Add a new Samba user, with the same username as on the Windows machine. From the dropdown list, select the appropriate ID and enter the other details. Obviously, the password should also be the same as on the Windows system.



STEP 5

Samba automatically shares your home directory when you connect successfully to the server. If you want to share another directory, click the Add button on the configuration window and enter the directory, together with a simple description of the share. Decide whether you want the shared directory to be read-only or writable too. Next, click on the Access tab to determine whether anybody or just a list of usernames can access the share.

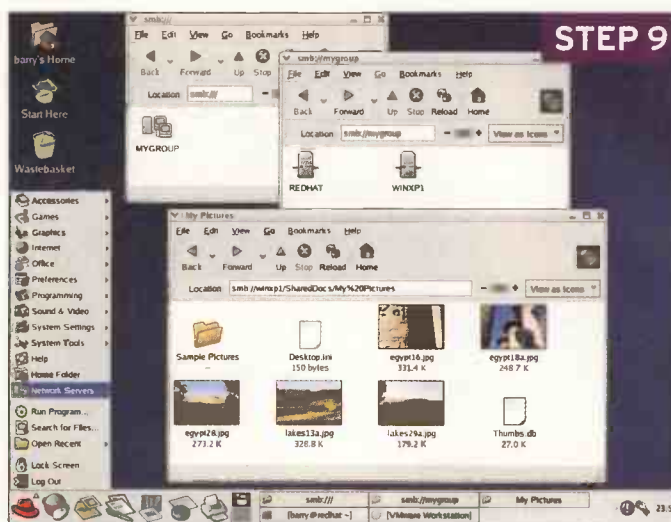
Once done, load the Services program from the same menu as step four, start the Samba service and set it to run on bootup. Again, no reboot is necessary. For most Linux systems, you can start Samba by running `/etc/init.d/samba start` in a shell, logged in as root. You can test that everything is working by opening a shell, and running the command `'smbclient -L //localhost'`. Use a blank password by pressing Return at the prompt. You will see a list of shares if all is well.



STEP 6

Both Linux and Windows are now ready for file sharing. On XP, any files you copy to the 'Shared Documents' folder are available to Linux and other Windows systems for both reading and writing. You can get here by clicking on 'My Computer'.

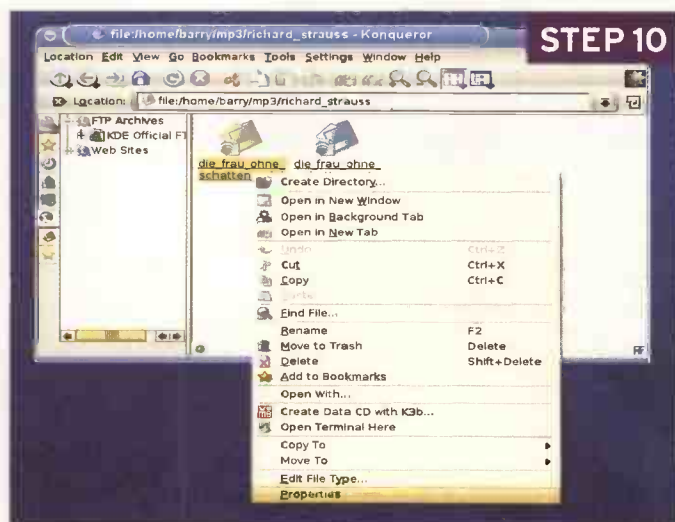
As long as your Workgroup is set correctly, and the same user and password is available on both systems, XP will automatically find and log in to your Linux shares. A great feature of Samba on Linux is that it creates a dynamic share for your home directory, so whichever user you log in as, you automatically get access to your own files. This is in addition to any other shares you set up in the previous step. Go to 'My Network Places' to see a list of available shares.



STEP 9

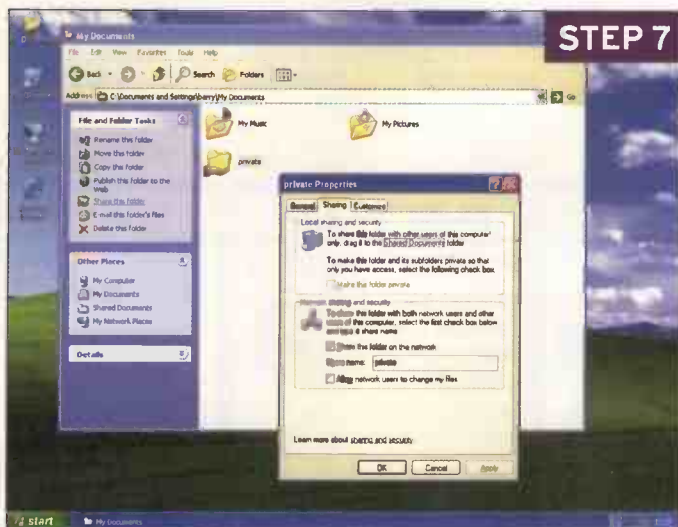
On the Red Hat side, accessing the Windows shares is just as easy. Select 'Network Servers' from the main menu to load up Nautilus, the file browser. Alternatively, you can type `'smb:/'` directly into the Location bar of an existing window. Nautilus displays the Workgroup icon, and in the same way as Windows, double-click to get the machine icons, and again to access the shares. Unlike XP, Linux will ask you for your username and password even if they are both the same. By default, XP doesn't care what you use – access is unrestricted and any username will do.

File sharing now works between Red Hat Linux and XP in both directions. You can set up shares that are read-only or writable too. On the Linux side, you can also gain access to your home directory from Windows with minimal fuss.



STEP 10

For the KDE desktop on Linux, the way to create shares is more similar to Windows, in that you can make the changes through Konqueror, the KDE equivalent of Explorer. Before getting that far, sharing has to be configured: right-click on the directory to share, and select Properties from the menu. Go to the 'Local Net Sharing' tab and click the button to configure sharing. Here you need to enter the root password, and can set KDE to allow users to share files from their home directory. You only need to perform this step once. Next, just right-click again on the directory you want, and select Share from the menu to finish off. A socket image appears on shared directory icons. Shares created this way are read-only; see step 12 for more details.



STEP 7

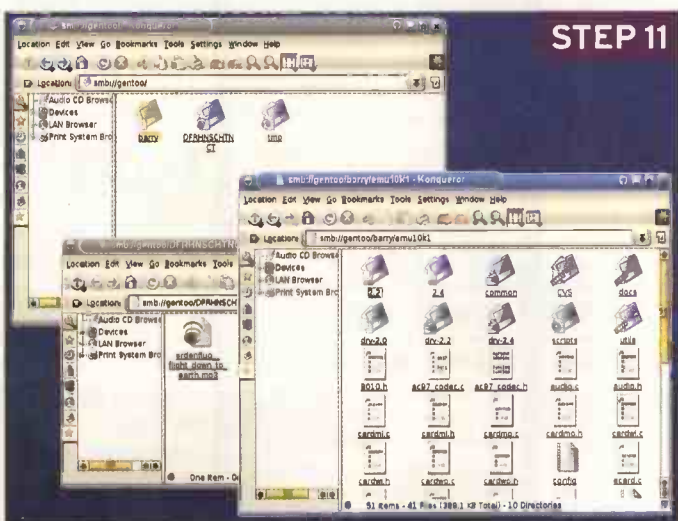


STEP 8

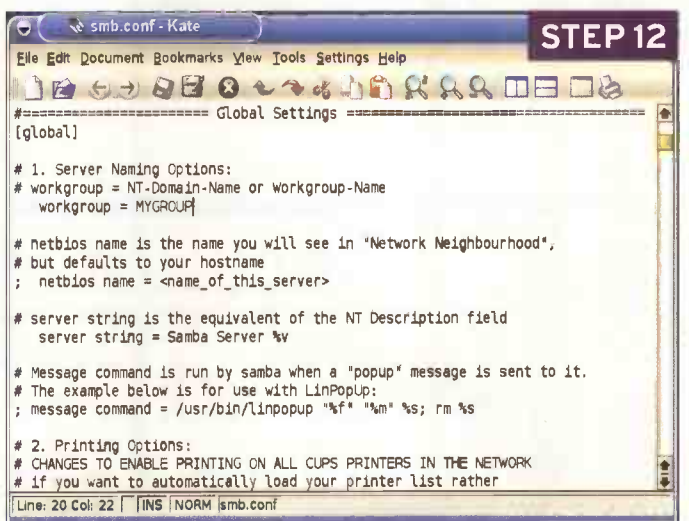
Just like Linux, XP lets you create a read-only share. This is especially useful if other people are on your network, as otherwise they can add and delete any files from your shared directories at will. To share a new directory on XP, just right-click on the directory's icon and select the share option from the menu. Under the 'Network sharing and security' section, click the lower box to enable write-access; if left unticked the files are read-only. Ignore the top section of the window; the two sections are mutually exclusive. A hand appears beneath any shared directory icon to differentiate it from normal ones.

There are two ways to browse your Linux shares through Windows XP: go to 'My Network Places' and double-click on the share name; alternatively, click on 'View workgroup computers' from the side pane, and double-click on the icon for the Linux server. All the shares on the server are listed here, and you can double-click to access them directly.

If you've had to use a different username and password between the systems, XP cannot log you in automatically, and you will have to enter the login details before gaining access to the shares. Once connected, you can drag and drop files across the network as you would on a local disk. For earlier versions of Windows, double-click on 'Network Neighbourhood' and locate the Linux server; this is the equivalent of the second method for Windows XP.



STEP 11



STEP 12

Konqueror accesses shares in a similar way to Nautilus. Enter 'smb://servername' in the Location bar to browse the shares on that machine. You cannot use the 'smb://' notation to browse the network as you could in Nautilus. Konqueror will prompt you for a username and password when you click on a machine, although you can set some default details through KDE's control centre to avoid this. Go to 'Internet and Network' and 'Local Network Browsing' and fill in the details for the Windows system. Versions of KDE before 3.1.2 have problems accessing shares in this way on many Linux distributions, including Mandrake Linux 9.1. Make sure you have all the latest updates, and see step 12 for more information if you have problems.

An alternative for accessing shares is to use the 'smbmount' command. This is equivalent to mapping a drive in Windows, but you use a directory instead of a drive letter. The command isn't difficult and is useful if you want to use KDE and have problems with SMB browsing. To mount 'myshare' on the Windows machine 'winxp1', using the directory 'stuff', run:

```
smbmount //winxp1/myshare stuff
```

The directory appears just like any normal directory, but inside is the contents of the share. You can use Nautilus or Konqueror in the normal way; the fact it's a network share is totally transparent. The smbmount command has several options – run 'man smbmount' to see the documentation on these. Use 'smbumount stuff' to unmount the directory.

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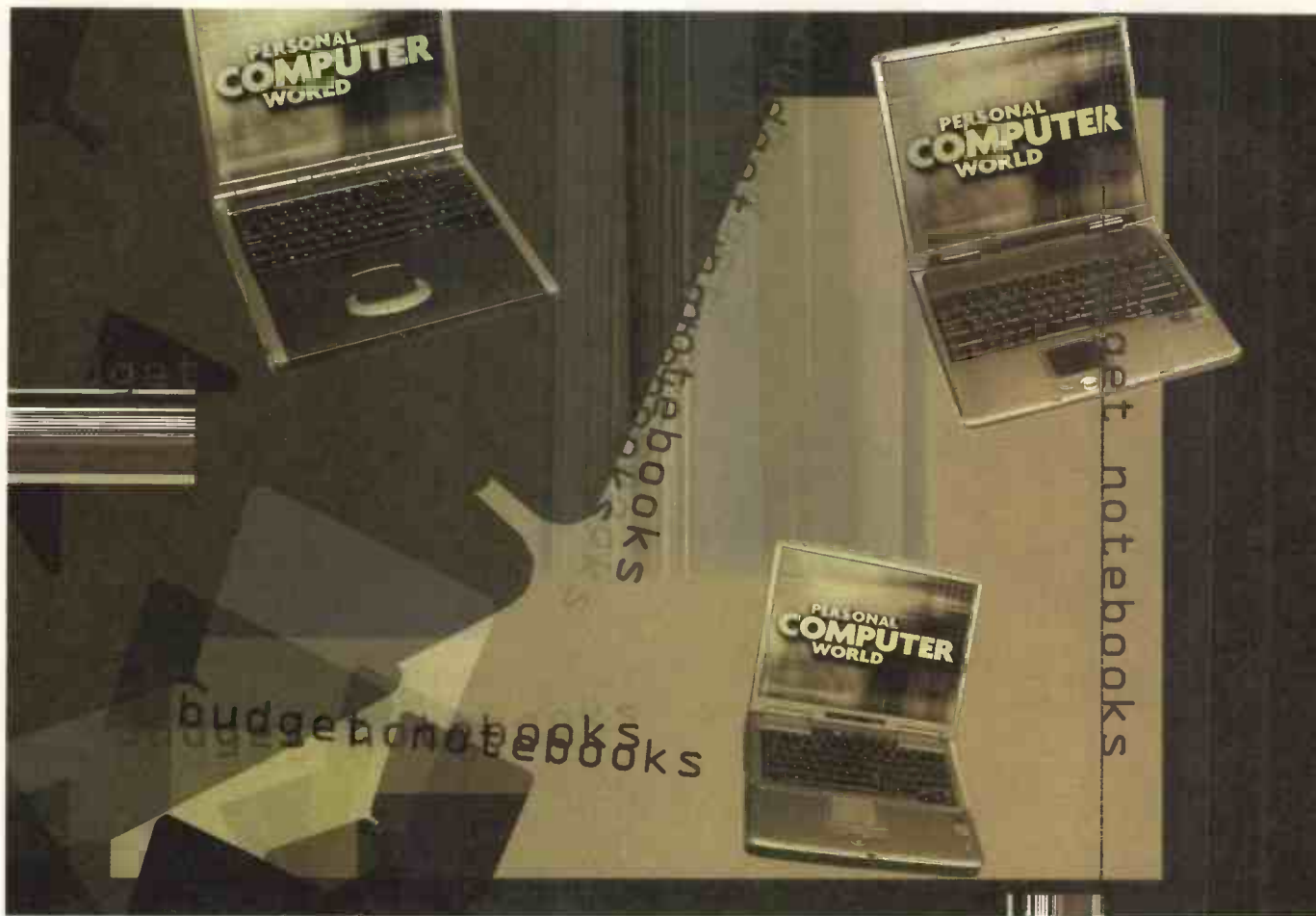
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Choosing a notebook these days can be a minefield when you're faced with such a variety of clever features – and the potential problems they can create. *PCW* lends a guiding hand

Upwardly mobile

WORDS: LEO WALDOCK TESTING: VNU LABS PHOTOS: BRUCE MACKIE

We all know about notebooks. They have slow processors, small hard disks, a pathetic amount of memory, a criminally short battery life and a scary price tag, right?

Well, that was certainly true a couple of years ago, but in fact the notebook sector is booming today, precisely because notebooks have come on leaps and bounds in the past year or two.

These days you could easily get rid of your desktop PC altogether and give yourself the choice of where you do your work, check your email and watch DVDs. It's possible to buy a desktop notebook that has more processing and graphics power than a

desktop PC – although it may weigh over 3kg or have a short battery life. Alternatively, you can buy a thin and light notebook that will slip into a slender document folder and allow you to watch a DVD on a plane or train journey. And then, of course, there's the wireless option – the newfangled Centrino.

Although there is a great deal of clever engineering in a notebook, there is also, by necessity, an element of compromise. It is unlikely you'll find a notebook that is all things to all people, which means making a number of decisions, and that in turn could result in an expensive mistake.

Once again *PCW* rides to the rescue with a group test of a dozen notebooks priced under £1,200 inc VAT, all to make your life easier.



Acer TM281LC

The Acer TM281LC is one of the few notebooks in this group test that is priced closer to £1,100 than our ceiling of £1,200, but the terrible truth is that you don't get many features for your money.

For a start it has only 256MB of memory, and a chunk of that is taken up by the integrated Intel graphics chip. This is a dynamic process that changes in use so, depending on the graphics workload, Intel says you can expect to see between 8MB and 64MB of memory allocated to the graphics. System properties reported that only 3MB was required for basic Windows duties, but you could find yourself in dire straits if you want to run a number of applications at once.

The hard drive is only 30GB in capacity, which is a little mean in these days of 40GB and 60GB mobile drives, and our other complaint is that the 15.1in screen has a low resolution of 1,024 x 768. None of these failings are unique to Acer but they need to be reflected in the price and, in that context, the Acer isn't cheap enough.

This is a shame as it's an attractive notebook that looks understated and sleek, and feels solid. There is plenty of room for the relatively few ports, and the huge exhaust

vent for the Pentium M 1.8GHz processor could easily handle a faster processor.

The processor holds back Sysmark performance and the Intel graphics are close to the bottom of our 3Dmark results, but the saving grace is battery life. Our Excel-based test is very tough, so the two hours 10 minutes managed by the Acer is very satisfactory and will give you a reasonable amount of time to work while you're on the move.

On a positive note, the two-year collect and return (C&R) warranty is very healthy, but that doesn't even begin to make up for the lack of ports, the minimal software package and the negative points that we've already listed.

DETAILS

PRICE £1,103.33 (£939 ex VAT)

CONTACT Acer

0870 900 2237

www.acer.co.uk

PROS Battery life; attractive styling; good warranty

CONS Only 256MB of memory; very few ports; small hard disk

VERDICT

The Acer needs to be cheaper to make it decent value for money

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL

★★★★★

★★★★★

★★★★★

★★★★★



Advent 7017

On paper the Advent 7017 is a powerhouse with a 3.06GHz

Pentium 4, 512MB of DDR memory and a Radeon 9000 graphics chip. It really ought to have topped our Sysmark charts quite comfortably so we were surprised that the Advent languished in the midfield. A little investigative work by our Labs revealed that the Advent doesn't have the ability to use hyperthreading, which must be responsible for some of the shortfall in performance. It just goes to show that you can't take specifications at face value.

This is the first of five notebooks in this group to use the ATI Mobility Radeon 9000 graphics chip with 64MB of dedicated memory. Performance is very impressive and it takes the five Radeon notebooks to the top of our 3Dmark results in this group. However, Advent lets the side down by only specifying a screen with a resolution of 1,024 x 768 when the others manage 1,400 x 1,050, which is far better for movie playback and gaming.

We weren't in the least bit surprised that the Advent had a fairly poor battery life of one hour, 25 minutes, as those components need a lot of power. As such, it's fair to class it as a desktop replacement notebook, particularly as it weighs 3.25kg and the power brick is enormous.

In many ways this means that you get the worst of all worlds with this notebook. It is physically quite large and fairly heavy, yet it doesn't have the performance of some smaller notebooks. Generally a larger chassis is used for a big screen or a large battery that offers a long life, and again the Advent suffers when compared to its peers.

The chassis is a fairly garish silver colour and we weren't taken by the champagne colour around the keyboard. We also found the mouse buttons to be annoyingly close together.

The 7017 would be of most interest if you rarely, if ever, carry your notebook about, and instead want to be able to lock it away in a drawer or cupboard for security.

DETAILS

PRICE £1,199 (£1,020 ex VAT)

CONTACT PC World

08705 464 464

www.pcworld.co.uk

PROS Graphics performance

CONS Poor Sysmark performance despite the 3.06GHz processor; low-resolution screen

VERDICT

Consider only if you want a desktop replacement notebook

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL

★★★★★

★★★★★

★★★★★

★★★★★



AJP M3000N-Centrino

Our first Centrino notebook in this group is the AJP M3000N-Centrino, which is a mouthful of a model code. The initial impression is of a notebook that looks very good. The combination of black and white sounds wrong but it works well, and the blue power button light is a touch of class.

Technically Centrino doesn't impress us very much at present as the low clock speed of the processor results in relatively poor performance. Witness the three lowest scores in our Sysmark test, which were all returned by Centrino notebooks, although the 1.4GHz AJP managed to beat the 1.5GHz Multivision. Centrino is more than a processor, as it also involves a chipset and wireless Lan chip, and in this case AJP has also chosen Intel graphics. The result is a fairly pathetic score in 3Dmark and an absolutely amazing battery life of two hours 41 minutes. Given that the AJP has a 14.1in screen with a resolution of 1,400 x 1,050 and 504MB of memory, you may think that it has a hefty battery but, no, overall it weighs in at 2.4kg, which is only a few grams heavier than the much smaller Evesham.

This is impressive stuff, and it suggests that Intel's claims about the battery-saving technology in

Centrino may have some merit, but it doesn't change the fact that the AJP has unimpressive Sysmark and graphics performance.

The screen resolution merits some attention as it has the same 4:3 aspect ratio as a regular TV, and it looks more natural than the more common 1,280 x 1,024 resolution that has a ratio of 5:4, particularly when watching movies.

Given our test results, it is clear that the AJP is a notebook designed for life on the move, with the added bonus that you can watch DVDs too. Connecting to the outside world should be easy enough as you have the choice of 802.11b, with infra-red or 10/100 Lan.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT AJP 020 8208 9755

www.ajp.co.uk

PROS Huge battery life; lightweight; wireless Lan

CONS Poor Sysmark and 3Dmark performance

VERDICT

If you have no need for gaming power, the AJP should be on your shopping list

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



Asus M2481E-DVDRW

The Asus M2481E-DVDRW is one of the slimmer notebooks in the group as well as one of the lightest. It's a fairly basic model, and is broadly similar to the Acer. Both notebooks have a 1.8GHz Pentium 4 M processor, and though the Asus uses a Sis chipset with Sis graphics, rather than Intel, you are barely able to separate the two in our 3Dmark and Sysmark tests. Asus supplied the notebook with 16MB of memory dedicated to the graphics, which is too little to run 3Dmark, so we increased it to 32MB. The score is still fairly disappointing, though.

It's easy to separate the Acer and Asus in the battery test, as the Asus has a fairly mediocre life of one hour 27 minutes, where the Acer scorches past two hours. It is tempting to say that the slim Asus chassis doesn't have the space for a big battery, but the AJP has shown just what is possible here, so the only conclusion we can draw from our tests is that the Asus battery life is unimpressive.

As the screen is a little small at 14.1in, and the resolution of 1,024 x 768 is also a bit below par compared to the rest of this group, it is fair to say that the power isn't going to the graphics. On second thoughts, perhaps we should

compare the Asus to the AJP Centrino, although that's a little harsh. The Asus has less memory, a lower resolution screen and a shorter battery life. All in all it doesn't compare well with the notebooks that we have seen so far in this group, and we have much better to come when we reach the award winners.

Although Asus has installed Windows XP Professional, and the notebook has 10/100 Lan and infra-red, it has no wireless Lan.

While the Asus certainly has merit and looks good, its biggest sin is that it doesn't have a single unique feature. It isn't even particularly cheap, and that means that we can't see much reason to recommend it.

DETAILS

PRICE £1,130 (£959 ex VAT)

CONTACT Asus

01908 518 000

www.asustek.co.uk

PROS Weight; reasonable battery life

CONS Poor Sysmark and 3Dmark scores; small screen

VERDICT

The Asus is a very average notebook in this group

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



Evesham Voyager XS 1.5

Our second Centrino is the Evesham Voyager XS 1.5, which is the lightest notebook in this group, even with its external USB combo drive. We weighed the notebook and USB drive together because we felt that you're likely to have to carry the unit around even if it's not plugged into the notebook.

When it comes to the specification, the Evesham is very similar to the AJP as both are Centrinos that use Intel graphics and have a 40GB hard disk. We've marked the Evesham down slightly as its small screen can only manage a resolution of 1,024 x 768. This isn't really a criticism; instead it's more a case of deciding whether you put a premium on a small, light notebook, or would prefer to have the screen space. In the first case choose the Evesham, in the second go for the AJP.

We weren't that impressed by the battery life of one hour, 36 minutes, but we are prepared to accept that there simply isn't much space in this slim chassis for a decent sized battery. Similarly there are no legacy ports and the three USB and one Firewire sit on the left-hand side and the back along with 10/100 Lan and modem ports. There are no ports on the right side at

all, and overall the look is very neat and tidy indeed.

One snag with the external drive is that you are unlikely to watch DVDs while travelling, as you'll have to support both the notebook and the drive. Mind you, with the relatively short battery life, you're unlikely to be able to watch a whole movie anyway.

Despite the small size, the screen is very clear and sharp and is a pleasure to use. Similarly, Evesham has specified a really good keyboard that comes complete with a Windows key and even has the Return key in its rightful position at the very edge of the keyboard – unlike almost every other model here.

DETAILS

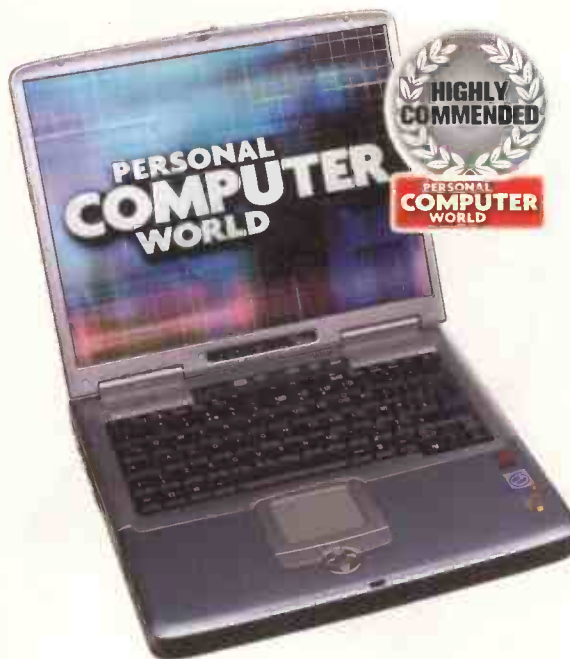
PRICE £1,200 (£1,021.28 ex VAT)
CONTACT Evesham
0870 160 9500
www.evesham.com

PROS Small; light; wireless Lan; very clear display
CONS Low resolution; battery life

VERDICT

An impressive example of what Centrino can do for notebook design

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



Fujitsu-Siemens Amilo D 8820

The biggest notebook so far in this group is the Fujitsu-Siemens Amilo D 8820, weighing in at a hefty 3.55kg. The power brick is as large as the Advent equivalent, and fairly noisy, too.

Inside the big, slab-sided chassis there is plenty of room for all the features you could want, and Fujitsu-Siemens doesn't disappoint. There's a 2.8GHz Pentium 4 with 512MB of DDR memory, and the Radeon 9000 graphics package, but you also get a full set of legacy ports as well as two PC Card slots. It's a bit of a surprise that you only get two USB ports when there is plenty of room for one or two more. The ports are on the back, which is a little inconvenient, yet there's a space on the right-hand side that would be far better for connecting up a mouse.

The hard disk is the biggest that we've seen so far at 60GB, although six of the notebooks here offer that much storage. The same is true of the 15in screen with its resolution of 1,400 x 1,050 which is superb for watching DVDs or doing a bit of document work. A total of six notebooks have this screen size.

It will come as no surprise to learn that the Fujitsu-Siemens performed very well in our Sysmark and 3Dmark tests,

and had a fairly short battery life. You are unlikely to be straying very far from a desk and mains power with a notebook of this size, so that's not much of a problem.

The real strength of this notebook is the software package, which consists of Microsoft Works Suite 2003 (Word, Encarta, Money and so on) and Adobe Photoshop Elements. That's decent software; it would cost you just over £100 in the shops and it's enough to get you up and running quickly with your new notebook.

Photo-editing software is fairly demanding of a computer, and it is impressive that modern notebooks can take applications such as this in their stride.

DETAILS

PRICE £1,149.99 (£978.71 ex VAT)
CONTACT Fujitsu-Siemens
0870 606 6677
www.fujitsu-siemens.com

BEST PRICE

www.pcw.co.uk/bestprices
PROS Performance; Software
CONS Big; heavy; short battery life

VERDICT

An impressive desktop replacement with good software

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



Hi-Grade Notino W6700

Hi-Grade sent us a rather unusual notebook in the shape of its Notino W6700. It's a reasonably light unit that sneaks in under 3kg but has the largest screen in this group. A screen is measured across the diagonal and this one measures 15.2in, however it is more of a landscape shape than the others here and it has an unusual resolution of 1,280 x 854. This gives an aspect ratio of 3:2, which we've never seen before, and this tricks the eye into believing the screen is smaller than others. We suppose it's one way of squeezing a wide screen onto a notebook without making it excessively large, but it all seems a little strange and we weren't overly impressed by the look. The width of the chassis means that there is plenty of space for an array of ports, although there is no PS/2, so you'll have to use a USB mouse.

This is the first of three notebooks with the Nvidia Geforce4 440 Go graphics chip, and in 3Dmark it ranks well above the integrated chips and a fair way below the notebooks that use Radeon 9000. The two clear deficiencies with the Notino W6700 are the 256MB of memory and 30GB hard disk. It shares these particular disadvantages with the Acer.

The Hi-Grade fights back by being strong on connectivity

with wireless Lan, 10/100 Lan and infra-red as well as a modem. The combo drive is slot-loading, which we prefer to the usual tray-loading drive as it takes up less room when you're on the train.

In our tests the Hi-Grade did surprisingly well and we are impressed that it got a better Sysmark score than the Advent, Rock and Time notebooks, each of which have significantly faster processors. It managed to get the highest score of all in the office productivity portion of our Sysmark tests. The 3Dmark score shows that the Geforce4 440 Go chip is borderline acceptable for gaming, but what really pulls the Hi-Grade back from the precipice is a battery life of over two hours, which makes this a very usable notebook on the move.

DETAILS

PRICE £1,198.50 (£1,020 ex VAT)

CONTACT Hi-Grade
020 8532 6100 www.higrade.com

PROS Good battery life; wireless Lan; reasonable weight

CONS Only 256MB of memory; small 30GB hard disk

VERDICT

An unimpressive notebook and we don't understand the reason for the unusual screen resolution

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



Mesh Discovery 2.8GHz Pro

We're in the thick of desktop replacement notebooks now and the Mesh Discovery 2.8GHz Pro weighs in at an eye-watering 3.5kg. Time chose the same chassis for its Ultima PQ, but there are differences between the two notebooks.

True to the form of desktop replacements, the Mesh is right up at the top of the Sysmark graphs and near the bottom of our battery tests. As the Mesh uses the same Nvidia Geforce4 440 Go graphics chip as the Hi-Grade, it follows that it, too, is somewhere in the middle of the 3Dmark graph. The rest of the specification is very similar to the Fujitsu-Siemens, in particular the high-resolution 15in screen that works at 1,400 x 1,050, and the 60GB Fujitsu hard disk.

There's nothing wrong with any of that lot, and clearly we have no problem with 512MB of memory either, but so far it's nothing special. The only unique point that Mesh has to offer is Lotus Smartsuite, which is fine but a little out of date. If the important point is to save money, why not include the more up to date Ability Office or Open Office?

The chassis is as big as the weight and screen size suggest, and it has plenty of space for all the features you need, including

four USB ports. There's no serial port, which is no loss at all, and the only feature that would really enhance the Mesh is wireless Lan. As this notebook comes with Windows XP Home it is fair to say that it isn't really targeted at the professional market, so the lack of wireless Lan isn't a major sin.

While we'd like to rail on about the Return key of the keyboard being poorly located, that is true of most of the notebooks here, so the Mesh gets off scot-free. Its real problem is that there is very little to distinguish this notebook from a number of the others in this group.

The Mesh will perform most tasks perfectly adequately, yet will excel at very little.

DETAILS

PRICE £1,198.50 (£1,020 ex VAT)

CONTACT Mesh 0870 046 4747
www.meshcomputers.com

PROS High Sysmark performance; loads of ports; high-resolution screen

CONS Very poor battery life; big and heavy

VERDICT

A decent notebook but offers nothing you can't get elsewhere

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



"Impressive Performance"

Computer Shopper Hit Award (5600D) - Feb 2003

AJP 8080 - Slim, Light & Wireless

- 14.1" TFT XGA (1024x768)
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- Built in 10/100 Ethernet Adapter
- Intel 855GM with Dynamic Video Memory
- Ports: IEEE Firewire, 3x USB 2.0, IrDA, TV-Out, Monitor, S/P DIF output
- Audio DJ onboard
- Built in Smart Card Reader (supports MMC/SD/SM/MS)
- Microsoft® Windows® XP Professional
- Up to 4.5 Hours Battery Life
- 318(W)x277(D)x25-30mm(H) / Weight: 2.4Kg
- Case, 36 months RTB Warranty***

Other Features: Built in 3D Sound & Speakers, 1x PC Card Slot, Smart Li-Ion Battery**, 5 Hot Keys

14.1" TFT

Centrino 1.3GHz

512MB RAM

Silent 40GB HDD

Combo Drive

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- Built in 3.5" FDD
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 64MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 3xUSB 2.0, TV-Out, Parallel, Serial, Monitor, PS/2
- Built in Video Camera
- Built in Bluetooth Technology
- Built in Wireless antenna
- 329(W)x275(D)x36mm (H) / Weight: 3.3Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3D Sound & Speakers, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Carry Case, Windows XP Home with CD & Manual, Wireless LAN module (Optional)

15" TFT

P4 2.8GHz

512MB RAM

Silent 60GB HDD

Combo Drive

£999 ex.VAT
£1173.83 inc.VAT



AJP NeoPC 4 - Desktop with a Difference

- 17.1" TFT SXGA (1280x1024)
- 2.66GHz Intel Pentium 4 with 512K Cache (Optional 2.8GHz)
- 512MB DDR RAM (upgradeable to 1GB)
- 120GB HDD (7200 RPM)
- Combo DVD/CD-RW Drive (Optional DVD-RW/CDRW)
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- 64MB DDR Shared Video Memory
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, Parallel, Monitor, 2x PS/2
- Built in Wireless Antenna
- Cordless Keyboard & Mouse
- 369(W)x188(D)x384mm (H) / Weight: 8.8Kg
- 0-15° Screen Tilt, 270° Swivel Base
- 36 months RTB Warranty***

Other Features: Built in 3.5" FDD, Built in 3D Sound & Speakers, 2x PC Card Slot, Windows XP Home with CD & Manual, (Optional) Wireless LAN module

17.1" TFT

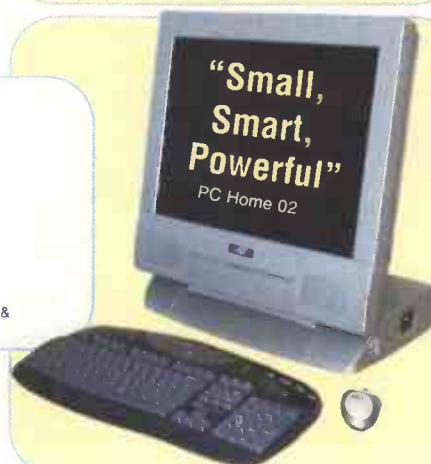
P4 2.66GHz

512MB RAM

120GB HDD

Combo Drive

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£1173.83 inc.VAT



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PC Home Silver Award 02

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What Laptop Silver Award (8880E) - May 2003



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- 4x Built in Speakers & Sub Woofer Module
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- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 64MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 3xUSB 2.0, IrDA, TV-Out, Video In (with TV Tuner only), Parallel, Serial, Monitor, PS/2, S/P DIF output
- Built in Video Camera
- Built in Bluetooth Technology
- Built in Wireless LAN antenna
- Full Size Keyboard & Separate Numeric Keypad
- 393(W)x275(D)x37.5mm(H) / Weight: 3.8Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3.5" FDD, Built in 3D Sound, 1x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual, Wireless LAN module (Optional)

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2.8GHz**

**1024MB
RAM**

**80GB
HDD**

**Combo
& FDD**

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Woofer**

**Video
Camera**

**Full Size
Keyboard**

Bluetooth



AJP 8880E - Ultimate Desktop Replacement

- 16.1" TFT UXGA (1600x1200)
- 2.8GHz Intel® Pentium 4 with 512K Cache (Optional 3.06GHz - **Hyper Threading**)
- 512MB DDR RAM (upgradeable to 1GB)
- 60GB HDD (upgradeable to 80GB)
- Built in 3.5" FDD
- Bay 1 Combo DVD/CD-RW (Optional DVD-RW/CD-RW)
- Bay 2 Optional 2nd HDD, *DVD or IP Sharing
- Bay 3 Optional 3rd HDD or TV Tuner
- Bay 4 Optional MP3 Player / Storage Disk
- Built in 56K fax/modem
- Built in 10/100 Ethernet Adapter
- ATI Mobility Radeon 9000 with Integrated AGP 4x
- 128MB DDR Video RAM
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, IrDA, TV-Out, Video In, Parallel, Serial, Monitor, PS/2, S/P DIF output
- Built in Wireless Antenna
- Sony Memory Card Slot
- Audio DJ onboard
- Full Size Keyboard & Separate Numeric Keypad
- 360(W)x299(D)x54.5mm (H) / Weight: 4.9Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3.5" FDD, Built in 3D Sound & Speakers, 2x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual, 4x IP Sharing Module for Networking/ADSL (Optional), Wireless LAN module (Optional)

**16.1"
TFT**

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2.8GHz**

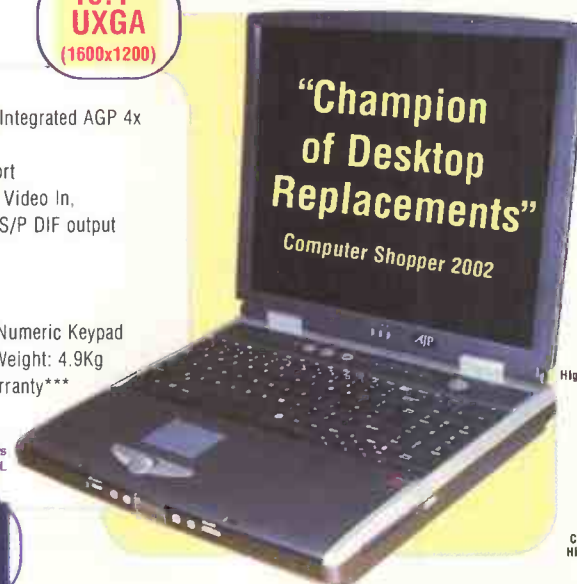
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Multivision Nexus 8010

You may have noticed in the features table that this 1.5GHz Centrino notebook doesn't have a modem. The reason is that the motherboard doesn't have a modem port, so Multivision would ordinarily fit a mini PCI card that supports wireless Lan, modem or both technologies. The problem is that Intel insists Centrino notebooks use an Intel 802.11b wireless card to qualify for the Centrino brand. Multivision is well aware that this is an issue for some customers so it offers a choice; you can have a Centrino notebook with no modem or it will peel the Centrino badge off and supply its usual mini PCI card that does have a modem.

Other than that, this is an unusual notebook because it is a Centrino but it uses Radeon 9000 graphics and a 15in screen with a 1,400 x 1,050 resolution display, which are all technologies that require plenty of battery power. The upshot is that the Nexus 8010 has the poor Sysmark performance that we have seen in the past from a Centrino, yet it has excellent graphics scores and a very reasonable battery life.

The notebook is relatively light and weighs just under 3kg, so is eminently portable yet very much a full-sized notebook, with a decent keyboard and a

regular touchpad that manages to look very big thanks to the bezel that surrounds it. The PC Card slot on the left and combo drive on the right are quite conventional, but the position of the 10/100 Lan port is a little weird as the cable plugs in on the left-hand side towards the front, rather than being tucked away at the back out of harm's way.

The inclusion of Ability Office is a positive thing and we wonder why more manufacturers don't include it.

Multivision has compromised on Sysmark performance by fitting a 1.5GHz processor, but almost every other aspect of this notebook matches or exceeds the other contenders in this group.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Multivision

0870 066 0885

www.multivision.co.uk

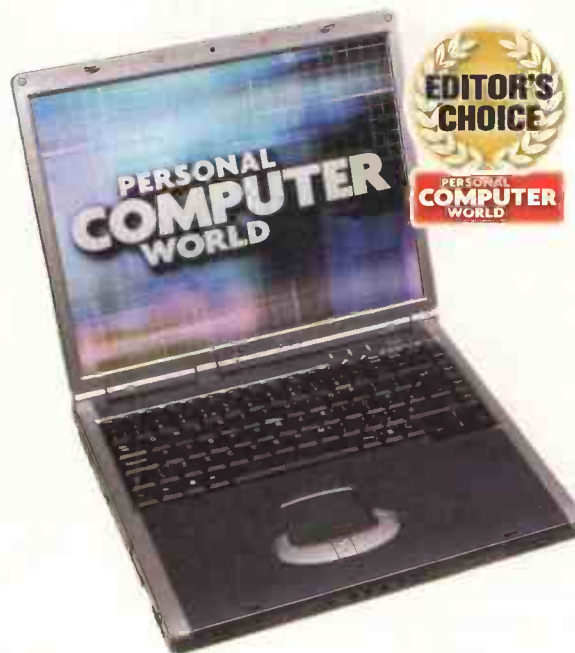
PROS Graphics performance and screen; decent battery life

CONS Slowest in Sysmark; you have to specify a modem

VERDICT

An unusual Centrino notebook that is a very good compromise

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



Rock Quaddra XT

It's an old joke, but the Rock Quaddra XT isn't so much a desktop replacement as the desk itself. Well, perhaps it isn't a joke – in this case it's almost true.

Most of the features are familiar to us from other notebooks in this group, so we'll skim through them quickly; the desktop Pentium 4 2.6GHz processor, 512MB of DDR memory, 60GB Fujitsu hard drive, combo optical drive, Radeon 9000 graphics package and 15in screen with 1,400 x 1,050 resolution are all relatively commonplace. They're all good components but there's nothing there to grab our attention.

This is clearly a decent desktop replacement notebook that offers nothing you can't get from Fujitsu-Siemens or Mesh. And then you look at the battery performance graph and everything is turned upside down. Somehow Rock has managed to produce a huge notebook with decent performance that lasted for two hours 41 minutes in our battery test, which matched the AJP 1.4GHz Centrino.

That means this desktop replacement can be used in most environments, although you wouldn't want to carry it very far at that weight. It doesn't have wireless Lan, and it's loaded with Windows XP Home, but there's another clue that the prime

market for the Quaddra XT is home users. In the centre of the open lid there's a tiny webcam – useful if want to prove to your partner that you really are stuck in a Travel Lodge on a business trip and aren't out having fun.

The drives are on the left-hand side and the ports are all along the back. Oddly there is nothing on the right-hand side.

In addition to the battery life and all-round performance, Rock has installed Ability Office and supplies an excellent three-year C&R warranty. There's that whole 'position of the Enter key' issue of course, but the most important thing is that Rock proves it's not essential to buy a Centrino to get excellent battery life, so long as you can live with a heavy notebook.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Rock 0870 990 9090

www.rockdirect.com

PROS Amazing battery life; three-year C&R warranty; good performance

CONS Big; heavy

VERDICT

The battery life lifts this desktop replacement into a completely different arena

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



Systemax Travelbook 4507

Systemax is another manufacturer that sent us a desktop replacement notebook, so the Travelbook 4507 model name is a little wishful as it conjures up the image of a paperback novel. The Systemax is certainly a great deal more substantial than that, and it's not the most attractive thing to look at, which is a factor when it sits on your desk.

On the right-hand side is the combo drive and behind that you get four USB ports in a square pattern, which unfortunately means that when you eject the disc tray it gets tangled up in your mouse lead. The left-hand side has a PC Card slot and a network port whose position is also a problem, in that your network cables will trail across the desk. There is also a huge exhaust vent for the processor cooler.

Moving to the back you'll find the legacy ports, another couple of vents, a TV-out port, the infra-red port and mini jacks for headphones and microphone.

Almost none of those ports are in a logical position. To paraphrase Morecombe and Wise, it has all the right parts, but not necessarily in the right order.

The Systemax is a decent performer in Sysmark, and it's very strong in 3Dmark too. The battery life is acceptable,

and all in all this is a decent enough notebook.

The 60GB hard disk offers plenty of storage space, but on the downside we weren't that impressed by the inclusion of Microsoft Works Suite.

This notebook certainly performs well in our tests, but it has two question marks hanging over it. The first is the strange layout of ports on the chassis, which counts as a black mark. The second is the fact that it uses all the same components as a number of other notebooks in this group, yet fails to bring anything new to the table.

That's really a sin of omission but, as you can get everything that Systemax has to offer and more elsewhere, the Rock Quaddra is a better buy.

DETAILS

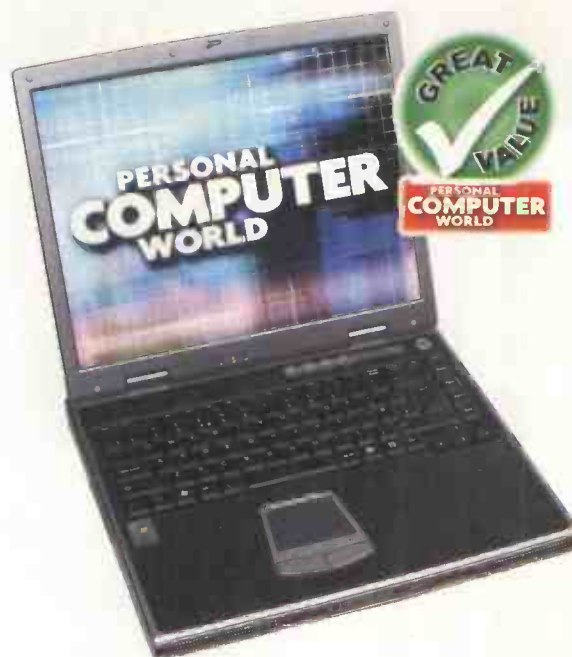
PRICE £1,199 (£1,020 ex VAT)
CONTACT Simply 0870 729 7366
www.systemax.co.uk

PROS Very good 3Dmark and Sysmark performance
CONS Poor arrangement of the ports on the chassis

VERDICT

On paper this is a decent notebook, but lacks those little extras that would earn an award

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



Time Ultima PQ

If you recall, we said in the review of the Mesh

Discovery 2.8GHz Pro that it uses the same chassis as this Time Ultima PQ. The chassis is so important to a notebook that you may think the two notebooks are nearly identical. Well they are, but even though they share a lot of the same hardware, there are significant differences.

They have a common screen size and resolution, use the same graphics chip, each has a 60GB hard disk and 512MB of memory, and naturally enough they are the same size and very nearly the same weight.

Time chose a slightly slower processor than Mesh and fitted a media card reader, which could be very useful for owners of digital cameras and PDAs. You may think that those are trivial differences, and ordinarily you'd be correct, but the Time is 20 per cent slower in Sysmark than the Mesh and 15 per cent slower in 3Dmark. Those differences can't be explained by a five per cent difference in processor speed, so the only other difference is that Time installs Windows XP Professional Edition while Mesh opts for XP Home.

A quick glance at the features table and performance graphs shows that XP Home notebooks

tend to be faster than those that use XP Professional, and that includes the Hi-Grade that did so well with only a 2.4GHz processor.

Our battery test confirmed the poor result we got with the Mesh, except that the Time lasted for less than an hour. As a result of that little lot it was marked down in the performance stakes but got a significant boost when we looked at value for money. Time charges £999 for the Ultima PQ, which is a very good price indeed. A heavy notebook with poor battery life and unimpressive performance doesn't sound very appealing, but put the word 'cheap' in there and things improve significantly.

DETAILS

PRICE £999 (£850.21 ex VAT)
CONTACT Time 01282 777 555
www.timecomputers.com

PROS Good value; big screen; plenty of hard disk space
CONS Poor battery life; poor Sysmark performance

VERDICT

If you're on a tight budget, the Time could be just what you need

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

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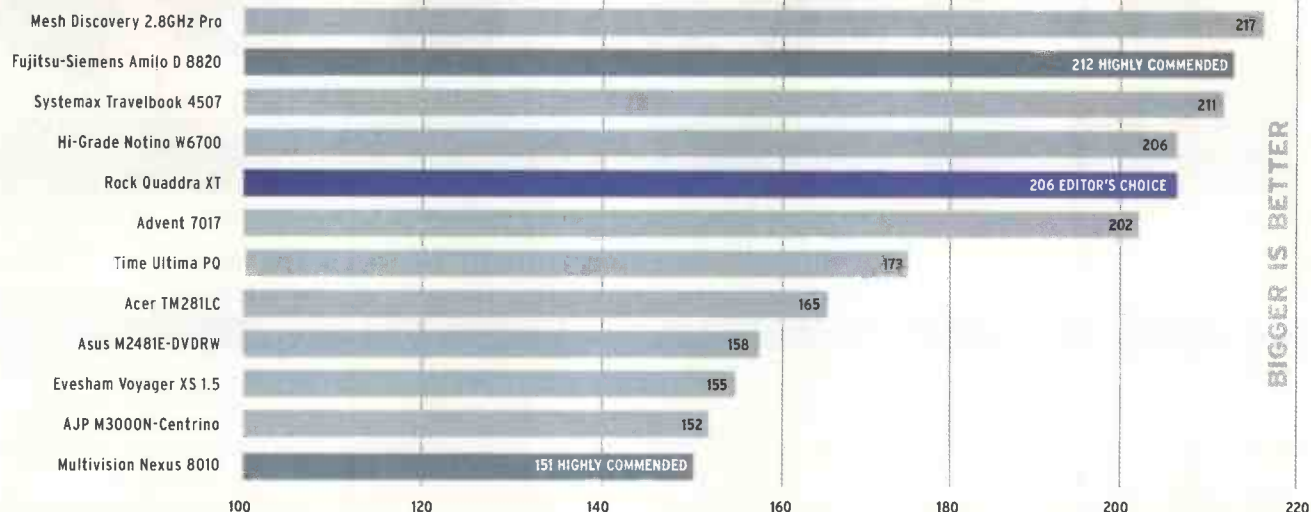
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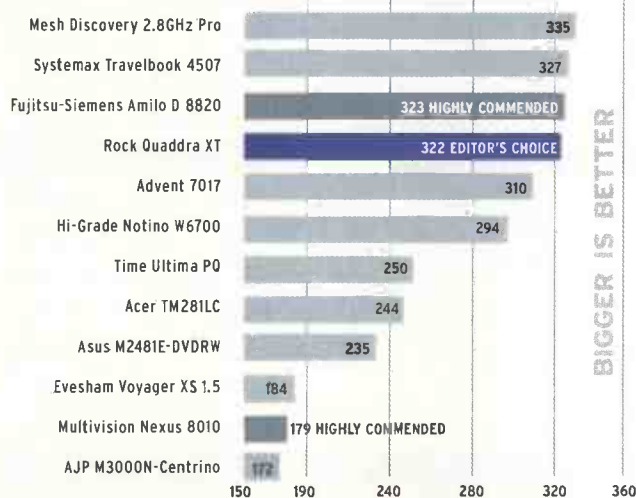
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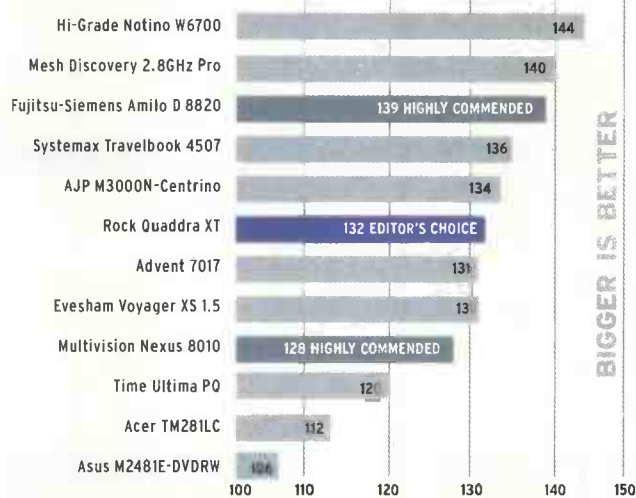
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Lab results**Sysmark 2002 overall**

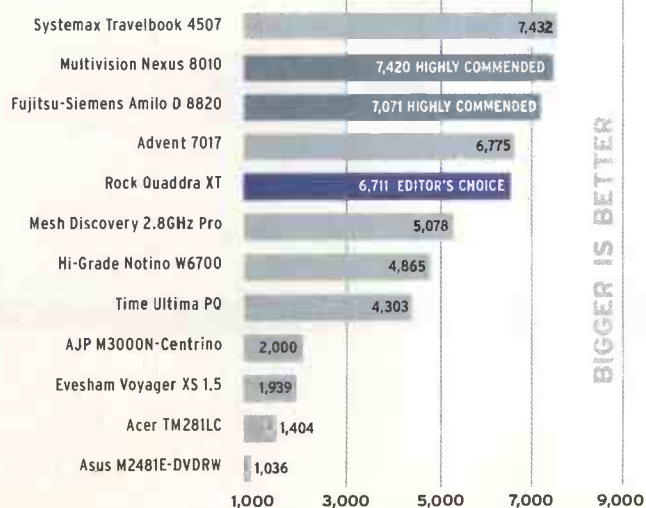
BIGGER IS BETTER

Sysmark 2002 Internet content creation

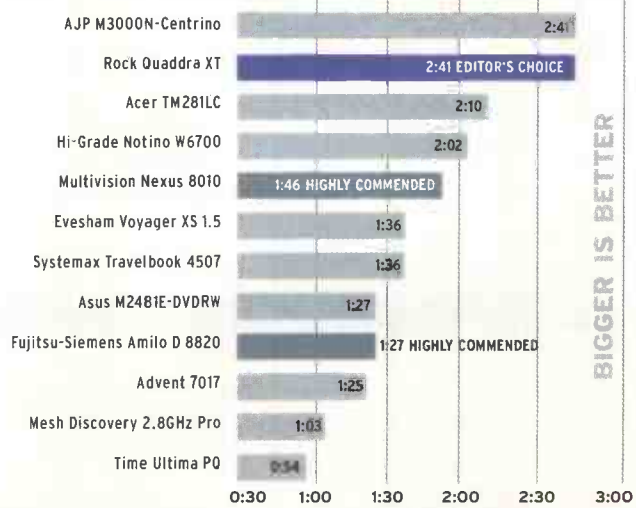
BIGGER IS BETTER

Sysmark 2002 office productivity

BIGGER IS BETTER

3Dmark 2001 (1,024 x 768 at 32bit)

BIGGER IS BETTER





Battery life (hours:minutes)

BIGGER IS BETTER

Please see page 12 for an explanation of how we tested the notebooks



Table of features

					
MANUFACTURER	ACER	ADVENT	AJP	ASUS	EVESHAM
MODEL NAME	TM281LC	7017	M3000N-CENTRINO	M2481E-DVDRW	VOYAGER XS 1.5
Price inc VAT (ex VAT)	£1,103.33 (£939)	£1,199 (£1,020)	£1,173.83 (£999)	£1,130 (£959)	£1,200 (£1,021.28)
Sales telephone	0870 900 2237	08705 464 464	020 8208 9755	01908 518 000	0870 160 9500
URL	www.acer.co.uk	www.pcworld.co.uk	www.ajp.co.uk	www.asustek.co.uk	www.evesham.com
HARDWARE SPECS					
Processor	Intel P4 M1.8GHz	Intel P4 3.06GHz	Intel P4 M1.4GHz	Intel P4 M1.8GHz	Intel P4 M1.5GHz
Chipset	Intel 845G	Sis 645DX	Intel i855 GM	Sis 645DX	Intel i855 GM
Memory and type	256MB DDR	512MB DDR PC2100	504MB DDR PC2100	352MB DDR PC2100	376MB DDR PC2100
Occupied/spare memory (Ram) slots	2/1	2/0	1/0	1/0	1/0
Max memory in this configuration	768MB	512MB	512MB	384MB	376MB
Hard disk manufacturer, model and spin speed	Fujitsu MHS2030AT, 4,200rpm	Toshiba MK4018GAS, 4,200rpm	Fujitsu MHS2040AT, 4,200rpm	Hitachi IC25N040ATCS04-0, 4,200rpm	Fujitsu MHR2040AT, 4,200rpm
Hard disk size	30GB	40GB	40GB	40GB	40GB
No of PC Card slots	1	1	1	1	1
No of USB/Firewire/serial/parallel/PS/2 ports	2/0/0/1/0	2/1/0/1/1	4/1/0/1/0	2/1/0/1/0	3/1/0/0/0
MULTIMEDIA					
Optical drive/floppy drive	Matshita UJDA740 combo/✓	OSI SBW-242 combo/None	OSI SBW-242 combo/None	Toshiba SD-R2102 combo/None	Toshiba SDR2312 combo/None
Sound chip	Crystal 4299	Sis 7012	Sigmatel C-Major	Sis 7012	Sigmatel C-Major
Graphics chip/memory	Intel 845G/ 8-64MB shared dynamic	ATI Mobility Radeon 9000/64MB	Intel 855GM/ 8MB shared	Sis 650/ 32MB shared	Intel 855GM/ 8MB shared
Screen size/maximum resolution	15.1in/ 1,024 x 768	15.1in/ 1,024 x 768	14.1in/ 1,400 x 1,050	14.1in/ 1,024 x 768	13.3in/ 1,024 x 768
OTHER INFORMATION					
Misc hardware/modem	56K V.92	Sis 10/100 Lan, infra-red, Smartlink 56K	802.11b wireless Lan, 10/100 Lan, infra-red, Actiontec MDC AC97 56K	10/100 Lan, Infra-red, SoftK56 Data Fax	Wireless Lan, 10/100 Lan, infra-red, Lucent Soft AMR 56K
Weight (kg)	3.05	3.25	2.4	2.45	2.35 inc USB combo
Version of Windows	XP Professional	XP Home	XP Professional	XP Professional	XP Home
Bundled software	Norton AV, Cyberlink Power DVD, NTI CD-Maker	Microsoft Works 7	Cyberlink PowerDVD, Ahead Nero	Asus DVD2000, Nero 5	Cyberlink PowerDVD
Standard warranty (RTB = return to base, C&R = collect and return)	2 years C&R	1 year C&R	1 year RTB, then 2 years RTB labour only	2 years RTB	1 year on site, then 2 years RTB labour only
SCORES					
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Budget notebooks <<Group test



FUJITSU-SIEMENS

AMILO D 8820

£1,149.99 (£978.71)

0870 606 6677

www.fujitsu-siemens.com



HI-GRADE

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020 8532 6100

www.higrade.com



MESH

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0870 046 4747

www.meshcomputers.com



MULTIVISION

NEXUS 8010

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ROCK

QUADDRA XT

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www.rockdirect.com



SYSTEMAX

TRAVELBOOK
4507

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0870 729 7366

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TIME

ULTIMA P0

£999 (£850.21)

01282 777 555

www.timecomputers.com

Intel P4 2.8GHz

Sis 645DX

512MB DDR PC2100

2/0

512MB

Fujitsu MHS2060AT,

4,200rpm

60GB

2

2/1/1/1

Intel P4 2.4GHz

Intel i845MP

256MB DDR PC2100

1/1

768MB

Hitachi DK23EA-30,

4,200rpm

30GB

1

2/1/0/1/0

Intel P4 2.8GHz

Sis 645DX

512MB DDR

2/0

512MB

Fujitsu MHT2060AT,

4,200rpm

60GB

1

4/1/0/1/1

Intel P4 M1.5GHz

Intel i855 PM

512MB DDR PC2100

1/0

512MB

Fujitsu MHS2060AT,

4,200rpm

60GB

1

2/1/0/1/0

Intel P4 2.66GHz

Sis 645DX

512MB DDR

2/0

512MB

Fujitsu MHT2060AT,

4,200rpm

60GB

1

3/1/1/1/1

Intel P4 2.80GHz

Sis 645DX

512MB DDR PC2100

2/0

512MB

Hitachi DK23DA-60

4,200rpm

60GB

1

4/1/0/1/0

Intel P4 2.66GHz

Sis 645DX

512MB DDR PC2100

1/0

512MB

Toshiba MK6021GAS,

4,200rpm

60GB

1

4/1/0/1/1

OSI SBW-241

combo/✓

Sis 7012

ATI Mobility

Radeon 9000/64MB

15in/

1,400 x 1,050

Matshita CW-8122

combo/None

Intel 82801

Nvidia

Geforce4 440 Go/64MB

15.2in/

1,280 x 854

OSI SBW-241

combo/None

Realtek ALC201

Nvidia

Geforce4 440 Go/64MB

15in/

1,400 x 1,050

OSI SBW-242

combo/None

Realtek AC97

ATI Mobility

Radeon 9000/64MB

15in/

1,400 x 1,050

Samsung SN-324B

combo/None

Realtek AC97

ATI Mobility

Radeon 9000/64MB

15in/

1,400 x 1,050

OSI combo

SBW-16/None

Avance AC97

ATI Mobility Radeon

9000/64MB

15in/

1,400 x 1,050

Toshiba SD-R2212

combo/none

Avance AC97

Nvidia Geforce4

440 Go/64MB

15in/

1,400 x 1,050

10/100 Lan,

Lucent AMR Soft

3.55

XP Home

Microsoft Works Suite 2003,
Adobe Photoshop Elements

1 year C&R

802.11b wireless Lan,

10/100 Lan, infra-red,

HSP56 MR8060

2.85

XP Home

Microsoft Works 7

2 years RTB

10/100 Lan, infra-red,

HSP56 MR8640

3.5

XP Home

Lotus SmartSuite 9.8

1 year RTB, then

2 years RTB labour only

802.11b wireless Lan,

10/100 Lan, infra-red,

no modem (see review)

2.9

XP Home

Ability Office

2 years C&R

Built in webcam,

10/100 Lan, infra-red,

56K MDC

3.55

XP Home

Ability Office, Panda AV

3 years C&R

Infra-red,

10/100 Lan/HSP56 MR

3.75

XP Home

Microsoft Works Suite 2002,
Cyberlink PowerDVD, Easy CD
Creator 5, Norton Anti-Virus

2 years RTB

10/100 Lan, MS,

SD, MMC card reader,

infra-red/HSP56 MR8640

3.45

XP Professional

Cyberlink PowerDVD

1 year RTB

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

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★★★★★

Editor's Choice

A quick glance down the features table shows you just how much hardware manufacturers can pack into a notebook these days. Given our relatively low price point of £1,200 including VAT, we were amazed at how few compromises you have to make when choosing a mobile computer.

These notebooks all have a hard disk with over 30GB of capacity, and most had 40GB or even 60GB of storage space. You don't need that much space for a few documents, so you might as well make the most of it and load up with MP3s and movies.

These notebooks all had plenty of processor power, and every one of them was made by Intel, with nary an AMD product in sight. The processors split into three groups: desktop Pentium 4, mobile Pentium 4 and Centrino. Sysmark demands a lot from the processor and the scores more or less followed the clock speeds, with a couple of notable exceptions.

The most obvious surprise was Advent, which failed to take the performance crown despite using a 3.06GHz desktop processor. This processor supports hyperthreading but the notebook doesn't have the feature, which we presume is due to the choice of motherboard in this model. The other surprise was Hi-Grade, which used a relatively slow processor yet managed to humble a number of its competitors.

'We were amazed at how few compromises you have to make'

All these notebooks use DDR memory and, although the minimum installed was 256MB, the norm was 512MB, which is as much as you expect to see in a desktop PC.

On the graphics front, there were also three camps. The integrated chips from Sis and Intel are perfectly competent for 2D work but have very poor 3D performance, as well as being a couple of generations old in terms of DirectX support. In short, they're no good for gaming. This is fine for a corporate or business notebook, but may be a limitation for home users who would like the option of gaming. The other snag with the integrated options is that they use a chunk of the system memory, which is not a problem if you have 512MB but could be one if you start with just 256MB.



Rock Quaddra XT



Fujitsu-Siemens Amilo 8820



Multivision Nexus 8010

The other two chips are the Nvidia Geforce4 Go 440 and the ATI Radeon 9000. Both have dedicated graphics memory and are of gaming quality, but our 3Dmark results show that the ATI chip is significantly faster than the Nvidia solution. In addition, the Nvidia chip supports DirectX 7, while the ATI chip can handle DirectX 8.1 thanks to its pixel and vertex shader hardware.

After we had analysed the Labs test results from Sysmark 2002, 3Dmark 2001 and our own battery test, and had a good look at each notebook, it was evident that our three award winners had plenty in common.

The winners

Our first **Highly Commended** award goes to the **Fujitsu-Siemens Amilo D 8820**. With its 2.8GHz Pentium 4 processor and 512MB of DDR memory, it took its rightful place near the top of the Sysmark chart, and its ATI Mobility Radeon 9000 graphics chip ensured it performed well in 3Dmark too.

Battery life wasn't superb but didn't cause too much concern, and we gave the Fujitsu-Siemens a decent score for performance. It was the first notebook in the group with a 15in screen and 1,400 x 1,050 resolution. You can only fit a screen of that size into a large chassis, so the 3.55kg weight is a little disappointing, but unavoidable – until someone invents a folding TFT display. Fujitsu-Siemens included copies of Microsoft Works Suite 2003 and Adobe Photoshop Elements, which added a bit of value and rounded the package off well.

Then we had the **Highly Commended Multivision Nexus 8010**, which uses the Centrino package and a processor running at 1.5GHz, making it one of the slowest on test here. This is reflected in the Sysmark score, but Multivision has fitted the Radeon 9000 graphics chip and the same specification screen as the Fujitsu-Siemens, which gave it very respectable 3D abilities but has an impact on battery life. Centrino often offers either a huge battery life or low weight, and the Multivision offers a compromise, having a reasonable weight and decent battery life.

Our **Editor's Choice** is the **Rock Quaddra XT**, which is more than a desktop replacement notebook. It has plenty of processing and graphics power and did well in our tests, but we were amazed at the massive life of its battery.

Rock doesn't seem to have compromised with its specification, so the only issue is whether you have the strength to carry this 3.55kg notebook around. We suspect that you'll give up before the battery does.

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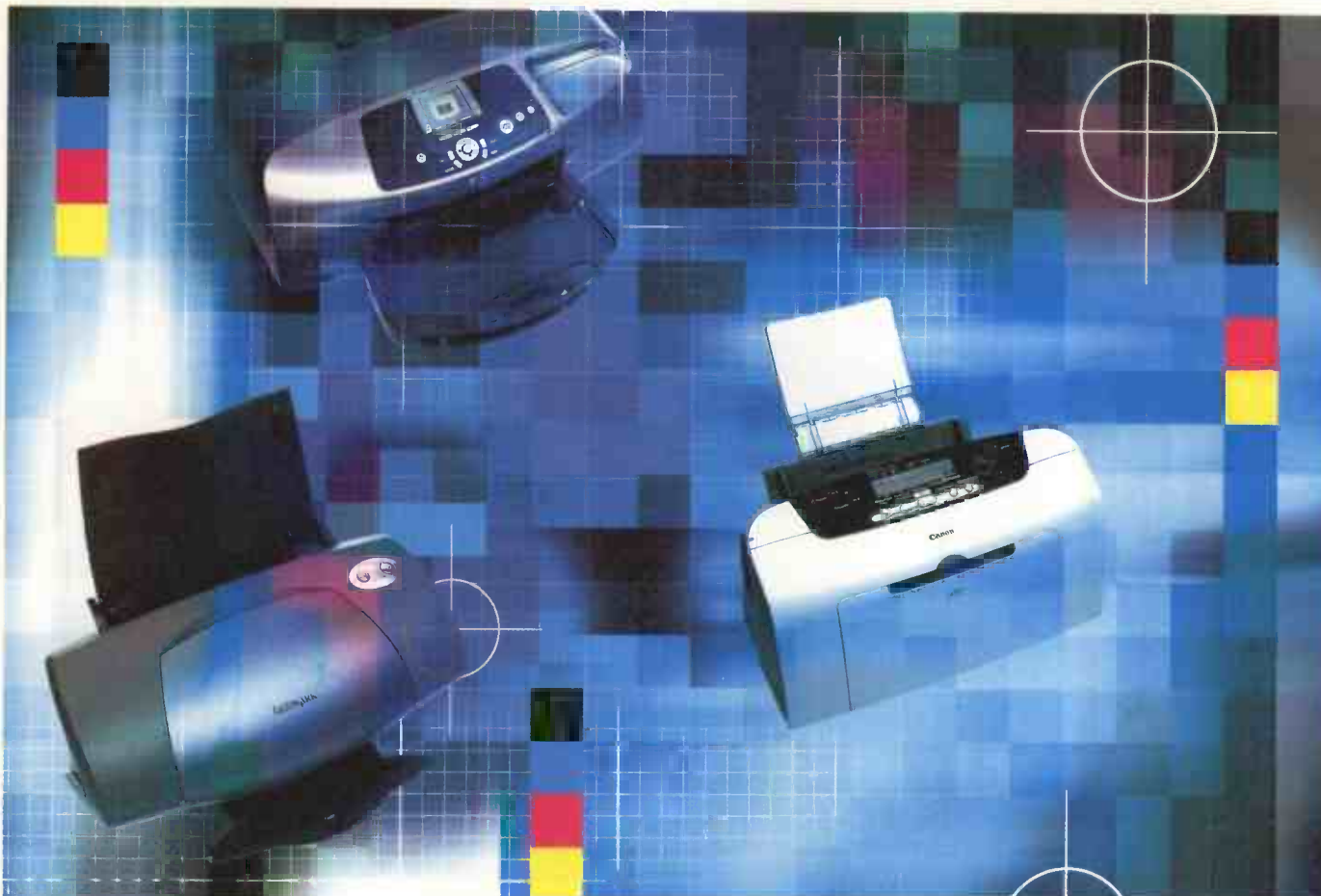
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Printer preview

WORDS AND TESTING: NIK RAWLINSON PHOTOS: BRUCE MACKIE

Today's printers are expected to do a lot more than simply churn out the odd letter. We tested eight colour inkjets to see how they handle a range of functions

Digital cameras may be today's hot product, but for years printers – both inkjet and laser – have been the number one PC peripheral. The reason for this is simple: unless you're happy to email all your letters, invoices and spreadsheets, or you work in a fabled 'paperless office', you have little choice but to churn out several reams of inky pages every year.

Most of us want to do more than that, though and, with the fall in prices of photo-editing software, as well as the scanners and cameras that produce the images we want to digitally enhance, manufacturers have at last realised that if they are to part you with your money they're going to have to

reproduce snaps as well as the high-street developers do.

Photo printing therefore formed an important part of our tests, along with the outputting of more mundane work such as word-processed documents, monochrome illustrations, Adobe Acrobat files and text – ranging from 100pt right down to 2pt to test for resolution handling.

This year, more than ever, the printers submitted for review all came very close in terms of performance, with the only distinguishing features being speed, looks and added functions. Over the next nine pages, we spell out those differences and pick the cream of the crop in time for you to print your summer holiday memories.



Canon i450

This is effectively the Canon i470D (see right) without the card slots or PC-free printing options. It retains the shape, though, with the port for connecting compatible Canon cameras and, once again, PC connection is by means of USB. It has just two buttons on the front – one for power and the other for controls, and opening up the top of the case positions the print cradle at the centre of the chassis for easy access. Into this slots a combined colour and black head, which in turn holds two separate wells – one for black and one CMY (cyan, magenta, yellow).

Like the i470D, it is able to print borderless A4 photos, and in our tests this increased the print time by just two seconds. Colours were a little washed out in the blue and green spectrums, but strong and vivid in red and yellow, so it's good for flowers but less suited to general landscapes. Skin tones were well rendered and realistic and, while areas of fine detail could be better, the results are perfectly acceptable at normal viewing distances.

Text resolution was excellent, with good clean characters exhibiting sharp edges on even photocopy paper, which makes this printer a good choice for the small business. Word documents containing a mixture of text and monochrome images were also

produced cleanly and quickly, without saturating the paper in areas of dense ink usage. Shaded backgrounds to Word boxes were rather coarse, as was the case with the i470D, but this is a matter of personal taste.

Installation was a breeze and the driver is more or less identical to the Canon i470D, with manual colour adjustment – which may sort out the washed-out greens and blues – customisable contrast settings and image optimisation, which is handy for outputting compressed graphics downloaded from the net.

We were very impressed by the 'quiet mode' setting, which slows things down but does reduce the noise when printing. This can be manually invoked or set to operate during certain times, which should appeal to late-night home workers.

DETAILS

PRICE £99 (£84.26 ex VAT)

CONTACT Canon 0870 514 3723

www.canon.co.uk

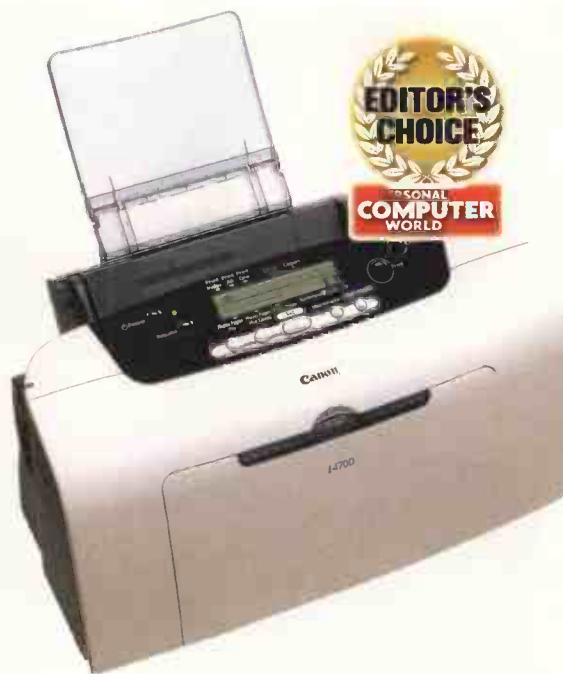
PROS Text quality

CONS Images slightly washed out

VERDICT

A good choice for the low-volume home or small office user

TEXT QUALITY	★★★★★
PHOTO QUALITY	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Canon i470D

Let's cut to the chase. The i470D may be chunky, but its text output is as sharp as a laser printer, and when it boasts borderless printing it really means it – our A4 test photo really did go right up to the edge of the page. Unfortunately its colours were neither as bright nor as vivid as those produced by either of the Epson printers on test – particularly when handling greens and blues, which does not bode well for landscapes – but if you're happy to increase the saturation in your photo-editing software, this should be easy to overcome.

PC connection is a USB-only affair, and power plugs in directly without the need for a transformer. On the left-hand side of the unit are two media slots for direct printing from all four primary Flash card formats, as well as a connection point for compatible Canon cameras. A screen and the dedicated control buttons on the top of the unit mean you can print your photos without turning on your PC – assuming you're confident enough with your camera skills.

Installation is simple, and so is cartridge installation, but we were disappointed to see that under the hood Canon has retained its flip-switch for alternating between paper and envelopes, especially in a device

so well suited to letter-printing. In use it's fairly noisy – about the same as the Epson 830U, but the results, as we said at the start, are excellent.

The i470D is a speedy worker, crossing the finishing line second in most of our tests, undercutting the Epson and Lexmark printers each time. It is impressive that it manages to do this without dropping its quality – just a year or so ago you'd have expected to drop into draft mode to achieve these kind of results, but in each of our tests we used the standard settings for text, and best for photos.

While we would not necessarily recommend this printer for dedicated photographers, it's certainly worthy of serious consideration for the low-volume business user, in spite of its looks.

DETAILS

PRICE £179 (£152.34 ex VAT)

CONTACT Canon 0870 514 3723

www.canon.co.uk

PROS Excellent text quality

CONS Photos are a little washed out

VERDICT

Fast and simple to use, it's one for the business user

TEXT QUALITY	★★★★★
PHOTO QUALITY	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Epson Stylus Photo 830U

The 830U is unmistakably Epson, with the familiar silver body, short pullout catcher tray to the front and curved input hopper behind. There are just three buttons – one for power and two for control – and power plugs in directly without the need for a transformer, cutting down on clutter. Connection is by means of USB only, with a port at the back for permanent connections and the front for notebooks.

It uses six-colour Piezo technology, with half-strength magenta and cyan inks supplementing the regular five colours in two cartridges for better photo printing and, paper permitting, it will ramp up to 5,760dpi (dots per inch) using what Epson calls Resolution Performance Management (RPM). Installation was a breeze and a comprehensive HTML-based help system, complete with search, does away with the need for manuals. The driver offers the expected features, including n-up printing where a single page is enlarged and spread across several sheets, and customisable settings for everything from contrast and saturation to the relative values of each colour laid down – a real boon for digital photographers. Once set, your preferences can be saved for future use.

The 830U is fairly noisy, with a lot of swishing and whirring.

The quality of its output, though, is fairly good. Word-processed text on photocopy paper shows evidence of slight feathering, and shaded monochrome backgrounds in Word documents are a little grainy, but text remained clearly legible right down to 2pt. Its photographic output is of the highest calibre. It is all but impossible to see the drops that make up the image, and colours – including skin tones – are true to life. Transitions between areas of varying tone are smooth, while sharp edges remain crisp with no evidence of bleeding.

Overall, this is better for the photographer than the novelist. If you want the best text output, try one of the Canon printers reviewed here, or the HP Photosmart 7550 if you'd rather combine text and photos.

DETAILS

PRICE £99 (£84.26 ex VAT)
CONTACT Epson 0800 220 546
www.epson.co.uk

PROS Excellent photo output

CONS Text could be better

VERDICT

The Canon i470D is a better overall printer but, for high-quality photos, consider this one

TEXT QUALITY	★★★★★
PHOTO QUALITY	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Epson Stylus Photo 900

Far larger than its sibling the 830U, the driver of the 900 is nonetheless almost identical. However, it is far quieter, far larger, and offers the option of either USB or parallel connection. Control buttons run to three, one of which loads and advances Epson's optional roll paper for printing panoramic photos, while a fourth button controls power. Around the back we find a lever for raising the platen to take a dedicated CD-loader tray, giving you the facility to print full-face labels directly onto CD media. Regardless of not having any Flash-media slots, this is without a doubt the most versatile printer in the group.

It holds two cartridges for a total of six colours, including half-strength cyan and magenta inks, and using proprietary Epson technology will push up its photo resolution to 5,760dpi given appropriate paper.

Output is very similar to that produced by the 830U. Text was slightly feathered on photocopy paper and shaded monochrome backdrops in Word documents were, again, slightly rough. However, it copes well with monochrome graphics on photocopy paper where you might otherwise expect the page to become saturated, and its photo-quality output really lives up to its title, coming close to

rivalling traditional silver halide photography.

Colours are bright and vivid and where one fades into another – for example, in a sky, which is usually darker at the top – the transition is smooth. Sharp edges where dark and light colours meet are well rendered with no evidence of bleeding.

In short, if you want the most versatile photo printer on the market, and A3 is overkill, this is the printer for you. It will be of particular interest to digital photographers who found panorama-stitching software in their camera boxes (including Nikon owners) who will make good use of the roll paper handling. It's not very fast, finishing in the bottom half of each of our tests, but sometimes you have to accept that good things come to those who wait.

DETAILS

PRICE £199 (£169.36 ex VAT)
CONTACT Epson 0800 220 546
www.epson.co.uk

PROS Versatile; offers banner and CD printing

CONS Text on photocopy paper

VERDICT

Perfect if you need a printer to do more than spit out text files

TEXT QUALITY	★★★★★
PHOTO QUALITY	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



HP Deskjet 6122

The 6122 is boxy but businesslike. It has no screen but uses lights on the front of its casing to keep you informed of how things are going. Paper follows the regular C-shaped path of all HP printers, unless you attach the bundled duplexer to the rear. This adds considerable value to a product at this price. Paper handling is excellent, with a full-width retainer on the end of the input hopper and a fold-away catcher on the end of the output tray, which reduces the amount of space required when not in use and saves it being snapped off. We were glad that the 6122 has also integrated the power transformer, doing away with the need for an external brick.

Installation was simple, and connection is by means of either parallel or USB lead, tipping the nod to businesses with legacy equipment. It is a shame there is no network connection as HP recently produced a networkable inkjet for just £140. It takes two cartridges – one colour and one black – which explains why its photo results were not up to the standard of the Photosmart 7550 equivalent. They were still good, however, with clean edges, no bleed and vivid colours. The only disappointment was the visibility of a fine grain in sky shots.

Text quality was not as good as that from the 7550 or the

Canon models, either. While outclassing both the Lexmark and Epson units it was not quite as smooth as we would have liked. That said, 2pt text remained clearly legible, as it has in the output of all of the printers tested here, while there was no degradation in our stepped climb to 100pt.

The 6122's killer feature is the speed at which it works, though, coming first in three of our four tests. It dropped our A4 photo into the output tray a full 24 minutes before the Lexmark Z605 and a minute in advance of its nearest competitor, the Canon i470D. In the mixed content and pdf printing tests it was a clear minute to a minute-and-a-half ahead of every other printer, and only in the plain text test was it beaten, to the tune of 30 seconds, by the Canon i470D.

DETAILS

PRICE £149 (£126.81 ex VAT)
CONTACT HP 08705 474 747
www.hp.com/uk
PROS Duplex unit; very fast
CONS Text could be a little better
VERDICT
 A good choice for the small business, and would be improved with the addition of a Lan port

TEXT QUALITY ★★★★★
PHOTO QUALITY ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★



HP Photosmart 7550

If printers were described the way we describe beds, the 7550 would be a kingsize. Wide, deep and with three printheads that load through a door on one side, it is nothing less than a behemoth. It has four media slots for any digital camera cards you fancy, and a screen for previewing your pictures before you use the integrated controls to print them out without the use of a PC. These hardware controls include functions that handle rotation, saving to the PC and even emailing your photos.

Installation was a doddle, but we were disappointed that power is transformed by a brick-like adaptor that sits on your desk and adds to the clutter. HP is the only manufacturer to submit PCs with power bricks this time around. As usual, paper follows the C-shaped path common to all HP inkjets, and a door at the back opens to aid in the freeing of jammed pages. Connection is by means of USB only, and a second USB port on the front lets you connect compatible cameras for direct photo printing.

On photocopy paper, text-based performance was beyond reproach. Characters were cleanly produced with no evidence of feathering seen in the output of the Lexmark and Epson printers reviewed here. Monochrome graphics in our mixed content

document, meanwhile, were smoothly produced and the paper was not oversaturated. Grey-filled text boxes were also well produced and we saw none of the hatching evident in the output of the Canon units.

Its photo output, as you might expect from a printer with dedicated media slots, is excellent. Skies are smoothly produced with barely any evidence of the dots that make them up, unless you look very closely indeed. Areas of complex detail are well rendered and there is no evidence of bleeding between darker and lighter areas. Skin tones, meanwhile, are well rendered and realistic.

This is an excellent printer for the home photographer who also needs to do more mundane office tasks. Just make sure you have plenty of room to house it.

DETAILS

PRICE £249 (£211.91 ex VAT)
CONTACT HP 08705 474 747
www.hp.com/uk
PROS Text output; photo quality
CONS Very large
VERDICT
 A great all-round printer with excellent output, but it is pricey

TEXT QUALITY ★★★★★
PHOTO QUALITY ★★★★★
VALUE FOR MONEY ★★★★★
OVERALL ★★★★★



Lexmark Z605

The smallest and flimsiest of the group could certainly improve its paper handling. Output lands messily into a flat output tray and slowly creeps further and further away from the printer with every new page. It does have a number of good touches, though. When you print, the driver speaks – through your speakers – to let you know how it's getting on. It sounds like Paul Gambaccini. The cartridge cradles are colour-coded, and the installation routine helpfully reminds you to remove the protective tape from each one. The power transformer is a plug-in brick, which keeps your desk clutter-free, and connection to the PC is by means of USB cable only.

There is just one button on the Z605, which itself looks very much like Lexmark's Z11 of several years ago. This controls power. The driver is extensive and well thought-out. It is attractive and intuitive, being split into a series of tabbed sections, and with dropdown task menus at the top of the window for carrying out print-related tasks such as improving your photos.

On photocopy paper, the Z605's text output is fairly good, with sharp edges that come close to rivalling the output of

the two Canon units on test here. Monochrome fills on text boxes in Word are very smoothly rendered, using the colour cartridge to produce a composite colour rather than relying on dithering the black output. Likewise, monochrome images were cleanly reproduced and did not saturate the page.

While it was fairly quick off the mark in printing plain text, anything more taxing slowed it down considerably, with our 10-page pdf creeping through at just a little over one page a minute. The photo, meanwhile, took an agonising 29 minutes, 11 seconds to complete, and even then the results were grainy, in spite of the clean, vivid colours. As suggested by its looks and price, the Z605 is a basic printer for users with basic needs – and some time on their hands.

DETAILS

PRICE £49 (£41.70 ex VAT)
CONTACT Lexmark
 0870 444 0044
www.lexmark.co.uk
PROS Text quality; intuitive driver
CONS Functionality; grainy photos
VERDICT
 A basic printer that will satisfy basic needs – eventually

TEXT QUALITY	★★★★★
PHOTO QUALITY	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Lexmark P706

Larger than the Z605 but similar in looks, the P706 has some neat additions, including a paper sensor that will handle cartridge alignment and detect the kind of paper you have loaded so it can decide on your behalf what quality setting to use. It is noisier than its smaller sibling, but still connects by USB cable, shares a very similar driver, and converts its power using an internal brick that reduces desktop clutter.

Installation was simple, and with only two buttons on its body – one for advancing the paper and the other to control power – even a novice should be able to use it from the off. It holds two colour-coded cartridges, providing colour, black and photo inks. Of these, Lexmark has supplied only the photo and colour options, so if you do a lot of text printing you'd be advised to invest in a black cartridge to supplement the collection. You might also be buying a new colour cartridge sooner than expected, too, as the one that's bundled is the 'moderate yield' option.

We were disappointed by the P706's text output. On photocopy paper it was feathered and, as it was producing a composite black

from the colour cartridge, was neither fast nor a good deep colour. Rather than black the output was a dark charcoal. Of course, the optional black cartridge would fix this, but as the P706 is delivered it harks back to the late 1990s.

Its photo output was similarly underwhelming. Even on photo paper and with the driver forced to best quality, it was grainy. The colours were good, and the grains are, of course, lost at regular viewing distances, but in areas of fairly constant colour, such as skies, output was not nearly as smooth as that produced by the Epson and Canon printers.

Sadly this is not a printer we can recommend. It is far slower than the competition, and its results were disappointing, regardless of the bargain price.

DETAILS

PRICE £69 (£58.72 ex VAT)
CONTACT Lexmark
 0870 444 0044
www.lexmark.co.uk
PROS Easy to set up
CONS Photo quality; text quality
VERDICT
 If you want professional-looking output you may be disappointed

TEXT QUALITY	★★★★★
PHOTO QUALITY	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



How did the printers perform?

The four output-quality tests we ran in this group produced a range of results, with some printers coping better than others. Below, we've picked out examples of the output from each test to illustrate the variations that can occur in printer output. We have not necessarily picked the best and the worst results from every test, as in some cases this will boil down to personal preference.

In reproducing these samples we have often enlarged them, which exaggerates imperfections.

Note that the way magazines are produced requires certain changes be made to the way colours are reproduced, and so there may be slight differences between the samples reproduced on this page and the actual results.

Characters at 48pt

48

Lexmark P706

The Lexmark P706 unfortunately ships without a black ink cartridge, which means black characters must be made from a composite of cyan, magenta and yellow. The results were blotchy.

48

HP 7550

A good, crisp set of prints from the HP Photosmart 7550 demonstrated the importance of using the right colours for the job. Even on photocopy paper the output was almost as good as you'd expect from a laser.

Photo test output

HP 7550



Lexmark Z605



An unfortunate showing for the Lexmark Z605 here. Notice how the sky is clearly made up using small dots of cyan ink. The same is true in the HP example, but the better rendition means it cannot be seen and the result appears as a continuous tone.



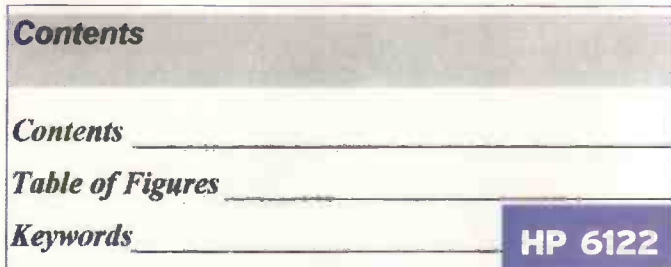
In both the red and yellow spectrums, the HP 7550 produced brighter, more vivid colours. The flowers are both more appealing and more realistic, proving that a dedicated focus on photo printing really pays off – watch the price, though, as the 7550 is very expensive.



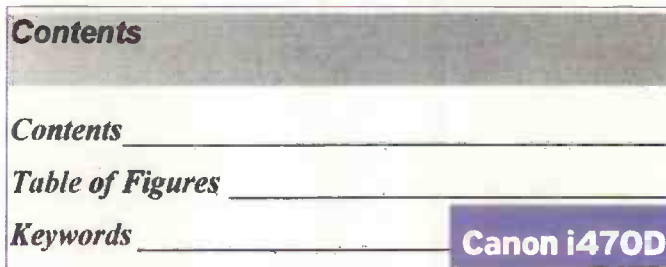
Notice how the 7550 sample has far more realistic skin tones on our swimmer's back. Not only is the tricky pink of the skin more realistic and less grainy, but the transition between areas of light and shadow is also more subtle. In addition, notice how the sea is more realistic.

Background shading

The HP Deskjet 6122 should be commended for producing such smooth grey tones in this shaded table cell in Microsoft Word. Close examination shows that it was produced using a mix of coloured inks rather than pure black.



In contrast to the HP, Canon's i470D produced this shaded cell using just black ink and so resorted to hatching. The result looks rough, but in its favour the edges of the overprinted characters are sharper.



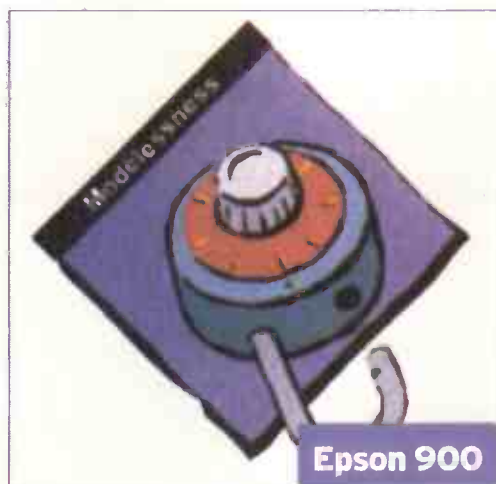
Font sizes

All the printers did relatively well when it came to reproducing small font sizes, and even the Lexmark P706, which we have criticised for using a composite black, produced perfectly legible characters at 2pt. They came close to matching the far more expensive Photosmart 7550.



Pdf icons

One thing for which we criticised the Canon i450 several times was the way that it hatched intense areas of non-photographic colour. In this example you can see what we mean, with a criss-cross pattern appearing on the blue background of this icon. The Epson Stylus Photo 900, meanwhile, produced smooth tones of continuous colour.



Screenshot contrast test

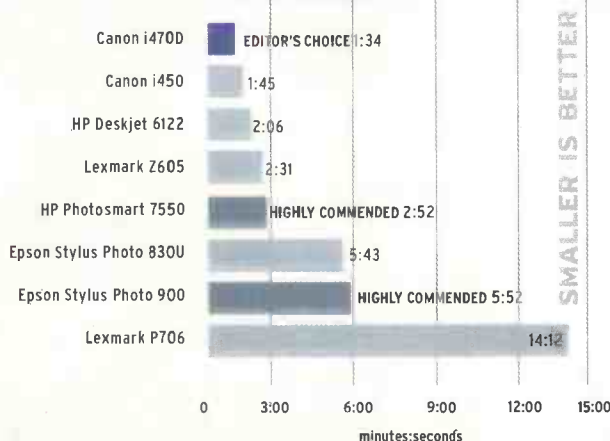
The wide range of colours produced by the HP 7550, and the way it lays down very fine droplets, has worked together to produce a very pleasing greyscale image. Notice how the contrast between light and dark areas on this screenshot are more defined in the HP sample, and how the edges of characters are sharper than in the Lexmark Z605 sample, thanks to better contrast.



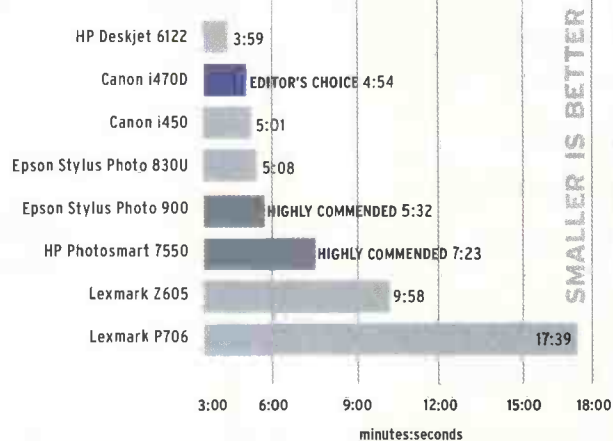
Lab results



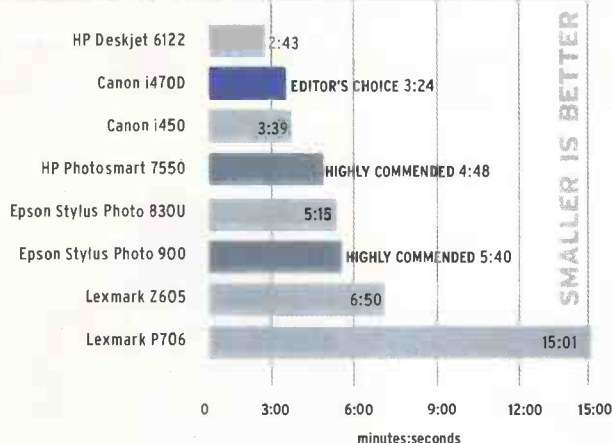
Time taken to print 10 pages of plain text



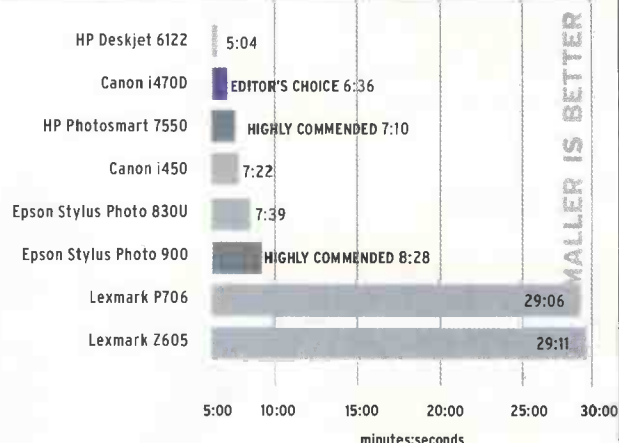
Time taken to print a 10-page pdf document



Time to print 10 pages of mixed content



Time taken to print a colour photo



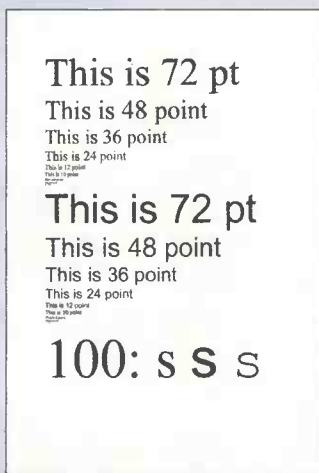
Printer output tests



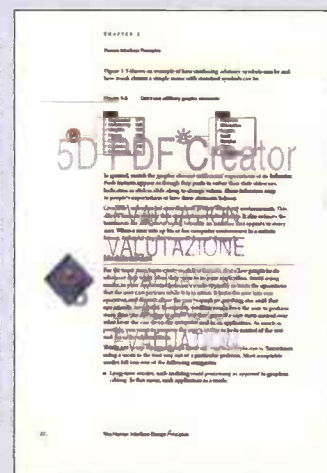
Our test photo contained areas of fine detail and tonal transition



The 10-page mixed-content document included images and text



In the plain-text test, printers were faced with 2-100pt characters



The 10-page pdf featured blocks of plain text, as well as small icons

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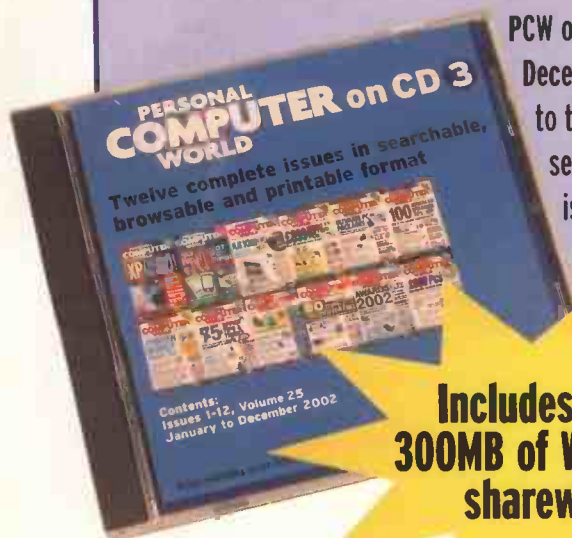
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MANUFACTURER	CANON	CANON	EPSON	EPSON
MODEL	i450	i470D	STYLUS PHOTO 830U	STYLUS PHOTO 900
Price	£99 (£84.26 ex VAT)	£179 (£152.34 ex VAT)	£99 (£84.26 ex VAT)	£199 (£169.36 ex VAT)
Contact and URL	0870 514 3723 www.canon.co.uk	0870 514 3723 www.canon.co.uk	0800 220 546 www.epson.co.uk	0800 220 546 www.epson.co.uk
Maximum resolution (dpi)	4,800 x 1,200	4,800 x 1,200	5,760	5,760
Parallel interface/USB interface	x/v	x/v	x/v	v/v
Input tray capacity	100 pages	100 pages	100 pages	100 pages
Cartridge types	Black/CMY	Black/CMY	Black/CcMmY	Black/CcMmY
Price of mono cartridge	£5.49 (£4.67 ex VAT)	£5.49 (£4.67 ex VAT)	£22.88 (£19.47 ex VAT)	£18.53 (£15.77 ex VAT)
Price of colour cartridge	£11.99 (£10.20 ex VAT)	£11.99 (£10.20 ex VAT)	£18.53 (£15.77 ex VAT)	£20.96 (£17.84 ex VAT)
Price of photo cartridge	None available	None available	None available	None available
Black/colour cartridge life at five per cent coverage	130 pages/160 pages	130 pages/160 pages	540 pages/220 pages	540 pages/330 pages
Maximum paper weight	270 grams per sq metre	270 grams per sq metre	255 grams per sq metre	255 grams per sq metre
Operating system support	Windows 98/ME/2000/XP Mac OS 8.6-9.x/X 10.2.1	Windows 98/ME/2000/XP Mac OS 8.6-9.x/X 10.2.1	Windows 98/ME/NT 4/2000/XP Mac OS 8.1 and above	Windows 95/98/ME/2000/XP Mac OS 8.1-9.x/X 10.1 or later
Printer weight (kg)	3.7	4	3.42	6.9
Printer dimensions w x h x d (mm)	393 x 202 x 258	393 x 218 x 258	477 x 269 x 475	493 x 302 x 546
Technology used	Thermal inkjet	Thermal inkjet	Micro Piezo	Micro Piezo
SCORES				
Text quality	★★★★★	★★★★★	★★★★★	★★★★★
Photo quality	★★★★★	★★★★★	★★★★★	★★★★★
Speed	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★

				
MANUFACTURER	HP	HP	LEXMARK	LEXMARK
MODEL	DESKJET 6122	PHOTOSMART 7550	Z605 JETPRINTER	P706 JETPRINTER
Price	£149 (£126.81 ex VAT)	£249 (£211.91 ex VAT)	£49 (£41.70 ex VAT)	£69 (£58.72 ex VAT)
Contact and URL	08705 474 747 www.hp.com/uk	08705 474 747 www.hp.com/uk	0870 444 0044 www.lexmark.co.uk	0870 444 0044 www.lexmark.co.uk
Maximum resolution (dpi)	4,800 x 1,200	4,800 x 1,200	4,800 x 1,200	4,800 x 1,200
Parallel interface/USB interface	v/v	x/v	x/v	x/v
Input tray capacity	150 pages	100 pages	100 pages	100 pages
Cartridge types	Black/CMY	Black/CMY/Kcm	Black/CMY	CMY/Kcm
Price of mono cartridge	£25.83 (£21.98 ex VAT)	£17.63 (£15 ex VAT)	£15.99 (£13.61 ex VAT)	£17.99 (£15.31 ex VAT)
Price of colour cartridge	£52.86 (£44.99 ex VAT)	£29.11 (£24.77 ex VAT)	£17.99 (£15.31 ex VAT)	£19.99 (£17.01 ex VAT)
Price of photo cartridge	None available	£21.43 (£18.24 ex VAT)	None available	£19.99 (£17.01 ex VAT)
Black/colour cartridge life at five per cent coverage	833 pages/970 pages	450 pages/400 pages	275 pages/140 pages	Not supplied/260 pages
Maximum paper weight	90 grams per sq metre	90 grams per sq metre	270 grams per sq metre	270 grams per sq metre
Operating system support	Windows 3.1/95/98/2000/ME/XP/ NT4 SP 6, Mac OS 8.6/9/X, Linux	Windows 98/ME/2000/XP Mac OS 9.x/X 10.1 or above	Windows 98/ME/2000/XP Mac OS 9.0.4-9.2.2/X	Windows 98/ME/2000/XP Mac OS 9.0.4-9.2.2/X
Printer weight (kg)	5.03	6.5	2.44	2.2
Printer dimensions w x h x d (mm)	454 x 184 x 378	514 x 164 x 386	403 x 248 x 432	439 x 268 x 375
Technology used	Thermal inkjet	Thermal inkjet	Thermal inkjet	Thermal inkjet
SCORES				
Text quality	★★★★★	★★★★★	★★★★★	★★★★★
Photo quality	★★★★★	★★★★★	★★★★★	★★★★★
Speed	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★

Cartridge abbreviations: C = cyan, c = half-strength cyan, M = magenta, m = half-strength magenta, Y = yellow, K = black

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Editor's Choice

The range of prices seen in this group test is extraordinary, with every base between £49 and £244 covered.

Unfortunately the least expensive also produced the most disappointing output, proving that in the world of inkjet printers the adage that you get what you pay for has never been more true.

Almost as varied was the feature list of each printer on test, for while many did nothing more than print photos and text direct from the PC, two were able to read from digital camera cards, making PC-less printing a reality. One printer could print onto CD facings, and all could take a wide range of papers for the best possible output quality. This was also the first group test in which we have seen a printer carrying three cartridges. Prior to that, the only units with more than two were the old Alps Electric devices, which used tapes and were interesting but fairly niche three or four years ago.

With so many differences between the devices, judging the winners of our Highly Commended and Editor's Choice awards came down to two main factors: the quality of the output and the versatility of the unit.

'The adage that you get what you pay for has never been more true'

The winners

Our **Editor's Choice** award this month goes to **Canon** for the **i470D**. This unusually designed printer is more upright than horizontal, which is something worth bearing in mind if you have limited desk space. Of course you'll have to make room for the pull-out output tray, but when it's not in use it is at least fairly compact.

The i470D's media card slots are becoming increasingly common with every major inkjet supplier now producing a model that can print from them without referring back to the PC, but Canon has done well to include this feature at £179 inc VAT. With media slots come display panels and buttons and while those on the i470D may seem complicated at first, they are nonetheless comprehensive and after a short time easy enough to use. As a bonus, the onboard screen shows a constant indication of the ink levels in each cartridge.



Canon i470D



Epson Stylus Photo 900



HP Photosmart 7550

What really impressed us about the i470D, though, was the quality of its text. Printer manufacturers have long been striving to emulate the output of a laser printer on the traditionally less precise inkjet and some have been boasting that they have done it for some time now – but that has generally only been true when using inkjet paper. Our text-based tests use photocopy paper, and even on this cheap porous media the characters laid down by the i470D are precise and razor sharp. They are readable right down to just 2pt, and when enlarged they retain a solid, even tone.

It earned itself bonus points for being able to print right to the edge of the paper, too, with true borderless output on A4. Canon is one of only a handful of manufacturers to have achieved this, and it amazes us that it manages to keep things straight even on the last few millimetres where there is barely any paper left for the printer to hang on to.

With the exception of the media slots, the i450 is almost identical. Its output is impossible to distinguish from the i470D as the two use the same print engine. If you do not need direct media printing – and we would recommend that serious photographers continue to download their shots to the PC before sending to paper anyway – it's worth saving £79 and opting for this cheaper alternative.

The first of our **Highly Commended** printers is the **Epson Stylus Photo 900**. It has had some serious price reductions recently, now falling to £199 including VAT. It may not have media card slots but it is still the most versatile photo printer here, with attachments for Epson roll paper which makes short work of long panoramas, and a tray that will feed CD-Roms into the body for on-face printing. This will eliminate the possibility of wrinkled labels spoiling the balance of your discs and slowing your drive.

While it is still one of the more expensive printers in the group and its text quality could be improved, we feel this is the most suitable choice for serious digital photographers.

The **HP Photosmart 7550** wins our second **Highly Commended** award. At £50 cheaper it would have walked away with our Editor's Choice accolade for its media slots, on-body screen for previewing photos and three print cartridges for first-class text and photo output. However, it is terribly expensive for a regular A4 printer. That said, if you have a spare £250 and you don't need the versatility of the Epson Stylus Photo 900 it's certainly worth serious consideration.

92%

of accountants who
recommend software,
recommend Sage*

*The Accountancy Age / Sage IT Skills Survey 2002

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Managing your finances can be a real headache. Whether you're a home user or own a small business, things can get tricky. We test seven accounting packages to help you get on track

Balancing the books

WORDS AND TESTING: JOHN RENNIE

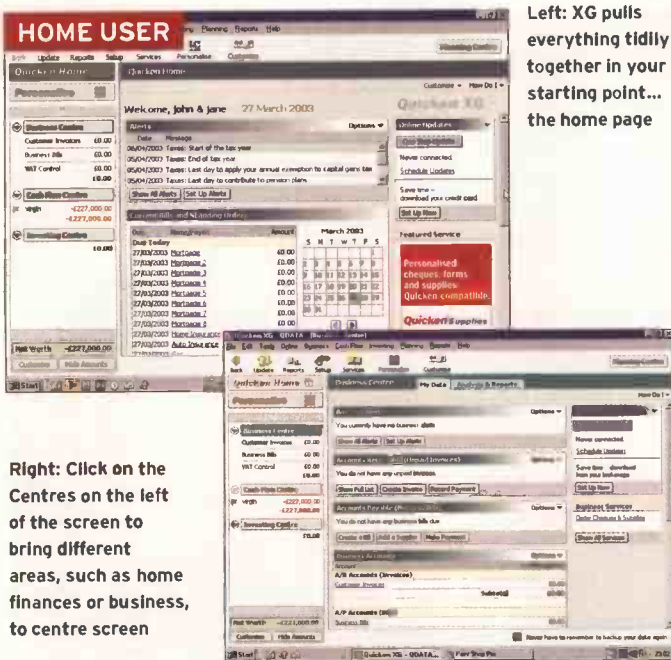
There are countless areas where computers have empowered individuals. The web and its delivery of ever-cheaper goods and services, email and the instant messaging revolution that lets us all keep in touch all the time, and then there's accounting software. Wait, come back – we know it doesn't sound exciting, but this is software that will increase the efficiency of your home accounts and business, cut waste and costs, and let you see where your finances are and where they are going.

First, though, a word of caution. Never has 'garbage in, garbage out' been so apposite. If your finances are a mess, then tipping the figures into one of these

packages will merely produce a computerised mess. To begin with, sit down and get the books straight – it may be the most useful task you've performed in years. Then give the packages here clean figures to chew on and they'll perform an excellent job.

We've split things into home user and small business. There is overlap, but go to our features table on page 145 and you should quickly work out which package you need.

We've gone for tried and trusted names and choices that are relatively easy for beginners to set up. None will let you down, and where you're relying on them to produce tax and VAT figures, you can be confident they are up to the job.



Right: Click on the Centres on the left of the screen to bring different areas, such as home finances or business, to centre screen

Intuit Quicken XG Startup

Quicken has its devotees, and they'd be as likely to swap from Celtic to Rangers as move across to Money. But what makes it so popular?

Quicken has a very different look to Microsoft Money – the default white backgrounds to pages give a much looser, less crowded feel, but in setup and use it's very similar. First, you give information about your financial status, and the process continues through setting goals, adding accounts, then producing a home page with all your information at a glance.

Quicken puts figures into a shape the less-numerate can quickly grasp, producing pie, flow and other charts to help you see why you are in the red and where you are headed. Planning is high on the agenda, as you project savings and retirement plans. You can print out cheques, and set up the calendar to ensure you don't miss payments of bills.

Intuit has recognised that many people use only a fraction of the tools on offer. Prioritising and neatness is everything in financial planning, and you can streamline it to focus on the bits you need. The 'My Data' tab gives an overview of tasks for today; and you can minimise reports or features at the bottom of the Quicken window.

Where we think Intuit has got it wrong with XG is in the

complex pricing structure. The budget cut here is a three-month 'taster'. To stick with the program you have to upgrade to a package costing £60 or more. In fairness, XG is more of a business package than Money, offering sales ledgers and invoicing via email. The sting comes when you realise that you have paid for a 12-month installation – you will have to upgrade in a year to continue using online services. Many users would do that anyway, but it rankles. But as an all-in-one financial minder it is hard to knock, working simply, tidily and at a fair price.

DETAILS

PRICE £19.99 (£17 ex VAT) for 3 months; upgradeable to full version £59.99 (£51 ex VAT)

CONTACT Intuit 0845 606 2161
www.quicken.co.uk

SYSTEM REQUIREMENTS

Windows 95 or above • 133MHz or faster processor • 32MB of Ram (64MB recommended, 128MB for XP) • 110MB of free hard disk space • Internet Explorer 5.5 or above • Double-speed CD-Rom drive

PROS Very slick; tidy home page

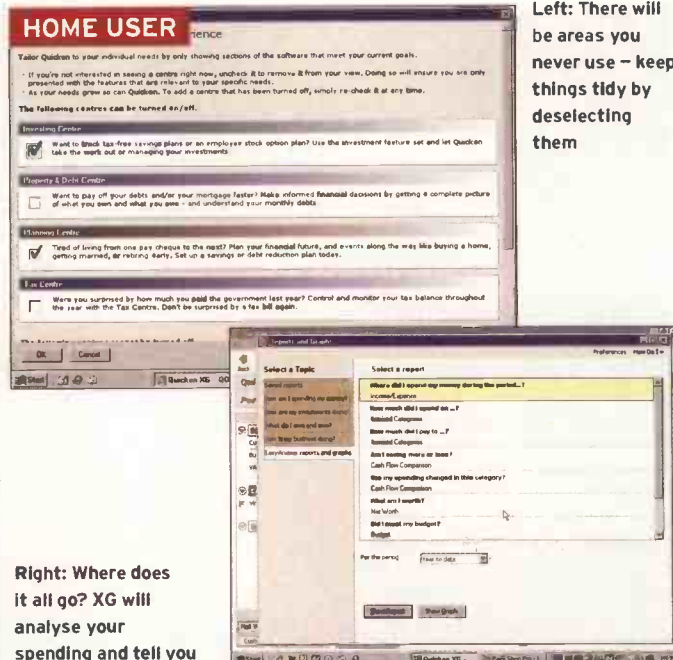
CONS Complex pricing structure

VERDICT

Competently straddles personal finance and small business

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

Left: XG pulls everything tidily together in your starting point... the home page



Left: There will be areas you never use – keep things tidy by deselecting them

Right: Where does it all go? XG will analyse your spending and tell you

Intuit Quicken XG Suite

As Financial Suite is to Money basic, so Suite is to XG Startup, though as we've said, working out exactly what you're getting for how much money is harder than it should be, thanks to the Byzantine pricing.

In this case, the added extra comes in the shape of Taxcalc. This is a pretty good deal – as a standalone package it will cost you around £20; it's also one of the slicker tax return compilers.

Improvements to the core Quicken personal finance features include bank account and credit card tracking, chequebook balancing, cashflow reporting, foreign exchange rates, stocks, investment and unit trust price updates. As ever with these packages, Quicken hammers the online content, inviting you to 'make better financial decisions with over 50 links to UK investment content'. But, as ever, we feel it's a hollow boast. There are any number of excellent financial websites dispensing free advice.

If you bank with HSBC, Natwest or the Royal Bank of Scotland, Quicken XG will let you download transactions directly from your bank into a Quicken account (you need to have signed up for online banking first). That's great, but at the risk of sounding curmish,

many of us don't use these banks. In fact we'd hazard that anyone IT savvy enough to be using Quicken is likely to be with one of the online banks which offers better deals than the high-street equivalents.

After tax and household accounts, the third part of the Quicken trio is the Home Business Centre. It's simple to set up accounts payable and receivable, so you can easily track customer invoices and bills, as well as email invoices to customers. You can generate more than a dozen business reports, and track VAT.

DETAILS

PRICE £69.99 (£59.57 ex VAT)
CONTACT Intuit 0845 606 2161
www.quicken.co.uk

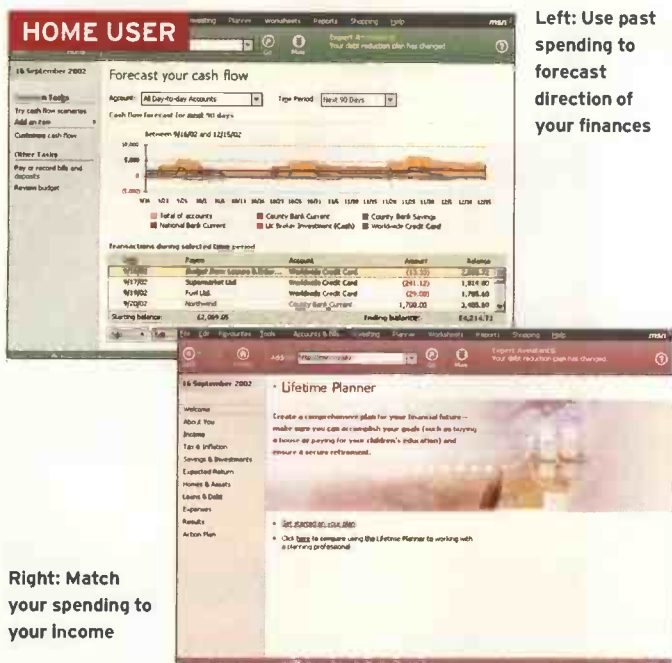
SYSTEM REQUIREMENTS

Windows 95 or above • 133MHz or faster processor • 32MB of Ram (64MB recommended, 128MB for XP) • 110MB of free hard disk space • Internet Explorer 5.5 or above • Double-speed CD-Rom drive
PROS Neatly combines personal finance and small business
CONS Expensive

VERDICT

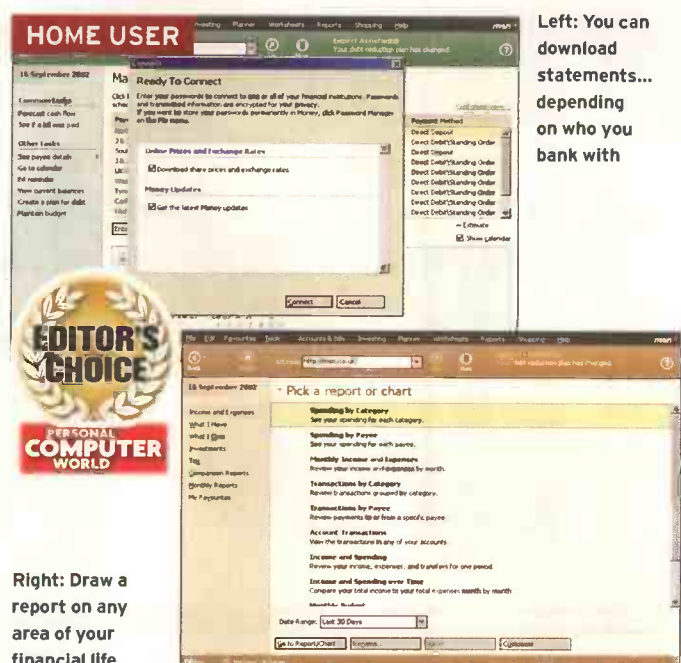
Good combo, but professional users may decide to go for a full accounts package

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



Left: Use past spending to forecast direction of your finances

Right: Match your spending to your income



Left: You can download statements... depending on who you bank with

Right: Draw a report on any area of your financial life

Microsoft Money 2003

Money starts with an audit of all your financial accounts. Current, savings, mortgage, pension and credit cards will all be assessed, with debits on one side and credits on the other. If you've let things slide then you will be assembling a pile of papers next to your PC as you punch in the information, and when it's done you'll have a complete picture of your net worth.

Next you set targets: How is your pension worked out? Do you want to budget for school fees? Maybe you just want to gradually erode your credit card debt? As you set plans and goals for each you reap the immediate benefit of getting your books in order, and of setting plans for the next years or decades.

Realising many of us glaze over when presented with figures, Money's strong suit is in presenting historical and future data in graph and chart format. Want to know how big a slice of your income is going on rental payments? Money will generate an easy-to-read pie chart. Need to know when that loan will be paid off? Click for a line chart and see when you cross back into credit.

Money is a very simple product; basically a glorified spreadsheet providing data to allow you to budget, plan and

cut waste. So what can Microsoft find to do new each year? After all we're now on version 11. It has put a lot of work into a friendly look and feel – Money went over to a browser-style interface a few versions back. And though the reliance on continually dashing online for information can be tiresome (and slow for anyone with a dialup connection) the home page concept generally works well. Within a customisable page, all your accounts, selected graphs and reports and links to www.ft.com and MSN Money are easy to access.

DETAILS

PRICE £24.99 (£21.25 ex VAT)

CONTACT Microsoft

0870 601 0100

www.microsoft.com/uk/money

SYSTEM REQUIREMENTS

Windows 98 or above • 166MHz or faster processor • 32MB of Ram (64MB recommended) • 75MB of free hard disk space • Internet Explorer 6 or above • Double-speed CD-Rom

PROS Stacks of features,

yet simple to use

CONS Online obsession

VERDICT

Another refinement of a slick package that delivers a lot at a budget price

FEATURES

★★★★★

★★★★★

★★★★★

★★★★★

★★★★★

Microsoft Money 2003 Financial

You'll already have noticed that this section is dominated by two players. Although we're all for the little guy, Microsoft Money and Intuit Quicken are so far ahead of the field in terms of slickness that there is really no competition.

Historically, both packages have offered an entry-level personal finance version; a mid-range edition, boasting extra features such as tax return software and a personal and business cut, incorporating invoicing and billing.

There's currently a hole at the top end of the Money range, as the last version, Personal and Business 2002, was very disappointing. Its inability to email invoices direct from the program – you have to print them out and post them – persuades us it is a very good personal finance package, with a very poor business end bolted on. Better to go with Money 2003 Financial Suite. This is nothing more than the basic edition of Money with TaxSaver attached. As we're increasingly being asked to self-assess, the extra £8 this will cost you is a bargain.

Some of Money's features will never be used: the ability to calculate capital gains and the will creator are useful, but are you going to use the air miles

tracker? And the boast that it can 'Download bank statements directly into Money' is qualified by a footnote that says 'options vary by financial institution'. Seamless downloading of statement information is one area that's never really got going and, while Money is rather better than Quicken at this, the list of banks hooked up is far from comprehensive.

If you use Money to get your finances in order, create a snapshot of where you are, use reports and charts to plan where you're heading, and you won't go wrong.

DETAILS

PRICE £39.99 (£34.03 ex VAT)

CONTACT Microsoft

0870 601 0100

www.microsoft.com/uk/money

SYSTEM REQUIREMENTS

Windows 98 or above • 166MHz or faster processor • 32MB of Ram (64MB recommended) • 75MB of free hard disk space • Internet Explorer 6 or above • Double-speed CD-Rom

PROS Does the job at a low price

CONS Not expandable for small business use

VERDICT

Money is a great package; the addition of TaxSaver makes it irresistible

FEATURES

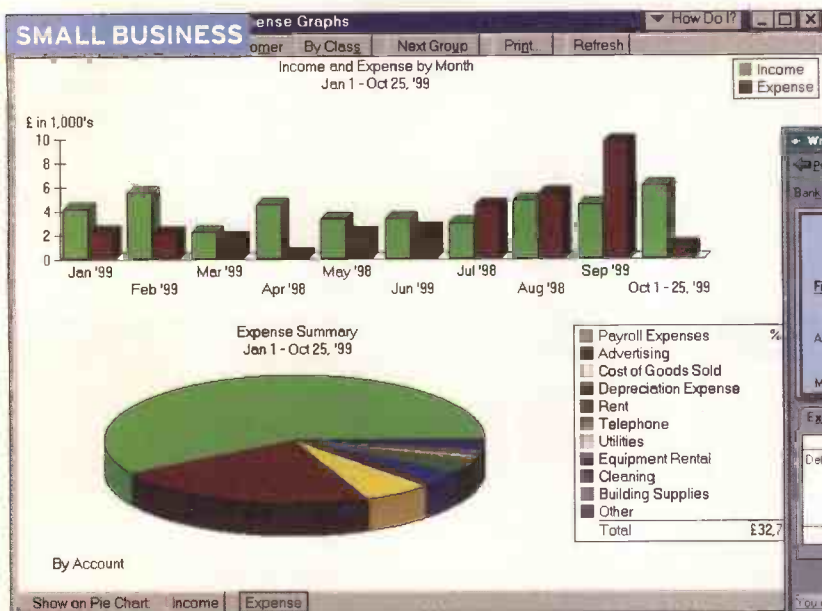
★★★★★

★★★★★

★★★★★

★★★★★

★★★★★



Above: Quickbooks is very good at using graphs to demonstrate financial data

Below: The familiar on-screen representation of forms, cheques and the like make things intuitive

Write Cheques - NatWest Current Account

Bank Account: NatWest Current Account Ending Balance: £15.00

Pay to the Order: DHL Couriers

Date: 06/03/2000

Amount: £15.00

Address: DHL Couriers

Memo: Fifteen Pounds and 0 Pence

Expenses: £12.77

Account	VAT	Gross Amt	VAT Amt	Memo	Customer Job
Delivery		12.77	2.23		
Totals		12.77	2.23		

Intuit Quickbooks 2003 Premier

Moving to dedicated business packages, we quickly encounter a familiar face. This is the big brother to Quicken, and the look and feel will be instantly familiar to home users.

Like Quicken, this package is phenomenally successful. It's been tried, tested and tweaked through annual releases over the past 10 years, racking up five million sales worldwide. We're not just trying to impress you with big numbers here. While 'all those people can't be wrong' isn't an infallible rule, it's a pretty clear indication where accounting software is concerned. Why? Because what every company wants, much more than the new features bolted on to get repeat sales with each new version, is reliability. You're taking the bookkeeping in-house and so the program must be foolproof – it's handling the income of your firm, and getting it wrong can be very expensive.

You can opt for a five-user package, which is great for having a terminal in the office, one in the warehouse, and one in dispatch – it means you get joined-up accounting and stock control, with a constant knowledge of the company inventory. But while the guys in the warehouse aren't fools,

they're not accountants either, so your software must be easy to learn and easy to use.

But can one financial package really run your company accounts, from VAT, invoicing and payroll, through online credit card transactions, to strategy and planning – and be 'more than just book-keeping' as Intuit boasts?

Setting up your company on the system is simple. The software interviews you, gleaning information about your business: number of employees, pricing structure, customer details and the rest. As for everyday use, if you can use a Windows-based PC you can use this as it blends seamlessly with Word and Excel.

The Quickbooks range comprises Regular, Pro and the version here: top-of-the-range Premier. Every version of Quickbooks lets you track cash, bank and credit card accounts; manage accounts receivable and payable; generate and manage invoices; break down income and expenses by class, and more.

You can now set up merchant services for online credit card payments from customers – a real winner we feel. Cashflow is crucial to small businesses, while poor control can send you under. The ability to effectively say to a customer 'pay now' and

to see the payment logged in before dispatch of goods, can make a big difference.

You can customise your invoices and statements, and the ability to directly email forms such as invoices, purchase orders and sales orders speeds your business. The inventory tools are much more flexible than they once were – you can buy, sell and stock items in different units of measure, and you can combine inventory items to create discrete, finished products.

Premier is heavily into strategy and planning. You can create a business plan; compare how your firm is performing against others in your industry, and prepare forecasts of where your company is going. As well as an essential health-check on how the business is doing, these are invaluable for preparing plans for your bank or financiers, and raising new capital.

Of course none of this is worthwhile unless your financial software does the basic things – affording cost and efficiency benefits. If it doesn't do that you may as well do it on paper. Before we even get to the money side, we tip our hat to Quickbooks as a serious management information tool – use it to get your business/order/client records in shape, and trust

it to be usable and relatively idiot-proof. Once up and running it will save staff time. You will be able to produce your own VAT-ready books and, at £450 for the full package, it will soon pay for itself.

Entry-level Quickbooks Regular does the books, Pro adds analysis and Premier adds strategic planning. Whether it's worth the extra £150 to go from Regular to Premier depends on whether you're going to be doing any planning. If so, it's worth it, producing professional, well-presented and costed reports.

DETAILS

PRICE £449.95 (£382.93 ex VAT)
CONTACT Intuit 0845 606 2161
www.quickbooks.co.uk

SYSTEM REQUIREMENTS

Windows 95 or above • Word and Excel • 133MHz of faster processor • 32MB of Ram (64MB recommended, 128MB for XP) • 110MB of free hard disk space • Internet Explorer 5.5 or above • Double-speed CD-Rom drive

PROS Shallow learning curve for Quicken users

CONS Lacks Sage's level of support

VERDICT

Bookkeeping, analysis and strategy in a reasonably priced package

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

SMALL BUSINESS

Account: Current Account Balance: -£1,718.66
 Dated From: 01/08/2002 To: 05/08/2002 Get Statement

Date	Src	ID No.	Payee	Account	Withdrawal	Deposit	Balance
02/08/2002	CR	CR000055		Petty Cash		£100.00	£29,449.23
05/08/2002	CD	100389	Good Printers Ltd	Printing	£250.00		£29,199.23
05/08/2002	CR	CR000056	ABC Ltd for SJ000004	Trade Debtors		£100.00	£29,299.23

Type: Spend Money Cheque No.: 100390 Date: 05/08/2002 Card:
 Account: VAT: Memo:
 Split...
 Say Recurring Use Recurring Cancel Rec

Help F1 Print

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Below: MYOB not only lets you import directly into Excel, you can then customise the file

Microsoft Excel - salesprint.xls
 Note the narrow column for Src. and the wider column for ID No.

A	B	C	D	E	F
					[[Compang]]
					[[Address1]]
					[[Address2]]
					[[Address3]]
					[[Address4]]
					[[Title1]]
					[[Title3]]
					[[Title Header Table]]

Above: Clear, crisp and uncluttered forms are one of the joys of MYOB

MYOB Accounting 11 Plus

Perhaps lesser-known to many of us than the all-conquering Quickbooks, or Sage, MYOB (or mind your own business) shares that characteristic of successful personal finance and accounting packages – a loyal buying base.

Like every package here, the setup process is rigorously idiot proof. With accounting being taken away from the experts and brought in house, things have to be simple. Accounting Plus walks you step-by-step through setting up your company accounts. At every stage you are pumped not just for information about your company, but what tasks you want the software to perform. Based on your answers, MYOB then customises itself around your business. It's not up and running in minutes, as it claims – we'd set aside an hour or two to transfer all your data and set up your systems – but most important, the process isn't scary for accounting novices.

The look and feel of MYOB is very different to Quickbooks and Sage. While their tabular, spreadsheet-derived pages scream 'this is an accounting package' MYOB goes for an illustrated menu system. Click on one of the cutely illustrated menus and a clear black-on-white flowchart appears.

Everybody's mind works differently, but we find this almost naively plain approach much to our liking. It makes it easy to understand the stages of each financial process and, crucially, prevents us getting lost when performing something like a stock audit.

Click Payroll and you'll be pointed to options for printing the monthly payslips, dealing with P45 and P60, organising payments to staff accounts and so forth. There's an arrow from those staff payments off to Banking. Similarly, if you accept a client order and, apart from the core job of processing the order, dispatching the goods and billing, you'll find links to banking (for payments received) and to the Card File for your client.

Over time, this holistic approach makes accounts appear much simpler, and you begin to construct a mental model of the company as a whole, with all the different operations relating to each other.

We're impressed by the customer information. The flexible Card File lets you store up to five addresses and contacts per card, and ship to multiple addresses, while billing a central site. You can set unique customer credit terms and payment methods, and log personal

information about your contacts. Search by individual, postcode, last contact date, and you can generate reports, using the customer or supplier history to construct a five-year snapshot.

The payroll function is strong too. The instant you run a payroll, all records are instantly updated, and MYOB calculates and tracks PAYE and NI as well as employee entitlements and expenses. It's also flexible enough to run side-by-side monthly and weekly payroll systems and to have concurrent systems for hourly, salaried, overtime, commission and bonus pay systems.

Multicurrency accounting will appeal to anyone who does business abroad, and will be especially useful if your company operates in more than one country. You'll be able to use suppliers' and customers' local currencies, track exchange rates at the transaction level, construct reports and debtors and creditors in your (and their) currency – or even a third 'neutral' one, such as the dollar or euro, and immediately calculate exchange rate gains or losses on the deal.

The Professional Time Billing is a wise attempt to move beyond mere bean-counting to a more creative use of financial intelligence. It lets you maintain

an audit trail of original time – in other words showing you the real cost to your company in time spent on a job. This is a tool that can really benefit your operation, showing you where to tighten things up and which jobs are simply not paying their way.

And though MYOB may be foreign to Sage or Quickbooks users, the transition will be eased by the fact that it works seamlessly with Word and Excel. You can even generate reports in HTML, so anyone can display them in a web browser – a handy alternative to large pdf files.

DETAILS

PRICE £351.33 (£299 ex VAT)
CONTACT MYOB 01344 397 283
www.myob.co.uk

SYSTEM REQUIREMENTS

Pentium or faster processor •
 Windows 95 or later • 32MB of Ram
 • 40MB of free hard disk space for program installation, plus an additional 35MB for each data file maintained

PROS Usable; friendly; good price

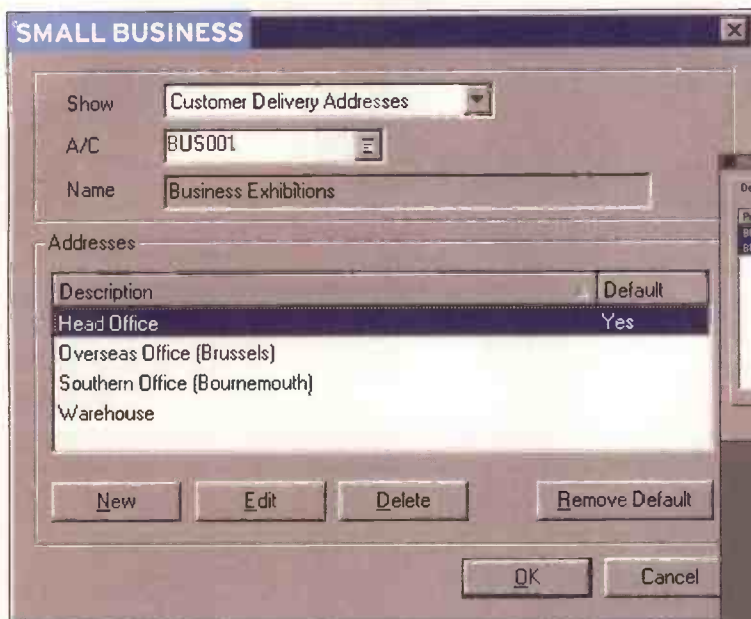
CONS Culture shock for Quickbooks and Sage migrants

VERDICT

A serious accounting and planning package at a third of the price of Sage

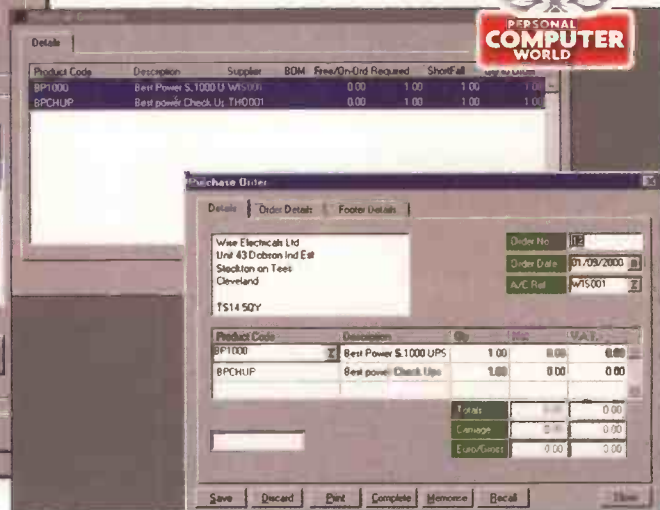
FEATURES

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



Above: Deliver to various offices while invoicing centrally

Below: Sage identifies stock shortages and raises a purchase order to correct the shortfall



Sage Line 50 Financial Controller 9

Newcastle-based Sage is a long-running UK software success story. Over 20 years of tweaking and refining its accounting and payroll packages, the company has sold its products to half a million UK businesses, from the relatively cheap Instant Accounting for one-person operations, to the web-enabled Line 500 for big businesses. Throw in strong customer support and training, and taking accounting in-house with Sage looks much less scary.

The Line 50 series debuted in the early 1990s, pitching at the more established business, with up to 50 employees and a turnover of up to £2m a year. This is Britain's most popular PC-based accounting package, and Financial Controller is top of the range – a suite of three applications, the accounts package, payroll, and Act Contact management.

Accountants getting to grips with the company books won't have much of a learning curve here. Running on the firm's PCs, Line 50 presents an interface familiar to anyone who uses Windows. It's simple to import data from Excel, Word and Outlook, and the package contains the three basic ledgers (sales, purchase and nominal ledger), profit and loss, balance

sheets, plus management reports, VAT management and credit control. There are also stock control, invoicing and cheque printing functions. Further features exclusive to Financial Controller are checks on sales order shortfall and fulfilment, processing, goods received notes and foreign currency.

Sage has continually beefed up the online element. Bacs transfers are a boon to cashflow, as customers have fewer excuses not to pay there and then. This meshes neatly with Webtrader 50, a service that lets you trade online, securely transferring orders, for which you'll be charged a monthly registration fee. Electronic banking is embedded within the package, allowing you to bring your account and the software together, reconciling what the bank says with your Line 50 transactions, and you can check your balance online. Be warned, though, you will again be charged an annual service fee by Sage, plus a bank service charge.

The Report Designer creates and amends reports and stationery layouts, and starts you off with more than 200 report templates, including reports in HTML format, so they can be posted online.

Sage offers a flexibility not always found in accounting

packages. You can set multiple delivery addresses for a single customer, while invoicing centrally. And there are flexible product options within invoicing – you can enter special stock codes for one-off items or custom-made articles. In this respect it beats Quickbooks hands down, though MYOB offers similar flexibility. Financial Controller lets you prepare quotations and, once accepted, transform them into confirmed orders and invoices. It also lets you generate purchase orders automatically from outstanding sales orders.

The big complaint about Sage is that it's not cheap. Of course that doesn't mean it's not value for money – you're getting a watertight, multi-user system that will not only do away with expensive external accounting services but will run every aspect of your firm's stock control and payroll systems.

Still some things do grate. Like Quickbooks, Line 50 lets you send and receive orders, invoices and other trading documents by email instead of the post, but charges you £99 a year for the privilege. Sage says it uses structured email containing a security code to make it difficult for tampering to go undetected, we're just not sure it is worth £99. It's just one

of many examples where you have to pay as you go to make the most of a strong package.

Similarly, while the initial 60 days of free support is welcome, it gets pretty pricey after that, with a complex menu of charges. Support for the Act Contact manager software alone will cost you £75 a year.

But just as they used to say no finance director ever got sacked for buying IBM, no accounts manager is ever going to receive his P45 for using Sage to run the books – a good, solid package and the industry standard.

DETAILS

PRICE £1,410 (£1,200 ex VAT)
CONTACT Sage
0845 300 0900
www.sage.co.uk

SYSTEM REQUIREMENTS

Windows 95 or above • 1GHz or faster processor • 128MB of Ram • 200MB free hard disk space • Internet Explorer 5.5 or above

PROS Powerful and all-encompassing
CONS Expensive; can be hard to learn

VERDICT

A serious package. It's still the one that MYOB and Quickbooks have to beat

FEATURES

★★★★★

PERFORMANCE

★★★★★

VALUE FOR MONEY

★★★★★

OVERALL

★★★★★

Table of features

	HOME USER			
				
MANUFACTURER	INTUIT	INTUIT	MICROSOFT	MICROSOFT
MODEL	QUICKEN XG STARTUP	QUICKEN XG SUITE	MONEY 2003	MONEY 2003 FINANCIAL SUITE
Price inc VAT (ex VAT)	£19.99 (£17)	£69.99 (£59.57)	£24.99 (£21.25)	£39.99 (£34.03)
Phone	0845 606 2161	0845 606 2161	0870 601 0100	0870 601 0100
URL	www.quicken.co.uk	www.quicken.co.uk	www.microsoft.com/uk/money	www.microsoft.com/uk/money
Planning and forecasting tools	✓	✓	✓	✓
Tax return software	✗	✓	✗	✓
Invoices (emailable)	✓(✓)	✓(✓)	✗	✗
Staff income tax and NI calculator	✗	✗	✗	✗
VAT returns	✓	✓	✗	✗
Bacs facilities	✗	✗	✗	✗
Payroll	✗	✗	✗	✗
Time and job costing	✗	✗	✗	✗
SCORES				
Features	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★

Table of features

	SMALL BUSINESS		
			
MANUFACTURER	INTUIT	MYOB	SAGE
MODEL	QUICKBOOKS 2003 PREMIER	ACCOUNTING 11 PLUS	LINE 50 FINANCIAL CONTROLLER 9
Price inc VAT (ex VAT)	£449.95 (£382.93)	£351.33 (£299)	£1,410 (£1,200)
Phone	0845 606 2161	01344 397 283	0845 300 0900
URL	www.quickbooks.co.uk	www.myob.co.uk	www.sage.co.uk
Planning and forecasting tools	✓	✓	✓
Tax return software	✓	✓	✓
Invoices (emailable)	✓(✓)	✓(✓)	✓(✓)
Staff income tax and NI calculator	✓	✓	✓
VAT returns	✓	✓	✓
Bacs facilities	✓	✓	✓
Payroll	✓	✓	✓
Time and job costing	✓	✓	✓
SCORES			
Features	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★
Value for money	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★

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Editor's Choice

It's always a tricky choice splitting Money and Quicken. So far ahead of the rest of the pack, they've shown the benefits of healthy competition, with Microsoft and Intuit having to raise their game each year in order to nose ahead. And since they each got the basic packages right many years ago, that's meant each new version piles on extras, innovative new features, and offers terrific value for money. This year, that is why **Microsoft Money 2003 Financial Suite** has won our **Editor's Choice** award for home users.

We said at the outset that there is overlap between personal finance and accounts software. Attempts have been made to straddle both markets by adding invoicing to Quicken, but if we're talking business software we'd be inclined to go for a dedicated business package, such as the three we've looked at here. All Quicken succeeds in doing is pinching a little of Quickbooks' thunder. Buyers are getting invoicing facilities in the £60 price tag, but to the average person who just wants to balance their personal finances, that usability will be hidden away. Take those out and you've got a £60 package competing with Microsoft's £25 software. Forget the fact the entry-level Startup starts at £17 – it will switch off after three months, making it merely an expensive trial version.

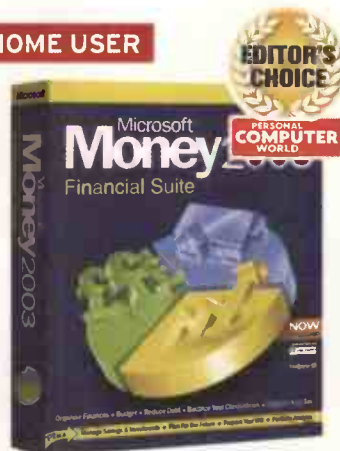
'MYOB's friendly, flowchart approach provides a quick learning curve'

The personal finance and tax combo of Money Financial Suite delivers superb value, and the online support from the MSN Money site is more impressive than Intuit's offering. We're not sure we'd trumpet too much about the ability to download bank account details – Money is better than Quicken but it's far from comprehensive. And if you like the brighter look and feel, and the excellent graphing capabilities of Quicken you're unlikely to swap, but Money Financial Suite has to take best in show.

Small business winners

When it comes to the small business, you may grumble that there is no competition. It's simply a matter of whether Quickbooks or Sage is going to land the small business

HOME USER



Microsoft Money 2003 Financial Suite

SMALL BUSINESS



MYOB Accounting 11 Plus

SMALL BUSINESS



Sage Line 50 Financial Controller 9

crown. But while both maintain their reputations for excellence with this year's models, we've been highly impressed by MYOB Accounting 11 Plus. Stacked with features, easy for beginners to learn and impressive value for money, it should give Sage something to think about. And, while we hesitate to say that you'll be doing the company's books with a smile on your face, MYOB makes figurework as close to fun as we can imagine.

Some people love working with numbers, but to most of the potential buyers here, they are a necessary evil. If you can present your software in ways that users can swiftly grasp then you have a winner. MYOB's friendly, flowchart-led approach not only provides a quick learning curve, but it also presents the company accounts in joined-up fashion. Now you will understand why balance sheets are important. You may never love them, but you will get on top of them. That is why **MYOB Accounting 11 Plus** wins our **Editor's Choice** award for the small business user.

We liked the contact management system, which makes it much easier to keep on top of who is buying what, when and for how much. This is vital data for a competitive company, but all too often it is wasted. In fact management information is a priority for MYOB. With a selection of 160 customisable reports, you are encouraged to analyse the health of your business and plan for the future. That turns it from being a rock-solid bookkeeping program into a tool for developing your business.

If they hadn't been so expensive, then any one of Sage's Line 50 products could have won the day. Sage produces superb accounting and planning products – and whether you run a one-person home business or a company with many offices, Sage will balance the books. Furthermore, users from the relatively basic Instant Accounting could use Line 500 without too steep a learning curve. **Sage Line 50 Financial Controller** therefore wins our **Highly Commended** award. We like the fact that importing data from Word and Excel is so seamless, and think Sage will fit into any existing system. Financial Controller is a professional standard payroll, accounts and contact management set and, if we have moaned a bit about the expense of the extra services, there is no doubting the quality of training and support Sage offers. If you have more money to invest and you want the security of a dedicated and human support team, you can't do better than Sage.

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COMPUTER
WORLD**

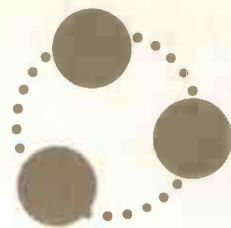
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WRITTEN BY ALAN STEVENS

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Space-saving disks

Storage arrays could get a lot smaller, following the unveiling by Seagate of its plans for a 2.5in enterprise disk drive platform. Small form factor disks, based on notebook technology, already exist on blade servers but, according to Seagate, there's a growing need for faster, more reliable drives designed specifically for rackmounted servers and storage systems.

Space saving is the main advantage, enabling hardware vendors to build smaller products without compromising on capacity or performance. There are other advantages too, such as lower power consumption and reduced heat and noise output, which are equally important when it comes to rack-dense products.

The first of the new Seagate drives are expected next year. They will have Fibre Channel and Ultra320 SCSI interfaces, just like current 3.5in enterprise products. However, the aim is also to develop next-generation Serially Attached SCSI (SAS) drives in the new format.

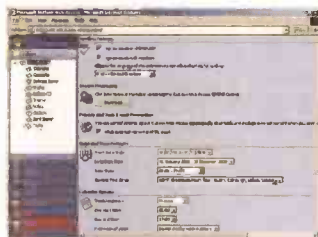
A number of interested parties have indicated support for the plan, including HP, Intel and Microsoft, although for it to really take off, broad industry support from other drive manufacturers will be needed. Western Digital recently introduced a 10,000rpm Serial ATA drive (the Raptor) in a new 3in format, indicating that other vendors may have their own ideas when it comes to storage standards.

This month, we round up the best content filtering software, to examine and manage web access and make your network secure

Exchange Server encourages upgrades

Close behind Windows Server 2003, the matching email software, Exchange Server 2003, is due out any day now. This will take advantage of features introduced in the new operating system, such as Volume Shadow Copy, but will also run on older Windows 2000 systems, addressing many of the shortcomings of the previous Exchange Server 2000 release. Microsoft is hoping to convince customers still clinging to Exchange 5.5 that the time is now ripe for an upgrade.

The emphasis is very much on performance and availability in Exchange Server 2003 with, for example, support for automatic client-side caching to reduce the need to continually fetch data from the server. That, together with the ability to support multiple data stores (introduced in Exchange Server 2000), should make life easier



The Outlook Web Access client for Exchange Server 2003 gets the same look, feel and functionality as the Windows client

for companies looking to consolidate email systems.

The new caching mode will also help when it comes to handling low-bandwidth connections. On top of that, support for Windows-powered mobile devices, such as the recently introduced Smartphone, is now included in Exchange rather than requiring the separate Mobile Information Server. Clustering is also enhanced to eight-way in

this release, and there's a new facility to restore user send and receive facilities immediately following disaster recovery, before mailbox contents are restored.

Server management, too, comes in for a refresh and the migration tools are beefed up. However, it's at the client end where the more obvious enhancements can be found, with a streamlined interface for Outlook 2003 and new anti-spam features. The Outlook Web Access (OWA) client has been totally revamped, giving it the same look and feel as the Windows client and, with just a few exceptions, the same functionality.

At the time of writing, the release candidate for Exchange Server 2003 was winging its way to the PCW labs, and we will bring you a full review in the next couple of months.

Thin client in again at HP

Following a quiet couple of years, the thin client market could be in for a boost, with the release of the first thin client system developed and engineered in-house by HP.

As with other thin clients, the HP's Compaq t5700 is designed to run applications remotely on a Windows or Citrix application server. It needs no local hard disk, making for a very secure and easy to manage solution. However, HP hasn't compromised by limiting functionality, as is the case with most competing products. Rather, the t5700 runs an

embedded implementation of the latest Windows XP operating system on a 1GHz Transmeta Crusoe chip, supported by up to 512MB of DDR memory, plus up to 512MB of Flash for local application settings, drivers and so on.

The latest Citrix ICA and Microsoft RDP clients are both built in as standard, along with 18 terminal emulators for use with legacy systems. There are also four USB ports to

support local peripherals and a PCI expansion module that can, for example, be used to add wireless networking facilities.

Starting at around £300 ex VAT, the t5700 is cheaper than most conventional PCs, plus it's got the HP badge on the front which may be all that's needed to lift sagging sales in this market.

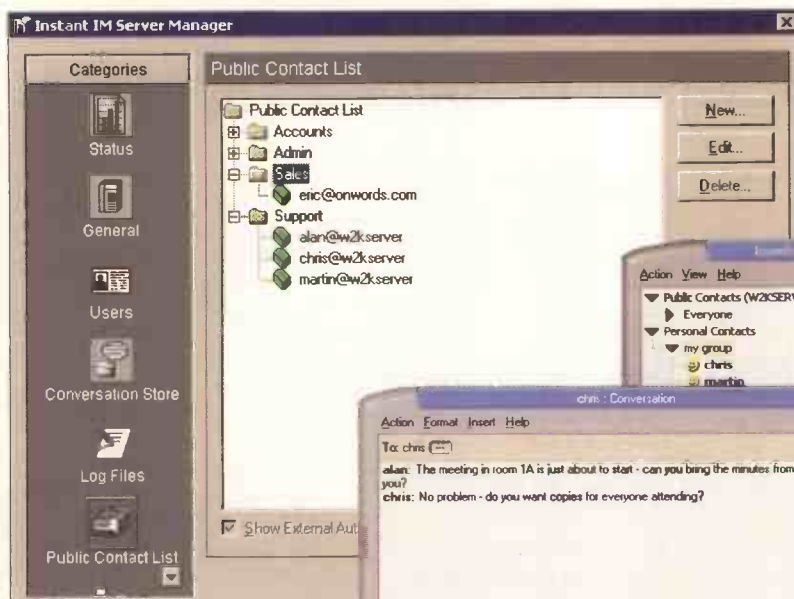
The thin client Compaq t5700 from HP runs an embedded implementation of Windows XP



INSTANT MESSAGING SERVER

Ipswitch Instant Messenger

Secure your network with this easy-to-use and install package



Above: A public contact list is one of several extra features provided by Ipswitch Instant Messenger, which can be centrally administered using a custom management console

Below: Users get a custom client that can't be used with external IM, and which communicates with the server using a proprietary encrypted protocol



include the ability to embed files into conversations and check POP3 mail servers for incoming email, with taskbar alerts for when new mail arrives. Group messaging is another key feature and messages can also be stored for offline users.

It took us less than five minutes to get up and running, with no problems at either the server or client end. On the downside you only get clients for Windows – integration with an email client would be a welcome addition. The lack of a whiteboard and application-sharing option also marks it down. Plus we'd like to see an anti-virus option to check attached files – although, as it's designed to be deployed in a closed environment, that isn't a major concern.

Ipswitch Instant Messenger isn't the only IM option, as there are a number of hosted and in-house alternatives. However, it is easy to deploy and use and, on the pricing front, breaks the mould with a single one-off server licence with no user limits. That can make it expensive on a small network, but a lot cheaper for large installations, with most other products priced on a per-user basis.

Although popular with users, public instant messaging (IM) services, such as those offered by AOL, MSN and Yahoo, are difficult to police. They also use protocols that bypass conventional firewall, anti-virus and content filtering measures, and threaten network security. However, there are real business benefits to using your own, local IM server. Ipswitch's Instant Messenger (IIM) enables this in a controlled, secure manner.

IIM is easy to install, starting with the server component. You insert the supplied CD-Rom into a Windows NT/2000 server (or an XP system on a small network) and follow the instructions. The only difficult bit is deciding whether to authenticate users against an internal database or leave it to Windows to validate them. You can change your mind, although companies that are standardising on Ldap (the Lightweight Directory Access

Protocol) will be disappointed by the lack of directory services integration.

For maximum security the server and its clients should ideally all be located on the same network, but by opening up port 5177, clients can access the Ipswitch server across a firewall. By making a few changes to the server setup you can accommodate users wanting access from remote networks protected by Nat (Network Address Translation) routers.

Rollout of the client software is simple, with a Windows setup utility copied onto the server during installation. This can be distributed using a shared folder, email or by posting on an intranet. Alternatively it can be installed from the CD-Rom.

A proprietary protocol is used for client/server communication which rules out the use of other clients. However, that can be viewed as a positive feature, with all communication between Ipswitch server and

clients encrypted by default using a built-in 168bit triple-DES algorithm. By only installing this client, end users can be IM-enabled but can't communicate externally using services such as AOL and MSN.

Another advantage is the ability of the instant messaging server to log all activity and keep a history of conversations. Limits can be set on message size and you can grant/deny access based on IP address to enhance security. The management interface is basic, with no web front end or MMC (Microsoft Management Console) integration, but it serves its purpose and is easy to use.

The client is similarly straightforward, with all the basic features, such as personal contact lists and graphical status icons to show when users are offline or on the phone. User-managed privacy controls are provided, and there's a centrally administered global contact list. Other extras

DETAILS

PRICE £549.90 (£468 ex VAT)
CONTACT Unipalm 01638 569 607
www.unipalm.co.uk

SPECIFICATIONS

Server: Windows NT/2000/XP; 96MB of Ram; 100MB of free hard disk space
Client: Windows 95 or later; 64MB of Ram; 10MB of free disk space

PROS Conversations logged and recorded; central management; proprietary protocol; price
CONS Windows only; no Ldap integration or virus scanning; no whiteboard and application sharing

VERDICT

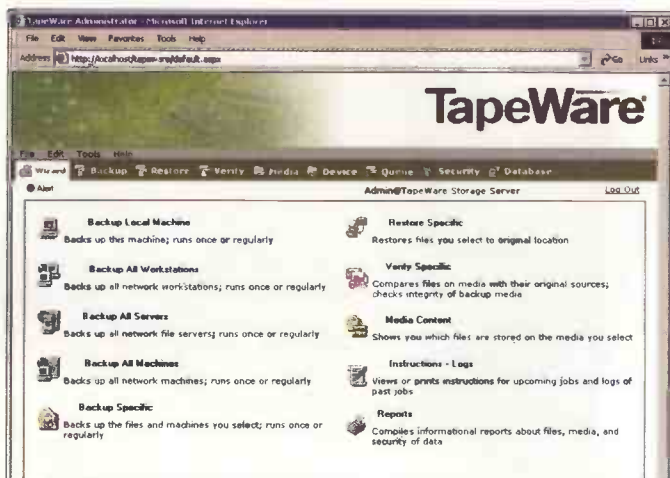
A low-risk, secure and affordable instant messaging package

FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
EASE OF USE	★★★★★
OVERALL	★★★★★

BACKUP & DISASTER RECOVERY

Yosemite Tapeware 7

A cost-effective multiplatform solution



The web gateway makes for easy remote management of the multiplatform backup and disaster recovery tools

Tapeware is a backup and disaster recovery program for small to medium-sized businesses. It's easy to use, with wizards to handle complicated processes, such as configuring devices and backup jobs, and a peer-to-peer architecture that allows tape drives to be shared by centrally controlled and local user-defined backups. It is a far from lightweight solution, however, with all the features of more expensive enterprise products, as well as a few options of its own.

Multiplatform backup has long been a feature of Tapeware, and version 7 adds support for Solaris and FreeBSD Unix to existing Windows, Network and Linux capabilities. It's also one of the first backup applications to work with Windows Server 2003, with software on any platform able to work with any other under the peer-to-peer architecture.

You get improved device support, including the ability to work with bootable tape drives in disaster recovery situations. Most popular drives are detected and configured automatically, and unlimited slot tape library support is included as standard.

Performance has been enhanced, with better use made of processor time and network bandwidth, and you can now

interleave up to eight separate data streams per backup device.

The most obvious change is a new web gateway, which delivers the existing management GUI and associated tools in a browser for remote administration.

You have to buy add-ons to handle applications such as SQL Server and Exchange, and it costs extra to support multi-drive tape libraries.

Tapeware 7 does what's expected, providing a cost-effective solution, which compares well with most of the more complicated competition.

DETAILS

PRICE £323 (£275 ex VAT)

Master Server Edition

CONTACT Yosemite Technologies

01628 788 342 www.tapeware.com

SYSTEM REQUIREMENTS

Windows 98 or above • Linux (2.2

kernel or above) • Sun Solaris •

FreeBSD Unix or Novell Netware • One

tape drive or library (USB, IDE or SCSI)

PROS Multiplatform support;

web-based console; peer-to-peer

CONS Add-ons required for SQL

Server and Exchange backups

VERDICT

Makes backup and recovery

simpler for small business

FEATURES

ENTERPRISE VALUE ★★★★★

EASE OF USE ★★★★★

OVERALL ★★★★★

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ETHERNET SWITCHES

Dell Powerconnect range

Connectivity for companies of all sizes



Powerconnect switches offer a mix of Fast and Gigabit Ethernet ports at very low prices, with optional management and stacking facilities

Dell's Powerconnect portfolio comprises three families, starting with the unmanaged Powerconnect 2000 range for small businesses looking for basic network connectivity. Prices start at just £90 ex VAT for the 16-port 2016, with the 24-port 2024 not much more expensive at £132 ex VAT. These are 10/100Mbps/sec switches, but Gigabit Ethernet is available in the eight-port Powerconnect 2508, which costs £351 ex VAT.

Companies looking for SNMP management on larger networks will be more interested in the Powerconnect 3000 range. These stackable Fast Ethernet switches all have Gigabit uplinks, with optional fibre as well as UTP connectors. Costing £457 ex VAT, the 3024 has 24 10/100Mbps/sec and two Gigabit Ethernet ports. Maximum density here is provided by the 48-port 3048, which also fits four Gigabit Ethernet uplinks into its 1U case and costs £862 ex VAT.

The third family is the Powerconnect 5000 range. With two products to choose from, these are for companies looking to build Gigabit backbones. The smaller 5212 (£995 ex VAT) offers 12 Gigabit ports. The 5224 costs £1,758 ex VAT and offers 24 ports. Both feature

SNMP and web-based management, and support for 802.1Q Vlan configuration.

Dell doesn't manufacture the Powerconnect switches itself. Quality is high though, and the products we looked at certainly do the job required with the minimum of fuss and at remarkably low prices. On the downside, you only get Layer 2 functionality at present, so you will have to look elsewhere if you need to support IP telephony or other applications needing the quality of service facilities provided by more intelligent Layer 3/4 devices.

DETAILS

PRICE From £105.75 (£90 ex VAT)
CONTACT Dell 0870 907 3000
www.euro.dell.com

SPECIFICATIONS

Layer 2 Fast Ethernet switches • 16-48 ports per switch • SNMP manageable Powerconnect 3000 stack six units high • Optional GBICs for fibre-optic connectivity on Gigabit ports

PROS Low price per port; choice of unmanaged and managed products

CONS Layer 2 switching only

VERDICT

A no-nonsense range of Ethernet switches

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★

SERVER ADAPTOR

Intel Pro/1000 MT

This quad-port card is the first of its kind



Intel's Pro/1000 MT Quad Port Server Adapter is the first PCI/PCI-X card to sport four Gigabit Ethernet ports

If you thought Ethernet adaptors were all similar, the Pro/1000 MT Quad Port Server Adapter from Intel could make you think again. The first adaptor with four Gigabit Ethernet ports, it is ideal for use in servers with limited expansion capabilities. The card also has enhanced teaming and load-balancing capabilities for greater reliability and data throughput.

The adaptor should be fitted into a PCI-X slot in the host server, although backwards compatibility with 64bit and 32bit PCI is provided for older systems. There are two Intel 82546EB controllers, each managing a pair of UTP connectors with auto-sensing facilities to negotiate port speed. These can now test each cable connection and report problems, while compensating for faults.

Drivers are available for Windows, Netware and most versions of Unix and Linux, with support for Intel's Advanced Network Services (ANS) for all platforms. This component allows ports on the adaptor to be configured in teams, along with ports on other Intel cards and embedded on the motherboard, for failover and load-balancing purposes.

You can also team with non-Intel adaptors, and there's a new

option called Switch Fault Tolerance (SFT), enabling port teams to be connected to switches to protect against failure. The adaptor supports full bidirectional bandwidth aggregation using both the IEEE 802.3ad link aggregation control protocol and proprietary technologies.

This adaptor performs well, our only issue being the drain on CPU resources as traffic rises. The card uses interrupt moderation technology to help reduce this, but you'll need fast processors to get the most out of this adaptor.

DETAILS

PRICE £399.50 (£340 ex VAT)

CONTACT Intel 01793 403 000

www.intel.com

SPECIFICATIONS

3.3v 32/64bit PCI/PCI-X adaptor; four 10/100/1,000Mbps/sec autosensing UTP ports; support for remote management; limited lifetime warranty

PROS Four Gigabit ports; enhanced failover and load-balancing facilities

CONS PCI-X required for max performance; can drain CPU

VERDICT

Good for those looking for maximum bandwidth on servers with limited expansion facilities

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★

SECURITY APPLIANCE

Servgate Edgeforce Plus

A modular approach to network security



The Servgate Edgeforce is unusual as it can be enhanced using optional software and plug-in hardware modules

Self-contained network appliances offering firewall, VPN (Virtual Private Network), anti-virus and other security facilities are widespread. Servgate's Edgeforce Plus stands out as it offers functionality and performance at a good price, and can be enhanced with plug-in modules.

The basic Edgeforce Plus is a 1U rackmount appliance sporting three 10/100Mbps/sec Ethernet ports. One is used to connect to the company Lan, one to the Internet, while the third is used to protect public-facing servers in a demilitarised zone. Installation is a matter of plugging in, switching on and managing the options via a web-based interface. Alternatively it can be managed through a local console or over the network using Secure Shell (SSH) and/or Simple Network Management Protocol (SNMP).

Basic functionality can protect a medium-sized organisation. A stateful inspection firewall comes as standard, processing up to 200Mbps/sec (75,000 sessions), plus there's a built-in IPsec-based VPN server able to cope with 45Mbps/sec of remote access across 1,500 encrypted tunnels.

For companies with greater needs, the optional performance module can push the firewall throughput to 250Mbps/sec

(100,000 sessions), and doubles VPN capacity to 90Mbps/sec and 3,000 tunnels. Ten VPN licences are included and Servgate supplies the Safenet VPN client.

McAfee anti-virus scanning is another option – a one-year licence adding £1,920 ex VAT, but you need the Professional Module to go with it. However, this gives support for web caching, logging and adaptive URL filtering, in addition to the Websense content filtering.

Redundant power supplies and the support for failover clustering complete the list, making this a compelling security solution for a growing business.

DETAILS

PRICE From £2,814.13 (£2,395 ex VAT)

CONTACT Unipalm 01638 569 714

www.unipalm.co.uk

SPECIFICATIONS

1U rackmount appliance; 3 x 10/100Mbps/sec Ethernet; USB and serial ports; optional expansion modules

PROS Upgrade potential; simple web management

CONS Single point of failure; lots of competition

VERDICT

Expansion facilities make this good for growing businesses

PERFORMANCE ★★★★★
FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
OVERALL ★★★★★



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Online offensive

WORDS & TESTING: ALAN STEVENS

The rise and rise of instant messaging, email and the Internet in business has opened up security holes within networks. But there is an answer – content filtering tools

Businesses that give employees free rein to browse the web, send email and use instant messaging are asking for trouble. Productivity is the first casualty, followed swiftly by network security, especially where employees are allowed to visit sites of a dubious nature, download anything that takes their fancy and chat with their friends as much as they like. Network performance can suffer too, and there are legal implications, with electronic messages now carrying the same weight as written material.

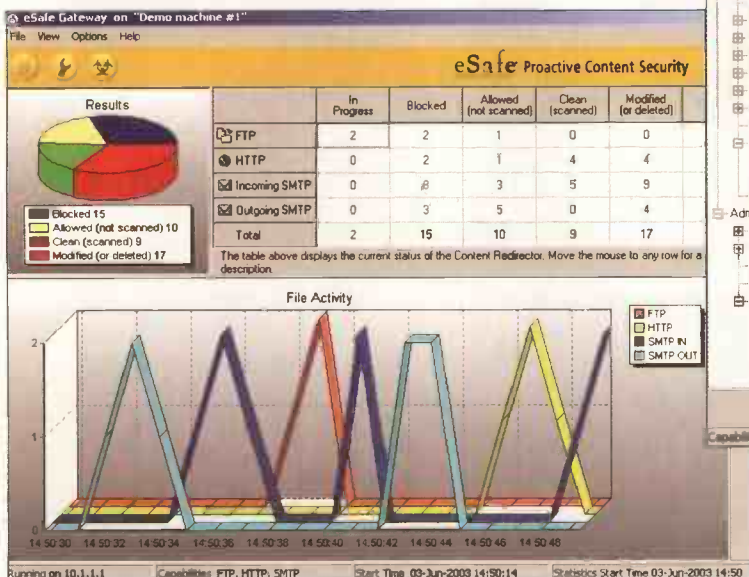
The solution is to use tools such as those reviewed here to examine, filter and manage content as it passes in and out of the network. The products fall into two main

groups, starting with web filters to block access to inappropriate sites and make sure that users don't download viruses, trojans or other nasties.

There are also tools to scan and filter email to weed out inappropriate and offensive material and block unsolicited or spam messages. They can also be used to monitor what goes out of the organisation, to stop confidential material being lost, add disclaimers and ensure all messages meet legal requirements.

Prices quoted in this group test are for an initial purchase. There are additional charges for subsequent maintenance and updates to the URL and restricted sender sites required by the products. Contact the vendors concerned for details.

Below: Realtime graphing of activity in the Econsole utility can be used to manage and monitor Aladdin Esafe Gateways



Above: Block spam based on content, as well as using restricted sender lists and by scanning SMTP headers



Aladdin Esafe Gateway 4

Unlike most of the vendors in this group test, Aladdin has just the one product to filter and manage both web and email traffic. Esafe Gateway 4 is available in several formats, starting with a virtual appliance CD that, when booted, installs a security hardened Red Hat Linux kernel and the Esafe software on the gateway machine. You can also buy it ready-installed on an IBM rackmount server or as a Windows 2000 or Solaris app.

Deployment is much the same in each case, with options to configure the Esafe gateway as a proxy server or as a transparent bridge. The advantage of the latter is that no reconfiguration of clients is needed, and there should be very little impact on network throughput. There's also a version for use with Checkpoint firewalls and a separate Esafe Mail product to police internal mail traffic on Exchange servers. It's also possible to cluster gateways, to balance load and provide failover redundancy.

The Esafe gateway inspects all HTTP (web), SMTP (email) and FTP (file transfer) traffic passing in and out of the network, taking a multilayered approach to securing that information. This starts with anti-virus filtering using Aladdin's 32bit scanning engine (an external scanner can also be used), with

facilities to selectively screen out attachments and handle compressed files. Macros can be stripped from files retrieved from untrusted sources and Java and ActiveX controls similarly filtered and selectively blocked or allowed, with facilities specifically to stop Denial of Service (DoS) attacks.

When a virus or other suspect attachment is detected, the Esafe gateway can automatically blacklist the source site. More general access to the web can similarly be controlled by URL and IP address blocking, with facilities to specify restricted sites manually and to optionally download a categorised database licensed from Surfcontrol.

Keyword filtering is another option, with customisable lists supplied as standard, while users attempting to access prohibited sites can either be shown warning messages or redirected to a custom URL. FTP traffic is similarly filtered, as are all email messages, both incoming and outbound, with options to prevent host mail servers being used to relay messages.

Email controls can be applied to any SMTP system and disclaimers added to outgoing mail. Outbound content can be checked for keywords to prevent distribution of confidential or offensive materials. You can also

block incoming unsolicited (spam) messages using a mix of restricted sender lists, SMTP header and keyword filtering. None of the more sophisticated anti-spam mechanisms found in the Surfcontrol or Marshall products is present.

With the Esafe Virtual Appliance you use a web interface to manage the gateway while a separate Windows utility, Econsole, is used to set up and manage security policies. This can configure and manage multiple gateways running on different platforms, although not as one using global policies.

The Econsole interface is easy to get to grips with and we particularly liked the realtime graphing of activity. On the downside, you can define VIP users and excuse them some of the controls, but you can't tailor access policies based on user identity or group membership. The built-in reporting is basic too, although there is support for the Crystal Reports report generator (not included) and the ability to export logging information to a common SQL database for further analysis.

Another disappointment is Aladdin's approach to instant messaging (IM) security. Esafe Gateway 4 can identify popular IM and point-to-point (P2P) protocols, but only to allow

or block them. A facility to disallow file transfers while still allowing conversations is planned for the next version.

With both web and email filtering, Esafe Gateway is attractive for small businesses, especially those with limited technical resources, where the virtual appliance deployment is useful. Services from Aladdin will keep the software up to date. You don't get the granularity of control some of the dedicated web and email tools offer, but that's not necessarily a bad thing, as configuring and managing the more advanced filtering products can be an issue in itself.

DETAILS

PRICE £2,115 (£1,800 ex VAT) for 25 users

CONTACT Aladdin Knowledge Systems 01753 622 266

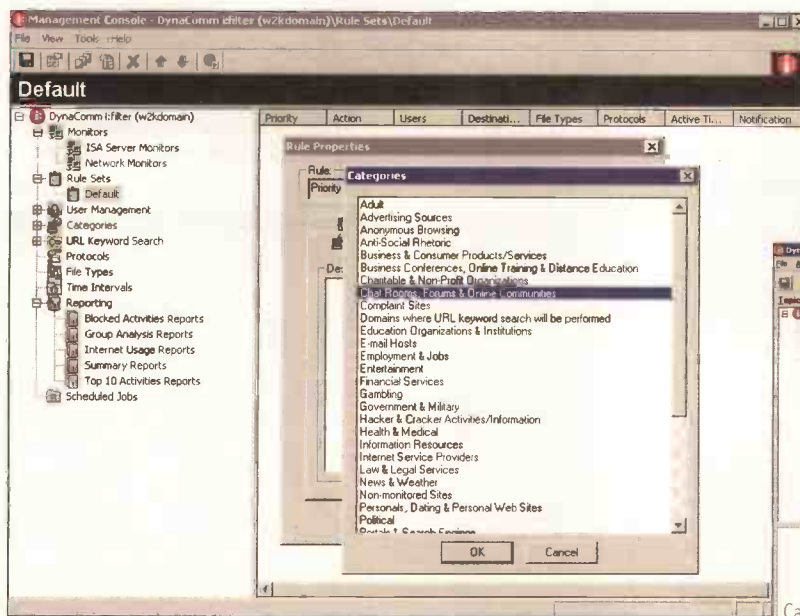
www.esafe.com

PROS All-in-one web and email filtering; virtual appliance option; realtime graphing of activity
CONS Built-in reporting is limited; can't tailor security by user or group

VERDICT

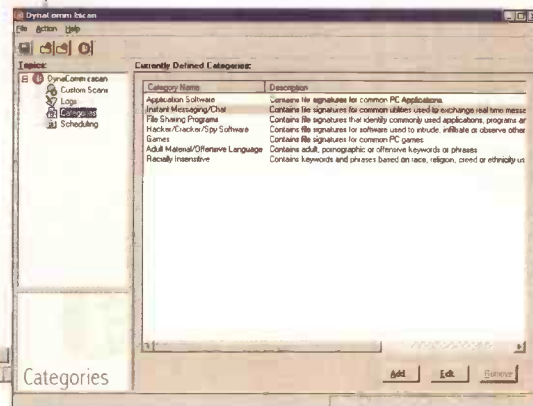
A good all-in-one solution for companies with limited technical resources

FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★



Left: With no facilities to scan for viruses or strip out malicious code, i:filter is nonetheless an effective tool when it comes to enforcing web access policies

Below: i:scan can be used to seek out and remove the client software required to access instant messaging and peer-to-peer networking services



Futuresoft Dynacomm i:series

Futuresoft's Dynacomm i:series content filtering tools consist of i:filter, for general HTTP and FTP content filtering, i:mail for email filtering, and i:scan which provides general file surveillance, including the ability to look for and disable, IM and P2P networking clients.

i:filter is a Windows NT/2000 application that can be used standalone or work with Microsoft ISA (Internet Security and Acceleration) server with, in each case, three main components. The network monitor does most of the work of intercepting and examining network traffic, with a separate management console and a self-contained database to hold the configuration information, plus all the activity logs and a categorised list of restricted sites. All three components can be installed on one server or distributed across multiple platforms and, because it only monitors traffic rather than acting as a gateway, no client changes are required.

There's no web interface, but the Explorer-like management console is straightforward. We quickly defined multiple network monitors and configured rule sets to manage access to specific types of website using either the categorised URL database

provided or keywords, or both. It's also possible to manage file download activity, but only by blocking access to particular file types altogether. There are no options to screen out pop-up ads, active agents and scripts, or to scan for viruses using either built-in or third-party scanners. Although rules can be applied to individual users, in order to identify them by logon ID an agent has to be installed on every client PC, and that can be problematic on a large network.

In its favour i:filter is very easy to use, does a good job in terms of applying web access policies and has good reporting facilities. It also has useful traffic monitoring tools that graph, in real time, all network traffic, broken down by direction, protocol, user and time.

i:mail is also for Windows NT/2000 and acts as a relay for use with any SMTP (Simple Mail Transfer Protocol) mail server. There are no specific versions for use with Microsoft Exchange or Lotus Domino.

A similar management interface to that in i:filter is used, with rules that can be configured to filter incoming messages by first matching them against a whitelist of permitted senders, followed by a blacklist made up of manually created restricted addresses plus

links to realtime black hole lists. The software will then look for known spam techniques using definitions that can be further finetuned and weighted to suit different business requirements. Assuming the messages aren't already blocked, i:mail can then strip out attachments and scan for viruses using third-party scanners, and apply other rules on an individual basis.

Outgoing mail can be scanned for viruses, checked against lists of permitted and blacklisted destinations and stamped with disclaimer messages. Creating the rules is easy, but can be time consuming so, to help with initial setup, you can apply a preconfigured set of rules to provide a basis for further customisation. These rules will block most spam and strip out all executable attachments. They will archive incoming messages for five days, to weed out any false positives, and stamp a disclaimer on all outgoing mail.

i:scan differs from most other content management tools, in that it's designed to find and examine files already on the network. This is done based on keyword content, to find potentially offensive or confidential material. File signatures can also be created to recognise files even though they may have been renamed. You

can't filter and allow restricted use of IM and P2P services, but access to them can be blocked by searching for and deleting the associated client software. You can export file signatures to i:mail to stop confidential data leaving the organisation and create audit trails for files that are allowed to leave.

The version of i:scan we tested could only scan remote systems configured with file shares to which the scanning system had access privileges. That severely restricts its operation, but a more comprehensive version with a local client agent should be on sale by the time you read this.

DETAILS

PRICE i:filter £1,110 (£945 ex VAT), i:mail and i:scan £1,175 (£1,000 ex VAT) each (all prices for 50 users)
CONTACT Futuresoft
01260 292 222
www.futuresoft.com

PROS Very easy to use; traffic monitoring; preconfigured rules
CONS No anti-virus scanning in i:filter; client agent required for user ID; can only remove IM/P2P clients in i:scan

VERDICT

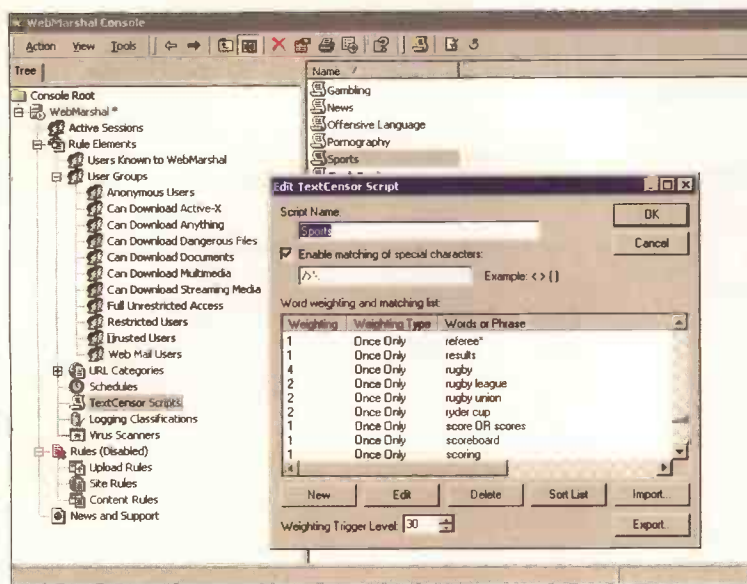
A straightforward set of tools that lacks other security options

FEATURES

ENTERPRISE VALUE ★★★★★

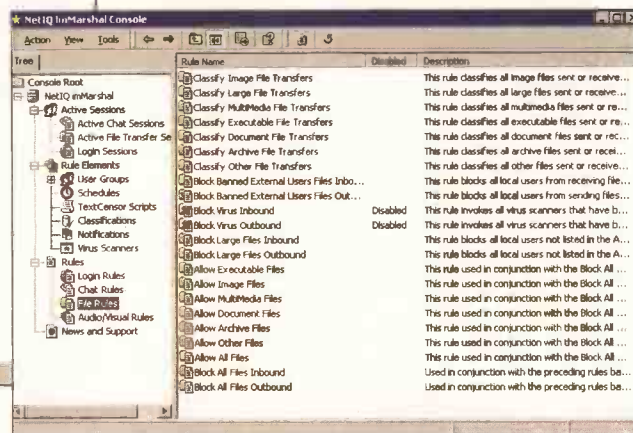
EASE OF USE ★★★★★

OVERALL ★★★★★



Left: Webmarshall can apply acceptable use policies based on user and group identity and filter content using complex lexical analysis tools

Below: Unlike other instant messaging filters, IMmarshall can selectively block access to the service, block or filter file attachments and scan files for viruses



NetIQ Webmarshall, Mailmarshall, IMmarshall

The Marshall range of filtering tools comprises Webmarshall, to filter and manage browser traffic; Mailmarshall, to do the same for email, with a choice of either generic SMTP or Exchange implementations; and a new IMmarshall package designed specifically for the MSN IM service. All three are written to run on Windows NT/2000 servers, but are otherwise platform independent and can filter and manage traffic on any IP-based network.

Webmarshall can be used as a standalone non-caching proxy, handling HTTP, HTTPS and FTP protocols, or in conjunction with other proxy servers with no protocol restrictions. The software can also be installed as a plug-in to the Microsoft ISA server. SQL Server or MDE (the runtime Microsoft Data Engine implementation of SQL Server) is a prerequisite for logging and reporting, with configuration and management achieved via a plug-in to the Microsoft Management Console (MMC).

Webmarshall is rules-driven with facilities to apply web access policies on a per user or group basis. Users can be identified using NT or Novell NDS authentication as well as the IP address of the requesting PC, however there's no Ldap

support in the current release. Preconfigured categorised URL lists are included, though, and to identify objectionable sites you can use TextCensor. This analyses the content of sites not already on a local blacklist and adds them if content matching custom lexical rules is found.

Screening of file downloads and uploads is a key feature of Webmarshall, with optional anti-virus scanning using a choice of third-party products, such as McAfee and Sophos. Cookie stripping is another useful option, but you can't specifically block Java or ActiveX controls. Nor can you view activity in real time, although there are excellent reporting facilities with a runtime version of Crystal Reports included with the package.

Mailmarshall runs on an NT/2000 server and needs SQL Server or MSDE for reporting. The host system is configured as the mail gateway and can be used with any SMTP-based mail server running on any platform, with a special implementation for Microsoft Exchange Server if needed. The software can also be configured as standalone POP3 mail server in a small business.

The same weighted lexical scanning technology used in Webmarshall is also used to filter messages in Mailmarshall.

The software is configured and managed using a rules-based interface implemented as an MMC snap-in, although it's not possible to manage the different products from one console. They shouldn't be hosted together on the same platform (for performance reasons), although they can share a common SQL Server host.

Mailmarshall offers the usual facilities to filter messages and attachments, selectively blocking, redirecting or quarantining them based on predefined rules. The rules can be configured using a variety of criteria and it can check for viruses by linking to third-party scanners. To provide an effective answer to the spam problem you can match against realtime black hole lists, as well as using Spamcensor, plus an automated update service.

Standard tools to add disclaimers to outgoing messages are supplemented by facilities to screen for confidential material in Mailmarshall. An optional module, Mailmarshall Secure, examines messages encrypted using the S/Mime standard for public key encryption. You also get comprehensive logging, alerting and reporting facilities.

IMmarshall has similar requirements to the rest of the range. The content scanning

technology lets you do more than just block access to MSN. It's possible, for example, to limit communication with members of trusted contact lists and manage access based on both user identity and time of day. File downloads can be selectively blocked and anti-virus scanning applied with third-party products. Disclaimers can be added to MSN conversations, and there are comprehensive facilities to archive conversations and report on activity. The biggest drawback to IMmarshall is that it only works with MSN, not any of the other IM or P2P networking services.

DETAILS

PRICE From £940 (£800 ex VAT) per product for up to 75 users
CONTACT NetIQ 01784 454 500
www.netiq.com

PROS Web, email and IM tools; common lexical scanning technology; user-based access controls; good reporting facilities
CONS Separate management consoles

VERDICT

A comprehensive set of filtering products with feature-rich instant messaging tools and strong reporting facilities

FEATURES

ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★

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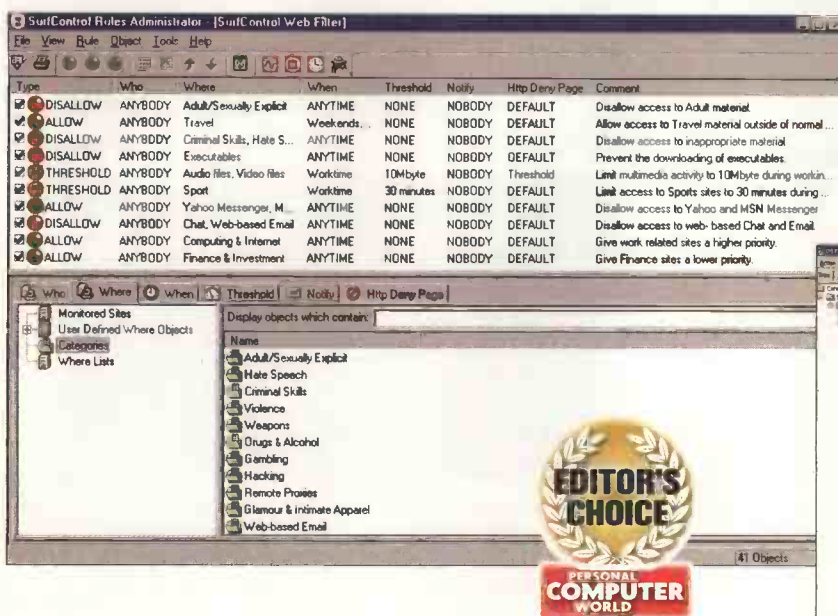
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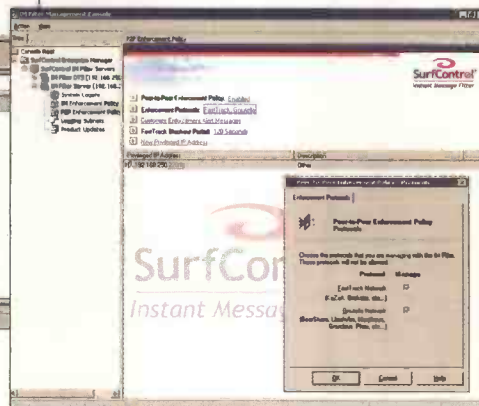
telephone

0906 906 0519



Left: Surfcontrol Web Filter has a very easy-to-use management interface that makes light work of both generating and monitoring the content filtering rules

Below: Instant Messaging Filter can be used with a range of public IM and P2P services, although it only lets you block or allow access



Surfcontrol Web, Email and IM Filters

One of the best known content filter providers, Surfcontrol sells three products, Web Filter, Email Filter and Instant Message Filter. All are designed primarily to run on Windows 2000 hosts, but protect a variety of IP-based networks.

Web Filter, for example, can be used in several ways, starting with the basic Windows version using packet sniffer technology to minimise the impact on network bandwidth and make for easy setup. The software can also be configured for pass-through filtering and used with Microsoft Proxy Server, ISA Server and Checkpoint Firewall-1.

Configuration and management is done using either a Windows console or a web browser, with a similar interface in each case. This looks a little daunting at first, but was one of the easiest to use of those tested. Surfcontrol uses the same interface to manage its Email Filter, although each requires its own console.

One feature we liked was the ability to start monitoring traffic as soon as the Web Filter software was installed. This makes it easy to see what is happening and better devise rules to manage the traffic. You can build very sophisticated rules, based on the daily updated category list, and apply

those rules to individual users and groups. Users can be authenticated using Microsoft Active Directory, Novell NDS and Ldap as well as by host name, IP and Mac addresses.

Access to websites can be blocked and users shown warning messages, with the ability to control access by content scanning as well as URL. A Virtual Control Agent (VCA) uses adaptive neural network technology to categorise new websites on the fly and use them in access rules. Downloads can be managed by Web Filter rules and there are useful bandwidth management controls.

Information logged by Web Filter is stored in an Access database with options to use SQL Server on larger networks. Alerting facilities are also built in and there's a comprehensive reporting module with a large number of customisable reports that can be published, viewed and exported in various formats.

Email Filter comes in two formats, to protect either generic SMTP mail systems or Exchange (v5.5). It can be used on a standalone server or the same system as the main message transfer agent, and is a well-specified filtering tool. It has the same kind of monitoring facilities as on Web Filter to snapshot traffic before

devising any rules and a similar Virtual Learning Agent (VLA). In this case, though, it uses the neural network technology to automatically fine tune the software based on the traffic being handled, the only slight drawback being the need to train the VLA to do its job.

The Virtual Image Agent can be set to recognise offensive pictures, and you get a McAfee-powered anti-virus scanner and multilayered anti-spam protection as standard. The Surfcontrol Anti-Spam Agent is the key to this last option, with facilities to filter messages against both public realtime black hole lists and by matching content using Surfcontrol's own database. Suspect material such as active HTML and Java components can be stripped from emails and there are the usual facilities to filter both incoming and outgoing messages and add disclaimers.

Rules can be created using all these and other filtering agents with drag-and-drop actions, and colour coding summarises what rules do. Messages can be blocked or quarantined and notifications dispatched to senders, recipients and their managers based on the content found. You can archive and audit messages and reporting as well as you can in the Web Filter.

Instant Message Filter can be used to manage a variety of IM and P2P protocols. It can block access to the leading AOL, MSN and Yahoo messaging services and P2P services using Fasttrack or Gnutella networks. It's also very straightforward to implement using a Windows 2000 host with, just like the other Surfcontrol products, comprehensive notification and reporting facilities. On the downside, however, it can only block or allow traffic, with none of the filtering controls found on IMmarshall for instance, but then the NetIQ product only works with MSN.

DETAILS

PRICE Web Filter £1,122 (£955 ex VAT), Email Filter £1,457 (£1,240 ex VAT) IM Filter £2,085 (£1,775 ex VAT) – for 50 users
CONTACT Surfcontrol 01260 296 200

www.surfcontrol.com

PROS Traffic monitoring; interface; user authentication; can filter IM and P2P protocols
CONS IM Filter can only block or allow traffic

VERDICT

Comprehensive set of tools that stands out from the crowd

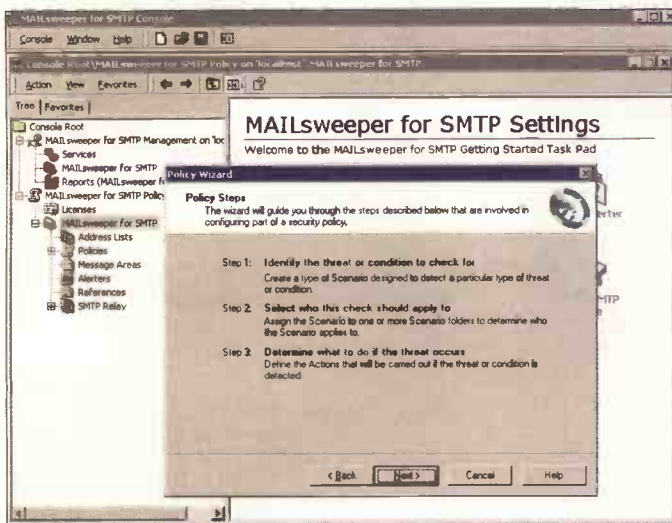
FEATURES

ENTERPRISE VALUE

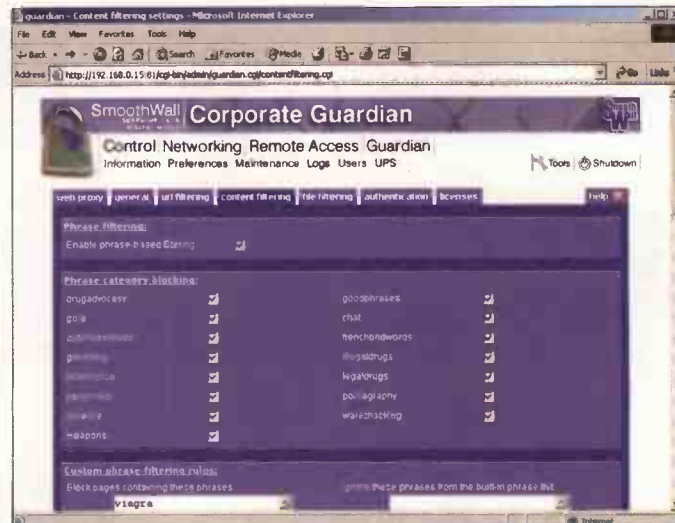
EASE OF USE

OVERALL

★★★★★
★★★★★
★★★★★
★★★★★



Security policies are made easy to define by the extensive use of wizards in CS MailSweeper for SMTP



Smoothwall Corporate Guardian is a Linux-based proxy server and content filtering tool that is quick to install and easily managed via a simple browser interface

Clearswift CS MailSweeper

Mimesweeper was the first email scanning tool to be released in 1995, since when it has been joined by several others sold under the Clearswift label. CS Mimesweeper for Web has replaced the Websweeper product. However, it wasn't released in time to be included here, so we tested CS MailSweeper for this group test.

As well as the MailSweeper for SMTP product, versions are available for Microsoft Exchange and Lotus Domino – all Windows 2000 apps based on the same scanning technology. This intercepts incoming and outgoing messages and breaks them into their component parts, enabling deep scanning by third-party anti-virus tools, allowing potentially harmful active components to be stripped out.

Links to Ldap directories allow policy rules to be applied on a per-user basis and you can scan for content as well as filter messages based on domain blacklists. You can also examine and filter image content rather than simply block attachments, although only by adding the CS Imagemanager package. You need CS Secretsweeper to deal with encrypted messages.

MailSweeper can be used both as a standalone solution or distributed across multiple servers for greater performance.

It's not particularly easy to install, a situation not helped by the supporting documentation, which is comprehensive but not easy to follow.

A lot of effort has gone into making MailSweeper easy to manage. We liked the option of downloading sample policies to get started plus the extensive use of wizards when creating policies from scratch. MMC snap-ins provide the management interface, with reasonable alerting and reporting tools included as standard. Unfortunately the product is starting to show its age, with easier-to-use tools now available that are just as effective in what they do.

DETAILS

PRICE From £1,116 (£950 ex VAT) for 50 users

CONTACT Clearswift
0118 903 8903

www.clearswift.com

PROS Sample policies; wizards for policy creation; well-established product; links to Ldap directories

CONS Complex deployment

VERDICT

One of the longest established email content filters and still a good product, but not as easy to deploy as some of the other products here

FEATURES

ENTERPRISE VALUE

EASE OF USE

OVERALL

★★★★★
★★★★★
★★★★★
★★★★★

Smoothwall Corporate Guardian

Smoothwall Corporate Guardian is a combined web proxy and content filter that runs on Linux. Installation is automated and management straightforward, making it very easy to deploy.

To install Guardian you'll need a dedicated PC with a recommended 1GHz processor, 96MB of memory and 2GB disk or greater. A single network connection is all that's needed, but as a proxy server some reconfiguration of client browsers may be required. A transparent proxy mode and the use of a supplied setup script minimises the work involved.

Installing the server is simple – just boot from the CD and it will format the hard disk, then install a security-hardened Linux kernel and load the Corporate Guardian software. The whole process took around 10 minutes in our labs, after which we were able to start filtering traffic with remaining configuration and management done remotely from a browser.

Filtering is done using a mix of subscription-based URL lists, updated weekly, and content analysis. The software can only analyse text, although it can be configured to strip out adverts and block file downloads. Another omission is the lack of any facility to scan files for viruses as they are downloaded.

The URL lists can be added to and are easily customised and the software as a whole is quickly mastered. However, there are only limited facilities to apply security policies on a per user basis, using either a manually maintained internal user list or an unsupported third-party utility to communicate with external authentication servers.

With only basic logging facilities and no email or IM scanning, Guardian won't appeal to large companies. Its main strengths are ease and speed of deployment and it is worth a look by smaller businesses that want to control web access.

DETAILS

PRICE From £235 (£200 ex VAT) for 10 users

CONTACT Smoothwall
0113 399 3292

www.smoothwall.co.uk

PROS Bootable CD installs everything required; simple browser interface

CONS Web filtering only; limited reporting facilities; no anti-virus scanning

VERDICT

A good tool for smaller companies looking for quick and easy web filtering only

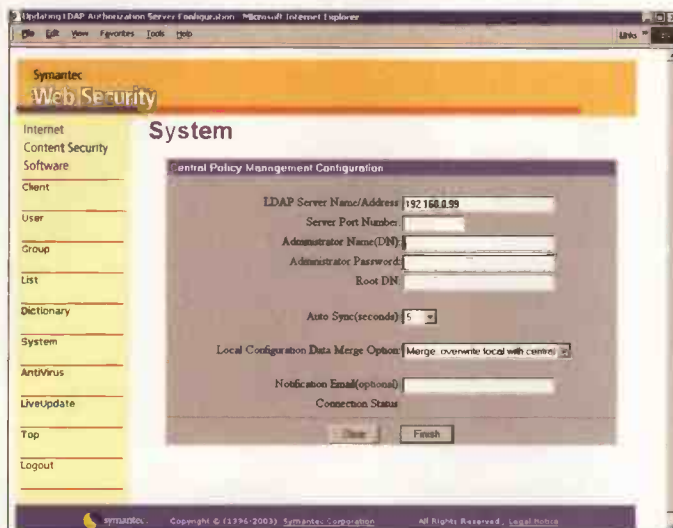
FEATURES

ENTERPRISE VALUE

EASE OF USE

OVERALL

★★★★★
★★★★★
★★★★★
★★★★★



Web Security from Symantec includes strong anti-virus protection and, by storing security policies in an Ldap directory, you can apply them globally across multiple gateways

Symantec Web Security

Although it offers an email content filtering tool – Mailgear – and a range of anti-virus tools for use with email servers, Symantec only submitted its web content filter, Web Security, for our test. This can be deployed on both Windows NT/2000 and Sun Solaris hosts and used to filter and manage both HTTP and FTP traffic. The chosen platform is configured as a proxy server and changes are required at the client end (to use the Web Security server as a proxy) to reflect this.

Web Security majors on anti-virus scanning, with all the usual features, such as Symantec Navex engine and the Live Update automated update service. These facilities are combined with filtering tools to manage access to web and FTP sites by reference to a categorised, automatically updated URL list, combined with context-sensitive heuristic content scanning.

The anti-virus protection is globally applied while content filtering can be applied on a per user or group basis, with users identified using Windows NT, Ldap or Radius (Remote Authentication Dial In User Service). Access can be blocked by time of day and downloads managed according to file type, but there are no facilities to filter out pop-up windows, Java or ActiveX applets.

The management interface, implemented via a relatively straightforward browser, is not as intuitive as some of the competition. In a large organisation you can arrange for policies to be applied across multiple Web Security gateways by storing the settings in a central Ldap directory so that any change, on any gateway, is automatically replicated to all Web Security systems.

There are alerting and reporting facilities, but the package is a solution for larger enterprises with other tools to manage email and other traffic, and is of most value to those using Symantec security products.

DETAILS

PRICE Price per user from £22.54 (£19.18 ex VAT) for 10-24, to £9.32 (£7.93 ex VAT) for 1,000-plus

CONTACT Symantec
0800 389 7030
www.symantec.com

PROS Policy management; anti-virus protection; access controls; HTTP and FTP filtering
CONS Requires client configuration changes; interface; no blocking of Java and applets

VERDICT
A good combination of anti-virus and content filtering

FEATURES ★★★★★
ENTERPRISE VALUE ★★★★★
EASE OF USE ★★★★★
OVERALL ★★★★★

Hardware filters

In this group test we've concentrated on content filtering tools designed to be run on industry standard hardware, typically as Windows NT/2000 or Linux applications. However, there are alternatives, in the form of security appliances that offer content filtering as either a prime feature or as one of a number of security options.

There are several advantages to going down the appliance route, such as getting all the hardware and software required in one package with no compatibility worries. Similarly, you shouldn't have to worry about performance as long as you stick to the manufacturers' recommendations when it comes to the number of users or sessions their hardware can handle. Plus, as with all appliances, you get something ready to use straight away, making content filtering a lot quicker and easier to deploy than with software you have to install yourself.

Content filtering is available on quite a number of appliances these days. The Esafe Gateway from Aladdin reviewed on page 156, for example, can be bought in appliance format, but it's far from unique. Other vendors include Bluecoat Systems (www.bluecoat.com), which offers a range of appliances able to filter web content using categorised URL lists from either Secure Computing or Websense.

There's support, too, for granular control of instant messaging on Bluecoat appliances, including the services users are allowed to access and whom they can chat with. Anti-virus scanning is another key feature on Bluecoat appliances, which start at around £5,000 ex VAT.

Email security isn't addressed specifically by the Bluecoat appliance but it is on those from Network Box (www.network-box.com). As well as comprehensive anti-spam tools and content filtering using software from Surfcontrol, Network Box appliances offer built-in anti-virus, firewall, IPsec-based VPN (Virtual Private Network) and intrusion detection facilities.

All of these run on a security hardened implementation of Linux with versions of the Network Box for large enterprises and to protect smaller companies or those with branch office networks. Prices start at just £1,400 for the 10-user small business appliance, plus an annual licence for the URL list and anti-virus updates.



Above: Web filtering using either Secure Computing or Websense lists can be bought as a ready-to-run service on Bluecoat appliances

Below: Network Box appliances offer a firewall, VPN support and intrusion detection, along with anti-spam and Surfcontrol Web filtering tools



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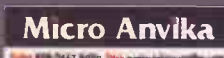
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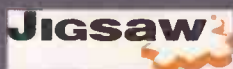
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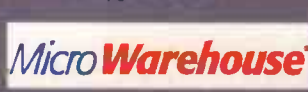
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Editor's Choice

Before making any specific comments about the filtering products in this group test, it's worth making a couple of observations about the market in general. The first is that there seem to be two quite different approaches to content filtering. Some manufacturers concentrate entirely on trying to stop users accessing sites they shouldn't, with little else in the way of functionality. Others see content filtering as one of several necessary weapons in the security war, including it in their products along with lots of other options such as anti-virus scanning, script blocking, intrusion detection and so on.

The Esafe Gateway from Aladdin is a good example of the latter approach, with a comprehensive set of security tools, of which content filtering is just one. At the other end of the spectrum, applications such as Dynacomm i:filter from Futuresoft and Smoothwall Corporate Guardian just block access to websites.

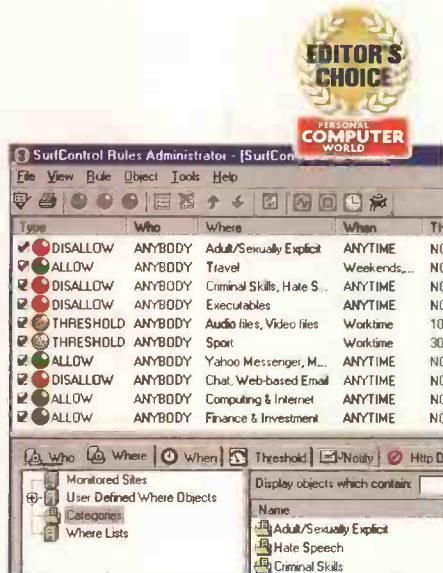
This dichotomy of purpose can make it difficult to choose the right product. For instance you may only be looking to manage web surfing, but the promise of

'You may only be looking to manage web surfing, but the promise of greater levels of security can be alluring'

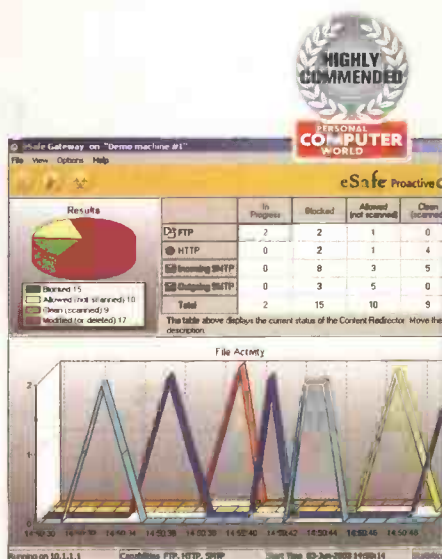
even greater levels of security can be very alluring, even though you may already have sufficient protection from other threats.

Web filtering tools are rarely built into other applications, but the same doesn't apply to email products. Lately there has been a headlong rush to include content filtering functionality into mail servers, primarily to combat the ever-growing problem of unsolicited mail, or spam.

Microsoft's new release of Exchange (Exchange Server 2003), for example, boasts a number of anti-spam features. Similarly, the latest SMTP mail servers from MDaemon (www.zensoftware.co.uk) and UK developer Gordano (www.gordano.com) major on filtering content, both to screen out viruses and block spam messages. There are plenty of others and, if this is the kind of functionality you crave, look to the vendor of your email software first. After all, the mail server is the most logical and best place to filter content and it will be easier, and cheaper in most cases, to deploy it that way.



Surfcontrol Web, Email & IM Filter



Aladdin Esafe Gateway

On the plus side standalone email filters aren't that difficult or expensive, but they can be time consuming to set up and manage. We would only recommend them if you either don't want to disturb your current server setup or can't get the correct mix of functionality using filtering tools built into the mail server itself.

The winners

Aladdin Esafe Gateway wins a **Highly Commended** award for providing both web and SMTP mail filtering, together with anti-virus and other security tools in one easy-to-use solution. We also liked the new virtual appliance format introduced in the latest release, which further bundles everything needed into the one package and simplifies deployment. A good solution for the small to medium-sized business looking for one product to manage everything, the downside to Esafe Gateway is that it doesn't have the user/group-specific policies of some of the competition.

In larger organisations the ability to tailor security policies on a group and individual basis is extremely valuable. The best product in this respect is **Surfcontrol Web Filter** which can identify individuals using a variety of techniques including Windows NT and Ldap authentication. However that's not the only reason we've opted for Surfcontrol as our **Editor's Choice**, as this company's set of products has lots of other advantages.

To start with, the Surfcontrol database is long-established, well-respected and licensed to numerous other vendors, so that you can be sure of sites being correctly categorised and the list being up-to-date. You also get access to a full set of filtering products to manage web, email and instant messaging access. The instant messaging Filter doesn't provide the same breadth of features as the IMmarshall from NetIQ, but it does work with a range of services.

Another bonus is the user interface, which is extremely well thought out, providing at-a-glance information about what rules do and simple controls to create and manage them. We also liked the ability to install the software and start monitoring traffic immediately, making it a lot easier to work out what it is you should be controlling and who the most likely culprits are. You also get automatic learning agents in both the web and email filters, an agent to recognise dodgy images and excellent alerting and reporting facilities, making Surfcontrol a hard content security act to follow.

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EDITED BY NIGEL WHITFIELD

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How to overclock the Shuttle XPC safely after adding components to this barebones system



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Discover the benefits of using fractal technology to compress images, in Digital imaging and video



PAGE 193

If you're brave (or mad) enough to attempt a DIY upgrade of your new tablet PC, we show you how



PAGE 201

Avoid the potential expense of remote server management by configuring Terminal Services

As I write this introduction to Hands on, it's one of the warmest days of the year, so where better to do it than in the garden, courtesy of a wireless Lan? And with the new 802.11g standard just ratified, such Lans are faster than before – but what happens if you have an older notebook with a slower wireless link? In this month's Mobile computing column, Guy Kewney shows you how you can upgrade the un-upgradable – if you're bold enough.



If you'd rather put together a PC from scratch than wrestle with the innards of your laptop or tablet, then this month's Hardware section from Gordon Laing takes a look at the Shuttle XPC barebones system – you can find out how it performs and how easy it is to put together on page 172.

In the world of imaging, Ken McMahon looks at the new scripting facilities in Paint Shop Pro and how you can tweak the templates for Photoshop's gallery projects. Ken also investigates a new type of compression to see if it's up to the claims made for it; and if you just want to organise pictures on your website, Web development has the concluding part of our web album project.

You'll get tips galore for all types of Windows from Terence Green and Tim Nott – between them covering dual booting, lost passwords, Dos applications and the curious conundrum of the clogged up inf files.

We've another 10th anniversary this month – Mark Whitehorn's Database column, which topically handles dates as well as documentation and report formatting. Meanwhile, dedicated Delphi users can find out in Visual programming about Borland's vision for .Net and C#.

As usual, there's Word processing too, with more on Autotext and the ins and outs of font embedding. Over in Spreadsheets Stephen Wells explains how date and time are calculated, which could solve some tricky problems with time sheets. And if you want to create amazing music, or simply spice up some of the games you play, turn to the Sound column, where Niall Magennis explains all about soundfonts. Finally, of course, there's Question time, where you'll find the answers to as many of your problems as we could fit in. I hope you enjoy this month's Hands on, and if there's anything you'd like to see covered, contact the contributors using the addresses on page 171.

Nigel Whitfield



Advice from our experts

Our Hands on experts answer your questions and solve your problems

Databases

Q I've written my dad a simple address book in Access. He's a bit short-sighted and finds it hard to click accurately on the tiny button to add a new record. Is there any way I can give him a bigger target?

Bert Pardoe

A Yes, you can certainly do this. It will be especially easy if you've created a form for inspecting records (even if you haven't, creating one with the wizard takes only a few clicks) because you can put a big button on it which will work in the same way as the fiddly little one. Open the form in Design view and check that the Control Wizards button in the toolbar is selected. Now click the Command Button tool from the toolbar, drag out a rectangle on your form and a wizard will open. Click the Record Operations category, then the Add New Record action. Click Next and add helpful text. Name the button, click Finish and it's done. Now you can tweak its size and alter its properties until it looks perfect: a clear font in a large size is probably best in your case, and go for good contrast between the font and background colours.

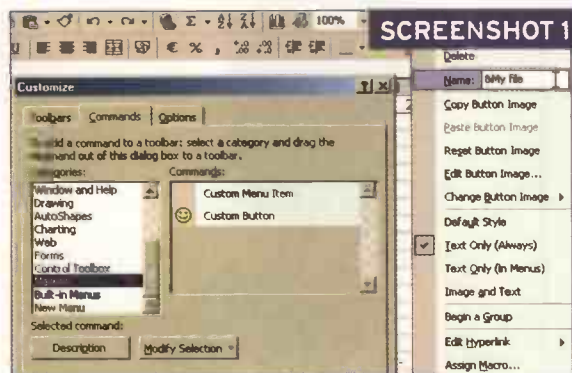
Hardware

Q I would like to write DVDs, but have no spare IDE channels for an internal DVD writer. If I replace my existing CD-RW drive with a DVD writer, will it also be able to produce CDs? Additionally, is there any performance disadvantage to using an external USB2/Firewire DVD writer?

Malcolm Johns

A All current DVD writers should also be able to record on CD-R and CD-RW media, thereby allowing you to safely replace an existing CD-RW drive. It's always worth verifying this fact by checking the DVD writer's specification sheets though, and this will also allow you to compare various read and write speeds. Additionally, if you're using an external DVD writer with a USB2 or Firewire connection, there should be no performance issues.

Q I was recently prevented from playing a Region 1 DVD movie on my DVD-Rom drive. The software said my drive was set to Region 2, but



How to create a new button which will open an Excel workbook

when I tried to change it, I discovered there were no more changes available.

Nitin Singhal

A Most DVD drives allow you to change their region up to six times, after which the drive is locked at the last setting. Clearly this is annoying for anyone with a collection of Region 1 and 2 titles, but fortunately there are ways around it. Region data is normally stored in the drive's firmware, which can usually be modified or reloaded, thereby either resetting the region counter or in some cases removing it altogether. Searching online with the words region, firmware and your drive's model should reveal all you need to know, although a good place to start is www.firmware-flash.com, which has a huge range of firmware updates. Changing your drive's firmware may invalidate your warranty so we are unable to officially support this action.

Spreadsheets

Q Is it possible to open a favourite Excel workbook via a new button on the Standard toolbar?

Patty Leutner

A It's quite easy. Right-click on the toolbar and choose Customize. Click the Commands tab and then Macros under Categories. On the right-hand side of this box you'll see a Custom button. Drag this to your position of choice on the toolbar. With the Customize dialogue box open you can right-click on the new tool button and you'll see a lot of options – one is Name: &Custom Button. Edit this to &My file. Then check the option for Text Only. That way the image on the button is just

the short name you choose for the file. Further on down choose Edit Hyperlink, Open. Select the workbook file you want the button to open. To insert a vertical separating line before your button, choose the Begin a Group option, then close the two dialogue boxes. If you hover on the new button now you'll see the Excel file path. Click the button and your Excel file will open (see screenshot 1).

Q A lot of data is sent to us with dates in the international format of yy/mm/dd. Does Excel offer a way to convert this style to the conventional dd/mm/yy?

Ruth Davis

A If the international date is in cell B3 this formula elsewhere will switch it around =DATE(B3/10^4,MOD(B3,10^4)/100,MOD(B3,100)). The caret mark (^) is above the 6 on the standard keyboard. I would suggest formatting the new cell d/m/yyyy if the leading zero in single-digit days and months is redundant, and it's always a good idea to spell out the year in case Excel misinterprets the century (see screenshot 2).

Q We sell a range of new and used products. This is recorded in one column on an Excel spreadsheet. How can I count the number of products in stock, indicating whether they are new or used?

Asif Iqbal

A Choose Name, Define on the Insert menu and Name the range which gives that information, Condition. Name the range which lists the products, Products. To count the number of new tables in stock enter the formula =SUM(IF(Products="Table",IF(Condition="N",1,0))) (see screenshot 3). Excel adds curly brackets to indicate it understands. To count the number of used chairs enter =SUM(IF(Products="Chair",IF(Condition="U",1,0))). Although this summarising table is included in the illustration, in use it's best to keep it away from the product list.

Q Is there a way to do a 'Find' through all the worksheets in several Excel 2002 workbooks?

Ken McClelland



A If you can't remember which Excel file any piece of text might be in, choose Open on the File menu, click the arrow by the side of Tools and choose Search. Enter the word or phrase in the Search for: box and click the Search button. In a few seconds all the Excel files with that name in them will be listed at the bottom of the dialogue box.

Q I've written a macro which transfers row heights or column widths in Excel. Would you like me to send it to you?

Maciek Gruszczynski

A Regrettably there isn't space here for long listings. However, recent versions of Excel offer a built-in option for this. Set any blank row to the height you require, or column to the width. Click on that row number or column letter, choose Save, press Ctrl and click on blank row numbers or any column letters to change. Right-click, and choose All for row heights or Column widths to adjust the columns.

Windows 2000

Q I have several classic music documentaries on VHS tape. Is it possible for me to somehow save these onto my hard drive and then burn them onto CD for posterity? I would also like to be able to edit out some commercials that were included in the TV recording. Any suggestions would be appreciated as I would love to preserve these classic concerts for posterity.

Robert Dolan

A You're running Windows 2000 which is an excellent base for video capture, as it can be made very reliable and it supports the NTFS file system which doesn't suffer from the file-size limitations of earlier versions of Windows. VHS tape is very low resolution storage, so it doesn't make sense to spend heavily on hardware to capture the video data. Cleaning the tape heads and using a high-quality composite cable to connect the VCR to a capture device in the PC is about as much as can be done to minimise quality loss due to transfer.

You may already have a video card which supports video capture. If not, an inexpensive card with video-in or a cheap TV card shouldn't set you back more than £30. VCDHelp.com (www.vcdhelp.com) has reviews and suggestions for appropriate cards, and lots of advice (see screenshot 4).

Consider creating both VCDs and Super VCDs (SVCDs) from your captures for maximum flexibility.

Either can be played on PCs with a suitable media player or on compatible DVD players, though some DVD players may not support the SVCD format. A VCD is likely to be as good but not better than VHS quality. SVCD can't improve on the quality of the source material but uses a more advanced digital video format which is likely to produce a sharper picture than VCD, especially when displayed on a TV monitor.

Q I run Windows 2000 and, even though I have entered no password to start with, it still asks for a password on start-up, and also reports that the password needs changing after so many days. The reminder keeps appearing even though I have not set a password. When time runs out it asks me to renew my password so I just cancel the box. How can I remove this annoyance?

David Kelsey

A When Windows 2000 is installed it enables an Administrator password to be set. This can be left blank. When Windows 2000 starts for the first time after having been installed, the Network Identification Wizard opens and offers two choices – normal logon security or Windows always assumes the same user logs on. Selecting the second option and leaving the password blank causes Windows 2000 to create an administrative account, set that account's password expiry time-out to 'never', and to disable the Ctrl & Alt & Del logon screen. Each time Windows 2000 starts in future it loads straight to the desktop with no security checks.

If the password expiry option is ever changed from 'never' the password prompt will be presented even if the actual password is blank. It's possible that an event – anything from installing an application to installing an update to some virus, worm or trojan – triggered this change, or that it was an accidental user action.

To stop the password prompts, log on with administrative rights, open Control Panel/Users and Passwords, click on the Advanced tab, and then click on the Advanced button. This opens the Local Users and Groups management console. Click on Users in the left pane and then double-click on the user accounts on the right to open their properties page. Under the General tab you'll be able to select 'Password never expires' (see screenshot 5). See <http://support.microsoft.com/default.aspx?id=310584> for other options.

Insert Format Tools Data Window **SCREENSHOT 2**

=DATE(B3/10^4,MOD(B3,10^4)/100,MOD(B3,100

	B	C	D
Name	Date of birth		
	International	Conventional	
Fortescue	990822	22/8/1999	
Smith	010101	1/1/1901	
Carter	851109	9/11/1985	
Morrow	900909	9/9/1990	
Needham	870619	19/6/1987	

Converting International format dates

Artil 10 * B / U **SCREENSHOT 3**

F2 =SUM(IF(Products="Table",1,0))

	A	B	C	D	E	F	G
	Stock No	Product	New/Used		Totals	New	Used
2	45896	Table	N		Table	3	1
3	45897	Chair	U		Chair	2	1
4	45898	Sofa	N		Sofa	1	2
5	45899	Bookcase	U		Bookcase	0	2
6	45900	Table	N		Chest	0	0
7	45901	Cabinet	U		Cabinet	0	1
8	45902	Chair	N				
9	45903	Sofa	U				
10	45904	Table	U				
11	45905	Chair	N				
12	45906	Sofa	U				
13	45907	Bookcase	U				

A formula to count items in an inventory

SCREENSHOT 4

BUY OPERA TODAY!

What is SVCD, CVD/CVCD and XSVCD?

mushkin memory speed stability mushkin

SVCD stands for 'Super VideoCD'. A SVCD is very similar to a VCD, it has the capacity to hold about 35-60 minutes on 7400 min CDs of very good quality full-motion video along with up to 2 stereo audio tracks and also 4 selectable subtitles. A SVCD can be played on many standalone DVD Players and of course on all computers with a DVD-ROM or CD-ROM drive with the help of a software based decoder / player. It is also possible to use menus and chapters, similar to DVDs, on a SVCD and also simple photo album/slides shows with background audio. The quality of a SVCD is much better than a VCD, especially much more sharper picture than a VCD because of the higher resolution. But the quality depends how many minutes you choose to store on a CD, less minutes/CD generally means higher quality.

SVCDs can be played on

- Many standalone DVD Players, check here for compatibility list
- All CD-ROM/DVD-ROMs can play SVCDs with a software DVD/SVCD Player

If your DVD Player does not support SVCD you can try this VCD header block, it requires no reencoding which means that you do not lose any quality.

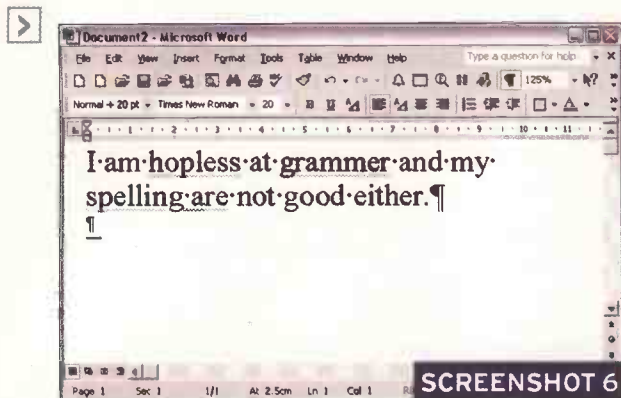
Buy original SVCDs from VCDGallery.com

Information about digital video can be found at www.vcdhelp.com

SCREENSHOT 5

Local Users and Groups Management console. Click on Users in the left pane and then double-click on the user accounts on the right to open their properties page. Under the General tab you'll be able to select 'Password never expires' (see screenshot 5).

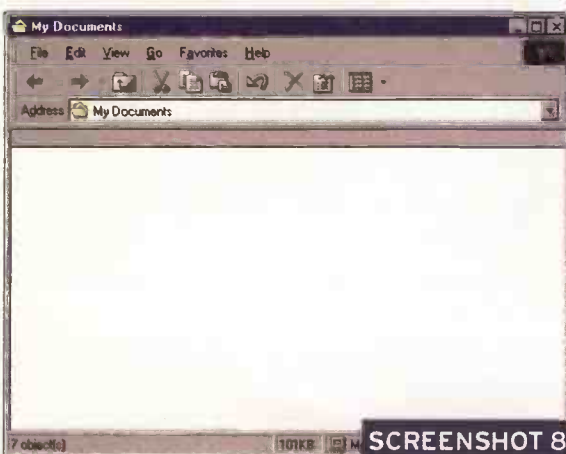
Banish those security hassles by setting password expiry to 'never'



You can change the colour of the lines – but only in Word 2002



The Files and Settings Transfer Wizard



Seven objects – but where are they?

Word processing

Q I recently updated Word to version 2002, operating on a Dell machine under Windows ME. Having written and inserted linked images for a couple of years on the earlier Word version which arrived with the Dell, all was going swimmingly with the new version.

Then suddenly, for no apparent reason, while inserting an image there were no images visible on the screen. Instead something like the following came up, and continues to come up, following every image insertion: `{INCLUDE PICTURE "picturename.jpg" *MERGEFORMAT \d}`. I understand that this is Word's own instruction, in Wordese, to link the original figure.

Indeed, the image will print out but the image is no longer visible on the screen. The remarkable thing is that the change from pure image to image code occurred spontaneously during a writing session.

Michael Oppenheim

A If you go to Tools, Options, and turn to the View tab, you will see an option to show field codes near the top right of the tab. If you uncheck this you will be able to see your images again. It's easy to trigger this accidentally as Alt & F9 toggles between viewing field codes and their results – in your case, the images.

Q Like four per cent of guys, I am red/green colour blind. In Word 2000, is there a way of changing the colours of the wavy red and green lines used for spelling and grammar checks so I can tell the difference between them?

David Stewart

A Not in 2000, I'm sorry to tell you. But, for the record, this is possible in Word 2002. If you look for a template named Support.dot in the Microsoft Office\Office10\Macros folder, you'll find it contains a macro for modifying several Registry-stored Word options, including the colours of the grammar and spelling underline. If you don't have this file you can get it by going to Office Setup, Add/Remove features. Scroll down through Microsoft Word, Wizards and Templates. Click on 'More Templates and Macros', and then select 'Run from my computer' (see screenshot 6).

Q I do quite a few letters in Word 97 with my home address, followed by the date at the top using a basic template. My problem is that when I save the letter as a document

and then some time later need to print another copy with the original date, the date field automatically updates to the date at the time I print it. How can I save the letter so that when I need a copy some days or months later, the printed copy has the original date?

Alex Wood

A What's happening is that you have a date field that is automatically updated when printing. One alternative is to use a CreateDate field in the template. Open the .dot file, delete whatever field is putting in the date, then Insert, Field. Choose 'Date & Time' from the Categories list, then CreateDate from the list on the right. Click the Options button to choose the date format. Letters based on this template will then always show the date that the letter (not the template) was created.

Windows

Q Where can I find the 'Files & Settings Transfer Wizard' to back up my files in XP Home? I've looked in 'Accessories' and it's not there. Alternatively, is there a better way or utility to perform this task?

Dermot Ball

A To answer the second question first, the Files and Settings Transfer Wizard is not designed to be a backup tool – as the name implies it's for transferring files and settings from one computer to another. We'll be looking at backup strategies in a future issue, but the short answer is that you can install the Windows NT backup utility. Insert the CD, choose 'Perform additional tasks' then 'Browse this CD'. Burrow down to `VALUEADD\MSFT\NTBACKUP`, right-click on `NTBACKUP.MSI` and choose 'Install'. To answer the first question, if you enter `%SYSTEMROOT%\system32\usmt\migwiz.exe` into the Start, Run box, or create a shortcut using that command, the Wizard should run (see screenshot 7).

Q I read your column in PCW and wondered if you may be able to solve a problem I'm having with Win 98 SE. Windows Explorer – View 'Details' mode – shows an empty pane. All other modes (icon, list, etc.) show the folder's contents correctly. I've run anti-virus software, Registry repair software and even reloaded Windows 98, but no joy at all. Do you have any ideas?

Don Kent



A This one has been baffling users since Windows 95. What has happened is that the columns, which should bear the headings, 'Name', 'Size', etc, have been set to zero width (see screenshot 8). Although we've never found a satisfactory answer to how or why this happens, it's easy enough to rectify. Click in the empty right-hand pane and press Control & + (on the numeric keypad). This should optimise all the column widths. If that doesn't do the trick, then with the cursor in the empty grey bar immediately above the file list area, move it to the far left. When it changes to a cross shape – just before you hit the edge of the window or pane – drag the cross cursor to the right. A column heading and the relevant file details should appear. Repeat this until all the columns appear correctly.

Q I have two laptops, one with Windows XP and the other with Windows 2000, both displaying an identical problem. When I try to establish a dial-up connection to the Internet, the dialogue box that appears has the wrong password in the password text box – I know it is the wrong password because the one displayed is 16 characters long, whereas in both cases it should be only five characters long. I always have to enter the correct password manually, even though I have ticked the option to have the password saved. Do you have any idea where this 16-character password is coming from, and how can I get the machines to remember the correct password?

Malcolm McKay

A This is just a security feature – 16 blobs appear regardless of the length of the real password, so anyone looking over your shoulder won't know the length of your password (see screenshot 9).

Linux & Unix

Q I'm trying to install Red Hat 8 with VMware, but it gives an error saying that it cannot start the X Server. Perhaps I need a newer version of XFree86 – how do I get this?

Oscar Nonweiler

A The problem lies with VMware (www.vmware.com) rather than XFree86. It emulates a PC, including all the hardware. That means the video card your virtual PC sees is not the same as the one you physically have installed – it's actually a virtual video card too. While some Linux distributions work fine with VMware, others, especially the latest ones,

have problems. Try a newer version of VMware, or contact the company for troubleshooting support.

Q I've managed to get Xine working following the instructions in the Hands on column, but when I switch to full screen on DVDs, I cannot restore it to the window view. How do I do that?

Jon Stock

A Xine has many keyboard controls that aren't immediately obvious. Have a look through the documentation or check www.xinehq.de/index.php/readme for a list of some. In your case, pressing the 'f' key switches between full screen and window mode. Another useful one is 'a', which switches the aspect ratio.

Q I've tried following step-by-step the instructions to install DVD and other software on my Linux laptop, but I always receive the message 'checking for C compiler default output... configure: error: C compiler cannot create executables'.

James Sun

A The build process is checking that your compiler works properly. The almost definite cause to this error is that you don't have the compiler and development tools installed. Refer to your distribution documentation on how to install new software, and include the development programs. A way to test that everything is OK is to type 'gcc -v' at the command line. If you receive 'command not found', you don't have the compiler installed.

Q How do I type accented characters in Linux? The Alt-keypad method that Windows uses doesn't seem to work.

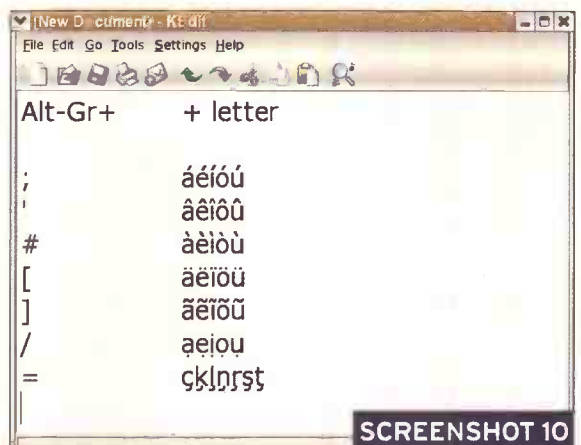
Simon Brady

A There are two ways of typing non-ASCII characters. The first is to load the 'character select' application, and copy and paste them. This might be useful for unusual symbols. However, the easiest way to get common accented letters is to use X's 'dead keys'. Here you press a key, which itself does nothing (hence it being 'dead'), but it changes the following key pressed. Press Alt & Gr with one of the keys shown in screenshot 10 to get the accented character. Some of the more exotic characters are only available in Unicode fonts, but you'll have no problems with the usual western European accents.



SCREENSHOT 9

The number of blobs doesn't tally with the password length



SCREENSHOT 10

Dead keys are the solution to accented character in Linux

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address below:

Databases:	database@pcw.co.uk
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Gordon Laing

has been a hardware enthusiast ever since his first Sinclair ZX80 and, as a 10-year contributor and former editor of PCW, what he doesn't know about technology isn't worth knowing

Get ready for lift off

After adding components to Shuttle's latest XPC, we test its overclocking prowess

Small form factor PCs, with their compact dimensions and stylish designs, continue to be a popular subject for readers of Hands on Hardware, and why not? Having endured huge beige boxes for years, it's a relief to find an alternative that's discrete, good looking and in some cases either very quiet or uncompromised in terms of connectivity and performance.

The small form factor market is currently dominated by two platforms: Shuttle's barebones XPCs, and systems based on Via's Epia Mini-ITX motherboards. While both have small dimensions in common, they serve very different markets.

Shuttle's barebones XPCs are capable of taking the latest Athlon or Pentium 4 processors, along with top-of-the-range 3D graphics cards, making them the choice for the performance enthusiast. Better still for the DIY PC builder, each XPC comes with its motherboard pre-mounted in a well-built cube case with a wealth of connectivity already wired up. All you need to do is add memory, a hard disk and processor and you're done. See www.shuttle.com for more information.

Via's Epia Mini-ITX motherboards feature embedded (and non-upgradable) CPUs which, while mid-range in terms of overall performance, are the coolest-running around. Consequently an Epia system can be quite quiet, or in some cases totally silent, which is great news

The rear of the SB51G reveals a wealth of connectivity, including Firewire, optical digital audio and the VGA port for the chipset's integrated graphics. On the right are two blanking plates for the motherboard's single PCI and AGP slots, the latter allowing you to fit a high-end 3D card if desired. The smaller grille on the left is for the power supply exhaust, while the larger one in the middle caters for the heatpipe that cools the main CPU. Note the small punch-out plate at the top for an optional parallel port



Shuttle's SB51G XPC barebones unit. As with other Shuttle XPC solutions, you get a well-built small form factor case with a fitted motherboard, heatpipe cooling and all the front ports already wired up. Simply add a processor, disk, some memory and you're off. This model is the SB51G, based on the Intel 845GE chipset and designed for Intel Socket 478 processors

for living room or media-playing boxes. Unlike the Shuttle XPC barebones, you'll need to supply your own case, but there are plenty of different ones available. A great place to find Mini-ITX equipment and imaginative projects is the appropriately named Mini-ITX website at www.mini-itx.com.

We've covered various Epia solutions in the past and will be looking at the latest Nehemiah-based M10000 model next month. This month though it's time to look at Shuttle's latest XPC models in detail; in particular, the SB51G model and a budget configuration based on a 2GHz Celeron processor. Since we've not covered overclocking for a few months, we'll also see how far you can push a humble Celeron in such cramped conditions.



The Shuttle solution

Preconfigured systems based on Shuttle's XPCs are now a familiar sight, but it's not until you've personally opened one up and fitted components that you realise how well-built they are. The first surprise for experienced PC builders is how much of the job has already been taken care of. Opening an XPC case, by undoing three thumbscrews and sliding off the lid, reveals that the motherboard has already been mounted and connected to the built-in power supply.

By supplying the case and motherboard together, Shuttle is also in a unique position to exploit the vast array of port headers found on today's motherboards. All modern XPCs feature front-mounted USB, Firewire and audio ports which again are already wired up to the correct internal headers. There are no worries about pin-compatibility or wire lengths – it all just works and, better still, has been done for you.

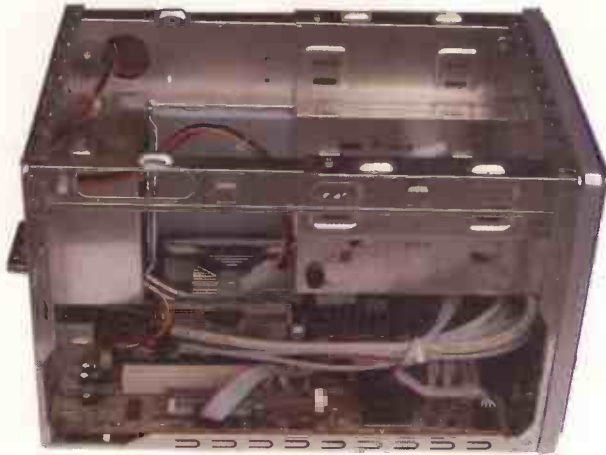
Perhaps the most pleasant surprise, though, is that Shuttle's carefully considered where these and other wires should go, even once the entire system has been built. In such a cramped environment, it would be easy to come unstuck, but the position of every drive, cable and plug has been well considered.

Preparing the drives

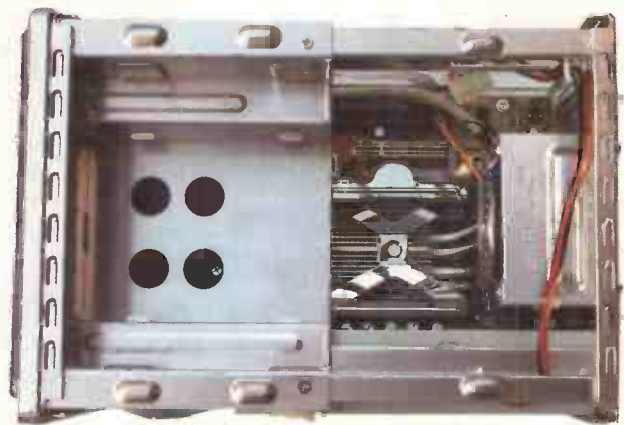
After unscrewing and sliding off the lid, the first step in assembling an XPC is to remove the drive cage. This is held in place by two screws, after which it can be eased out. Depending on your configuration, you may wish to remove one or both of the drive bay panels.

If you intend to fit a floppy drive, now is the time to fit the supplied cable. It connects under the power supply, then should be routed upwards along the inside of the chassis; adhesive is also supplied to fix it in position.

You can now fit and secure your drives in the cage, starting with the hard disk in the bottom, followed by a second 3.5in drive such as a floppy, then finally the 5.25in optical drive. The cage will be fitted back in the chassis later once the CPU and memory are in place.



Open a Shuttle XPC case and you're confronted with what looks like a spaghetti of wires, but it's actually very well thought out. The horizontal cables pictured connect the Firewire, USB and audio motherboard headers to the front-mounted ports. Beneath these are the single PCI and AGP slots. The bar running along the top of the case is used to tuck away the thin IDE cable to an optical drive



The opened Shuttle XPC case viewed from above. On the left side is the drive cage, which can accommodate one 5.25in optical drive and two 3.5in disks, one with optional front access. On the right half you can see Shuttle's heatpipe cooling solution in place

Processor and memory

Fitting the memory is pretty straightforward, as both Dimm slots are easily accessible with the drive cage removed. Fitting the CPU, though, requires a little more effort, and it's not entirely obvious how to do it at first glance.

With the case open and drive cage removed, it's impossible not to notice the unique cooling solution Shuttle has developed. As the photos above indicate, there's simply no room for a conventional heatsink and fan combination rising from the motherboard surface. There is, however, some room at the back of the case, so Shuttle has used heatpipes to transfer the heat from the CPU through 90 degrees to a vertically-mounted radiator and cooling fan (see above right). Having the fan at the back of the case also allows the CPU heat to be blown directly outside rather than warming the other internal components as in traditional PCs. The only problem for the first-time XPC builder is figuring out how to remove the heatpipe and get the CPU fitted.

Fortunately, removing the heatpipe is very straightforward. First remove the four thumbscrews around the central exhaust vents at the back of the case. The main heatsink can then be released by pressing down on two silver clips and turning them outwards; this is sometimes more easily achieved by pressing down on the single lip in the middle, and unhooking the clips as they become loose. At this point, the entire heatsink/heatpipe/radiator/fan combination can be removed, along with the spring-loaded retention clip.

With a familiar Zif socket revealed, it's now just a case of correctly inserting your processor and smearing it with a little thermal grease, which again Shuttle supplies. The heatpipe combination then sits on top and the retention clip can be reattached, pressed and hooked into place. The radiator and fan can now be screwed in firmly using the four thumbscrews. Finally, don't forget to connect the fan to a power header on the motherboard; the default header is labelled Fan3.

Cables and drives

With the motherboard surface still accessible, it's now time to connect the IDE drive cables, but once again Shuttle has gone the extra mile. Realising there's only room to keep one hard disk cool in the case, Shuttle supplies a relatively short IDE cable with a single connector on the end. The end which connects to the hard disk has a curved band attached which makes it easy to pull out later if you need to.

To reach the optical drive, the second supplied IDE cable is longer than the first, but interestingly the wires are bunched together along most of its length. This allows it to be snaked up and along the top edge of the chassis before being poked through a gap at the end, ready to meet the back of the drive. Once again, this is very well thought out.

With the cables ready, the drive cage can then be lowered into place, before being screwed tight. The data cables should then be connected, followed by the power plugs. From this point on, it's no different from any PC.

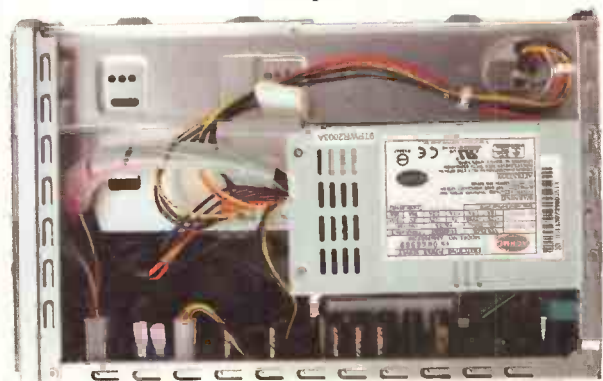
Close the case, power up and boot into an operating system setup. Drivers are supplied on a CD for the chipset, integrated graphics, audio and network.

A budget configuration

In an earlier issue of *PCW* we tested the Shuttle SB51G with a 2.4GHz Pentium 4B processor, but this time wanted to put together a system based around a cheaper CPU, the Intel Celeron. We also wanted to see how easily this processor could be overclocked in the Shuttle's tight environment, if at all.

As with all processor purchases, it's important to carefully consider all the specifications to ensure you're getting the most appropriate model for your requirements. When it comes to overclocking, for example, you should ensure the manufacturing process which produced the chip in the first place is physically capable of achieving higher clock speeds. The important figure here is the number of microns used in the process, with smaller numbers representing a finer, newer process, capable of higher clock speeds.

The opened Shuttle XPC case viewed from the other side, revealing the compact power supply which should have sufficient juice for a high-end P4 and 3D card, not to mention a couple of drives





Sysmark 2002 results from a Shuttle SB51G with onboard VGA, 256MB of PC2700, 80GB Seagate Barracuda IV, Windows XP Professional



Look closely at the Celeron spec sheets on Intel's website, and you'll notice the 1.7 and 1.8GHz versions are made with the old 0.18micron process, while the 2GHz and faster models are on the finer 0.13micron process. The 1.2, 1.3 and 1.4GHz models are also made at 0.13micron, but these are designed for older FC-PGA2 motherboards.

The top speeds officially used by Intel on the 0.18micron process were just over 2GHz, whereas the 0.13 micron process has already created chips running at 3GHz. We're not saying any 0.13micron chip can be clocked at 3GHz (nor that 2GHz is the limit for 0.18micron), but clearly the finer process is the one to go for if you're into overclocking. Wanting the cheapest chip with the greatest potential, we bought the lowest-priced 0.13micron Socket 478 Celeron available: the 2GHz model, which in June cost around £50 ex VAT.

We then fitted this into a Shuttle SB51G, available for around £175 ex VAT from suppliers such as Overclockers UK (www.overclockers.co.uk). We then used a stick of Crucial 256MB PC2700 memory for £23 ex VAT from www.crucial.com/uk. Finally we fitted a slot-loading Pioneer DVD-Rom drive and a Seagate Barracuda 7200 80GB hard disk, costing around £30 ex VAT and £55 ex VAT respectively. The total cost using the onboard graphics (but minus the operating system, keyboard and mouse) came to £333 ex VAT.

Test results

We installed Windows XP Professional on an NTFS partition and ran Sysmark 2002. The overall result for the 2GHz Celeron was 156, broken down into 205 for Internet content creation and 119 for office productivity.

Since Intel locks the clock multiplier on its CPUs, the only way to overclock them is to increase the bus speed. Our Celeron may have had a 400MHz system bus but, like the P4s, this is achieved

using quad-data rate technology. The front-side bus for the Celeron is 100MHz, which meant our 2GHz model was using a fixed 20-times multiplier. Overclocking may not work on your system and will invalidate your warranty.

We are also unable to support it, so proceed at your own risk.

The Shuttle XPCs offer jumperless configuration, so to overclock, you'll need to enter the Bios during system startup. Under the voltage and frequency section you'll find options to adjust the latter, but sadly not the former – this could be to ensure the processor doesn't get too hot for the heatpipe to adequately cool. Unfortunately the inability to increase the processor's core voltage does limit how far it can be overclocked. Normally the voltage must be increased to achieve the highest overclocked speeds under stable conditions. But faced with the tools we had, we increased the front-side bus speed, starting with an extra 5MHz.

The system successfully rebooted at 2.1GHz and subsequently delivered an overall score of 164 (218/124) in Sysmark. We then restarted the machine and increased the bus to 110MHz, with the system now clocking the Celeron at 2.2GHz. It ran Sysmark fine again, with a proportionately higher score of 171 (228/129). Back to the Bios and another 5MHz added to the bus saw the processor now running at 2.3GHz, and once again a subsequent Sysmark increase to 180 (230/136).

Shuttle's heatpipe processor cooler. You can see from previous photos that there's no room for a conventional heatsink and fan. Shuttle's solution is to use heatpipes to transfer the processor's heat through 90 degrees to a rear-mounted fan-cooled radiator. In practice it works well, although the fan is not the quietest



Sadly this is as far as we could push the chip, but it certainly seemed stable at 2.3GHz, working through multiple Sysmark runs. Checking the temperature also only saw it increase from 30 degrees Celsius at 2GHz to 34 degrees C at 2.3GHz, which is absolutely fine. The proportional increases in Sysmark also indicated the chip was far from throttling back, and would probably have been capable of much more had a higher voltage been available. We'll see how far it can be pushed in a full-sized motherboard with significant cooling in a future column.

But how does this fare compared to a P4? The 2.4GHz P4B we tested in an earlier issue with an otherwise identical configuration scored 228 in Sysmark, split into 310 for Internet content creation and 168 for office. This chip may have been one of the cheapest P4s available at the time of writing, but still cost £120 ex VAT. With both chips clocked as they were intended, the P4 delivered 46 per cent higher performance, but cost almost two and a half times more. With the Celeron overclocked to 2.3GHz, the performance gap narrowed to 26 per cent.

Was it worth it?

The entry-level Celeron certainly delivered a good result, although if you can afford a little more on a processor, a mid-range Athlon XP will probably be a better choice. Shuttle offers decent XPCs for AMD processors, such as the Nforce2-based SN42G2 for around £200 ex VAT. Some people do, however, prefer the combination of Intel processors and chipsets, and the Celeron at least proves that a relatively affordable system can be built.

The real winner here, though, is the Shuttle XPC, which has evolved into a product that's a joy to build and use. Latest models such as the SB61G with the Intel 865G dual-channel chipset also prove small form factor systems can keep up with the latest technology available. Our only real complaint is that the heatpipe's fan is fairly loud compared to some of the solutions for physically bigger systems. We hope Shuttle will address this in the near future to produce a small form factor PC that's also perfect for quiet domestic environments.

CONTACTS

Gordon Laing welcomes your comments on the Hardware column. Email him at: hardware@pcw.co.uk. Please do not send unsolicited file attachments.

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	• Microsoft Windows XP

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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

Are you sitting comfortably?

Enhancing your Windows experience, a Registry adventure and adjusting your colours

People intending to upgrade their PCs often ask what particular aspect of hardware is the most important for running Windows. Should they get a new processor and motherboard, more memory or a bigger hard disk? Obviously, the choice depends on the current configuration and the uses they want to put the computer to, but even so the question misses a very big point.

If you are going to spend any length of time in front of a PC, then the first considerations are comfort and health: in other words, the way you physically interact with the machine. When I first bought a PC, character-based operating systems and applications were the norm. The average monitor supplied with a PC circa 1990 would, if you were lucky, display 640 x 480 pixels, and probably at a pretty low refresh rate. The VGA display card touted as a feature of a new PC would probably be capable of 16 colours.

On a desktop system, whatever the version of Windows, anything less than 1,028 x 768 pixels, a 75Hz vertical refresh rate and 64,000 colours is frustrating and eye-straining. In 1992, with VAT included, this would set you back around £1,500. And if you wanted more colours and accelerated video you'd be looking at a four-figure sum just for the display card. Fortunately, it has all got a lot cheaper since then, and you owe it to yourself to invest in a decent monitor that doesn't flicker, has a high resolution, sharp text, good geometry and accurate colour. With top-quality 19in CRT monitors capable of 1,600 x 1,200 pixels now less than £300, and 17in TFT displays little more, it's an investment you won't regret, and your eyeballs will thank you every day. Trying before buying is essential. Position is important, too – place the monitor so that you can read it with your head held level, looking straight ahead and so it doesn't reflect windows or light fittings.

Mice and keyboards are also important to the Windows experience, and I've long been a fan of Microsoft's efforts in this respect. The original Mouse 2, despite its decidedly asymmetric kidney shape is – speaking as a left-hander



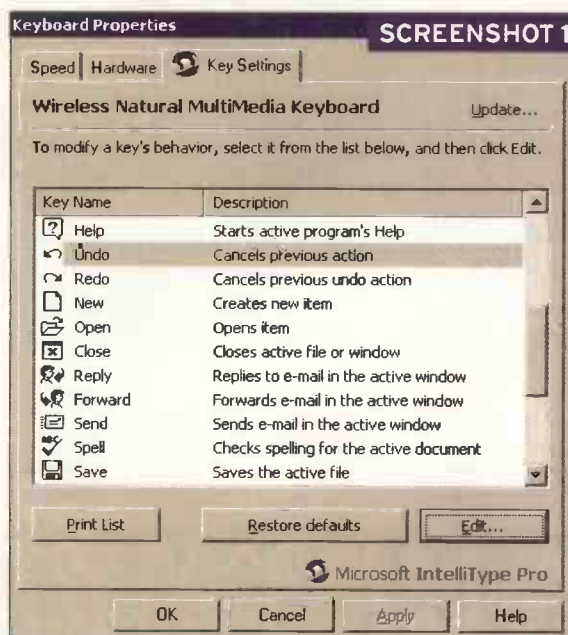
Doing the splits
– the Natural
Multimedia
keyboard

– surprisingly comfortable. The Microsoft Natural Keyboard was a breakthrough in that the split design – as well as encouraging me to type properly – caused much less strain on the wrists. So, to celebrate last month's 10 years in the Hands on Windows saddle, I decided to upgrade to state of the art.

In my left hand – the MS cordless optical mouse. Though not quite the chunky handful of its predecessor, this strictly symmetrical rodent is comfortable enough. The wheel is ribbed for better grip, and the lack of ball means I don't have to spend time removing accumulated grot from its innards when the rollers start to stick. Under my left and right hands is the Wireless Natural Multimedia Keyboard (see above).

Like the mouse, this is finished in charcoal and silver rather than beige, but the split keyboard design is still a winner. As with previous models, build quality isn't blindingly impressive – the spacebar has an annoying little rattle and the makers still haven't mastered the art of getting the lettering to stay on the keytops. Cordless, however, is wonderful. Apart from not having grubby cables snaking across the desk, it makes it much easier to swap the mouse for right-handed users, or heft the keyboard out of the way when I want to read a book.

Customising
the keyboard



As with its competitors, (such as my wife's excellent, but unsplit, Logitech), there are also a load of extra buttons which do all sorts of exciting things. Many of these are programmable (see screenshot 1), so I can hit the Mail key and summon a mail client of my choice or hit the Media button to start Ultraplayer rather than Windows Media Player – though I'm still trying to get the play/pause and back/forward buttons to work in the former.

What is decidedly odd, however, is the treatment of the function keys. These have F1 to F12 printed on the front edge of the keys, and other legends, such as Help, Undo, Redo, New, Open and Panic printed on the top. All right, I admit I made that last one up, but you get the general idea. The really strange thing is that, apart from Help, none of these commands seem to correspond with those inherent in Windows or Microsoft Office. So you can be beaver away in Word, hit F10 to focus on the Menu bar and the spelling checker starts up. Similarly, you can be browsing around in Internet Explorer and hit F5, which you know refreshes the page, except that it doesn't – it summons the 'Open' dialogue.

I'm still working out whether this is meant to be some sort of practical joke, as the alternative mappings are what you get at booting up. To be fair, it only takes one press of the F Lock key to return to sanity, but it still catches me out. Windows XP users may be pleased to know there's a way to fix this – see this month's column on page 180 – but the rest of us are going to have to live with it. The Logitech keyboard, as well as boasting buttons for webcam and shopping, also has programmed function keys. Naturally, the mappings are completely different, but it doesn't seem to take over automatically and respects the existing browser and Office keystrokes.

Windows 3 came with a utility named MSD – Microsoft System Diagnosis. In one of life's better ironies, the company that appropriated the abbreviations DNA and DNS for its own use, now refers to MSD as Musculoskeletal Disorder on the health warning on the bottom of the keyboard. Logitech's medical –



or perhaps I should say legal – team takes your welfare even more seriously, with a health warning on the top as well as the bottom of the device.

Which brings us back to where we started – health and comfort. A final essential Windows utility is a good chair. Treat yourself to something that offers good back support, as well as being comfortable and adjustable. Having said that this column is currently being written on a chair with no back support: it's one of those 'ergonomic' chairs where you split your weight between knees and bum. So far it seems excellent for keeping a good posture, but pretty tough on the shins – trials continue.

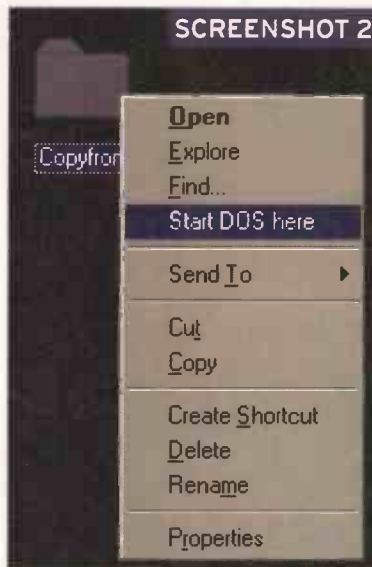
MS-Dos anywhere

In recent months we've covered the basics of both the Windows Registry and MS-Dos, so this seems an ideal moment to set out on an adventure involving both. Veteran Windows users will remember that Tweak UI was originally packaged as part of the Windows Powertoy. Although Tweak UI was upgraded to work with Windows ME as well as 98/95, and can be downloaded from www.microsoft.com/networkstation/downloads/powertoys/networking/nttweakui.asp, the rest of the Powertoy seems to have vanished from the playpen. One such toy was the very useful shell extension that let you right-click on a folder and open a Dos prompt there, which saved a lot of typing.

So, if you'd like to be able to do this, try the following. Having taken the precautions outlined in June's column, run regedit and go to HKEY_CLASSES_ROOT\Directory\shell and create a new key here named 'DOS'. With the new key selected, double-click on the 'Default' string value in the right-hand pane and type in whatever you'd like the menu item to be – for example, 'Start DOS here'. Now create another key under the new 'DOS' key and call that 'command'. Set the 'Default' string value of this key to 'command.com /k cd "%1"'. Note that you need to type in those double quotes around %1 but not the single quotes round the whole thing. Close regedit and right-click on any folder – 'DOS in here' (or whatever you chose) should appear on the menu and it will launch an MS-Dos session starting in that folder (see screenshot 2).

Utterly bizarre

Here's some interesting advice from reader Jim Carless, inappropriately enough on the subject of drivers. Jim



Roll your own shell command



The tooltips which state the obvious

bought a new Hewlett-Packard scanner, which refused to be installed: all efforts ended with a progress dialogue box called 'Updating hardware information database', which didn't move and locked the system.

After some research at the Microsoft Knowledgebase, he discovered that the cause was too many device driver .inf files (Oem*.inf) in the Windows\Inf folder. The problem can occur not just with hardware installation, but with various software updates, such as DirectX or critical updates from the Windows Update website. The solution is to delete all files of the form Oem*.inf that are zero KB in length, as they have no content whatsoever.

According to the MSKB article 281967, these files 'can be created by Windows Update, Internet Explorer Setup, and any other program that uses the Microsoft Setup APIs if a disk utility program currently has a volume lock on the drive. Microsoft programs and third-party utility programs such as Scandisk, defragment programs and other system utilities must get a volume lock on the drive to control access by other processes to the volume.' I can't make much sense of that either – do they mean people are defragging and

updating at the same time? Anyway, Jim found he had 47,000 such files, and after deleting them his scanner installed perfectly. Note that the .inf files and the inf folder may be hidden, so turn on the 'Show hidden files' option in Explorer before looking for them.

And while we're on the subject of the bizarre, a reminder from Chris Beeson about the Task Scheduler in Windows 98. It may not work if the Windows folder is situated on a drive with the label 'Windows'.

No tipping

Here's another neat little Registry Tweak, which gets rid of the annoying tooltips that pop up when you hover the cursor over the window control buttons. If you've been using Windows for more than a few hours, you probably know what the Minimize, Maximize, Restore and Close buttons are for and don't need to be reminded (see screenshot 3).

However, there's no built-in way of turning these off and even TweakUI can't crack it. A little Registry edit will, however, so having taken the usual precautions, run Regedit and go to HKEY_CURRENT_USER\Control Panel\Desktop and double-click on the UserPreferenceMask value. Change this by subtracting eight from the leftmost digit. Remember this is in hexadecimal, so a=10, b=11, and so on. If, for example, the existing value is BE 00 00 00, then change this to 3E 00 00 00. Close Regedit, restart Windows and the tooltips will be gone.

Several readers have asked if it is possible to edit the title of Outlook Express in the same way as Internet

The long and short of it...



SCREENSHOT 4



Explorer (see July Question time), and indeed it is. The same people who wrote the IE Personalizer have also produced an Outlook Express Tweaker, which you'll find at <http://accesscodes.hypermart.net/product04.html>.

If you want the excitement and satisfaction of a DIY solution, then, having taken the customary precautions, run Regedit and go to HKEY_CURRENT_USER\Identities\{long hex number}\Software\Microsoft\Outlook Express\5.0. Create a string value named 'WindowTitle' (without a space) and set it to the title of your choice. Just to complete the set there's a similar trick available for Windows Media Player. Go to HKEY_CURRENT_USER\Software\Policies\Microsoft and if there isn't a key named WindowsMediaPlayer, create it.

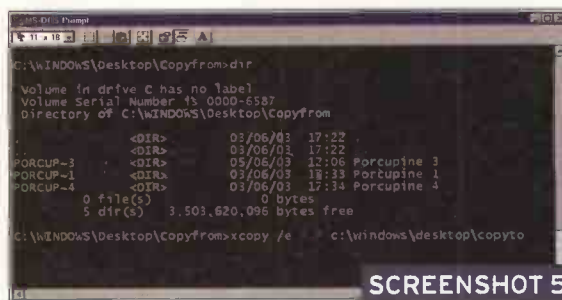
Open the key and right-click in the right-hand pane to create a new string value and name this TitleBar. Double-click on TitleBar to give it a suitable value. Unlike the IE and OE equivalents this does not change the title completely, but appends 'provided by' followed by the text value of TitleBar. But I'm sure our readers will be able to make imaginative use of the feature despite this constraint.

Xcopy problems

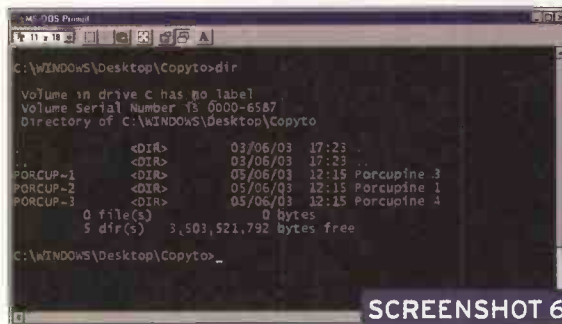
In July's section on Dos, I mentioned using Xcopy to create backups, and I've been taken to task by David Sculfor, as it seems Xcopy has a problem with short file names. You can find out the full story at Charles Kozierok's website – www.pcguide.com/art/xcopy.htm.

But if you want to try a quick experiment for yourself, create a folder and populate it with four similarly named sub-folders, as per screenshot 4. If you then open an MS-Dos session and navigate to the same folder, then do a DIR command you'll see the short names, formed by taking the first six letters of the long name and appending a tilde and a number. So far so good.

Now delete, say, the second folder. A DIR command will show you still have the folders ending in ~1, ~3 and ~4 (see screenshot 5). Now use the Xcopy command to copy these folders elsewhere – you'll need the /E switch which copies empty folders. Navigate to the destination directory and do a DIR. Hey presto, you now have ~1, ~2, ~3, as Xcopy has generated new short names (see screenshot 6). This can create problems if there are references to the original short folder name



SCREENSHOT 5



SCREENSHOT 6

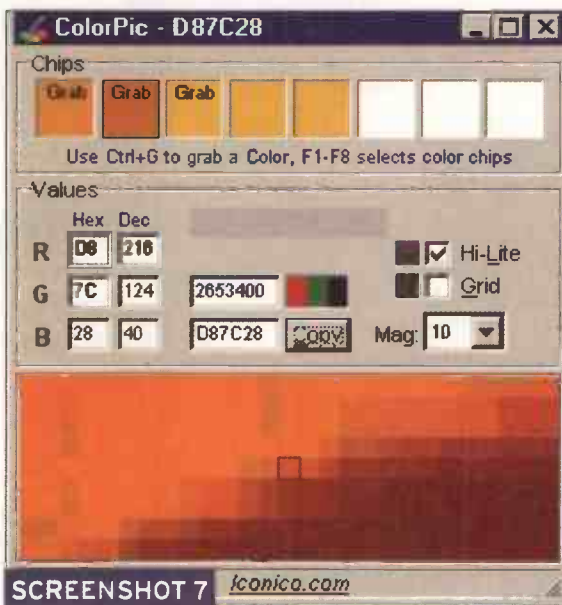
Top: ...Xcopy changes...

...short folder names (bottom picture)

somewhere in the system – such as in the Registry. Perhaps I should have stated explicitly that the idea was to do a quick backup of data files – I frequently use Xcopy to back up my work, but don't use it as a system-wide utility.

Although this will be of little concern to Windows 95, 98 and ME users, Rob Watt tells me that Xcopy also has problems with the timestamps when backing up from NTFS partitions to Fat32 or Fat partitions. He recommends XXcopy, which is available in freeware and pro versions, and comes with over 200 command line switches, if you like that sort of thing. Unsurprisingly I haven't had time to investigate this fully, but you can see for yourself at www.xxcopy.com.

Free-range colour picking with Colorpic



SCREENSHOT 7 iconico.com

Lost key

In April's issue we looked at spring cleaning – that is reinstalling Windows from scratch. To do this, I wrote, you need the Windows 98 or ME installation CD and the Product Key, which is the 25-character code printed on a yellow sticker on the back of the CD jewel case or sleeve. A number of readers have mentioned that, although they have the former, the original case has been discarded or lost. In this case you can recover the key from the Windows Registry, and obviously you need to do this before you start reinstalling.

Run regedit.exe and navigate to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion. Look in the right-hand pane for a string value (one with the 'ab' icon) entitled ProductKey. Double-click on this and it will appear in an edit box – don't alter it, but just press Control & C to copy it before clicking the cancel button. You can then paste the key into Notepad and print it out for future reference. Do take care that it's the ProductKey you copy – not the ProductID, which is the number you see in System Properties.

If you are planning to reinstall Windows 95, then doubtless you have your own good reasons. But in this case, the CD key number you need is a three plus seven-digit number, and it forms the two middle groups of the ProductID string value.

Pick your own

If you do anything that involves the Windows colour picker, such as creating custom colours in Display Properties or in Windows Paint, you'll know what a frustrating experience it can be trying to get a colour just right.

Colorpic lets you pick any colour from anywhere on the screen, offering a new approach to matching your paint and wallpaper (see screenshot 7). It has a built-in magnifier to show individual pixels; you can harvest up to eight colours at a time; and RGB values are displayed in both decimal and hex.

It's free, and you can find it at www.iconico.com/colorpic/index.asp. Don't miss the other interesting things at that site, such as the collaborative artwork Dirty Fingerprints screensaver.

CONTACTS

Tim Nott welcomes your comments on the Windows column. Email him at: win@pcw.co.uk. Please do not send unsolicited file attachments.

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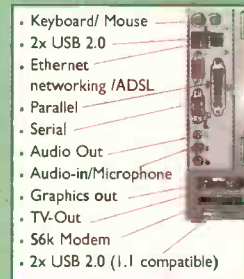
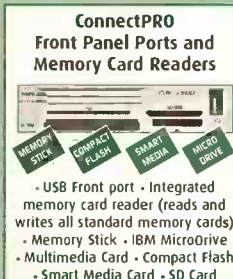
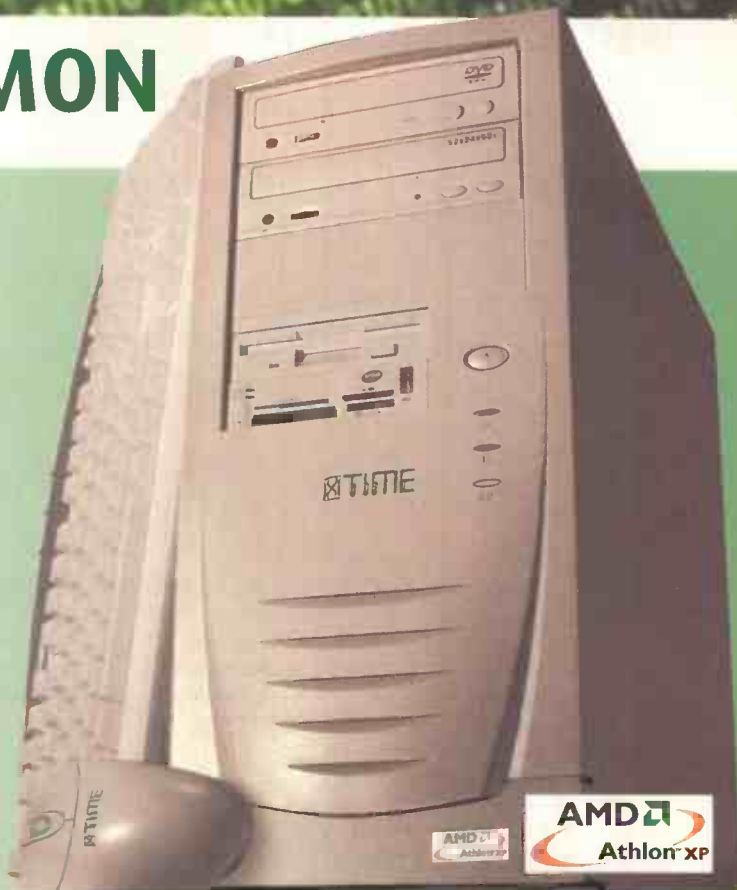
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Tim Nott

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

Double dutch

Solving a zip mystery, resetting the function keys and some keyboard shortcuts

Vivian Dunn came up with an interesting problem using the built-in Windows XP zip feature.

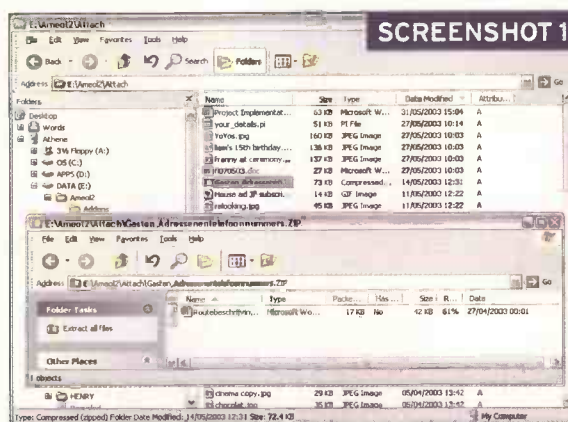
As regular readers will know, you can create a zip file in XP (and ME) by selecting the files, right-clicking on the one whose name you want the zip to inherit and choosing Send To - Compressed folder. Vivian and a Dutch colleague had been using this method to exchange files, and the former noticed that some files were not appearing when the zip was opened in XP. In particular, one zip containing an Excel and a Word file showed only the latter. Curiously, the size of the zip file indicated that there was more than the Word file present (see screenshot 1) and both were present when opened with Winzip.

I've been using this feature since it first appeared in Windows ME to zip and send copy, screenshots and tables to PCW in a variety of formats without losing any files, and was mystified. So, armed with a sample zip from Vivian, I set about experimenting and, sure enough, the Excel file was Awol in XP (and ME) but present and correct when using a third-party zip utility under Windows 98. After some head-scratching, I noticed that the extracted Excel file was named Gasten,Adressen,telefoonnummers.zip. Taking a long shot I renamed the file, just removing the comma. And thereafter it zipped perfectly. The problem doesn't seem confined to Excel - Word documents and jpg files with commas in the name also failed to show up.

Further investigation showed that Microsoft is aware of the problem, which is mentioned in Knowledgebase article 813942: ironically enough, this bug crept in with a 'hotfix' for a zip security problem. However, at the time of writing the alleged fix for the fix doesn't appear to be downloadable: you need to 'contact Microsoft Product Support Services to obtain the fix'. So it may be simpler just to avoid commas in filenames.

Unflocking

In this month's Hands on Windows column, I mention that there is a solution for XP (and 2000) users annoyed by the F Lock feature on certain Microsoft keyboards. To



Something missing - the curious case of the XP zip

recap, this feature remaps the function keys so that F2 and F3 undo and redo, F4 creates a new document, and so on. Some users may find this useful, but if you've invested considerable time and effort in learning that F3 launches a 'find' in many applications, F5 refreshes a web page or Explorer window or that F2 starts a new game of Solitaire, you may find this frustrating.

Although it only takes one keypress to restore the standard function key layout, I believe that the latter should be the default behaviour. To digress slightly, old NT/2000/XP hands may know that there is a similar problem with the Num Lock key, which defaults to off when you boot up, irrespective of any Bios setting. This can be cured by a small bit of Registry editing. Having taken the usual backup precautions, run Regedit and go to HKEY_CURRENT_USER\Control Panel\Keyboard. If there is not a string value named InitialKeyboardIndicators under this key, then create one. Double-click on it and give it a value of two. Close Regedit and log off and back on (or restart) and you should find that Num Lock is now on by default.

Encouraged by this, your columnist experimented with other values for InitialKeyboardIndicators, to see if

this would affect the F Lock key, but if there is a magic number, then it eluded me, and judging by a web search nobody else has cracked it.

There is, however, another solution, which involves the Scan Code Mapper. This again is done via a Registry entry, but I am not going to reproduce it here as, first, it consists of a long sequence of hexadecimal numbers, and second, I can take no credit for its discovery. That honour goes to Jason Tsang, who provides the relevant .reg files at the following URLs. The zip file downloadable at

www.mvps.org/jtsang/flock.html

contains a Registry file that reverses the behaviour of the F Lock key, so that Windows starts up with the conventional function key mapping, and pressing F Lock changes to the 'enhanced' version (see screenshot 2).

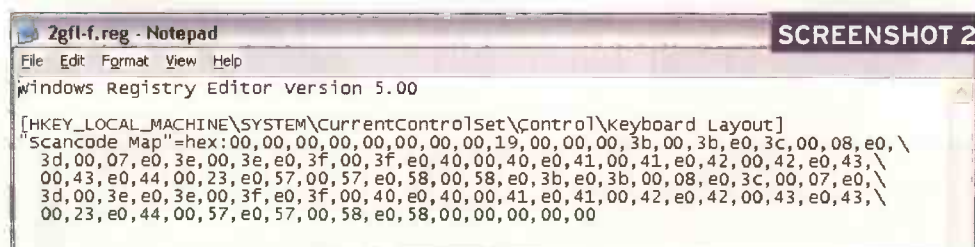
Another version, at www.mvps.org/jtsang/flock-e.html disables the F Lock key completely, so that the keyboard is always conventional. Both come with a readme.txt and a separate Registry file to undo the changes.

Feedback

Simon Smillie directs us to a comprehensive list of XP keyboard shortcuts. I'm not going to reproduce it here as there isn't room, and it isn't what you'd call an exciting read - though it is undoubtedly useful. You can find the full thing on the Microsoft Support Knowledgebase, article number 301583. And don't forget the lazy user's way to MSKB articles - just type the number into the XP Help and Support 'Search' field, and (assuming an active Internet connection) it will find the article. Finally, although I used the word 'comprehensive' earlier, there's one thing missing from that list and at least one mistake - can you spot it or any others?

In June's column I mentioned that you need to disable the Welcome screen to get access to the Logon

Don't type this in - download it from www.mvps.org





screen so that you can log on as the unnamed administrator. Mark Moore points out that there is a way round this: at the Welcome screen, press Ctrl & Alt & Del twice to get to the conventional login dialogue. This only works if no other users are logged on.

The search for security in XP Home (see May and June columns) continues with a contribution from Andrew Willett. He recommends 1st Security Agent, which lets an administrator set restrictions on a global level, on a per-user level or on the default user level, in which all accounts created subsequently will be restricted. This is pretty much what we were after. The only drawback is that it isn't free – after your 30-day trial you must pay \$49 (£30 approx) to license the software. You can find 1st Security Agent at www.softheap.com (see screenshot 3).

Quicklaunch

Here's another tip. If you let the mouse linger over an icon on the desktop or a file in a folder, you get a yellow pop-up or 'tooltip' giving some relevant information. This feature has been around since Windows 98, but XP does things rather differently. For a start you get tooltips for folders too, and there's a checkbox in Folder Options, View, to show the folder content size in tooltips.

Windows ME introduced customisable tooltips for shortcuts in the Start Menu and in folders, but you still couldn't customise the text for the icons in the Quicklaunch bar. I have to admit that I find little yellow boxes that pop up to tell me I can 'Create and edit text and graphics in letters, reports, web pages, or email messages by using Microsoft Word' or that Internet Explorer 'Finds and displays information and websites on the Internet' intensely annoying. With XP Quicklaunch shortcuts, however, if you right-click and choose Properties, you get the option to edit the 'Comment' in the Shortcut tab. Remember you can also edit the icon title – which is the first part of the Quicklaunch tooltip – from the General tab.

If you want to be rid of tooltips, then the option is back in the Folder Options, View list – last item but one. This stops tooltips on the Desktop and in folders, but those in the Quicklaunch bar soldier bravely on. I've yet to find a way of disabling these, other than having a blank 'Comment' field. The trick mentioned in this month's Hands on Windows column, for getting rid of

the equally tiresome tooltips that tell you what the Minimize, Maximize and Close buttons do on every window, appears to also work in XP.

Consolation

In June's Question time, I answered a query from Bill Childs asking how you could create a boot disk in XP. The answer I gave was somewhat economical with the truth.

Although you can boot the PC with the disk, you can't do much else. It doesn't load CD-Rom drivers, you can't access any NTFS partitions, you can't run Windows and the VER command returns Windows ME. If you want to boot to a command prompt to attempt, say, to repair a damaged Windows XP

installation, you need to use the Recovery Console. We covered this last December, so I will recap briefly. There are two ways of doing this. First, you can boot from the Windows XP CD, having first set the CD-Rom drive to be the first boot device in the Bios. After a fairly long wait, you'll be presented with a menu allowing you to run the Recovery Console. A better method is to make this a permanent boot option.

With Windows XP running and the installation CD in the drive, open the Start, Run box, and type in D:\i386\winnt32.exe /cmdcons, replacing D with the correct letter for your CD-Rom drive. Follow the prompts and, when finished, remove the CD and restart. You'll then get a menu offering a choice of running Windows XP normally or starting the Recovery Console. This will default to running XP after 30 seconds, or if you press the Enter key.

One sticky situation that can be saved by a floppy disk is a forgotten



Making a Password Reset Disk

login password. Normally when you create a password for an account on a standalone or peer-to-peer networked XP machine, or change an existing one you get the chance to add a hint.

As all other users will be able to see this hint by clicking the ? button next to the username on the Welcome screen, it should be some word or phrase that will be totally obscure to others, but hopefully jog your memory. Common suggestions are your first pet, first lover or mother's maiden name: none of which are particularly secure, but I'm sure you can do better.

A more sensible precaution is to create a Password Reset Disk. To do this, equip yourself with a formatted floppy disk, then go to Control Panel, User Accounts. If you are logged on under an administrator account, then double-click on that account. If you are logged in under a restricted account you'll be taken straight there. In the 'Related Tasks' panel, choose 'Prevent a forgotten password'. Follow the prompts and you will end up with a Password Reset Disk for that account (see screenshots 4 and 5).

When you log on, and type an incorrect password, then you'll get the further option of using the reset disk. Put this in the drive and you will be able to create a new password – and hint – without knowing the old one. What makes this different from writing the password down on a piece of paper, is that the disk version still works if you change your password subsequently, so you don't have to make a new disk each time.

Another way to restrict users in both XP Home and Pro



CONTACTS

Tim Nott welcomes your comments on the Windows XP column. Email him at: xp@pcw.co.uk. Please do not send unsolicited file attachments.



Terence Green

has tussled with computers ever since starting as an IBM mainframe operator in 1979. Since 1981 he has documented the gap between what PCs claim to do and reality

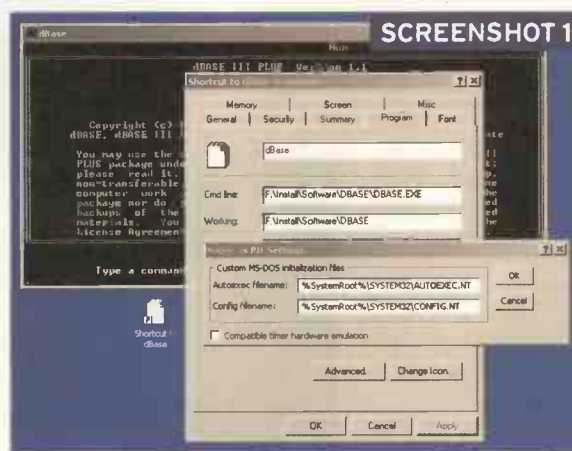
Achieving the (nearly) impossible

You don't have to lose Windows 2000 if you want to run Dos programs

A surprising number of people still need to run Dos programs and have discovered that many of the older programs either don't run at all or run erratically under Windows 2000 (and XP). Malcolm Gerard has an old (pre-Windows era) MS-Dos program that will not run properly from the Command prompt. Malcolm says he understands that, unlike earlier versions of Windows, MS-Dos is not present when a computer only has Windows 2000, and he would like to know if there is any way round it. He has MS-Dos 6 on floppy disks and Windows 98 on CD, and he knows that his Dos program runs perfectly well on either of these older operating systems. But his computer only has Windows 2000 installed, and Malcolm has been told that it is not possible to install Windows 98 after Windows 2000 without losing Windows 2000 permanently.

In fact, although it's a little tricky to achieve, it is perfectly possible to add Windows 98 to Malcolm's system while retaining Windows 2000, but we would suggest that first he investigates the possibility of encouraging Windows 2000 to be more friendly to his Dos program. Begin by creating a shortcut for the Dos executable (right-click and select 'Create Shortcut'). Then right-click on the shortcut icon and select Properties. There are numerous options on the Memory, Screen and Misc tabs which can be used to tweak the way the Dos program runs. To make effective changes here you either need to experiment a lot, get lucky, or do some research on the specific Dos program that you're trying to run. You can also go to the Program tab, click on the 'Advanced' button, and enter AUTOEXEC.BAT and CONFIG.SYS commands into AUTOEXEC.NT and CONFIG.NT files which will run each time you start the program from this shortcut (see screenshot 1).

Manipulating the Windows properties for a Dos program in this way stores the changes in the shortcut file in Windows 2000 and later. In earlier Windows versions these properties were edited with the Program Information File (PIF) editor and stored in a file named for the Dos executable and with a PIF extension, for example, dBASEIII.PIF. If you're



Change PIF options to encourage Dos programs to run in Windows 2000

having difficulty getting a Dos program running in Windows 2000, and can't find any support from the program supplier, you may be able to find help by using Google to search for the executable name and PIF. As an example, a search of <http://groups.google.com> using the keywords dBASE III and PIF revealed numerous discussions of PIF file settings for dBASE III. Often, some judicious editing of the memory settings will get a Dos program going in Windows 2000, but some Dos programs insist on having direct access to the physical hardware so will never work properly in Windows 2000.

Putting the boot in

In order to run such programs you must boot into real Dos or run Windows 98/ME. Malcolm has a copy of MS-Dos 6 and could boot with an MS-Dos 6 boot floppy to run his program. Or, as the program runs well in Windows 98, he could install Windows 98 in a dual boot configuration with Windows 2000 and select the operating system to

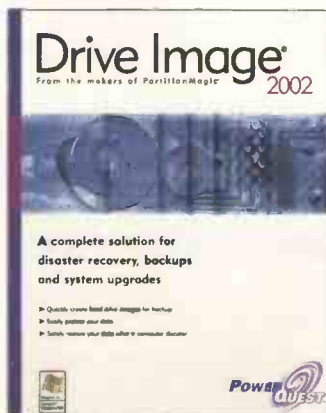
run from a menu at boot time. Contrary to what Malcolm has been told, Windows 98 (or ME) can be installed after Windows 2000 (or XP). Before continuing, read the Microsoft technical document at www.microsoft.com/technet/prodtechnol/winxppro/proddocs/dual_booting.asp which explains the situation in great detail, and print it out

if you plan to continue. Notice that there are numerous caveats; they're all important, especially the warning against installing more than one version of Windows on the same partition. Never do this. If you do, you'll enter a world of pain and your children will run away in search of a Windows-savvy parent. The only one of these caveats that can be worked around safely is the one regarding the order of installation, but even that has its own warnings. First off, it's potentially lethal to your data, so we've confined our workaround to some basic but widely used configurations. If you're at all unsure about any of the following procedures, don't do it. If you have a Heath Robinson-style system with a variety of drives and drive interfaces or any third-party software installed on the hard disk to make it look like a standard drive, don't use this advice. You're far better off following Microsoft's advice to install each Windows operating system in the order it was released. What follows is specifically aimed at people with a single hard disk containing Windows 2000 (or XP) who would like to be able to boot into either Dos or Windows 98/ME. If you have a more complex configuration, take this advice as a starting point and use Google to search for advice more specific to your configuration.

Let's prepare some recovery tools. We need the Windows 2000 CD, the Windows 98 CD (preferably Second Edition) and a couple of floppy boot disks. While it's possible to achieve all our aims by only using the tools provided with Windows 2000 and 98 SE, we can make the process a lot easier with the help of some third-party tools. When you're working at partition table level, a recovery tool that runs from a Dos boot floppy is invaluable.

Before making any major alterations to drive setups, consider backing up with a backup or drive imaging tool that supports restoring from a Dos floppy boot. Windows Backup doesn't, but drive imaging tools and full-featured backup utilities do. We use Powerquest Drive Image (www.powerquest.com) (see picture, left), but many people swear by Symantec's Ghost (www.symantec.com). Backup tools that support disaster recovery from a

Back up your data with Powerquest Drive Image





Dos floppy boot include Novabackup (www.novastor.com), NTI Backup Now (www.ntibackupnow.com), and Handybackup (www.handybackup.com). Fire up Windows Backup anyway as you need to create an Emergency Repair Disk (ERD) (see screenshot 2). Don't forget to select the option that asks whether you also want to back up the Registry to the Repair directory.

Now create a Windows 2000 boot floppy by copying the NTLDR, NTBOOTDD.SYS, and BOOT.INI files from C: to a freshly formatted blank floppy disk. Don't use a Dos bootable floppy as that won't work. It has to be a blank floppy with only those three files on it. If you also have an NTBOOTDD.SYS file in the root of C: you have SCSI drives in your computer and the following advice may not apply to you. Seek further advice before continuing. If you can't see any of these files in the root of C:, open Windows Explorer and unhide them using the check boxes in Tools/Folder Options/View (see screenshot 3).

Now prove your new boot floppy by inserting it into the floppy drive and restarting the computer so that Windows 2000 boots from the floppy drive. If you don't hear the floppy grinding away or see its operating light you may have to set your computer to boot from floppy in the Bios.

Do not continue until you've satisfied yourself that your Windows 2000 boot floppy works. You may not need this floppy but if you do run into difficulties it will enable you to start Windows 2000. You will also need a Windows 98 Second Edition Startup Disk which you can create from the Add/Remove control panel in Windows 98SE. You'll boot with this floppy in order to run Setup from the Windows 98SE CD. If you don't have access to Windows 98, download a boot floppy from www.bootdisk.com. Test this floppy by booting with it and verifying that you are given the option to start Windows with CD-Rom support.

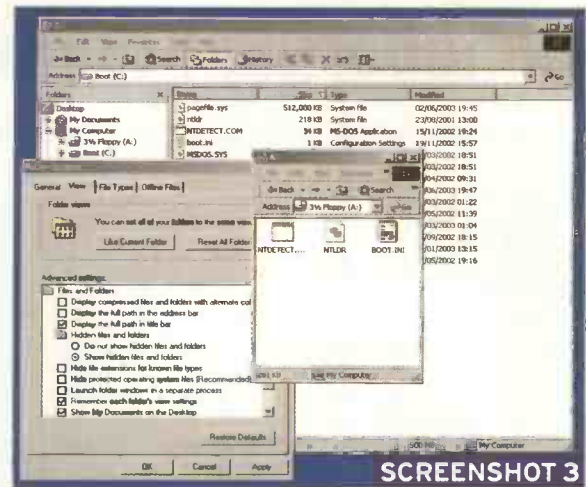
The simple solution

The vast majority of Windows 2000 installations are set up to occupy a single hard disk with one primary partition formatted as either Fat32 or NTFS with Windows 2000 installed on it – that is, on C:. Let's skim through the other possible configurations before coming back to this one. If your hard disk has multiple partitions, Windows 2000 (or XP) is installed on drive D or higher, there is no other version of

Windows on C:, and there's enough space on C: to install Windows 98SE/ME, then you're in luck. And if C: is Fat- or Fat32-formatted, you're laughing. All you need to do is boot with a Windows 98SE Startup floppy, remembering to enable CD-Rom support, insert the Windows 98 CD and run Setup which will install Windows 98 on C:. Then follow the instructions in the Knowledgebase article at <http://support.microsoft.com/?id=293401> to restore the Windows 2000 boot sector.

Create an ERD and preferably a backup as well before plunging in. If drive C: is NTFS formatted it gets a little more complicated, but not too scary. You can use a tool like Partition Magic (www.powerquest.com), Bootit NG (www.terabyteunlimited.com) or Partition Manager (www.partition-manager.com) to convert C: to Fat32 before following the above instructions. A better (and cheaper) plan would be to format C: as Fat32 from within Windows 2000. This will destroy the Windows 2000 boot files and prevent it from starting again but we can fix that later, as explained in the aforementioned Knowledgebase article 293401, after we have installed Windows 98SE. Formatting C: from Windows 2000 before installing Windows 98SE will ensure that the partition data remains consistent. Third-party tools sometimes introduce slight variations in the partition data that don't affect performance but can appear to Windows 2000 as non-standard.

All the above scenarios only apply when Windows 2000 is not installed on the C: drive and, frankly, they're uncommon. The most common configuration by far for a Windows 2000 computer is a single hard disk bearing a single partition formatted (with either Fat32 or NTFS) as C:. There's no way that we can adequately explain how to deal with both of these situations in the remaining available space so we'll cover the easy one – Fat32 – and next month we'll show



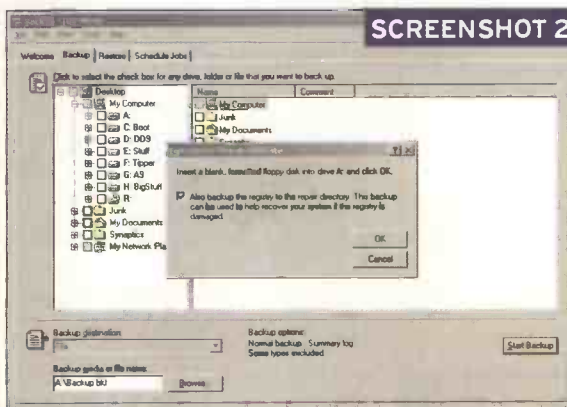
SCREENSHOT 3

A Windows 2000 boot floppy complete – only three files, no Dos

you how you can add Dos or Windows 98SE to a computer running Windows 2000 when the C: drive is formatted as NTFS. We'll also detail some of the theory behind these shenanigans, and discuss some of the issues affecting multiple hard drive scenarios. Although it might seem a tad esoteric to devote so much space to achieving Dos compatibility, the concepts and processes we've covered here can be put to good use recovering from everyday disasters, for example if a virus invades your computer and trashes the boot sector, you can use the Windows 2000 boot floppy you created earlier to start Windows 2000 and run your anti-virus software.

OK, you have Windows 2000 installed on C:, the only disk partition on your hard drive, it's Fat32-formatted, and you want to add Windows 98SE (or Dos, or Windows ME) without reinstalling Windows 2000. The main restriction here is that Windows 2000 must stay on C:. It can't be moved to D: due to hard-coded drive paths littered throughout the Registry. Fortunately, you can install Windows 98SE on D:. In common with all Windows operating systems, only the initial boot code needs to be on the active primary partition, C:. Simply boot with the Windows 98SE Startup disk, insert the Windows 98SE CD, run Setup to install and then follow the instructions in Knowledgebase article 293401 to restore the Windows 2000 boot sector that the Windows 98SE Setup has overwritten with Windows 98SE boot data. Next month – fun with NTFS. Don't forget to back up first.

Always create or update the Emergency Repair Disk when changing drive parameters



SCREENSHOT 2

CONTACTS

Terence Green welcomes your comments on the Windows 2000 column. Email him at: win2000@pcw.co.uk. Please do not send unsolicited file attachments.

**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

Conquering Konqueror

An in-depth look at the complexities and issues involved in configuring KDE

A few months back we looked at adding applications to KDE's menu system, and configuring Konqueror to open both new and existing file types with them. A few readers have been interested in how all of this works, but confused by the different configuration issues – desktop files, app and Mime links and so on. So this month we will go into a bit more detail and provide a few more examples, which will hopefully make everything perfectly clear.

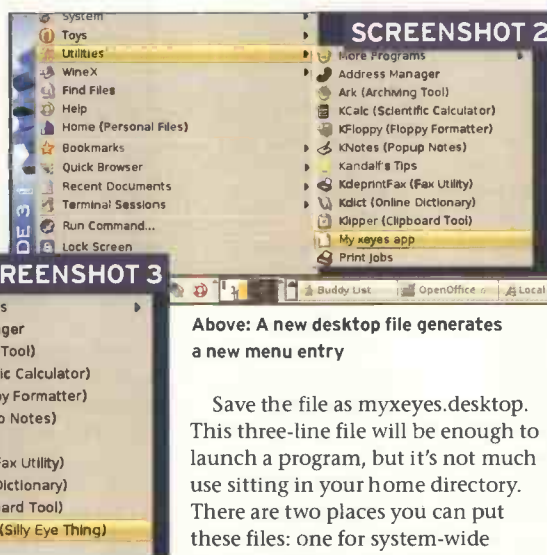
All of KDE's configuration is based around text files, making it possible to edit them by hand or through a dedicated GUI tool. For the case of menus and file types, the basic unit is the 'desktop' file, and it always ends in the extension '.desktop'. There has never been a three-letter restriction on file extensions in Unix, so why start now?

A desktop file includes all the information necessary to represent an application on the desktop. If you think about the absolute basics you'd need, you'll probably guess what they are: a name for the application and an executable to run. One extra line is needed to identify the text file as a desktop file. So below is the simplest of examples, for that tremendously advanced program, Xeyes.

```
[Desktop Entry]
Name=My xeyes app
Exec=xeyes
```

A more refined desktop file and menu

Each folder represents an entry on the main menu, and you can create new entries here directly



Above: A new desktop file generates a new menu entry

Save the file as myxeyes.desktop. This three-line file will be enough to launch a program, but it's not much use sitting in your home directory. There are two places you can put these files: one for system-wide menu entries, and the other for individual users. The system-wide directory varies between distributions, though it's usually found at /usr/share/applnk (for Red Hat only it is /usr/share/applnk-redhat). Inside this directory there are several subdirectories, each for every sub-menu entry: Accessories, Utilities, and so on. Within these directories exist more sub-menus and the .desktop files that form the menu items. Copy the new desktop file to an appropriate directory, for example:

```
# cp myxeyes.desktop
/usr/share/applnk/
Utilities/
```

(Key: ✓ code string continues)

It is much easier to add the menu item for your user's setup alone. The destination doesn't vary this time, it's .kde/share/applnk. Inside here are a similar set of subdirectories, so simply copy across the file:

```
$ cp myxeyes.desktop
~/.kde/share/applnk/
Utilities/
```

For per-user changes, you can do it all through Konqueror. Start it up, and select 'Go -> Applications' from the menu (see screenshot 1). This takes you directly to the right place, and you can copy the desktop file into any of the directories here. What's more, if you create the desktop entry here using 'Create New -> Text File', everything is done in one step – just remember to save the text file with a .desktop extension, or it will not work.

Whichever way it's achieved, the menu should automatically update

with the new entry, though it can sometimes take a minute or two before it's refreshed. See screenshot 2 to see how it will look.

Now, as it stands, the Xeyes entry is functional but could be better. The first thing to remedy is its icon; the plain default isn't very imaginative. We may not have our own icon (you could use kiconedit to create one, but that's another column), but there are plenty of icons to choose from. As luck would have it, in this case there is an icon supplied with KDE for Xeyes. Edit the .desktop file from wherever you copied it, and add the following line:

```
Icon=xeyes
```

No file extension is needed; KDE finds the image itself.

Now our program runs from the menu and has an icon alongside. Another improvement would be to add a more descriptive name. For example, Xine could be called 'Video Player' and kghostview 'Postscript/PDF viewer'. Xeyes doesn't really fit into a category like that, so we'll call it 'Silly Eye Thing'. Again, edit the .desktop file and add the line:

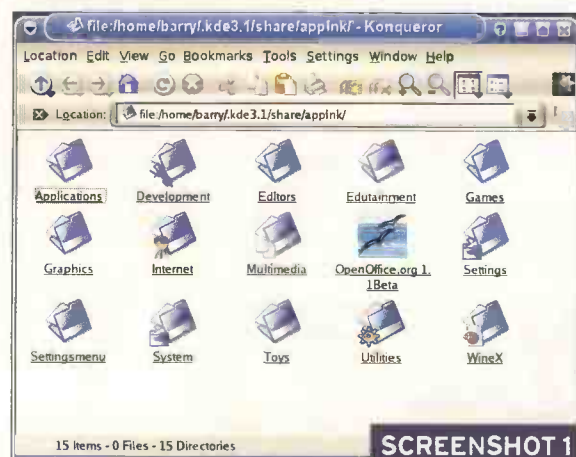
```
GenericName=Silly Eye
Thing
```

These modifications, unlike the initial menu creation, might not show up until you restart KDE. The final result should look like that shown in screenshot 3 and the final .desktop file should read like this

```
[Desktop Entry]
Name=My xeyes app
GenericName=Silly Eye
Thing
Exec=xeyes
Icon=xeyes
```

Opening files

While this example is fine for adding new applications to the KDE menu, it doesn't help with opening up files in Konqueror. Xeyes isn't the most useful of programs, so instead we'll move to XMMS, the multimedia player. As a Gnome program, it won't always be set up to work under KDE. On the whole, the process is the same: create a desktop file with similar details in a suitable directory. In addition, a few extra entries need to be included so KDE knows that XMMS can open up certain file types.



SCREENSHOT 1



First of all is the full .desktop file, see figure 1.

Most of the entries are the same as the original Xeyes example, so we'll just look at the new parts. The first line tells KDE which language encoding the text file is in, and this is only relevant if you're using non-ASCII characters – leave it as UTF-8. The Exec line now has a '%U' on the end: Konqueror will replace this generic code with the file you've opened up, so XMMS automatically plays the file. The Terminal line is either 0 (false) or 1 (true), and tells KDE whether it should open up a terminal/shell window in which to run the command – the default is false, and it's not normally needed for GUI programs. Type is always set to 'Application'.

The last line gives the information Konqueror needs to connect the new application to the various different files it can open. We've looked in some detail at Mime types over the past couple of months but, as a reminder, each Mime type describes a type of file, like jpeg, MP3 or mpg. The desktop entry needs to list the Mime types that the application can handle, each separated by a semi-colon. KDE tends to hide the Mime type, preferring to use the description (Microsoft AVI Video instead of video/x-msvideo, for example) – we will show you an easy way to discover the type later.

Once the .desktop file is set up, right-clicking on any files of the types above will give XMMS as an option under the 'Open With' menu.

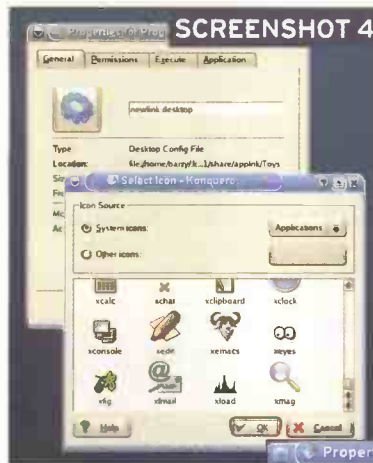
Helpful GUIs

Doing these things by hand is more precise, but it's more prone to error and can take too long. KDE provides a few options for making changes with a user interface, but these are generally only provided for altering the setup for an individual user – system-wide changes usually need to be done by hand.

Creating a new menu entry is easy. Start up Konqueror, and again select 'Go -> Applications'. Enter the necessary directory (eg Toys), right-click in the window and select 'Create New -> Link to Application'. In the dialogue that pops up, enter a new name for the link (for example, newlink.desktop – remember the extension) and click on the image to see a selection of currently installed icons (see screenshot 4).

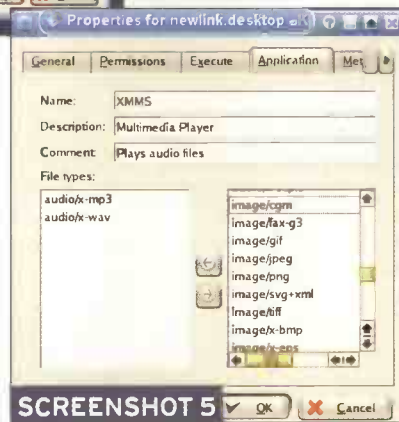
Now move to the Execute tab, and enter (or browse) to the program to execute (Xeyes, XMMS, etc). Here you can also set the application to

run as another user, and KDE will prompt for a password when it's launched. Next, select the Application tab, and fill in the fields here (see screenshot 5). The 'Description' field relates to the GenericName field in the final text



Left: Using KDE to set a desktop file's icon

Below: The fundamental details of a desktop file



Below: The desktop file created by the GUI is similar to the manual effort

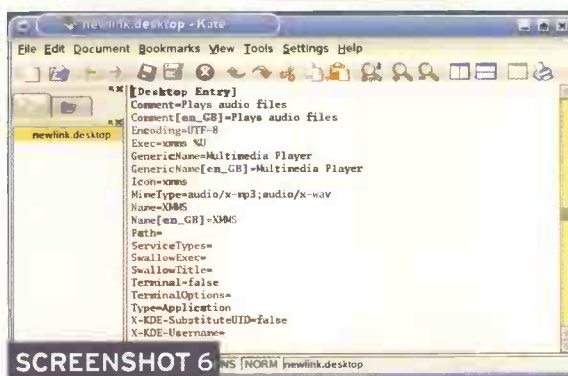


FIG 1

The full .desktop file

```
[Desktop Entry]
Encoding=UTF-8
Name=XMMS
GenericName=Multimedia Player
Exec=xmms %U
Icon=xmms
Terminal=0
Type=Application
MimeType=application/x-ogg;audio/x-mp3;audio/x-mod;audio/x-
x-wav;audio/x-mpegurl;audio/x-scpls
```

(Key: ✓ code string continues)

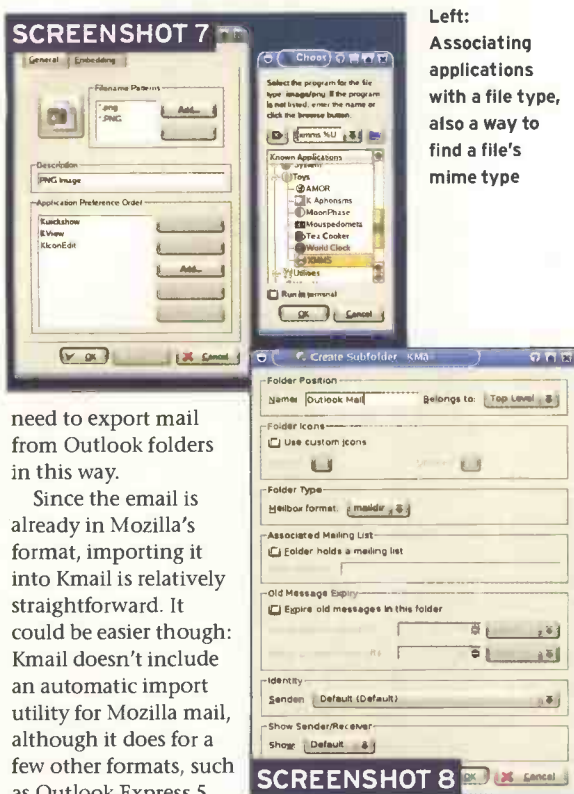
file. If you know the Mime types you want at this stage, add them here. When that's done click OK to save, and if you take a look at the desktop file created, it's a little more verbose, but pretty much the same as we made by hand (screenshot 6).

Adding new file types to the list that the application supports is made much simpler by using the GUI. After creating the new desktop file (manually or otherwise), just right-click on the file in question and select 'Edit file type'. For example, to associate a png image with a new graphics program, just right-click on any png file. In the dialogue window, click the Add button and find the new application in the presented menu (screenshot 7). That's all there is to it. The Mime type is shown at the top of this last window, and that is the quickest way to get hold of a file's type in KDE.

All of this applies equally to the standard menus in KDE, and it's possible to go into the system-wide directories and make changes to the existing entries there. Fortunately, more recent Linux applications are much better at automatically setting up desktop files in the right places on install, and the latest Linux distributions are concentrating on cleaning up the menus to be more intuitive and consistent.

Kmail

Sticking with KDE and carrying on from last month's column on importing Microsoft Outlook email into Mozilla, we'll look now at doing the same for KDE's Kmail. Most of the difficult work last month was getting across the data from Windows to Linux. To do that we used the Windows version of Mozilla, because this version can access the DLLs (Dynamic Link Libraries) needed to manipulate Outlook folders. Have a look at last month's column if you



SCREENSHOT 7

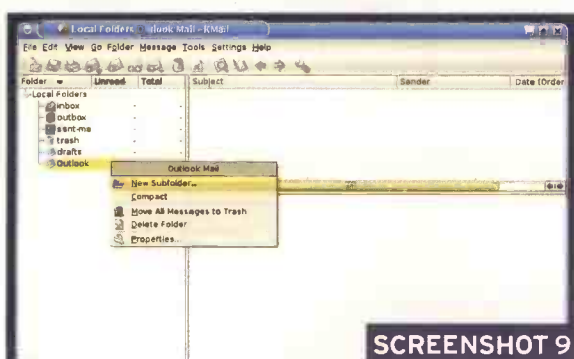
Left: Associating applications with a file type, also a way to find a file's mime type

need to export mail from Outlook folders in this way.

Since the email is already in Mozilla's format, importing it into Kmail is relatively straightforward. It could be easier though: Kmail doesn't include an automatic import utility for Mozilla mail, although it does for a few other formats, such as Outlook Express 5 and Pegasus Mail. The likely reason is that Mozilla stores email in plain text – each folder is really just a file of concatenated emails. Kmail handles mail somewhat differently, but also uses plain text, so it can read email from Mozilla more or less directly. The import process is therefore getting the files copied from one place to another.

If you recall from last month, Mozilla's files are stored in a user's home directory under the .mozilla subdirectory. The full path is similar to .mozilla/default/rba1u5nc.slt/Mail/Local Folders/. Mozilla always uses a directory name with a random Dos-like string before the data is found. Descend into the right directory, and here you will find several files with names sounding like email folders, 'Sent' and 'Drafts' for example. In addition, there are files with the same base names and a suffix 'msf'. Ignore these, Kmail has no use of them.

Above: Creating a new folder in Kmail



SCREENSHOT 9

A temporary step needed to create the necessary disk-based directories

In contrast, Kmail keeps things a bit simpler by storing all its email files in the 'Mail' directory, located at the top level of your home directory. If you look inside here, there are once again several files and directories, but this time, email folders are generally stored as real directories. For example, any email in your Inbox folder is found under ~/Mail/inbox/cur/. Every email message is given its own file, which has a long, randomly generated filename.

A basic import is simply to copy any of Mozilla's email files into Kmail's mail directory. So, assuming you have a Mozilla email folder called 'old', you could do something like this:

```
$ cd
"$/.mozilla/default/
rba1u5nc.slt/Mail/Local
Folders"
$ cp old ~/Mail
```

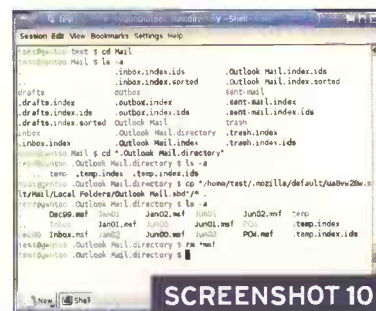
If you want to copy files from a sub-folder directly into Kmail, it's much the same. Mozilla stores sub-folders using a suffix of 'sbd'. The Outlook import process last month moved all of Outlook's folders into a new Mozilla sub-folder called 'Outlook Mail'. The files are kept in the exact same way, so to copy the mail folder 'stuff', you would do:

```
$ cd
"$/.mozilla/default/
rba1u5nc.slt/Mail/Local
Folders/Outlook Mail.sbd/"
$ cp stuff ~/Mail
```

You can, of course, use a file browser like Konqueror to copy these files around. It might be easier because of the deep directory structure Mozilla insists upon, and the spaces in the file names (always an unpopular thing in Unix). You can also copy the files directly from a Windows installation of Mozilla; there's no need to take them from the Linux version.

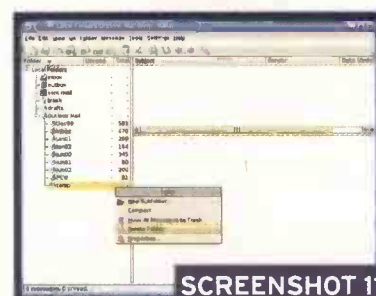
These examples are fine for copying across simple folders, but it gets messier if you want to copy across entire sub-folders or place the imported email into new sub-folders in Kmail. The example here is to copy across all of the Outlook imported email (found under Outlook Mail.sbd on Mozilla) to a new sub-folder in Kmail, also called Outlook Mail. It's not quite as simple as creating a directory and copying the files across – a bit of a hack is in order.

First of all, start up Kmail and create a new folder by right-clicking on the list. In the dialogue that appears, enter the name as appropriate – Outlook Mail in this case (see screenshot 8). Next, right-click on the newly created folder,



SCREENSHOT 10

Copying files the old fashioned way, Konqueror might be quicker



SCREENSHOT 11

Import finally finished

and select 'New Subfolder' (see screenshot 9). A similar dialogue will pop up as before, but this time enter any name for the folder – 'temp' will do. Performing these steps makes Kmail create the correct structure on the disk, albeit in a roundabout way. In the Mail directory, you now have a few extra files, including a directory called 'Outlook Mail.directory' (note the full stop at the beginning), and inside this directory is the temporary 'temp' directory.

Copy all of the email files that you want to import from Mozilla to 'Outlook Mail.directory', ignoring the temporary directory for now. Again, this might be simpler to perform with Konqueror or Nautilus, but a shell example is shown in screenshot 10. In this window, all of the contents of the 'Outlook Mail.sbd' directory that Mozilla maintains is copied across to the new Kmail directory. The 'msf' files mentioned earlier aren't needed, and are deleted from Kmail's copy.

Once done, start up Kmail again and the new folders should appear under the 'Outlook Mail' sub-folder. The temporary sub-folder isn't needed any more, so just delete that by right-clicking on its name. See screenshot 11 for the final appearance.

CONTACTS

Barry Shilliday welcomes your comments on the Linux/Unix column. Email him at: llinux@pcw.co.uk. Please do not send unsolicited file attachments.

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Tim Nott

is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

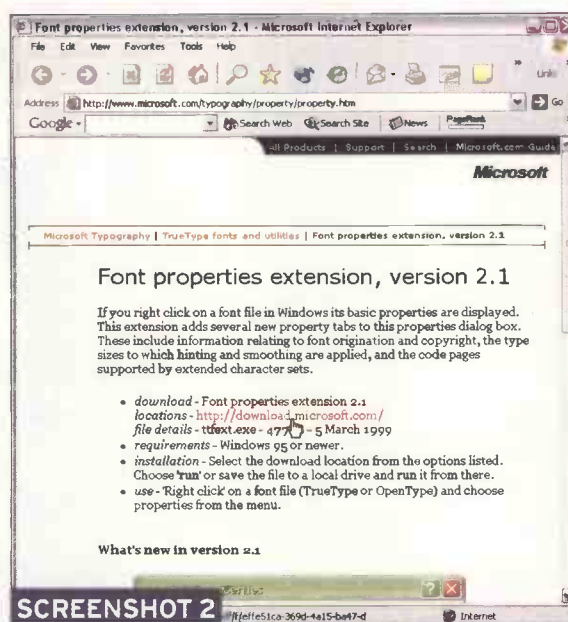
Save yourself time with Autotext

Here are some power tricks that'll automate mundane tasks and free up some time

Last month we took a look at Word's Autotext feature, and I promised some more power tricks for this month. For a start, there are all those things that require some effort to type. In July's Question time, for example, we looked at a way of creating letters with an overscore: although this involves inserting fields and is a little fiddly, once you have the field set up you can save it as an Autotext entry for instant re-use. Another use is for trademarks and logos. Although it's easy enough to use Autocorrect to produce copyright and trademark symbols by typing (c) or (tm) it's easier still to use Autotext to take care of the company or product name as well, such as Whifflesoft® Ezeebase™. Since you can store formatting in Autotext entries this could be in a distinctive typeface and even incorporate an in-line graphic.

A more mundane use is for 'boilerplate' text. Although an Autotext name is limited to 32 characters, there is no limit – apart from memory and disk space – to the number or length of Autotext entries. In true 'because it's there' spirit I tried defining the entire Project Gutenberg text of *War and Peace* as an entry. It did work, storing more than half a million words in one lump, but it's not the sort of thing you'd want to experiment with if pushed for time.

As mentioned earlier, an Autotext entry can contain fields. An even more powerful combination is a field that contains Autotext entries. Let's say that you are creating one or more documents that contain multiple instances of some boilerplate text – this could be some technobabble, legal mumbo-jumbo, marketingspeak



Get your free Font Properties Extension

or whatever. The problem is that the committee of experts charged with formulating this text have yet to agree on the final wording, and you only have a draft version. So, what you do is define the draft text as an Autotext entry. For this example we'll give the entry the name BS. Type BS followed by F3 and the text will appear, as expected. If, however, you insert an Autotext field, you will again see the expected text, unless you have 'View field codes' active in which case you'll see something like { AUTOTEXT BS }.

When the final version of the all-important text is available, delete the existing Autotext entry named BS and replace with the definitive text, again using the name BS. Select the entire document and press F9 to update the fields, and the new text will take the place of all instances of the old.

Another way of using Autotext in a field is in the creation of dropdown lists within a document. If you insert an AutoTextList field into a document or template, right-clicking on it will produce a list of all the Autotext entries in the template. Left-click on one of these and it will appear in the field – you can repeat the operation to change it. I'm sure this has some less frivolous uses, but I can see it revolutionising the writing of your Christmas or birthday thank you letters (see screenshot 1). There are further options for specifying

styles and tooltips, which I'll leave you to experiment with.

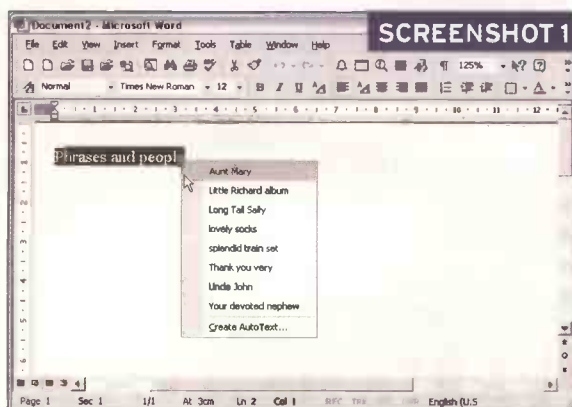
Font embedding (again)

July's piece on font embedding drew some interesting feedback. On a technical point some readers were unable to download and install the Microsoft Font Properties Extension. If you're having problems go to www.microsoft.com/typography/property/property.htm and click on the download link (see screenshot 2). Elect to save the file and you should end up with ttfext.exe, size 477KB, with a digital signature dated 5 March 1999. Double-click on this and you will be asked 'Do you wish to install OpenType Font Shell Extension?' Click the Yes button. Click the Yes button again in the Licence Agreement dialogue, and a few seconds later you should see an 'Installation Complete' message. OK this, and that should be it – you shouldn't have to restart. Right-click on any TrueType or OpenType font file – these have the .ttf extension but don't have to be located in the Fonts folder – and choose Properties. You should then see the extra tabs: I've tried this under Windows 98, ME, XP Home and XP Pro and they all work.

On a related matter, one reader complained that 'the font foundries are preventing fair use of their fonts if they deny embedding in files sent to a printing firm'. The reader suggested that it would be fair use to send a copy of the font to the printer to install temporarily or use a font creation program to change the embedding permissions. Neither is a good idea, and may result in the font creators chasing you with a very big lawyer. A font file is a piece of code, much like a program, and the terms of the licensing agreement will probably forbid either of these. If you sent a Photoshop file to a firm of printers and it couldn't read it as it didn't have the Photoshop program, it would not be 'fair use' to lend them a copy. Embedding permissions are a concession by the foundry – not a right of the consumer.

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.





Rock around the clock

A timely lesson in how Excel handles hours, minutes and seconds

Scheduling staff holidays, recording race results, and logging flights using Excel are all the subject of regular questions from readers. So it's opportune to review how Excel handles time.

Frequently problems are caused by assuming that Excel thinks like the clock on the wall, which just records hours and minutes on any day. The typical clock isn't aware of the date. But Excel is. It treats hours, minutes and seconds as fractions of a specific day. If you just enter, say 8:30, Excel records it as 0.354166 recurring. Format the cell as d/m/yyyy h:mm and your entry will be displayed as 0/1/1900 8:30. That's because the Excel dating system counts 1 as 1/1/1900, 2 as 2/1/1900, and by not specifying a day, by default, you entered 0.

There are a few exceptions to this counting system. To be compatible with an error in Lotus 1-2-3, Excel includes Feb 29th, 1900. Someone erroneously assumed 1900 was a leap year. To be compatible with Excel for the Mac, Excel for Windows offers an alternate date system which starts where 0 is Jan 1st and 1 is Jan 2nd, 1904. If your work requires you to record dates before 1900 you could download the Excel XDATE Add-In from John Walkenbach's website www.j-walk.com/ss/excel/files/xdate.htm. This is accurate back to 1752. Or, instead of Excel, use Corel Quattro Pro which works back to Jan 1st 1600.

You can always check the Excel date number recorded in a cell by pressing Ctrl & ` (single left quotation mark, usually the key on the top row to the left of 1), or choose Tools/Options/View/Formulas. Enter 6/10/2003 in a cell then switch to view the date number. It will be 37900 meaning 37,900 days since Dec 31st 1899.

To enter the current time in a cell press Ctrl & : (colon). Alternatively enter =NOW() and at any time afterwards you can press F9 and the time will update.

Let's do some typical timesheet calculations. The example in screenshot 1 is for an employee who

	A	B	C	D
1	Day	Started	Finished	Hours
2	Monday	8:30 PM	4:30 AM	8.00
3	Tuesday	-	-	
4	Wednesday	8:30 AM	4:30 PM	8.00
5	Thursday	12:30 PM	8:30 PM	8.00
6	Friday	9:30 PM	5:30 AM	8.00
7	Total hours worked:			32.00
8	Working week:			30.00
9	Overtime:			2.00
10	SCREENSHOT 1			

works both day shifts and night shifts with rests in between. The range B2:C6 has the Custom format h:mm AM/PM. The totals in column D are formatted as a Number with 2 decimals. The formula in D2 is =(C2-B2+(C2<B2))*24. The difference between the start and end times is calculated and multiplied by 24 to convert days into hours. If C2 is less than B2 then a 1 is created (representing True) which adds one day to the result to allow for working past midnight into the next day. This formula is dragged down to D6.

This employee's total hours for the week are calculated with the formula =SUM(D2:D6) in cell D7. The total hours the employee is contracted to work per week are entered in D8. To avoid a negative sign showing up in D9 that cell has the formula =ABS(D7-D8).

If the total hours actually worked are more than the contracted amount we want the label in B9 to read

How to create a simple timesheet in Excel

Multiplying labour times by an hourly rate

	A	B	C	D	E
1	Invoice				
2	To: The General Service Company				
3	15/9/2003				
4	From: Unlimited Fitters Ltd				
5					
6	Preparation	2hrs:45mins	£ 25.00	£ 68.75	
7	Fitting	9hrs:15mins	£ 30.00	£ 277.50	
8	Clean-up	1hrs:15mins	£ 15.00	£ 18.75	
9	Total:			£ 365.00	
10					
11	Terms: payment in 30 days				
12	SCREENSHOT 2				

Overtime:.. If it's less, cell B9 should read Hours owed:.. So the formula entered in B9 is =IF(D7<D8,"Hours owed:","Overtime:").

Hang on a second

To convert a list of numbers of seconds to suit the time format, divide by 86,400 (24 hours x 60 minutes x 60 seconds).

If you wish to add a list of times, format the totalling cell [h]:mm. This permits the hours to accumulate, as the day won't roll over into the next one. If you intend to add up a list of times which are in minutes and seconds, you must enter a leading zero and colon (0:) so Excel knows you mean minutes and seconds and not hours and minutes. If you use the SUM totalling tool at the foot of the list Excel will give the right format to turn every 60 minutes into an hour. That's [h]:mm:ss. But if you actually want the total in minutes and seconds with no hours use the Custom format [m]:ss.

If you want to deduct hours using the 1900 date system, enter the full date and time like 1/9/2003 22:00 in A1 and 2/9/2003 4:30 in A2 and format both cells as d/m/yyyy h:mm AM/PM. Format A3 as h"hrs":mm"mins" and enter the formula =A2-A1. A1 will display 1/9/2003 10:00 PM. A2 will display 2/9/2003 4:30 AM and A3 will display the difference 6hrs:30mins.

If you have kept a record of the hours and minutes worked for a customer in cell C6 of a worksheet, and that cell is formatted as Time, enter the hourly rate in D6 and enter the formula =C6*D6*24 in cell E6 to calculate the labour charge. D6 and E6 are formatted as Currency. For example, 2hrs 45mins x £25 per hour equals £68.75. You multiply by 24 as, in Excel serial time, 1 is a day and there are 24 hours in a day (see screenshot 2).

If you have a number of hours, like 5.5 in cell D4, and you want to display this in another cell as 5:30 AM enter =D4/24 and format as h:mm AM/PM. To make it 5:30 PM enter instead =(D4/24)+0.5.

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 became a freelance journalist after he experimented with graphics on a Commodore 64. In 1987 he bought an Apple Mac Plus before founding Pelican Graphics, and hasn't looked back since

Secrets of the script

Discover the power of scripting with Paint Shop Pro 8, Photoshop and Genuine Fractals

In the June issue, a reader called James, who either has no surname or likes to keep it to himself, wanted to know if he could make brightness adjustments to images in Paint Shop Pro (PSP) using a hotkey. Aside from the merits of using Brightness (Levels provides better control and better results) this kind of automation is something that's been sadly lacking in an otherwise sophisticated photo-editing application.

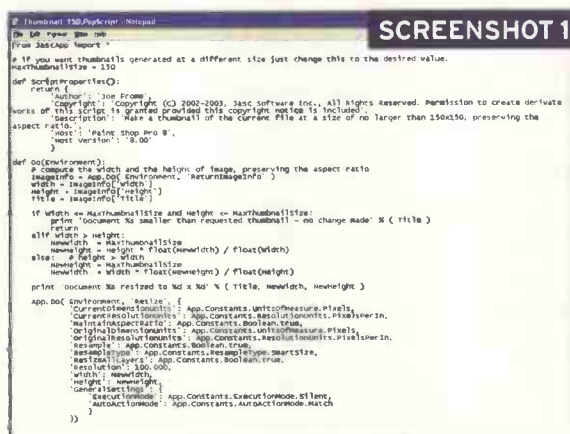
But the release of Paint Shop Pro 8 changes all that. Version 8 (see PCW July 2003, page 129) now includes scripting and enhanced batch processing as well as a redesigned interface, a new painting engine, new image-editing, compositing, warping, deformation tools and a raft of new filter effects. If you're still using version 7, I strongly recommend you visit www.jasc.com and download the 30-day trial version of 8.

Paint Shop Pro's new scripting comes courtesy of the Python scripting language. The application itself has all of the script recording and playback functions you'd expect, so you don't need to be a script jockey to take advantage of it. But if you know a bit about Python, or want to find out about it in order to write and edit your own scripts, a good place to start would be www.python.org/doc/Newbies.html.

If you just want to see what PSP8's scripting can do, start with the supplied scripts. If it isn't already visible, display the script toolbar (View/Toolbars/Script). By default, the dropdown has a list of scripts saved in Paint Shop Pro's Scripts-Trusted and Scripts-Restricted folders.

Select the Onestepphotofix script and click on the Run selected script button (having, of course, first opened an image on which to run the script). This script applies Automatic Color Balance, Automatic Contrast Enhancement, Clarify, Automatic Saturation Enhancement, Edge Preserving, Smooth and Sharpen to the image. It can also be applied from the Enhance photo tab on the photo toolbar.

Other useful scripts include Autotuber, which creates a picture tube from a selection of open images; Exif captioning, which prints the camera and exposure Exif data in the bottom right-hand corner of the



SCREENSHOT 1

PSP 8's scripts can easily be adapted using a text editor

image; Simplecaption, which expands the canvas, adds a background and prompts you to enter captioning text; and thumbnail150, which creates a 150pixel-wide thumbnail.

You don't need any special scripting knowledge to make minor edits to these existing scripts. To edit the currently selected script click the Edit button on the Script toolbar and the script file will open in Windows notepad (to change the script editor go to File/Preferences/File locations and scroll down to Python source files in the File types list). Screenshot 1 shows the thumbnail150 script. To produce thumbnails of a different size you simply overwrite the Maxthumbnailsize = 150 value.

Similarly, you can tweak the Onestepphotofix script, altering the strength and colour temperature parameters for the automatic colour balance as well as other adjustment filter parameters. In this way you can produce a Onestepphotofix tailored to enhance images from your digital camera for improved screen display. Or you might adapt this script to alter a folder of images prior to printing.

On the Select Script Dropdown you'll notice several scripts named BoundsScript 1 to BoundsScript 9. BoundsScripts are special scripts that can be added to a toolbar, menu, or keyboard shortcut. The existing boundscripts don't do anything, they're just placeholders.

To add the Onestepphotofix script to the scripts (or any other) toolbar, first select it from the dropdown, then press the Edit script button. Don't change the script, but select Save as and navigate to the folder containing the BoundsScripts. Unlike the other script files, boundscripts are

located in My Documents\My PSP8 Files\Scripts-Restricted. Save the Onestepphotofix script as BoundsScript1.pspscript.

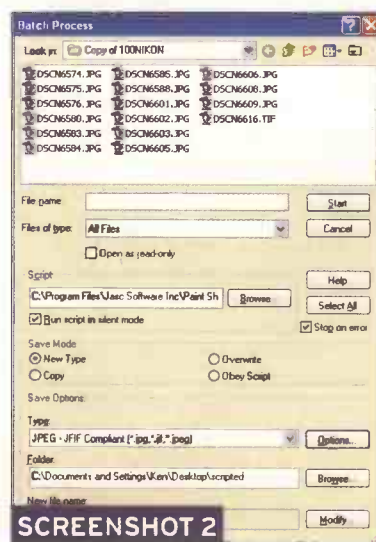
To add the new script to a toolbar, right-click on the toolbar and select Customise, then select Bound Scripts in the Categories list and drag 'Run BoundsScript1' into position on the toolbar. You can add a keyboard shortcut at the same time by clicking the keyboard tab in the customise dialogue. Select Bound Scripts from the category list and 'Run BoundsScript1' from the Commands list, pressing the key combination you want to use and then clicking the Assign button.

Script secrets

While running a script consisting of a multitude of editing steps on a single image can be a timesaver, it's not until you combine scripts with batch processing that you begin to appreciate the awesome productive power of scripting.

PSP7's batch convert command, which allowed you to convert a bunch of images from one file format into another, has been enhanced and now includes the ability to run any script on a folder of files, as well as providing versatile renaming and saving options.

Screenshot 2 (below) shows the batch processing dialogue. To add a folder of images for batch processing you need to navigate to the folder and select all – it's not possible to select a folder and neither can you include sub-folders. It's important to check the 'Run script in silent mode' radio button so that the script uses



SCREENSHOT 2

Right: PSP8's new batch processing dialogue now includes scripts and versatile renaming options



dialogue box settings assigned when the script was created, rather than opening the dialogue box for you to enter new values. Interactive script mode has its uses, but batch processing isn't one of them.

The save mode panel provides four options: you can overwrite the existing files (risky, unless you have backups); save in a different file format; create copies; or defer to any save instructions included in the script. The safest option is to save copies of files into a new folder. While you're doing this you can also rename the files, and PSP8 provides some very useful options here, including the ability to rename files and add the current date, time and a sequential number to the filename.

Hopefully, in the future, we'll see a decent shareware library of PSP8 scripts emerging as has developed over the years for Photoshop actions. You can already download a PSP8 script from www.udraw2.com/sp/psppower/textonanellipsePSP8.html. Developed by Mike Thomas, this script generates text on an elliptical path.

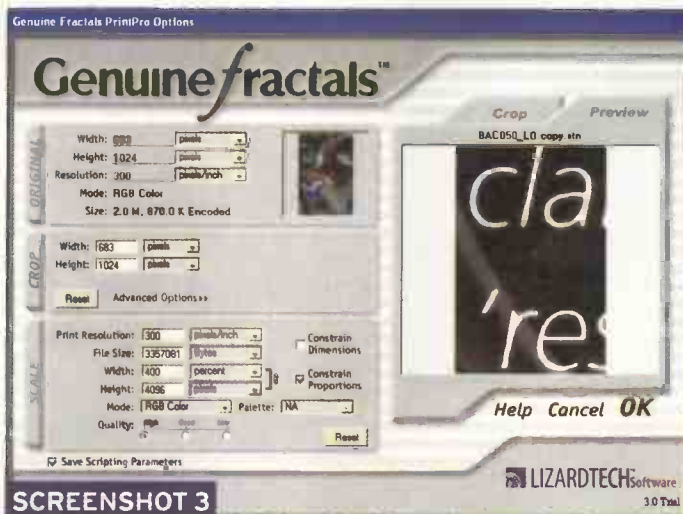
Customising Photoshop

When it comes to scripting, Photoshop is hard to beat. Actions first appeared in version 5, which was released way back in 1998. This has not only given individual Photoshop users and plug-in developers plenty of time to develop and make available a growing library of actions, able to produce anything from ready-made chrome text to instant photo frames, but Adobe has provided incredibly useful and time-saving script-based features such as Contact Sheet, Web Photo Gallery and Picture Package.

All three of these features use a script to resize a batch of images and position them on the page. I've looked in-depth both at Photoshop actions and the Web Photo Gallery in previous Hands on columns but, if you like to have real pictures that you can hold in your hand, then Picture Package, which is also available to Photoshop Elements users, is a very worthwhile tool.

You can print an entire folder of pictures using Picture Package by selecting Folder in the source document pulldown menu. However, rather than fill each position on the page with a different image, Picture Package creates a multi-layout page for each picture. For example, the four up 4 x 5in layout used on a folder of 24 pictures produces 24 pages each with four copies of the same photo.

If you want to produce a single page with a selection of photos, you need to click on one of the images in the preview pane and select a custom file.



SCREENSHOT 3

You can customise existing Picture Package layouts, or create new ones using a text editor. The layout files are located in the Photoshop Elements 2\Presets\Layouts folder.

ThreeHbyFive.txt looks like this:

```
I 8 10
(4)3.5x5
0 0 3.5 5
3.5 0 3.5 5
0 5 3.5 5
3.5 5 3.5 5
```

It produces four pictures, 3.5 x 5in, on a 10 x 8in page. The top line defines the unit of measurement – I for inches, and the page size; the first line is the name as it appears in the layout pulldown menu; and the remaining four lines indicate the x and y coordinates and size of each picture.

To redesign it, using centimetre measurements to fit four slightly bigger images on an A4 sheet with a white border around each one, make the following changes and resave the document as a4fourup.txt:

```
C 19 27
(4)9x13
0 0 9 13
10 0 9 13
0 14 9 13
10 14 9 13
```

You'll find a new page size has been added to the pulldown menu. It's still in inches – 7.5 x 10.6 – but is the 19 x 27cm page we have just created. By customising the Picture Package layouts you can also produce templates for non-standard sizes – for example, pictures that have been cropped square and panoramic shots.

Genuine Fractals

One of the fundamental laws of resampling is that you can remove pixels easily enough, but putting them back is a different matter. Downsampling images in any image-editing application is a routine job – you can do it with a script and it

produces much smaller files with no loss in quality. But just try going the other way when you no longer have the original, when you want an A3 print from your 2.1 megapixel digital camera, or when you've bought a low-resolution image from a stock library for web use, but discover it doesn't have sufficient resolution for your printed catalogue.

You can, of course, sample up images in Photoshop or any other image-editing application. But, as a result of interpolation

– inserting intermediate pixels based on the value of neighbouring ones – image quality suffers. Detail is lost, images become soft and fuzzy, and no amount of unsharp masking will restore them to the quality of the original.

But suppose you could resize digital images to any size you liked with no loss in quality? That's the claim made by Lizardtech Software for its Genuine Fractals plug-in which works with Photoshop, Photoshop Elements, Corel Photo Paint, Paint Shop Pro and any other application that accepts Photoshop compatible plug-ins.

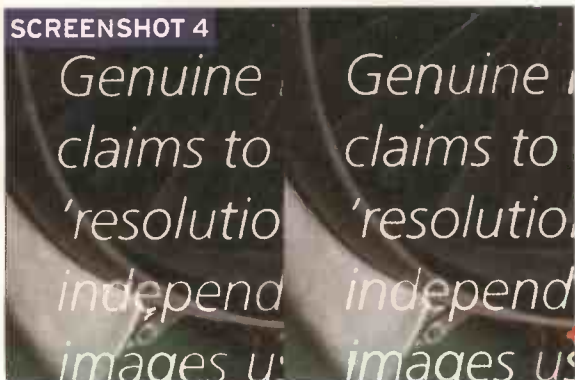
Genuine Fractals comes in two versions: Genuine Fractals 3.0 works with RGB and greyscale images and the Printpro 3.0 version can also be used on CMYK and CIE-Lab colour images. As the name suggests, they use fractal technology to compress images and – here's the interesting bit – to upsample small, low-resolution images to virtually any size you want with, so Lizardtech claims, no appreciable loss in quality.

Having installed the plug-in, the first step is to save the image in Genuine Fractals' proprietary .stn format. This gives you the option of saving using lossless or visually lossless (in other words lossy) compression. Using the lossless option, our test file, which was 2,067KB as an uncompressed tif, shrank to 870KB.

At this point, .stn files can be opened in your image-editing application via the Genuine Fractals Printpro options dialogue box (see screenshot 3). This is split into four panels: one displaying the original image dimensions, print resolution, file size and colour modes; one with input boxes for cropping; a scale panel in which you enter the new dimensions; or a scaling factor. On the right, a preview window shows a



SCREENSHOT 4



portion of the image at 1:1 pixel dimensions so you can make an assessment of the quality.

The workflow model is that you save all your image files at relatively low resolution in .stn format, producing files of around 5-10MB on disk that can then be opened and resampled to any size you like.

There are a few caveats. First, Alpha channels and clipping paths are supported but layers are not, so you'll have to flatten layered files (keep a backup copy if you want to do further editing) before saving in .stn format. If images have previously been jpeg compressed and show evidence of artefacts, the Genuine Fractals scaling process will only make them worse. Likewise, it's recommended that any cropping and unsharp masking is carried out after scaling and just prior to output.

So much for the theory, the only question of any real interest is: what is the quality like? As I'd just downloaded a medium resolution image from Corbis, this seemed like an ideal opportunity to test Lizardtech's claims for Genuine Fractals.

Corbis royalty-free images are available in three sizes – 32MB images cost \$199.95 (£119.30), 14MB images cost \$139.95 and 2MB images \$49.95. The image I wanted was for a newsletter. It was a small photo on the inside pages, but needed cropping. Nonetheless, I reckoned I could get away with the 2MB file – a 683 x 1,024 pixel image that prints 57 x 86mm at 300dpi.

As it turned out, the image was slightly too small once cropped, a problem I quickly resolved by dropping the resolution to 250dpi. But, had the problem been more severe, or should I need to use the image at a larger size in future, could Genuine Fractals save me a return trip to Corbis and another \$199.95?

To find out, I saved the Corbis image in .stn format, then re-opened it, specifying a scale factor of 400 per cent to produce a new image at 2,732 x 4,096 pixels. Then I resized the original

400 per cent enlargement: on the left, GF interpolation, on the right, Photoshop...

tif in Photoshop using the Bicubic resampling option, and made a side-by-side comparison. Before doing this, I added a text layer to the image and rasterised it to see what effect the resampling would have on the type.

The two images are shown in screenshots 4 and 5, where the picture on the left in each example is that of Genuine Fractals, and the one on the right is the Photoshop resampling. The first and perhaps most obvious point to make is that, while the Genuine Fractals resampling is superior to that of Photoshop, it falls short of the quality of the original by a wide margin.

I did a second experiment, resampling the same image by a factor of 10, producing 200MB files with a pixel resolution of 6,830 x 10,240. Again the Genuine Fractals compression did a better job than Photoshop, producing sharper detail, but nothing that, on screen at least, came close to the detail present in the original file.

To be fair, the claims made by Genuine Fractals apply to print rather than screen output, so the images on these pages are a better comparison than the ones I'm viewing on screen while writing. Also the Corbis image I used, like most stock photo library shots, was a jpeg, albeit a very high quality one with no visible artefacts.

My feeling is that Lizardtech's claims of 'resolution independence' fall a long way short of the reality. If I want a bigger image for my newsletter, I'm going to have to pay Corbis \$199, and if you want big prints from your digital camera, you're going to have to pay the price for a model with five megapixels or more. In other words, there's no substitute for real pixels.

If you want to try it for yourself, you can download a trial version of Genuine Fractals Printpro 3.0 (limited to 20 saves/opens) from www.lizardtech.com.

Analogue video capture

A number of people have emailed to ask about digitising archive material – be it old TV programs recorded on

VHS tapes, analogue camcorder footage and even Super 8 cine film.

I'll come to cine film in a moment, but as far as video is concerned there are a number of options ranging from TV tuner cards, DV editing cards like the Matrox RT.X10 and Pinnacle's Pro-One, to dedicated analogue capture cards like the Pinnacle Lynx USB Plus (PCW June 2003, p72).

If you own a card with a composite or S-Video input, you can probably connect a camcorder, VCR, or other device and digitise the signal. The quality of the results will depend on the capture hardware and the codec used. The problem with many older cards is that they don't support newer codecs that produce high-quality DV avi and mpeg-2 files.

An easy way around this problem is to use your DV camcorder to do the digitising. If it's an older model the chances are it won't have an analogue-in port, unless it's a Sony. Many recent models do have analogue-in ports though – all of the models in our July DV camcorders and video packages group test, with the exception of the Panasonic NV-DS65, have AV-in ports.

To record from an analogue source with one of these models you simply connect the two machines, press Play on the source and Record on the camcorder, then transfer the DV footage to your PC in the usual way with a Firewire capture utility.

Because manufacturers of 8mm film projectors didn't think to include a Firewire port, this format presents more of a problem. If you own an 8mm film projector with variable speed control, you can get quite good results by projecting an image of about 15cm across onto a piece of white card and recording the image with your camcorder on a tripod. The variable speed is required to synchronise the projector and camcorder frame rates and eliminate strobing.

Alternatively, a far simpler, if more expensive option – and one guaranteed to produce professional results – is to pay someone to do it for you. At www.digitalcopycat.com they can transfer Standard 8mm, super 8mm, single 8mm, 16mm and 9.5mm to VHS, S-VHS, mini DV and DVD. Other places worth looking include www.cineservices.co.uk, www.videostudio.co.uk and www.topfotoservices.co.uk.

CONTACTS

Ken McMahon welcomes your comments on the Digital imaging & video column. Email him at: digitalimaging@pcw.co.uk. Please do not send unsolicited file attachments.

...and the same comparison at 1,000 per cent enlargement



SCREENSHOT 5



Go-faster portable

How to give your tablet PC a speed boost with the new wireless standard



One way to get hold of the mini-PCI card you need is to take one out of a Linksys 802.11g router...

...unfortunately, it's glued to the main board, making removal difficult

interface that allows the manufacturer to take a standard motherboard and plug in extra components, in almost exactly the same way you plug cards into a desktop PC, and using the same electrical interface – but these cards are small enough to fit inside a portable machine.

There's also the problem that you can't buy these cards from Amazon. They aren't sold to the general public unless you regularly buy from distributors; and they are, in small quantities, expensive.

However, thousands of mini-PCI cards are made with the 802.11g spec. You never see any, though, because they are always hidden away. There's one, for example, in every Linksys 11g access point or router; and, if you're brave, you can find them even more easily, as we'll explain below.

The fact that you don't see these cards doesn't mean you can't fit one. It's a simple plug-in device, and the only real problem with plugging one into a notebook PC is opening the notebook. And, of course, pulling one out of something else.

I've seen one (very well-documented) DIY scheme at www.crossbonz.com/TC1000%2080211g which shows how to get the mini-PCI card out of



This month, I have decided to cater for the truly insane among our readers. And the project is indeed mad. If you've never held a soldering iron before, shut this magazine NOW, or switch to something like network configuring. This is 'void your warranty' day. It's a way of speeding up a tablet PC with built-in 802.11b, to use the new standard, 802.11g. And it's really a daft thing to do – but if you want to do it, then this is how.

Suppose you've bought a notebook PC, or a tablet; and it comes with built-in Wifi. Brilliant – except that almost every wireless-equipped PC on the market comes with the boring old 802.11b standard – and you're looking for an excuse to buy a new, five-times-faster 802.11g wireless access point.

Well, it will work, but will only talk to your brand new notebook at the standard 11megabit rate of 11b wireless. And what you want to do is upgrade it to 11g, and the only way of doing this, it seems, is to buy an 11g card, and push it into the PC Card expansion slot. Which, you complain, is not what you want to do – you need that slot for other things.

Wrong! You can take your computer apart, and replace its internal wireless circuitry with some that conforms to the new standard.

User serviceable parts

The key is the 'mini-PCI' standard. Normally, this is something you just read about on the spec sheet of your PC, and never get to look at. It is an

'Mini-PCI cards aren't sold to the general public and they are, in small quantities, expensive'

What you need

Here's what you should have handy if you want to boost your portable with the new wireless standard.

1 Windows XP or 2000 (preferably, XP) – there were no drivers for Wireless-g for Windows 9x at the time of going to press.

2 Drivers for the card. People who buy the card get a CD with it containing a setup wizard. That works. You may just want to run the normal setup wizard that Windows does; but that needs these drivers.

They're at www.linksys.com/download/driver.asp?dclid=92&osid=6.

3 A PC with PCI slots, and the Windows XP operating system – in which you can test the card before you break it apart.

a Linksys broadband router. I decided to put this to the test, and got as far as pulling the mini-PCI card out of a Linksys Wireless-G broadband router (see picture top left), when I thought it might be best to ask whether this was legal, first.

Officially, said my source at Linksys, no. Unofficially, they conceded that it would work. But (asked one) what on earth was I doing? 'There's exactly the same mini-PCI card on our standard desktop PC PCI card,' he pointed out. 'The router costs over £100 at Amazon.co.uk,' he said (www.amazon.co.uk/exec/obidos/ASIN/B00008DOYO/qid=1055456239/sr=1-2/ref=sr_1_0_2/202-1986708-9044626). 'The PCI card costs nearly half that,' he added.



Getting the card out of the router is fraught with opportunities to wreck the thing, too. The plastic case needs a screwdriver to pry it open; and the mini-PCI card is not just plugged into its socket – it is physically glued to the board, too (see picture on previous page). If you want to do it that way, feel free.

By contrast, the mini-PCI card on the full PCI card just snaps off; and there's no need to clean the glue off the back, either.

After the struggle of getting a mini-PCI card out of a router, putting the card into your notebook is a doddle by comparison. Here, however, I have to admit to cowardice: the only Tablet I could borrow was the Compaq one; and Hewlett-Packard, quite reasonably, refused to give me permission to hack it apart. I got a friend to agree to let me take pictures of his Tablet, showing how it opens; but he point blank refused to let me cut any wires.

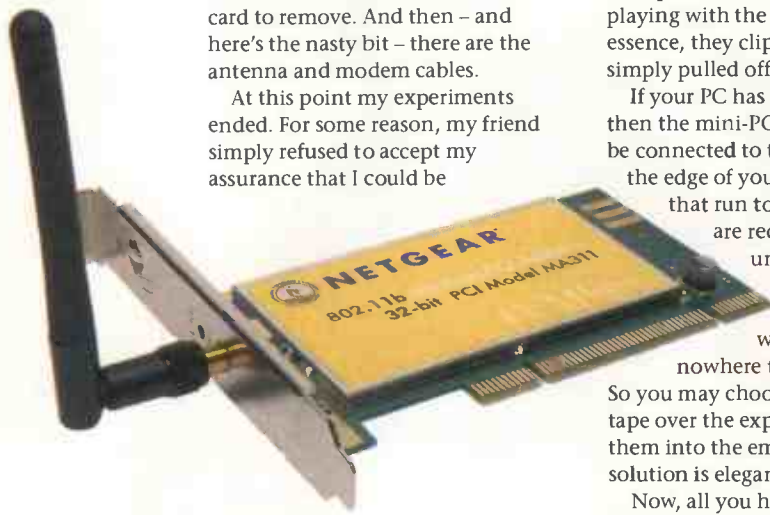
The principle, however, is simple. You open up the back of the PC. You make sure you know how to re-assemble it when you've finished; and then you take out the old mini-

PCI card, and replace it with the new one. In detail, however, it's a bit of a nightmare.

Step by step

First, there's a set of panels to remove. Then there's the battery to remove – see 'No guarantees' box below. Then there's the mini-PCI card to remove. And then – and here's the nasty bit – there are the antenna and modem cables.

At this point my experiments ended. For some reason, my friend simply refused to accept my assurance that I could be



A cheaper, and easier, alternative is to remove the daughter board from a desktop PCI adaptor

trusted to re-solder the antenna wires if they didn't fit properly after the test. As far as I can tell, the logic is obvious and straightforward – but this part of the experiment is not tested. (Again, if you doubt your ability to work this out for yourself, you shouldn't have unscrewed the back panel, never mind started playing with the circuit card). In essence, they clip on, and can be simply pulled off.

If your PC has an internal modem, then the mini-PCI card inside it will be connected to the phone socket on the edge of your Tablet. The wires that run to the phone socket are redundant until or unless you want to replace the modem. The card we're installing has nowhere to plug them into.

So you may choose to cut them, or tape over the exposed ends and tuck them into the empty space. Neither solution is elegant.

Now, all you have to do is fasten the antenna leads to the new mini-PCI card. Again, I wasn't permitted to do this, and so can't tell you for sure that it is easy; but it looks straightforward; the cables in the Compaq Tablet simply clip on.

If you're trying this on a notebook that isn't designed for wireless, you'll be expected to know how to fit and connect your own antenna.

Now, replace the cover, the battery, and the panel; and start the unit. It will detect the new hardware, and if you haven't already got the drivers on your hard disk, you'll have to work out a way of reading the CD. Either the Linksys setup utility or the XP wizard should make it work without hiccups.

If it doesn't work, you have my sympathy, and my admiration for trying; and if you mail me, I'll do what I can to help. But if you start this with any sense of diffidence in your own ability to make it work, you probably shouldn't have even thought about doing it.

A tablet running at Wifi 802.11b speeds is plenty fast enough for any Internet connection you're going to meet over the next year or so. I'd be inclined to note this project down as interesting, but not for the fainthearted. Good luck to those of you who want to try.

Stop! No guarantees...

Don't attempt to replace the PCI card in your portable unless you are prepared for the consequences.

1 This is a project for an experimenter, not someone who isn't sure how to wire up a portable. It isn't guaranteed to work; if it doesn't work, it's up to you to find out why. We can't offer individual support.

2 It's no use expecting to be able to recycle the parts if it doesn't work. By taking the mini-PCI card out of the Linksys client card, you void the product's warranty. By opening up the notebook PC, you virtually guarantee to void that warranty too. And there is a serious and real risk that in doing this, you will break something. PCW can't accept responsibility for any damage you cause.

3 Get all your software ready **FIRST**. It's no use trying to download the drivers after you've installed the wireless card in your notebook. See the box on the previous page for information on what you need to have ready.

4 Some notebooks and tablets work badly with Wifi – not because they have obsolete hardware in them, but because they are poorly designed. In three tablet PCs that I've tested, the antenna was placed behind the touchscreen by a designer who didn't appreciate that the electro-sensitive display was going to reduce signal strength. Replacing the circuitry inside the device won't improve the antenna!

5 You may lose your modem. Actually, you almost certainly will. The Wifi card included in most portable PCs appears to be dual-purpose, modem as well as Wifi adaptor. There's almost nothing, physically, to the modem, because the Pentium processor does all the signal processing, so it is easy enough to include it. But there's no modem on the mini-PCI card you're recycling in this project.

6 You will void the warranty on the Linksys card. I know I said that before, but this means if the card doesn't work, Linksys won't replace it. Obvious? Well, no. It really means that if the thing was dead when it was shipped to you, it still doesn't matter.

Testing the card isn't necessarily a question of 'plug it in and see if the PC recognises it'. You have to try it out in a wireless network that does both 802.11b and the new 802.11g protocols. It's perfectly possible to have a card which works partially – only on one or the other. Once you've broken the warranty seal, it doesn't matter. Do make sure the device runs at full speed.

7 Before mucking around inside your tablet, make sure it and you are both earthed; make sure it is not connected to the power brick; and that the battery is removed. These circuits are not robust, and any static spark or battery power surge can burn them out.

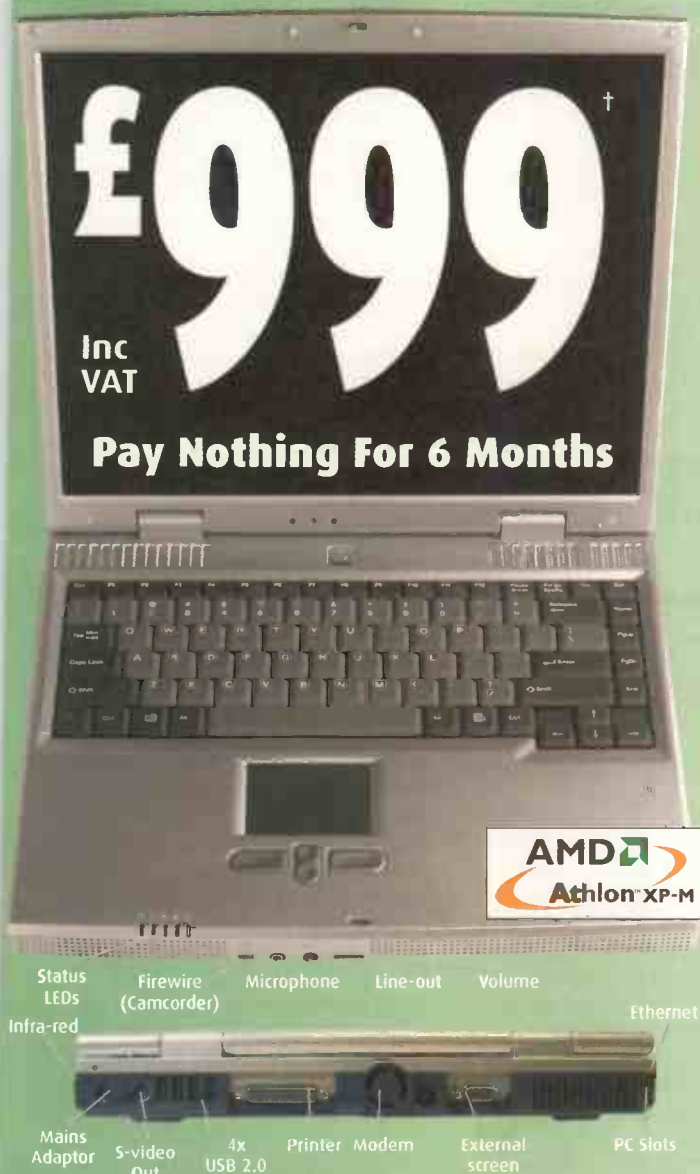
CONTACTS

Guy Kewney welcomes your comments on the Mobile computing column. Email him at: mobilecomputing@pcw.co.uk. Please do not send unsolicited file attachments.

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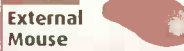
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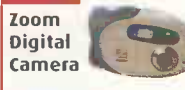
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Niall Magennis
has been dabbling in Midi and digital audio since the days of the Atari ST. He writes on a freelance basis for a number of music magazines and lives in London in a flat overrun with music equipment

Create your own samples

Get to grips with soundfonts and turn your sound card into an advanced sampler

There's a whole heap of music power lying untapped within many sound cards, simply because people don't know how to use soundfonts. This month we're going to look at how you can expand your sound card's sonic palette by using soundfonts to create and download your own sounds into the card.

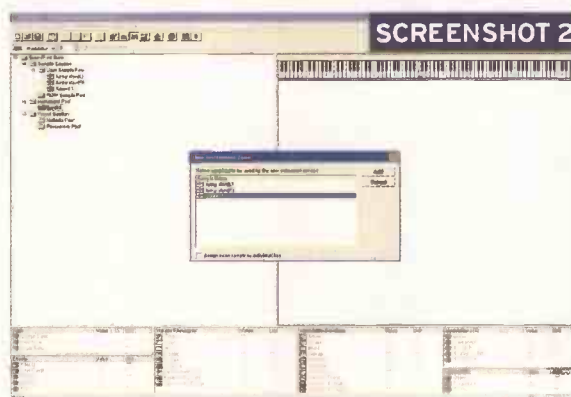
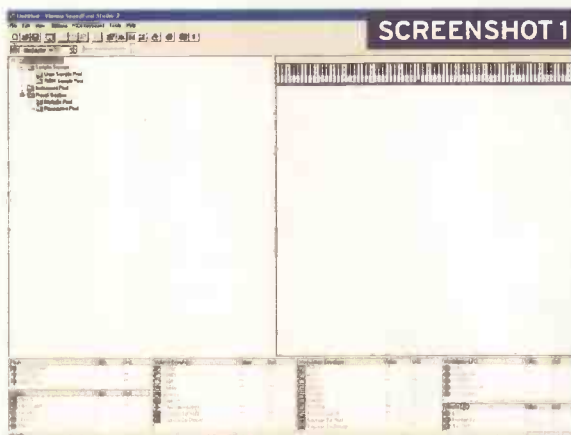
But just what exactly are soundfonts? The technology was originally developed by Creative and Emu Systems (which Creative now owns) and essentially allows you to load your own samples and synth patches into your sound card's onboard synth to replace or work alongside the sounds that are supplied as standard. This means that soundfonts allow your sound card to act much like a professional sampler – the sounds it can produce are completely reliant on the sounds that you decide to load into it. Essentially there are two parts to the data held in a soundfont file. The first is the raw sample data which is essentially just a wave file. Then on top of this there is patch information for filter and envelop settings to tell the sound card how the sample should be played.

When soundfonts first appeared, computers were generally quite low on horsepower, so games companies tended to make use of a sound card's Midi sounds to produce background music. Doom is a classic example of a game that uses Midi background music. Naturally, on cards with poor Midi sounds the music sounded pretty dire. But if you had a sound card that could handle soundfonts, you could load up a bank of industrial-type sounds and suddenly the backing track became much more punchy and scary and less like music written for use in department stores.

Nowadays most games come with digital audio soundtracks that are streamed from CD or hard disk and they sound all the better for it. However, soundfonts are still very useful for musicians because they essentially give you access to an unlimited number of synth and drum sounds.

Creating soundfonts

Now we've seen the power that soundfonts offer, let's have a look at how you can create your own. We're



Top: Vienna uses a hierarchical folder system to order the different elements of a soundfont

Bottom: To create a soundfont you have to assign a sample to an instrument

going to choose Creative's Audigy 2 EX as our sound card, and the company's Vienna Soundfont Studio software. Unfortunately this package no longer seems to come on the CD with Creative's new cards. However, it is available free from the downloads section of the company's www.soundfont.com website.

The first thing you'll notice when you start up Vienna is the Explorer-type view that shows a number of folders down the left-hand side of the main window. These are roughly split into folders dealing with samples, instruments and presets (see screenshot 1). As you can probably guess, soundfonts are split into these three elements. First of all you need to load in a raw sample that you will use as the basis of your sound. Next you have to assign this to an instrument,

which allows you to add the synthesis elements such as filter and envelop settings to tell the patch exactly how it should play the sample. The final part is to take the instrument you have created and add it to the preset section, which tells Vienna where in the banks of sounds the instrument should appear when you try to select it via a Midi sequencer.

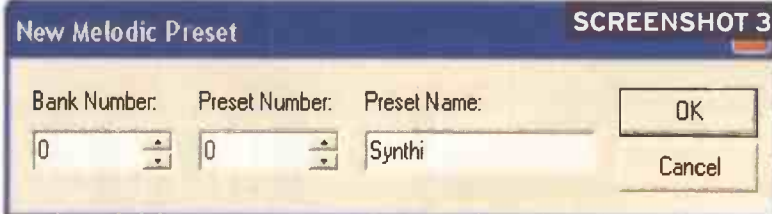
It may sound quite complicated, but it's pretty simple to get your head around once you start building your own fonts. Having the process split into three parts makes it a bit easier to create more complex soundfonts because you can approach the task one stage at a time.

Right, let's have a look at how you would create a very simple soundfont containing just two presets: a synth sound and a drum loop.

First of all we need to import our raw sample data. Start by right-clicking on the User Sample Pool Folder and then select Import User samples from the pop-up box that appears. This will open the file browser so all you need to do is find the two samples you want to use, select them and click on the Import button. We're using a mono synth sample and a stereo drum loop.

If you've imported a stereo sample you'll see that it is shown as two separate samples marked with L and R for left and right. This is because a stereo file in wav format is really just two separate samples that are panned hard right and hard left when they are being played back. Don't worry, though – Vienna makes it very easy to work with stereo samples.

Now that we have our raw sample data we need to use the samples to create an instrument. We're going to first take our mono synth sample and add it to an instrument. To do this you need to right-click on the Instrument Pool folder and select New Instrument from the pop-up box. Next you give the instrument a name, such as Synth1, and press the OK button. You'll now be presented



Each Preset needs to be given a name



with a list of samples that you have imported as User Sample Data. Just select the sample you want to use for your sound and click on the Add button (see screenshot 2). You can now play around with the filter and envelop settings in the bottom half of the main screen to manipulate the sound in different ways. If you want to loop your synth sound then just right-click on the sample name under the Instrument Pool tree and select the loop option from the pop-up box. In the window that appears, tick the box marked 'Enable Looping on this Sample'. You can also use this window to fine tune your looping points.

When you're happy with your Instrument settings you need to right-click on the folder marked Melodic Pool and select New Melodic Instrument preset. Give the preset a name and click OK (see screenshot 3). Select Synth1 in the box that appears and click Add.

Instrument settings

OK, now we need to create the instrument settings for our breakbeat, so right-click on the Instrument Pool folder and create an Instrument called breakbeat1. Hold down the Control key on your keyboard and click on the left and right samples for your breakbeat before ticking the box marked Assign each Sample to Individual Key. Now click on the Add button. Vienna will ask you what key you want to assign the sample to. Enter 60 and press OK. It will then ask you to select what key you want to use for the second sample. Enter 60 again because it is a stereo sample and we want both the left and right channels triggered at the same time.

Now right-click on the Percussive Pool folder and select New Percussive Preset. Enter a name for your preset and click on OK. Select breakbeat1 from the list of instruments shown and click on Add.

That's the soundfont complete, so click on File, select Save as and give

Here are some we prepared earlier

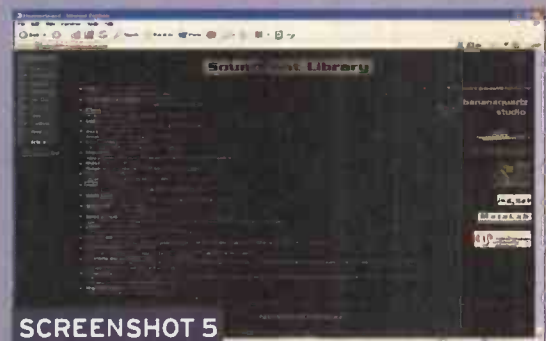
If you don't fancy making your own soundfonts – and let's face it, it can be a bit of a chore – then don't worry, because there are lots of different sources for preprepared fonts. Naturally, there are commercial companies that offer ready-made soundfonts you can buy in retail stores or over the net. One of the early pioneers was Sonic Implants (www.sonicimplants.com). It started by offering soundfonts for improving the quality of in-game music, for titles such as Doom and Descent, but it now has a range of soundfonts geared towards musicians. The soundfonts are offered in CD format or for direct download, but if you go for the download option beware, because some soundfonts can be very large due to the amount of sample data they contain.

Emu, which created the soundfont standard for Creative, also offers a number of soundfont CDs for sale on its website. Emu is a manufacturer of professional synthesizers, so many of the sounds contained in these soundfonts are taken directly from the sample Rom of the company's professional kit. Unsurprisingly, they are generally of a very high quality (www.emu.com).

However, unless you need a very good grand piano sound or something that calls for an equally professional level of sampling and synth programming expertise, you can generally get most of what you need from one of the many free soundfont download sites. In fact, there are so many soundfonts available online it's difficult to know where to start looking.

However, you could do a lot worse than heading over to www.hammersound.net. Here you will find an enormous archive of soundfonts containing everything from vintage synth sounds to samples of the latest drum machine (see screenshot 5, right). There really is an astounding range of sounds on offer. You'll also find plenty of free soundfonts at www.listen.to/sblive, as well as tips on using Soundblaster cards.

The best option, however, is just to do a search on Google for free soundfonts. There's a massive number of sites out there and you will find some really cracking sound sets if you look hard enough.



SCREENSHOT 5

Hammernet has a huge range of soundfonts that you can download for free

your soundfont a name such as SimpleSoundFont.sf2.

Now you've got your soundfont ready to go, how do you get at it from your sequencer? Well unfortunately all sequencers handle soundfonts in different ways. Some can load them into the sound card from within the sequencer itself, while others need the soundfont to be loaded before you start up the sequencer. If your sequencer uses the latter system then you can use Creative's Soundfont Manager, which is supplied on CD with your sound card.

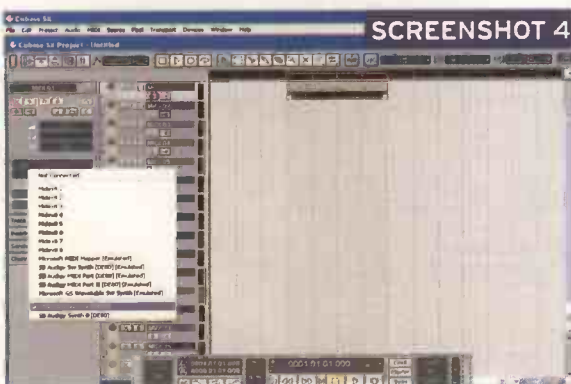
If you use Cubase SX then you're in luck, since you can access soundfonts from directly within Cubase SX and easily load them into the sound card. Creative's Audigy 2 Platinum EX, and most of the Audigy 2 cards, present two synth

ports to Cubase. Go to the Devices menu and select SB Audigy Synth A. Then click on Load Bank, use the file browser to select the soundfont you have just created and click Open. Close the soundfont loader windows and then, in the track panel at the right-hand side of the main Cubase SX, arrange page select SB Audigy Synth A in the outbox (see screenshot 4). Now if you set Cubase to play back on Midi channel one you'll hear your synth sound. Your breakbeat has been loaded into the rhythm presets, so change the Midi channel to channel 10 and press the middle C note on your keyboard, and you will hear your sample being played back.

Hopefully you're now confident enough with soundfonts to start creating some more elaborate fonts that you can use to stunning effect in your own tunes.

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

To play back your sounds you have to select the correct synth in the outbox on the arrange page

**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

Welcome to my picture show

The easy way to let people view the photo galleries on your website

Last month, we looked at the first stage of a project to manage photo albums on your website, with a PHP script that scans a directory for images and then presents each one on a form in turn, allowing you to fill in details such as captions, location, date taken and so forth. All the information is stored in a database.

This month, we're going to look at the viewing side of things – scripts that will let people look at the pictures in the database in a variety of ways. The result is a system that lets you upload pictures to a folder, enter the details, and provide a link to each collection, without having to create galleries for each one. If you're in the habit of taking lots of pictures, it's a good way of putting them on your site quickly.

First things first

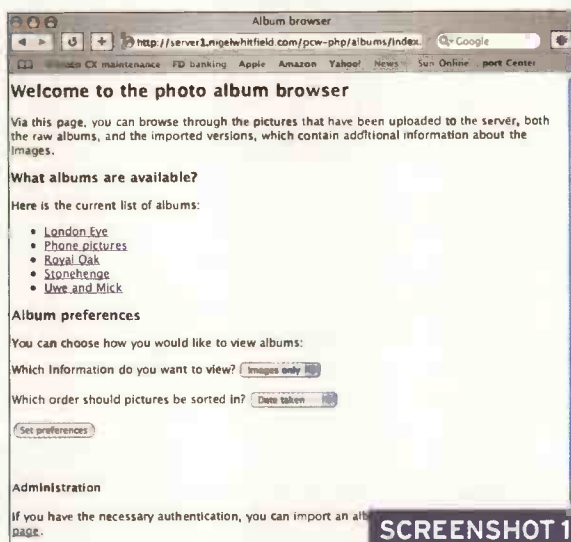
We'll start again with our index page – we explained last month how to get a list from the database of the albums available. For each one, we'll want to call an album.php script to display the images. We've stored information in the database, but often people won't want to have it all displayed. So how about three different views for an album – images only, brief details and full details. In the finished script (which you can see at www.nigelwhitfield.com), the brief details list only location and date below each picture. You might want to specify how an album is sorted – date, location, photographer and so on. We'll pass this information to the album script via URL parameters, since that makes it simple for people to bookmark, with a URL like mysite.com/album.php?album=Stonehenge&view=brief&sort=bydate.

Since the name of the album may have spaces, we'll need to encode it properly using something like this in the HTML, assuming we've got an album stored in \$album:

```
<a href="album.php?album=
<?php echo urlencode
($album)?>&mode=<?php
echo $albumprefs?>&sort=
<?php echo $albumsort?>">
<?php echo $album ?></a>
```

(Key: ✓ code string continues)

We first saw the urlencode function in an early Web development column, and we'll need to revisit some old tricks for those preferences. To allow people to set their options for viewing

**SCREENSHOT 1**

The index page allows you to set preferences and pick an album to view

albums, there's a form on the index page with two menus, which calls the same page using the Post method when people click on the Set preferences button (see screenshot 1).

Then, at the top of the page, we can use this code to set a cookie to store the preferences if they've just been set, or to retrieve them if the page was requested normally:

```
if ( $HTTP_SERVER_VARS
['REQUEST_METHOD'] ==
'POST' ) {
    setcookie
('Nwalbumview',$HTTP_
POST_VARSE['albumprefs'] );
    setcookie
('Nwalbumsort',$HTTP_
POST_VARSE['albumsort'] );
    $albumsort =
$HTTP_POST_VARSE['album
sort'];
    $albumprefs =
```

```
$HTTP_POST_VARSE['album
prefs'];
} else {
    $albumsort =
$_COOKIE['Nwalbumsort'];
    $albumprefs =
$_COOKIE['Nwalbumview'];
```

Remember that this code has to appear before any HTML is output.

Albums and photos

The real work, of course, is done in the album.php script; we're using the same image scaling idea as in the July 2003 issue, but this time we don't need to examine each image, since we stored the width in the database when it was imported. You could speed things up now by creating thumbnails on the server, but you'll need PHP compiled with the right graphics extensions.

We've used object techniques to manage our albums, with a file called imageclasses.php. This contains two classes: Album and Photo. The album class has properties called albumname, dbhandle, size and contents, and provides the three methods that we use in the script – openAlbum, closeAlbum, and getNext.

We use these to hide the workings of the database, so we can say simple things like:

```
$photos = new Album ;
$photos->openAlbum
('Stonehenge', 'bydate') ;
echo "This album contains
$photos->size
images";
```

And to get the next picture from an album, we say:

```
$image = $photos->
getNext();
```

FIG 1

The getPath method

In our database, if no path was stored, then the image is in one of the AL_ subdirectories, otherwise it's elsewhere on the server.

```
function getPath() {
    // return a path to the image file for a particular picture
    if ( $this->path == '' ) {
        // it's a file in an AL directory
        $newpath = preg_replace('/','_', $this->album) ;
        $filepath = 'AL_' . $newpath . '/' . $this->image ;
    } else {
        // it's elsewhere in the filesystem
        $filepath = $this->path . '/' . $this->image ;
    }
    return $filepath ;
}
```




Here, though, we need a couple of tricks.

In the getNext() method for an album, we're using the mysql_fetch_object to retrieve the next record from the database – the openAlbum method does the initial connection to MySQL and sends a query for the album we want.

You might think you can simply code the getNext method like this:

```
$image = new Photo ;
$image = mysql_fetch_object($this->contents) ;
return $image ;
```

but it won't work. Although we've said that \$image is an object of the class Photo in the first line, that won't really work; when you use the mysql_fetch_object function, you get something back that looks like a Photo – it has the properties that match the ones we defined in the class – but that's simply because they match the field names we use. It's not actually a Photo object, and so if you try to call any of the relevant methods, they don't work.

Instead, we need to add a method in the Photo class, which essentially copies the properties into a real Photo object, and code our getNext in the Album class like this:

```
function getNext() {
    $image = new Photo ;
    $image->dbFetch(
mysql_fetch_object(
$this->contents));
    return $image ;
}
```

In our Photo class, the dbFetch method looks like this:

```
function dbFetch($db_object) {
    // take an object
from the database and put
the properties
    // into the
current object
    $this->album =
$db_object->album ;
    $this->image =
$db_object->image ;
```

Now, when we ask for the next object from an album, the item returned really is a photo and we can use other methods on it – someone could alter the properties, for example, and then save it back to the database.

For this example, we have just one other method, called getPath, which is shown in figure 1. This looks at the information stored in the database, to find out the path to the actual picture file, which will be needed in creating the web page.

In figure 2, you can see how we open the album, and check for the options that have been passed as parameters to the script. We've shown the code up



In full mode, there's a caption below the picture and other details to the side

FIG 2

Displaying the photo album

This portion of album.php opens an album, and scans over the pictures, working out scaling for each one, outputting a table cell containing the image, with a link to view it full size.

```
<?php
require('imageclasses.php') ;
$photos = new Album ;

$photos->openAlbum($HTTP_GET_VARS,
['album'],$HTTP_GET_VARS['sort']) ;
?><p><?php echo $photos->size ?>pictures to
display ...</p>
<table align="center" border="0">
<tr>
<?php
$count = 0 ;
for ( $i = 0 ; $i < $photos->size ; $i++ ) {
    // iterate over the album,
displaying the photos

    $image = $photos->getNext() ;
    $count++ ;

    // work out the scaling for the image
    if ( $image->width < 200 ) {
        $width = $image->width ;
    } elseif ( $image->width < 400 ) {
        $width = 0.5 * $image->
width ;
    } elseif ( $image->width < 650 ) {
        $width = 0.3 * $image->
width ;
    } elseif ( $image->width <
1000 ) {
        $width = 0.2 * $image->
width ;
    } else {
        $width = 194 ;
    }

?><td width="200" align="center"
valign="middle"><a href="<?php echo $image->
getPath()?"> target="_blank">title?"></a>

(Key: ✓ code string continues)
```

until the point where the image is displayed. The next section is an if/elseif that looks at the view variable, to see whether we output more information, such as a location and date for the picture in brief mode, or a table cell with all the information in full mode. You can alter the format to suit. Screenshot 2 shows the full view; images only formats pictures three across the page. For simplicity, the version of the script at

www.nigelwhitfield.com scales all images to be no more than 200pixels wide, but you can easily change that or add different view options.

If you simply want to use the system on your own site, you'll need to download index.php, import.php, imageclasses.php, album.php and db_populate.php, and put them all in the same folder on your server. And don't forget to create the database table and update the scripts with the correct user parameters. You can also download an SQL script to set up the table along with the scripts.

Album system in use

Once you've put the scripts on your site, it's simple to work with. Suppose you've created a folder called albums, with all the scripts inside. For new pictures, make a subdirectory called something like AL_Holiday_2003, and the album will be called 'Holiday 2003'. To make it appear in the index, click the import link from the index page, then click Holiday 2003 from the list, and fill in the form for each of the pictures. When you've done them all, you'll be returned to the import page.

If you want to import pictures from elsewhere – say www.mysite.com/pictures/myflat where the album system is at www.mysite.com/albums – go to the import page, and in the form type in a name for the album, like Pictures of my flat, and in the path enter ../pictures/myflat. Once again, you'll see each picture in turn, and you can enter the information.

After pictures have been imported into the database (more correctly, the pictures stay where they are, but the information about them is in the database), you'll see the album listed on the index page, and you can click on any image to open it in a new window, full size.

And that's it – you now have a simple to use photo album system on your website.

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.

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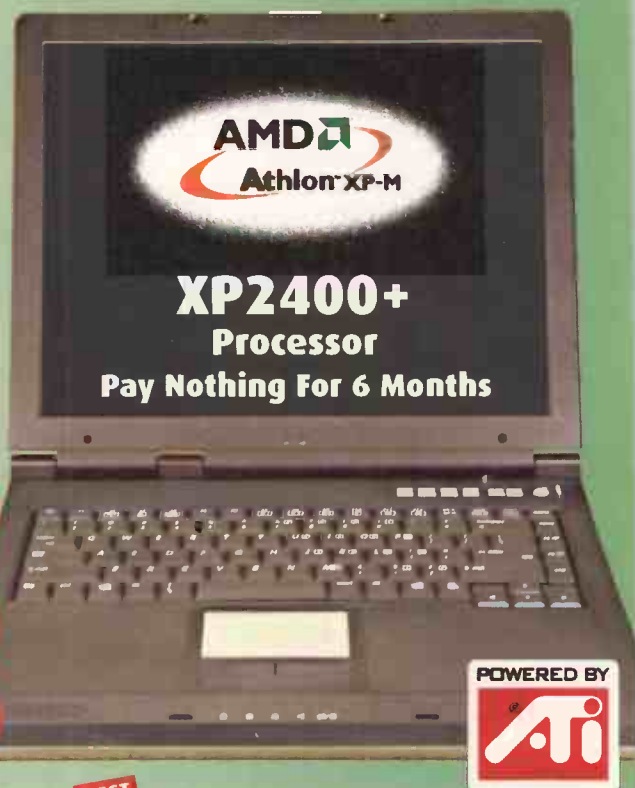
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From a distance

How to configure Terminal Services to manage your Windows 2000 servers remotely

Remote server management is a subject dear to the hearts of network managers everywhere. This is particularly the case in large organisations where server hardware is often locked away in secure data centres or scattered around the country, making physical access both difficult and time consuming. Even in a small business it can be more convenient to manage a server from your desktop.

A common approach is to use a KVM (Keyboard, Video, Mouse) switch, where a single console can be switched between a number of remote systems. However, there aren't many that allow the remote console to be located at much of a distance from the servers. For truly remote KVM management you need switches capable of transmitting screen and keyboard data over a network, such as the DSR family (pictured above) from Avocent (www.avocent.com), which incorporate both network encapsulation and a KVM switch in one unit, or the Rose Electronics Ultralink (www.rosel.co.uk) that can be used with existing KVM switches. Both of these can be used to manage servers remotely over a TCP/IP connection, whether over a private network or the Internet.

Unfortunately you need to have lots of spare cash available to afford IP-enabled KVM hardware, putting it beyond the reach of most small companies. But it isn't absolutely necessary, as there are lots of cheaper software alternatives on offer. Moreover, if it's a Windows 2000 server you want to manage, you've already got everything you need, in the form of the bundled Terminal Services software. The other bonus is that it doesn't cost anything to use, which may surprise you if you thought Terminal Services was only there to allow applications to be run remotely on the server – a configuration for which you do have to purchase extra licences.

Terminal setup

Terminal Services in Windows 2000 Server can be configured to run in two different modes – remote administration or application server – and support for up to two remote management connections is included



at no extra cost. You will, though, have to expressly enable the software, as it's not configured by default when Windows 2000 Server is installed, but there's not really much to that either.

All you have to do is log onto the server as an administrator, select Add/remove Programs in the Control Panel, and click on Add/remove Windows Components. Then select Terminal Services and a wizard will ask which of the two possible setup modes is required (see screenshot 1) before prompting for the original installation CD-Rom (or install share), followed by a reboot to activate the new service.

When the server restarts, Terminal Services will load automatically and run in the background with no further configuration work required at the server end. However, you will have to install client software before you can use it and there have been one or two changes in this area recently, most notably since Windows XP was released.

Configuring the clients

The client software for Terminal Services has always come in several guises, starting with Windows clients

IP-enabled KVM switches, such as these from Avocent, can be used to manage servers remotely over the network, but are expensive to deploy

copied onto the server when Terminal Services is enabled. The requirements for these are very modest: just 8MB of memory, 1.5MB of disk space, and access to TCP/IP to carry the Remote Desktop Protocol (RDP) which connects Terminal Services servers and clients together. The built-in clients are also very easy to deploy, by sharing the server directory involved and running the appropriate setup routine on the remote PC (see screenshot 2).

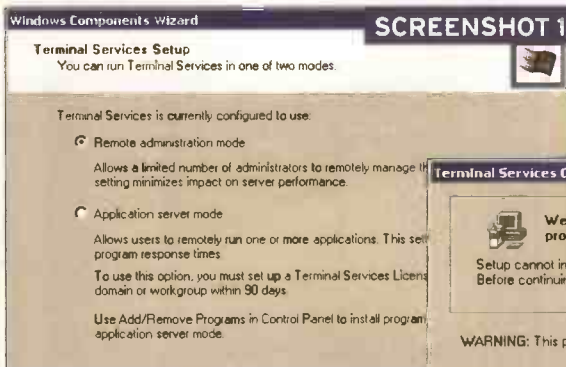
The directory to share is %systemroot%\system32\clients\tsclient and, as well as 32bit Windows software, you'll find a folder in this share for older 16bit Windows systems if you're still running them. Alternatively a Client Creator utility will have been installed during setup which can be used to create installation floppies.

The XP way

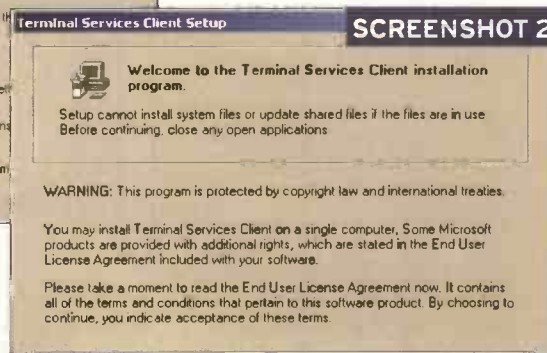
For PCs running Windows XP the approach is a little different, and more straightforward, as XP comes with a client already as part of the built-in Remote Desktop Connection. This is primarily there to let XP users remotely access and troubleshoot other Windows XP PCs but, because it's based on the same core Terminal Services technology, it can also be used to manage Windows 2000 servers. And it's not just XP users who benefit, as the Remote Desktop Connection client can be installed on other Windows PCs instead of the older client software included with the Windows 2000 Terminal Services.

If you have XP Pro, the Remote Desktop client will normally be already installed, while on XP Home User and non-XP systems it can either be downloaded from the Microsoft website or installed from the XP CD-Rom. If you have such a

Below: When you enable Terminal Services on a Windows 2000 server, you'll be asked to choose between the free Remote Administration mode and an Application Server setup, which requires additional licences



Right: Windows Terminal Services clients are on the Windows 2000 server and can be installed using either a network share or floppy disks produced using the Client Creator utility





CD, simply put it into the CD-Rom drive and take the option to Perform additional tasks from the Autoplay menu, whereupon you'll find 'Set up Remote Desktop Connection' as the first option.

You shouldn't have any problems with the installation, but finding the client once it's installed can be a bit of a task. That's because rather than create a convenient desktop icon, it's cunningly hidden away on the Start menu, under Programs/Accessories/Communications.

When you run the client you'll be prompted for the name or IP address of the remote server to be accessed and, optionally, the user name and password to be used when you log on, as in screenshot 3. Other options include the ability to choose the screen resolution to use for the remote session and facilities to share local resources (such as disks) with the remote host. The resource sharing only works when connecting to another XP or Windows Server 2003 system, not Windows 2000 servers running the earlier Terminal Services software.

Remote browser access

Another very useful facility is the ability to connect to Terminal Services and manage a Windows server using a browser, doing away with the need to install a local client at all. An IIS web server is required for this to work, either running on the server to be managed or elsewhere on the Lan. In addition you have to install a special ActiveX control and a collection of HTML pages to go with it. These used to be referred to as the Terminal Services Advanced Client (TSAC), but with the advent of Windows XP and Windows Server 2003 they're now called the Remote Desktop Web Connection.

As with the XP Remote Desktop Connection client there are a number of ways of obtaining the web software. For instance it's included on the CD-Rom version of Service

Windows XP comes with a built-in Terminal Services client as part of the Remote Desktop Connection facility, and the same client can also be used on other Windows platforms

By installing the Remote Desktop Web Connection software on an IIS server it's possible to connect and logon to a remote Windows 2000 server using a Web browser rather than a custom client

Pack 1 for Windows XP. However, for most people the easiest way of getting hold of it is as a download it from the Microsoft website. Unfortunately as with all Microsoft addresses the URL involved may have changed by the time you read this, but at the time of writing the web software download was at www.microsoft.com/windowsxp/pro/downloads/rdwebconn.asp.

Installation is easy enough, the setup routine merely creating a directory on the IIS server, at C:\Intepub\Wwwroot\Tsweb, before copying everything required into it. And there's no need for extra software or special setup at the client end of the link, just a browser that supports ActiveX, such as Internet Explorer, and an IP-enabled Lan or Internet connection between the client and remote server.

How you access the Web Connection software once it's loaded will depend on whether DNS and WINS are configured on the network, to convert server names to IP addresses. However, even when they're not you can simply type in the IP address of the server followed by /tsweb, as in screenshot 4.

The HTML in the /tswb directory will then prompt for the name of the Windows host and the resolution to be

used, just as with the standard client software. You can also specify a user name to pass to the logon dialogue, although not a password as with the Windows client. That's considered too risky with software that, potentially, enables users to access and manage servers over the Internet.

If you don't supply the account name up front the usual Windows 2000 logon dialogue displays in the browser (full screen if you select that resolution), followed by the desktop. Then you get the remote desktop on the local display, just as with the standard Windows clients, looking something like screenshot 5.

Once connected, it's more or less like sitting at the local server console. All the management tools and applications normally accessible can be run remotely. The speed of the link is the main limiting factor and for maximum performance a 100Mbps/sec Lan connection or faster is required. However, the software can be used over slow dial-up lines and still give reasonable results. You need to take security seriously and, if you're connecting to the server over the Internet, consider setting up an encrypted VPN (virtual private network) connection to ensure privacy.

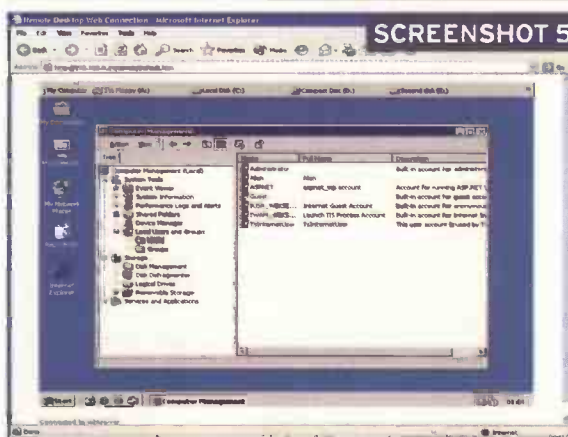
The drawbacks

Windows-based PDAs and thin-client PCs can also be used for remote server management, and there's a Terminal Services plug-in for the Microsoft Management Console (MMC). As a free built-in component of Windows 2000 Server, Terminal Services is worth enabling and using to remotely manage your servers. However, it's not all good news as there are some things you can't do remotely using Terminal Services.

You can't send Ctrl & Alt & Del to the remote server, for example. Nor does it let you chat with a remote operator or let them see what you're doing, unlike some other software-based remote control tools. A remote server can be rebooted, but you can't cycle the power remotely or regain access until Windows has reloaded, which means you can't troubleshoot start-up problems remotely or change Bios settings with Terminal Services. It's really only possible to do that with the more expensive KVM hardware solutions.

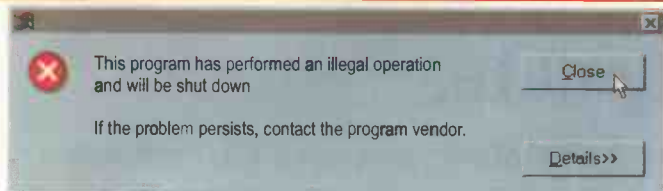
CONTACTS

Alan Stevens welcomes your comments on the Networks column. Email him at: networks@pcw.co.uk. Please do not send unsolicited file attachments.



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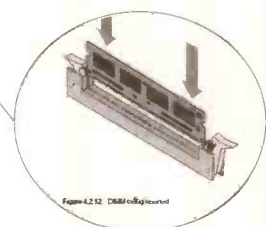
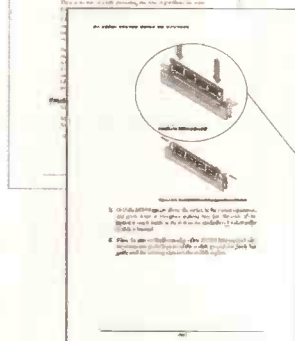
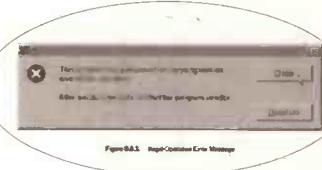
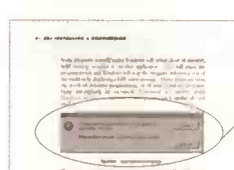
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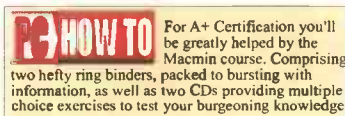
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Mark Whitehorn

is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars

Green fingers and sticky dates

A nursery report grows, we explain how to document a database, and solve a date problem.

Placing text fields in Access reports can be tricky, especially when they contain variable length strings, as is almost always the case. Either you have huge text boxes to accommodate the longest possible entry and waste space, or make them smaller and risk a nasty case of truncation. Eric Spencer, who runs a small plant nursery, hit this problem printing reports of the plants in his Access 97 database.

Concatenation of text fields can often provide an answer. In the nursery database, plant names are stored in three separate text fields, Genus, Species and Cultivar, to allow records to be sorted by genus and species. Plant names vary from the terse (*Arum pictum*) to the verbose (*Campanula portenschlagiana*) and beyond (*Primula japonica* Miller's Crimson). Eric had placed an unbound text box in the detail section of a report and typed in:

```
= [Genus] + " " + [Species] + " " + [Cultivar]
```

(Key: code string continues)

The strings from those three text fields were placed neatly with one space between each name without any gaps or overlaps (see screenshot 1).

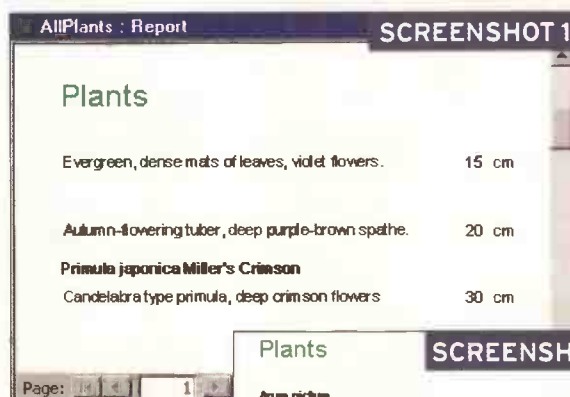
Well, almost. The names were entirely missing for the first two plants, but appeared, as he was expecting, for the third.

The answer is therefore to edit the text box to read:

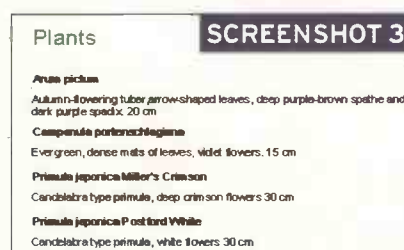
```
=[Genus]&" "&[Species]&" "&[Cultivar]
```

whereupon everything works as it should

This is an excellent illustration of one of the differences between + and &. Access' help says quite clearly that + can be used to concatenate strings, but it goes on to say that to eliminate ambiguity, & should be employed. The reason given is that if you're concatenating a mixture of strings and numbers using +, the arithmetical result is returned. But we're only working with strings here, so what's the problem? It seems to be that if any of the text fields are empty (ie are null), then the concatenation does not proceed. (Even seeding – pardon the pun – the Cultivar field with an empty string as a default value doesn't help).



Above: Summing text is not always optimal...

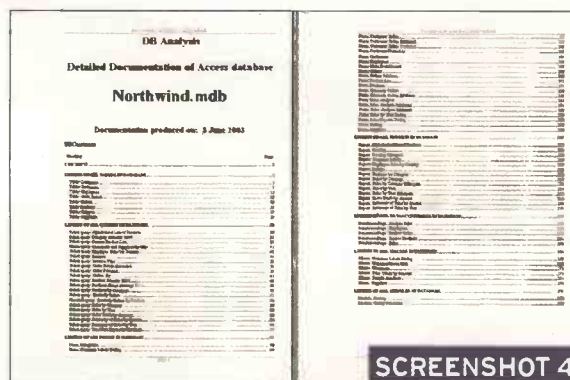


Above: ...finally
it works

This sounds weird but it has a certain logic. Remember that + is a mathematical operator and that null has a very specific meaning. It means we do not know the value in the field – in other words, the value is unknown. Now, if you add three and an unknown value, you can see it is impossible to give an accurate answer, which is why Access refuses to give one.

So, in mathematical terms, we can never give an answer to a sum that includes a null. However, in this case, since we are dealing with the names of plants stored in text fields, a null value can safely be taken to mean

**Documented
databases at the
touch of a button**



SCREENSHOT 4

‘There is no text in here.’ The ampersand operator converts all values into strings and then concatenates (rather than adds) them, which is why it works. So, as a general rule, I’d advise using the ampersand rather than + when you want to concatenate strings.

Eric was delighted with the solution but came back with another problem. He improved the use of space further by concatenating the description and height fields:

```
="[Description]" & "✓"  
"&[Height]" & " cm"
```

Making the Detail section considerably deeper and looking at the report again gives us a clue: it shows that all the plants have grown. Access is interpreting the word 'height' as meaning the height of the current section. The height is measured, you'll be pleased to know, in twips: 'A unit of measure used by Microsoft Access that is equal to $\frac{1}{20}$ of a point, or $\frac{1}{1,440}$ of an inch. There are 567 twips to a centimetre.' This is despite the property list showing the height in normal centimetres...

The answer is to include the table name in front of the Height field, like this:

```
=[Description]&" "  
"&[Plants.Height]&" cm"
```

Finally, sorting the plants by genus, species and then by cultivar would be useful, so click the **Sorting and Grouping** button and enter:

[Genus]&[Species]&
[Cultivar]

Once again & is the symbol of choice for a perfectly sorted list (see screenshot 3). All the foregoing appears to be true for Access 2000 as well.

Documenting databases

In theory all databases should be extensively documented. In the world of serious database design (banking systems etc) we can use ER modelling tools to create, maintain and document the databases (although it has to be said that even at this level I see a terrifying number of poorly documented systems). It is clearly OK for simple, hobbyist databases to be undocumented; the trouble is that these often quietly

morph over time into multi-user, mission-critical databases. Then one day the database dies and no-one can fix it without the documentation that wasn't produced in the first place.

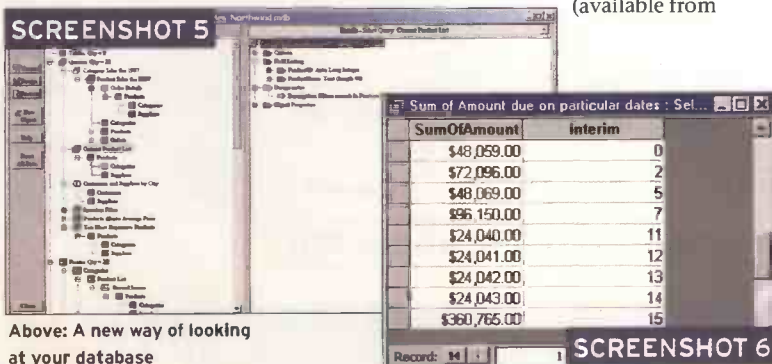
The simple answer is for me to shout loudly at you: 'You must document important databases!' The problem is, if you are a normal database designer, you won't. You will have a variety of excellent excuses – you are too busy, you'll do it next week, documentation is for cissies, whatever. I know – I use exactly the same excuses. The bottom line is that many mission-critical Access databases are totally undocumented. So what we really need is an automatic documentation tool for Access, and I've found one. It's called Db Analysis 2: you simply fire it up, point it at an Access database and it will generate the documentation. At full blast it generated a 281-page document about Northwind (see screenshot 4) which contains everything you could possibly imagine about the database and is wonderful when you suddenly discover that the auditors are due. For your own use you can select whatever detail level you require.

Db Analysis 2 would be an outstanding tool if all it did was to document, but there is more. It provides an excellent hierarchical view of the objects within the database, which is invaluable for more complex databases (see screenshot 5). It also has a seek and replace facility and a database map that shows all of the Access databases on the network: where they are, when they were last used and the objects that they contain.

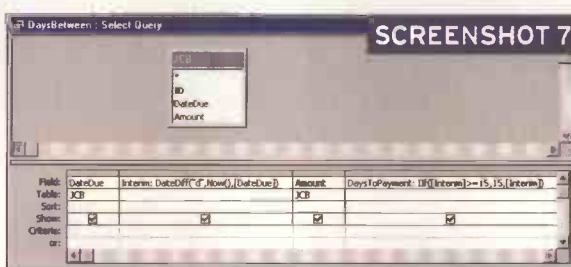
If you are a serious user of Access then this tool will be worth its weight in gold. Think about it. How many hours would it take you to earn £295 ex VAT? Do you really want to spend all of them writing documentation – visit www.dbanalysis2.com instead.

Sticky dates

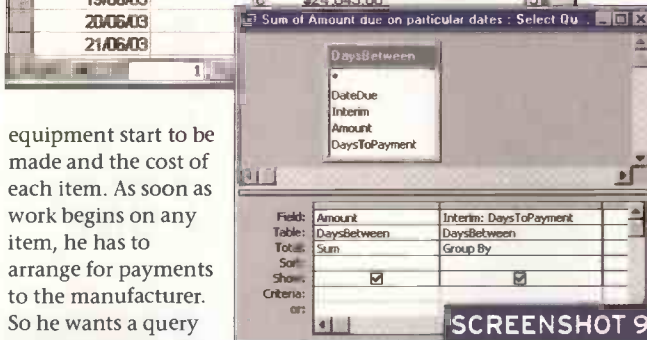
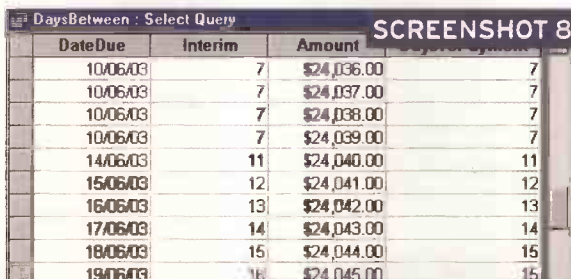
Mark Shaefer emailed in a date problem. He has a table containing the dates on which items of



Above: A new way of looking at your database



Above: The first query - DaysBetween



SCREENSHOT 9

equipment start to be made and the cost of each item. As soon as work begins on any item, he has to arrange for payments to the manufacturer. So he wants a query that will tell him, for any given day in the future, the total sum that he will have to fork out on that day. Or more accurately, he wants a total for each of the next 14 days. Any payments that are more than 14 days in the future should be summed into one large total (see screenshot 6).

This problem is best solved in two steps, with two queries. The first one will calculate the difference in days between today's date and the start date; it'll also do the groundwork that will allow us to group together records as Mark requires. We'll base the second query on this one. This second query will group together the records with the same date difference and sum the amounts for all of the records in each group.

In the sample file dbcsep03.mdb
(available from

www.penguinsoft.co.uk) is a simple table called JCB with an ID field, a DateDue field and an Amount field. The first query is called DaysBetween, see screenshot 7.

The second column creates a field called `Interim` and the code that manipulates the dates is:

```
DateDiff("d", Now(),  
[DateDue])
```

DateDiff is an Access function that takes three arguments: first, the part of the data that interests you, and then the two dates between which you want to calculate the difference. Mark is interested in days, so the "d" tells the function to look at the day part of each date. Now() is another function which returns today's date and [DateDue] is the field in the underlying table in which the

starting dates for builds are stored. Whenever the query is run, the day element from today's date and for each start date will be compared, the difference calculated and put into the Interim field.

The last column creates another field, `DaysToPayment`, and this code will let us, when the second query is run, amalgamate the values for any date differences of over 14 days into a single amount:

```
DaysToPayment: ✓  
If([Interim]>=1  
[Interim])
```

This says if it is true that the value generated by Interim (ie the difference in days between dates) is greater than or equal to 15, write "15" into the DaysToPayment field. If it is false, write in the value from the Interim field (see screenshot 8).

Values in the DaysToPayment field run up to 14 and then all further entries contain the value 15.

Now we create a second query, based upon `DaysBetween`, to do the grouping and summing (see screenshot 9).

The records are grouped by the values in the DaysToPayment field and for each group the values in the Amount field are summed as shown above. The result is a list of days ahead from today and the sum to be paid. These screenshots were taken with dummy data that differs from that in the sample file: the dates in the sample should encompass the period when you're likely to be reading it.

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Mark Whitehorn welcomes your comments on the Databases column. Email him at: database@pcw.co.uk. Please do not send unsolicited file attachments.

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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



Delphi regenerated

We take the lid off Borland's long awaited revamp of Delphi and the launch of IDE for C#

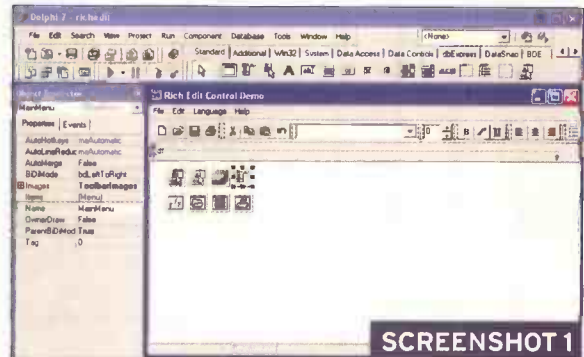
For many years, Borland's Delphi has been the smart choice for Windows development. Its Object Pascal language is more powerful than Visual Basic (VB), but easier to learn than C++. With its user-friendly visual development IDE, fast compiler, and broad support from third-party component vendors, Delphi has it all. That said, Delphi developers have not been greatly impressed by the way Borland has managed the product in recent years. It marches from version to version, but many of the changes are in the form of add-on products that are not essential for day-to-day development (see screenshot 1).

The IDE has changed little, and long-running complaints, such as poor online help, never seem to be resolved. The one major innovation has been cross-platform support for Linux. Kylix is Delphi for Linux and, provided you use the CLX library (where CLX probably stands for Component Library for Cross-Platform), you can build native

executables for both Windows and Linux. Although Kylix works well, it hasn't yet taken off in the way Borland hoped. It seems that most Delphi developers still target Windows, or else use Java for their cross-platform efforts.

The big news currently is that Delphi is about to get its most radical revision since it went 32bit back in 1996. That includes a completely new IDE and a new target platform. The product does not yet have an official name, so I'll call it Delphi 8. Borland is promising to ship it some time this year, which most likely means the fourth quarter.

Delphi 8 still supports the VCL (Visual Component Library) and presumably CLX. However, if you use the VCL you can choose whether to target Win32 native code, or Microsoft .Net. If you target .Net then Delphi invokes dccil.exe, Borland's Pascal to MSIL compiler. Compatibility is good, so porting an existing Delphi application to .Net should be relatively straightforward. There are a few problem areas,



SCREENSHOT 1

Despite achieving version 7, Delphi has not changed radically for several years

though. For database work, anything that uses the old BDE (Borland Database Engine) will need revising to use Microsoft's ADO.Net library instead. The same is true of applications using dbExpress, Borland's more recent database API, but these convert more easily because they use a disconnected model similar to ADO.Net. Another tricky area is third-party components. At this stage, it's impossible to say which Delphi components will support .Net. Finally, code that makes use of pointers, such as



Where next for Delphi?

David Intersimone (pictured), Borland's vice-president of developer relations talks about the future of Delphi and where .Net fits in.

Q What are the benefits of .Net for Delphi developers?

A It gives you another trick to leverage your skills in Delphi. If you're a corporate developer and you've got some Microsoft infrastructure you want to move forward, .Net is a natural place to extend. Longer term, all future interfaces to Windows will be managed code. Getting to know how to use this will be critical to future versions of Windows.

Q Microsoft seems to have trouble moving people to .Net. Won't it be even harder for Borland?

A It's just at the early stage. When Java first came out people were wondering what it was for apart from applets. That happens naturally at the beginning of the adoption curve. I think ASP.Net is a real difference. It's too bad they called it ASP.Net, because it has no relationship whatever to ASP. It is a really clean architecture for easily putting together robust web applications. There's a nice collection of re-usable components and a component model so that you can build server-side components very easily.

Microsoft has also put all the databases under one interface layer, ADO.Net, as opposed to being all over the box with ODBC and OLE DB and so on. It's a set of interfaces people can still innovate underneath like we've done with our Borland Data Provider

technology. One could argue over whether to use Delphi VCL or VB or C++ to do Windows apps, but that is more of a long-term payoff.

Q What's new in Delphi 8?

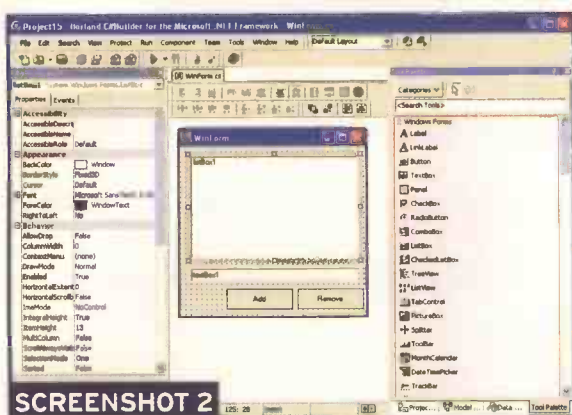
A There is the new development environment implemented in C# Builder, a common development environment for Windows and .Net. It has the C# Builder language in it now, but the Delphi developers will get all the same functionality later this year. They can choose which component library or framework to use.

Q How easy is it to port a Delphi application to .Net?

A In most cases it's just a recompile. There's a one-for-one replacement of database components, but they are built on the same infrastructure as our dbExpress technology. Going from dbExpress to Borland Data Provider is simple, with one-for-one plug-compatible components. We've moved over almost everything in the VCL.

Q Is Borland interested in Mono, the .Net Framework on Linux?

A We believe in cross-platform development, but first we have to support Microsoft because that's where the bulk of the business will be. Microsoft is not keen on licensing the .Net Framework for other platforms, though. They've given the common type system, the common runtime and the language to ECMA (a European standards organisation), but the challenge is in implementing the whole .Net Framework without infringing on Microsoft's patents. We have an interest in multiple platforms, not just Microsoft, and not just Java, so we're watching what's going on.



SCREENSHOT 2

Delphi's PChar type, will need modifying to work in .Net.

Ironically, Borland is doing a better job with Delphi compatibility than Microsoft managed with Visual Basic and VB.Net. One reason for this is that Object Pascal is a better place to start. It already supports inheritance, exception handling, try/finally blocks, and other good things that VB never had. Further, the VCL is similar to the .Net Framework in many respects. All of this means an easy ride for Delphi developers migrating to the managed code of .Net.

A point of interest is how many Delphi developers will want to make this move. It's a community that is satisfied with its chosen tool, and reluctant to embrace change for its own sake. Developers like the fast native code that Delphi builds, and it will take a strong incentive before they accept the large runtime library that .Net imposes. This is especially true of Windows Forms applications, which typically load more slowly and consume more memory than their Win32 counterparts. At the recent Delphi Conference I quizzed David Intersimone, Borland's vice-president of developer relations, on this subject, and you can see his comments in the interview on the previous page.

Win32 development will be a large but declining market in the coming years, so Delphi developers will probably need to jump somewhere. It won't necessarily be to .Net though, since both Kylix/Linux and Java have their attractions. Still, full credit to Borland for opening up the .Net platform to Delphi users. Another factor is that .Net components work seamlessly with any .Net language, so Delphi, VB and C# will have a level playing field. That should mean more and better components all round.

CSharpBuilder

CSharpBuilder is Borland's IDE for Microsoft C#, also including some

The CSharpBuilder IDE will also be used for Delphi 8

support for Visual Basic .Net. It's being launched before Delphi 8 and should be available now. This is the first commercial alternative to Microsoft's Visual Studio .Net. Considered as a plain C# IDE, it's unlikely that CSharpBuilder will win over many developers from Visual Studio, which is itself an impressive product. However, CSharpBuilder does have a few advantages. One is that Borland has used its cross-platform expertise to create Janeva, an add-on that bridges .Net with J2EE and Corba. This is excellent for organisations that have J2EE application servers but want to make use of .Net or ASP.Net clients.

Another factor is database support, with Borland providing new ADO.Net drivers for Interbase, Oracle and DB2. Third, Visual Studio is weak in the modelling area, whereas Borland is strong, particularly since its acquisition of Togethersoftware. Over time, more and more of the Together modelling and refactoring technology will find its way into CSharpBuilder and Delphi 8 (see screenshot 2). Overall, Borland's entrance into .Net development is welcome news for anyone using Microsoft's new platform.

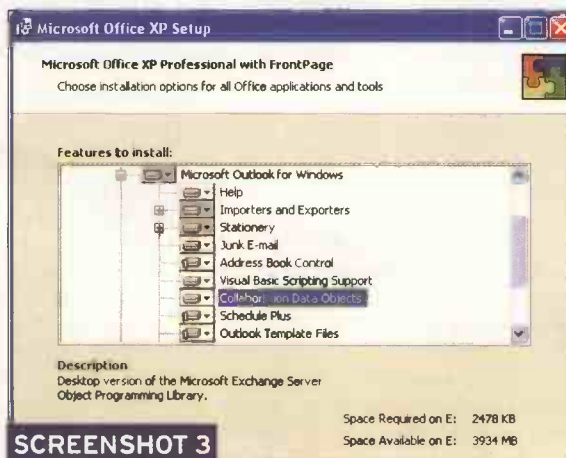
Programming Outlook

Moving on to programming Outlook, reader Geoffrey Behrman wrote in to say: 'I am using Outlook 2000 with Windows ME. I would like to record a macro so that I can do an Add to Junk and Delete at the same time.'

This can be done, but it is not as easy as it should be. You cannot record a macro in Outlook, but you can write a macro using VBA. The first task is to get a reference to the currently selected item, which you can do easily:

```
Dim selItem As MailItem
Set selItem = Application.ActiveExplorer.Selection
```

To get the sender's email address from Visual Basic, you have to install Collaboration Data Objects



SCREENSHOT 3

Item(1)

(Key: ✓ code string continues)

A MailItem has a Delete method, which moves it to the Deleted Items folder. Alternatively, you might want to move it to the Junk E-mail folder. To do this you need to search through the Outlook folders. The top-level folders collection is a property of the Namespace object, and each folder has its own folders collection. In a standalone Outlook, there is likely to be just one top-level folder, so you can find Junk E-mail like this:

```
Dim ns As Namespace
Set ns = GetNamespace("MAPI")
Dim junkfolder As MAPIFolder
Set junkfolder = ns.Folders(1).Folders("Junk E-mail")
selItem.Move junkfolder
```

If Outlook is used with Exchange, there will be at least two top-level folders, one for the mailbox and one for public folders. In this case, iterate through the top-level Folders collection until you find the right one.

The next part is more problematic. You need to find the sender's email address and add it to the junk senders' list. For some reason, Outlook does not expose the sender's email. To get it, you need to use CDO (Collaboration Data Objects), which is not installed by default. Go to Add-Remove programs, modify the Outlook installation and select CDO (see screenshot 3). You will need the Office installation CD. Then grab code to retrieve the sender's email from here: www.slpstick.com/dev/code/getsenderaddy.htm. As this article notes, you may run into the infamous Object Guard, which throws up a warning about programmatic access to the address book. Once you get past that, you can add it to the junk sender's list by appending it to the file Junk Senders.Txt, which is located with your other profile data. For example, in Windows XP it is somewhere like: C:\Documents and Settings\username\Application Data\Microsoft\Outlook.

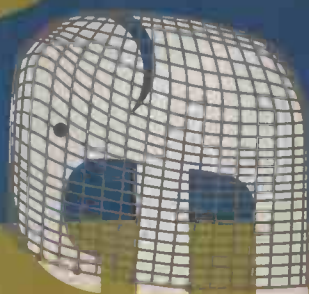
The easiest way to find it is through a search. Unfortunately, the worst spammers frequently change their From address, but it may help with semi-legitimate marketing lists.

For information on CSharpBuilder and Delphi 8, see www.borland.com.

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.

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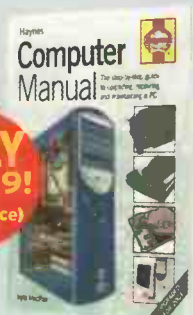
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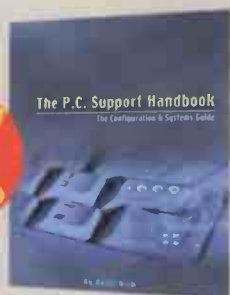
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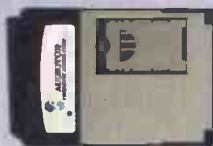


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AAA0132	512MB CompactFlash card	£85.76 inc	(£72.99 exc)
WAAH0129	CompactFlash to SD card adapter	£19.99 inc	(£17.01 exc)

Pocket PC and Palm OS PDAs

WCOH0134	HP iPAQ H3970	£323.11 inc	(£274.99 exc)
WCOH0149	HP iPAQ H5450 Pocket PC	£439.95 inc	(£374.42 exc)
PPAH0211	Palm Tungsten T	£251.45 inc	(£214.00 exc)
PPAH0228	Palm Tungsten C	£340.74 inc	(£289.99 exc)

Bluetooth and Wi-Fi accessories

Bluetooth USB dongle

AAA0130 £34.99 inc (£29.78 exc)

- > Easy to install on PC or laptop
- > Connect to email through your phone
- > Sync wirelessly to Bluetooth PDA



Bluetooth headset

AAA0134 £49.99 inc (£42.54 exc)

- > Rechargeable - mains adaptor included
- > "high quality connectivity and great value for money" What Cellphone



Prolink Wi-Fi 802.11 CF card

- > Wireless LAN card supports 64/128 bit encryption, 11Mbps
- > CF type I card
- > Supports Windows 98/2000/XP/ME
- > Pocket PC 2000/2002



Pocketop wireless PDA keyboard

"It's neat, and thin, and light. Pocketop may have a winner." Guy Kewney

"A must have for any serious PDA user." Earth Village. Rating: 5 out of 5

"Build quality of the keyboard is good. Data entry was faster than any Pocket PC or Palm 'on device' method." What Laptop

AAA0129 Pocketop Wireless Keyboard £68.08 inc (£68.08 exc)

NEW! Now works with HP iPAQ 1910, 5400, Fujitsu-Siemens Pocket Loox Download the latest drivers from www.pocketop.net

Pocketop



TomTom Navigator 2 satellite navigation for Pocket PC



WAAHxxxx £281.99 inc (£239.99 exc)

The GPS of choice for Pocket PC. Voice instructions and high resolution maps. Includes GB mapping software which can be loaded on CF or SD. Including cable for your PDA.

Special offer:

Buy a 128MB SD for only £15+VAT when bought with Navigator 2. See www.widget.co.uk for latest bundles of Navigator 2, plus Viewsonic or HP iPAQ.

WayFinder mobile phone-based satellite navigation system

AAA0214 £399.99 inc (£340.42 exc)

A complete wireless satellite navigation system for Symbian Series 60 mobile phones, including Nokia 7650, 3650 or 6600. Includes Bluetooth GPS unit and 1 year subscription to mapping service



Zipling retractable USB sync chargers



AAA0175 Nokia/Ericsson Phone Charger £24.99 inc (£21.27 exc)

WCOH0160 iPAQ 38/39/54xx £17.61 inc (£14.99 exc)

PPAH0230 Palm m5xx/Tungsten/Zire £17.61 inc (£14.99 exc)

"a handy range of retractable cables for the mobile worker, from USB cables to laptop-mobile chargers and phone-charging cables. There are no dangling cables: you zip the slack back into a button-size container." The Times

The coolest way to recharge phones or hotsync PDAs. USB and Firewire extension cables, Car chargers also available.

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The specialist component centre within every PC World store has everything the computer expert needs to build or upgrade their own PC or laptop.

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- Our basic packaging, and no instructions, cables or software, ensures rock bottom prices.
- Take away from store today with no delivery charges.▲



TOP DEALS THIS MONTH

AMD ATHLON XP3200+
400MHZ FSB PROCESSOR-IN-A-BOX
3DNOW! PROFESSIONAL QUANTISPEED APPROVED
HEATSINK FAN AND 3 YEAR AMD WARRANTY
PRODUCT CODE 935654



For illustration purposes only

PC WORLD PRICE
EX VAT
£325.00
INC VAT
£381.88

PNY GEFORCE FX5800
GRAPHICS CARD
128Mb DDR2, AGP 8x, 400MHz Core Clock, 3.2b Texels, 12.8Gb Bandwidth, TV-Out, DVI.
PRODUCT CODE 929721



PC WORLD PRICE
EX VAT
£250.00
INC VAT
£293.75

CHANTECH 7NJS Ultra
ULTRA MOTHERBOARD (AMD)
nVidia nForce2, 3x DDR DIMMS (Max 3Gb), ATX Form Factor, 400MHz FSB, AGP 8x, 6x USB
2.0, 5x PCI slots, 1 x ACR slot.
PRODUCT CODE 935648



PC WORLD PRICE
£110.00
INC VAT
£129.25



ADVENT 3517

Intel Pentium 4 3.2GHz processor with HT technology, 1024Mb DDR RAM,
200Gb hard drive, separate DVD-RW & DVD-ROM drives, 256Mb GeForce
FX5600 graphics, 56k modem, software: Windows XP Home, Works 7.0.

PRODUCT CODE 939382



PC WORLD PRICE
EX VAT
£1090.20
INC VAT
£1280.99



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AMD PROCESSORS



AMD ATHLON
XP2000+
333MHz FSB
PRODUCT CODE 759664

THIS PROCESSOR IN
A BOX SOLUTION
COMES WITH AN
APPROVED
HEATSINK FAN AND
3-YR AMD
WARRANTY

PC WORLD PRICE
EX VAT
£51.00
INC VAT
£59.93



AMD ATHLON
XP2400+
333MHz FSB
PRODUCT CODE 810594

THIS PROCESSOR IN
A BOX SOLUTION
COMES WITH AN
APPROVED
HEATSINK FAN AND
3-YR AMD
WARRANTY

PC WORLD PRICE
EX VAT
£64.00
INC VAT
£75.20



AMD ATHLON
XP2800+
333MHz FSB
PRODUCT CODE 837193
(selected stores only)

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APPROVED
HEATSINK FAN AND
3-YR AMD
WARRANTY

PC WORLD PRICE
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£129.00
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£151.58



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AMD ATHLON
XP3000+
333MHz FSB
PRODUCT CODE 935656

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3-YR AMD
WARRANTY

PC WORLD PRICE
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£209.96
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AMD ATHLON
XP3200+
400MHz FSB
PRODUCT CODE 935654

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COMES WITH AN
APPROVED
HEATSINK FAN AND
3-YR AMD
WARRANTY

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INTEL PROCESSORS



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1.8GHz
Socket 478
PRODUCT CODE 755623

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SOLUTION FROM
INTEL INCLUDES
FAN AND INTEL
WARRANTY

PC WORLD PRICE
EX VAT
£51.00
INC VAT
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INTEL PENTIUM 4
2.0GHz
Socket 478
PRODUCT CODE 687696

RETAIL BOX
SOLUTION
512K L2 CACHE
400MHZ FSB

PC WORLD PRICE
EX VAT
£119.00
INC VAT
£139.83



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INTEL PENTIUM 4
2.4GHz
Socket 478
PRODUCT CODE 755561

RETAIL BOX
SOLUTION 512K
L2 CACHE
533MHZ FSB 0.13
MICRON

PC WORLD PRICE
EX VAT
£125.00
INC VAT
£146.88



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INTEL PENTIUM 4
2.8GHz
Socket 478
PRODUCT CODE 856689

RETAIL BOX
SOLUTION 512K
L2 CACHE
533MHZ FSB 0.13
MICRON

PC WORLD PRICE
EX VAT
£215.00
INC VAT
£252.63



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INTEL PENTIUM 4
3.06GHz
Socket 478
PRODUCT CODE 856697

Hyper-threading
Technology
533MHz Bus
512Kb L2 Cache
0.13 Micron

PC WORLD PRICE
EX VAT
£255.00
INC VAT
£299.63

FANS



COOLER MASTER'S LATEST
RETAIL COOLER, IS THE
SILENT FAN - X-DREAM.
WITH ITS
AERODYNAMICALLY
DESIGNED FAN GRILL TO
REDUCE NOISE DEFICIENCY,
ADJUSTABLE FAN SPEED
WITH MAXIMUM AIR FLOW
OF 62CFM, COPPER BASE
AND THEIR WELL KNOWN
TOOL-LESS INSTALLATION.

COOLERMASTER PC WORLD PRICE
HHC-L61 SILENT FAN
Socket A 2600+
6800rpm
37.6CFM
PRODUCT CODE 770548
EX VAT
£25.50
INC VAT
£29.96

COOLERMASTER PC WORLD PRICE
HAC-V81
Skt A for AMD
up to XP2800+
PRODUCT CODE 852909
EX VAT
£11.00
INC VAT
£12.93

COOLERMASTER PC WORLD PRICE
SILENT FAN
XP2100+ Fan
5400rpm
PRODUCT CODE 620472
EX VAT
£6.00
INC VAT
£7.05

COOLERMASTER PC WORLD PRICE
80mm LED FANS
Available in blue,
green, orange, purple,
red & white
2500rpm, 25DB(A)
EX VAT
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£9.40

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PC World Component Centre offers a
range of memory products to cater
for every customer's needs.

- Component Centre Value Memory means
we won't be beaten on price.
- Our OEM range supplied to us from PNY
also offers excellent value, with the added
benefits of a recognised brand and 5 year
manufacturer's warranty.
- Corsair XMS, the memory of choice for
the serious gamer, is now available in
selected stores.

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FREQUENTLY CHECK INSTORE
TODAY FOR OUR LATEST PRICES**

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PC WORLD

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CUBESYSTEMZ BAREBONE SYSTEM

This lifestyle PC, new from CubesystemZ, is a highly spec'd barebone PC supporting socket 478 Intel processors up to 3.06GHz. Ready fitted with an Intel 845GE motherboard, features include support up to 2Gb PC2700 DDR, AGP 8x support, 2x DIMM slots, 1x PCI, 128Mb Video memory, 6-channel audio, LAN, Firewire, USB and SPDIF IN/OUT.
PRODUCT CODE 847718

EXCLUSIVE TO
COMPONENT CENTRE



PC WORLD PRICE
EX VAT
£212.76
INC VAT
£249.99

(Perspex side panel sold separately)

CUBESYSTEMZ BAREBONE SYSTEM

This AMD version of the CubesystemZ also comes highly spec'd, supporting Socket A processors up to XP2400+. Ready fitted with an SiS740/961 motherboard, features include 2x DIMMS slots supporting up to 2Gb DDR, 1x PCI slot, SiS315 graphics, AC97 6-channel audio, 4 x USB 2.0, IEEE1394 Firewire, LAN. This barebone PC leaves the choice of processor, memory and drive solution up to you.
PRODUCT CODE 847656

EXCLUSIVE TO
COMPONENT CENTRE



PC WORLD PRICE
EX VAT
£178.71
INC VAT
£209.99

(Perspex side panel sold separately)

MOTHERBOARDS AMD Socket A Compatible

LEADTEK K7NCR18D

NVIDIA nForce2-S,
200-333MHz FSB, Supports
to 3 x PC3200 DDR, AGP 8x
PRODUCT CODE 859284

PC WORLD PRICE
EX VAT
£63.00
INC VAT
£74.03

MSI K7N2 DELTA-ILSR

400MHz FSB, nVidia nForce2,
3x DDR DIMMS (Max 3Gb),
ATX Form Factor, AGP 8x,
6x USB 2.0, 5x PCI slot,
1x ACR slot
PRODUCT CODE 935648

PC WORLD PRICE
EX VAT
£85.10
INC VAT
£99.99

CHAINTECH 7NJS

Ultra Motherboard, 400 MHz
FSB, nVidia nForce2, 3x DDR
DIMMS (Max 3Gb), ATX Form
Factor, AGP 8x, 6x USB 2.0,
5x PCI slots, 1 x ACR slot
PRODUCT CODE 935648

PC WORLD PRICE
EX VAT
£110.00
INC VAT
£129.25

Intel Socket 478 Compatible

FUJITSU D1555

SiS 648, 533MHz FSB, 3 x
DDR DIMMS, Supports
max 3Gb PC2100, LAN,
Audio
PRODUCT CODE 857433

PC WORLD PRICE
EX VAT
£60.00
INC VAT
£70.50

MSI 865PE NEO-L

800/533/400MHz FSB, 2x
ATA100, 8x AGP, 5x PCI slots, 2x
DDR DIMMS, 5.1CH audio
PRODUCT CODE 942766

PC WORLD PRICE
EX VAT
£72.33
INC VAT
£84.99

ABIT BH7

Intel 845PE, 533MHz FSB,
DDR333 Support to 2Gb,
LAN, Serial ATA
PRODUCT CODE 859596

PC WORLD PRICE
EX VAT
£72.33
INC VAT
£84.99

MORE MOTHERBOARDS AVAILABLE IN-STORE

POWER SUPPLIES



JEANTECH
300W PSU
PFC Compliant
PRODUCT CODE 328137

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JEANTECH
400W PSU
PFC Compliant
PRODUCT CODE 529740

PC WORLD PRICE
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£34.00
INC VAT
£39.95

JEANTECH
500W PSU
PFC Compliant
PRODUCT CODE 786244

PC WORLD PRICE
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£51.00
INC VAT
£59.93

DESIGNER SYSTEM CASES FROM JEANTECH

CHROME



FRONTED MIDI
300W PSU 4 x 5.25"
bays
PRODUCT CODE 786252

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£34.00
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£39.95

BLUE



MIDI CASE
Incl. 300W PSU
4 x 5.25" bays
Front USB/audio
PRODUCT CODE 497523

PC WORLD PRICE
EX VAT
£34.00
INC VAT
£39.95

SILVER & BLACK



MIDI TOWER
300W PSU 4 x 5.25"
bays
PRODUCT CODE 786279
(Transparent panel &
lights not included)

PC WORLD PRICE
EX VAT
£38.00
INC VAT
£44.65

VENTED SILVER



FRONTED MIDI
Model JN102, 300W
PSU, 4 x 5.25" bays
PRODUCT CODE 786287

SELECTED
STORES ONLY
PC WORLD PRICE
EX VAT
£38.29
INC VAT
£44.99

HYDRAULIC DOOR



MIDI TOWER
Front USB/Audio,
300W PSU
PRODUCT CODE 786400

SELECTED
STORES ONLY
PC WORLD PRICE
EX VAT
£46.50
INC VAT
£54.64

ALUMINIUM



MIDI TOWER
Front USB/Audio,
excl PSU
PRODUCT CODE 786295

PC WORLD PRICE
EX VAT
£51.00
INC VAT
£59.93

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MOTHERBOARDS, SYSTEM CASES & POWER SUPPLIES

3

COMPONENT CENTRE HARD DRIVES



For illustration purposes only

SEAGATE

60Gb Hard Drive
7200 rpm Version 5
PRODUCT CODE 817537

This is the latest version of the Seagate Barracuda. This hard drive has an ultra ATA/100 interface, 7200 rpm desktop performance, 2Mb Cache Buffer, 3-D defence system (Industry's most comprehensive drive and data protection system) and Software FDB motor

PC WORLD PRICE

EX VAT
£55.00

INC VAT
£64.63



This 60Gb Hard Drive offers Ultra ATA/100 interface with a 2Mb Multisegmented cache. The average seek time is a 8.9 milliseconds. This Hard drive comes with Date Life Guard



60Gb Hard Drive
7200 rpm
PRODUCT CODE 753269

PC WORLD PRICE

EX VAT
£57.01

INC VAT
£66.99



This 80Gb Hard Drive offers Ultra ATA/100 interface with a 2Mb Multisegmented cache. The average seek time is a 8.9 milliseconds. This Hard drive comes with Date Life Guard



80Gb Hard Drive
7200 rpm
PRODUCT CODE 753398

PC WORLD PRICE

EX VAT
£68.00

INC VAT
£79.90



This 120Gb Hard Drive offers Ultra ATA/100 interface with a 2Mb Multisegmented cache. The average seek time is a 8.9 milliseconds. This Hard drive comes with Date Life Guard



120Gb Hard Drive
7200 rpm
PRODUCT CODE 753417

PC WORLD PRICE

EX VAT
£80.00

INC VAT
£94.00



With the Ultra ATA/100 interface, 2Mb Multisegmented cache and an average seek time of 8.9 milliseconds. This Hard drive is also S.M.A.R.T capable

For illustration purposes only

SEAGATE

20Gb Hard Drive
5400 rpm
PRODUCT CODE 753363

PC WORLD PRICE

EX VAT
£38.00

INC VAT
£44.65



With the Ultra ATA/100 interface, 2Mb Multisegmented cache and an average seek time of 8.5 milliseconds. This Hard drive is also S.M.A.R.T capable

For illustration purposes only

SEAGATE

40Gb Hard Drive
7200.7 rpm
PRODUCT CODE 856802

PC WORLD PRICE

EX VAT
£46.00

INC VAT
£54.05



With the Ultra ATA/100 interface, 2Mb Multisegmented cache and an average seek time of 8.5 milliseconds. This Hard drive is also S.M.A.R.T capable

For illustration purposes only

SEAGATE

80Gb Hard Drive
7200.7 rpm
PRODUCT CODE 880717

PC WORLD PRICE

EX VAT
£59.00

INC VAT
£69.33

DVD+RW



GREAT VALUE
AT THE COMPONENT
CENTRE

This Multi spin two speed DVD writer has IDE/ATAPI interface with ultraDMA 33 (mx 33Mb/sec transfer rate). The tray loading mechanism supports horizontal and vertical use. Speed: DVD: 12x2.4x2.4, CD: 40x16x10

For illustration purposes only

COMPONENT CENTRE

PRODUCT CODE 815312

PC WORLD PRICE

EX VAT
£127.00

INC VAT
£149.23

52x CDRW

52X CD-RW 52x 24x 52x E-IDE/ATAPI 2Mb Data Buffer Up to 7800 KB/sec. PRODUCT CODE 766265



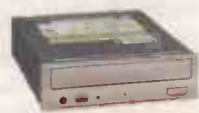
PC WORLD PRICE

EX VAT
£38.00

INC VAT
£44.65

48X CDRW

48x24x48 CD-RW IDE drive, supports up to ultra-DMA mode 2 of 33.3Mb per second, 2Mb buffer memory, innovated SMART-x technology PRODUCT CODE 813165



PC WORLD PRICE

EX VAT
£38.29

INC VAT
£44.99

16x IDE DVD-ROM DRIVE

E-IDE Interface Conforms to DVD-Multi Standards, Auto Balance System with mechanism to reduce vibration and noise. High speed DVD/C playback, Smart-X technology. PRODUCT CODE 798706



PC WORLD PRICE

EX VAT
£29.00

INC VAT
£34.08

52x CD-ROM

ATAPI/E-IDE Interface, access to all formats. Auto Balance System, 80 millisecond access time, 3300-7800Kb/second, Sustained Transfer Rate. PRODUCT CODE 677435



PC WORLD PRICE

EX VAT
£15.00

INC VAT
£17.63

FLOPPY DRIVE

FLOPPY DRIVE

1.44Mb, 3.5" height
PRODUCT CODE 677427



PC WORLD PRICE

EX VAT
£8.50

INC VAT
£9.99

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NETWORK CARDS



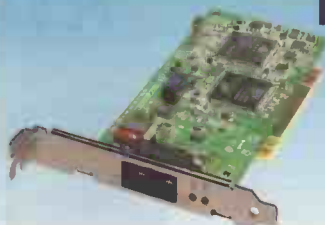
Single shielded RJ-45 connector, 10/100Mbps speed, on-board socket for a optional remote boot ROM, provides 1 diagnostic LED to monitor linking status, single +5 V power supply operation.

For illustration purposes only

10/100 Network Card
RJ45 connection
Wake on LAN
PRODUCT CODE 679808

PC WORLD PRICE
EX VAT **£8.50**
INC VAT **£9.99**

MODEMS



Full-rate adaptive modem with max. 8Mbps downstream and max. 1Mbps upstream rates, DTM modulation and demodulation, supports splitterless ADSL implementation.

COMPONENT CENTRE
PCI ADSL modem
PRODUCT CODE 810941

PC WORLD PRICE
EX VAT **£31.00**
INC VAT **£36.43**



COMPONENT CENTRE
56k Modem
V92
PRODUCT CODE 690990

PC WORLD PRICE
EX VAT **£9.50**
INC VAT **£11.16**

GRAPHICS CARDS



GeForce FX 5800 GPUs guarantee powerful 3D experiences, with blazingly fast performance. 128Mb, DDR2, AGP 8x, 400MHz Core Clock, 3.2b Texels/Sec, 12.8Gb Bandwidth, TV-Out, DVI.

PNY
Verto GeForce FX 5800
PRODUCT CODE 929721

PC WORLD PRICE
EX VAT **£250.00**
INC VAT **£293.75**



The Ti4800 is made for the most enthusiastic users. Hardcore Gamers will be able to play with a maximum level of details, keeping a total fluidity even with the most recent and complex games. 128Mb, DDR, AGP 8x, 300MHz Core Clock, 4600m Texels/Sec, 10.4Gb Bandwidth, TV-Out, DVI.

PNY
Verto GeForce Ti4800
PRODUCT CODE 920306

PC WORLD PRICE
EX VAT **£136.11**
INC VAT **£153.93**



128Mb, DDR, 400MHz Core Clock, 1b Texels/Sec, 6.4Gb Bandwidth, 4 Pixels/Clock, 128 bit colour, 8x AGP

CHAINTech
GeForce FX5200 FX20
PRODUCT CODE 920486

PC WORLD PRICE
EX VAT **£67.91**
INC VAT **£79.80**



This Graphics card has a Geforce 2 MX chipset with an AGP 4x/2x BUS. The card has a 64Mb SDRAM memory size. The key properties of this card are: nVidia shading rasterizer, 4 texels per clock, Integrated 2nd generation transformation and lighting engines, 256 bit 3D and 2D graphics accelerator plus much more

SPARKLE
GeForce 2 MX 400
64Mb, AGP
PRODUCT CODE 534611

PC WORLD PRICE
EX VAT **£42.00**
INC VAT **£49.35**

ACCESSORIES



PREMIUM COMPOUND
PRODUCT CODE 539208
- 1700 poise viscosity
- Thermal conductivity 6.8w/mk

PC WORLD PRICE
EX VAT **£5.10**
INC VAT **£5.99**



HEATSINK COMPOUND
PRODUCT CODE 539170
- 300 poise viscosity
- Thermal conductivity 4.18w/mk

PC WORLD PRICE
EX VAT **£3.40**
INC VAT **£3.99**

CABLES

PART CODE		EX. VAT	INC. VAT
539458	Floppy Drive Cable	£2.54	£2.99
539103	Internal Power Cable	£2.54	£2.99
539466	Internal Sound Cable	£4.25	£4.99
539025	IDE Fast Cable	£12.76	£14.99
539068	Round IDE Cable	£12.76	£14.99

KITS & BITS

PART CODE		EX. VAT	INC. VAT
539170	Heatsink Compound	£3.40	£3.99
852898	Alloy mouse pad	£8.50	£9.99
852871	Alloy front bezel	£7.65	£8.99
539208	Premium Compound	£5.10	£5.99

ACCESSORIES NOT AVAILABLE IN ALL STORES

SOUND CARDS, GRAPHICS CARDS & ACCESSORIES

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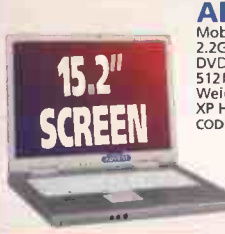
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ADVENT

2004

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3517

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up to 14 ppm in colour, up to 600x2400 dpi scan resolution,
up to 48 bit depth, standalone copying facility, up to 16 ppm
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CODE
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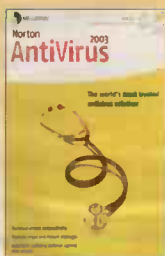


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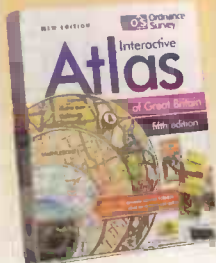


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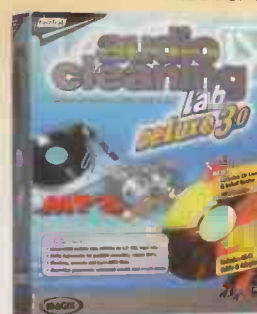
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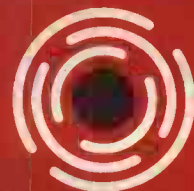


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September 2003 edition

issue 99

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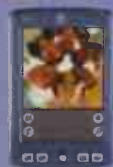
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21XHPW	101910 19" TFT	527.57	449.00
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1YOWPW	CTXPV520A 15" TFT LCD Panel	257.32	219.00
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138BPW	PV720A 17.1" LCD TFT Silver/Black	410.07	349.00
2D14PW	19" Multimedia TFT Bk/Silver	616.87	525.00
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28D6PW	18.1" TFT 1280x1024 DVI	392.00	335.62
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22ZCPW	Gallery 1740 VGA Version	405.37	345.00
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295XPPW	Gallery 1740 Oxygen DVI	468.82	399.00
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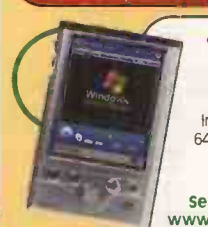
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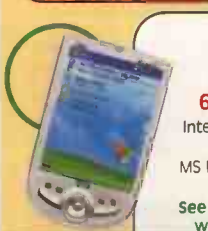
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- Schneider-Kreuznach Varlogon lens

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Panasonic

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1Y1MPW	Powershot A30	193.87	165.00
2D5CPW	Powershot A70	257.32	219.00
2557PW	Ixus V3	345.00	293.62
2FC7PW	SS0	475.87	405.00
25KHFW	Powershot G3	522.87	445.00
FUJIFILM			
244FPW	Finepix A202	128.00	108.94
244HPW	Finepix A203	182.12	155.00
14CHPW	Finepix 2800 Zoom	245.57	209.00
221TPW	Finepix 401	304.32	259.00
177KPW	Finepix F601 Zoom	404.20	344.00
21JNPW	Finepix 5602	546.37	465.00
HP			
21YDPW	320 Digital Camera 2.1MP	89.99	76.59
21YCPW	620 Digital Camera 2.1MP ZM	134.99	114.89
24YYPW	Photosmart 850 Cam with Dock	339.98	289.35
KODAK			
2FC2PW	Easyshare DX6340	245.57	209.00
2FC8PW	EasyShare LS633	276.12	235.00
NIKON			
1YJWPW	Coolpix 2500	276.12	235.00
277NPW	Coolpix 3500	351.32	299.00
SONY			
2FC4PW	DSC-P52 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
2FC8PW	DSC-P10 Cyber-shot	389.00	331.07
2FC9PW	MVC-CD500 Navica	489.00	409.00
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2DHOPW	MV650i	645.07	549.00
21K9PW	MV5i	727.32	619.00
2FNW/PW	MVX150i	774.32	659.00
Q21PW	MV30i D	938.82	799.00
ROZPW	MV3i Di	1056.32	899.00
SONY			
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
2C1DPW	DCR-TRV60 Handycam	879.00	748.09
11BVPW	IP7 MicroMV Pocket Camcorder	999.00	850.22
28KCPW	DCR-IP220 Network Handycam IP	1314.82	1119.00
2M2ZPW	DCR-PC103 Handycam MiniDV	649.99	553.19
2CP9PW	DCR-TRV33 Handycam MiniDV	649.99	553.19

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KNKPW	128Mb Compact Flash	28.20	24.00
1531PW	128Mb Secure Digital	41.12	35.00
14JVPW	64Mb Multimedia Card	20.56	17.50
Y1MPW	128Mb Compact Flash	57.57	49.00
28HNPW	256Mb Secure Digital	82.25	70.00
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28DDPW	64Mb Compact Flash	39.95	34.00
28DMPW	128Mb Compact Flash	72.85	62.00
28XPW	128Mb SmartMedia	76.37	65.00
28C8PW	256Mb Secure Digital	175.07	149.00
28C0PW	128MB XD Card	75.20	64.00
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J7KPW	64MB Memory Stick	35.00	29.79
Y2VPW	128MB Memory Stick	55.00	46.81
2DMKPW	128MB 2 memory Stick	111.62	95.00
2DMLPW	64MB Memory Stick Duo	64.62	55.00
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247CPW	I550	108.10	92.00
2974PW	I850	157.45	134.00
2973PW	I950	276.12	235.00
205MPW	I70	222.07	189.00
EPSON			
2113PW	C42UX	51.70	44.00
2310PW	C62	69.32	59.00
2577PW	C82	90.47	77.00
241VPW	Photo 850	86.95	74.00
257GPW	Photo 915	130.42	111.00
257JPW	Photo 925	173.90	148.00
21YRGPW	Photo 950	304.32	259.00
2113PW	Photo 2100	521.70	444.00
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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			
25HNPW	Z45se	57.57	49.00
25HPPW	Z55se	69.32	59.00
295WPW	Z65P	139.82	119.00
25HQPW	Z65 Pro	182.12	155.00

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100NPW	HL1440	175.07	149.00
100TPW	HL1470N	346.62	295.00
FF1PW	HL5040	217.37	185.00
EPSON			
2114PW	EPL-6100	249.10	212.00
2892PW	EPL-6100L	158.62	135.00
KYOCERA			
20NNPW	FS-1010	229.12	195.00
20FPWP	FS-1900D	504.07	429.00
LEXMARK			
07SPW	E210	163.32	139.00
13LGPW	E320	233.82	199.00
13LHPW	E322	151.57	129.00
OKI			
2CTHPW	B4200	245.57	209.00
2CTJPW	B4300	276.12	235.00
QMS			
2270PW	Pagepro 1200W	158.62	135.00
2271PW	Pagepro 1250e	292.57	249.00
SAMSUNG			
2F9FPW	ML1510	139.82	119.00
2F9CPW	ML1710	163.32	139.00

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24N2PW	Lide 30	76.37	65.00
2889PW	Lide 50	96.35	82.00
2CKHPW	3000F	96.35	82.00
24N3PW	5000F	175.07	149.00
24N4PW	8000F	193.87	165.00
2CKJPW	9900F	287.87	245.00
EPSON			
24LXPW	Perfection 1260	70.50	60.00
2445PW	Perfection 1660 Photo	131.60	112.00
2444PW	Perfection 2400 Photo	175.07	149.00
HP			
24YVPW	Scanjet 4570C	144.99	123.40
24YXPW	Scanjet 5500C	229.12	195.00
MICROTEK			
201WPW	ScanMaker 4800 Photo	92.82	79.00
1774PW	FilmScan 3600	453.57	369.00
UMAX			
11HXPW	Astra 4450	118.67	101.00
28MOPW	Astra 6700	137.47	117.00

Multifunction Devices

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1V27PW	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
21X2PW	PSC 2110	139.99	119.14
24Y2PW	PSC 2175	195.00	165.96
24YRPW	PSC 2210	219.00	186.39
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24LGPW	X75	72.85	62.00
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2LJMPW	Radeon 9600 DVI VO 128MB DDR	94.50	80.43
2LJNPW	Radeon 9600 Pro DVI VO 128MB DDR	139.00	118.30
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7N7PW	GeForce MX 420 VO 64MB SDRAM	54.50	46.39
7N8PW	3D Blaster 4 MX440 64MB DDR	68.00	57.88
2LRTPW	3D Blaster 5 FX5200 Ult. DVI 128 DDR	129.00	109.79
GAINWARD			
2MB1PW	PRO/660 TV-DVI 128MB DDR	78.50	66.81
2MBGPW	ULTRA/760 XP "GS" 128MB DDR	213.00	181.28
2MBJPW	ULTRA/780 XP "Pro" 256MB DDR	223.00	189.79
2MFXPW	ULTRA/1200 XP "GS" 128MB DDR	366.00	311.49
2MFXPW	ULTRA/1600 XP "GS" 256MB DDR	465.00	395.75
2MGPW	COOL FX ULTRA/1600 XP "GS" 256 DDR	599.00	509.79
GIGABYTE			
2LP3PW	Radeon 9200 DVI VO 64MB DDR	50.50	42.98
2LP4PW	Radeon 9200 DVI VO 128MB DDR	70.00	59.58
2LP5PW	Radeon 9200 DVI VIVO 128MB DDR	71.00	60.43
2MQ7PW	Radeon 9200 DVI VO 128MB DDR	72.50	61.71
2MQBPW	Radeon 9600 Pro DVI VO 128MB DDR	143.00	121.71
2LP9PW	Radeon 9800 Pro DVI VO 128MB DDR	300.00	255.32
2MQCPW	Radeon 9800 Pro DVI VO 256MB DDR	379.00	322.56
MSI			
2MSJPW	GeForce FX5200 VO AGP 128MB DDR	58.00	49.37
2MSNPW	GeForce FX5600 DVI VO 128MB DDR	123.00	104.69
2MTDPW	GeForce FX5900 DVI VO 128MB DDR	299.00	254.47

Sound Cards

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13Q1PW	SoundBlaster 4.1 Digital	25.50	21.71
13Q1PW	SoundBlaster 5.1 Digital	42.00	35.75
18C2PW	SB Exigy	126.00	107.24
2LUTPW	SB MP3+ USB	34.50	29.37
HERCULES			
2217PW	Gamesurround Muse LT	12.50	10.64
2218PW	Gamesurround Muse 5.1 DVD	29.00	24.69
25DHPPW	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	SonicXplosion RP	40.50	34.47
2830PW	SonicXplosion DVD RP	61.00	51.92
TERRATEC			
21RTPW	128i PCI	18.50	15.75
28B9PW	Aureon 5.1 Fun	26.00	22.13
28BCPW	Aureon 5.1 Sky	93.00	79.15
21RXPW	DMX 6Fire 24/96LT	103.00	87.66
28BDPW	Aureon 7.1 Space	107.00	91.07
21R2PW	DMX 6Fire 24/96	163.00	138.73

DVD Drives

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28PFPW	USB2 8xDVD 32xCD 2.4x-D-RW	227.00	193.20
ARCHOS			
2MRHPW	DeX-DVD-RW USB2 DVD-R/RW 2x	200.00	170.22
2MRJPW	MiniDVD USB2 8xDVD 24xCD	100.00	85.11
LITE-ON			
24GT7PW	LTD-165 Retail IDE 16xDVD 48xCD	28.00	23.83
LG			
295MPW	GRD-81618 RP IDE 16xDVD 48xCD	32.50	27.66
2FN5PW	GMA-4020B RP IDE DVD-R/RW/RAM	140.00	119.15
MITSUMI			
2H34PW	DM200T0E OEM IDE 16xDVD 50xCD	30.50	25.96
2FTDPW	DW7081TE IDE DVD-R/RW 4x	163.00	138.73
NEC			
2LLRPW	MD-1300A Retail IDE DVD-R/RW 4x	211.00	179.58
PANASONIC			
2FMXPW	UFD-521E IDE DVD-RAM/R/RW	175.00	148.94
PHILIPS			
2MFWPW	DVDRW416K/00 IDE DVD-R/RW 4x	171.00	145.54
PLEKTOR			
2FQYPW	PX-504A IDE DVD-R/RW	180.00	153.20
PIONEER			
2DH6PW	DVD-120 IDE 16xDVD 40xCD	32.50	27.66
2C9FPW	DVD-120S IDE 16xDVD 40xCD	37.50	31.49
28N6PW	DVR-105 IDE	117.50	100.00
28N7PW	DVR-A05 IDE	143.00	121.71
SAMSUNG			
21FBPW	SD-616FRPS IDE 16xDVD 48xCD	29.50	25.11

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2CNSPW	MX440SE VO AGP 64MB DDR-RAM	44.00	37.45
2HNSPW	FX5200 2xVGA VO PCI 128 DDR-RAM	80.50	68.51
2HNTPW	FX5200 2xVGA VO AGP 128 DDR-RAM	81.00	68.94
2LH6PW	FX5200 Ult. DVI VO AGP 128 DDR-RAM	127.00	108.09

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2GM9PW	FX5200 DVI VO 128MB AGP	55.00	46.81
2H2GPW	FX5200 Ultra DVI VO 128MB AGP	119.00	101.28
2H2KPW	FX5600 DVI VO 128MB AGP	119.00	101.28
2H2JPW	FX5600 DVI VO 256MB AGP	135.00	114.90
2H2LPW	FX5600 Ultra DVI VO 128MB AGP	159.00	135.32
DABSVALUE Radeon			
2HMTPW	9200 DVI VO 64MB DDR AGP	47.00	40.00
2HMPW	9200 DVI VO 128MB DDR AGP	58.00	49.37
2HMKPW	9600 DVI VO 128MB DDR AGP	100.00	85.11
2HMPW	9600 Pro DVI VO 128MB DDR AGP	140.00	119.15
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2FV6PW	CDRW 52x52x24x USB 2.0	110.00	93.62
2G38PW	Predator 40x40x12 USB 2.0	91.00	77.45
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2MRLPW	500003 MiniCD 24x USB Twenty Four	72.00	61.28
12QSPW	CD-5520 IDE Fifty Two	16.00	13.62
2179PW	LTN-5265-02VVC IDE Fifty Two	14.00	11.92
17NXPW	FX-5410 OEM IDE Fifty Four	15.00	12.77
2M3PPW	CS2 IDE Fifty Two	14.00	11.92
2M3QPW	CS2-Black IDE Fifty Two	14.00	11.92
2LSHPW	PX-547A/T3 IDE Fifty Four	19.50	16.60
2LSJPW	PX-547A/T3BP IDE Fifty Four	19.00	16.17
2LSLPW	PX-547A/T3BPB IDE Fifty Four	19.00	16.17
2ZDPW	SC-152 IDE Fifty Two	15.00	12.77
2CZFPW	SC-152 Retail IDE Fifty Two	16.00	13.62
2DDJPW	SC-152 Black IDE Fifty Two	16.00	13.62
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2MRGPW	500367 CESAR USB2 24r 24w 10rw	136.00	115.75
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2J6NPW	CRW-5224U/Ext USB2 52r 52w 24rw	72.50	61.71
2B07PW	ZipCD 52521 USB 2.0 48r 48w 24rw	82.00	69.79
2FV6PW	32650 USB 2.0 52r 52w 24rw	110.00	93.62
2G38PW	Predator 32449 USB 2.0 40r 40w 12rw	91.00	77.45
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2FV8PW	GCE-8520BB OEM IDE 52r 52w 24rw	37.00	31.49
2G20PW	GCE-8520B Retail IDE 52r 52w 24rw	40.50	34.47
2FGVPW	CCC-4480BB OEM IDE 16xDVD	52.00	44.26
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2M3KPW	CR52-A2 IDE 52r 52w 24rw	31.50	26.81
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2ZCQPW	SW-2528EA RP IDE 52r 52w 24rw	37.50	31.92
2HTMPW	SM-352 Retail IDE 16xDVD 52r 52w 24rw	58.00	49.37
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2DHGPW	CD-W552EK Retail IDE 52r 52w 24rw	44.00	37.45
2DHPWP	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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277LPW	180GXP 123.5 UDMA100 8Mb 7200	100.00	85.41
277LPW	180GXP 185.2 UDMA100 2Mb 7200	137.00	116.60
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247GPW	160.0 UDMA133 2MB 5400	125.00	106.39
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16MKPW	Protege 40.0 UDMA100 2Mb 5400	46.00	39.15
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2MRQPW	MiniHD 20.0 USB2	109.00	92.77
2MRRPW	MiniHD 20.0 Fire	109.00	92.77
2MRSPW	MiniHD 40.0 USB2	144.00	122.56
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21FNPW	Portable 20.0 USB 2	127.00	108.09
21FPPW	Portable 40.0 USB 2	155.00	131.92
21FRPW	Portable 40.0 FireWire	154.00	131.07
QHPDPW	HDD 40.0 USB 2	117.00	99.58
2HPCPW	HDD + PCI 80.0 USB 2	156.00	132.77
21FVFW	HDD 120.0 USB 2	185.00	157.45
21FVFW	HDD 120.0 FireWire	184.00	156.60
	MAXTOR		
14JGPW	MPS 3000LE 40.0 USB 2.0 5400	111.00	94.47
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20K0PW	5000LE 80.0 USB 2.0 7200	134.00	114.05
2LYTPW	5000DV 160.0 USB/Fire 7200	198.00	168.51
2CG3PW	5000DV 200.0 USB/Fire 7200	222.00	188.94
Q972PW	5000XT 250.0 USB/Fire 5400	235.00	200.00

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14JXPW	512Mb Compact Flash 26x	80.86	80.86
2CGQPW	1GB Compact Flash 26x	174.90	174.90
KN7PW	32Mb SmartMedia	6.39	6.39
LNQPW	64Mb SmartMedia	10.64	10.64
ZDCPW	128Mb SmartMedia	20.43	20.43
TLNPPW	32Mb MMC	8.51	8.51
14JVPW	64Mb MMC	14.90	14.90
2999PW	64Mb MMC + SD/MMC USB Reader	23.41	23.41
QBBFPW	128Mb MMC	25.54	25.54
2H6VPW	64Mb XD Picture Card	23.41	23.41
2H6VFW	128Mb XD Picture Card	42.56	42.56
2BHPPW	64Mb Memory Stick	21.28	21.28
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quicklink	AMD Athlon XP	inc VAT	ex VAT
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2B5PW	1800+ 1.53GHz 256Kb 266MHz	52.00	44.26
2B7PW	2000+ 1.67GHz 256Kb 266MHz	55.00	46.81
2B8PW	2100+ 1.73GHz 256Kb 266MHz	66.50	56.60
21X3PW	2200+ 1.8GHz 256Kb 266MHz	68.00	57.88
24T9PW	2400+ 2GHz 256Kb 266MHz	87.00	74.05
2B9PW	2600+ 2.08GHz 256Kb 333MHz	127.00	108.09
2B26PW	2700+ 2.17GHz 256Kb 333MHz	152.00	129.37
2CYGPW	2500+ 1.83GHz 512Kb 333MHz	104.00	88.51
2CYKPW	2800+ 2.08GHz 512Kb 333MHz	187.00	159.15
2CYLPW	3000+ 2.25GHz 512Kb 333MHz	272.00	231.49



Intel® Pentium® 4 2.6 512KB 800Mhz

quicklink 2HNLPW

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24SWPW	Pentium 4 2.67GHz 512KB 533MHz	164.00	139.58
245YPW	Pentium 4 2.80 512KB 533MHz	225.00	191.49
28LXPW	Pentium 4 3.06 512KB 533MHz	330.00	280.86
2HNKPW	Pentium 4 2.4 512KB 800MHz	153.00	130.22
2HNLPW	Pentium 4 2.6 512KB 800MHz	186.00	158.30
2HNMPW	Pentium 4 2.8 512KB 800MHz	230.00	195.75
2HNPPW	Pentium 4 3.0 512KB 800MHz	344.00	292.77

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SHVPW	256MB 168Pin DIMM PC133 SDRAM Non-Parity CL2		
SHVPW	128MB 168Pin DIMM PC133 SDRAM Non-Parity CL2		
17BVPW	512MB 184Pin DIMM PC2100 DDR RAM Non-Parity CL2.5		
SCVPW	128MB 168Pin DIMM PC100 SDRAM Non-Parity CL2		
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24YDPW	Plus8 40.0 UDMA133 2Mb 7200	54.00	45.96
24YFPW	Plus9 60.0 UDMA133 2Mb 7200	66.00	56.17
24YHPW	Plus9 80.0 UDMA133 2Mb 7200	71.00	60.43
25JUPW	Plus9 80.0 UDMA133 8Mb 7200	75.50	64.26
25YJPW	Plus9 120.0 UDMA133 2Mb 7200	92.50	78.73
25ZJPW	Plus9 120.0 UDMA133 8Mb 7200	102.00	86.81
25B1PW	Plus9 160.0 UDMA133 2Mb 7200	129.00	109.79
25B2PW	Plus9 160.0 UDMA133 8Mb 7200	141.00	120.00
29LUPW	Plus9 200.0 UDMA133 2Mb 7200	181.00	154.05
29LXPW	Plus9 200.0 UDMA133 8Mb 7200	192.00	163.41



Barracuda 7200.7 120GB SATA150 7200

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- 9.0ms Average Seek Time
- Interface Type DMA/ATA-100 (Ultra)

quicklink	SEAGATE	inc VAT	ex VAT
25DDPW	U Series X20 20.0 UDMA100 5400	41.50	35.32
2CZ4PW	Barracuda 40.0 UDMA100 5400	44.00	37.45
2FZNPW	Barracuda 40.0 UDMA100 7200	50.50	42.98
2H1TPW	Barracuda 60.0 UDMA100 7200	55.00	46.81
2FZQPW	Barracuda 80.0 UDMA100 7200	66.00	56.17
2FZSPW	Barracuda 120.0 UDMA100 7200	85.50	72.77
2FZVPW	Barracuda Plus 120.0 UDMA100 7200	95.50	81.28
2FZWPW	Barracuda 120.0 SATA150 7200	110.00	93.62
2FZVPW	Barracuda 160.0 UDMA100 7200	119.00	101.28
2000PW	Barracuda Plus 160.0 UDMA100 7200	133.00	113.20
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21XOPW	FHD-1 18014 USB 2 60GB	134.00	114.05
2FNDPW	FHD-1 18015 USB 2 80GB	152.00	129.37
21X1PW	FHD-1 18016 USB 2 120GB	170.00	144.69
2K5SPW	FHD-2 20155 USB2 20GB	110.00	93.62
2K9PW	FHD-2 20156 USB2 40GB	157.00	133.62
2K7KPW	FHD-2 20690 USB2 60GB	219.00	186.39
2N01PW	FHD-2 20686 USB2/Firewire 20GB	129.00	109.79
2N02PW	FHD-2 20688 USB2/Firewire 40GB	170.00	144.69
2N03PW	FHD-2 20403 USB2/Firewire 60GB	230.00	195.75



Lacie PocketDrive 20GB USB 2 & Firewire

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2511PW	PocketDrive 60GB, Firewire and USB2	257.32	219.00
2163PW	PocketDrive 20GB, USB2 cable	110.45	94.00
2165PW	PocketDrive 40GB, USB2 cable	204.45	174.00
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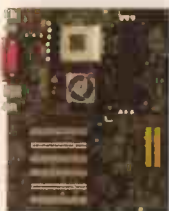


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quicklink	MSI	inc VAT	ex VAT
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2H3YPW	865PE Neo2-FIS2R Intel 865PE SoA 478	120.00	102.13
2H40PW	865PE Neo2-L Intel 865PE SoA 478	86.00	73.20
2H41PW	865PE Neo-L Intel 865PE SoA 478	78.00	66.39
2H42PW	865G Neo2-L Intel 865G SoA 478	91.00	77.45
2H43PW	845PE Max3-FISR Intel 845PE SoA 478	107.00	91.07
2H44PW	845PE Max3-SR Intel 845PE SoA 478	84.50	71.92
2H45PW	845PE Max-L Intel 845PE SoA 478	60.50	51.49
221XPW	845E Max Intel 845E SoA 478	52.00	44.26
28DDPW	845GE Max-L Intel 845GE SoA 478	74.50	63.41
28TDPW	45 Combo-L SIS645 SoA 478	45.50	38.73
2H46PW	651M Combo-L SIS651 SoA 478	52.00	44.26
2861PW	648 Max SIS648 SoA 478	56.50	48.09

quicklink	MSI	inc VAT	ex VAT
2222PW	M5-6378 VIA KLE133 SoA	38.00	32.34
2223PW	M5-6378-L VIA KLE133 SoA	41.50	35.32
2H26PW	KM2M Combo-L VIA KM266 SoA	45.50	38.73
2BDGPW	KT4 Ultra-FISR VIA KT400 SoA	89.50	76.17
2869PW	KT4 Ultra-SR VIA KT400 SoA	75.50	62.56
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2MYKPW	KT3V-L VIA KT333 SoA	48.50	41.28
28TKPW	KT2 Combo-L VIA KT266A SoA	39.00	33.20
2BDJPW	KT2G-ILSR nForce2 SoA	105.00	87.66
28DKPW	KT2G-L nForce2 SoA	82.50	70.22
2H2VPW	K7N2 Delta-ILSR nForce2 SoA	89.50	76.17
2M3CPW	K7N2 Delta-L nForce2 SoA	67.00	57.03
2FHPW	746F Ultra-L SIS746 SoA	54.40	46.39

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- Chipset: nVidia nForce2 IGP (Crush 18G), nVidia MCP-T
- Main Memory: DDR DIMM x3
- Graphics: 8X AGP slot
- Form Factor: AT

Motherboards

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2LQ8PW	C7 Intel 875P Socket 478	107.00	91.07
2H2VPW	IS7-G Intel 865PE Socket 478	133.00	113.20
2H33PW	IS7 Intel 865PE Socket 478	100.00	85.11
2H4VPW	IS7-E Intel 865P Socket 478	81.50	69.57
2ANSPW	KD7 VIA KT400 Socket A	59.00	50.22
2N4TPW	KD7-RAID VIA KT400 Socket A	72.00	61.28
28RNPW	KD7-S VIA KT400 Socket A	76.00	64.69
28RQPW	KD7-G VIA KT400 Socket A	81.50	69.57
24NVPW	A77 MAX2 VIA KT400 Socket A	104.00	88.51
28J9PW	NF7 nForce 2 18D Socket A	72.50	61.71
283RPW	NF7-S nForce 2 18D Socket A	95.50	81.28
2C92PW	NF7-SL nForce 2 18D Socket A	93.50	79.58
28R5PW	NF7-M nForce 2 18D Socket A	87.50	74.47

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2J31PW	AX45G-N Intel 865G Socket 478	84.50	71.92
2J32PW	AX45G Max Intel 865G Socket 478	131.00	111.49
2J33PW	MX45G-N Intel 865G Socket 478	79.50	67.66
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2CQWPW	AX45-4D MAX SIS 655 Socket 478	90.00	76.60
2HRTPW	MK77M-II VIA KM266 Socket A	50.50	42.98
280VPW	AK77-BXN VIA KT400 Socket A	62.00	52.77
2810PW	AK77-BX MAX VIA KT400 Socket A	68.50	58.30
2J34PW	AK77-BX VIA KT400 Socket A	57.00	48.51
2J35PW	AK790-400V nForce 2 Socket A	74.00	62.38
2FSLPW	AK790 MAX nForce 2 Socket A	100.00	85.11
2FSPWP	AK790 MAX nForce 2 Socket A	94.50	80.43
2CRQPW	AK790-1394 nForce 2 Socket A	73.00	62.13
2CR3PW	MK79C-1394 nForce 2 Socket A	81.00	68.94
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10PCPW	Ultimate Slim Zip 100MB H/Powered	57.58	49.00

SoA VIA KT400A ATX A L

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- CPU Bus Clock: 333MHz (EV6)
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S478 Intel 865PE ATX A L

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- CPU Bus Clock: 333MHz (EV6)
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14XJUPW	8 Port 10/100Mbps	20.00	17.03
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1Y31PW	10/100 RJ45 PCI	5.00	4.26
28V1PW	10/100 CardBus	15.50	13.20
28V3PW	10/100 USB	19.50	16.60
291WPW	802.11b+ 22Mbps PCI	47.00	40.00
291XPW	802.11b+ 22Mbps PCMCIA	38.00	32.34
178YPW	802.11b 11Mbps PCMCIA	26.50	22.56
178ZPW	802.11b 11Mbps USB	33.00	28.09
1790PW	802.11b 11Mbps PCI	49.50	42.13

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25BWPW	56k External USB	17.50	14.90
14XFPW	56k External Serial	21.00	17.88
86LPW	56k PCMCIA	25.50	21.71
28NJPW	ADSL USB + Filter + PSU	30.00	24.54
17P7PW	ADSL Conexant Router 1Port	49.00	41.71
17P8PW	ADSL Conexant Router 4Port	59.00	50.22
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200WPPW	Intuit QuickBooks XG Advantage/Startup	19.97	17.00
251CPW	MS Money 2003 Standard	17.62	15.00
22VPPW	MS Money 2003 Deluxe Financial Suite	24.67	21.00
17XDPW	Sage Instant Accounts 8.0	104.57	89.00
17XCPW	Sage Instant Accounts 8.0	88.12	75.00
Q199BPW	McAfee TVD Suite 5-user Pack	205.62	175.00
249BPW	McAfee TVD Suite 10-user Pack	433.57	369.00
250JPW	McAfee VirusScan 7.0 Home	30.55	26.00
250CPW	McAfee VirusScan Professional 7.0	29.37	25.00
24V1PW	Symantec Norton Antivirus SB 5-user	175.07	149.00
2471PW	Symantec Norton Internet Security 2003 45.82	39.00	
13P6PW	Dantz Retrospect Express 3.6	41.12	35.00
28CPW	Elby Clone CD+CD-R's	24.67	21.00
YR4PW	Roxio GoBack 3.0	28.20	24.00
248BPW	Symantec Norton Ghost 2003	38.77	33.00
2MNPW	PowerQuest Drive Image 7.0	41.12	
35.00			
2002PW	AutoCAD LT2004	804.87	685.00
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14LFPW	Laplink Gold 11.0	111.62	95.00
15W6PW	Laplink PC Sync	52.87	45.00
2LWDPW	Symantec Norton Antivirus R v11	135.12	115.00
1G9PW	Symantec WinFax Pro 10.0	52.87	45.00
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244VPW	Act! 6.0 S User	574.57	489.00
225TPW	Filemaker Pro 6.0	245.57	209.00
WV4PW	Microsoft Office 2002	280.82	239.00
2H01PW	MS Visual FoxPro Pro 8.0	515.82	439.00
WMPW	MS Office Standard 2002	163.32	139.00
WMPW	MS Office Professional 2002	370.12	315.00
212HPW	Adobe FrameMaker 7.0	746.12	635.00
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X20PW	Adobe Pagemaker 7.0	475.87	405.00
2LS2PW	Adobe Publishing Collection 13.0	985.82	839.00
2L71PW	Adobe Design Collection 7.0	1021.07	869.00
WMPW	MS Publisher 2002	99.87	85.00
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236RPW	Adobe Photoshop Elements 2.0	69.32	59.00
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011PW	Adobe Type Manager Deluxe 4.1	64.62	55.00
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WVFPW	Microsoft Office 2003	186.82	159.00
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21Y9PW	Sun Star Office 6.0	45.82	39.00
201MPW	Abby Fine Reader Pro 6.0	64.62	55.00
23V8PW	Microsoft Office 2003	327.82	279.00
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Q2TQPW	MS Windows 2003 server Std 5 Clients	797.83	679.00
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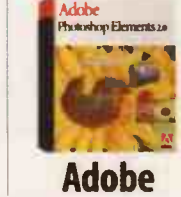
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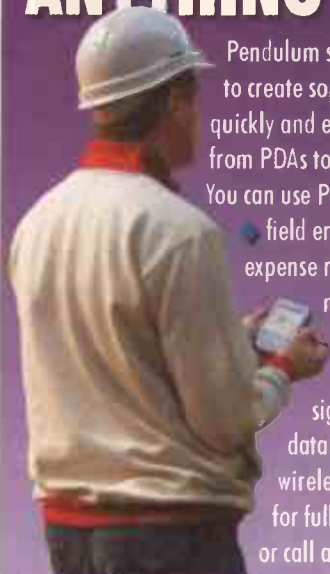
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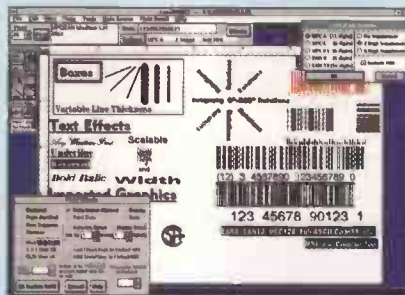


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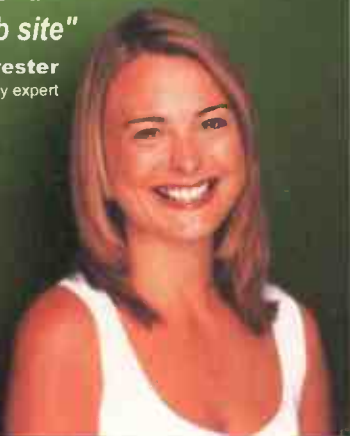
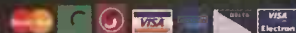
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51625A 19.5ml Tri-Colour Ink Cartridge	£21.99		£12.99
51626A/G Black Ink Cartridge			
Full: 40ml/Low: 20ml/Recycled: 40ml	£21.99	£14.99	£10.49
51629A 40ml Black Ink Cartridge	£20.99		£11.99
51633M Black Ink Cartridge			
Full: 30ml/Recycled: 40ml	£18.89		£10.49
51641A 40.5ml Tri-Colour Ink Cartridge	£22.49		
51645A/G Black Ink Cartridge			
Full: 42ml/Low: 20ml/Recycled: 40ml	£20.69	£15.49	£9.99
51649A Tri-Colour Ink Cartridge			
Full: 22.8ml/Low: 11ml/Recycled: 24ml	£21.49	£12.99	£14.49
C1816A 23ml Photo Ink Cartridge	£22.99		
C1823D/G Tri-Colour Ink Cartridge			
Full: 30ml/Low: 15ml/Recycled: 39ml	£23.99	£19.29	£14.99
C5010A 19ml Tri-Colour Ink Cartridge	£18.49		
C5011A 23ml Black Ink Cartridge	£16.29		
C6578A/D Tri-Colour Ink Cartridge			
Full: 38ml/Low: 19ml/Recycled: 39ml	£41.99	£23.89	£19.99
C6614D/N Black Ink Cartridge			
Full: 28ml/Low: 14ml/Recycled: 40ml	£20.39	£11.99	£11.29
C6615D Black Ink Cartridge			
Full: 25ml/Low: 14ml/Recycled: 42ml	£19.29	£13.19	£11.89
C6625A Tri-Colour Ink Cartridge			
Full: 15ml/Recycled: 39ml	£21.49		£15.99
C6656A 19ml Black Ink Cartridge	£14.79		
C6657A 17ml Tri-Colour Ink Cartridge	£23.99		
C6658A 17ml Photo Ink Cartridge	£17.99		
C8727A Black Ink Cartridge	£13.99		
C8728A Tri-Colour Ink Cartridge	£15.39		

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Black 7401 3 pack **£15.49**

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5-Colour 8401 Single **£5.79**
5-Colour 8401 3 pack **£16.49**

Epson Stylus C42ux
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3-Col T037040 **£5.49** each



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51634Z Premium A4 Inkjet Paper (200)	£12.29
C1821A Banner Paper (5)	£8.09
C1825A Bright White A4 Paper (500)	£6.99
C1847A Glossy A4 Photo Paper (20)	£5.29
C1853A A4 Premium Heavyweight Paper (100)	£9.99
C6040A Premium A4 Glossy Photo Paper (15)	£5.69
C6042A Matt White Greeting Cards (20)	£4.99
C6045A Glossy White Greeting Cards (10)	£5.89
C6050A A4 T-Shirt Iron-On Transfer Paper (10)	£10.99
C6818A A4 Brochure and Flyer Paper (50)	£8.49
C6829A Textured Cream Greeting Cards & Envelopes (20)	£7.99
C6832A A4 Premium Plus Glossy Photo Paper (20)	£9.99
C6951A A4 Premium Plus Matt Photo Paper (20)	£10.99
C7040A A4 Premium Glossy Photo Paper	£16.99
C7891A 6" x 4" Glossy Photo Paper (20)	£3.59
C7894A 6" x 4" Glossy Photo Paper (50)	£9.19

EPSON Inkjet Papers

S041054 A6 144gsm Photo Quality Inkjet Card (50)	£6.49
S041061 A4 102gsm Photo Quality Inkjet Paper (100)	£8.59
S041126 A4 141gsm Photo Quality Glossy Paper (20)	£5.99
S041134 6 x 4 inch 194gsm Perforated Photo Paper (20)	£4.99
S041140 A4 194gsm Photo Paper (20)	£7.39
S041150 A4 Inkjet Cleaning Sheets (3)	£2.69
S041154 A4 Iron On 'Cool Peel' T-Shirt Transfer Med. (10)	£10.89
S041214 A4 Premium 80gsm Inkjet Plain Paper (250)	£3.59
S041255 100mm x 150mm 194gsm Photo Paper (20)	£3.29
S041256 A4 167gsm Double-Sided Paper - Heavyweight (50)	£9.09
S041287 A4 255gsm Premium Glossy Photo Paper (20)	£10.49
S041303 100mm x 8m 255gsm Premium Glossy Photo Paper Roll	£13.09
S041332 A4 251gsm Premium Semigloss Photo Paper (20)	£11.19
S041342 A4 192gsm Archival Matte Paper (50)	£10.19
S041349 A4 215gsm Glossy Paper - Photo Weight (20)	£9.69
S041442 A4 Bright White 100gsm Inkjet Paper (500)	£9.69
S041560 A4 245gsm ColorLife(tm) Photo Paper (20)	£12.69
S041569 A4 178gsm Double-Sided Matte Paper (50)	£12.99
S041620 A4 141gsm Photo Quality Glossy Paper (50)	£13.69
S041622 A4 194gsm Photo Paper (50)	£14.19
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BC-02 Black Ink Cartridge	£16.79	£10.69
BC-05 Colour Ink Cartridge	£20.19	£13.49
BC-06 Photo Ink Cartridge	£16.59	£13.49
BC-20 Mono Ink Cartridge	£22.49	£12.99
BC-21e Colour Ink Cartridge	£32.59	-
BC-22e Photo Ink Cartridge	£18.79	-
BC60 Black Ink cartridge	£23.49	-
BC61 Colour Ink Cartridge	£23.49	-
BC62e Photo Ink Cartridge	£37.49	-
BC121Bk Black Ink Tank	£4.89	£2.69
BC121C Colour Ink Tank	£12.69	£3.89
BC124Bk Black Ink Tank	£4.79	£3.29
BC124C Colour Ink Tank	£9.99	£3.99
BC136Bk Black Ink Tank	£7.99	£3.99
BC13e Cyan, Magenta, Yellow	£6.19	£3.49
BC13ePbk Photo Black Ink Tank	£6.39	£3.49
BC13ePM Photo Magenta Ink Tank	£6.39	£3.49
BC13ePG Photo Cyan Ink Tank	£6.39	£3.49
BC16 Bk, Cyan, Mag, Yell, Photo Cyan, Photo Mag (each)	£6.49	£4.29

Full Canon Cartridge Range Available - Call for Details

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FM-101 Glossy Photo Cards-101.6x152.4mm (20)	£5.10
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PC101S Photo Paper Pro - 101.6 x 152.4mm (15)	£8.99
TR201A4 A4 T-shirt Transfer Material (10)	£8.99

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12A1985 Colour Ink Cartridge (470 pages)	£29.99	-
12A1990 Photo Ink Cartridge	£26.89	£19.99
10N0016 Black Ink Cartridge	£20.19	-
10N0026 Colour Ink Cartridge	£21.99	-
17G0050 Black Ink Cartridge	£19.99	CALL
17G0060 Colour Ink Cartridge	£21.49	£16.29
18L0032 Black Ink Cartridge	£22.09	-
18L0042 Colour Ink Cartridge	£25.99	-
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13619HC Colour Ink Cartridge	£25.19	£14.99
15M0120 Colour Ink Cartridge	£25.49	CALL
15M0125 Colour Ink Cartridge	£39.99	-

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Cartridge Ref.	Suitable for Use in Printers	Choice Cartr.	TOP UP KITS	Trade In Credit
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BCO2 Black	BJ200/200e/220e/220ex/230/BJC150/210/240/250/1000	£ 9.35	£ 8.23	£ 1.50
BCO5 Colour	BJC150/210/240/250/1000	£12.75	£10.99	£ 1.50
BCO6 Photo	BJC240/BJC250/BJC1000	£13.75	Top Up Kits refill carts up to 3 times	£ 1.50
BC20 Black	BJC200/210/2110/4000/4100/4200/4300/4400/4550/4650/5000/5500	£11.99		£ 1.50
BXO2 Black	FAX B320/3410	£ 9.99		.50
BXO3 Black	FAX B100/110/MP10	£ 9.99		.50
BJC4000 Twin	2000/4000/5000 (BCI21B & BCI21C)	£ 3.49		
BJC3000/6000	Black	£ 4.49		
BJC3000/6000	Each Individual Colour	£ 4.49		

HP Compatibles

Cartridge Ref.	Suitable for Use in Printers	Choice Cartr.	TOP UP KITS	Trade In Credit
51626A Black	500/510/520/540/550C/560C	£10.25	£ 8.99	£ 2.00
51625A Colour	310/320/340/540/550/560	£12.99	£10.99	£ 1.00
51629A Black	600/660/690C/695C	£10.45	£ 9.99	£ 3.00
51649A Colour	600/610C/612C/660C/690C/695C	£14.99	£10.99	£ 2.00
51645A Black	710C/720C/820CXI/850CXI/870CXI	£ 9.95	£ 9.99	£ 1.00
51633A Black	310/320/340	£10.45		£ 1.00
C6614ABlack	610C/612C	£10.75	£ 9.99	£ 1.50
C6615ABlack	810C/840C/843C	£11.75		£ 1.50
C1823AColour	710C/720C/810C/815C/820C/895C	£15.49	£10.99	£ 1.00
C6578AColour	970CXI/930C/950C/1220C/P1000	£16.99	£11.75	£ 2.00
C6625AColour	840C/843C	£16.99		£ 1.00

LEXMARK Compatibles

Cartridge Ref.	Suitable for Use in Printers	Choice Cartr.	TOP UP KITS	Trade In Credit
13619HC Colour	1000/1020/1100/2030/2030PE/2050/2050PE3000	£15.29	£10.99	£ 1.20
13400HC Black	1000/1020/1100/2030/2050/3000/4078/Execjet 11/11C	£13.89	£ 9.99	£ 2.00
12A1980 Colour	3200/5000/5700/5770/7000/7200/Z11/Z31/Z43	£15.29	£10.99	£ 2.00
12A1970 Black	3200/5000/5700/5770/7000/7200/Z11/Z31/Z42/Z51/Z52/Z53/X73/X83	£13.89	£ 9.99	£ 2.00
15M0120 Colour	Z42/Z43/Z51/Z52/Z53/Z83/X73/X83	£17.50	£11.75	£ 2.00
17G0050 Black	Z12/Z22/Z32/IJ600	£13.89	£10.99	£ 4.75
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- Colour Pack 5 Colour Cartridges £15.70
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- Mono Pack 5 Black Cartridges £23.99
- Colour Pack 5 Colour Cartridge £26.99
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Instant Dry Gloss	160 gsm	20 sheets	£ 5.49
Instant Dry Gloss	180 gsm	50 sheets	£12.99
Instant Dry Gloss	210 gsm	20 sheets	£18.99
Instant Dry Gloss	254 gsm	20 sheets	£ 9.99
Instant Dry Gloss Self Adhesive		20 sheets	£ 6.49
Double Sided Gloss		20 sheets	£10.99
7x5 Photo Cards			£ 4.99
A4 Matt Coated Matt	100 gsm	100 sheets	£ 5.99
Coated Matt	100 gsm	200 sheets	£11.75
Coated Matt	140 gsm	100 sheets	£ 7.49
Coated Matt	160 gsm	100 sheets	£ 9.75
Coated Matt	210 gsm	100 sheets	£11.45
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Leisure

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MotoGP2

An exciting motorcycle racing game that all the family can enjoy



MotoGP2 is the sequel to the original MotoGP, just as the name suggests. Its full name is MotoGP URT2 (for Ultimate Racing Technology), which is certainly accurate, but it doesn't exactly trip off the tongue.

We all know that motorcycle racing differs from other forms of motorsport as it includes thrills, spills, and racing, unlike the procession that is Formula 1. A total of 24 riders line up on the grid ready to do battle for each race, and you can never be sure who is going to win. The usual mantra is 'rostrum or resuscitation' and the racing is truly exciting. There are the foundations for a really good game in the sport of MotoGP – and, naturally, the console boys got it first. Now that the Xbox users have had their wicked way with MotoGP2, it has been ported to the PC and is great fun.

You'll need a gamepad to get the most from the game – just like a console, but at its simplest you can play the game with a single thumb. Simply set the gear change to automatic, and you can control left and right lean, as well as the throttle and brake, all from the left joystick. Even

setting up a rider character and getting started is easy – you can be up and riding in seconds.

You have the option to control the front and rear brakes individually, as well as the gears and your weight balance.

As this is the officially licensed game of the sport, you get to visit all 16 circuits in 13 countries, but there's a neat twist. You start by riding a circuit in the correct direction. Then, when your times are fast enough, a reversed version of the track is unlocked. Go faster still and a mirrored version appears, until finally you get to ride a mirrored, reversed track. It makes you keep your wits about you and is a lot of fun.

After each race you can use the replay option to see how it looked to outsiders, which will give you a new perspective and should help you get even faster. There's also an option to play online against up to 15 other riders or in a 16-bike race.

Last year the rules changed in MotoGP to effectively outlaw the two-stroke engine and to introduce four strokes, and that also helps the game as the soundtrack is truly glorious.

The physics of the game are good and the graphics are truly superb. Although the system requirements are quite low we played with a top-line PC and the frames flowed like a movie.

This is a really impressive PC game, fun for all the family.

Leo Waldoock

LOADING...



Movie madness and graphics gossip

Since we reviewed Enter the Matrix last month, sales figures have shown that this game is flying off the shelves, selling more than 2.5 million copies across all platforms – excluding Japan.

Another movie tie-in is due soon in the shape of *Hulk*. The movie was better than expected, so we'll see how the game does.

And finally, there's industry gossip about which graphics core will be used in games consoles currently being developed. It is possible that ATI will hijack Xbox2/Xbox Next from under the nose of Nvidia. On the other hand, we reckon ATI will provide the chips for Gamecube.

DETAILS

PRICE

£29.99 inc VAT
CONTACT THQ 01483 767 656
www.thq.co.uk

SYSTEM REQUIREMENTS

Windows 98/ME/2000/XP, Pentium 2 450MHz, 128MB Ram, DirectX 9 compatible graphics, 615MB hard drive space

VERDICT

This is one of the best games ever ported from a console to the PC

OVERALL

★★★★★



It's simple to get started, but MotoGP2 doesn't lack challenges



Competitions

Win a Chaintech PC upgrade bundle or a Samsung 21in TFT Monitor

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Starsky and Hutch

Relive the 1970s and drive the 'red tomato'



What a superb idea – become your childhood heroes and catch the bad guys, all in the comfort of your living room. That's certainly the aim of this game, but sadly it only focuses on one element of Starsky and Hutch's crime-fighting capers – driving around chasing bad guys.

The main game takes the form of 18 episodes spanning three 'seasons'. These have a time limit that can be increased by collecting the tokens scattered across the city. Each takes five or more minutes to complete, and you can't skip an episode and just move on to the next one – each one needs to be completed in order. This can be frustrating, particularly as they have to be played the whole way through – you can't save during a car chase.

Other modes include Free Roam, where you can wander about in your car, and Stunt Special, where you can practice stunts to perform for extra time in the game itself. The bonus TV Special missions can be unlocked by completing the game's secondary objectives, nearly all of which are painfully simple. The TV Specials are a nice touch, but don't provide anything that isn't offered by the original game.

Controlling the car takes a lot of getting used to with the

keyboard and mouse method. Essentially, Starsky drives while Hutch leans over the side, shooting the bad guys (and pedestrians if you so wish) – the keyboard deals with the driving and the mouse aims the gun. Like an early arcade game, the controls are the only difficult thing about the game.

A real letdown is the lack of participation from either David Soul or Paul Michael Glaser. Huggy Bear does the voiceover, but age seems to have worn his raw accent down to more of a posh wimper.

Essentially it's a rather basic game with some very irritating foibles. But in spite of this, it is still rather charming, and you will probably find yourself getting into it quicker, and far more, than you expected to.

Mark Walsh

DETAILS

PRICE £29.99 inc VAT

CONTACT Empire Interactive

www.starsky-and-hutch.com

SYSTEM REQUIREMENTS

Windows 98, Pentium II 450MHz, 128MB memory, 700MB hard disk space, DirectX 8.1

VERDICT

Limited and weakly designed game that is somehow still great fun

OVERALL



Grand Theft Auto: Vice City

Sun, sea, shooters and a 1980s soundtrack



At first glance, Vice City is a shameless retread of Grand Theft Auto III (GTA3) relocated to sunnier climes, but scratch the surface and you'll find a game that's bigger, better and badder.

It's the 1980s and you play Tommy Vercetti, whose rise to crime lord begins after he's sent down from Liberty City to open up opportunities for the mob. Your character speaks in the gravelly tones of Goodfella Ray Liotta, and you get to spend your ill-gotten gains on more than just weapons and police bribes. There are several properties that can be bought as safe houses/save points, as well as businesses that present their own set of missions and which can make you money.

The city, and the range of vehicles with which to explore it, is larger, while motorbikes and helicopters make a welcome debut. The number of weapons has also increased, although you're restricted to only one from each weapon classification – for example, hand guns, heavy artillery and so on. You'll have the choice of chainsaw or Samurai sword and mini gun or rocket launcher before embarking upon missions.

Vice City benefits from a complete overhaul of its textures, resulting in greater detail. It has

an MP3-specific radio channel on which to play your own tunes, and you can switch between keyboard and gamepad to allow you greater control in the game's driving and shooting elements.

The game deserves its 18 certificate, thanks to its violence and language, but its satire and design betrays its sophistication. Pop culture references abound; from the 1980s soundtrack to the *Miami Vice*-style detectives who pursue you.

The game's freeform structure makes for a unique experience, while the sheer variety of missions and games make it a veritable games compendium. With so much on offer it's unlikely you'll become bored in a hurry.

Andy Stewart

DETAILS

PRICE £29.99 inc VAT

CONTACT Take Two Interactive

www.take2games.co.uk

SYSTEM REQUIREMENTS

Pentium III 800MHz processor (P4 recommended), 256MB of Ram, 1.55GB of hard disk space, DirectX 9 compatible video card

VERDICT

Freeform gameplay and high production values make for a unique and entertaining gaming experience

OVERALL





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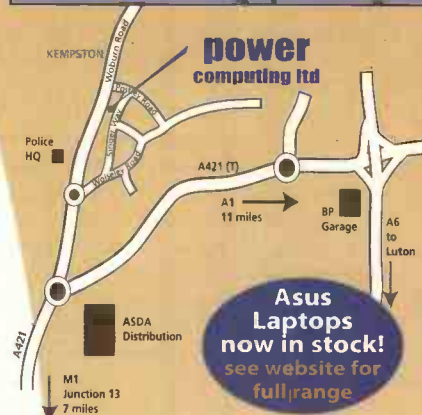
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If you're looking for PC upgrade kit, *PCW* and Chaintech are offering you the chance to win one of three upgrade prize bundles, worth £350 each. Each winner will receive the latest DirectX 9 graphics card from Chaintech and the choice of Chaintech's very latest Athlon-compatible 7NJS Ultra Zenith or Pentium 4-compatible 9CJS Ultra Zenith motherboard.

If you've been inspired by our 'DIY upgrades' on upgrading your PC this month (p84), Chaintech's feature-rich Ultra Zenith boards could be just the thing to help turn a bland beige system box into a feature-rich computing powerhouse. The 9CJS Ultra Zenith board supports up to eight USB2 ports to hook up your peripherals and support for 7.1-channel audio, while the 7NJS board also boasts integrated support for a Smart Card reader.

Both boards also feature Firewire, S/PDIF, and Gigabit Lan, and Chaintech plans to cater for case modders with its forthcoming FX5900 Ultra graphics card, which will feature special design and light effects.

For more information on these, or any of Chaintech's products, visit:

www.chaintech.com.tw

For a chance to win one of these upgrade bundles, simply answer this question and follow the how to enter instructions:

The 9CJS Ultra Zenith motherboard features support for how many channels of audio?

- a) 2.1
- b) 5.1
- c) 7.1



PCW SEPTEMBER 2003 CHAINTECH COMPETITION ENTRY FORM

The 9CJS Ultra Zenith motherboard features support for how many channels of audio?

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 ☐

If you do NOT wish us to contact you BY POST about products or services available from PCW or the VNU Business Publications Group, please indicate here ☐

If you do NOT wish us to pass your details on to other carefully selected companies to contact you BY POST about their products or services please indicate here ☐

PERSONAL
COMPUTER
WORLD

Rules of entry

This competition is open to readers of *PCW*, except for employees (and their families) of VNU Business Publications, Chaintech and Samsung. *PCW* is the sole judge of the competition and the Editor's decision 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.

July winners

The five winners of the gaming packages from Abit are Simon Collinge of Blackpool, Mark Gibson-White of Devon, Vance McDowell of Hove, Dr LI Hart of Dorking and PT Harrison of St Albans. The two winners of the Acer PCs are Kathleen Stonelake of Chorley and I Stook of Flintshire.

A stylish Samsung 21in TFT monitor worth £1,299

Add style to your desktop with an exclusive chance to walk away with Samsung's new SM213T TFT screen.

The SM213T changes the rules of monitor dimensions with an ultra-narrow 18mm frame that can be rotated to change the view from portrait to landscape and an expansive viewing area of 21.3in (541mm)

With the dual-input facility, you can watch movies, play games, examine large spreadsheets or operate multiple windows on the broad display area. The 1,600 x 1,200 native pixel resolution exhibits up to an impressive 16.7 million colours with immaculate detail, allowing greater control when working with pantones.

Measuring a compact 473.4 x 458.1 x 220.3mm the SM213T provides a 50 per cent power saving over traditional CRT monitors and has the added benefit of reduced glare and a larger display area of the screen.

The Samsung SM213T provides a bright image of 250cd/m² with a stunning contrast ratio of 500:1. The Samsung technology that powers this widescreen format device allows it to play even the most demanding graphics interfaces without any shadow effect, thanks to a responsive screen refresh rate of 25ms.

For a chance to win the Samsung SM213T, answer the question below and follow the instructions on how to enter.

What pixel resolution does the Samsung SM213T operate?

- A) 800 x 600
- B) 1,280 x 1,024
- C) 1,600 x 1,200



How to enter

Fill in the coupon and send to the following address by 26 August 2003:

Chaintech or Samsung September 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 **PCW1** for the Chaintech competition, and **PCW2** for the Samsung 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 SEPTEMBER 2003 SAMSUNG COMPETITION ENTRY FORM

What pixel resolution does the Samsung SM213T operate?

.....

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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WORLD**

Mindbenders

These puzzles will keep you amused for hours, and if you solve them you could win a Concise Oxford English Dictionary or a copy of Microsoft Encarta Premium Suite 2003

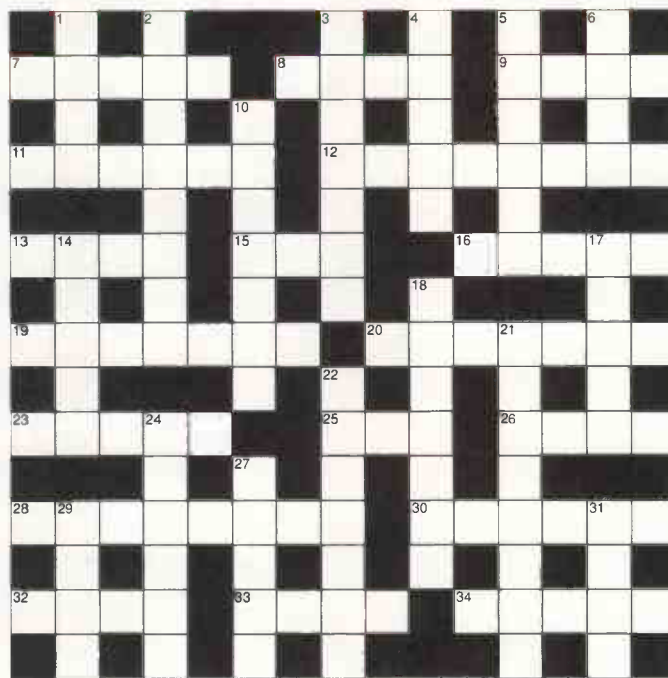
Prize crossword

ACROSS

- 7 An 8bit byte (5)
8 Embed one construct inside another (4)
9 Comply with computer command (4)
11 Break free from a program (6)
12 ___ directory, series of descriptor queues (8)
13 Means of passing audiotape copies (4)
15 Make a screen less bright (3)
16 Very small time measures (5)
19 Inserting copied text (7)
20 High-speed backbone network for Internet2 (7)
23 Small computer? (5)
25 Generic file extension (3)
26 Intel chip providing SMP (acr) (4)
28 Web page chart with several hyperlinks (5,3)
30 Microsoft -, work-related package (6)
32 ___ screen, film effects technique (4)
33 Unix pattern-matching utility (acr) (4)
34 Repeated design (5)

DOWN

- 1 Performs (4)
2 Effete, worn out (8)
3 Greeting that's written on the mat? (7)
4 Smelled strongly (5)



- 5 Witches' activity groups (6)
6 Departed (4)
10 UK rock festival town (7)
14 From Baghdad? (5)
17 Tom ___, Shirley Valentine actor (5)
18 British Formula One driver, initially first! (1,6)
21 Children's jumping game (8)
22 Took on another's child (7)
24 Outdoor team sport (colloq) (6)
27 Spanish friend (5)
29 Ratty's burrowing friend (4)
31 10p for instance (4)

Scrabbleword

In the following crossword, the real letters have been replaced with imposters. These imposters should appear elsewhere in the crossword. If B has replaced L then each occurrence and placement of B represents the the occurrence and original position of L. The position and occurrence of L, therefore, will represent the position and occurrence of another letter, and so on. If A is 1 and B is 2 and so on, the values of the original letters have been totalled horizontally, vertically and diagonally. Solve the original crossword.

I	A	G	E	H
C		O		E
S	N	E	L	U
L		U		A
R	T	L	T	R

47 73 32 43 28 62 32



Each month, one PCW crossword entrant will win a copy of the Concise Oxford English Dictionary, and the brainteaser winner gets a copy of Microsoft Encarta Premium Suite 2003.

Send your completed crossword to: 'PCW September - Prize Crossword', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive no later than **12 August 2003**. Send the answers to the brainteaser to: 'PCW September - Prize Puzzle', at the address above, to arrive by **26 August 2003**.

Please state clearly on your entry if you DO NOT wish to receive information about other products and services from VNU Business Publications Ltd. Please state if you DO NOT wish your details to be passed on to other carefully selected companies for marketing purposes. No purchase of the magazine is necessary to enter the competition.

July's winners

The winner of July's crossword is A. Bayliss from West Midlands, and Mark Preston from Whitworth won the brainteaser puzzle.

SOLUTIONS

August crossword

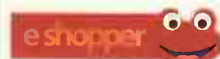
ACROSS: 7 Input 8 Axis
9 Only 11 Charge 12 Reroutes
13 Menu 15 Arc 16 Eniac
19 Sandbox 20 Celeron
23 Leads 25 Pie 26 Talk
28 Resistor 30 Cursor 32 Time
33 Meta 34 Comet
DOWN: 1 Inch 2 Surround
3 Extract 4 Users 5 Column
6 Flee 10 Hexagon 14 Evade
17 Atoll 18 Defence 21 Exterior
22 Operate 24 Drivel 27 Stamp
29 Emit 31 Over

July brainteaser

- | | | |
|----|---------|----------------|
| 1 | Sue | Green anorak |
| 2 | Billy | Blue cagoule |
| 3 | Freddie | Yellow cagoule |
| 4 | Mary | Blue anorak |
| 5 | Rachel | Mauve cagoule |
| 6 | Josie | Yellow anorak |
| 7 | Anna | Red anorak |
| 8 | Jimmy | Green cagoule |
| 9 | Tommy | Mauve anorak |
| 10 | Darren | Red cagoule |

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SEPTEMBER 1983

Forget cover discs – in September 1983 PCW gave away a wall chart full of Basic code words for 13 popular micros. 'One day, all computers will understand the same language,' we wrote, and the chart was designed to 'tide you through until this great day arrives'. It must have looked great on a bedroom wall beside posters of Morten Harket and Dexy's Midnight Runners.

Word processing was just emerging as a killer application. Not only did we list a word-processing program in our do-it-yourself pages at the back of the mag, but we also reviewed Tasword Two for the Spectrum. Our conclusion? 'If your main reason for buying a micro is to use it for word processing,

With a load of Lego and some perseverance, you could produce some sophisticated robots for their time in 1988

then the Spectrum would be one of your last choices.' Fair comment, but we quite liked the software nonetheless.

Finally, a rather telling story on the subject of how much cash the various computer manufacturers were spending on advertising, shows how times have changed. Commenting on Apple's relatively modest ad budget, Sol Libes said it: '...may account for why it is lagging behind IBM in the image department'. Funny to think that these days Apple is perhaps the most image-conscious manufacturer on the market.

SEPTEMBER 1988

September 1988 seems to have been quite a slow time for the IT industry, the most important news being transputing's shift to the world of MS-Dos, and how to make Lego move thanks to an Atari ST and a few bits of sticky backed plastic.

A 'transputer' was the term adopted in the late-1980s for a multiprocessor workstation. They traditionally performed server-based tasks, but the Multiputer from Microway was the first time you could use one to run MS-Dos applications. The £30,000 asking-price did mean this was a bit impractical, and data bottlenecks at the disk controller level meant it wasn't as speedy as we had hoped.



But it was making Lego with an Atari ST that really got us excited. Atari released a Robokit that included a printed circuit board that plugged into the ST's cartridge port, a 360KB disk of toy-making software and a manual. With some high-class Lego to hand, our then resident toy boy Nick Walker set to and, thanks to an optical sensor and a good deal of persistence, produced some rather sophisticated (for the time, of course) robots that could even type on a Qwerty keypad.

SEPTEMBER 1993

In 1993 the humble CD was busy carving itself a place in the world of computing, and in the September issue we took a look at two CD-related technologies from Kodak and Philips. Kodak had announced the Photo CD back in 1990 but the product did not emerge from the labs until late 1992. The consumer version of the product comprised a CD player that plugged into your TV so you could look through your holiday snaps from the comfort of your sofa. Each Photo CD disc could store up to 100 images, but users were slow to catch on the concept.

Philips helped spawn Photo CD, having been present throughout much of the development process, but eventually decided to use the technology to create a multimedia version, CD-i.

Meanwhile, as RSI (repetitive strain injury) entered the dictionary we looked at two ergonomic keyboards – a relative novelty back then. The £125 KBC 5500 Ergonomic got a thumbs-up from our reviewer, who liked the split keypad with both halves set at an angle to help turn the typist's wrist inward. The Adjustable Keyboard from Apple also went down well. At £195 it cost a little more than the KBC product, but the split body design meant you could set the two halves of the keyboard to the most comfortable position. The lack of a dedicated numeric keypad was, however, a drawback.

This issue also saw the introduction of our Editor's Choice award, which has graced the pages of PCW group tests ever since.

SEPTEMBER 1998

It's a mark of how times change that as recently as 1998 we used two pages of the Hands on section to discuss updating the Bios of your motherboard. This is an important subject, but the big change in 1998 was the ability to update your Bios with software, rather than extracting the chips and replacing them with updated components. This meant that Bios flashing was available to the public for the first time, and you could expect motherboard manufacturers to issue downloadable fixes for a minor bug that would have previously continued to annoy.

Five years ago Nik Rawlinson did a group test of 12 inkjet printers, and in this very issue Nik is at it again. Things have moved on since then, with today's printers giving you much more realistic results when you print your photos.

Meanwhile, our PC group test had a £2,500 price limit and we requested a Pentium II 400MHz processor from manufacturers. These 'Power Stations' had 128MB of memory, a 10GB hard drive and ran on either Windows 98 or NT4, although at the time we were desperate for the stability of NT5, which was later to be renamed Windows 2000.

Barry Fox touched on this subject when he upgraded from Windows 95 to 98 and suffered problems with hardware that wasn't supported by drivers, plus a Microsoft spokeswoman who asked 'What's a Registry?' With hindsight, Windows 2000 caused far more problems when it came to drivers for 'consumer' hardware, but in 1998 we were all full of vim and hope.

The PCW team



Mattel Aquarius

In 1983, a failed promise led to the launch of one of the world's least successful computers

By the summer of 1982, the electronics division of toy giant Mattel was in trouble. Its Intellivision games console may have been selling well – and was generally accepted as being technologically superior to its arch-rival the Atari VCS – but a failed promise had drawn unwanted attention from the Federal Trade Commission (FTC) and a hefty monthly fine. A quick solution was imperative, but few expected its follow-up to become one of the shortest-lived computers ever.

Back in 1979, as the video games market exploded, Mattel executive Jeff Rochlis persuaded his board to resurrect an earlier aborted console project. The resulting Intellivision Master Component System was launched in 1980 and quite simply blew the dominant Atari VCS away in terms of technology.

High-resolution graphics and three-channel sound aside, one of the most exciting prospects of the Intellivision was its unique expandability. At launch, Mattel promised an add-on keyboard unit, which would transform the console into a home computer, truly justifying its official badge of

Intelligent Television. Until Mattel failed to deliver the goods, that is. Months passed with no sign of the keyboard. Alleged high costs saw the project delayed until it became an industry joke. At Mattel Electronics' 1981 Christmas party, comedian Jay Leno joked in his speech that the three biggest lies were: 'The cheque's in the mail, I'll still respect you in the morning, and the keyboard will be out in the spring'.

But the keyboard didn't come out in the spring, so disgruntled Intellivision customers pursued matters further. The FTC investigated Mattel Electronics for fraud, and in mid-1982 ordered the company to pay a reputed monthly fine of \$10,000 until the keyboard unit was available.

Mattel responded by releasing its Entertainment Computer System (ECS), which had been developed earlier as a sideline. While hardly the peripheral it had promised, it was enough to get the FTC off Mattel's back.

Mattel had, however, been bitten by the home computer bug and, recognising the huge growth in this market, decided to get in on the act. Without time to develop its own computer, Mattel began searching for an existing platform it could rebrand.

As luck would have it, Radofin Far East, the Hong Kong manufacturer of much of Mattel's Intellivision parts, had developed three new computers based on the Z80A processor. Mattel struck an exclusive deal to market and distribute the first two models in the US, and relaxed in the knowledge it had now become a player in home computers.

Internally at Mattel, the pair of Radofin computers were codenamed Checkers and Chess. Outside they were known as the Aquarius 1 and 2, with the former, simpler machine announced at the winter of 1982 Consumer Electronics Show, and released the next spring.

The ultimate problem with the Aquarius was that it was woefully under-powered. The Z80A processor ran at just 3.5MHz and its 4KB of Ram memory was very tight; once the built-in Microsoft Basic interpreter was running, a meagre 1.7KB remained for running programs.

After the Intellivision's gaming capabilities, the Aquarius 1 was shockingly basic, especially considering it was released three years later. The absence of programmable graphics, sprites, game controller interfaces and a full-stroke keyboard all added up to a big disappointment.

Recognising its graphical limitations, Mattel had designers come up with a character set featuring running men, robots, explosions and various shapes, but it hardly added up to a compelling entertainment system. Games designer, Bob Del Principe, summed up fellow programmers' feelings by proposing the slogan: 'Aquarius – system for the Seventies'.

To be fair, Mattel launched the Aquarius 1 with numerous peripherals including a Mini-Expander unit which could take hand controllers, two cartridges, and had the same sound chip as the Intellivision.

But it wasn't enough. The Aquarius 1, launched in spring 1983, bombed. Mattel cancelled the Aquarius 2 launch, and by autumn negotiated with Radofin to let it out of its contract. The video games crash saw Mattel shut down in January 1984.

One beneficiary of the Aquarius demise was the Intellivision game *Burgertime*, which enjoyed the considerable advertising space and the TV time Mattel had pre-booked for its home computer – which, with a lifespan of less than six months, goes down as one of the least successful computers of all time.

Gordon Laing



6 FULL PROGRAMS

£526 worth of software for photo and website editors, and more



September Cover Disc

Photags Lite www.photags.com

Since the invention of the camera, people have used the backs of pictures to write personal notes and comments to help preserve the memory of the moment. Now Photags brings the digital photography experience closer to traditional film and print by allowing captions to be stored in the photo, while adding significant intelligent enhancements that only digital jpeg pictures can provide.

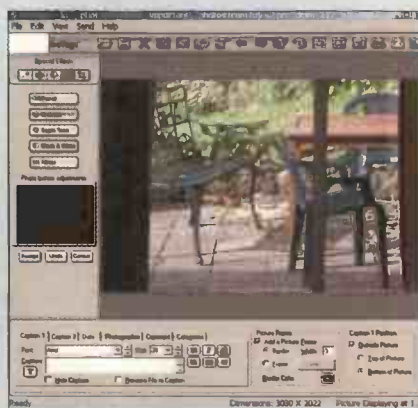
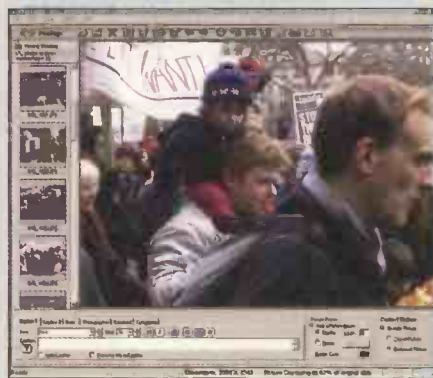
Photags is a technology that puts Activecaptions inside your digital jpeg photos, so they can be emailed, printed, stored and edited in the same file as your photo.

The software lets you create Activecaptions of any length to be displayed anywhere on the photo or on an external frame area, which can be created using the software. You can also hide the captions at any time, restoring the jpeg photo to its original appearance. Unless you decide to remove it, the caption will be retained inside the photo for search purposes, or for it to display on the photo at a later time.

You can display captions and a date, in any font, colour and type size, anywhere on your photo or its border. The Photags caption editor lets you add, change or remove captions, comments, categories, borders and frames whenever you want – without altering the original jpeg photo in any way.

Print up to four photos per page with or without the captions and borders displayed. Download your photos to any Pocket PC handheld device, and Photags will automatically resize and optimise the photos.

Remember the moment with an Activecaption for your pictures



Captions can be displayed in any way you choose, and they can also be removed

Full versions

Acronis True Image Deluxe

www.acronis.com

Acronis True Image Deluxe is a Windows-native online hard disk drive imaging program. Create complete images of your entire hard disk or individual partitions including all your data, applications and operating systems – these can be restored on the same or a different PC directly in Windows. Because True Image Deluxe is a Windows-native application, you don't have to reboot or run outside Windows, unlike other disc imagers – you can carry on working in Windows while imaging your hard disk. You can write the image to a hard drive, to CD-R/CD-RW, Zip, Jaz or other device. A user-friendly Windows XP-like wizard-style interface makes it easy

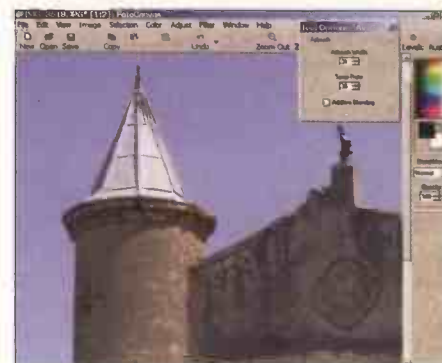
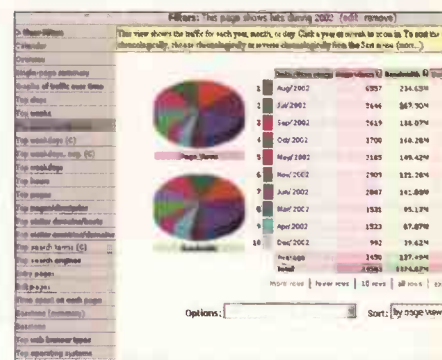
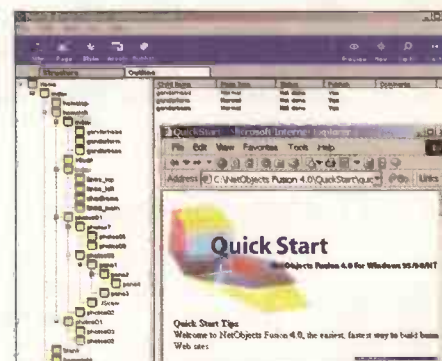
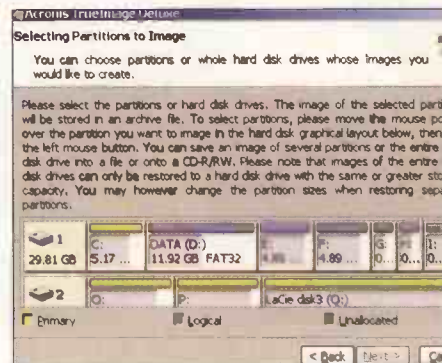
for both beginners and experts. The software supports Fat 16/32 and NTFS, as well as the Linux Ext2, Ext3, ReiserFS file systems. After installation Acronis True Image Deluxe lets you create a bootable disk or CD to help you perform disk/partition image creation and restoration procedures on a PC with any operating system.

You will need to register this product online by going to www.acronis.com/mag/personalcomputerworld.

Netobjects Fusion 4

www.netobjects.co.uk

This is a visually intuitive, productive and integrated website-authoring package with which you can singlehandedly build and maintain a complete, professional-quality site. Fusion 4's easy-to-learn, visual



Top to bottom:
Acronis True Image Deluxe
Netobjects Fusion 4
Sawmill 5
ACDSee Powerpack 3.1



environment contains all the tools needed to plan, build, publish and manage sites that will work with any browser version. Netobjects Fusion makes it easy to get the desired page layout results via drag-and-drop visual site development.

There's no need to learn HTML code or Javascript as Netobjects Fusion handles all the coding to create pages that look consistent in all browsers. You can add database access for creating product catalogues, developing lead generation, reporting and more, or use built-in components to add ecommerce functionality to your site.

Sawmill 5

www.sawmill.net

This powerful and flexible log file analysis tool is available for all the major platforms, including all popular versions of Unix, Linux, Windows and Macintosh. Sawmill currently analyses over 700 log file formats, including those produced by web servers, proxy servers, firewalls, mail servers, VPN servers, virus control servers, databases, streaming media servers, FTP servers etc. This full version software is worth £199.

ACDSee Powerpack 3.1

www.guildsoft.co.uk

If you liked ACDSee v2.43 on last month's CD, you'll love this. As well as the main ACDSee package you also get Fotocanvas, a deluxe version of Photo Enhancer photo-editing software and Fotoangelo software and plug-in for creating photo slideshows and screensavers. (These programs are also sold as separate products.)

The software also has a new plug-in architecture for adding third-party functions to the software. You can also use Adobe Photoshop plug-in image format filters. There's read support for ps, eps, pdf, and Quicktime still image codecs, and Powerpack adds support for arj, cab, tar, tgz, gzip, rar and uu compression as well as lzh and zip.

You will need to register this product online by going to www.guildsoft.co.uk/cmp/3086UPCW1.

Taxcalc Lite 2003

www.taxcalc.com

According to Intuit, the Inland Revenue gets 500,000 tax calculations wrong each year. Taxcalc Lite is a fully functional but restricted version of Taxcalc 2003 (see review on page 69).

It will allow those needing only the core return and employment form, and with incomes of £20,000 or less, to file quickly and securely over the Internet.

Eye2eye Norfolk

www.eye2eyesoft.co.uk

Explore the beautiful counties of Norfolk and north east Suffolk on-screen. Eye2eye is ideal for planning where to go – you can see for yourself the region's beaches, heritage and picturesque towns and villages. You can explore any corner of this area at the click of a mouse. Step from place to place, seeing the sights with 224 full-screen photos of 73 places. Enjoy a round-coast trip along Norfolk's coast.

Essentials

25 top utilities selection

This varied collection of programs includes:

Ad-Aware 6 Personal which can spotlight risks to your privacy while surfing. This free version can scan your memory, Registry and drives for known data mining, tracking components and advertising.

DivX 5.05 is the latest version of the amazing codec that compresses near-DVD-quality video into a fraction of its original mpeg-2 size.

AVG Antivirus 6 – this free version includes resident protection, email and on-demand scanner, basic scheduled tests, automatic update feature and healing of infected files, the AVG Virus Vault and more.

DVD Genie 4.10 lets you modify the region code for popular software-based DVD players.

Imageforge lets you create and edit images from a scanner or digital camera.

Musicmatch Jukebox 8.0 is a powerful and versatile multimedia jukebox suite.

Morpheus 3.1 allows you to connect with other users of this software and similar peer-to-peer technologies to form a user network.

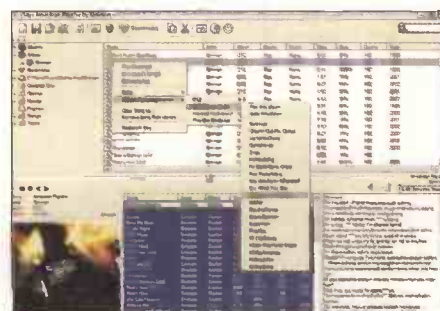
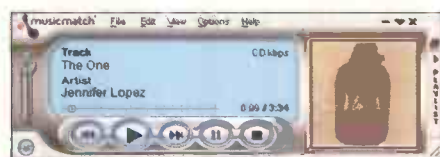
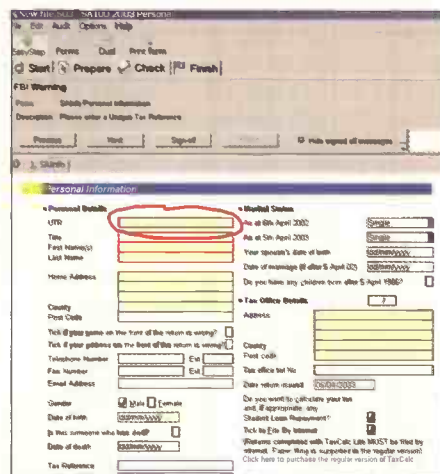
Easi MP3 is an MP3 manager and MP3/video/CD player.

Arachnophilia (Windows & Linux versions) This fully featured and easy-to-use web design software is written in Java, making it OS independent.

Trial versions

On the CD you'll also find trial versions and demos of some of the latest software around. This month's selection includes trials of Taxsaver 2003, No More Spam 1.5, Mailfiler, Thinkfree Office and McAfee Spamkiller.

Top to bottom:
Eye2eye Norfolk
Taxcalc Lite 2003
Musicmatch Jukebox
Easi MP3
Imageforge





What's on the DVD

If you bought the DVD edition of *PCW*, you'll have all of what the CD-Rom has to offer, plus the programs below

Full version

Red Hat Linux 9

www.redhat.com/software/linux

Last month we brought you Mandrake Linux 9.1. This month it's the turn of Red Hat Linux 9 which, incidentally, was reviewed in last month's issue. Red Hat is probably the most talked about Linux option, so this version is an important update and is a good choice for anyone looking to switch from Windows.

Red Hat's attractive new Bluecurve interface is here, which gives it somewhat of a Mac OS look and feel, and there are numerous tweaks that make this version easier to use and more logical than before. For example, the equivalent of the Start menu has been reorganised so that 'extra' programs, which used to appear on a separate menu, have been repositioned in a flyout of the section in which they would otherwise be found.

Installation and configuration procedures have been simplified, too, with most settings adjustable using graphical controls. The first time a system is booted after installation, the Setup Agent gives step-by-step guidance for setting up date and time, sound card testing, registering for Red Hat Network and installing additional software. When installation is complete you'll be running the 2.4.20 kernel, Evolution 1.2.2, Open Office 1.0.2, Gnome 2.2.0 and KDE 3.1.

The software is supplied as three ISO image files, each of which must be burnt to CD-R to create your installation disc set. The files can be found in `\software\redhat\` on the DVD. We strongly recommend you visit the Red Hat website for further advice and information before installing.

Playable game demos

Six more playable game demos for you...

Next Generation Tennis 2003

In Wanadoo's new tennis sim lets you take part in both Roland Garros and the US Open, playing on all surfaces and choosing from stars such as Marat Safin, Justine Henin, Alex Corretja. There's a new game engine, and animations featuring various

shot types, from serve and sidespin effects to dropshots and underarm serves.

Colin McRae Rally 3 Colin's latest outing on PC sees him piloting his famous Ford Focus (and other cars) through another selection of hazardous driving conditions.

Fire Chief is the first 3D realtime strategy/management game to be set in the world of fire fighting. Guide the team from Fire Station 615 through their extraordinary everyday lives. Witness awesome explosions and tackle fearsome blazes—on a train, at a service station, at the aftermath of a storm, a bank and a nuclear power plant.

Breed Hailed by some as a Halo killer, the year is 2610 and an aggressive race of aliens known as the Breed has taken over Earth. There are 18 missions, numerous fighter jets, landing craft, tanks, jeeps, buggies and so on, along with a huge arsenal of weapons.

Indycar Series is all about the Indianapolis 500 – a 15-race, single-seat championship that competes on speedways throughout the US, with the historic and world-famous Indy 500 the highlight of its racing calendar.

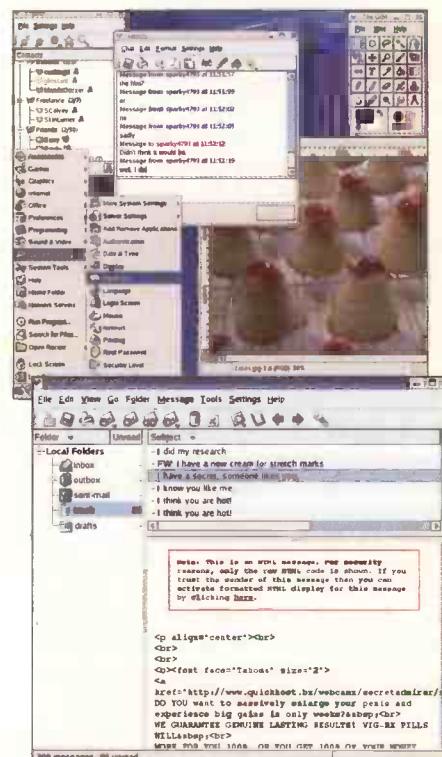
Ghost Master is a kind of Ghostbusters, but in reverse, as you command your legions of ghosts, ghouls and spirits... your job: to frighten mortals from their homes and places of work.

70 essential utilities and add-ins

In our regular section are more than 70 of the top must-have programs and add-ins, sorted into five main categories – Internet, Office, Creative, Utilities, and Others.

PCW workshops and product tests

You'll find a huge selection of past group tests and workshops in the Editorial section. Two years of product tests from the pages of *PCW* include desktop PCs, anti-virus software, CD writers, databases, digital cameras, DTP software, hard drives, image editors, monitors, motherboards and loads more.

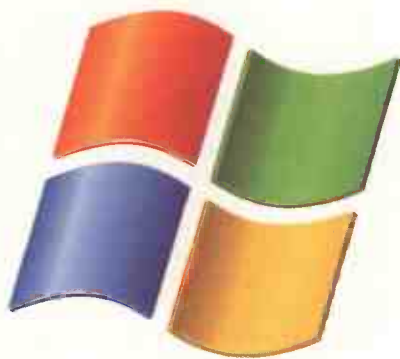


Top to bottom:
Red Hat 9
Breed
Fire Chief

Next Month

on sale 21 August 2003

Find out how to
get the best out
of Windows



Mastering Windows

You use it everyday, but do you really know how to make the most of it? Your operating system can do more for you than you can imagine. PCW will show you how to master Windows, whether old or new, and make it work for you.

Is new better?

The state of computer technology is changing every day, where new standards replace old, but is new always better – and in the user's interest? We investigate the real reasons behind some of IT's newest trends.

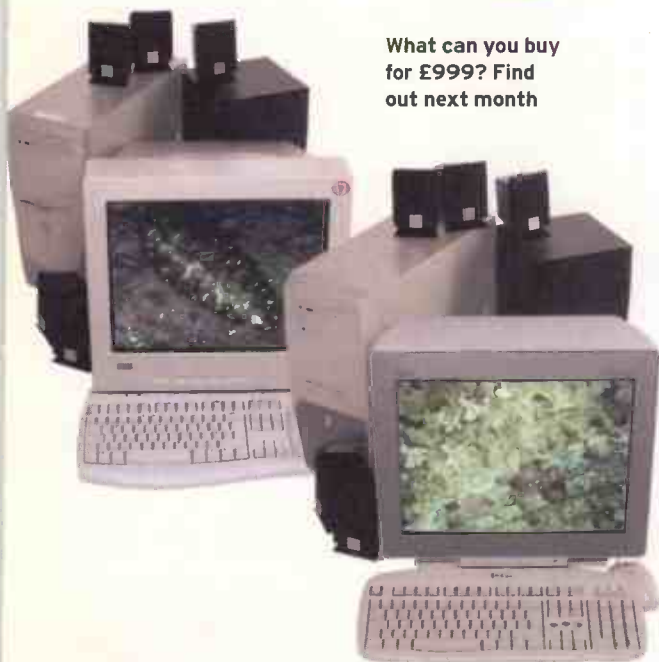
£999 PCs

Can you get a multimedia PC for just £999 ex VAT? What about if you're into image or video editing? Find out how much can be packed into a £999 ex VAT PC in our group test of 10 systems.

Multifunction devices

When your desktop is feeling the pinch, what better way to save some space than to combine your printer and scanner? Not only is it a cheap home photocopier, with colour functions as a bonus, but also you often find yourself with a rather nifty fax machine. We test the best and give you the lowdown on these space-saving wonders.

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out next month



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Dump the jargon and make it simple

Forget complicated specifications, argues Ed Henning, today's PCs need to be accessible to everyone

I have noticed that I tend to write increasingly about usability issues surrounding PCs, and I am sure the reason for this is that the PC industry is evolving too slowly for its own good. I had hoped that the recent difficult times the industry has been through would shake companies out of their complacency, creating a new wave of creativity and innovation. Some inspiring optimism, that!

Many PC manufacturers I spoke to three or four years ago, when the hard times were just beginning to be visible, did not agree with the point I made that radical changes were needed – not just to supply lines, margins and other bean-counter measures, but to the fundamental design of PCs and the software that runs on them. In short, PCs needed to be made easier to use and understand.

Looking at the PC market now, and comparing it with three or four years ago, it is in fact still very similar. Sure, everything is faster or bigger, but essentially not much has changed. PC companies can be forgiven for this to some extent, because consumers had for years been fired with enthusiasm by the constant, ever-faster, ever-bigger approach. But this has come to an end, and the industry hasn't adjusted.

One way in which the PC industry needs to evolve is away from further integration and towards a more modular style of operating system.

The argument against this approach is that PCs are ubiquitous devices that can do a number of different tasks and need to be flexible. But that flexibility need not be compromised by a proper modular operating system running on fully integrated, non-user configurable machines.

For most users, this is what is needed. Who buys a television these days and knows the specification of the tube, the receiver and the sound amplification system? Sure, there are some who will always want to know this level of detail, but for most it would be an unwelcome distraction and a source of confusion.

Readers of this magazine are among the more computer literate of users and, like myself (still an avid fan and user of Dos and its command line interface), could probably continue happily with computers styled the way they have been for the past couple of decades. But I, and many others like me, am in a decreasingly small minority, and the way the majority of users think about, buy and use PCs has a huge influence on the market and on the rest of us. And at the moment, the majority is not happy.

A few years ago, what were the questions asked of me by friends needing PC advice? Simplifying a little,

it was along the lines of: 'Should I get one of these 66MHz machines or wait for the 75?' Life was so much more straightforward then. Now, just look at the specification for a modern machine; you need an acronym dictionary and a technical education to work out what is going on.

I recently suggested to somebody who has been using a PC for a few years (and is therefore by now reasonably comfortable with the technology) that in order to buy a new machine he should call one of the major, reliable PC manufacturers. 'No, that's a waste of time,' he said, 'They'll just blind me with all this bytes and megahertz nonsense without explaining what it all means. I am sure they just want to sell me what they want me to have.'

I am not surprised that they don't explain what it all means, it really would take too long. If the product is too complicated for the majority of users to understand, then surely the best approach is to simplify the product?

Look at the recent TV ads by one of the UK's largest mobile telephone companies, Orange, in which it is

preparing its staff to train users in the technology. If you ignore the dreadful nature of the adverts themselves, there is an important point underlying this – the company must have realised that users are having difficulties understanding and using modern mobile phones.

Digital technology seems to have this influence on manufacturers – they will stuff ever more functionality into something, not because it is useful or

necessary, but simply because they can. Mobile phone companies got lucky with text messaging – nobody predicted the success it would have – but the addition of ever more complex features has clearly gone too far.

If this is the situation with mobiles, consider just how much more complex a modern PC is compared to a mobile phone. Educate the users then? No, no, no. Simplify the products.

So it should be with PCs. I, and many of you, will always want to know the size and spec of our hard disks and other components, but this industry will not thrive again until it realises that most users are simply intimidated by such information.

The best thing the PC industry can do for itself is to go back to the design drawing board and start fresh. If we get to the stage that buying, using and adding to a PC is a one, two, three affair, you can bet the majority of consumers will actually want to use the technology, and that has to be a good thing for everyone – including an old Dos hack like me.

'The best thing the PC industry can do is to go back to the design drawing board and start again'



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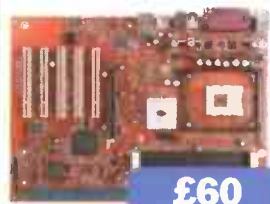
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