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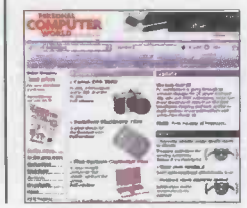

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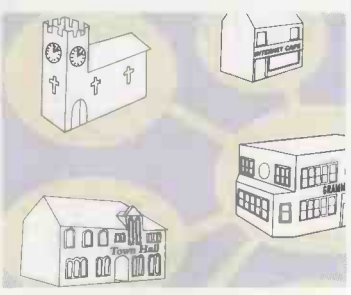

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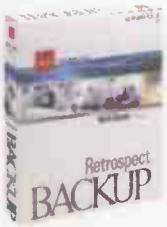

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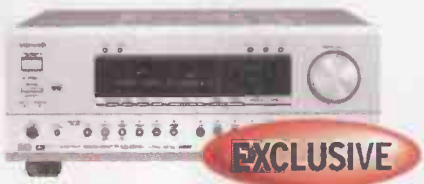

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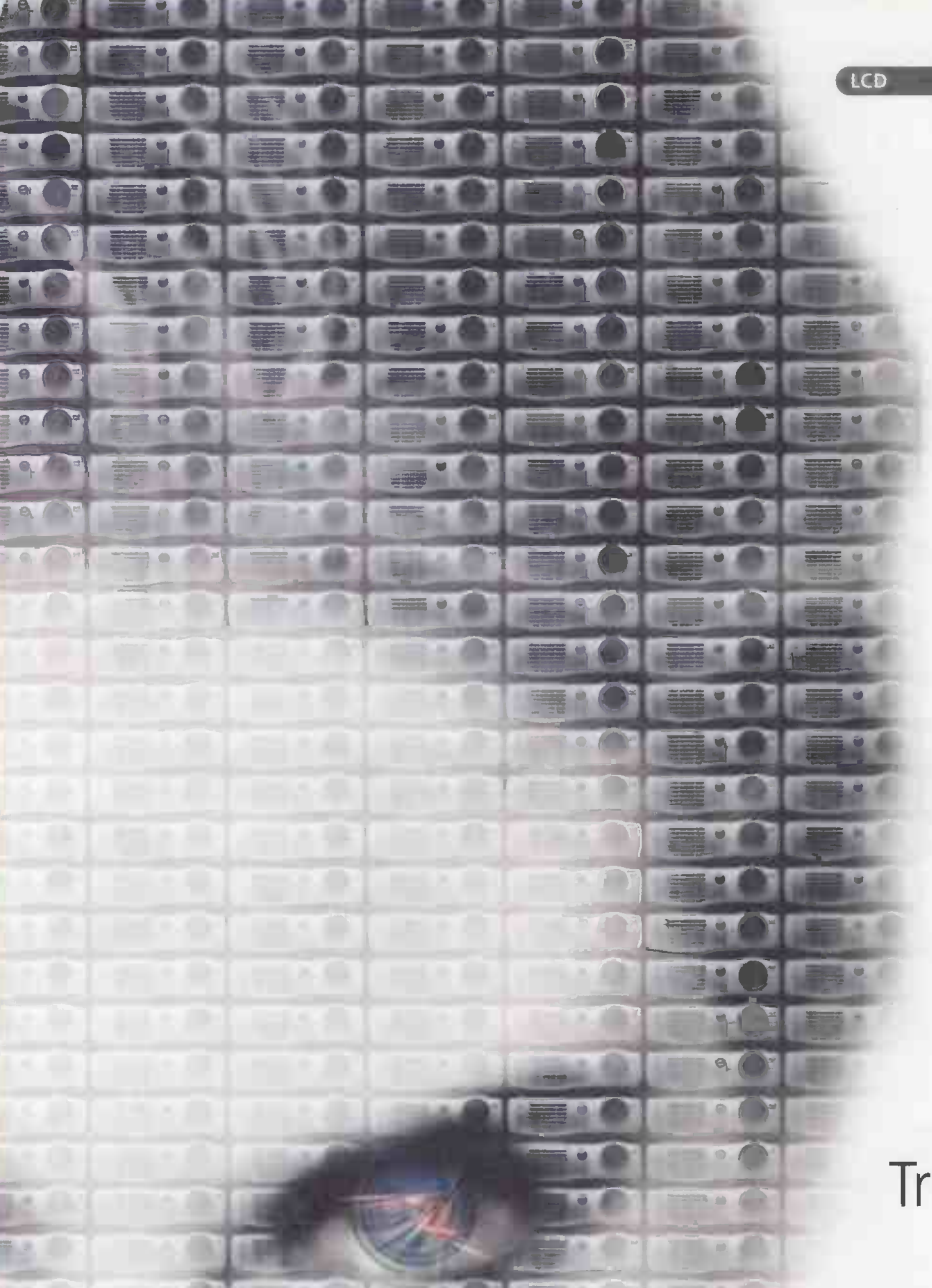

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Confessions of an IT hoarder

PCW Editor Rob Jones struggles to dispose of old electrical kit, but not just for practical reasons

>> **Electronic waste**
Tackling the problem of IT waste disposal – see page 103

The thing about computing is that it has a tendency to bring out the hoarder in us – or is that just me?

I seem to be physically unable to throw out old kit, be it digital cameras (I still have my first, an 8MB Vivitar Vivicam 3000 with no screen and a resolution of just 640 x 480), old CD drives and graphics cards, big, boxy modems, aged software, PDAs, mobile phones, speakers and various components and cables that I know I will never use.

Some of these have yet to be relegated to the loft and emotionally I know that, despite their obsolescence, I will not be getting rid of them any time soon. Because you never know when they may come in handy... or so my argument goes.

An old scanner that could produce colour only in shades of green was finally chucked out recently – but only after sitting for months on the floor used as nothing more than a glorified (very) low-standing table. I kept the cable just in case.

But the way we throw out old hardware – be it a PC, monitor, printer or scanner – will change from August, with the forthcoming Waste Electrical and Electronic Equipment Directive (although the directive's full requirements will not come fully into force until August 2005).

The directive, which is the focus of our feature on page 103, aims to start tackling the growing mountain of waste products occupying landfill sites, and the statistics make uncomfortable reading. Around one million tonnes of electrical and electronic equipment are dumped each year, of which 39 per cent is computer hardware.

While retailers and vendors will have to make provisions for taking back old equipment, there is nothing to stop the consumer simply throwing their waste into the household bin. So the disposal of goods can best be described as a bottlebank for high-tech waste. But more is going to be recycled, and where this is not possible, burnt for energy.

There are two obvious downsides to this directive. First, it is the consumer who will pay the price, because you can be sure that if retailers and vendors have to spend money taking back and safely disposing of waste equipment, then so will you when you buy your replacements.

The second, in my view, is the voluntary nature of the scheme. With no comebacks for putting an old printer in the bin, perhaps hidden inside a bin liner, then only those committed to helping the environment are going to think twice about how they throw away their old equipment.

How households dispose of electrical equipment is tough to monitor, but the directive is a start. It prompts an education process that makes us think about what we do with the hardware we no longer need, and hopefully will pretty quickly have us safely disposing equipment, rather than letting it add yet more to the local landfill site.

If, however, hoarding is more your style, then we have plenty of products in this issue to tempt you to part with your cash and so add to your 'obsolete' household clutter. The graphics cards group test on page 123 puts 10 through their paces and will attract those who want to use the latest, highest-end kit. It includes a card from Hercules, which announced it was pulling out of this market as we were going to press, but that could mean readers can line up a bargain.

If you are operating on a tighter budget and the time has come to replace your PC, then the round-up of £699 machines will be up your street. It will show you just what you can get for your money these days, especially if you are not too concerned about living on the extreme edge of computing. ■

'There is nothing to stop the consumer throwing their electrical waste into the household bin'

>> **Graphics cards**
Ten of the best reviewed – see page 123

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PERSONAL COMPUTER WORLD

vnu labs

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

Sysmark 2004 tests system performance by running popular applications

SYSMARK 2004

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

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

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

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

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

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

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

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

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

Office productivity

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

Internet content creation

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

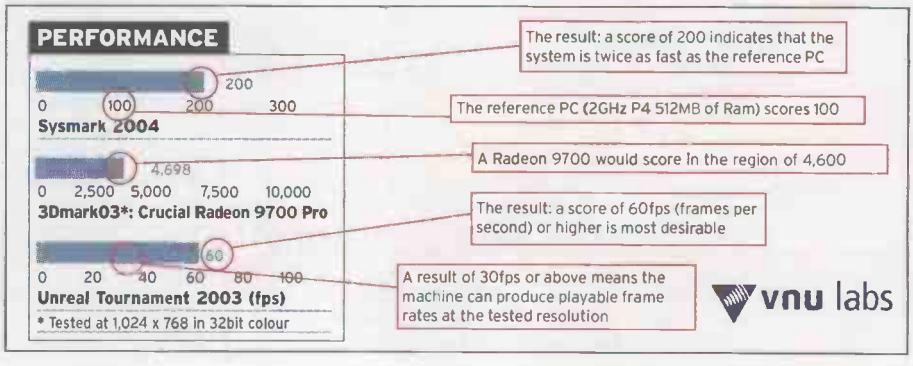
See www.bapco.com for pricing information and full details of testing strategies and methodologies.

3DMARK 2001

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

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

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



Unreal Tournament 2003 is used to test real world DirectX performance

PCmark04 measures memory, processor, graphics and hard drive performance

3DMARK03

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

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

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

UNREAL TOURNAMENT 2003

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

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

PCMARK04

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

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

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

BATTERY TEST

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

TEST BEDS

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

3DmarkO3 is so demanding it will only work on the latest cards

3Dmark 2001 tests DirectX performance

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News

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Addressing gets smarter

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24, 25, 27 Talking in light

This is a prototype of a fast interface between electricity and light that is likely to make optical links far more common. It's just one of the technologies highlighted in our three-page report on the Intel Developer Forum – including what was billed as the greatest change in the PC platform for a decade.

Analysis

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How can we beat viruses?

PCW numbers

Some news stories carry *PCW* numbers. You get a fuller versions or more information by entering these in the box provided at www.pcw.co.uk.

Intel U-turn over 64bits

Intel did a coy U-turn on 64bit computing last month, announcing that some processors shipping later this year will run 64bit code as well as today's 32bit PC applications – just like AMD's Athlon64 and Opteron processors.

Actually, 'announce' is too strong a word for the drip-feed of information on the subject at the Intel Developer Forum (IDF), the geekfest at which the company showcases the results and trends from its $4b R&D budget (which is higher than the entire UK spend on R&D).

There have been rumours of an Intel 64bit x86 project since AMD launched the Opteron, challenging the lower end of the market for Intel's 64bit Itanium, which runs classic x86 PC code only in emulation.

Intel chief executive Craig Barrett, in his IDF keynote, described it as Intel's worst kept secret but seemed reluctant to let it out, speaking vaguely of a new generation of Xeons that would support 64bit addressing. Intel usually has this kind of thing bulleted out in Powerpoint.

Addressing is only one part of the 64bit package – albeit an important part, because 32 bits can only address 4GB of Ram directly. So was he talking of full 64bit operation or not? Pressed on this by journalists, Barrett blustered that Microsoft had promised that its 64bit edition of Windows XP would run on 'both platforms'.

Intel mobile-platforms chief Anand Chandrasekhar shows what he calls an Entertainment PC that doubles as a slimline TV. In the base is a wireless keyboard and a remote control that doubles as a mouse

This set the pattern for IDF: Intel was not going to spell out the details because it could not bring itself to admit that it was following AMD. In fact, it would not mention AMD at all, which was hard on anyone trying to find out if the new architecture used AMD's 64bit extensions to the x86 instruction set.

The message dribbled out over the next three days: the new architecture had three modes: 32bit, 32bit/64bit mixed, and full 64bit. It would appear first on a Xeon later this year followed shortly (or the same time, or next year, depending on who you talked to) by a 64bit-enabled Prescott Pentium. One Intel man told me that Prescott Pentiums already have elements of the architecture, as rumoured before their launch last month.

I was back in London before I could establish whether the new platform uses AMD instructions. Richard Baker, AMD European marketing manager, said: 'It is our understanding that they do.'

This makes sense. It would have been hard even for Intel to push Microsoft into writing for two very different instruction sets, though compilers already have to cope with differences between Intel and AMD in multimedia extensions.

AMD was not Intel's major concern. It fears competing with its own Itaniums which it stressed repeatedly will remain superior in speed, robustness, and even cost. Our affable Intel minder at IDF told me: 'The message is that some time after the middle of the decade [that is, next year] Itanium will reach price parity with a Xeon and will be twice as fast.'

It was a measure of this IDF that the issue did not dominate proceedings. Other technology there was as interesting, or more so. It included a fast photonics interface, next-generation UWB wireless links, and what Intel described as the biggest changes in PC architecture for a decade.

Read about IDF in our three-page special report from page 24, or online at www.pcw.co.uk. CA

Chip enables multimedia Dab handers

A UK firm has developed a chip that will allow mobiles to pick up Digital Audio Broadcasting (Dab) – a move that, as we highlighted last month (*PCW*, page 26), could create a new medium with elements of the Internet, TV and radio.

Frontier Silicon, which is working on the project with Samsung, said its Chorus chip uses 30 per cent less power than rivals and will support a Digital Multimedia Broadcasting (DMB) spec being developed in Korea.

Dab is just taking off here for audio and Korea is pioneering its use for multimedia. NTL is interested in following suit in the UK. Dab stations are restricted to using only part of the signal for non-audio – almost always text. But there is no technical reason this should be so.

Steve Evans, Frontier's head of sales, said DMB sits on and is compatible with Dab.

Power drain will be the big issue for mobiles. Evans says the Frontier module draws up to 400mw and runs for 12 hours on two AA cells. That is heavy for a PDA, but Evans claimed that users need only switch DMB on when they need to receive data.

The drain would be tolerable in a notebook and is nothing to a car radio (for which Dab was originally developed). Future chips should be more frugal.

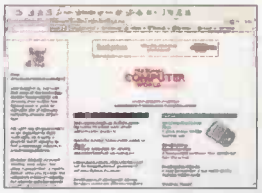
Evans said some people have a licence to broadcast data at 256Kbits/sec but a single Dab channel could go up to 1.5Mbit, enough for small-format video.

One model being explored by NTL is to have PDAs fed with information in their cradles at night and then trickle-charged with Dab updates in the day.

Other usage models, such as providing location-based data, could use cellphones as a back channel, which is why Frontier and other Dab firms were at the industry's 3GSM show.

More from 3GSM – page 21

Keep up to date with the news, reviews and competitions in our weekly newsletter. To subscribe go to www.vnuservices.co.uk/pcw



Graphics cards
We round up 10 of the fastest gaming cards – turn to page 123

'Caller ID' to fight spam

Microsoft is to introduce a 'caller ID' for email to foil spammers and other email abusers who protect themselves by 'spoofing' a fake address.

The system, being developed with Yahoo and email specialist Sendmail, verifies that the origin of each email message is from the Internet domain it claims.

Microsoft chairman Bill Gates, who recently tempted fate by pledging to eliminate spam within two years, told the RSA security conference in San Francisco that the Domain Keys cryptographic authentication scheme would make it easier to filter out junk mail. It would also allow legitimate users to protect their domain names, which can be hijacked by spoofers.

Email senders will need to register the IP addresses of their outgoing email servers to take advantage of the system.

Yahoo recently unveiled a system that uses public and private cryptographic keys to generate a signature in an email header.

When an email message is received from a particular domain, the system verifies the signature with the sender's public key lodged with a public Domain Name Server. Microsoft is to include new security features into an XP service pack (SP2) due to be released later this year – though it will not include a virus scanner, as early reports suggested. It will have a pop-up monitor that allows you to adjust settings of third-party virus scanners and firewalls.

Meanwhile Microsoft confirmed that it is considering releasing 'XP Reloaded' before its projected 2006 launch of Longhorn, the successor to Windows XP. 'We look forward to outlining details but at this time we don't have anything further to say,' the company said in a statement.

USB pond life gets odder

We've seen some fairly eccentric uses for the USB port, including a back scratcher and a massage pad, but the duck-dongle (below right) is a real quacker.

Apart from inviting appalling puns, it holds 16MB of data. The blurb says it needs no skill to install, which we suspect will be news to users of Windows 98, who are likely to find themselves paddling around for a driver. It's not a good thing to leave within range of a toddler either: you might find it in the bath.

The USB drive pictured above it is more satisfactory for those who prefer peripherals to look the part. The Clipdrive Bio, from Memory Experts, opens a hidden partition only to those whose fingerprints it recognises, which is good news if you carry around sensitive information. Future versions will double as a log-on key to vet access to computers.
www.i-duck.co.uk; www.clipdrive.com

Clipdrive (above) checks its users' fingerprints. The duck drive (right) would be easier for thieves to quack

Rivals mock BT 'broadband lite'

BT has launched its first sub-£20 512K broadband service – capping users to 1GB of downloads a month, but has worded the offer to sound like this was doing them a favour.

Duncan Ingram, head of BT Openworld, said the cost of the £19.99-a-month BT Broadband Basic service was held down by designing it around basic needs. 'For example, we have included a data allowance of 1GB a month,' he said in a press statement.

NTL caused a furore when it limited users to 1GB a day. The cap would, for instance, rule out listening to Internet radio, one of the major bonuses of having an always-on link.

Plusnet described the 1GB cap as 'punitive' and annnounced a £18.99 512K service with no cap.

But BT could be setting a trend. Telewest announced a £17.99 a month 256K service with 750MB-a-day cap.

IT staff work for free

IT managers do the equivalent of three months' unpaid overtime a year, according to the TUC. They average 9.3 hours a week, and their support staff average 5.3 hours, says a union league table.

Teachers, doctors and farmers fare worse. Corporate and civil service bosses do the most overtime, but they get paid more.

'Three months a year for 20 years... with time off in lieu, I should have retired three weeks ago'

Hercules withdraws from graphics market

One of the great names of PC graphics is leaving the market. News that production of Hercules 3D graphics cards is to cease, along with the Prophetview range of LCD monitors, was announced by the Guillemot Corporation, which bought the brand in 1999.

Hercules was once almost synonymous with PC graphics, producing high-res boards at a time when you were lucky if you had CGA, boasting a maximum four colours in 320 x 200 graphics mode. But its star has faded in recent years. Guillemot cited 'weak gross margins' and 'crowded markets' as the main reasons for the withdrawal.

PJ Fletcher, Hercules UK business unit manager, said: 'The opportunity for innovation and differentiation has diminished... it makes perfect sense for Guillemot to put its resources into areas where we can offer fresh and exciting products.'

The latest Hercules board, the 3D Prophet 9800XT Classic, is reviewed in our graphics group test on page 123. It will be available while stocks last.

The Hercules brand will live on with a range of video, audio and wireless devices. **Will Stapley**

The code farmers

Stock breeders show how to 'solve' intractable problems using evolutionary computing

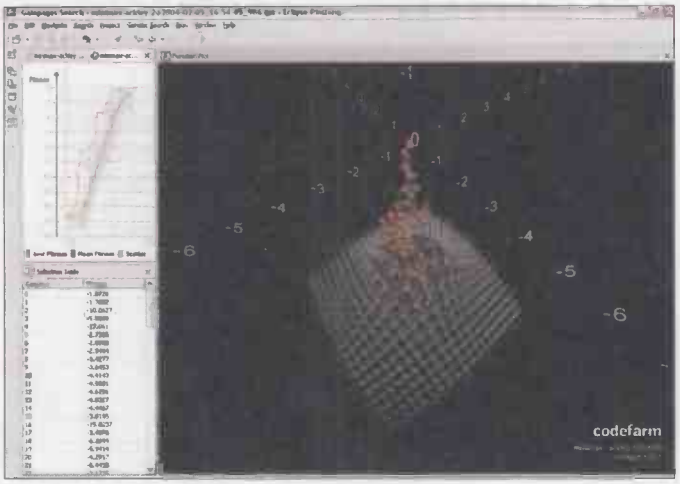
Charles Darwin took a great interest in stock breeds at the time he was developing his ideas on evolution, as he saw they were doing something very similar to nature. Both allowed the fittest to survive: natural selection by killing off the weakest and the human breeder by selecting preferred strains.

Now modern evolutionists have returned to the farm, but with a difference: they are breeding code instead of creatures, and are surrounded not by fields but by the campus of the University of Sussex at Brighton.

A start-up called Codefarm based at the Sussex Innovation Centre, a business incubator allied to the university, is using evolution to solve (or provide useful answers) to certain types of complex problems. 'We are farming solutions,' said managing director Jeremy Mabbitt.

Evolution needs three conditions: a population capable of reproducing, mutation across the generations and some way to select 'fitter' mutations. Given these evolution is bound to occur.

Evolutionary computing starts with a population of programs making a rough stab at a problem; these are run and the best selected on the basis of what is called the 'fitness function'; the selections then go through a mutation process such as a parameter change and the process is repeated.



Codefarm optimisation routine: windows at left show generations and 'fitness'

A typical application is to predict the behaviour of, say, stock prices, using data on what has happened in the past. A simple model might involve 10 parameters, each with a thousand possible values, says Mabbitt. A brute force approach of trying every possible combination of values, allowing a second per run, would take far longer than the age of the universe.

Alternatively you can make a single educated guess and then tweak values until you come to an optimal solution – the hill-climbing approach. 'That can lead you down a dead end,' said Mabbit. 'You might get an optimal solution for the route you have taken but you might have done better going up a different hill.'

The evolutionary approach tries a variety of different routes and plays them off against each other using a fitness function that measures how well the model fits the real data.

Mabbitt does not pretend to be able to make specific forecasts, such as which prices will go up by how much and when. But in City firms juggling unimaginably huge amounts of money you only need to be able to predict with a slightly more than even chance to be able to make a great deal of money.

Codefarm provides software that can be run on a supercomputer, or a grid network on which computing resources are used collaboratively to mimic a supercomputer. Eventually it plans to have a server farm to host applications.

It sees applications in finance, engineering, manufacture, logistics, medical diagnostics, biometrics and telecoms. Many tasks, such as routing and other network problems, involve optimisation. But such is the complexity of some of some problems that Codefarm can only find a presumed optimum: it cannot say for certain that there is none better.

However Mabbitt points out that a conventional approach can lead to people solving the wrong problem. 'They map their real problem onto a simplistic formulation and apply classic optimisation routines that produce a genuine solution. But it is not the solution to their own problem.'

Clive Akass

Psion sells its family silver

Psion's sell-off of its stake in the Symbian mobile-phone software consortium last month looked like a break from its glory days – and an admission of defeat by a company that virtually invented the handheld computer.

At the 1997 launch of its classic Series 5 organiser, Psion issued a promotional cartoon showing its founder David Potter fighting the 'Goliath' Bill Gates. Microsoft's only mobile software at the time, early Windows CE, was so flaky it deserved its nickname of Wince.

But Microsoft got where it is because it is good at learning from its mistakes – or, as cynics put it, by allowing early adopters to pay for the privilege of bug-testing its prototype code.

Now CE has matured and mutated into a variety of mobile platforms, including the smart phone. And the only Psion mobiles come from its Teklogix division – and almost all of them use CE.

Psion helped form Symbian shortly after the Series 5 launch, throwing its family silver into the deal. Its organiser code base formed the kernel of the consortium's projected mobile software suite. Symbian partners included Nokia, Ericsson, and Motorola, representing a huge slice of global mobile sales.

Psion bought out Motorola's stake last year, bringing its own Symbian stake to 31.1 per cent. Nokia wants to buy all this, giving it a majority stake, but the other partners also have options to buy (see above right). They are Sony Ericsson (1.5 per cent), Ericsson (17.5 per cent), Samsung (five per cent), Panasonic (7.9 per cent) and Siemens (4.8 per cent).

The situation parallels that in the new digital home market, where consumer-electronics companies fear being outflanked by Microsoft. Richard Poole, head of strategy at consultancy Conchango, said: 'None of the mobile-phone operators wants Microsoft... but the choice is either to work against Microsoft or with the company – and some are going with it.'

Nokia rules the consumer mobile market but models using Symbian are a harder sell to corporates. Poole says only on usability is Symbian software at least as good as Microsoft's, though people used to Windows may find it harder to get used to.

Microsoft is ahead on all other counts, from a corporate point of view, says Poole. Its software is more portable, as you cannot be sure an app that runs on one Symbian phone will run on another. It wins hands down on integration with Microsoft-dominated back-office systems, particularly email, and it has a huge developer community, creating online applications and services using .Net tools.

But Jerry Panagrossi, vice-president of Symbian's US operations, points out that tools are available to allow developers to use Visual Basic and .Net skills to create applications that compile directly to Symbian.

And he says Symbian allows much more design freedom, particularly in the user interface, than the tightly controlled look-and-feel of Microsoft. This allows for cultural differences across the world and has been particularly successful in Japan.

For Psion, the Symbian sell-off may be a good move financially. Potter makes a good case that the unglamorous warehouse mobiles that Teklogix produces are needed for the complex logistics of globalised commerce.

But still the sale has the smack of a cop-out by a company once identified with UK innovation. Potter justified it, doing no favours to Symbian, with the words: 'We are eliminating risk.'

Clive Akass

Symbian platform: Nokia's latest Communicator 9500

Nokia communicates with IBM

It was unclear as we went to press whether Nokia would get a majority share of Symbian – see our website for updates.

Other partners had the option on Psion's share (see left) and there remained regulatory hurdles, chief executive David Levin said at the 3GSM show in Cannes. Whatever happens Symbian's strategy will not change, he pledged.

Nokia is setting up the kind of alliances it will need to compete with Microsoft. It announced a deal with IBM to integrate its software with Notes and Tivoli. Palmsoft, which now owns the Palm OS, is in a similar position to Nokia (though much stronger in US corporates) and setting up similar deals.

Jason Chapman, principal analyst at Gartner, said: 'It's going to be important for all the vendors to work with IT suppliers to make inroads into the mobile market.

'We'll see more of these deals. Microsoft has a different route in that it is also talking with equipment manufacturers and operators to try and get an end-to-end solution.'

Nokia also announced a new Communicator, the 9500 (above), that will form the platform for its IBM deal. It supports triband GSM/GPRS, Edge networks and Wifi. It is also optimised for data use by businesses.

It uses Nokia's Series 80 application suite on top of the Symbian OS and will sell late this year for around £537 unsubsidised.

Iain Thomson in Cannes

>> Symbian 8

More than two million Symbian-powered handsets were shipped in the final three months of 2003 – three times more than the same period of 2002. A total of eight new models came from Motorola, Nokia, Siemens and Sony Ericsson, the company said.

At the 3GSM show, the company announced the availability of its latest Symbian OS version 8, with upgraded multimedia, Java, and management facilities. It also supports the SDIO standard, extending the use of Secure Digital slots to features like digital TV or fingerprint recognition.

>> Prepaid 3G

3G mobile operator 3 is offering a pay-as-you-go service, initially available only on the Motorola A835 handset, offering 100 minutes of talk time for £15, 500 for £25 and 750 for £35. There are options for extra services, such as £5 for 10 minutes worth of video calls.

The 3G service, launched mid-2003, had 210,000 subscribers by the new year. Per-minute charges for its prepaid Threepay service are the same as those for invoiced customers, it says.

PCW number 1153001

>> Data boom

Businesses are warming to the idea of mobile data, which has begun to boom over the past few months, according Research In Motion, developer of the Blackberry email-on-the-move device.

'We are seeing hockey stick growth across the whole market now; things may have dipped but now they are shooting up,' said Rick Constanzo, vice-president for commercial relations in Europe.

Only 10 per cent of mobile data calls are made by businesses, according to figures released by the Mobile Data Association.

PCW Number 1152996

>> For more

You can read more about on 3GSM at www.pcw.co.uk/specials/1153027.

Prepare to meet MyDoom

Pointing the finger is little help when yet another virus goes on a global rampage. Everyone, inside and outside the industry, must do more to protect the system. Terence Green reports

Soon after the MyDoom worm appeared, it was described as the 'fastest-spreading, ever'. A mass-mailing virus that propagates by copying itself over a network, it spread rapidly, but not as widely as feared. Ultimately, its main impact was on public understanding of risk.

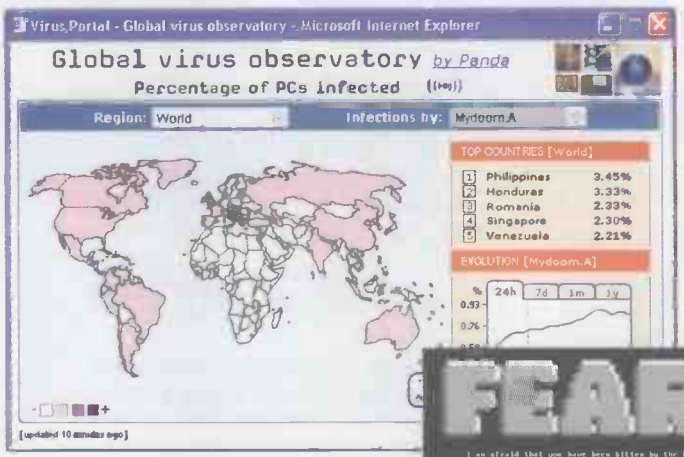
Informed comment was overwhelmed by wild predictions of Internet meltdown and risibly inflated predictions of financial impact. In retrospect, MyDoom looks less damaging than earlier worms that shut down hospital networks, bank ATMs and airline reservation systems. It slowed the Internet marginally, mail server administrators were seriously inconvenienced, and lots of people were very annoyed. But MyDoom was a blip compared to the chaos caused by an inch of snow in southern England, in midwinter.

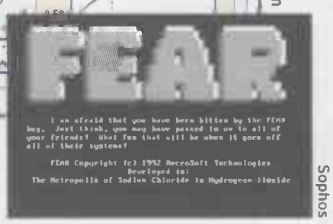
MyDoom was not especially sophisticated. Unlike many of its predecessors, it did not exploit one of the many vulnerabilities in Windows. MyDoom employed social engineering to encourage people to open an email attachment.

Such behaviour prompts pundits to blame 'stupid users', but this convenient finger-pointing obscures the fault of companies so focused on protecting their outer perimeter that they failed to address the possibility of internal infection. Further slips were made by companies, institutions and service providers with improperly configured mail systems.

Worms invariably forge sender and recipient addresses, but many email servers still return undeliverable email to an address from which it almost certainly didn't originate. Many of these 'bounced' messages contain the attached worm. Ironically, some even warn the user that the attachment may be dangerous.

Other email systems, and some anti-virus products, thoughtfully remove the attachment before sending a warning back to someone who never sent it in the first place. This only sows confusion and needlessly swells a spam burden that is becoming overwhelming.





Above: Map of MyDoom incidents last month
Right: This 1992 virus seems designed to instill rogue-code paranoia

Improperly configured servers distribute a significant proportion of spam, according to the US Federal Trade Commission. Corporate servers are the main culprits, but the FTC believes that one-third of all spam emanates from home users with broadband Internet access. One of the easiest ways for a spammer to gain access to a remote computer is by exploiting 'back doors' – trojans that allow a computer to be accessed and controlled remotely. Viruses routinely carry trojans as a 'payload', and install them on infected computers. MyDoom installs a back door that has already been the target of several exploits. It carried a second payload, a Denial of Service (DoS) attack aimed at the website of the SCO Group (PCW number 1152431).

Worms are an effective means of deploying a DoS attack across multiple computers. Scheduling the DoS, as MyDoom did, creates a Distributed Denial of Service (DDoS). DDoS attacks are very common, but companies do not like to publicise them, so the incidence is far greater than reported.

DDoS attacks have many varied motivations, but there is increasing evidence of criminals extorting payoffs by threatening to prevent a company from carrying out its business. Several cases have been reported, most recently by the Paddy Power online betting site (PCW number 1148440). But DoS attacks are not dependent on viral distribution. Last December, spam succeeded in forcing Natwest to take its online banking site offline when customers were inundated with 'phishing' email, which tried to trick them into revealing their account details.

More concerning still, there is evidence of active co-operation between spammers and virus authors. Spam has always been motivated by profit; but virus authors, with the exception of an embittered subset, are generally more interested in impressing their peers. 'It's a game,' said Carole Theriault, a security consultant with Sophos. 'But, lately, the game has changed. They don't appear on your screen saying 'Ha-ha, gotcha' any more. Now the game is to spread as far and as fast as possible.'

This is worrying, as people don't always realise that their computers are infected. If spammers bring money to the game, it would be easy, given the frailty of Windows, to create a stealth network of compromised computers. There are already tens of thousands of so-called 'zombies' unwittingly running trojans, as traffic monitoring by the Internet Storm Centre and others reveals. But it is a disorganised melange.

An organised network would constitute a real threat. This is why, said Theriault, 'everyone should understand how important it is to protect your computer. Computers are powerful tools and have been marketed as super-toys. Every user has a responsibility to learn about the potential risks'.

Education is required across the industry. As delivered, most new Windows computers are riddled with security flaws rendering them unsafe to connect to the Internet. But users must connect to the Internet to download fixes. Microsoft has only just begun to address this problem with a security CD.

More needs to be done. Anti-virus vendors must stop adding to the confusion by allocating different names to new viruses. Companies should protect every desktop as well as they protect the perimeter. Mail servers should never bounce virus email back to users who never sent it in the first place. And we should all be very wary of attachments, even if they come from people we know. It is better to ask the sender if they really did send it.

Thankfully, most attacks so far have failed to reach their full potential. Whether this is by design or by accident is not always clear. What we do know is that exploits are being tested and refined – and that everyone has a part to play in protecting the email system on which we have come to rely.

• See also page 19

'Killer chip' claim denied

Printer vendors have hit back at a claim they are using 'killer chips' to curb third-party refill sales – and say they are making every effort to encourage recycling.

Friends of the Earth (FoE) made the claim last month with a call for ink cartridges to be included in Britain's implementation of the EU Waste Electrical and Electronic Equipment (WEEE) Directive, forcing vendors to disposal of old products.

Britain says ink cartridges are not whole products, such as PCs, and so are not covered by WEEE. But FoE said: 'As well as being bad for the environment, this [view] would also lead to increased costs for businesses.

The FoE's claims came as Lib-Dem MP Phil Willis handed Downing Street a petition stating that WEEE legislation due to be passed in August will allow manufacturers to make unfillable cartridges.

Lexmark says this new model X422 combines the functions of a printer, copier, fax and colour scanner with ease of use and high performance. It copies and prints both sides at 22 pages a minute and has a 50-sheet feeder, all for £999

Lexmark and HP both issued statements denying the use of killer chips on inkjet cartridges, though some contain logic for talking to the PC and features such as colour matching and paper recognition. HP said: 'We recognise there is space in the market for original and remanufactured cartridges.'

Lexmark said it did use a killer chip on some laser cartridges, but only for customers who got a discount for agreeing to return the product when empty.

Lexmark was criticised last year when it threw the US Digital Millennium Copyright Act at a company that cloned one of its cartridge chips, a move some saw as using a dodgy law to enforce a restrictive practice.

Lexmark and HP have both launched postage-paid return schemes to encourage recycling, and say these will be extended this year.

The DTI says it does not see smart chips as a threat to the 'thriving' UK cartridge-recycling industry. It pledged: 'We will be monitoring the situation closely.'

High cartridge prices 'pay for R&D'

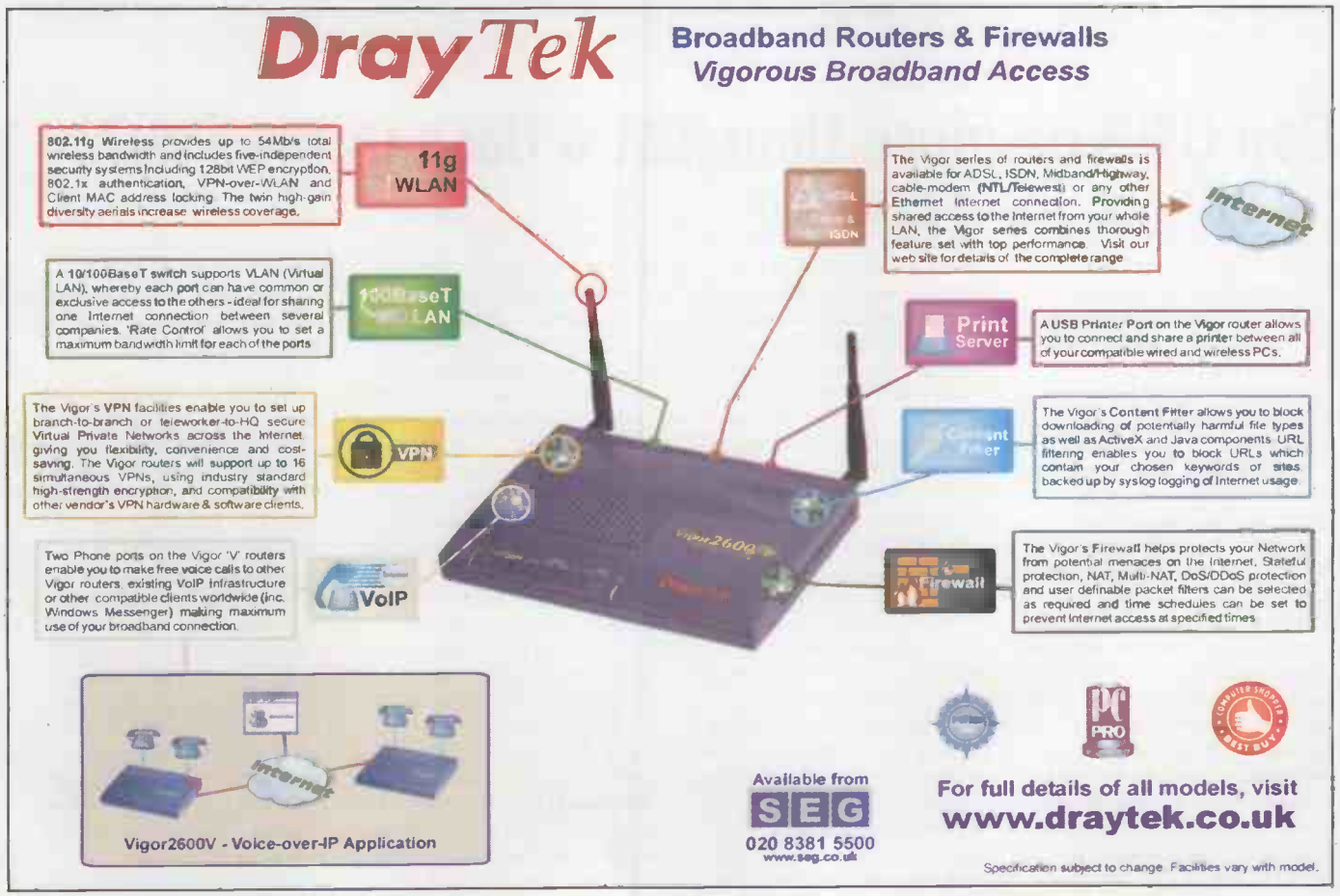
Suspicions that the printer industry is reaping huge profits from consumables are not justified, according to Lexmark's UK managing director Giovanni Giusti.

Many people smell a rip-off when they realise refills for their smart new printer cost almost as much as the product itself, but Giusti denied using printers as a loss-leader.

'We make a good profit on the printer and we make a good profit on the cartridges... though an end-of line model is occasionally sold below cost,' he said.

He agreed cheerfully that the industry uses a classic razor-blade business model: sell your razor, and you enjoy years of blade sales. He would not disclose what proportion of profit comes from consumables.

But he added: 'When you look at the global figures for HP and Lexmark, we don't make outrageous profits. We spend enormous amounts on R&D.'



Split over new fast radio link

Developers of next-generation Ultra Wideband (UWB) short-range wireless links offering data rates up to 480Mbits/sec have split into two camps that could bring rival technologies to the market.

One group, headed by Motorola, favours a technology called Direct Sequence CDMA. The other, backed by Intel, HP, NEC, Phllips, Samsung and Microsoft, favours one called Multiband-OFDM. Attempts to agree a single draft specification for an IEEE standard have failed.

Now the Multiband OFDM Alliance is developlng a specification independently. Intel chlef technology officer Pat Gelsinger said at the Intel Developer Forum (IDF) that lt was proving impossible to get a standard through the governlng IEEE because it required a 75 per cent majority vote. He stressed: 'We are not bypassing the IEEE. We will present the specification to the IEEE when we have completed it.'

And he predicted, in the face of some scepticism, that the two sides would come to an agreement.

Ultra-wldeband differs from conventional radio in that instead of concentrating a signal into a very narrow set of frequencies it is spread across a very wide range. The total transmit power may be of the same order but the power at any given frequency is low.

This low spectral density makes USB appear like normal low-level nolse to conventional radios tuned to a particular frequency – which is just as well, because by its very nature UWB has to share bandwidth with them. UWB proponents say that interference is negligible, but this is something they will have to prove to regulatory authorities in all countries where it is sold.

A major use of the technology is likely to be in home multimedia networks and computer peripherals (see below).

Intel is already developing wireless USB2, logically identical to the standard version but replacing the usual cable with a UWB link and a similar version of 1394 Firewire is planned.

Wimax for remote access

Boxes like these, shown at IDF, could be your saviour if you are still out of broadband range – though they could mean yet more activity in crowded 2.4GHz and 5GHz bands that don't require licences. They are combined transceivers and aerials for the new 802.16 standard, aka Wimax, that delivers two-way wireless access at a range of up to 30 miles.

BT is currently trialling Wimax in four areas as a way of reaching remote users, though like other operators it may use paid-for 3.4GHz bands to cut interference.

The setup shown at IDF used a base station providing 70Mbits/sec capacity to each of six 60° sectors.

The transceivers pictured are designed for fixed exterior use. But a longer-term goal of Wimax is to deliver broadband to mobiles.

Can UWB be more than just a flash in the Pan?

Intel's UWB message was that this is a personal area networking (Pan) technology intended for links within a room – like a faster version of Bluetooth, which it may eventually supersede.

It is supposed to complement Wifi, which is promoted as a local area networking (Lan) technology with a longer reach. But Intel engineers admitted the reality is more complex.

The way to throw them off-message was to mention radio pollution, not an easy subject when you are promoting Wifi as a feature of your new products. The new Granstdale platform (see pages 18 and 27) packs a Wifi access point, allowing a new PC to become the hub of a home wireless net.

Louis Burns, vice-president of Intel's desktop platforms group, enthused: 'Our fundamental belief is [that] all clients, desktop or mobile, in the home... will have a built-in soft access point. Wireless is so fundamental to this usage model, we put it in the chipset.'

This is fine if you believe Wifi can scale up to cope with many access points within range of each other, as can easily happen in cities. Nor is there anything wrong with Wifi as a short-term short-range link, preferably used at minimum power (as Europe is insisting for 802.11h, its version of the US .11a Wifi standard). But when there is already a shortage of free channels in some areas, should it be promoted as a distribution medium blasting data round large buildings?

The ideal setup is whispering wireless: you use radio at the least necessary power over the shortest possible range, hard-wiring your network as far as possible. This allows the greatest number of users in a given area, lengthens the battery life of connected untethered devices and reduces security problems because you are no longer shouting your secrets to the neighbourhood.

Intel engineers admitted the sense of this – and that UWB looks ideal for the task, assuming that it does not interfere with other broadcasts. But they also point out that people do not want more wires round their homes; nor do they want to fork out for extra access points.

Yet, if developers are to be believed, UWB will soon be in most rooms as it will be Incorporated into most consumer electronics devices. At a pinch, mains wires could be used for the hard-wired network, though currently they carry only 14Mbits/sec. Ideally fibre would be used, and Intel is working on a technology that could make that more feasible on a mass scale (see page opposite). Meanwhile gigabit copper is a fair alternative and 50 times faster than Wifi.

Intel is not alone in promoting promiscuous use of Wifi. In Britain it is being sold to builders as a cheap way of distributing broadband round new homes, even though hard-wiring is easy if installed with the mains wires (see *PCW* February, page 16) – the cost of extra access points is trivial compared to that of a house. Clearly people will not wish to rewire their homes if they don't have to, but they should be encouraged to think In terms of best practice. With thousands of new homes planned in the UK alone, the builders certainly should.

The fear is that, as Wifi is selling, it may be sidelining other technologies, and that market forces are dictating matters best addressed by strategic planning. **Clive Akass**

Chips make light conversation

Computing shifts from electronics to photonics with the advent of a low-cost modulator that can be put on a chip and heralds an era of terabit optical links. Clive Akass reports

Intel has found a cheap way to implement a fast interface between light and electricity that could make optical links between devices of all scales far more common.

The shift from electronics to photonics could be more far-reaching than Intel's move to 64bit x86 computing. It means optical 'wire', capable of passing terabytes per second, can replace hard-wired links in system buses, home and small-office networks, and even within chips.

The high cost of optical components means their use is currently confined mainly to fibre-optic backbones and high-end server links. Intel says it should now be able to mass-produce them like processors.

Intel announced last year that it had developed a way of taking light from a cheap laser and cleaning it up by passing it through a microscopic silicon grating to provide the kind of coherent beam required for fast signalling. Silicon is transparent to light in the infra-red part of the spectrum; light at these frequencies can be fed into oxide-clad silicon channels, called waveguides or ribs, that act just like glass fibre – the optical equivalent of a wire. They are made of the same materials as logic circuits and can be laid down in precisely the same way.

The problem that faced researchers was how to translate very fast electronic data streams into light. Their first solution was to pulse the laser, but this was inefficient and generated data rates only of around 20Mbits/sec.

Over the past year they have developed a system using a cunning form of amplitude modulation (see box below) that pushes data rates up to a 1Gbit/sec – 50 times faster. Different colours within the infra-red spectrum can be used to provide many channels down the same fibre conduit, pushing the throughput up into the multi-Gigabits.

A major problem, oddly, is mechanical: how to get glass fibre input and output leads into precisely the right positions – something that has to be done manually on today's larger modulators. Intel engineers are confident they can harness the hyper-accuracy of nanotechnology to make this simply a matter of pushing the fibre into a tapered socket.

A prototype 'silicon photonic modulator' was demonstrated at the Intel Developer Forum (IDF), passing high-definition video over 5km of fibre.

Mario Paniccia, director of Intel's corporate technology photonics research lab, said the technology should appear in products by the end of the decade, although elements might be used earlier.

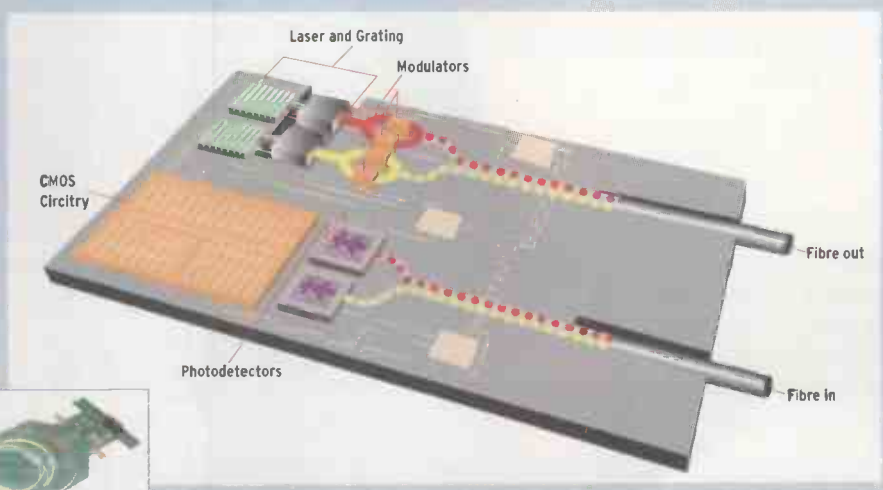
One possible use would be to communicate between the body and the lid of a notebook. 'A lot of companies want to pack a variety of aerials in the lid to enable it to communicate,' he said.

'This is creating problems in how to pass data across the hinge, which could be done very easily with glass fibre. This would be far too expensive to do at the moment.'

The light source is the only component in the system that cannot be mass produced using CMOS silicon processes. Kevin Kahn, director of the company's communications technology lab, said the technique could lead to light processors being integrated directly into logic chips, creating processors that can talk to each other in light.

Similar techniques could also be used to implement Gigabit-plus free-to-air link, though they would require higher transmit power. Infra-red ports today support a maximum 4Mbits/sec.

How Intel harnesses the logic of light



Prototype (left) of photonic modulator that will be incorporated onto a chip (above)

This diagram shows two modulators on a notional future chip passing two data streams using different colours from the infra-red portion of the light spectrum generated by separate lasers. In practice there could be many more coloured channels.

Each colour is modulated with data in exactly the same way. The light is beamed into a silicon rib which splits into two, creating two identical light beams in perfect phase. A section of the waveguide doubles as part of a silicon transistor in which the charge levels (positive or negative) are controlled by an applied voltage.

The refractive index of the silicon changes with these charge levels, which has the effect of shifting the phase of the light. Levels are chosen so that when the transistors in each branch of the waveguide switches on, the phase of the light in one shifts forward by 90° and that of the other branch moves back by the same amount, shifting them 180° relative to each other.

The shift makes the peak of one light wave coincide with the trough of the other, so that they cancel out when the branches merge back into a single channel. This can be done (or not) a billion times a second, so that a Gigabit electronic data stream can become a Gigabit light data stream.

The lower part of the diagram shows the corresponding receiver in which the data streams are read by photodetectors. Next to these is some CMOS circuitry, showing how the system can be integrated into a chip.

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All change on the PC front

An emerging generation of motherboards and chipsets designed for the latest 90nm processors amount to the biggest change in PC design for a decade, said Intel.

Notebooks and desktops will have a new PCI Express bus (see box below) to talk to peripherals. It will coexist with the PCI and AGP buses, then supersede them.

Linked to the bus will be slots for new Express Cards, which are likely to supersede the PC Card. They could be as common on desktops as on mobiles, reducing use of internal expansion cards.

Before July, Intel will launch two chipsets, Grantsdale and Alderwood, to go with its new 90nm Prescott Pentiums. They differ only in that Alderwood is designed to take third-party graphics boards; Grantsdale has integrated graphics that support DirectX 9 and 'outrun any games box on the market,' said Louis Burns, vice-president of Intel's desktop group.

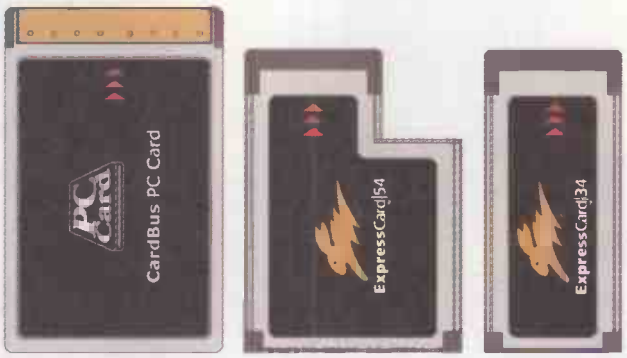
The chipsets also support twin monitors and extended desktops, so you can spread your windows across two displays. They use dual-channel DDR2-533 Ram and 'Azalia' audio with 7.1 sound developed with Dolby, and have a soft access-point to let a PC become the hub of a wireless network (see page 24).

The platform supports Raid 0/1, to bring resilient storage to homes and small businesses at the cost of a second hard disk.

For notebooks, a new mobile Pentium codenamed Dothan will launch shortly. A version with a 533MHz front-side bus will follow this year, as will a new Alviso chipset supporting Azalia audio and a feature that cuts screen drain by adjusting lighting to ambient conditions.

Also later this year Intel will launch its Calexio 2 module, upgrading onboard Wifi to support all flavours(11a, b and g), and hard-wired Advanced Encryption Standard (AES). It helps Bluetooth and 11b/g Wifi share 2.4GHz airspace.

The whole mobile platform has the codename Sonoma.



Slots of speed and convenience

Two types of the new Express card sit to the right of the fastest of the old PC Cards: 32bit Cardbus, a PCI extension passing 1Mbit/sec.

The Express cards pack one PCI Express channel passing 2.5Gbit/sec in both directions (see box below) and one 480Mbit/sec USB2 link. They are about 1cm shorter than the old cards, but the larger Express Card is the same width at one end. The other end is the same size as the smaller card and has the same connections.

Wide slots will taper inside to ease insertion of smaller devices.

Express lane from old highways

PCI Express, formerly known as third-generation I/O, is a serial link passing 2.5Gbits/sec in each direction per channel.

It can look like a parallel link because up to 32 channels may be aggregated. A 32bit parallel link passes data in 32bit chunks at one bit per channel. A PCI Express bus, by contrast, passes separate byte streams down each channel, and switches them to their destinations.

Parallel buses have timing problems at high speed, which is why new fast links are all serial.

PCI Express implementations will have a number after them to indicate the number of channels. The new Grantsdale platform, for instance, boasts PCI Express x16 graphics.

Multiprocessors and the era of tera

Intel is approaching the limits to clock rates and will be forced to squeeze multiple processors onto single dies to boost speed, chief technology officer Pat Gelsinger said.

If clock speeds continued to rise as they are, the heat density on chip surfaces would reach that of the sun. Hyperthreading used on the latest Pentiums prepares the ground for multi-cores because it treats a single chip as a virtual multiprocessor. Its 'threads' of code can be assigned to multi-cores.

Gelsinger went to some pains to address the question that Intel is always asked, and hates to answer: 'Do people really need this extra computing power?'

He said we are moving into an 'era of tera' in which 3D photo-realistic graphics and huge multi-media data banks will shift our processing needs by an order of magnitude. Faster CPUs, caches, Ram interfaces and interconnects will be needed to keep up.

Gelsinger, whose keynote is a highlight of the IDF, said there were a lot of inefficiencies at the system level. Fast processors spend half their time waiting on memory and it takes 21,000 clock cycles to process a 1KB IP packet.

IDF bits and soundbytes

PCW has banged on for years about the need for an easy way to get data snippets from paper to PC. Why not put barcodes or glyphs on business cards so we don't have to coax software to sort out the data from the fancy logos? Because few people carry a barcode reader, that's why. Or was why. Most new mobile phones carry a camera that will do the job. Korean Telecom is using phonecams to read glyphed web addresses in adverts, said former Intel UK MD Sean Maloney, now executive VP of Intel's communications group.

Intel showed off a 65in display using the prototype Liquid Crystal on Silicon (LCoS) chip featured in April's PCW (page 26). The quality looked good and Intel says it is on track for 60in screens costing under $2,000.

I asked a man from the Universal Plug and Play organisation when we're going to get a power supply that just gives what it is asked for and saves us from carrying all those wretched adapters. He opined that all you needed was a standard low-voltage source that a client device could adapt without a hot bulky transformer.

The subject came up again at chief technology officer Pat Gelsinger's press conference. He was asked what he thought of the Splash Pad that charges devices lying on it (*PCW*, April, page 22). He liked the idea but had concerns about induction losses.

So I asked him when Intel was going to free us from mains adapters. 'There is no industry momentum for it,' he replied.

Someone called out: 'How many adapters are you carrying?' Gelsinger did not reply. Let's hope he was gathering momentum.

A new BTX motherboard arranges all the hot components so they can be blasted cool by a single fan, a new design of which has a second set of blades that is said to 'untwist' the air to make cooling quieter and better.

For more news from the Intel Developer Forum, go to www.pcw.co.uk/specials/1152923. CA

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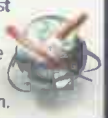

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Wifi gets set for dual-mode phones

A new range of access points aims to improve the quality of voice calls over wireless network links ready for the emergence of dual-mode mobile phones that support both cellular and Wifi.

These will allow you to make low-cost or free Voice-over-IP calls in the office or home and switch to cellular outside. But Wifi does not yet support the controls needed to ensure voice calls are not broken up by other traffic.

An emerging 802.11s standard deals with this issue and new products from Proxim and Symbol address another problem – network delays that cause unnatural gaps in conversations.

Proxim's enterprise-class Orinoco AP-4000 AP makes the delay in passing a call from one node to another 'barely appreciable', the company says.

Rar deal

Winrar, a Windows archive manager, is said to compress files up to 30 per cent better than other zip utilities. Other features include long filename support, programmable self-extracting archives (SFX), and archive repair. It costs €33 (£22.70) from www.win-rar.com.

J2SE beta

Sun Microsystems has kicked off the beta programme for the latest version 1.5 of its Java 2 Platform Standard Edition. Improvements include reduced start-up time, a smaller memory footprint and Java Virtual Machine (JVM) auto-tuning.
PCW number 1152564

Cluster buster

Directory Snoop 5 claims 'to see what data may be hiding in the cracks' on PC or networked drives, allowing you to recover files or erase sensitive ones beyond recovery. New features include NTFS support, batch recovery and sorting by any field. You can also link clusters to files and examine the Fat and Master File Tables. It costs $40 (£22 approx) from www.briggsoft.com.

Tiny in dotcom revival

Tiny Computers, which was bought out after hitting problems two years ago, has now been relaunched as a low-cost online vendor under the name Tiny.com.

The move could amount to a double revival if successful, as the fashion for promoting well-known brands as dotcoms died in the Internet crash at the turn of the millennium. This was mostly due to hype and frenzy in the money world and online sales of computers and peripherals have flourished.

Even the Tiny brand has been selling 100,000 PCs a year since it went into administration in 2001, according to Tariq Mohammed, director of the new dotcom and co-founder of the Time Group which bought it out. 'The brand awareness is still high' he said.

Mohammed admitted that his company had been caught on the back foot after finding that thousands of pre-buyout Tiny customers had been left without warranty cover. 'We have learned our lesson,' he said.

Tiny machines will be put together at Simonstone, near Burnley, Lancs and will be sold with minimal marketing to cut overheads. Mohammed said that, coupled with the buying power of a large group, this would enable him to offer low prices, without compromising on service levels or quality.

He pledged to use only top-quality components and added: 'We will promise less and deliver more.'

Tiny claims it will offer PCs and notebooks 15 per cent cheaper than online rivals and 25 per cent lower than shops.

Pen screen for desktops

Optoma's Pi500 combines the functions of desktop flat-panel monitor and a graphics tablet for pen input. The 15in TFT screen has a maximum resolution of 1,024 x 768, and comes with a range of software, including Pen Soft Pro handwriting recognition, which is compatible with Mac and Windows office applications.

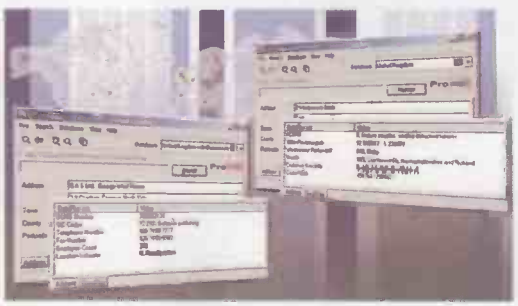
A bundled utility called Power Presenter allows you to scribble annotations to Powerpoint slides during presentations. The Pi500 costs £999 inc VAT. Watch out for an exclusive review in *PCW* next month. www.optomaeurope.com

Auto-addressing system gets smarter

The company that helped take the drudgery out of providing personal information over the phone has streamlined and widened the scope of its technology.

Quick Address Systems (QAS) is largely responsible for the fact that UK call centres and other businesses usually ask you first for your postcode and house number, which is all you need to identify most addresses. Its software checks the code against the Post Office Address File (PAF) and completes it for you, saving everyone's time.

The system is also used by mass-mailers who get discounts by using PAF-corrected addresses to help sorting. But, with businesses in particular, addressing is not always that simple, as many may be registered at the same address and may even have different names, points out QAS chief executive Simon Worth.



QAS supports addressing for a number of countries

His latest product, Quickaddress Dataworld, merges information from Dun and Bradstreet's UK business information with PAF so a single search can query both sources. Details of more than 60,000 trading aliases are included.

It also provides address barcodes which qualify for more postal discounts. Dataworld can draw from more than other 70 datasets (depending on what you buy into) that provide information such as postcode marketing profiles, electoral rolls, foreign address files and map references.

Its search engine uses fuzzy matching and other tricks to cope with bad spellings and typing errors. www.qas.com

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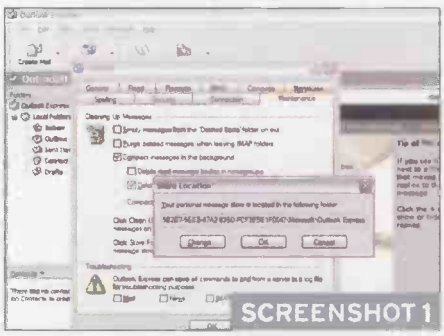
Letters

If the lens cap fits >

Ken McMahon, in his Hands on article (*PCW* April 2004), says Canon's message to EOS film camera users is that 'you can still use all your old lenses', but this is not so. Canon (on the website or in the manual) says that you can use 'all Canon EF and EF-S lenses', not all lenses that fit EOS cameras. I tried a Sigma 105mm macro from an EOS film camera but it would not work with the 300D. The camera repeatedly threw up Error99 when the lens was fitted, focused and a shot was attempted. Having emailed Sigma and had no reply, I guess this is a real problem. I thought Ken's was a good article, certainly an advance on anything else written about the new breed of SLRs.

Dave Howson

Ken McMahon replies > You are, of course, correct in saying that only Canon EF (and the new EF-S) lenses can be used with the EOS 300D, and that's what I said in the review of the EOS 300D (*PCW* March 2004). In the Hands on column I was making the general point that, while Canon appears to be making efforts to maintain continuity between its digital and film SLR range by adopting the 'four-thirds' (4/3) system, Olympus is taking a more radical path. Some would argue that conventional SLR lenses designed for a film camera aren't well suited to a digital SLR, and that's obviously the case if you favour wide-angle lenses, as anyone who has tried to obtain a fisheye lens for a digital SLR will testify. Only time will tell if Olympus has got it right with 4/3, but the news that Panasonic, Sanyo and Sigma have added their support to the standard is encouraging for anyone thinking of going down this route.



Backup your Outlook Express emails with the Store Folder

The Outlook's stormy >

After a long hard day at my computer I generate a lot of files, including emails and my backup system now is an external hard drive. Backing up ordinary files is easy – drag and drop onto the external drive. However, what do I do with the emails? I know I can copy them folder by folder but I lose the will to live just thinking about it.

Is there an easy way to back up all Outlook Express emails at the end of the day? Is there any software available to help or a shortcut within Outlook? It seems crazy that you can export your address book and favourites but not the emails. A recent hard disk failure and loss of data has concentrated my mind on the problem, so I hope you can help.

Ian Rutter

PCW replies > An easy and free way to back up Outlook Express files is to find its Store Folder and add this location to your normal backup routine. Select Tools, Options, Maintenance, Store Folder and copy the

WIN!

The author of the Letter of the Month will win a copy of Microsoft Office 2003.

Featuring new and enhanced versions of popular Office applications such as Word, Excel and Powerpoint, Office 2003 gives you the power to find, record and share information with ease. Among other improvements, the popular email client Outlook has been given a revamp, allowing you to send, receive and organise your email more efficiently.

For more information on Microsoft products and services, go to www.microsoft.com/uk or call 0870 601 0100.

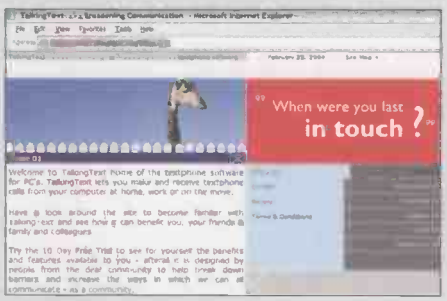
Letter of the month

Help for the hard of hearing >

I have hearing problem which means I can no longer use a speech telephone. Email is very useful for people in my position, and my wife and I sometimes keep in touch by texting each other on mobile phones. Many organisations list a textphone number, but not an email address, for the benefit of people who cannot use a speech telephone. I am therefore considering acquiring a textphone, but the available devices are not satisfactory.

The largest display available is only 160 characters, which is insufficient for anything more than a very simple conversation. One model can be connected to a computer so the conversation is displayed on the monitor, but the associated software is so out of date that it won't work with Windows XP. This rules out my present computer. Textphones communicate at a baud rate of 300, but I don't know of any modem which can be set to this. This modem incompatibility appears to be the reason software which would make a computer emulate a textphone isn't available. Communication technology is advancing by leaps and bounds, so would someone please sort this one out.

Les Pook



Talkingtext works with a range of modems

PCW replies > It might be worth having a look at Talkingtext. This is a PC textphone emulation package compatible with Windows 95/98/ME/XP and a wide range of modems. You can use it to send or receive messages from any textphone device. It costs just £29, and a 10-day free trial is available at www.talkingtext.net.

directory string you're presented with (see screenshot 1). Paste this string into Explorer and you'll see all your Outlook Express mail files that you can backup to your chosen media. To restore these files from a back up, use Outlook Express' File, Import, Messages command. Choose Outlook Express 6, hit Next then check the 'Import mail from an OE6 Store directory'.

Woof woof >

PC security. What a dog's breakfast. My guess is that most people in a domestic setting are operating PCs that are wide open to intrusion. They might have one program installed and think that covers it. And it should. They don't read computer magazines in the same way they don't read car maintenance mags, so they do not know the whole confusing story. And why should they? My neighbour down the road just wants to send and receive emails with a bit of Internet surfing thrown in. She needs a single first-class package that she can install to cover everything – all the security issues covered and test programs included. No complex, unintelligible configuring. No multiple programs that overlap and/or conflict. One install. One price. One renewal fee. No worries. Job done. Come on chaps, get it together!

Brian Ellis

TFTs? No thanks >

I am a young computer fanatic, and I love to keep my computer up to date in every way, but why does everybody insist on having a TFT monitor? I currently have a flat-screen Samsung 753DFX 17in CRT, and I have just ordered a flat-screen Iiyama Pro454 19in CRT from Ebuyer for a shade over £170 including VAT and carriage. When I was considering what I would like for a new monitor, I went to PC World and, even with £50 off, the cheapest reasonable TFT monitor was a Samsung for £300. For this price you could get a 21in CRT from many decent manufacturers.

I believe unless you are short on space, a CRT is better for games – I have tried a TFT and the picture quality was worse. I also think that buying Windows XP is a waste of time. I have Windows ME on my computer, which is cheaper and almost as good. By not buying XP and a TFT monitor when I built my PC I saved around £275. I rest my case for the slightly less desirable computer.

Paul Davies

Short waves >

I've read a number of Barry Fox's articles over the years and always agreed with him, but in his article on power line telecoms (PLT) (April 2004) the use of the phrase '...who needs short wave radio except for a few radio hams behaving like Tony Hancock...' made me wonder.

TFTs can add to the price of your system, but is it worth it?

A friend with a PhD in data-comms assures me that PLT will (regardless of interference) rapidly become a shambles when it moves from small-scale trials to full implementation, so I take some comfort from that, but there is one aspect which never seems to get mentioned.

Barry uses the phrase 'the longest aerial in the UK', without mentioning that aerials receive as well as they transmit. So when the rather more than a 'few radio amateurs' in this country fire up their transmitters, the potential for corrupted/missed packets would surely slow the service to a crawl?

In Europe, the PLT provider from one country has received so many complaints of interference that it is allegedly threatening to sue its National Radio Amateurs' Association for running a campaign of speculative complaints and, allegedly, even threatening to sue those who complain.

While 1Mbit transfer rates sound good now, in five years' time they could be almost an irrelevance. The cable companies have already stated their intention to increase their data rates through their fibre every time BT ups its data rates through its copper, and I would guess that fibre has rather more 'headroom' than PLT. Could we eventually see the ironic situation where the Monopolies Commission (at the behest of BT) asks the cable companies to unbundle their local loop?

If PLT is set to be such a sure-fire success, why did automated meter reading fall flat on its face? If they couldn't reliably manage to interrogate electricity meter readings via the mains at low data rates, what chance does 1Mbit PLT have? Hopefully PLT will (like the dotcom boom) turn out to be a busted flush, but it took quite some time for dotcom investors to see sense, so we may have to abandon the short waves for some time.

David Reynolds

Fight the spam >

Up until two weeks ago I was plagued with spam. I, like many others, had tried various anti-spam programs with either limited success or, in one case, a fivefold increase in received junk. The problem with most anti-spam programs is that you end up downloading the spam from your ISP. I knew it was possible to set filters on my emails with my ISP (www.tiscali.co.uk), but I didn't really understand how they worked. I looked at the To, From and Cc boxes on the spams I was receiving and one thing that struck me was very few of the spams I received were addressed exclusively to me. So I set up two filters on my ISP email, which are as follows: if To: is not [my_email@address] then discard the message, and if Cc: contains [my_email@address] then discard the message.

Can PLT really be a success?

The reasoning behind the second filter is that a lot of amateur spammers seem to Cc the same people each time. You would have to look at your spam to see who the common Ccs are. That's all I've done, and my spam has been reduced to about five per day from up to 40 per day. I'm not claiming that these two filters will block all your spam, but I'm sure many people don't bother with these filters.

Steve Simpson

Clarification > In the Home Video Editing software group test (*PCW* February 2004), the following factual errors were made in the review of Pure Motion Edit Studio 4. We reviewed the download version 4.0.3 (£59 inc VAT), not, as implied by the review price, the full boxed version (£89.99 inc VAT) which includes the MpegXS plug-in (valued at £19.99 inc VAT) and a printed manual. The Mpeg XS plug-in adds support for mpeg1 and mpeg2 export formats.

- Route tracer paths can be edited.
- The features table entries for Chroma key and third-party effects plug-ins support were incorrect – Edit Studio 4 has full support for both these features.
- The features table entries for supported video/audio input formats omitted the Quicktime and wma input formats and the wma audio input format. These formats are not enabled in the standard download package, but can be enabled by free downloads from the Pure Motion website.
- Our comment that toppings are not explained in the help file was factually incorrect, but we did find it very difficult to locate this information.

We apologise for these errors and for any confusion caused. We would also like to clarify our comments about Edit Studio's storyboard/timeline functionality. Although you cannot edit items on the timeline that are also being edited on the storyboard, you can add extra media items to the timeline while keeping the storyboard active.

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Get ready for a plague of hype

Guy Kewney predicts some profile-raising activities as companies try to sell their shares to the public

guyk@pcw.co.uk

Over the next three months, you can expect to read some astonishingly enthusiastic comments on an amazingly dull bunch of companies that make really uninteresting high-tech products. The reason is simple. All the venture capitalists, encouraged by rising share prices, are trying to 'implement the exit strategy' – or pull their money out, as you and I might say.

More often than not, the first clue you get that a company is planning to go public with its shares is when 'profile' articles start appearing. They work like this: A PR company rings a journalist. 'I don't know whether you're interested, but the CEO of a rather interesting American/Chinese/Russian company will be in London next week. It looks like the sort of outfit you'd be interested in.'

Then the CEO, who normally refuses to answer the phone to anybody under the rank of chief technical officer, 'makes some time available' and buys the journalist lunch.

During this lunch, all sorts of fascinating details about the technology behind the company, and the rival companies, are revealed.

An article swiftly appears praising the company and enthusing about its future.

The shares go public.

Those in the know shake their heads sadly, and invest their money in bonds.

The thing is, until the end of 2003, most PC companies looked like dead ducks from an investment point of view. Big venture capitalists had sunk large sums into them three years ago, in the expectation of seeing their investment treble in six months – only to discover that they owned a substantial share of the square root of nothing at all, and couldn't sell the shares at any price.

Now, with the revival in the market for PCs, there's a window of opportunity; find a sucker, shift the shares, and run before the market collapses again. And so you're finding that at technical conferences and conventions, the 'elevator pitch' is becoming a bigger highlight than the technical seminar.

Two or three of my friends are now venture capitalists, and I'd like to assure you guys (you know who you are!) that when I say: 'All venture capitalists are b*****s' I don't mean you. But in general, they are power-mad, money-obsessed, and surprisingly unintelligent – and with the scruples of a vulture.

I know times have been hard for the past three years, but that doesn't excuse some of the unprofessional behaviour I've witnessed in high tech sector. I've seen people disclose their secret business plan to a venture capitalist doing 'due diligence', only to find that said venture capitalist has passed every scrap of data over to the dominant company in that industry. I've seen people find secondary sources of finance at half the interest rate the venture capitalist was asking, only for the venture capitalist to threaten to wind up the company, rather than let anybody else share in the profit. And I've seen perfectly good companies wound up, because some egomaniac in finance wanted to prove that he was 'in charge' and that he wasn't going to be told what to do by the founder of the company, even if the founder knew what he was doing, and the venture capitalist didn't.

These people, when trying to get their funds out of a company, make used-car sales executives look like George Washington, who could not tell a lie. They will claim their protégé corporations are capable of being the next Microsoft, the next Intel and the next Cisco all rolled into one. They'll commission 'market research' from needy consultants, saying, literally, 'Get us some figures which show this market growing at 250 per cent a year for the next four years.'

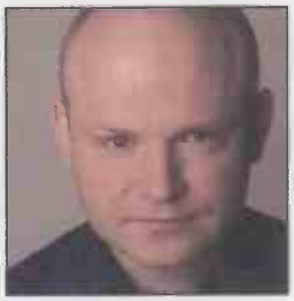
> 'When trying to get funds they make used-car sales execs look like George Washington'

Needing good news to write, journalists often fall for this, and praise start-ups, refinancings, and takeovers, which should carry a stark red warning label saying: 'Bargepole contact only!'

My judgement is simple: in most computing sectors, there is going to be a huge growth in the number of people using or buying products and services. But at the same time, the prices charged for these products and services is going to plummet.

I dare say, an awful lot of us in the computer sector will carry on working, and getting paid; but the trend is clear: work longer and harder, but get paid less. Profits in PCs are not going up, and neither is product quality. More and more, you will find that the hardware you buy is built 'to a price' and components will burn out after a few months, leaving you with a metal shell with 'no user-serviceable parts' inside and, quite probably, only a bankrupt supplier to complain to. I can't say, in a public arena, which companies I expect will go bust or get swallowed, but the economic recovery is shallow, and simply won't refloat some of the beached hulks out there. Some of them only appear to be floating because they're stuck in mud. If the tide does come in, they'll fill with water.

Hence the need to hype. Hype always happens, of course. I just thought you ought to be aware, there's going to be an absolute plague of it in the next quarter.



Searching for a streaming solution

Gordon Laing hopes that home media streaming will become a reality, if the big names can get it right

gordonl@pcw.co.uk

Hallelujah! Microsoft has finally admitted what enthusiasts have known for ages: that with the right software the Xbox games console can make a fantastic home media player. At this year's Consumer Electronics Show (CES) in Las Vegas, Microsoft announced its Windows Media Center Extender technology which, with the help of new network appliances, will allow you to stream videos, photos and music from your PC to TVs in your home. The good news is that Microsoft is also going to deliver a software title which will allow the Xbox to become such an appliance. The bad news is you'll need a PC running Windows XP Media Center.

This is the latest in a long line of announcements which bring a warm smile to your face, before slapping it. Sony's Roomlink network media appliance was another product which sounded great until you were told it only worked with Vaio PCs. Fine if you own a Vaio, but you're not going to invest in another PC just so you can use a particular company's network player.

It's the same situation with Windows XP Media Center. Don't get me wrong, I love its user interface, which has to be one of the slickest takes on a home entertainment PC yet. In fact, I'll go as far as to say I'd be first in line to buy a copy and upgrade my existing Windows XP Professional system. After all, I've got a PC with plenty of spare disk space which could double-up as a media server. But that's not allowed. Windows XP Media Center Edition is only available on pre configured PCs to ensure 'the best user experience', which means you can't buy a copy like an earlier Plus-Pack, even if you're willing to accept installation hassles.

Consequently, by releasing products which require a PC running Windows XP Media Center in the background, Microsoft is effectively telling most people they'll also need to buy a new computer to use them. The ironic thing is that the kind of people who are into media streaming already have a significant digital collection, and most likely a significant investment in one or more decent machines too. These people are unlikely to shell out on yet another PC.

There isn't any voodoo behind streaming media over a network. It's just that Microsoft and Sony demand you invest in their products too, just to get hold of the software to make their respective appliances work. I understand they want to sell their other products, but surely by allowing the streaming software to run on any PC, they'd then have a greater audience for their appliances.

It's not rocket science. Network media players from the likes of Pinnacle, Slim Devices and Linksys are supplied with utilities to stream content from almost any PC; Slim even lets anyone download it for free to try out. Indeed if you're after a quick demonstration of how simple streaming can be, just open a media file stored on PC over a network using something like Microsoft's Media Player; it works seamlessly. But if you want to use Sony's or Microsoft's forthcoming media appliances, you'll also need to buy into their PCs.

It's precisely these draconian limitations which encourage people to look for workarounds. One of the most impressive is the Xbox Media Player project, now updated to the slicker-looking Xbox Media Center. This is an open-source media player for the Xbox which allows it to decode all manner of video and audio formats, whether stored locally on the console's hard disk or streamed from a PC. As an uncertified piece of software you'll need a modified Xbox to run it, but this process can be carried out by enthusiasts, or you can buy pre-modded units for less than most network media appliances, and it'll play games and DVDs. Go to www.xboxmediaplayer.de for details.

> 'Power users, fed up with what's currently available, develop their own, far superior solutions'

A quick browse around forums reveals modified appliances offering far greater flexibility and performance than what's currently available, while not tying you into specific platforms either. Another great example are the numerous modifications you can perform on a Tivo PVR. By fitting a special network card, you could tweak the settings for better quality, download listings over broadband, remotely schedule recordings using a web browser and even extract the mpeg2 video from the Tivo into your PC and onto a DVD for archiving. It's this kind of powerful functionality and lack of platform restrictions which power users want, and equally it's the same power users who, fed up with what's currently available, develop their own, far superior solutions. I for one am a convert to using my Xbox as the front end for viewing the video housed on my perfectly normal PC.

It's still early days for media streaming in the home, but as companies such as the BBC talk about housing their archives on peer-to-peer systems, an increasing number of people will find themselves with PC-based video collections they'd like to view more comfortably.

The industry seems to agree that downloading media onto a back-room PC and streaming it to players throughout the home is the answer, I just wish the solutions from big names weren't so proprietary. Certainly until they become more open and compatible, and work with my existing kit, I'll be sticking to the modifications. ■

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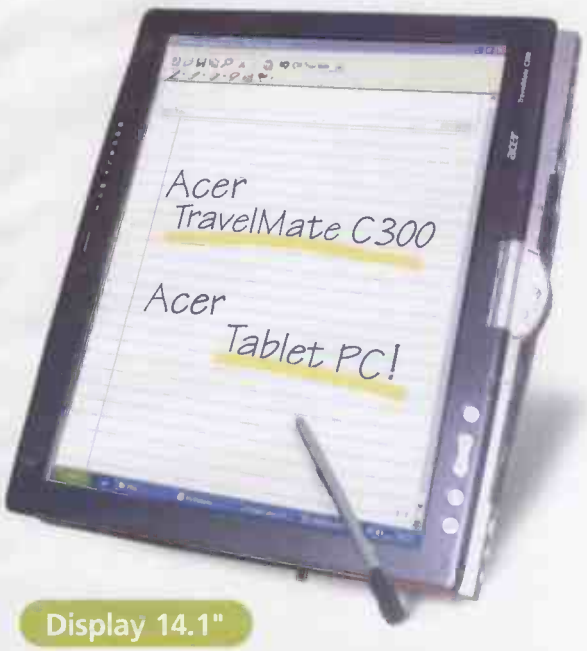

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Disc revolution on the horizon

Hybrid DVD/CD and dual-layer DVD recording are the future, says Barry Fox

barryf@pcw.co.uk

A lot of what we write about is pigeon step stuff; exciting but logical progression – a few more MHz or megabits, larger LCDs and cheaper Ram and Flash.

The 'tipping points', as futurologists call them, come every few years. Sometimes they are obvious, like CD and DVD. Sometimes not; Sony's Walkman was at first written off as an expensive recorder that did not record and only worked with headphones. The hard disk personal video recorder only looked logical after Tivo.

Sometimes the big steps come because technology has caught up with an old dream. Pulse code modulation was a pre-war idea. The plan to split the country up into radio cells so frequencies could be re-used dates back to the 1940s, but no-one could make it work until the 1980s. Spread spectrum is equally old. COFDM, the coded orthogonal frequency division multiplex system that makes digital TV and ADSL possible, began as an idea for digital radio. I vividly remember the first time I saw the impossible – full-motion video from a music CD, thanks to what later became mpeg1, and then mpeg2 and mpeg4. All these systems had to wait for huge, but cheap, processing power.

When the bugs are sorted out and new spectrum opened up, 802.11 Wifi will change our lives. Given time, 3G cellular will, too.

So what are the next big steps? The most likely candidates are blue laser recording, dual-layer DVD recording and hybrid DVD/CDs.

The idea of a 'hybrid' disc that works in a music CD player, CD-Rom drive, DVD-Rom drive, DVD movie player or DVD-audio player is obviously a winner – if it works. It allows single-inventory stocking, which cuts costs and customer confusion.

This is almost what the Super Audio CD (SACD) format allows. The recent Rolling Stones re-issues and new Sting album were hybrids that play ordinary CD stereo on a CD player and surround audio, with higher quality, on an SACD deck. The disc is pressed with two layers, one at the standard 1.2mm depth for CD playback and one at the 0.6mm depth used for DVD. A semi-reflective layer lets the infra-red laser in a CD player see through one layer and read the other. An SACD player, with DVD red laser, 'knows' it should lock onto the 0.6mm layer unless 'told' to read the CD player.

This works because an SACD player is designed to play SACD hybrid discs, and SACDs are designed to play in SACD players. There is no attempt at compatibility between SACD discs and existing DVD players. There can, however, be compatibility between SACD players and DVD video discs. Virtually all new DVD home theatre kit from Philips and Sony is based on an SACD player tailored to play either DVD video discs or SACDs.

The DVD system is bedevilled with bolt-ons. Regional coding was added at Hollywood's request. DVD recording was added late against Hollywood's wishes when the studios were too heavily committed to back out. That's why there are several different recording formats, none of them 100 per cent compatible with existing players.

DVD-audio was an afterthought, too, and it suffers for it. An attempt at making dual-layer hybrid CD/DVDs failed miserably because playback on existing players differs from player to player. Some play the CD audio first; others play the DVD video.

That's why the five major record companies are experimenting with back-to-back CD/DVD hybrids or 'flippers' called Dualdiscs or DVD Plus discs. A shaved-down CD, less than the standard 1.2mm thick, is glued to a shaved-down half-DVD, less than 0.6mm thick. The result is a hybrid just within the maximum 1.5mm allowed by the CD and DVD standards. So it should not jam in slot-load players and it may or may not keep the player optics in focus, especially in high-speed Rom drives.

'They are teaching a dog to dance', said an engineer at an independent lab in the US, which has been testing hybrids sold on trial in Boston and Seattle. 'The dog does dance – but it's not going to win any prizes.'

Dual-layer DVD blanks work like an SACD hybrid, with a semi-reflective layer between two DVD recording layers. Not surprisingly, given the company's involvement in SACD, Philips is the prime mover. The first recording format to get the dual-layer option and double capacity will be write-once DVD+R. Recorders and blanks are due before the end of the year. DVD-R is sure to follow. Eraseable DVD+RW and DVD-RW are harder to modify because of the lower reflectivity of their phase-change coatings. DVD-Ram is being superseded by hard disc video.

Existing recorders will need modifying to handle dual-layer discs. The mods may involve both laser power and software control. No-one is yet saying which of the DVD burner drives going on sale this year will be fixable. Bear this mind when buying a DVD recorder.

The third potential tipping point, blue laser recording, is coming – faster than you think. A recent breakthrough in laser manufacture holds the key. The downside is a mess of different standards that could make the VHS and Betamax fight look like a schoolyard squabble. Nothing is on sale yet – in the UK at least – so blue can wait until next month.

'This could make the VHS and Betamax fight look like a schoolyard squabble'

Changes in the processor position

Ed Henning wonders about the future of new processors and how they are developing

edwardh@pcw.co.uk

The news is that Intel has bowed to the inevitable and announced plans for 64bit extensions to its standard x86 processor instruction set. This means in the long term a 64bit version of its existing x86 architecture evolving out of the Pentium family. Like several others, I predicted this nearly two years ago, because I didn't believe the Itanium 64bit architecture would be a major success.

Before looking at the reasons for this and the possible future success of Intel's two 64bit offerings, it is worth making clear just what the difference is between them. The first IBM PCs used a 16bit processor from Intel, the 80186. Such a processor operates a set of instructions that are precisely defined, and it is large collections of these instructions that make up the software running on a PC. The original chip was a bit of a hybrid, being really an 8bit processor with 16bit extensions. The bit-size mainly refers to the size of the registers in the processor, and therefore the maximum size of data elements it can handle – this also affects the range and accuracy of numerical information it can process.

Larger registers also mean that simple data can be processed more quickly and larger amounts of memory can be used. Speed, efficiency and accuracy are all generally improved with more bits per register.

For these reasons, after the 80186 came the 80286 – a full 16bit processor. A little later came the 80386 and subsequent processors, up to and including the current Pentium family, which have all been 32bit processors. These processors were all backwards compatible, so they would run most software written for those earlier systems. Clearly 8bit and 16bit data items will fit into a 32bit register, and the new systems preserved the earlier instruction set, adding to it new versions of the instructions for handling the larger data items.

However, mistakes are made when designing processors and software is later written either to use these or work around them. This famously happened, for example, with high memory addressing on the early 80186 processor and this meant that future processors had to emulate this error so existing software would continue to run properly.

How many processors and compromises have there been in the 20 or more years since the 80186? Quite a number, and there must come a point when preserving backwards compatibility becomes counterproductive and progress is better made by creating a brand new architecture and jumping straight to that. All software has to be rewritten, but all that old baggage can be thrown away.

> 'How many processors and compromises have there been in the 20 years since the 80186?'

Incidentally, similar arguments apply in software development, and the mistake of clinging to old software without a rewrite, instead adding and correcting bits here and there, I have often referred to as Ashton-Tate syndrome. If you wonder why Ashton-Tate is no longer in business, the answer should be easy to guess.

The processor position two years ago was this. Most agreed that progress required the move to 64bit processing. AMD held the view that the x86 architecture could be extended to 64bits, hence the Opteron family; and Intel decided it was time to move to a new architecture, throwing away all the baggage, hence the Itanium line of processors. (There is a 'third way' that I never saw discussed – to redesign the x86 architecture for 64bits, throwing away all compromises and baggage, retaining compatibility with at least recent software and requiring only small changes to compilers. This will eventually come, I believe.)

The problem for Intel, as I saw it, was that the argument to move to a new architecture was only partially convincing, and in making the change the company did a very bad job.

Most of Intel's previous processors had been designed by small teams, often led by one or more gifted individuals. Things have to change with market conditions, but the Itanium was designed by committee and it really shows. There were many stories coming out of Intel about bad decisions and compromises through the years of the extended design process.

My way of understanding hardware has always been to write software for it, and I was looking forward to this new architecture from Intel. But once I started to learn the details, particularly about possible low-level programming, my reaction was immediate. I never did proceed to writing anything for the Itanium – to do so at a low level is just too complex.

Intel might counter by saying that in modern times such low-level programming is not necessary, but at the leading edge it always has been and probably always will be. Intel positions all its processors initially for server and high-end systems only, but 64bit technology will be mainstream at some point in the future, and so consider for example a couple of likely uses of 64bit computing in the home: live video compression or virtual reality.

You certainly would not write such code in Visual Basic. You would want to be as close to the metal as possible and the choice between the Itanium architecture and an extended 64bit modern x86 system is an easy one. AMD has been relying on this kind of argument and it seems that Intel has finally woken up to the reality. And the future of the Itanium? It doesn't have one.

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123629	Intel Pentium 4 3.4 GHz PC 800 Boxed	£288
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Nikon

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118986	LG DVD recorder GSA-4040B Retail	£105
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120467	Datasafe DVD+R media 4,7GB 25 p.	£20
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119437	Samsung CD recorder 52x/32x/52x	£26
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121927	MSI GeForce FX5700 TD128	£117
120648	Gainward GeForce FX5900	£135
121710	Sapphire Radeon 9600PRO AIW	£152
119678	Abit Siluro GeForce FX5600 ULTRA	£166
119628	Sapphire Radeon 9800 PRO Ultimate Ed	£197

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121722	Gainward GeForce FX5700 Retail	£121
121421	Sapphire Radeon 9600XT Retail	£123
119629	Sapphire Radeon 9800PRO Ultimate E.	£273
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SKU	Productname	Price inc. VAT
121607	Verbatim USB2.0 Store`N`Go 64MB	£25
121754	TwinMOS USB2.0 Mobile Disk III 128MB	£27
116566	TwinMOS USB2.0 Mobile Disk 256MB	£49
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116568	TwinMOS USB2.0 Monile Disk 1024MB	£183

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122999	MSI MEGA Stick 256MB MP3/Memory	£85
122645	JazPiper UBit-3 256MB MP3-player	£104
114639	IRiver MP3-player IFP190TC	£158
122428	JOS MP3-player 512MB	£214
121447	iRiver MP3-player iHP-120	£307
122439	Apple iPod MP3-player 40GB	£387

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115453	Upgr. Kit XP2600+ A7V8X-MX, 512MB	£ 161
118126	Upgr. Kit XP3000+ A7V8X-X, 512MB	£ 220
111923	Upgr. Kit Intel P4 2.8GHz, Abit IS7, 512MB	£ 246

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SKU	Productname	Price inc. VAT
121602	EpoX EP-P4Mki 533mhz, ATA133, VGA, LAN	£ 31
122995	MSI K8T NEO-FSR S-ATA GbLAN, ATX	£ 74
122992	MSI 865PE NEO2-PFISR S-ATA,GbLAN	£ 86
119657	Abit IC7-MAX3 Firewire, Raid, GbLAN, ATX	£ 141

MAINBOARDS AMD

SKU	Productname	Price inc. VAT
119666	EpoX EP-8KMM3i KM400,ATA133, LAN	£ 37
121703	EpoX EP-8K9A7i KT400A AC97,USB2.0	£ 35
117577	MSI K7N2 DELTA-L Ultra400 LAN, nForce2	£ 51
117213	Abit NF7-S V2.0 S-ATA nForce2-SPP	£ 74

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111122	Western Digital Caviar 80GB 8MB Cache	£ 51
115541	Maxtor DiamondMax Plus 9 200GB	£ 121
117680	Seagate Barracuda 120GB S-ATA	£ 72
115561	Maxtor DiamondMax Plus9 160GB S-ATA	£ 94
118875	Western Digital Caviar 250GB S-ATA	£ 171

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SKU	Productname	Price inc. VAT
122764	Trust SP-6018 300 W Speaker	£ 4
122761	Trust 460P Soundforce soundsystem	£ 24
118819	Logitech Z-640 soundsystem	£ 63
119322	Altec Lansing soundsystem ACS621	£ 89
122101	Altec Lansing soundsystem 5100	£ 124
114063	Logitech Z-680 5.1 soundsystem	£ 289

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119947	SMC Barricade Wireless G 54 Mbps switch	£ 64
120287	3COM Wireiss 11g Cable/DSL Gateway	£ 72
122955	SMC EZ Connect G Wireless 64 Mbps	£ 77
116911	3COM Wireless Bluetooth PC Card	£ 78
121675	SMC Barricade Broadband Router 4P	£ 293

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122007	AC Ryan Acrylic Case - UV, Green Midi	£ 79
121160	Thermaltake "Skull" Xaser III Midi Tower	£ 112
119922	Shuttle SS51G Barebone PC S478	£ 78
114495	MSI MEGA PC Barebone PC S478	£ 168

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SKU	Productname	Price inc. VAT
123259	Mustek USB2.0 Be@Paw 2448CU Pro	£ 37
116950	Canon CanonScan Lide 50	£ 81
119984	Canon CanoScan 5000F	£ 126
119982	Canon CanoSCan 8000F	£ 186
118754	Canon CanoScan 990F	£ 309
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111061	Trust Silverline Direct Access Keyboard	£ 20
114743	Microsoft Multimedia & Optical Pack	£ 25
121545	Logitech Cordless Desktop Deluxe Pack	£ 34
121550	Logitech Cordless Desktop MX	£ 89
112765	Logitech Marble Mouse	£ 21
120445	Microsoft Wireless IntelliMouse Leather	£ 47

MEMORY

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111362	Crucial PC2700 DDR-DIMM 256MB	£ 27
117208	Corsair Value S. PC2700 256MB	£ 28
117212	Corsair Value S. PC3200 512MB	£ 59
115491	TwinMOS PC3200 512MB w/windbond	£ 61
118737	Corsair Value S. PC3200 1024MB kit	£ 123
116120	Corsair TWINX1024 PC3200 1024MB kit	£ 191

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Western Digital

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LG

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MONITORS

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112930	Hansol 17" CRT 730E TCO-99	£ 85
122389	Samsung 17" LCD Syncmaster 173T	£ 405
121885	Samsung 19" LCD Syncmaster 193T	£ 510
117989	Eizo 19" LCD FlexScan L767K	£ 715

PROJECTORS

SKU	Productname	Price inc. VAT
117177	Panasonic projector PT-AE300E	£ 820
116147	Infocus projector X1 1000ansi lumen	£ 938
119988	ASK projector C50 1100ansi lumen	£ 1173
123116	Panasonic projector PT-AE500E	£ 1050

SOUNDCARDS

SKU	Productname	Price inc. VAT
112039	Hercules Gamesurr. Musse 5.1	£ 21
108810	TerraTec SoundSytem DMX6Fire	£ 123
120910	Hercules Muse Pocket USB 5.1 ext.	£ 35
118911	TerraTec Producer Phase 26 USB	£ 199

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Reviews

EDITED BY DAVID LUDLOW

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

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Onyko's TX-NR801 is a home cinema receiver with great sound at a good price

PAGE 48

If you want music on the move, then the Philips HDD060 mp3 player could be for you

PAGE 60

Making notes made easy with the Nokia SU-1B digital pen

PAGE 74

How does Cyberlink's Powerdirector 3 measure up to Pinnacle's Studio 9? We put them to the test

It's time to put your feet up and relax, as this issue we've got everything you need for home entertainment. First, we have an exclusive look at Onkyo's TX-NR801 THX home cinema receiver. It's a great for pumping out surround sound for movies, but it also has an Ethernet port for streaming mp3s around the house. Convergence is a horrible word, but this product certainly proves it's on the way.

If portable entertainment is more up your street then we have Creative's 4GB Muvo² and Philips' 1.5GB HDD060. They're both built using microdrive hard disks, making them physically a lot smaller than the current batch of players.

In the hardware section and you'll see the review of Systemax's Encore 3102 home theatre PC, which offers music and movie playback. It looks like a hifi component and is perfect for sliding under a TV.

If you prefer the hands-on approach, then our components section has the MSI Mega 180 barebones system, which Systemax used to build the Encore. We've also got Shuttle's new XPC Zen barebones unit. It's the first to use an external power supply making it virtually silent in operation. Finally, Dell's W1700 is a 17in LCD TV with monitor inputs.

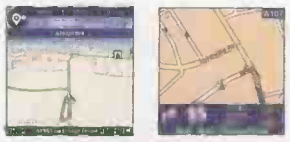
But all this doesn't mean we're lacking on other reviews. With the Evesham 3.2P we have one of the first PCs to use Intel's new Prescott processor. It has more cache than the current Northwoods and some extra multimedia instructions as well.

If like me you get lost easily when driving, our peripherals section is here to help. We have a head-to-head of Viamichelin and Tomtom's latest Palm navigation software. You might then find you need a Palm-based PDA to run these applications, so why not read our Sony Clié PEG-TH55 review? This is Sony's latest budget offering and, with Bluetooth and Wifi onboard, it's got tons of features.

Finally, we have seven pages of software reviews including Borland's Delphi Studio for developing Windows and .Net applications and Cyberlink's Powercinema 3 to help turn your PC into an entertainment centre. And for all the budding Spielbergs out there, we have a two-page head-to-head comparison of Cyberlink Powerdirector 3 and Pinnacle Studio 9.

Be sure to come back next month when we'll be featuring Intel's brand new Dothan mobile processor, AMD's latest 64bit offering and a round-up of Bluetooth headsets.

Hard disk round-up
We put nine of the latest ATA and Sata drives on test – turn to page 64



Viamichelin v Tomtom
Two GPS navigation tools for Palm go head-to-head – see page 47

PENTIUM 4 PC

Evesham Evolution 3.2P

As one of the first PCs available to feature the new Prescott processors, this is fast, well-specified and great value for money

The Evesham Evolution 3.2P is one of the first commercially available PCs to feature a Prescott Pentium 4 processor. This latest addition to the Intel family is the inevitable successor to the current crop of processors based on the Northwood core. It brings with it a larger cache, a new set of instructions for optimising multimedia performance and the promise of clock speeds as high as 5GHz.

While the 3.2GHz Prescott offers a small glimpse of the future, the remainder of the system is rather more familiar. It is housed in the Evesham splat case – a boisterous design that does as much for hinting at the system's hidden power as it does for alienating the more conservative PC buyer.

Internally, Evesham has opted for the MSI 865PE motherboard. It's a good choice, as its passively cooled Northbridge helps to keep overall system noise to a minimum. Joining this is a generous 1GB of Ram on separate 512MB Dimms. These are installed in a dual-channel formation designed to reduce performance bottlenecks.

The rest of the PC is similarly well decked out. The 256MB ATI Radeon 9800 Pro graphics card is a competent workhorse and, performance-wise, not far behind its big brother, the 9800 XT. Accordingly, the 3Dmark03 benchmark result of 5,983 was impressive and the Unreal Tournament 2003 result of 82fps at a resolution of 1,024 x 768 is solid. But graphics enthusiasts should note that the Microland PC (reviewed on page 114) achieved a superior 3Dmark result with a 128MB 9800 Pro graphics card and an Athlon 64 3000+ processor clocked at just 2GHz.

However, more inspiring results were expected of the Evolution's core performance. The 3.2GHz Prescott could conceivably have been labelled a Pentium 5. It is the first Intel processor since the original Northwood P4 to boast a new multimedia extension set – the arrival of which usually coincides with a new generation of Pentium. Interestingly, Intel's decision to extend the Pentium 4 branding to the Prescott range may relate to its less-than-stellar performance results.

Sysmark 2002 benchmarks revealed it still has some way to go before equalling the muscle provided by the Pentium 4 Extreme Edition. The overall score of 301 is respectable, but similar figures can be extracted from standard Northwood P4s, despite the Prescott having twice as much L1 and L2 cache. To the processor's credit, however, software that takes full advantage of its new instruction set has yet to arrive.

In terms of storage, the Evolution 3.2P is equipped with a 160GB hard disk and the excellent LG GSA 4040-B DVD rewriter. This drive is capable of writing to both plus and minus DVD formats, as well as DVD-Ram. This covers you for all eventualities in a climate where a prevailing DVD format has yet to be established.

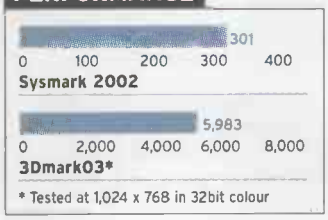
A total of six USB2 ports provide plenty of scope for system expansion. Two of these are at the front of the PC, alongside microphone and headphone sockets. Sound is provided courtesy of the Creative Audigy 2 soundcard and the Creative Inspire 7700 speakers. These provide 7.1 channels of sound for games and movies.

Display duties are handled by a sleek Viewsonic VP171S monitor, which complements the appearance of the 3.2P's case. It has a high-quality 17in screen, with good resilience to distortion along the horizontal viewing axis. Although the same cannot be said for viewing along the vertical axis at extreme angles, the VP171S makes up for this with a height-adjustable stand and swivel function.

Despite a few minor disappointments, the Evesham Evolution 3.2P provides great value for money at just £1,229 ex VAT. It may not demonstrate the performance we had hoped, but it does offer more power than most Athlon 64-based machines, and should demonstrate its true potential as new software takes advantage of its larger cache and new instructions.

Rory Reid

PERFORMANCE



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

DETAILS

RRP £1,526.35 (£1,299 ex VAT)
BEST PRICE & PRODUCT INFORMATION Evesham 0870 160 9500 www.evesham.com
SPECIFICATIONS
Windows XP Home • Intel Pentium 4 3.2GHz 1MB cache 800MHz (Prescott) • 1GB PC3200 DDR • MSI i865PE ATX motherboard • Intel 10/100 Lan • 160GB Sata hard disk (8MB) • LG GSA 4040-B DVD rewriter • ATI Radeon 9800 Pro graphics card 256MB DDR • Viewsonic VP171S 17in TFT • Creative Inspire T7700 speakers • Microsoft Works Suite 2004 • 2yrs on-site, 1yr RTB warranty
PROS CPU; hard disk; good value
CONS Prescott processor doesn't increase performance as hoped
VERDICT
Fast and well-specified, it provides great value for money

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

DESKTOP REPLACEMENT NOTEBOOK

Toshiba A40

A reliable, solid performer

Some notebooks really stand out, but there's little to shout about with Toshiba's A40. While there's nothing wrong with it, this is mundane fare. The A40's problem is that it offers a bargain-basement specification but lacks the price tag to match.

An Intel Celeron processor running at 2.6GHz drives the notebook, and it put in a score of 118 in Sysmark 2004. We were concerned that XP would struggle with the 256MB of memory, but this can be upgraded to a maximum of 2GB. A 30GB hard disk is a little lacking, but should provide enough space for most.

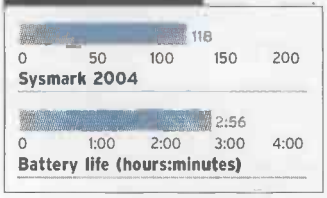
One thing you won't be doing with the A40 is having much fun. The onboard graphics scraped in at 112 in our 3Dmark03 test. There's a CD rewriter and DVD drive, but the 15in TFT screen is built for spreadsheets. The usual connections are in place, with four USB2 ports and one S-video for TV. A data and fax modem is also built in.

The A40 is solidly built, although there is some give in the centre of the keyboard. One problem is the markings for extended functions. These have been set in grey next to black keys so it's easy to lose sight of them. The touchpad is competent but there's no scroll wheel.

The A40 clocked two hours, 56 minutes of battery life, but at 3.5kg it isn't that portable. At £749, this notebook is no bargain but the inclusion of Microsoft Works 7 adds value. This would make a reasonable second computer but there is better available for the price.

Paul Allen

PERFORMANCE



DETAILS

RRP £749 (£638 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Toshiba 0870 444 8943
www.toshiba.co.uk
SPECIFICATIONS
Intel Celeron 2.6GHz • 256MB of DDR Ram • 30GB hard disk • 10-speed CD-RW 8-speed DVD combination drive • 15in TFT display at 1,024 x 768 • 337 x 298 x 37mm (w x d x h) • 16bit stereo speakers • Windows XP Home • Microsoft Works 7
PROS Solid; performance
CONS It's no bargain
VERDICT
Nothing outstanding, but it will offer reliability

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

WIDESCREEN NOTEBOOK

Samsung X30

Good looks and power but at a hefty price

One of the things lacking in many notebooks is portability. Samsung's X30 shows mercy to the biceps but you'll lose more than a few pounds sterling carrying it out of the shop.

The X30 is designed for entertainment – the pearl-look case is only 2.4cm thick and its 15.4in widescreen display is well suited to the latest epic. All this is reflected in its price tag though, with the 1.7GHz model costing £1,899. But then this is a *PCW* debut for a Pentium M running at 1.7GHz in a notebook, so early models will attract a premium.

Our tests delivered a Sysmark 2004 score of 137. A hard disk capacity of 80GB should satisfy most needs, while its 512MB of memory is enough for Windows XP. One of Centrino's best features is its effect on battery life. Samsung claims you will get more than four hours from the X30, and our tests fell only slightly short of this. The internal bridge will enable you to pop in a new battery with the notebook in standby mode, giving a safety margin of three minutes.

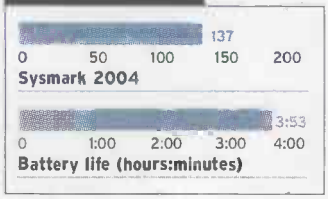
The X30 also caters well to gamers, as the onboard Nvidia Geforce FX 5200Go card is good enough for the occasional gaming session.

One feature that marks out the X30 is its fingerprint recognition, which can replace passwords or encrypt documents.

There's little to quibble with in terms of quality, although a DVD rewriter would have been useful. All that leaves is the cost which, like a Hollywood starlet, is dazzling.

Paul Allen

PERFORMANCE



DETAILS

RRP £2,231 (£1,899 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Samsung 01932 455 000
www.samsungelectronics.co.uk
SPECIFICATIONS
Windows XP Pro • Intel Pentium M 1.7GHz • 512MB DDR of Ram • 80GB hard disk • DVD/CD-RW combo drive • 15.4in 1,680 x 1,050 LCD • Nvidia GeforceFX 5200Go 64MB graphics card • 360 x 265 x 23.9mm (w x d x h) • 2.4kg • 1yr collect and return warranty
PROS A good all-round entertainer
CONS You'll need deep pockets
VERDICT
Plenty of power and good looks but this is a lot of money to spend on a notebook

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

HOME THEATRE PC

Systemax Encore 3102

Good hardware and software combine to make this a choice for home theatre beginners

The launch of Windows Media Center edition showed that home theatre PCs are here to stay. With the Encore 3102, Systemax uses the MSI Mega 180 barebones (reviewed on page 69) and its own brand of software to deliver its own entertainment PC.

It's built using a miniature case. The front is dominated by a large, colourful LCD. There is a large volume dial with a couple of function keys, memory card reader slots and basic controls for the DVD drive. Two USB2 ports, two Firewire and audio ports remove any need to scrabble around the back of this system, which is very important if it is going to be installed next to the television.

The back has everything that you might need for a home theatre computer. There are dual monitor outputs, S-video, PS/2, two USB2 ports, parallel, modem, S/PDIF and the standard audio outputs. The TV card also has S-video and composite inputs.

Inside, things are crowded but not overly so. An MSI motherboard based on the Nforce2 chipset provides the core for this system, with an AMD Athlon XP 2800+ providing the raw power. 512MB of Ram backs this up and gives Windows enough room to breathe.

Systemax has decided to use the dual-channel aspect of this chipset, which means more power now but greater cost if you decide to upgrade in the future.

The onboard Nvidia Geforce4 MX graphics are used. This provided adequate performance in our tests, although it will struggle to play the latest demanding games. However, there is a spare AGP slot if you fancy upgrading.

Storage is handled by a 120GB Samsung hard disk. As there are bigger devices in the market, this is a little small, especially once you start to record lots of video. There is no compromise with the Sony DWU18A DVD +/- RW. Finally, a TV card takes up the only PCI slot in the machine.

The widescreen TFT is excellent for this computer. It offers much in the way of connectivity and has a TV input, so it is possible to record one channel and watch another. There are also composite and component connectors, so you can connect any existing equipment you may have.

Booting the computer should take you straight into MSI's home theatre software. The styling is very similar to Windows Media Center, but there are some important differences. The feel is much cleaner and all the starting options are visible, rather than the scrolling menu of Media Center.

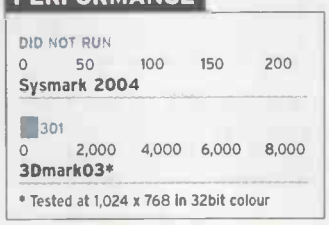
Setting up is easy, although our PC did crash once while searching for channels. However, there is more to this computer than the Windows Software. It is quite a capable home entertainment system on its own. From the power off mode, it can play DVDs, CDs, TV and radio. It can also act as a Personal Video Recorder. This makes impulse recording a viable option as you don't have to wait for Windows to load. If you want to edit or view these videos in Windows, they are recorded as mpeg2.

The remote control operates for both of these modes and the Encore is intelligent enough to recognise whether it is in Windows or not. The remote control is very thin and, at times, it was hard to be sure if a button had been pressed, as there can be a slight delay before anything happens.

Unfortunately, the Encore was unable to fully complete Sysmark 2004, although the scores of 310 in Internet content creation and 156 in office productivity indicate sufficient power for anything you might want to do. With a high score in media handling this is a very attractive computer for recording and editing television programs.

Tim Smith

PERFORMANCE



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

DETAILS

RRP £1,199 (£999 ex VAT)

BEST PRICE & PRODUCT INFORMATION

Systemax 08707 297 369

www.systemax.co.uk

SPECIFICATIONS

Windows XP Home • AMD Athlon XP 2800+ • 512 MB DDR PC3200 • MSI Nforce motherboard • 120GB hard disk • Sony DWU18A DVD/RW+- • Onboard Geforce4 MX graphics • Iiyama 17in C1c71WT LCD TV • Videologic ZXR-550 speakers • Remote control • Ability Office 2003 • 1yr on-site warranty, 2yrs return to base

PROS Software; memory

CONS Hard disk could be bigger

VERDICT

An excellent combination of hardware and software, the Encore succeeds where Windows Media Center edition fails

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

HOME CINEMA RECEIVER

Onkyo TX-NR801

A great price for a quality sound receiver

Don't worry, we haven't turned into *Personal Hifi World* overnight, although this is a home cinema receiver. But it's not just any old receiver, as it has an Ethernet port, which it can use to stream mp3 files around the home.

With this one box – and what a box it is – you can get the most out of DVD movies and stream music from your PC. One of the first things you'll notice is the THX-certified badge on the front of the large silver chassis. This gives a good indication of the kind of sound you can expect.

Swing the box around and you'll see that it supports 7.1 speaker configurations. Using 6ohm speakers, the TX-NR801E delivers 135w per channel. When we had it hooked up to our speakers and a DVD player, the sounds was superb for the price and the equal to many of the more expensive receivers.

The rear has a large choice of inputs including seven S-video and composite, two component video, three digital optical audio and three digital coaxial. Using the remote it's possible to assign these inputs to different sources, such as optical 1 to the DVD. This makes the Onkyo TX-NR801 very flexible.

Streaming mp3s involves installing the Net-Tune server software. It looks like a very basic mp3 player and is a little clunky to use when creating items such as playllsts. However, once done the TX-NR801E detected our server and all of its music.

A track can be selected by artist, genre, album or playllst using either the large LCD on the front of the receiver or, preferably, a TV screen. What you can do from the receiver is basic, but it's dead easy to use.

For the price this is an amazing receiver packed full of high-end goodies.

David Ludlow

DETAILS

RRP £999 (£850.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Onkyo 07887 553 101
www.onkyo.net
SPECIFICATIONS
7 x 135w channel • THX-certified • 7.1 • Ethernet Port • Net-Tune Central Software • Multifunction remote control
PROS Flexible; good sound
CONS The mp3 software is a little clunky
VERDICT
This receiver has everything you could possibly want, and more, at a bargain price

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

PALM PDA

Sony Clié PEG-TH55

A new standard for Palm OS PDAs

Sony has been using 320 x 480 screens on its clamshell Cliés for some time, but there's no tiny keyboard on its new PEG-TH55. With this svelte black model, the screen fills the whole of the case's front, with the four application buttons relegated to the bottom edge.

The jog wheel has moved too. The top edge of the case's rear may seem like an odd place to put it, but since that's where the forefinger falls when the TH55 is held in your left hand, it works pretty well. The new button and wheel placements also mean it can be used without lifting the smoked plastic screen protector.

The back of the TH55 is also home to the lens for the built-in dlgital camera. Its 640 x 480 images are fine for the odd snapshot and email, and the latter task is made easier by the built-in Bluetooth and 802.11b (a dual-wireless feature found in the European and Japanese models).

Sony's Handheld Engine processor appears in the TH55. It varies its speed according to need and, while some applications can be sluggish, the processor stretches out the battery to a working day of constant use. There's a dedicated DSP too, which means the TH55 works as well as any Flash-based mp3 player. The graphics accelerator chip can display video from a card in the Memory Stick Pro slot at 320 x 240 with 30 frames per second.

While you can watch video in landscape mode, the TH55 only supports portrait for other applications, but the new Sony Organizer makes up for this. This is a revamped multimedia version of the standard Palm applicatlons and supports embedded images, sounds and on-screen doodles. There's a slew of other utilities too, maklng this one of the best-equlpped PDAs we've ever seen.

Julian Prokaza

DETAILS

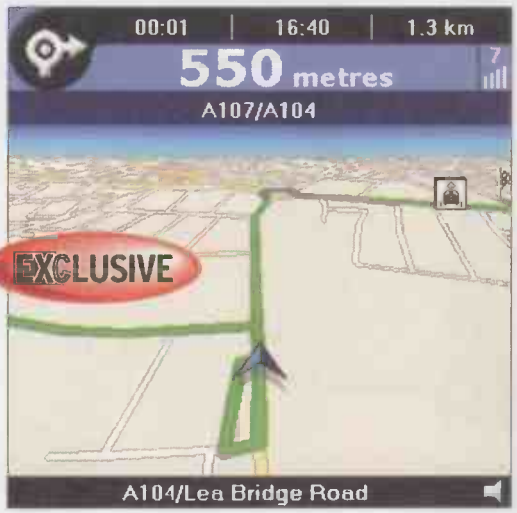
RRP £300 (£255.32 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Sony 020 7365 2934
www.sonystyle.co.uk
SPECIFICATIONS
Palm OS 5.2 • Sony Handheld Engine 8 – 123MHz • 32MB of Ram • 32MB of Rom • 320 x 480 screen • Memory Stick Pro slot • Infra-red, Bluetooth, 802.11b, 3.5mm audio • 176g • 105 x 89 x 18mm (h x w x d)
PROS Great screen; features
CONS Meagre memory; processor can be sluggish
VERDICT
The PEG-TH55 sets a new standard for Palm OS PDAs – Pocket PCs should take notice

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

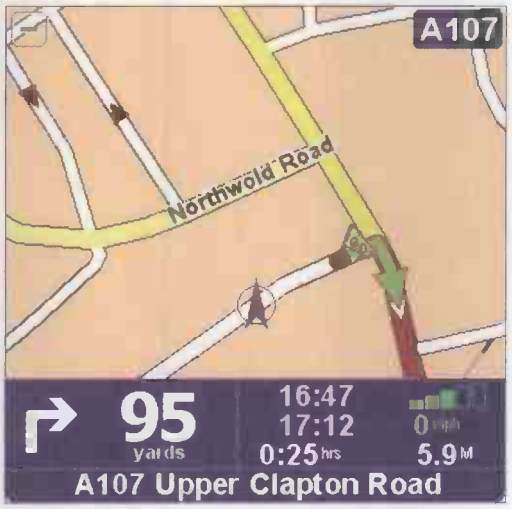
GPS NAVIGATION FOR PALM

Viamichelin Mapsonic v Tomtom Navigator

Two packages go head to head to offer route maps at your fingertips



Viamichelin's Mapsonic provides a customisable 3D view, with adjustable scale



Tomtom also provides 3D view but we prefer the standard 2D version

Until recently, if you wanted GPS (Global Positioning System) navigation with turn-by-turn directions, the only option was Pocket PC, as Palm OS devices simply weren't up to the task. However, with models such as Palm's T3 offering high-resolution screens, fast processors and plenty of memory, PalmOS is now viable for such a task. Viamichelin's Mapsonic and Tomtom's Navigator for Palm are both available to run on the Palm T3, taking advantage of the rotating screen to provide portrait or landscape displays.

Tomtom's system is the easiest to set up. It comes on a memory card with all the roads for your chosen country – we tested the UK version – and a companion CD of major European roads. You can't, as yet, buy extra country maps.

Viamichelin's Mapsonic requires a PC to get going. There are four CDs covering western Europe in detail. You have to install them on your PC and use the Mapstore software to select which parts you want to transfer to the PDA. The level of detail, including streets or major routes, also needs to be selected.

It's fiddlier, but you can save memory by just transferring over the data you want. Pick a large area, though, and it'll take time to sync, as will Tomtom if you want to add maps that aren't on the supplied card.

Along with a preloaded memory card, Tomtom comes with a choice of wired or wireless GPS units, which increases the price. Mapsonic is software only, although some dealers do bundle it with a receiver. It works with any National Maritime Electronics Association (NMEA)-compliant GPS unit, and we tested it using Tomtom's Bluetooth one, which is about the size of a pack of 10 cigarettes.

Planning a route with both systems means searching for start and destination locations. Tomtom's software has a built-in favourites list and home address setting. But unlike Garmin's Ique 3600 (reviewed in April's issue, www.pcw.co.uk/products/1152323) there's no integration with the Palm address book. You can set up favourites on Mapsonic by creating a category of Points of Interest. It takes some lateral thinking, and it works, but it is not as slick as Tomtom's method. You can, though, import an address book entry to use in the search for a destination.

We found searching a little easier with Tomtom. With Mapsonic you tend to begin by selecting a region, then a smaller entity such as a city, and then search for the street. On both, of course, adding addresses to a list makes it quicker to revisit them.

During navigation, both products give clear instructions, but Tomtom seemed to have a slight edge – rather than issue each instruction one at a time, it says 'Turn right, then left at the roundabout', for example.

As with Pocket PC navigation, these products often 'break' the interface to provide something that will make sense when used in a car. Tomtom is the most Palm-like, with screens of large clear icons to set preferences, but the on-screen keyboard to enter addresses seems unnecessary when the Palm OS already offers one. Viamichelin's interface mimics its desktop Mapstore program. Both packages, though, plot good routes – they both use Teleatlas mapping data, so there's not much difference – and you'll soon become used to either.

The key differences are in mapping range and price, although adding a GPS receiver bumps up the Viamichelin price. Neither will take you door to door across Europe.

Tomtom only has detailed maps for the country you buy in and only major routes for Europe. Viamichelin contains maps for many countries but you can't plan a route that spans two or more countries.

It makes the choice trickier. If you want a complete bundle that's easy to use, buy Tomtom. If you want complete mapping for Europe, buy Viamichelin.

Nigel Whitfield

DETAILS

TOMTOM
RRP With Bluetooth GPS: £449 (£382.13 ex VAT); wired GPS: £349 (£297.02 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Tomtom
www.tomtom.com
SPECIFICATIONS
Palm Tungsten T3
PROS Complete bundle; easy setup
CONS Pricey; lacks detail on international maps
VERDICT
Good navigation and simple configuration in a complete package for UK travellers

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

DETAILS

VIAMICHELIN
RRP £199 (£169.36 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Viamichelin
www.viamichelin.com
SPECIFICATIONS
Windows 98 or later, Palm OS 5 upwards
PROS Extensive multi-country maps supplied; address book link
CONS Awkward interface
VERDICT
The interface lacks polish, but Mapsonic performs well and includes a lot of detailed maps for a reasonable price

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

MP3 PLAYER

Creative Muvo²

Perfectly sized with lots of room for music

While the first batch of hard disk mp3 players was based on squeezing the highest capacity disks into a chassis, there's been a recent move towards smaller, more portable devices. Creative has just released the 4GB version of its Muvo². Around half the size of a deck of cards, it's small enough to slip into even the slightest of pockets.

However, it's not exactly what we want from an mp3 player. It suffers from the inclusion of Creative's Mediasource Organiser, which isn't friendly and not worth the installation time. It's better to use the USB2 connection and manually drag and drop files to the player.

This method has its problems, too. Most noticeable is the Muvo²'s complete disregard for ID3 tags. Instead, music is stored and played alphabetically. There's no option to search for a track by genre, artist, name or album. When you think that 4GB is enough storage for around 800 songs (recorded at 192Kbits/sec), this restriction can make it hard to find a given track.

The only answer is to create a rigid folder structure to house albums or create playlists, and use Creative's interface to browse through them. It's far from perfect and Creative should be using tags to spare us from worrying about file organisation.

The Muvo² goes some way towards redeeming itself by its top-notch sound quality. There's also a choice of EQ settings to complement any genre of music.

It's powered by a rechargeable AA battery, which gave us around 10 hours of playback. There's a jack for a remote, which has its own display, but this costs an extra £39.90 inc VAT.

It's a perfect size with plenty of room for music, but Creative must address file organisation to appeal to the mass market.

David Ludlow

DETAILS

RRP £279.90 (£238.21 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Creative
http://europe.creative.com
SPECIFICATIONS
4GB of storage • mp3 and wma playback • Four-band graphic equaliser • USB2 interface • 14-hour quoted playback • 66 x 20 x 66 (mm) (w x d x h) • 91g
PROS Good sound quality; plenty of room for music
CONS Poor music organisation; poor software
VERDICT
It's not a complete disaster, but Creative needs to work on the interface to make it a must-have

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

MP3 PLAYER

Philips HDD060

Small and stylish with great sound quality

Small, hard-disk-based mp3 players are all the rage at the moment. This month, as well as Creative's Muvo2 (left), we have Philips' HDD060. Around the same footprint as a credit card and as thick as a deck of cards, this player has a 1.5GB hard disk.

If looks are anything to go by, Philips is onto a winner. It fits perfectly in the hand and looks very stylish. However, it is usability that really counts.

For the most part, it's very good. The HDD060 uses ID3 tags to categorise music. From the home screen you can easily find a track by playlist, album, artist or genre. To make things easier when dealing with large numbers of tracks, Philips has included its Superscroll function, which first made an appearance on the HDD100. By holding down the scroll buttons, it causes a track list to be skipped by alphabetical letter, not individual track. It works really well and makes it simple to find a given track.

We were also impressed by the sound quality, especially when using the EQ settings and the bass boost. With around 10 hours of playback, it looks like an almost perfect player.

There are a few downsides. First, there's no resume function. If you stop playback during a playlist, for example, then you can't continue from where you left off next time you turn the power on.

The software for copying tracks isn't much cop, either. It's a Java app and is a little fiddly to use. There's no escaping from it either, as the HDD060 will only play tracks copied using this software. The stated reason is maintaining digital media rights.

Finally, a remote with a screen would be useful, but it's really a minor point. Aside from those little niggles, it's a top player at a good price.

David Ludlow

DETAILS

RRP £169 (£143.83 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Philips 0870 900 9070
www.philips.co.uk
SPECIFICATIONS
1.5GB hard disk • mp3 and wma playback • USB2 interface • LCD screen • 10-hour playback • 85 x 18 8 54 (mm) (w x d x h) • 95g
PROS Small; good sound quality; good price
CONS Have to use the Philips software; no resume mode
VERDICT
A tiny mp3 player with lots of space for music, but a couple of little niggles hold it off top marks

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

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EXCELLENCE DISPLAYED

ADSL SECURITY GATEWAY

Zyxel Prestige 652HW

Well-featured, but experience required

The Zyxel Prestige 652HW is not designed for the inexperienced. Acting as an ADSL gateway for Soho or SME markets, it requires a certain degree of technical knowledge to configure the more advanced functions.

Wizards provide some help with installation and access to the management console is primarily through a web browser, although it is accessible via Telnet. The interface is very basic but functional.

It supports multiple public IP addresses, which are protected behind Zyxel's own ISCA-certified operating system. This runs a Stateful Inspection firewall, which also guards against Internet attacks such as Denial of Service.

The usual array of content-filtering capabilities is available with all the necessary logs and alerts easily set. For always-on environments there is automatic failover protection, switching over to an ISDN or analogue modem if your ADSL connection should fall.

At the rear, a four-port switch allows sharing with other PCs, although one port can be configured as a DMZ. Wireless connectivity is available via a PC Card slot located at the side of the unit. However, only Zyxel's own 802.11b PC Card has been certified, which is disappointing.

Security can be based on advanced protocols such as Radius and IEEE 802.1x Port-based authentication. There's also onboard Application Specific Integrated Circuit (Asic) DES accelerator, which caters for up to 10 IPsec VPN tunnels.

Although it provides nearly everything required of an office gateway, it is limited by the wireless restrictions, and its more advanced features shift it towards experienced users or branch offices.

Alexander Arias

DETAILS

RRP £229 (£195 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Zyxel 0118 981 0600 **www.zyxel.co.uk**
SPECIFICATIONS
Stateful Packet Inspection firewall • CLI, Telnet, SNMP, FTP and web management • RJ-11 or RJ45 Wan port • 4-port 10/100 switch • Optional 802.11b PC Card • Two-year warranty • 206 x 161 x 51mm (w x d x h)
PROS Very well featured
CONS Bland interface; based on 802.11b
VERDICT
Good for branch offices, otherwise it needs knowledgeable users to take advantage of all its capabilities

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

BROADBAND WIRELESS GATEWAY

BT Wireless Network 1250

Easy to use and flexible, but it's expensive

One of the benefits of broadband is that it's fast enough to share between multiple home PCs. BT has decided to get in on this act with its 10-user Wireless Network 1250 ADSL gateway.

Wireless isn't the only trick up its sleeve, though, as it comes with HomePNA 2.0, which uses existing phone cables to be used as a network. Most houses have multiple phone sockets, so it's an easy way to get a 10Mbytes/sec network connection.

Larger than your average broadband router, its simple installation makes it stand out. Colour-coded ports and cables with detailed manuals should ensure a painless installation.

A clear and simple web-based browser interface allows you to configure features such as parental control. This lets you apply restrictions both on time of day and the websites you can access on a per PC basis.

Application control is a strong feature. A comprehensive list of online games and applications, such as Netmeeting, can be allowed through the integrated firewall at a click of a button.

Wirelessly, it is based on the 802.11b standard, although it is not Wifi-certified, which may cause problems with inter-operability. Theoretically this gives throughput rates of 11Mbits/sec, but realistically you'll achieve 6Mbits/sec – plenty for surfing the Internet. Security is on by default and has been preconfigured using 64bit WEP, reasonable for a home environment. Be aware that wireless coverage can vary depending on surroundings.

For Wireless and HomePNA connections, extra adapters need to be purchased. Although more expensive than others on the market, the ease of use and flexibility in sharing broadband Internet access within the home helps justify the additional cost.

Alexander Arias

DETAILS

RRP Router: £179 (£152 ex VAT)
HomePNA adapter: £39.99 (£34.03)
Wireless adapter: £39.99 (£34.03)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
BT 0800 328 6738
www.bt.com/homenetworking
SPECIFICATIONS
Windows 98SE or above, MacOS 8.5 or above • Stateful Inspection firewall • 802.11b • 1 RJ11 1 USB2 ports • 50 x 205 x 255 mm (w x d x h)
PROS Wireless security on by default; flexible in sharing net access
CONS Expensive; based on 802.11b; not Wifi-certified
VERDICT
More expensive than some; well-designed for home environment

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

15IN TFT MONITOR

Dell W1700 LCD TV

Versatile choice for PC-based home theatre

If you have been considering building a home theatre PC, the Dell W1700 LCD TV is an excellent option. With its widescreen format, built-in TV tuner and veritable wealth of connection options, it's a great all-rounder.

On first impressions, the W1700 appears quite small. However, this is really a trick of perspective, as it is the same height as a standard 15in TFT but in widescreen format. The stand is heavy enough to stop the TV from toppling over, but is not too deep. Fitting the stand involves resting the screen face down on a surface, so be careful not to damage it when doing this.

Once fitted, you can adjust the monitor's height and tilt, which is very useful to reduce glare. The box also contains the external power supply, VGA and DVI cables and a remote control. There is also a cable tidy tube supplied – especially useful if the monitor is not in an office.

The W1700 works very well as a TV and there's a picture-in-picture option, which means you can watch TV while beavering away on a Word document. The antenna socket is turned through 90°, so the cables can be fitted without any problems.

The manual is very helpful and explains all the functions and how to set up the LCD TV. However, the legends of the buttons on the front are hard to read, and it is much easier to use the remote control.

The picture quality is good and the monitor will scroll output from a television if it is higher than the 1,280 x 768 native resolution.

This monitor can't compete with dedicated TVs or monitors, but as a jack of all trades, it's a flexible option for your entertainment needs.

Tim Smith

DETAILS

RRP £540 (£459.57 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Dell www.dell.co.uk
SPECIFICATIONS
17in widescreen TFT • 1,280 x 768 native resolution • Antenna, S-video, composite audio and video, component video, D-Sub, DVI-D, Scart inputs • Brightness: 450cd/m² • 400:1 contrast ratio • 88° viewing angle (horizontal and vertical)
PROS Connectors; versatile stand
CONS External power supply
VERDICT
For a PC-based home theatre setup, the W1700 is an excellent choice. It can't compete with a traditional television for size, but it wins on versatility

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

19IN TFT MONITOR

Viewsonic VG910s

For those who want size over resolution

The days when a 19in CRT monitor was the height of luxury are over, with 19in TFTs ruling the roost. Viewsonic's 19in VG910s offers a larger viewable screen but takes up a quarter of the space.

Despite the space-saving advantages of TFT monitors, the first impression of this monitor is the large size of the display area. The small bezel helps to increase this effect, while the bottom of the monitor contains the stereo speakers and houses the small control buttons.

At the back of the monitor is everything you would expect. Connection to a computer can be either an analogue VGA plug or DVI. An audio jack and power-in complete the set, while an internal power adapter keeps desk clutter down.

There are eight buttons on the front for the onscreen display and volume controls. They are small but have a positive action and are widely spaced.

Unfortunately, despite the huge viewing area, the VG910s has a maximum resolution of 1,280 x 1,024. As any 19in CRT would have a resolution of 1,600 x 1,200, this is a disappointment.

Resolution aside, the image quality is very good, with a high 600:1 contrast ratio and vibrant colours. A 25ms video response time means that there is no delay for video or games. Gamers would be wise to use some anti-aliasing to compensate for the low resolution.

Brightness and contrast settings can be accessed directly from the front-panel buttons. The onscreen display is easy to navigate with lots of onscreen guidance. A useful option is the ability to turn off the resolution reminder if you use applications that don't use 1,280 x 1,024.

It's a good monitor for those wanting size over resolution, but if it's greater definition you're after, look elsewhere.

Tim Smith

DETAILS

RRP £529 (£450.22 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Viewsonic 01293 643 912
www.viewsoniceurope.com/uk
SPECIFICATIONS
19in TFT • 1,280 x 1,024 native resolution • VGA and DVI • 422 x 438 x 180mm with stand (w x d x h) • Brightness: 250 cd/m² • 600:1 contrast ratio • 170° viewing angle (horizontal and vertical)
PROS Large display area; fast response
CONS Resolution
VERDICT
If size is more important than resolution, this is a good monitor to buy. Those who want greater detail should look elsewhere

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

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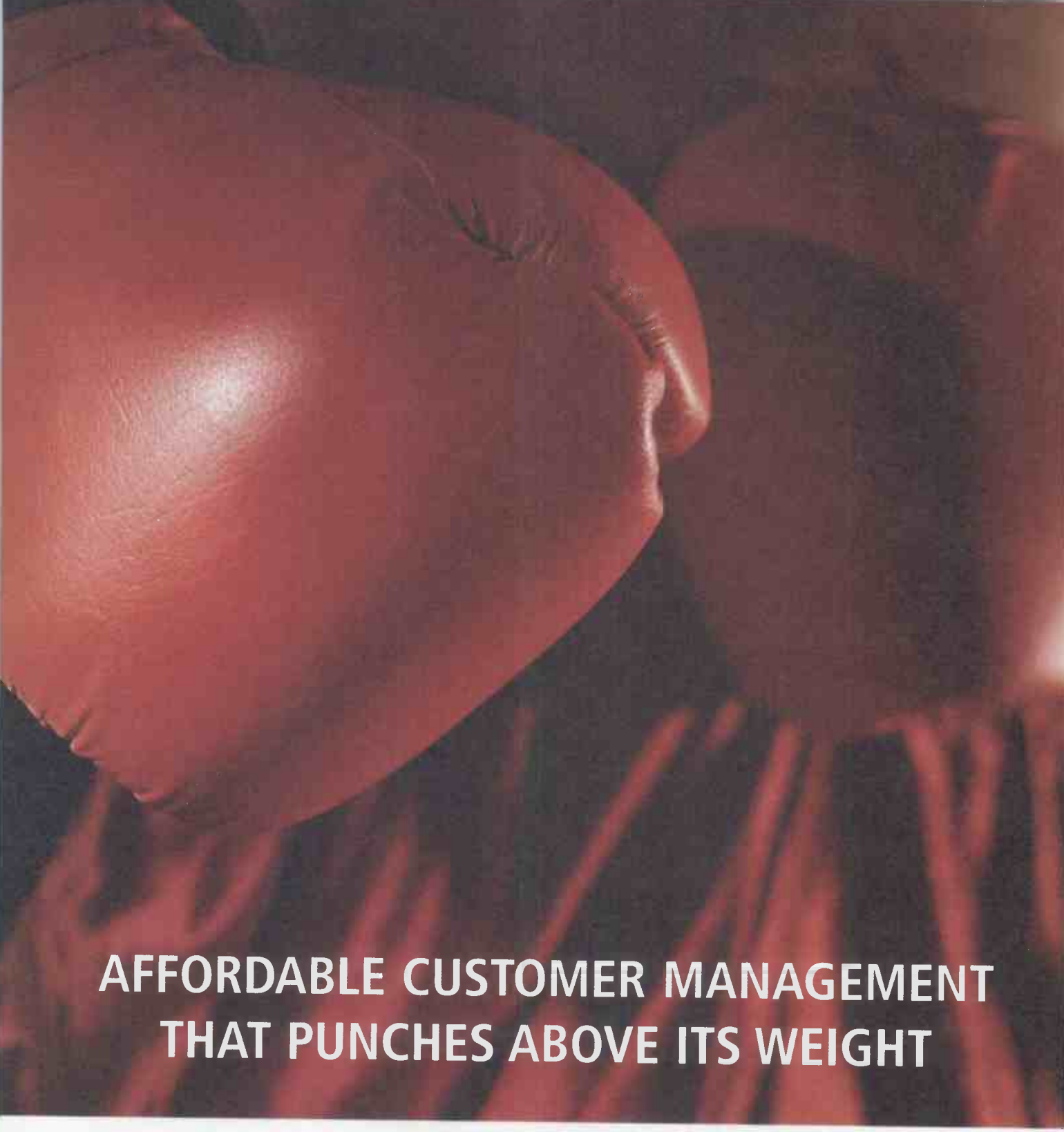

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COLOUR MANAGEMENT

Spyder Pro and Printfix

Impressive colour calibration results and a must for professionals

While colour calibration is probably not something every PC user has thought about a great deal, it's of critical importance to the likes of professional digital photographers and publishers.

It's no good making an adjustment to the colours of an image on your computer just so someone else can see the image with noticeably different colours. The problem is that not all monitors are the same. If you sit two side by side and display the same image on them, you can end up with two very different results. This is where the Spyder Pro and Printfix tools attempt to help out.

The Spyder Pro is reasonably easy to use, and attaches to your monitor via three sucker pads. If you want to calibrate an LCD panel or notebook screen, the wires included in the package allow you to hang the Spyder Pro from the top of the screen to prevent damage to the display.

There is a range of software included in the package. The Precal utility prepares your monitor for the calibration process by adjusting the brightness, contrast and colour balance. It's not a completely automated process and requires you to play around with your monitor settings. Unfortunately, many monitors have very fiddly menus, so this can get more than a little frustrating.

The Optical software then guides you through the process of calibrating the screen using the Spyder Pro device. After making the initial adjustments to your monitor, you simply place the Spyder Pro on the screen and it starts to read the colours displayed – the whole process doesn't take much more than 10 minutes. If you're only purchasing the Spyder, as opposed to the Spyder Pro package, you get a utility called Photocal, which is a cut-down version of Optical and doesn't allow as much fine-tuning.

Although the Spyder Pro will also work on notebooks, we found that it couldn't produce the same results with notebooks as it can with standard CRT and LCD monitors. The reason for this is that most notebook screens don't have the same controls as a standalone monitor, and therefore can't be put through the Precal process.

Windows can only handle one profile at a time, so the calibration software hits a bit of a wall when it comes to PCs with multiple monitors. You can only fully calibrate one of your monitors, leaving the others running on your primary monitor's settings and, more than likely, looking a little odd as well.

The Printfix utility, as you'd expect given its name, deals with colour calibrating printers. If you've spent an age getting your images looking right on the screen, you're going to want them to print out correctly as well. It's worth noting that you'll need a copy of Adobe Photoshop or Photoshop Elements in order to use Printfix.

The Printfix package consists of a small scanner, similar to a business card scanner, and the Printfix software. The whole process is a little more complex than the Optical calibration and we ran into a few problems during testing. Unfortunately, this isn't helped by the fact that the manual isn't of the highest quality or very easy to follow.

Printfix is only compatible with a small selection of Epson and Canon printers. We tested Printfix on an Epson Stylus Photo 2100, and you can get the full list of compatible printers at www.colourconfidence.com.

If you're looking to buy either of these products, there are a few options open to you. The Spyder monitor calibration tools cost just over £110 and comes with the basic Photocal software. The Spyder Pro is priced at £170 and comes with both Photocal and Optical. Printfix is available for £225, but if you want to purchase both Printfix and the Spyder Pro as a package it will set you back £351.33 (£299 ex VAT).

Our experiences with these two products differed somewhat. While the Spyder Pro worked well in calibrating both CRT and LCD monitors, Printfix wasn't particularly easy to use and didn't really produce the results we were expecting.

Will Stapley

DETAILS

RRP £351.33 (£299 ex VAT) Spyder Pro and Printfix bundle
£111.63 (£95 ex VAT) Spyder
£170.38 (£145 ex VAT) Spyder Pro
£233.83 (£199 ex VAT) Printfix
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Colour Confidence 0121 604 1234
www.colourconfidence.com
SPECIFICATIONS
Windows 98 or higher • Adobe Photoshop or Photoshop Elements • USB connection • Supported printer
PROS Spyder Pro worked well in calibrating CRT and LCD monitors
CONS Printfix didn't produce the results we were expecting
VERDICT
Probably way above what the average PC user needs, but the Spyder Pro in particular produced impressive results

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

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Computeractive, Issue 142

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Computer Shopper, Feb 2004

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PC Pro, Recommended & A-List, February 2004

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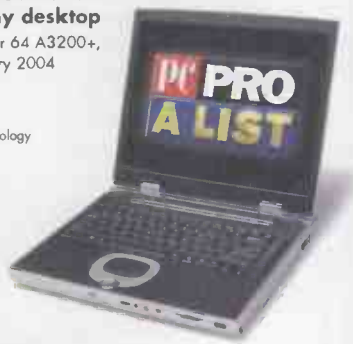

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- FREE Microsoft® Works 7.0
- Ports - 4x USB2.0, Firewire, Parallel, VGA, PCMCIA Type II x 1
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- 3 year warranty - 1 year on-site, 2 years RTB

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What Laptop, June 2003

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What Laptop, June 2003

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COLOUR LASER PRINTER

Samsung CLP 500

A great choice for smaller workgroups

With the CLP 500, Samsung has made its first steps into the colour laser market and, at just £499, it is one of the cheapest models currently available.

Thanks to its Non-Orbiting Noiseless Optic Imaging System (NO-NOIS), Samsung claims the printer is a lot quieter than the competition. It also comes with a duplex feature as standard, which is quite a rarity when it comes to budget colour lasers.

With the low price tag, we were instantly suspicious that Samsung was going to sneak in some expensive consumables. As expected, the CLP 500 is shipped with starter mono and colour toner cartridges at 2,000 and 1,500 pages respectively. Once these run out you can purchase replacement mono toner lasting 7,000 pages at £77, and colour cartridges at £90 lasting 5,000 pages, all at five per cent coverage. Certainly not the cheapest toner we've seen.

Both the imaging drum and transfer belt need to be changed every 50,000 images, at a cost of just under £250 (£145 for the imaging drum and £100 for the transfer belt). However, since this is a four-pass model, you'll have to replace both every 12,500 pages if you're printing in colour.

In terms of print speed, Samsung rates this printer at five pages per minute (ppm) colour and 20ppm mono, and our tests proved these claims to be almost spot-on. The colour output can't quite match the likes of the Epson C900, but the CLP 500 did churn out an A4 colour photo in just 36 seconds.

A network version, the CLP 500N, is available for £100 extra but, if you're sharing this printer among more than a handful of people, you'll find consumable purchases start to mount up. However, for a Soho environment, it offers speedy printing and a low initial outlay.

Will Stapley

DETAILS

RRP £499 (£424.68 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Samsung 0870 242 0303
www.samsung.co.uk
SPECIFICATIONS
166MHz processor • 64MB memory (upgradeable to 196MB) • 1,200dpi resolution • 5ppm colour, 20ppm mono • 350-sheet input, 250-sheet output • USB2, parallel, wireless option • Duplex feature as standard • 510 x 467 x 405mm (w x d x h)
PROS Quiet; fast; low RRP
CONS The printer has relatively high running costs
VERDICT
A great colour laser for small workgroups, but extensive use will result in high running costs

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

MULTIFUNCTION DEVICE

Brother MFC-3820CN

A good value package with useful features

Multifunction devices have long had a reputation for being competent all-rounders but far from outstanding in any area. The Brother MFC-3820 aims to reverse this stigma with an assortment of features at a very reasonable price.

It does, however, have low running costs. Its standard black cartridge costs £13.99 (ex VAT) and can print around 500 A4 sheets. Meanwhile, the standard colour cartridge is enough for 400 pages and retails for £7.99.

Despite its budget pricing, it is one of just a handful of multifunction devices that incorporates a built-in Ethernet port allowing you to copy, print, scan and fax over a network. It also includes a four-in-one memory card reader, allowing you to print images directly from common memory cards.

The 3920CN's print quality was of a good standard, but its results were poorer than those of many dedicated inkjet printers. Images looked a bit less saturated than they should have, giving them a pastel appearance. This can be corrected by using high-quality inkjet paper, but this adds expense and is best reserved for more critical print jobs.

Scanning results were solid but not on par with dedicated scanners. Images at 100 per cent zoom looked excellent, but zooming in closer revealed some artefacts. Print speed was also not very impressive. It took three minutes 30 seconds to print a 10-page text document, compared to the 57 seconds taken by the HP PSC 2210 reviewed in our October issue.

On the whole, the MFC-3820 does little to dispel the opinion that multifunction devices are jacks of all trades but masters of none. To its credit, though, it provides a number of useful features in one attractive and relatively compact unit.

Rory Reid

DETAILS

RRP £199 (£164.17 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Brother 0870 830 4030
www.brother.co.uk
SPECIFICATIONS
600 x 2,400 scan resolution, 9,600 x 9,600 print resolution 36bit • Inkjet technology • 11kg • 448 x 585 x 446mm (w x d x h) • Software: Scansoft, Paperport, Textbridge, Presto • USB, Lan connection
PROS 4-in-1 card reader; scan multiple files unattended
CONS Slow prints; output quality
VERDICT
The MFC-3820CN provides good value for money and a comprehensive list of features

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

BLUETOOTH KEYBOARD AND MOUSE

Logitech Dinovo

A great concept with stylish looks

Your average keyboard and mouse aren't very exciting, but Logitech is aiming to change that with its new wireless Dinovo. Finished in a sleek black and metallic grey, it certainly stands out.

A close look reveals that the keypad is separate from the main keyboard and has a small LCD screen. This is so the pad can be used as a standard calculator, with the results being pushed to the Windows clipboard. The screen also displays Windows or MSN Messenger messages, such as new email.

Where it really comes into its own is as a wireless remote. Logitech provides its own media software, which lets you view pictures, listen to music or watch a movie clip in a similar way to Microsoft's Media Center.

The media controls – track skip, play and stop – can also be used to control Windows Media Player and are replicated on the main keyboard. The keypad does have its downsides, though. Most notable is the fact that it doesn't have any legs and lies flat on the desk, which can make it difficult to use.

The main keyboard is very responsive and works really well. The same can be said of the mouse, which has additional buttons to navigate web pages and switch tasks. It's comfortable and is designed to suit both left- and right-handed people.

We did run into some problems with installation, though. Logitech has opted to use Bluetooth, but the bundled software initially kept getting us to perform the pairing operation. At different times, the pairing was lost, and the mouse and keyboard became useless until we paired them with the PC again.

At £200 we didn't expect to run into these kinds of problems. It's a case of a great concept marred by a flaky implementation.

David Ludlow

DETAILS

RRP £199.99 (£170.20 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Logitech 020 7309 0127
www.logitech.co.uk
SPECIFICATIONS
Bluetooth • Separate media keypad with LCD screen • Rechargeable mouse cradle • Scroll wheel mouse • Media control keys • Five-year warranty; Logitech media software
PROS Looks great; feels responsive
CONS Flaky installation; Bluetooth pairing option a pain
VERDICT
It's a great idea and looks the part, but we ran into lots of problems that detracted from the overall package

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

WIRELESS KEYBOARD AND MOUSE

Cherry Cymotion Solar

Solar-powered with extra function keys

Cherry has attempted to breathe a bit of life into its latest wireless keyboard and mouse combo by installing a solar panel in the keyboard. Don't get too excited, though, as the keyboard still requires batteries.

However, the solar panel will trickle-charge the two AA rechargeable batteries to ensure you don't have to replace them every few months. The optical mouse doesn't feature the same solar technology and, to be honest, looks more than a little dated with just the two buttons and a scroll wheel. For such an expensive package, we really expected more features from the mouse.

It's clear that Cherry thinks the average keyboard doesn't have enough keys on it. To put things right, it has crammed in an extra 30 function keys. These include a designated '@' key – presumably for those too lazy to hold down the Shift key – scroll keys, and special 'cut and paste' shortcuts. User-defined actions can be assigned to most of these keys if required.

Cherry describes the keyboard as having 'multi-haptic key areas for optimal actuation feel', which is marketing speak for keys that are supposed to be more ergonomic. While this may well be true, we found that the plethora of extra keys took a bit of getting used to. The problem is that you expect keys such as 'tab' and 'caps lock' to be situated on the edge of the keyboard and, with the extra keys slapped on the edge, erroneous key presses were all too frequent. What's more, it seemed to be a fair bit louder than others we've tested with each key press producing a meaty 'clack' sound.

Unfortunately, the solar panel feels more like a gimmick and does little to make up for the shortcomings of this rather basic keyboard and mouse.

Will Stapley

DETAILS

RRP £68.73 (£58.49 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Scan 0870 755 4747 www.scan.co.uk
SPECIFICATIONS
Solar-powered keyboard • RF wireless • 30 special function keys • Keyboard manager software • 800dpi optical mouse • 4 AA rechargeable batteries supplied
PROS Solar panel should save on batteries
CONS Too many function keys; basic mouse
VERDICT
Overloaded with extra keys, which get in the way and the mouse is rather lacklustre

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

DIGITAL PEN

Nokia SU-1B

Great design and download flexibility

Of the three mainstream digital pens currently available, the Nokia SU-1B is the slimmest and best designed. The larger digital pens are the Logitech Io and the Sony Ericsson Chatpen.

Slim digital pens are preferable – having impressive technical features is less significant if you struggle to write with an unwieldy device. Another design bonus is that you can put a regular Nokia phone charger either into the underside of the USB base or directly into the end of the pen, which is handy if you are travelling.

Digital pens download their stored data either by docking with USB-powered bases or wirelessly via Bluetooth. The Nokia SU-1B at present is the only digital pen that has both USB and Bluetooth options.

The SU-1B stores up to 100 A5 pages that can be downloaded to the Digital Note Viewer. By default the file is saved in pen-generated document (.pgd) file format. 'Save as' opens up other formats including bitmap, png, and jpg.

You can send pages to email applications, Powerpoint and Word from the Digital Note Viewer, but editing is fairly basic In comparison to the Logitech Io software. The Nokia Pen now has the same handwriting recognition trial software as the Logitech pen, which is a useful addition but accuracy depends on the neatness of your writing.

As with all Bluetooth devices, sending an image or note to a paired phone as an MMS (Multimedia Messaging Service) is limited to a range of 10m. However, you can send a note to yourself then forward it to anyone with an MMS-enabled mobile. This separates Nokia's pen from the competition. It scores highly because of the design and download flexibility.

Andrew Swinton

DETAILS

RRP £129.99 (£110.63 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Nokia 08700 555 777 www.nokia.co.uk
SPECIFICATIONS
1MB data memory (100 A5 written pages) • Bluetooth 1.1 • Up to two hours' operation time • Rechargeable Li-Polymer battery • Digital paper types: MMS Pad, B7 size 94 pages, A5 size 94 pages • 35g • 149 x 23 x 20mm (h x w x d)
PROS Compact design; flexible download options
CONS Sparse editing software
VERDICT
The flexibility of either Bluetooth or downloading via USB makes this pen worth having

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

SYMBIAN SMARTPHONE

Nokia 6600

A competent smartphone with good camera

Nokia's 6600 is the third Series 60 Symbian smartphone after the innovative but brick-like 7650, and the eccentric-looking 3650. The tri-band, GPRS/HSCSD 6600 is a return to a more restrained design that wisely drops the circular keypad of the 3650.

At 58.2mm across it is wider than Sony Ericsson's P900 phone, but a reasonable 125g weight doesn't detract from day-to-day use. However, having the menu key on the left edge rather than centrally positioned is odd.

An impressively bright 65,536-colour 16bit TFT display of 176 x 208 pixels should bring a smile to your face. Flip the phone over and a large matt silver disc houses the VGA camera that has several settings, plus a video mode with audio. Video clips are restricted to about nine seconds before auto-saving.

Using the comprehensive PC suite you can link via Bluetooth to transfer video clips and images or to synchronise contacts and calendar, as there is no USB option. The support CD also has Nokia Media Player which plays the video files.

Nokia is targeting corporate users with the 6600. Its benefits include being able to control a Powerpoint presentation on the 6600 via Bluetooth with Nokia Wireless Presenter at a cost of €39 for the download. Generous support for eight Bluetooth profiles means that the 6600 can be paired with most Bluetooth devices.

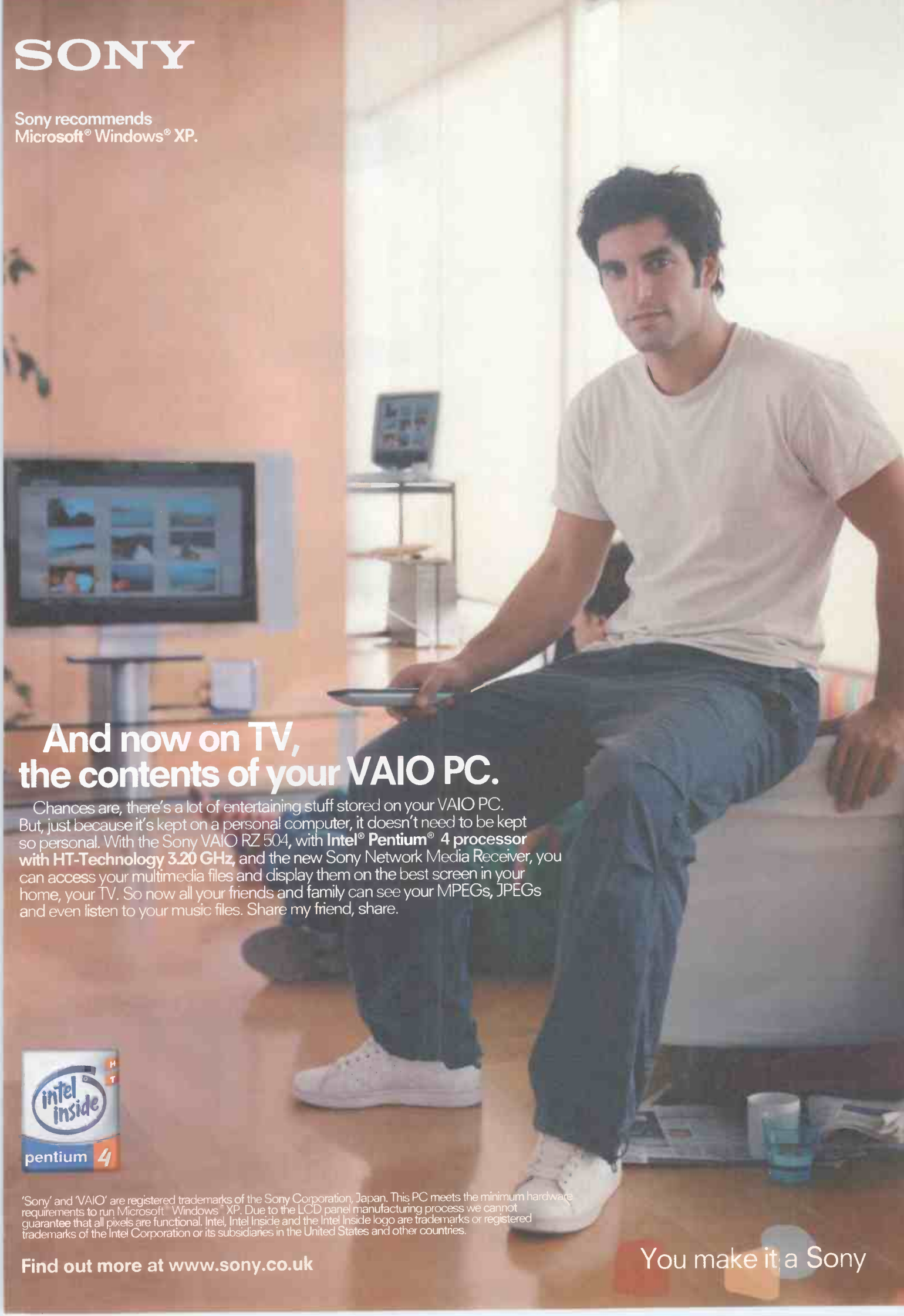
The xHTML browser also supports secure email access via 128bit SSL encryption and a mobile VPN. There is also a full version of the Opera browser, which reformats web pages to fit to the scale of a mobile screen. A 32MB removable MMC (Multimedia Card) sits under the battery. This is a competent phone from Nokia, but far from outstanding.

Andrew Swinton

DETAILS

RRP £99.99 (£85.10 ex VAT) (Carphone Warehouse)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Nokia 08700 555 777 www.nokia.co.uk
SPECIFICATIONS
Symbian OS • 65,536-colour screen • Real One Player • Bluetooth, infra-red • 6MB internal shared memory • 32MB MMC card • xHTML & Opera • Java MIDP 2 support • Battery: talk 2-4 hours, standby 150-240 hours • 108.6 x 58.2 x 23.7mm (h x w x d)
PROS Video with audio; MMC card
CONS No USB; menu key position
VERDICT
Understated design, good camera and excellent Bluetooth make this a competent smartphone

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


SONY
Sony recommends
Microsoft® Windows® XP.
And now on TV,
the contents of your VAIO PC.
Chances are, there's a lot of entertaining stuff stored on your VAIO PC. But, just because it's kept on a personal computer, it doesn't need to be kept so personal. With the Sony VAIO RZ 504, with Intel® Pentium® 4 processor with HT-Technology 3.20 GHz, and the new Sony Network Media Receiver, you can access your multimedia files and display them on the best screen in your home, your TV. So now all your friends and family can see your MPEGs, JPEGs and even listen to your music files. Share my friend, share.
intel inside
pentium 4
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PORTABLE HARD DISK

Lacie Mobile Hard Drive

Lightweight, compact and well priced

Lacie's Pocketdrive range of portable hard disks has proved popular with many users, thanks to the rugged design that makes them very tough and reliable.

The Pocketdrives are rather expensive, though, so Lacie has come up with a cheaper range of portable drives as an alternative. Designed by the renowned FA Porsche design agency, the new Mobile Hard Drive is a sleek, slimline unit measuring just 17mm high, 76mm wide and 129mm deep. That makes it about the size of a Palm PDA, so it's easy to carry in a pocket or slip into carrying bag. At 200g it's very light and certainly not a burden to lug around.

Installation is very easy, as the drive is recognised automatically by Windows ME or above. For Windows 98 there's a utility called Silver Lining, which acts as both driver and diagnostic software. The only minor oddity is that there's no support for Windows NT.

Our review unit had a capacity of 80GB and a Firewire interface, although there are 20GB and 40GB models also available. Lacie also provides a choice of either Firewire or USB2 interface, with the latter version likely to appeal more to PC users.

The drive's minimalist design certainly makes it a good choice for the mobile computer user and, as it's bus powered, there's no need to carry a power supply around.

However, it's definitely not as rugged as the Pocketdrive, so you may still prefer to pay a bit extra to get the tougher product.

If you're not working on a building site, you'll find that the Mobile Hard Drive provides an extremely lightweight and compact storage device at an attractive price.

Cliff Joseph

DETAILS

RRP £250 (£212.76 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Lacie 020 7872 8000
www.lacie.co.uk
SPECIFICATIONS
76 x 129 x 17mm (w x d x h) • 200g • 4,200rpm hard disk • Firewire or USB2 interface • Bus powered
PROS Extremely lightweight and compact portable hard disk
CONS 4,200rpm drive delivers average performance; less rugged than Pocketdrive
VERDICT
There are plenty of cheaper drives available, but the Mobile Hard Drive is hard to beat for sheer portability

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

STORAGE

Digimagic DM220

Bulky, but a simple and economical choice

The shift from traditional to digital photography presents as many problems as it solves. Most prevalent are the cost of storage and the complexity of getting images from camera to PC or other storage away from home.

The Digimagic DM220 attempts to solve these problems by incorporating a memory card reader with an otherwise standard USB CD rewriter. The principle of copying Flash memory directly to a blank disc is simple but effective. Compact Flash and Microdrive cards can be plugged directly into the Digimagic's card slot, whereas Memory Stick, Multimedia Card, Secure Digital and Smart Media cards can be connected by means of a four-in-one adapter.

Getting data from your memory cards to a blank CD is simple. The Digimagic has a single button for copying files, and can do this without being connected to a PC. Once the process is complete, a buzzer informs you that the file transfer is complete. Various LEDs offer feedback on potential errors, such as a full disc.

We tested the 24-speed version of the Digimagic with a standard 64MB Smart Media card and managed to get all our data across in just over two minutes, although the manufacturer claims a full 512MB card can be copied in less than seven minutes. Users without large capacity cards can copy images to a multi-session disc in segments, maximising the space available on a CD.

The Digimagic is bulky, but at just 600g it is lightweight and has an optional carry bag with a battery pack that uses four AA batteries. An assortment of high-capacity memory cards is a more convenient way to store images, but the low price of blank CDs makes this a more economical form of data storage.

Rory Reid

DETAILS

RRP £199 (£164.17 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Card Media 0870 240 6574
www.vosonic.com
SPECIFICATIONS
Digital camera Flash memory card compatibility: Compact Flash Type I/II, Microdrive, Smart Media, Multimedia Card, Secure Digital, Memory Stick (xD picture cards via an adapter) • USB2 interface • Four rechargeable AA Ni-MH batteries in a battery pack • 150 x 190 x 35mm (w x d x h) • 600g (without battery pack)
PROS Battery-powered; easy to use
CONS A bit on the large side
VERDICT
A potentially money-saving way of backing up data on the move

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

MINI ROUND-UP

Hard disks

Is it worth making the move from ATA to Sata? We find out by testing nine devices

The price of Hitachi's ATA drive is high, but it still gets our vote

Maxtor's ATA offering is the only 5,400rpm device in this round-up

The ATA drive from Seagate put in a disappointing performance

Western Digital's ATA device is cheap at only 50p per GB of storage

There is a good chance that the next hard disk you buy will have more storage space than the sum of all the hard disks and PCs that you have ever owned. It'll probably also be amazingly good value for money. Western Digital's Caviar 200GB ATA100, for instance, costs £99 inc VAT – less than 50p per GB. That makes hard disk storage almost as cheap as recordable CD, which is mind-boggling when you consider the precision engineering that goes into each hard disk.

Once you have a huge amount of storage space, the way you use your PC changes, particularly if you have a broadband Internet connection. You can retain draft documents and have huge photo libraries and it becomes second nature to run every new audio CD through your PC. If you download new drivers and application patches, it makes sense to keep a library of files, so you can solve any problems later on. It also speeds up the reinstallation of Windows.

Then there are games and, of course, Windows wants between four and 12 per cent of the drive for System Restore files. You also need to keep 10 per cent of the disk empty just so Windows can defrag it. A 100GB hard disk can suddenly start to look a bit full.

Hard disk capacities are getting larger, but they are also going through a transition from ATA to Serial ATA (Sata). At present this means Sata drives use an 8mm cable, compared to 50mm ribbon cables. This has major benefits for PC assembly, as the new cables make it easier to manage airflow inside the case and so cool components, but it makes very little difference to the drive itself.

Theoretically Sata150 offers a maximum bandwidth of 150Mbytes/sec, but in practice using ATA100 isn't a restriction, as it is rare to find a hard disk that can top 50Mbytes/sec consistently. Even Raid arrays struggle to pass 80Mbytes/sec.

It is also unlikely that many desktop users will get much benefit from Sata's hot-plug feature, if only because it is safer to shut down your PC before you swap hard disks.

Tagged or Command Queuing (think of it as Hyperthreading for hard disks), is also fairly irrelevant for a single hard disk, although it has performance benefits in a Raid environment.

Sata should interest small businesses that need lots of fast Raid storage, without the expense of SCSI. For desktop users the single largest benefit is the move to slim data cables. In time faster versions of Sata and smaller form factors of hard disk will come to market.

Testing the nine hard disks in this round-up was tricky as performance varies depending on the type of work the drive is doing. We used PCmark04's hard disk test suite, which tests performance for XP start-up (disk activities during start-up); application loading (opening and closing Word, Acrobat Reader 5, Media Player, 3Dmark 2001SE, Winfast DVD and the Mozilla browser); copying 400MB of files; and general hard disk usage (file encryption, virus scanning, playing audio and movie files, using a browser and loading, playing and exiting Tom Clancy's Ghost Recon). Due to space restrictions we've only printed the results (opposite) for the overall and application loading tests.

ATA DRIVES

Hitachi Deskstar 7K250 250GB ATA100

This is the first drive released by Hitachi since it took over IBM's storage division. The drive is based on platters that each give 83GB of storage, squeezing 250GB from three platters in this version. Smaller versions are available, down to 40GB.

The 7K250 is a conventional modern design with an 8MB cache, Fluid Dynamic Bearings (FDB), a 7,200rpm spindle speed and an ATA100 interface. The spindle speed results in an average latency of 4.17ms. The claimed average seek time of 8.5ms is no better than the Seagate Barracuda 7200.7, yet the Hitachi was consistently fast in all sections of the tests, while running quietly and no hotter than the other drives here.

The key to this drive's success lies in the medium (the coating on the platters that stores your data). IBM developed Pixie Dust technology (the sandwiching of a one-atom-thick layer of ruthenium between layers of magnetic material) and Hitachi has developed this so it uses an extra layer of these materials, which is five atoms thick.

Add in a proven history of developing accompanying technologies, such as Giant Magnetoresistive (GMR) read/write heads and you have a surprisingly good hard disk.

For a 250GB drive, £170 is a high price. Despite that small reservation, we give the ATA100 7K250 a Recommended award.

Maxtor Diamond Max 16 250GB ATA133

The Maxtor Diamond Max 16 250GB ATA133 is the only 5,400rpm drive here. It's also only one of two with a 2MB cache instead of 8MB. It uses ball bearings, comparing poorly with most of the drives that sport FDB technology. The latter offers a higher resistance to shock loadings. The fact that the Diamond Max 16 has an ATA133 interface is effectively a red herring as this drive isn't fast enough to need any more than ATA100, but Maxtor adopted ATA133 some time ago.

The Diamond Max 16 faced an uphill struggle with such a lowly spec, but to add to its woes Maxtor has saddled it with a steep £229.90 price, which is £60 more than the superb Hitachi 7K250. This is far too expensive for a drive of this calibre. The one thing it has in its favour is the three-platter 250GB design, and its 83GB per platter density, but this isn't unique.

In our tests the Maxtor failed to impress, but it is only fair to point out that Microsoft's recommended system spec for the Windows XP start-up test includes a 7,200rpm hard disk. Our tests results bear that out and we suggest you only consider the Diamond Max 16 as an extra data storage drive.

Seagate Barracuda 7200.7 120GB ATA100

It's hard to distinguish the Seagate 7200.7 from the Hitachi 7K250. This 120GB drive uses two platters and three heads, so it is essentially half a 7K250 with the same 80GB per platter density. That should make it a nippy performer, but our tests painted a very different picture.

This drive was consistently towards the bottom of the performance charts, along with its Sata brother. This is a bitter disappointment and our results mean that we have to query Seagate's claimed average seek time of 8.5ms, as it is even slower than Western Digital's ATA100 drive's 9.9ms.

Something doesn't add up and, to make matters worse, it isn't particularly cheap. It's not expensive in either cash terms or cost per GB, but with these performance levels the 7200.7 needs to be a steal to make it desirable. It is possible that Seagate will be able to improve the 7200.7 with a firmware update, but for now we suggest you avoid it.

Western Digital Caviar WD2000BB ATA100

Western Digital knows that its WD2000BB isn't particularly fast, but it's cheap. This was the first drive to hit the 200GB mark in late 2002, using three platters with a 66GB density. At the time this was impressive but, compared to more recent drives using up to 83GB per platter, this is no longer the case.

The proof is in the 9.9ms average seek time. In addition, the drive only has 2MB of cache and it continues to use ball bearings in the motors, as Western Digital has been slow to adopt FDB motors. This makes the WD2000BB look rather aged. It battled with the two 7200.7 models for the title of 'slowest drive in the round-up'. Western Digital seems to be well aware of this situation and has cut the price to £99, making this an incredibly cheap drive that costs just under 50p per GB, so despite its age you cannot afford to ignore this model if you're looking for a secondary drive.

SATA DRIVES

Hitachi Deskstar 7K250 250GB SATA150

The second 250GB Hitachi 7K250 is a Sata drive. However, its spec is nearly identical to the ATA100 model. It uses a parallel-to-serial bridge chip, just like the Sata offerings from Maxtor and Western Digital.

The Sata offering from Hitachi has a lot to offer, but is expensive

Maxtor's Sata drive did better in our tests than we expected

Serial power and data connectors sit on the back of the drive, as well as a legacy Molex four-pin power connector. This gives you the best of all worlds as you can power the drive using either connector.

If you have an old power supply you can use the Molex connector, but get the benefit of the slender serial data cable. If you use a power supply with serial connectors, or a power adapter, you get the benefit of hot plugging.

Frankly it doesn't matter how the manufacturer adopts serial technology so long as there isn't a performance penalty. Here, Hitachi scored strongly. The Serial 7K250 performs in a very similar fashion to its ATA100 sibling. However, we got one odd result in application loading which hurt the overall score.

Our biggest concern is the £29 premium that Hitachi charges for the privilege of those serial connectors. This makes the drive unattractive, which is a shame it has so much to offer for people who are keen to move over to Sata.

Maxtor Diamond Max Plus 9 200GB SATA150

Just like Hitachi, Maxtor uses a bridged solution inside the 200GB Diamond Max Plus 9, so it can offer the drive in both ATA and Sata150 forms. Again, the Sata version has both serial and legacy power connectors.

The Max Plus 9 series ranges in capacity from 60GB to 200GB, using a relatively low 63GB per platter density, which hurts seek time a little. No doubt Maxtor hopes the ATA133 interface and 8MB cache will help it a little in burst tests. It certainly performed rather better in our tests than we would have predicted.

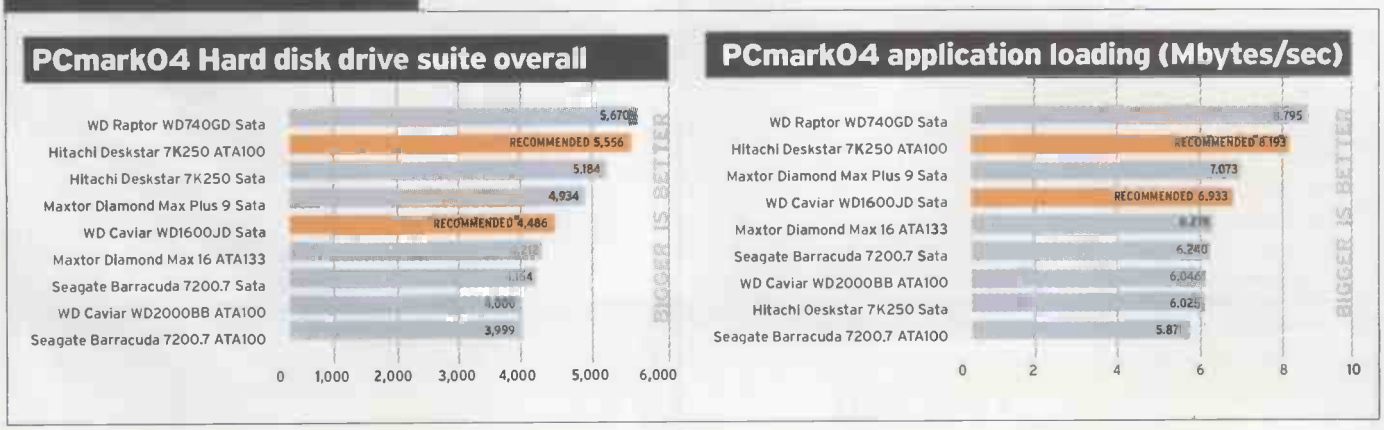
The real sticking point, again, is the price. Maxtor quotes £189.90. A cheaper price would have made a massive difference.

Seagate Barracuda 7200.7 120GB SATA150

The 120GB Seagate 7200.7 ST3120026AS is the only native Sata design here and it caused some geeky excitement in the Labs as it gave us the perfect opportunity to directly measure the impact of the parallel-to-serial bridge chip used by others.

Lab results

vnu labs



For the best prices for hard drives, go to www.pcw.co.uk/bestprices

Seagate's Sata drive caused some excitement in the Labs

Western Digital's Caviar Sata drive wins a Recommended award

The Raptor from Western Digital has enormous potential but is pricey

The excitement lasted until we saw the test results. The drive was slightly faster than the 7200.7 ATA100 model, but that isn't saying much.

There is only a serial power connector, which could cause problems, as so few power supplies have these connectors.

The one glimmer of hope is that Seagate only charges a £7 premium over the ATA100 version, but even that seems a little odd as you might expect a native serial drive to sell at a discount instead of a premium.

Western Digital Caviar WD1600JD Sata150

The 160GB Western Digital Caviar JD has benefited from astute parts-bin engineering. The 'D' suffix on the model code denotes that this is the Sata version of the 8MB cache JB drives that are often marketed as an SE version of the original 2MB BB drives. All that alphabet soup shows that the WD1600JD is the result of steady evolution, instead of radical new design. Inside the casing Western Digital has improved the drive in the most important areas.

Once again, this is a bridged design with both serial and legacy power connectors.

This 160GB version uses a two-platter design with four heads, to give it a competitive areal density, although Western Digital claims a slow 9.9ms seek time. Despite that, it performed well, and gave the Seagate drives a hiding.

When you factor in the low £89 price of this drive and its tiny 56p per GB cost, it is hard not to be impressed, and this makes the product worthy of a Recommended award.

Western Digital Raptor WD740GD 74GB Sata150

Our final hard Sata drive is a bit of an oddball, with elements of Sata and SCSI technologies, all rolled up in an aggressive name, the Raptor.

With a 10,000rpm spin speed and using 3in diameter platters, the 74GB WF740GD borrows a few ideas from SCSI drives. It gets rather hot and is the noisiest drive here, although well within acceptable limits.

The first Raptor was a single-platter design with a capacity of 36.7GB, which was too small for desktop use. This twin-platter 74GB design makes the Raptor far more interesting. Western Digital has also used the update to quieten the drive slightly, and to speed up its access times.

The company markets the Raptor as an Enterprise Sata drive and it is targeted at small businesses that need high-performance storage, but don't want the expense of SCSI.

The relatively small capacity of Raptor means it is likely to be used in a Raid array of two or more drives. This should bring further speed increases from the Command Queuing feature, as soon as disk controllers arrive.

Mind you, a Raid array of Raptors won't be cheap at £177 per drive. The real surprise is that Raptor wasn't a clear-cut victor in our tests. Enterprise drives don't produce their full benefit in single-drive configurations, but that is how most of us use our PCs so that is how we tested it.

The price will dissuade many people and the small capacity will scare off a few more, but the Raptor is a Sata drive with enormous potential.

Our verdict

We're on the verge of a move from ATA to Sata, but at present the new technology doesn't offer a compelling reason to make the jump.

The two Hitachi 7K250 drives impressed us. However, neither is cheap. The £29 premium charged for the Sata version is excessive, so our vote goes to the ATA100 drive, which offers excellent performance and good value for money.

Western Digital has an interesting take on Sata. Its WD1600JD isn't particularly fast, but holds its own in tests and backs that up with an amazingly low price that gives superb value for money. The fact that it is a Sata drive is almost incidental, but the slender serial data cable is very welcome.

Leo Waldock

MANUFACTURER	HITACHI	HITACHI	MAXTOR	MAXTOR	SEAGATE	SEAGATE	WESTERN DIGITAL	WESTERN DIGITAL	WESTERN DIGITAL
MODEL NAME	DESKSTAR 7K250 (SATA)	DESKSTAR 7K250 (ATA)	DIAMOND MAX PLUS 9 (SATA)	DIAMOND MAX 1 (ATA)	BARRACUDA 7200.7 (ATA)	BARRACUDA 7200.7 (SATA)	CAVIAR (ATA)	CAVIAR (SATA)	RAPTOR (SATA)
Full model code	HDS722525 VLSA80	HDS722525 VLAT80	6Y200M0	4A250J0	ST3120026A	ST3120026AS	WD2000BB	WD1600JD	WD740GD
Price inc VAT (ex VAT)	£199 (£169.36)	£170 (£144.68)	£189.90 (£161.62)	£229.90 (£195.66)	£73 (£62.13)	£80 (£68.09)	£99 (£84.26)	£89 (£75.74)	£177 (£150.64)
Phone	020 7133 032	020 7133 032	01923 712448	01923 712448	01628 890366	01628 890366	01372 360055	01372 360055	01372 360055
URL	www.hgst.com	www.hgst.com	www.maxtor.com	www.maxtor.com	www.seagate.com	www.seagate.com	www.wdc.com	www.wdc.com	www.wdc.com
Interface	SATA150	ATA100	SATA150	ATA133	ATA100	SATA150	ATA100	SATA150	SATA150
Power connector type	Molex & serial	Molex	Molex & serial	Molex	Molex	Serial	Molex	Molex & serial	Molex & serial
Capacity	250GB	250GB	200GB	250GB	120GB	120GB	200GB	160GB	74GB
Rotational speed	7,200rpm	7,200rpm	7,200rpm	5,400rpm	7,200rpm	7,200rpm	7,200rpm	7,200rpm	10,000rpm
Cache size	8MB	8MB	8MB	2MB	8MB	8MB	2MB	8MB	8MB
Platters/heads	3/6	3/6	3/6	3/6	2/3	2/3	3/6	2/4	2/4
Average latency/seek time	4.17/8.5ms	4.17/8.5ms	4.2/9.3ms	5.6/12.6ms	4.16/8.5ms	4.16/8.5ms	4.2/9.9ms	4.20/9.9ms	2.99/5.2ms
Bearing type*	FDB	FDB	FDB	Ball Bearing	FDB	FDB	Ball Bearing	Ball Bearing	FDB
Cost per GB inc VAT	80p	68p	95p	92p	61p	67p	50p	56p	£2.39
SCORES									
Performance	★★★★★	★★★★★	★★★★☆	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★★★
Value for money	★★★☆☆	★★★★☆	★★☆☆☆	★★☆☆☆	★★★★☆	★★★★☆	★★★★★	★★★★★	★☆☆☆☆
Overall	★★★★☆	★★★★★	★★★☆☆	★★☆☆☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆

* FDB = Fluid Dynamic Bearing

SONY
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DVD+Recorder
Dual RW Compatible
DVD+RW/DVD-RW
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BAREBONES SYSTEM

Iwill XP4 Evo

If you are on a budget but want to build your own small form factor PC, try this out

The small form factor (SFF) PC revolution shows no sign of slowing down, with more and more manufacturers trying to gain footholds in the market. One of the latest to appear is the XP4 Evo from Iwill.

It's a barebones system, so you don't have to worry about what motherboard or power supply to use, as these are already installed.

At the heart of the XP4 Evo is one of Iwill's own motherboards based around Intel's i845GV chipset. This has integrated graphics, which you're stuck with, as there's no AGP slot. Further expansion can only be carried out through the full-size PCI slot.

The choice of chipset means the XP4 Evo is never going to form the basis of a performance monster or a hardcore gamer's system, but rather it will make a steady reliable platform. The choice of processor is limited to 400/533MHz front-side bus (FSB) speed Pentium 4s and 400MHz FSB Celerons. You may have to take care with your choice of processor, however, due to the small power supply. There's also not much room between an installed optical drive and the processor heatsink. A better idea would be to use a third-party low-profile heatsink rather than the standard Intel one.

Memory is limited to a single Dimm slot, which can house a single module of PC1600 or PC2100 DDR memory up to 1GB in size.

To house drives there are two fixed bays: a 3.5in internal and a 5.25in one with external access. This bay is masked by a dropdown door, which prevents a regular optical drive from spoiling the look of the case. It's disappointing that there's no external 3.5in drive bay, as there's no way to fit a floppy drive or, more commonly, a memory card reader. This limits solid-state removable media to USB memory keys.

Fitting a hard disk and optical drive is not without problems, though. The data cables are tricky to install, as connectors on the motherboard sit at 90° to the drives directly under them. It's definitely a case of fixing cables in place before trying to install any drives.

The only integration apart from the graphics is the Lan controlled by a Realtek 8100 chipset, which supports 10 or 100Mbits/sec speeds, and the audio again controlled by a Realtek chip, in this case an ALC655.

Iwill has fitted a 220w power supply in the XP4 Evo which uses a ball bearing fan, while a second smaller case fan sits under it. The good news is that both of these are whisper quiet.

The northbridge is also passively cooled so with a quiet CPU fan you can make this a silent system; just the thing for a PVR (Personal Video Recorder) or DVD player.

The chassis is constructed from a thin grade of aluminium, which doesn't make it feel as solidly built as most of its competitors. The overall look is pleasant enough; the case cover is finished in an attractive brushed aluminium look. It's held in place by three thumb screws, while the front bezel has a blue plastic panel covering most of it, save for a silver coloured section which holds the power and reset buttons and a push-open door behind which are two USB2 and two audio ports.

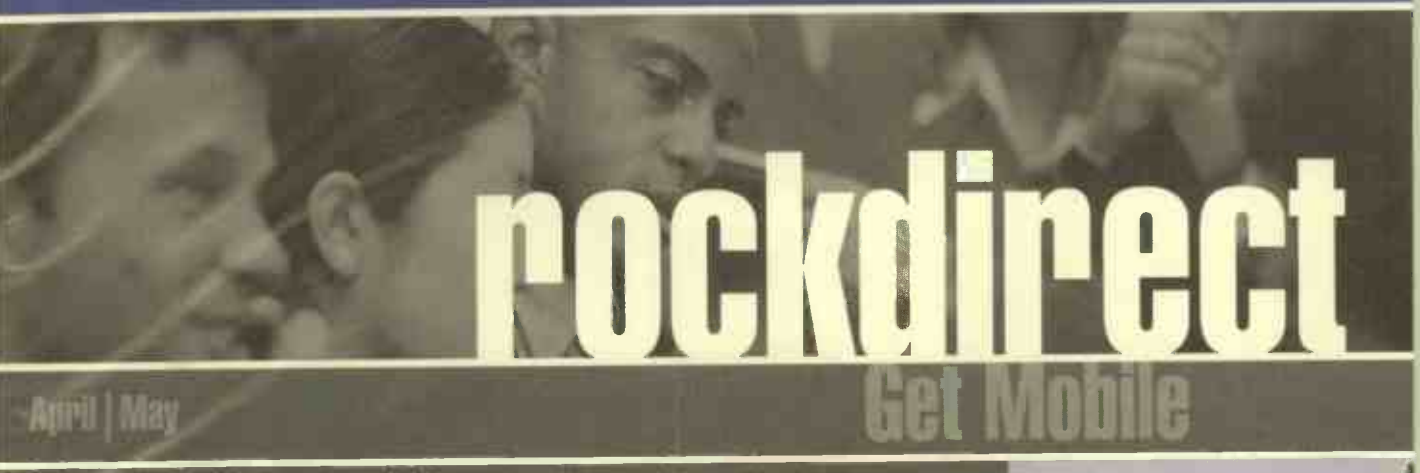
The small components box holds a well-written manual, data cable and mounting screws. Iwill's XP4 Evo lacks a lot of the features found in other SFFs from the likes of Shuttle, Biostar and Aopen but, on the other hand, it is cheap and ideal for anyone who wants build a basic, compact PC with older components they may already have.

Simon Crisp

DETAILS

RRP £125 (£106.38 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
PC Nextday www.pcnextday.co.uk
SPECIFICATIONS
Intel Pentium 4 and Celeron • Intel i845GV motherboard • Single memory slot • Integrated 4x AGP • Audio support AC97 • Single PCI slot • 4 USB2, 2 PS/2, parallel, serial, VGA, Lan, 5 audio (three in rear panel, two in front panel)
PROS Low price
CONS Limited integrated features; no AGP slot
VERDICT
Iwill's XP4 Evo is a low-cost solution for those on a tight budget who want to build a basic SFF PC

BUILD QUALITY	★★★☆☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★☆☆



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April | May

Get Mobile

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INTRODUCING

NEW **Quaddra Ti**

THE PINNACLE OF NOTEBOOK PERFORMANCE

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ATI MOBILITY RADEON 9700

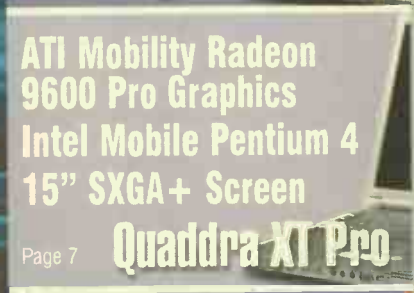
SEE PAGE 5 FOR FULL SPECIFICATION

17" WXGA Widescreen
ATI Mobility Radeon 9600 Pro Graphics
Intel Mobile Pentium 4

Page 4 **Quaddra DTS Pro**

Intel Centrino Mobile
Up to 7hrs battery
from only
£799 Exc VAT

Page 8 **Pegasus CTS**



ATI Mobility Radeon 9600 Pro Graphics
Intel Mobile Pentium 4
15" SXGA+ Screen

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Page 11 **Xtreme**

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Page 9 **Pegasus DTS Pro**

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When choosing your notebook supplier, don't be taken in by headline price. There are other factors to consider! In addition to inflated delivery charges, other notebook manufacturers often have additional hidden charges for items, which when taken into account, mean that you could be paying over the odds for your solution. Check that your operating system, carry case and office software are included in the price. They may also charge premium rates for their technical support phone line and should your notebook develop a fault you could incur parts, labour and courier charges if these are not included in the warranty. Read the small print and check with your supplier to ensure there are **NO HIDDEN CHARGES.**

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Rock notebooks are tailor made to suit your individual requirements.

On receipt of your order and your payment confirmation, you will receive your notebook within 72 hours.

Prices taken from:
February 04 issue magazines

3 Year Collect & Return Warranty

Can you put a price on peace of mind? ...Other manufacturers think you can!

Other notebook manufacturers may charge in excess of £200 + VAT to customers who wish to upgrade a standard warranty to that of an equivalent to Rock's unique support package, which incidentally, comes as standard with any notebook purchase.

rockdirect is still the ONLY notebook manufacturer to supply a 3 Year (INSURANCE BACKED) COLLECT AND RETURN WARRANTY (covering all parts and labour) on its entire notebook range as standard.

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Our 3 year warranty is only part of our after sales package. As well as our fantastic warranty, you'll also receive lifetime telephone support and 24hr on-line support. So you can be sure that, whichever Rock notebook you choose, you really will be getting the finest warranty package available in the UK today -

...and a great long-lasting relationship.

Lifetime Telephone and On-line Support

Latest Award Wins

What Laptop | April 2004 | Gold Award
"More than capable of handling our test offering good features and performance at an attractive price."

Computer Shopper | April 2004 | Best Buy Award
"Rock's Xtreme XTR 3.2 is, for us, the best gaming notebook available at present."

ICT in Education | April 2004 | Editor's Choice Award
"With its mix of lightweight design and power processing, the Pegasus CTS offers a laptop that meets the needs of the modern user."

What Laptop | December 2003 | Best Service & Support Award
"rockdirect was one of the first UK companies to offer a three year warranty as standard on its laptop range. This has not only helped differentiate the company's products from everyone else's but has proven a popular buying incentive, making the company a worthy winner."

Deloitte & Touche | November 2003 | UK's Number 1 Leading Notebook Manufacturer
"rockdirect has been ranked 21st as one of the fastest growing Technology Companies in the Deloitte & Touche Fast 50 Awards 2003."

Laptop | October 2003 | Best Buy Award
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FIRST EVER 256MB GRAPHICS DEBUTS IN THE ROCK QUADDRA Ti

Rockdirect continue to lead the industry by incorporating the new ATI MOBILITY™ RADEON™ 9700 GPU into their award winning product portfolio. Working closely with ATI to launch the new graphics technology, rockdirect has launched a new product to suit the Quaddra Ti.

The new Quaddra Ti is the perfect advanced workstation incorporating all the latest notebook technologies featuring an 800MHz FSB, processing power up to 3.4GHz, RAID1 Hard Drive technology and the first ever 256Mb graphic GPU *(See page 5 for full product details)*.

The ATI MOBILITY™ RADEON™ 9700 GPU, delivers the highest standards of performance required by the most demanding notebook users. It has more processing power than ever before seen in a notebook graphic card. It redefines the mobile computing experience for the next generation of home & business users.

Unprecedented Graphic Processing Power in a Notebook

- *Low-K Technology delivers the fastest mobile performance and longer battery life*
- *Up to 30% faster than its highly acclaimed predecessor*
- *Supports the Microsoft® DirectX® 9.0 programming standard which will drive the most demanding next generation games*
- *Enough processing power to turn your notebook into a mobile video-editing studio*

Share the Visual Wealth

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512Mb 333 - 1Gb 333 DDR
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512Mb 333 - 1Gb 400 DDR
£130 Ex VAT £152.72 Inc VA

60Gb - 80Gb HDD
£50 Ex VAT £58.75 Inc VAT

80Gb 4200rpm - 80Gb 5400rpm
£25 Ex VAT £29.38 Inc VAT

XP Home - XP Pro
£50 Ex VAT £58.75 Inc VAT

SONY Multi-Format DVD Writer
£100 Ex VAT £117.50 Inc VAT

TV Tuner
£99 Ex VAT £116.33 Inc VAT

Bluetooth Module
£40 Ex VAT £47 Inc VAT

For further upgade options please call

Quaddra DTS Pro
Configurations & Pricing

Model: QDTSP-2.8

Intel Mobile Pentium 4 2.8GHz
Microsoft Windows XP Home
512Mb DDR333 RAM
60Gb HDD
17" WXGA TFT Screen
128Mb ATI Radeon 9600 Pro
DVD/CD-RW Combo Drive
Built In Video Camera
3yr Collect & Return Warranty

£1099 Exc VAT
£1291.33 Inc VAT

Model: QDTSP-3.2

Intel Mobile Pentium 4 3.2GHz
Microsoft Windows XP Home
512Mb DDR333 RAM
80Gb HDD
17" WXGA TFT Screen
128Mb ATI Radeon 9600 Pro
DVD Writer
Built In Video Camera
3yr Collect & Return Warranty

£1299 Exc VAT
£1526.33 Inc VAT

Model: QDTSP-3.06

Intel Mobile Pentium 4 3.06GHz
Microsoft Windows XP Home
512Mb DDR333 RAM
80Gb HDD
17" WXGA TFT Screen
128Mb ATI Radeon 9600 Pro
DVD/CD-RW Combo Drive
Built In Video Camera
3yr Collect & Return Warranty

£1199 Exc VAT
£1408.83 Inc VAT

Main Specification Quaddra DTS Pro

Up to Intel® Mobile Pentium® 4 3.2GHz Processor
- Featuring Intel® SpeedStep™ and HyperThreading™ Technology
Microsoft® Windows® XP Home
Up to 2GB DDR333 RAM
Up to 80Gb Ultra DMA Hard Drive
17.0" WXGA TFT Screen *(1440 x 900 Res)*
128Mb ATI Mobility Radeon 9600 Pro Graphics
5.1 DTS Sound Output
5 Speaker System including Subwoofer
Built In Video Camera
DVD/CD-RW Combo Drive
Sony Multi Format DVD Writer *(Optional)*
Bluetooth Module *(Optional)*
6 in 1 Card Reader
Gigabit LAN & 56k Modem
Firewire & 2 x USB 2.0 Ports
Ability Office & Anti Virus Scan
Carry Case
Dimensions: 393 x 275 x 36mm
Weight 4.2Kg *(including battery)*
3yr Collect & Return Warranty

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Quaddra Ti & DTS PRO

Introducing the new Quaddra Ti. Feature rich, this outstanding notebook is the ultimate workstation. Whether used as a Powerful Presentation Tool or as a Digital Entertainment Centre, the new Quaddra Ti has all and more to offer the serious notebook user.

The Quaddra Ti incorporates the latest in notebook technology, with up to 3.4GHz 800FSB raw processing power and introducing the new state of the art ATI Mobility Radeon 9700 graphics CPU offering 256Mb of video memory. The impressive spec also includes RAID1 hard disk drive technology, DUAL DDR 400 RAM and a built in 7-in-1 card reader as standard making the Quaddra an ideal powerhouse.

For amazing presentations or the full home cinema experience the Quaddra Ti boasts a luxurious 17" Widescreen to really enhance your visual computing experience. It offers the same viewing area as a 19" CRT monitor with a resolution of 1440 x 900 pixels. The Quaddra Ti also boasts 5 internal speakers including a removable Subwoofer for the best quality sound available.

1024 x 768 Resolution

1280 x 854 Resolution

17" Super Wide WXGA - 1440 x 900

rockdirect recommends Microsoft® Windows® XP

Quaddra Ti Main Specification

Up to Intel® Mobile Pentium® 4 3.4GHz Processor
- Featuring Intel® SpeedStep™ and HyperThreading™ Technology
Microsoft® Windows® XP Home
Up to 1GB Dual DDR RAM
Up to 80Gb Ultra DMA Hard Drive
- Featuring RAID1 (Hard Drive Fault Tolerance System)
17.0" WXGA TFT Screen *(1440 x 900 Res)*
256Mb ATI Mobility Radeon 9700 Pro Graphics
802.11g Integrated Wireless Technology
5.1 DTS Sound Output
5 Speaker System including removable Subwoofer
Sony Multi Format DVD Writer
Built in Bluetooth Module & 7-in-1 Card Reader
Gigabit LAN & 56k Modem
Firewire / 3 x USB 2.0 Ports / DVI Port
Ability Office & Anti Virus Scan
Executive Carry Case
Dimensions: 393 x 280 x 42mm
Weight 3.9Kg *(including battery)*
3yr Collect & Return Warranty

Quaddra Ti Configurations & Pricing

Model: QTi-3.0
Intel Mobile Pentium 4 3GHz
Microsoft Windows XP Home
512Mb Dual DDR RAM
60Gb (7200rpm) HDD
17" WXGA TFT Screen
256Mb ATI Radeon 9700
DVD Writer
Executive Carry Case
3yr Collect & Return Warranty

£1399 Exc VAT
£1643.83 Inc VAT

Model: QTi-3.4
Intel Mobile Pentium 4 3.4GHz
Microsoft Windows XP Home
1Gb DDR400 RAM
60Gb (7200rpm) HDD
17" WXGA TFT Screen
256Mb ATI Radeon 9700
DVD Writer
Executive Carry Case
3yr Collect & Return Warranty

£1699 Exc VAT
£1996.33 Inc VAT

- 17" 1440 x 900 resolution widescreen display offers greater working space and boosts multimedia enjoyment.
- Hardware Raid 1 provides a mirror backup of your data.
- Built in 7-in-1 Card Reader supports SD/MMC/MS/SM/CF/Micro Drive/XD Picture Card provides a fast and convenient way to transfer your data.
- Duel Channel DDR System Memory supports 266/333/400MHz, providing the best match for all Intel Processor types.
- Built in Bluetooth Module and 802.11g Wireless Module, take care of wireless communications.

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VIDEO CAMERA ABOVE SCREEN

Quaddra XT
Configurations & Pricing

Model: QXT-3.06

Intel Mobile Pentium 4 3.06GHz
Microsoft Windows XP Home
512Mb DDR RAM
60Gb HDD
64Mb ATI RADEON 9000
15" SXGA+ TFT Screen
DVD/CD-RW Combo
Ability Office & Anti Virus
3yr Collect & Return Warranty

£899 Exc VAT
£1056.33 Inc VAT

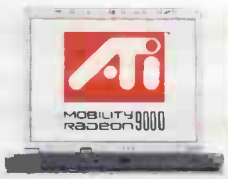
Model: QXT-3.06 DVD-R

Intel Mobile Pentium 4 3.06GHz
Microsoft Windows XP Home
512Mb DDR RAM
60Gb HDD
64Mb ATI RADEON 9000
15" SXGA+ TFT Screen
DVD Writer
Ability Office & Anti Virus
3yr Collect & Return Warranty

£999 Exc VAT
£1173.83 Inc VAT

Main Specification Quaddra XT

Up to Intel® Mobile Pentium® 4 3GHz Processor
- Featuring Intel® SpeedStep™ Technology
Microsoft® Windows® XP Home
Up to 1Gb DDR RAM
Up to 80Gb Ultra DMA-100 Hard Drive
15" SXGA+ TFT Screen *(1400 x 1050 Res)*
64Mb ATI Mobility Radeon 9000 Graphics
Built-In Video Camera
DVD/CD-RW Combo & Floppy Drive
Sony Multi Format DVD Writer *(Optional)*
Bluetooth Module *(Optional)*
Firewire™, USB 2.0 & Serial Ports
56k Modem & 10/100Mbps LAN
Ability Office & Anti Virus
Carry Case
Dimensions: 329 x 275 x 36mm
Weight 3.5Kg *(including battery)*
3yr Collect & Return Warranty



intel inside pentium 4

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Quaddra XT Pro

The Quaddra XT Pro strikes the optimum balance between portability and performance and makes no compromise on specification - A True Mobile Powerhouse!

Featuring up to an Intel Mobile Pentium 4 3.2Ghz processor with SpeedStep™ and Hyper-Threading™ Technology, the Quaddra XT Pro will give you all the performance you could ever need together with excellent battery life at superb value.

Boasting a large luxurious 15" SXGA+ screen and 6-in-1 card reader, this notebook also delivers the ultimate in graphics performance with the inclusion of ATI's Mobility Radeon 9600 Pro graphics.

rockdirect recommends Microsoft® Windows® XP

Quaddra XT Pro Main Specification

Up to Intel® Mobile Pentium® 4 3.2GHz Processor

- Featuring Intel® SpeedStep™ and HyperThreading™ Technology

Microsoft® Windows® XP Home

Up to 2Gb DDR RAM

Up to 80Gb Ultra DMA-100 Hard Drive

15" SXGA+ TFT Screen *(1400 x 1050 Res)*

128Mb ATI Mobility Radeon 9600 Pro Graphics

Built-In Video Camera

6-in-1 card reader

DVD/CD-RW Combo Drive

Sony Multi Format DVD Writer *(Optional)*

Bluetooth Module *(Optional)*

Firewire™, USB 2.0 & Serial Ports

Gigabit LAN & 56k Modem

Ability Office & Anti Virus

Carry Case

Dimensions: 329 x 275 x 36mm

Weight 3.5Kg *(including battery)*

3yr Collect & Return Warranty

Quaddra XT Pro Configurations & Pricing

Model: QXTP-3.06

Intel Mobile Pentium 4 3.06GHz
Microsoft Windows XP Home
512Mb DDR RAM
60Gb HDD
128Mb ATI RADEON 9600 Pro
15" SXGA+ TFT Screen
DVD/CD-RW Combo
Ability Office & Anti Virus
3yr Collect & Return Warranty

£999 Exc VAT
£1173.33 Inc VAT

Model: QXTP-3.2

Intel Mobile Pentium 4 3.2GHz
Microsoft Windows XP Home
512Mb DDR RAM
80Gb HDD
128Mb ATI RADEON 9600 Pro
15" SXGA+ TFT Screen
DVD Writer
Ability Dffice & Anti Virus
3yr Collect & Return Warranty

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512Mb 333 - 512Mb 400 DDR
£30 Ex VAT £35.25 Inc VAT

512Mb 333 - 1Gb 400 DDR
£130 Ex VAT £152.72 Inc VA

60Gb - 80Gb HDD
£50 Ex VAT £58.75 Inc VAT

80Gb 4200rpm - 80Gb 5400rpm
£25 Ex VAT £29.38 Inc VAT

XP Home - XP Pro
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SONY Multi-Format DVD Writer
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The Pegasus DTS Pro features best-in-class audio, with a convenient and easy to use AV panel

Pegasus CTS
Configurations & Pricing

Model: PCTS-1.4

Intel Pentium M 1.4GHz
Microsoft Windows XP Home
256Mb DDR RAM
30Gb HDD
14.1" XGA TFT Screen
DVD/CD-RW Combo Drive
Intel Pro Wireless LAN
Carry Case
3yr Collect & Return Warranty

£799 Exc VAT
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Model: PCTS-1.6

Intel Pentium M 1.6GHz
Microsoft Windows XP Home
512Mb DDR RAM
40Gb HDD
14.1" XGA TFT Screen
DVD/CD-RW Combo Drive
Intel Pro Wireless LAN
Carry Case
3yr Collect & Return Warranty

£899 Exc VAT
£1056.33 Inc VAT

Main Specification Pegasus CTS

Intel® Pentium® M Processor
-Featuring Intel® Centrino™ Mobile Technology
Microsoft® Windows® XP Home
Stylish & Ultra Slim Notebook Design
Up to 7 hours extended system battery life
Intel® Pro 802.11g Wireless LAN
1Mb Level 2 Cache
Up to 1Gb DDR RAM
Up to 80Gb Ultra DMA-100 Hard Drive
14.1" XGA TFT Screen
Built-in Video Camera
DVD/CD-RW Combo Drive
10/100Mbps LAN
56k Modem
Firewire™
2 x USB 2.0
Ability Office & Anti Virus Scan
Carry Case
Dimensions: 312 x 273 x 27mm
Weight 2.5Kg (including battery)
3yr Collect & Return Warranty

intel inside centrino MOBILE TECHNOLOGY

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Pegasus CTS/DTS

The Pegasus range will unwire your life with Intels innovative Centrino Mobile Technology specifically designed for the mobile computing world. Get mobile with extended battery life, stylish ultra slim notebook designs and built in wireless technology.

The Pegasus DTS Pro is a revolutionary notebook, incorporating the latest Centrino Mobile Technology, a spectacular WXGA widescreen 15.4" TFT display, with best-in-class Video/Audio feature sets. The Pegasus DTS Pro combines powerful presentation capability and maximum digital entertainment possibilities with portability, making it the most fully featured total mobile solution for work or play.

The Pegasus CTS provides unbeatable extended usage with up to 7 hours battery life. Featuring an Intel Pentium-M processor up to 1.6GHz, the Pegasus CTS gives you breakthrough mobile performance where you need it most. Anywhere. Anytime.

rockdirect recommends Microsoft® Windows® XP

Pegasus DTS Pro Main Specification

Intel® Pentium® M Processor
-Featuring Intel® Centrino™ Mobile Technology
Microsoft® Windows® XP Home
Up to 1Gb DDR RAM
Up to 80Gb Ultra DMA Hard Drive
15.4" High Definition WXGA TFT Screen
64Mb ATI Mobility Radeon 9600 Pro Graphics
Intel® Pro 802.11g Integrated Wireless LAN
Front Load, Slot DVD/CD-RW Combo Drive
Sony Multi Format DVD Writer *(Optional)*
8 Cell Smart Li-ION Battery
56k Modem & 10/100Mbps LAN
2 x Firewire™ & 3 x USB 2.0
6-in-1 Card Reader
Bass Enhance System & Switchable Subwoofer
New HDD Protector
Magnesium Alloy Lid
Ability Office & Anti Virus Scan
Executive Carry Case
Dimensions: 354 x 255 x 34mm & 3.1Kg
3yr Collect & Return Warranty

centrino MOBILE TECHNOLOGY

Pegasus DTS Pro Configurations & Pricing

Model: PDTSP-1.5
Intel Pentium M 1.5GHz
Microsoft Windows XP Home
512Mb DDR RAM
60Gb HDD
15.4" WXGA TFT Screen
DVD/CD-RW Combo Drive
Intel Pro Wireless LAN
Carry Case
3yr Collect & Return Warranty
£999 Exc VAT
£1173.83 Inc VAT

Model: PDTSP-1.6
Intel Pentium M 1.6GHz
Microsoft Windows XP Home
512Mb DDR RAM
60Gb HDD
15.4" WXGA TFT Screen
DVD/CO-RW Combo Drive
Intel Pro Wireless LAN
Carry Case
3yr Collect & Return Warranty
£1099 Exc VAT
£1291.33 Inc VAT

Model: PDTSP-1.7
Intel Pentium M 1.7GHz
Microsoft Windows XP Home
512Mb DDR RAM
60Gb HDD
15.4" WXGA TFT Screen
DVD Writer
Intel Pro Wireless LAN
Carry Case
3yr Collect & Return Warranty
£1249 Exc VAT
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Upgrades

256Mb - 512Mb DDR
£35 Ex VAT £41.13 Inc VAT

512Mb - 1Gb DDR
£100 Ex VAT £117.50 Inc VAT

30Gb - 40Gb HDD
£20 Ex VAT £23.50 Inc VAT

40Gb - 60Gb HDD
£40 Ex VAT £47 Inc VAT

60Gb - 80Gb HDD
£50 Ex VAT £58.75 Inc VAT

XP Home - XP Pro
£50 Ex VAT £58.75 Inc VAT

USB Floppy Drive
£49 Ex VAT £57.58 Inc VAT

12 Cell Battery Option
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It's a Notebook ...and a tablet PC

The new Rock T200 hits the market as the 'Best Value' convertable tablet 'Without Compromise' - it's a fully functional notebook, but with all the benefits of tablet technology. Whether you require the functionality of a Laptop or the convenience of Pen and Paper, the T200 is the ultimate, versatile, ultra-portable business tool at a very affordable price.

The revolutionary rotating screen enables the true mobile user to convert their notebook into a tablet. The sharp, bright 14.1" TFT is the first ever 14" screen available on a Tablet PC which supports a pen based input so you can scribble, jot, make notes as you naturally would using a pen and paper. The 14.1" TFT screen is comparable to an A4 notepad.

The T200 comes as standard with Intel's Centrino™ Mobile Technology, so you can 'Work Longer' with extended battery life, 'Work Anywhere' with Intel's Wireless LAN Technology and as 'Quickly' as you would in the office with high processing power and a flexible range of features.

...It's a Notebook PC

...It's a Tablet PC

Tablet T200 Main Specification

Intel® Pentium® M processor 1.4GHz
- Featuring Intel® Centrino™ Mobile Technology
Microsoft® Windows® XP Home
1Mb On-Die L2 Cache
256Mb DDR RAM
30Gb Ultra DMA Hard Disk Drive
14.1" XGA Active Matrix Touch Panel Display
Screen rotation - 90°/180°/270° degrees
Integrated Intel Extreme Graphics, 64Mb Shared Memory
802.11b Integrated Intel Pro Wireless Technology
Built-in Digital Video Camera
Built-in 4-in-1 Card Reader
(Optional External DVD/CDRW combo drive)
6-cell Smart Li-Ion Battery
Internal 56k V.90 Modem & 10/100 LAN
2 x USB 2.0 ports
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External DVD-RW	£249 Exc VAT	£292.58 Inc VAT
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Hang on for Maximum Mayhem

To celebrate the launch of the exciting new Bad Boys II game, Rockdirect have teamed up with Empire Interactive to launch a limited edition black version of the specialist gaming notebook, the Xtreme. The first 100 Xtreme's ordered in the exclusive Bad Boys II finish will recieve a free copy of the Bad Boys II PC game.

The Rock Xtreme plays host to the fastest, most immersive 3D performance available on any notebook - ATI's Mobility Radeon 9600 Pro, the world's most advanced and only DirectX9 mobile graphics GPU. Enjoy premium 3D performance with vivid, cinematic quality graphics for the most demanding visual applications and the widest variety of next generation games.

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"The Xtreme XTR-3.2 is, for us, the best gaming notebook available at present."
Computer Shopper | April 2004 | Best Buy Award

"Proclaims its gaming intentions in no uncertain terms."
What Laptop | December 2003 | Silver Award

Xtreme Main Specification

Up to Intel® Pentium® 4 3.4GHz Processor
-Featuring HyperThreading™ Technology
Microsoft® Windows® XP Home
800MHz Front Side Bus
Up to 2Gb DDR400 RAM
Up to 80Gb Ultra DMA-100 Hard Drive
15" SXGA+ TFT Screen *(1400 x 1050 Res)*
128Mb ATI Mobility Radeon 9600 Pro Graphics
5.1 DTS Sound Output
Bluetooth Module
802.11g Internal Wireless LAN *(Optional)*
DVD/CD-RW Combo Drive
Sony Multi Format DVD Writer *(Optional)*
Internal FDD Drive *(Swappable)*
Firewire™ and 4 x USB 2.0 Ports
Gigabit LAN & 56k Modem
Audio DJ Functions
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3yr Collect & Return Warranty

rockdirect recommends Microsoft® Windows® XP

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- *Low 1.0V operation*
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- *World's Fastest 3D Benchmark scores*

Racing Red | Piercing Blue Metallic | Bad Boy Black Metallic

Colours shown are for illustration purposes only. Actual colours may vary.

Xtreme Configurations & Pricing

Model: XTR-3.0	Model: XTR-3.2	Model: XTR-3.4
Intel Pentium 4 3.0GHz	Intel Pentium 4 3.2GHz	Intel Pentium 4 3.4GHz
Microsoft Windows XP Home	Microsoft Windows XP Home	Microsoft Windows XP Home
512Mb DDR RAM	512Mb DDR RAM	512Mb DDR RAM
60Gb HDD	60Gb HDD	80Gb 5400rpm HDD
15" SXGA+ TFT Screen	15" SXGA+ TFT Screen	15" SXGA+ TFT Screen
DVD/CD-RW Combo	DVD/CD-RW Combo	DVD-RW
128Mb ATI RADEON 9600 Pro	128Mb ATI RADEON 9600 Pro	128Mb ATI RADEON 9600 Pro
Gigabit LAN & Bluetooth	Gigabit LAN & Bluetooth	Gigabit LAN & Bluetooth
3yr Collect & Return Warranty	3yr Collect & Return Warranty	3yr Collect & Return Warranty
£1199 Exc VAT	**£1299** Exc VAT	**£1499** Exc VAT
£1408.83 Inc VAT	£1526.33 Inc VAT	£1761.33 Inc VAT

OPTIONAL UPGRADES

512Mb DDR 400 RAM to 1Gb DDR 400 RAM	£100 Exc VAT	£117.50 Inc VAT
512Mb DDR 400 RAM to 2Gb DDR 400 RAM	Please Call	
60Gb 4200rpm to 80Gb 4200rpm	£50 Exc VAT	£58.75 Inc VAT
DVD/CD-RW Combo to SONY Multi-Format DVD-RW	£100 Exc VAT	£117.50 Inc VAT
802.11g Internal Wireless LAN	£69 Exc VAT	£81.08 Inc VAT
All items below are swappable with Internal Floppy Drive:		
6-in-1 Card reader	£39 Exc VAT	£45.83 Inc VAT
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80Gb 2nd HDD	£249 Exc VAT	£292.58 Inc VAT

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only
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1x Wireless Access Point

only
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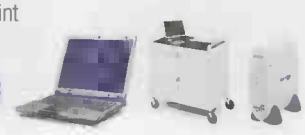

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BAREBONES SYSTEM

Shuttle XPC Zen

A small case for those seeking quiet

For its latest barebones system, Shuttle has tweaked the design to make the quietest XPC yet. It's 20 per cent smaller than its predecessor, the XPC ST6164, thanks to the removal of the standard internal power supply, replaced instead with an external 180w brick. (See *PCW* March for a review of the ST6164 or go to www.pcw.co.uk/products/hardware/1153020) Combined with the CPU heat pipe and the Bi-Sonic 80mm fan, it's certainly very quiet.

From the outside little else is different. At the front are two USB2 ports and mini-jack audio ports. The rear has the two more USB2, network and S/PDIF input and outputs.

The Shuttle motherboard, built around the ATI RS300 chipset, offers an onboard Radeon 9100 graphics core. It's nippier than anything Intel offers, but is really only suitable for the occasional 3D game. This board has no AGP slot, so a new graphics card can't be installed.

The motherboard supports all Intel Socket 478 processors up to an 800MHz front-side bus including the new Prescott. The latter processor requires a Bios update from Shuttle, though.

As with other Shuttle barebones systems, the inside is a joy to work in. The hard disk bay unscrews and slides out to make working easier. It's all thumbscrews on the inside. Only parallel ATA drives can be used, although Shuttle provides its own IDE cables, so that you don't end up with a box full of cabling.

Finally, there's a single PCI slot for further upgrades. To us this immediately suggests a TV card for a home theatre system. The quiet operation and decent built-in graphics makes it perfect for this job or as a low-performance second PC where noise would be an issue.

David Ludlow

DETAILS

RRP $299 (£160 approx)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Gemma Computers www.gemma.co.uk
SPECIFICATIONS
Intel Pentium 4/Celeron (800MHz FSB) • ATI RS300 chipset • Dual-channel DDR memory • (200/266/333/400MHz) • Realtek 5.1-channel sound • ATI Radeon 9100 graphics • 2 USB2, Ethernet, S-video, S/PDIF in/out, VGA • 180w external power supply • 280 x 170 x 190 (h x w x d) • 5.2kg
PROS Small; very quiet
CONS No AGP slot; power supply
VERDICT
A quiet offering, although the small power supply and lack of upgrade options mean it is suited to less demanding tasks

BUILD QUALITY	★★★★★
FEATURES	★★★★½
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

BAREBONES SYSTEM

MSI Mega 180

A good alternative to a full-tower PC

The growing popularity of small form factor PCs has contributed to a minor explosion in the availability of barebones computers. The MSI Mega 180 is among the latest to infiltrate the market and is targeted at the style-conscious PC user.

Physically, the Mega 180 is as attractive as any small form factor unit we've come across. It has a dark but highly reflective front panel, and is given contrast courtesy of a coloured strip housing its main volume and power controls.

Installing additional components such as a hard disk drive is never easy in a small case, but the instructions provided are straightforward, and pictures illustrate each step of the process.

The unit is supplied with the Nvidia Nforce2-based MS-6796 motherboard. This provides a single PCI and 8x AGP slots, as well as a pair of empty Dimm slots that are capable of taking up to 2GB of DDR266/233 memory in a dual-channel configuration. An integrated Geforce4 MX graphics card rounds things off.

The Mega 180 is well specified. MSI has incorporated an mp3 player capable of playing music without the computer being fully switched on. This reads files from CDs and is joined by an FM radio tuner which can be operated without the need to boot into an operating system. These can all be controlled via a infra-red remote control.

Elsewhere, the Mega 180 features everything you'd expect to find in a modern PC. There are Lan, S/PDIF in/out, four USB and two Firewire ports to aid connectivity. There are drawbacks to owning a small form factor PC, such as the limited scope for upgrading graphics, the power supply, and lack of internal space. Most users, however, should find the Mega 180 an attractive alternative to a full-tower system.

Rory Reid

DETAILS

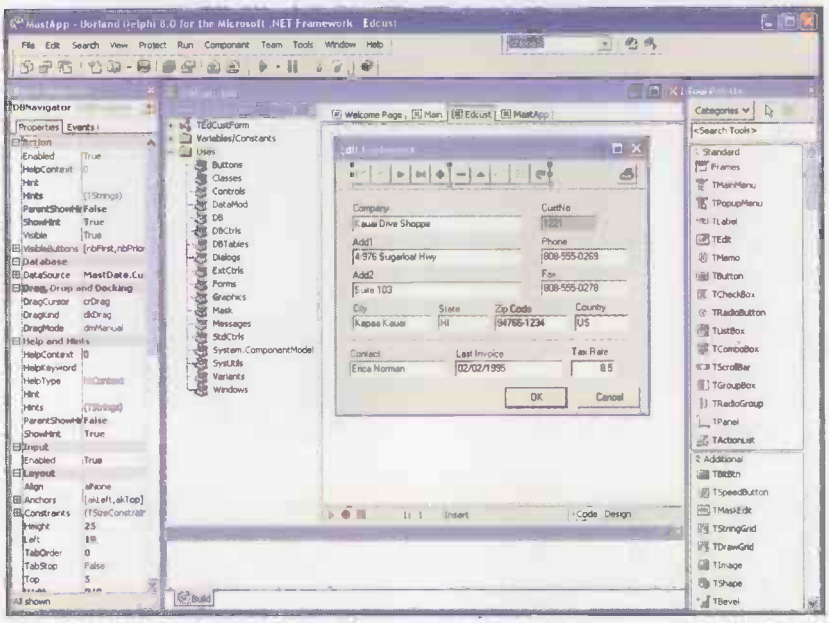
RRP £258.50 (£220 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Scan 0870 755 4747 www.msi.com.tw
SPECIFICATIONS
AMD Socket A • Nvidia Nforce2 MPC motherboard • Two memory slots • AGP 8x • 5.1 audio • 1 PCI slot • 200w power supply • 4 USB2, 2 Firewire, 2 S/PDIF, serial, parallel, 2 VGA
PROS 6-in-1-card reader; remote control; mp3 playback
CONS Fiddly to work in; limited power supply
VERDICT
The Mega 180 is a viable alternative to a full-sized PC and will appeal to the style conscious

BUILD QUALITY	★★★★★
FEATURES	★★★★½
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

PROGRAMMING ENVIRONMENT

Borland Delphi 8

Good compatibility makes this impressive package ideal for Delphi users moving to .Net



Delphi 8 can be used to develop applications for the .Net framework

Borland's Delphi has been the best Windows development tool for many years. This time around, Delphi 8 is a completely new product targeting Microsoft's .Net Framework. The benefit is that Delphi is now in tune with the direction of Windows itself and gets full access to the rich Framework class libraries. The downside is that applications now depend on the 20MB .Net runtime and will generally run more slowly than their Delphi 7 equivalents.

There are, therefore, a couple of different ways to assess Delphi 8. One is from the perspective of existing developers wondering whether to port their code. The other is how it stands up against Microsoft's Visual Studio .Net, which offers .Net development in both Visual Basic and C#.

Delphi 8 is hosted in Borland's Developer Studio Integrated Developer Environment (IDE), as also used by the company's C# Builder product. Along with a code editor, it includes a visual form designer for both Windows and web applications, as well as additional features such as a database explorer and the ability to view your code as a Universal Modelling Language (UML) diagram.

The language used is Borland's Object Pascal, now officially (but unhelpfully) called the Delphi language. Considering it targets a new platform, there is an impressive level of compatibility with the old Delphi. Simple projects will still load and run unchanged. The main issues are with pointer types, which are rarely used in .Net, direct calls to the Windows API and third-party components that are not yet available.

In order to achieve high compatibility, Borland has created a new Visual Class Library (VCL) for .Net, based on the old Delphi VCL which has far-reaching implications. Delphi 8 supports two different frameworks for Windows applications, one using VCL.Net and the other using Windows Forms, which is Microsoft's standard visual class library. In practical terms, this means you have to choose between the two when starting a new application and, therefore, two form designers and two sets of components such as buttons, listboxes and so on. VCL.Net has some advantages, such as better performance in some cases. The big problem is lack of compatibility between VCL.Net and Windows Forms. Many third-party and open-source components for .Net are for Windows Forms, which will not work directly in VCL.Net. There is an import wrapper, but it is described as experimental and is not always successful.

Borland has its own data access library for .Net, called the Borland Data Provider (BDP). It offers live data at design time, so you can see query results when laying out your form. Again it is a mixed blessing, since you cannot use standard ADO.Net drivers with BDP. On the other hand, BDP has useful additional features and can be used as a standard ADO.Net data source. For compatibility with existing code Delphi 8 retains several additional database libraries, so you easily get at data in Paradox, Dbase or Interbase format.

The high-end Architect edition of Delphi includes Enterprise Core Objects (ECO), a feature which enables model-driven development. The idea is that you design and maintain your application as a UML model, letting ECO generate the code, including the necessary database tables. It's a promising technology, although still in its early days.

Getting started with Delphi 8 is not as easy as it should be. It has the appearance of a rushed release, and documentation is skimpy. The product badly needs a developer's guide, as well as a more detailed reference. Even so, as a technical accomplishment it is most impressive.

The more awkward question is whether it is a compelling alternative to earlier versions of Delphi or, indeed, to Microsoft's .Net tools. Not everyone wants to build .Net applications and, if your priorities are fast performance and deployment without the burden of a runtime layer, the old Delphi still wins. Borland recognises this by including Delphi 7 alongside the new version.

Borland will find it harder to tempt new users, although the support for UML and model-driven development is an important advantage. Whereas the original Delphi easily outclassed Visual Basic, there is little to choose between Delphi 8 and Microsoft's C#.

Tim Anderson

DETAILS

RRP Pro £787.25 (£670 ex VAT)
Enterprise £1,962.25 (£1,670 ex VAT)
Architect £2,350 (£2,000 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Borland 0118 924 1400 www.borland.co.uk
SYSTEM REQUIREMENTS
Windows 2000 or above • Pentium III 850MHz or higher • 512MB of Ram • 600MB of disk space
PROS Compatibility; innovative development; fast framework for Windows applications
CONS Hard choice between VCL.Net and Windows Forms; documentation; slower than previous version
VERDICT
Great technology and ideal for Delphi users migrating to .Net, but Visual Studio .Net is a safer choice

EASE OF USE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

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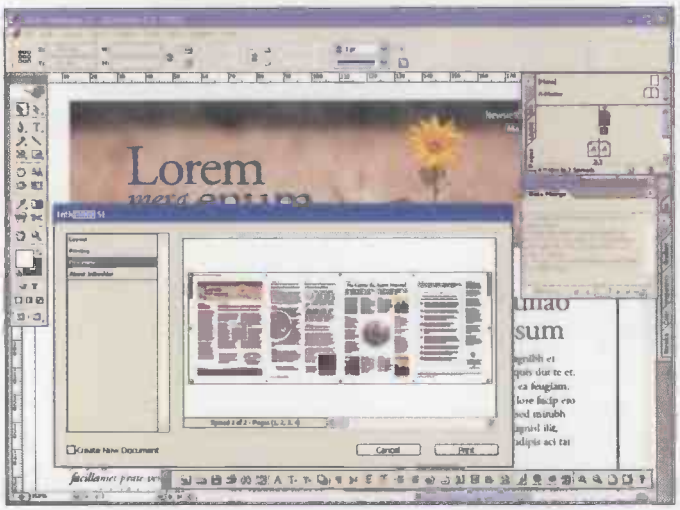
DESKTOP PUBLISHING

Adobe Pagemaker Plug-in

An Indesign tool to help smooth transition



Some of the key features from Pagemaker are included in this plug-in for Indesign to help you move from one package to the other

The application that launched the DTP revolution is being put out to grass. Adobe will continue to sell Pagemaker 7, but there won't be any new numbers or a Mac OSX version. This is a serious issue for Mac users, who will have to make the switch or persevere with an application that will run only in Classic mode.

Adobe hopes that Pagemaker users will now migrate to Indesign CS and has released this Pagemaker plug-in pack for the newer program. In addition to a converter, which allows you to open Pagemaker 6 documents in Indesign (version 6.5 and 7 documents will open without the plug-ins), the pack includes some of Pagemaker's high-end features.

There's the splash screen, providing access to document filing and a template library. The Office-style Pagemaker toolbar with familiar printing, filing, text formatting and view options is present, the position tool works like Pagemaker's crop tool and another plug-in adds all the keyboard shortcuts.

It works very well, and anyone making the move to Indesign will have a smoother ride as a result. Indesign already shares some features with Pagemaker and, for users who are hooked into features such as data merge or the build booklet command, the case for upgrading to a professional package with the additional functionality of Indesign is strong.

But there's a proportion of Pagemaker users whose requirements are more modest. For these the upgrade price to Indesign may be too steep.

Ken McMahon

DETAILS

RRP Plug-in £47.19 (£39 ex VAT) Indesign CS Pagemaker Edition upgrade £339.58 inc VAT
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION Adobe 020 8606 4001 **www.adobe.co.uk**
SYSTEM REQUIREMENTS
Pentium II • Windows 2000 with Service Pack 2 or Windows XP • 128MB of Ram • Indesign 312MB, plug-in pack 258MB of disk space
PROS Adds crucial Pagemaker tools and templates to Indesign CS
CONS Not for casual users
VERDICT
For those who need the sophistication of Indesign, this is a great upgrade opportunity

EASE OF USE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★★☆

MEDIA PLAYER

Cyberlink Powercinema 3

Hassle-free music and movies

Marketed as a cheaper alternative to Windows Media Center, Cyberlink's Powercinema 3 is aimed at those who want to play movies and listen to music with the minimum of fuss.

With large buttons and a simple design, navigation isn't a problem, even if you output it to a standard TV. If you buy the optional remote control you don't have to go anywhere near your keyboard or mouse.

Powercinema is split into four main sections: movies, pictures, videos and music. The movies section plays DVDs and VCDs, while the other sections allow you browse your hard drive for relevant media.

Although the simple interface makes it easy to navigate, it is a little lacking in features. For example, the settings section of the manual states you can 'fine tune its performance to your machine'. However, when you go to Settings you get just one choice to alter the screen mode – not exactly what we would call fine tuning. The music feature is also a little simplistic. You can play individual songs or select an entire folder, but you can't create your own playlists.

There are some decent features lurking within. The CLPV option will convert 4:3 videos in to 16:9 widescreen format by stretching the outer edge of the picture, while the CLMEI function will convert a stereo input into a multi-channel output.

If you like the idea of being able to browse your media files without having to sit at your PC, Powercinema could be for you. However, its functionality is limited and you may find yourself reverting to Windows Media Player when watching DivX movies or playing mp3s.

Will Stapley

DETAILS

RRP £44.99 (£38.29 ex VAT); remote control £19.99
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Cyberlink 020 7221 4600
www.gocyberlink.com
SYSTEM REQUIREMENTS
Windows XP • Pentium III 450MHz or higher • 32MB of Ram • 200MB of hard disk space
PROS Easy to use
CONS Features; no remote control
VERDICT
It works well, but with the remote control an extra it's overpriced

EASE OF USE	★★★★☆
FEATURES	★★★☆☆
VALUE FOR MONEY	★★☆☆☆
OVERALL	★★★☆☆

The four main sections of Powercinema help you to choose which type of media you want to organise

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VIDEO-EDITING HEAD-TO-HEAD

Pinnacle Studio 9 v Cyberlink Powerdirector 3

How does newcomer Powerdirector compete against seasoned pro Studio?

Left: Give your movie a name with Studio's titling tools

Below: Tabs running along the top of the interface show the three main work areas

Desktop video editors certainly have a healthy choice of programs these days. At the top end of the market are some great products from Apple and Avid, while home movie makers and those on a budget are virtually swimming in software aimed at cutting down long, wobbly takes and compiling them into an assemblage of footage, music, effects and titles for output to tape or disc.

At the most basic level you can do most of this for free – Windows users have Movie Maker 2 and Mac owners have Imovie. But between the two extremes are dozens of fairly priced third-party video-editing applications that offer a range of increasingly sophisticated movie tuning tools.

Pinnacle Studio is fast becoming a veteran of the video-editing world. Indeed, testing out its latest incarnation felt a little like trying on an old coat, not least because, on the surface, very little has changed.

Everything feels familiar, which can work in the program's favour as well as against it. On the positive side, those looking to upgrade from a previous version will find themselves in instantly recognisable territory. The tried and tested Studio interface has managed to avoid the indignity of a makeover.

As before, Studio's screen provides a context-sensitive layout, depending on which stage of the editing process users are tackling. Tabs running along the top side of the interface denote the three main work areas: Capture for importing clips from cassette, edit for trimming, Cutting and adding effects, and Make movie for producing your finished film to file, tape or disc. Ever present throughout are the preview and library windows. The latter is also tabbed to provide quick access to your video clips, effects, audio and titling tools.

As with preceding versions, Studio 9 allows beginners to assemble their footage, along with any supplementary media (images, audio, and the like), in a basic storyboard window, where clips, effects and transitions are laid down next to each other in a simple sequence. Old hands can, however, opt for the more detailed timeline view, as favoured by pro video-editing programs, such as Adobe Premiere.

Meanwhile, those who have no interest whatsoever in getting their hands dirty with manual video editing can choose a brand new automated process called Smartmovie. Just point Studio to a folder full of raw footage, select an accompanying tune, choose one of the style presets and the program will do the rest, producing watchable pop video-like results with the minimum of intervention or time wasting, depending on your point of view.

Easy installation

It's been nearly 18 months since Studio 8 came our way, so we were hopeful that version 9 was a little more than another annual incremental release and that Pinnacle had tackled some of the issues we had with the previous outing. Installation was mercifully free of any problems and we didn't encounter anything like the sort of instability issues that have plagued previous releases. Unbelievably, however, there's still no support for external previewing via Firewire. This means you will only be able to watch full-screen previews as you work if you have a dual-monitor setup or a supported graphics card with TV-out.

Previewing is something of a weak point. Rather than opting for increasing Studio's realtime capabilities, Pinnacle has implemented a background rendering technique to help reduce the amount of progress bar grief that video editing often entails. This works well on fast, new computer systems (especially those with Hyper-threading processors, for which the feature has been optimised), but those with PCs at the lower end of the minimum specifications will have to endure delays when reviewing complex cuts or demanding effects, and preview playback can get a bit jerky.

These are Studio 9's main downfalls and, to be fair, they will probably be obvious only to more experienced editors – in other words, not Studio's primary target user base. However, there are a few additions to the new release that should please expert users. For example, Studio 9 supports capture, editing and output of footage shot in 16:9 widescreen mode – something that was missing from the previous version. With widescreen TVs and 16:9-capable camcorders more prevalent, it's a feature that's becoming more crucial for home users.

Another useful high-end feature that will please home cinema buffs is the inclusion of some very straightforward yet effective surround-sound mapping tools. You can't plot and output true digital 5.1 channels, but you can encode your soundtracks using Dolby Pro Logic. This means viewers with the right equipment (a Pro Logic-compatible A/V decoder

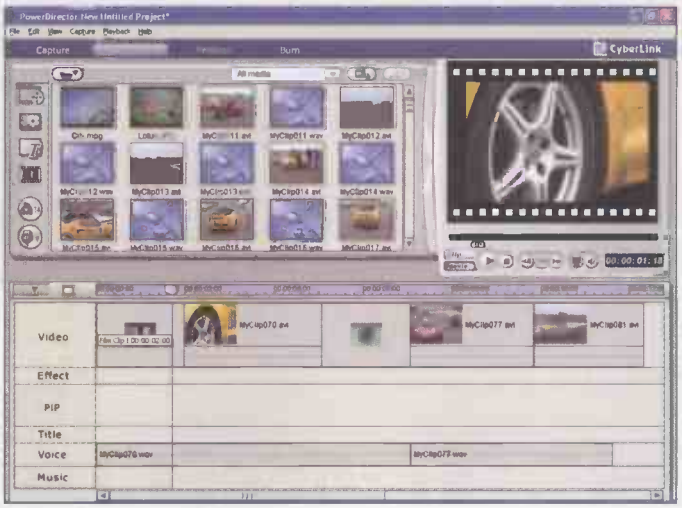
and set of 5.1 speakers, for instance) can get the benefit of any surround audio effects, while those with standard television setups will still be able to enjoy stereo sound. The audio-balancing control is remarkably easy to use with a bird's-eye view of a six-speaker setup within which you can place your audio tracks and move or fade them between speakers to create surround effects. It's worth pointing out, however, that if your computer doesn't have a Pro Logic decoder and 5.1 or more speakers you'll have a tough job getting the surround mix right.

Doubtless there is already a successor to Studio 9 in the pipeline that will address some or hopefully all of our quibbles. Let's just hope that Studio 10 doesn't go for shock and awe tactics. Studio's workspace is one if its enduring strong points – if it ain't broke, don't fix it – just make sure it does everything you want it to do.

Powerdirector

Coming from virtually nowhere to compete directly with Studio in the budget video-editing arena is comparative newcomer, Cyberlink Powerdirector 3. Previous versions haven't measured up particularly well when compared to market leaders like Pinnacle's product, but the latest edition is beginning to look like more of an interesting prospect.

At £49.99 it's £10 cheaper, yet it shares many of its rival's features. Ease of use is a high priority this time round. Transferring video from tape to disk, for instance, is a lot



Stitch together your project in Powerdirector's timeline mode

simpler in Powerdirector than in many other budget programs, particularly when automatic scene detection is used to keep footage down to workable-sized clips. You can also easily make DVDs of your finished films, but not from within Powerdirector itself. For this task, you'll have to import your production into a separate wizard-based disc-authoring application called EZproducer.

Although not quite as easy on the eye, Powerdirector's main window could almost be mistaken for an earlier incarnation of Studio's interface. Everything from Studio's tabbed editing stages to the context-sensitive library window and omnipresent preview screen are all mirrored in Powerdirector's workspace and are even located in the same areas of the screen as their Pinnacle counterparts.

And the similarities don't end there. Powerdirector shares a number of its best features with Pinnacle's editor, including the choice between a beginner's storyboard and an advanced timeline approach to stitching your projects together. We're not suggesting that Cyberlink is ripping off all of Pinnacle's ideas – Powerdirector isn't the only budget video-editing suite to share these similarities with Studio. Ironically, the very fact that there are so many similar video-editing packages on the market only makes it easier to choose. In this case, if you're after a streamlined workspace and features such as surround sound and automated movie making, head straight for Studio 9. If you're looking to save a few bob, then Cyberlink's alternative gives you nearly as much control over your video for less than £50.

With some crucial features missing, Pinnacle's program feels a little like a seasoned pro that's starting to slow down. Young pretenders like Powerdirector, while by no means perfect, are beginning to catch up in areas that have traditionally been Studio's area of expertise. At its most stable yet, Studio is still an extremely good choice for video-editing newbies – particularly when it is purchased in conjunction with one of Pinnacle's capture devices, such as the external Studio Moviebox DV (£199). Powerdirector 3 on the other hand is surprisingly usable and has a few tricks up its sleeve, such as its ability to capture and edit footage in mpeg format, and its support for imported Dolby Digital audio. But there's still plenty of room for refinement, especially in terms of finding a balance between providing an intuitive working environment and accessible advanced features for those who want them.

James Bennett

Make DVDs in Powerdirector using disc-authoring wizard EZproducer

DETAILS

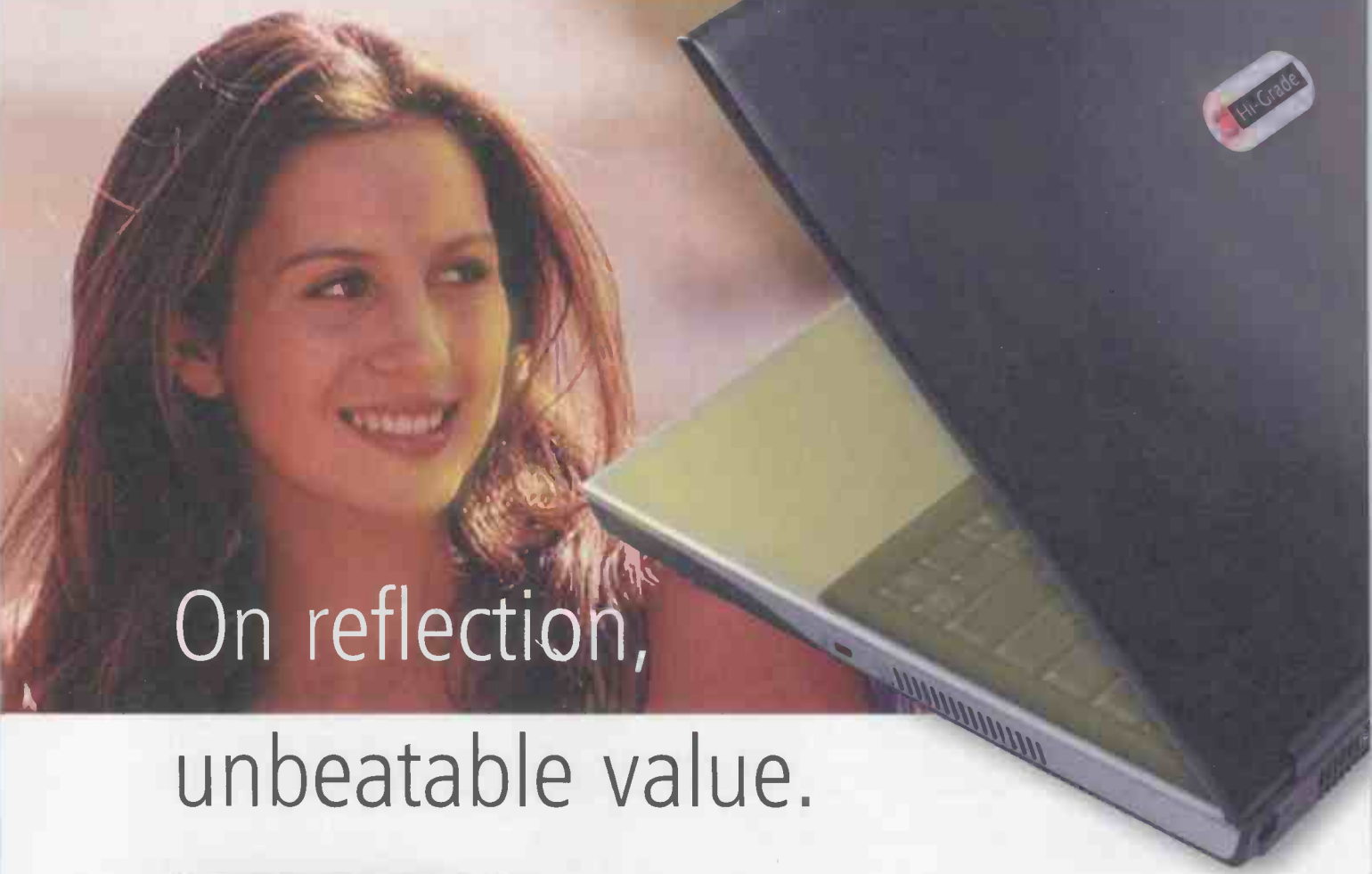
PINNACLE STUDIO 9
RRP £59.99 (£51.06 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Pinnacle 01895 442 003
www.pinnaclesys.com
SYSTEM REQUIREMENTS
Windows 98SE/ME/2000/XP • Pentium/Athlon 800MHz or higher • 256MB of Ram • DirectX 9 or higher compatible graphics and sound cards • 500MB of disk space to install • Video capture device • CD/DVD burner for VideoCD/DVD authoring
PROS Stable (at last); widescreen support; surround sound
CONS No preview over Firewire
VERDICT
Without being too much of a radical overhaul, it is the best version yet. It lacks some important features but is still the top program in its league

EASE OF USE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆

DETAILS

CYBERLINK POWER DIRECTOR 3
RRP £49.99 (42.54 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Koch Media 01256 707 888
www.gocyberlink.co.uk
SYSTEM REQUIREMENTS
Windows 98SE/ME/2000/XP • Pentium II 450MHz or higher processor • 128MB of Ram • 1,024 x 768 display • 1GB of disk space • Video-capture device • CD/DVD burner for videoCD/DVD authoring
PROS Solid; cheap
CONS Range of effects; limited right-click options
VERDICT
Powerdirector is a simple, basic package covering most common requirements, but is also a cut-back and an occasionally annoying variation on a theme

EASE OF USE	★★★☆☆
FEATURES	★★☆☆☆
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆



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Notino 3600, PCW September 2003

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- *Type II PC-card slot*
- *Dimensions: 326 x 258 x 32mm*
- *Weight: 2.8kg*

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NOTINO 3600S-2000A FEATURES

External USB floppy disk drive (optional); Li-ion battery 8 cell (~2.30 hours); type II PC-card slot; ports: external VGA monitor, 2 x USB 2.0, parallel, serial, IEEE1394, TV-out, IR, line-out, mic-in; Dimensions: 326 x 258 x 32mm; weight: 3kg; Microsoft® Works v7; 1 year collect and return warranty.

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Notino 5000, Computer Shopper April 2004

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MEETINGS MANAGEMENT

Filemaker Meetings

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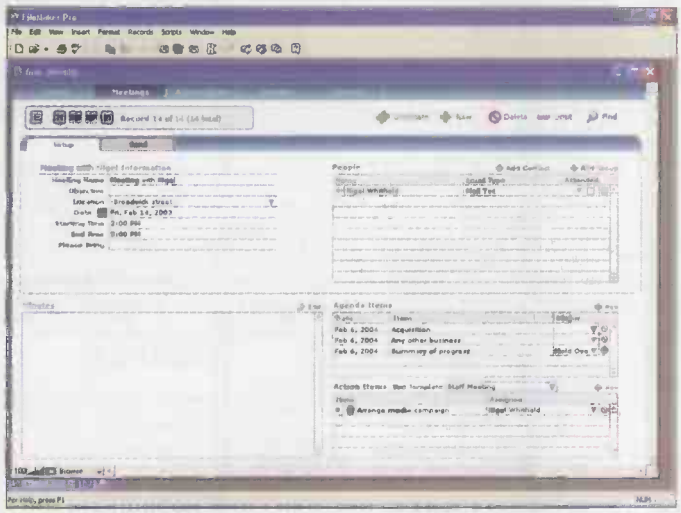


The Filemaker Meetings application allows you to store minutes and agendas for all your meetings

Filemaker Meetings is an application designed to manage all aspects of meetings. It provides circulation of agendas with email notifications, recording who was present at a meeting, minute taking and distribution, along with action items that arise. In short, it keeps you on top of things.

With Filemaker (FM) Pro 6 on your machine, installation is simple. Double-click on the Filemaker Meetings application and start exploring. Sample data is provided, to give you a way to get to grips with how it works. It's not difficult, but you'll need time to work out how everything fits and to customise the system with your contacts, meeting locations, organisational groups and so on. Even so, at this price, it's a lot cheaper than developing an application from scratch.

The home screen provides an overview of meetings and their actions, giving you a summary, while the main meeting screen clearly shows minutes, agenda, attendance and action items. You can send customised emails to attendees, with tasks, agendas, dates and time – all the templates can be modified and Filemaker will fire up your email client to do the sending.

There's clear documentation provided, but you probably won't need it, even if you're not familiar with Filemaker Pro. If you already use FM Pro and want a way to manage meetings that doesn't tie you to a Personal Information Manager such as Outlook, this application is everything you need. It's also not bad value even if you don't already have the database.

Nigel Whitfield

DETAILS

RRP Download £35.19 (£29.95 ex VAT); CD £41.07 (£34.95 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Filemaker 01628 534 158
www.filemaker.co.uk/applications
SYSTEM REQUIREMENTS
Windows XP SP1 • 300MHz Pentium • 128MB of memory • Filemaker Pro 6
PROS Comprehensive; easily customised; networkable
CONS Can take time to set up
VERDICT
A comprehensive system for managing meetings and agendas, but you'll need Filemaker Pro and time to set up the data

EASE OF USE	★★★★★
FEATURES	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

TASK MANAGEMENT

Filemaker Tasks

A powerful tool to assign and track tasks

Like Filemaker Meetings, Tasks is a ready-built database to load into Filemaker (FM) Pro 6. It's designed to manage allocation and tracking of tasks for an organisation, with priorities, tasks, teams and individuals. Tasks can be assigned keywords, labels and priorities, in addition to due dates and assignees.

The database comes loaded with templates and sample data that you'll be well advised to spend some time playing with. We did find Tasks a little fiddlier than Meetings, especially when it came to using the Find function, where the manual would be helpful.

That aside, there are lots of useful tools here, including reports to view outstanding tasks by creator, or everything that a particular person hasn't yet completed. It makes it easy to keep on top of individual workloads. As with Meetings, it's simple to mail task information to people using templates.

It would be good to see support for recurring tasks – allowing automatic assignment for things such as preparing accounts or making backups. And, while other applications will work well managed by a secretary, a task system like this needs to run on a network, so everyone can check their tasks easily.

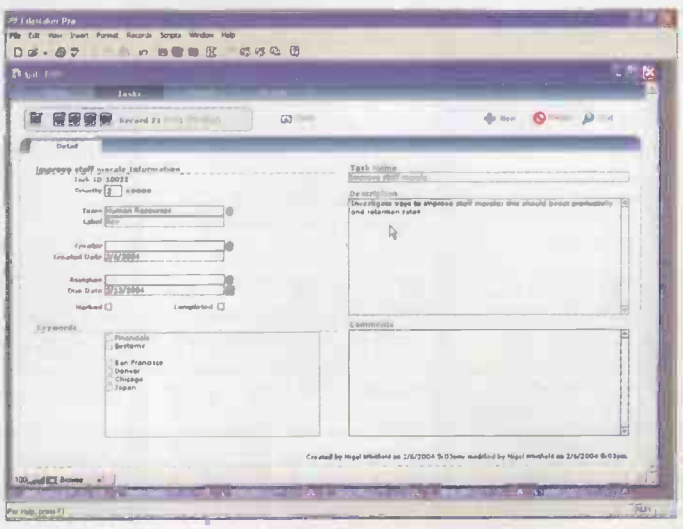
That's an additional expense to bear in mind if you don't already use FM Pro and, of course, existing Personal Information Managers users may be reluctant to have another tool to keep track of their tasks. If, however, those caveats don't apply, this is a powerful and fully customisable way to organise the assignment of tasks.

Nigel Whitfield

DETAILS

RRP Download £46.94 (£39.95 ex VAT); CD £52.81 (£44.95 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Filemaker 01628 534 158
www.filemaker.co.uk/applications
SYSTEM REQUIREMENTS
Windows XP SP1 • 300MHz Pentium • 128MB of memory • Filemaker Pro 6
PROS Flexible task assignment and reporting
CONS Standalone nature may be awkward for PIM users
VERDICT
A comprehensive way of assigning and tracking tasks that would benefit from networking

EASE OF USE	★★☆☆☆
FEATURES	★★★★★
VALUE FOR MONEY	★★★☆☆
OVERALL	★★★☆☆



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Left: The new Smart Drawing tool makes it easier to create professional-looking hand-drawn illustrations... ...but Photo-Paint 12 (below) is a disappointing upgrade, with few important new features

This is one of those upgrades that will either grab you straight away or leave you wondering what all the fuss is about.

Like its predecessors, the Coreldraw Graphics Suite is a collection of graphics software that contains three main applications. There's the veteran Coreldraw for vector graphics work, Photo-Paint for photo-editing and the often overlooked Rave, which is a good program for creating web animations.

All three programs have been upgraded in the latest version of the Graphics Suite, yet the list of new features is surprisingly brief. That's because the main new feature – the Smart Drawing tool – is designed to introduce a new way of working, rather than padding out a list of features.

It is similar to the freehand brush or pen provided by many vector graphics programs, but instead of simply recording your brush strokes on screen, the Smart Drawing tool has a degree of intelligence built in. This enables it to recognise the shapes you're drawing and automatically convert them into smooth curves and straight lines in order to create a more polished appearance.

You could use the program's existing freehand tools, of course, but creating freehand drawings on a computer screen is always tricky. Drawing accurately with a mouse is very difficult and even with a good graphics tablet it only takes a slight shake of the hand to cause a glaring error.

Using the new Smart Drawing tool helps to eliminate these errors and enables even amateur artists to create smoothly finished vector artwork. There's also an option to adjust the smoothing level, so you can turn the smoothing right down to give your artwork a rough, hand-drawn appearance.

The Smart Drawing tool works pretty well, although you'll probably get better results from it if you're using a graphics tablet. Your appreciation of this tool will also depend on whether or not you tend to create a lot of hand-drawn artwork.

Business users who just use Coreldraw for creating simple business graphics may never feel the need to explore this tool, but more adventurous designers who like to create their own artwork will probably use it a lot.

This isn't the only new feature, though. To assist in creating more technical drawings, Coreldraw 12 boasts improved snapping controls and new 'dynamic guides' that can be customised to work the way you want. You can tell the cursor to snap to specific points on nearby objects, or create guidelines that run at specific angles relative to any line or curve you select.

There's also an impressive new Eyedropper tool. As well as sampling the colours you click on, the Eyedropper can now copy object attributes, such as stroke and fill, or even the degree of rotation applied to a particular object. It's a really clever idea, and could be a major time saver when creating complex illustrations.

All these new features are also found in Rave, the animation program which is probably the least well-known of all Corel's products. These new tools make it easier to create your own graphics within Rave, but the program's strength remains its ease of use and the ability to export Flash animations. This makes it a great alternative to Flash, which is too complicated and expensive for anyone who isn't a professional web developer.

That leaves Photo-Paint, which unfortunately draws the short straw in this upgrade. Its only major new feature is the Touch-up brush. This works well enough, allowing you to quickly remove scratches and other blemishes from photographs, but by itself it makes for a pretty disappointing upgrade.

The other disappointing detail is the cost of upgrading from the previous version of the Graphics Suite. Corel has translated the US upgrade price from $179 to £179 ex VAT. But, to be fair, the full price of the complete Graphics Suite is still less than a single copy of Adobe Photoshop, so it's a good choice for any business user or technical illustrator looking for a good all-round collection of graphics tools.

Cliff Joseph

DETAILS

RRP Full version: £421.82 (£359 ex VAT);
Upgrade: £210.32 (£179 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Corel 01628 589 800
www.corel.co.uk
SYSTEM REQUIREMENTS
Pentium II • 256MB of Ram • 256MB of hard disk space • Windows 2000 or XP
PROS Comprehensive suite of bitmap, vector and animation tools; competitively priced
CONS Upgrade price is high; only minor upgrade for Photo-Paint
VERDICT
You'll either love the new Smart Drawing tool or be completely unimpressed by it, but this is still the best all-round suite of business graphics applications

EASE OF USE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆

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PC MIGRATION

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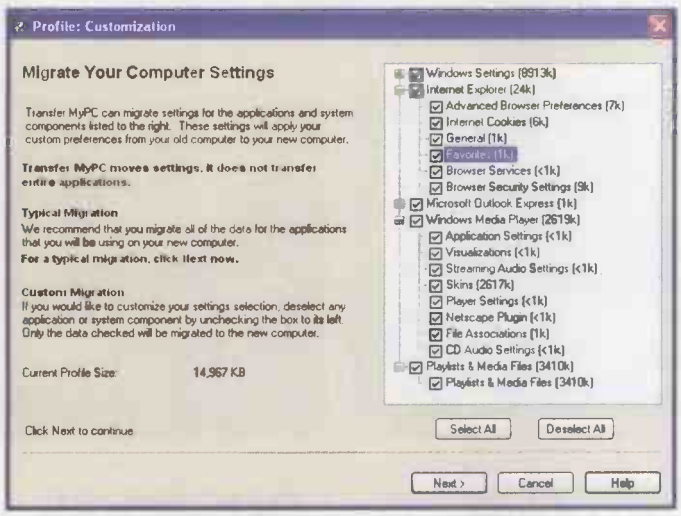


Transfer MyPC allows you to select a wide range of file types and settings that can be transferred to your new PC

It's always exciting when you buy a shiny new PC or laptop, but getting the machine set up the way you want it can be a bit of a chore.

Transfer MyPC can speed up the process by allowing you to transfer important files and documents, as well as settings such as email accounts, browser bookmarks and Windows configuration settings.

The transfer process is very straightforward, as you just select the relevant files and settings from a simple list. This transfer of settings will also work even if the two PCs are running different versions of Windows. There are both USB and parallel cables included along with the software, so even old pre-USB PCs are covered.

We tested it by transferring files and settings from notebook to PC. The process was quick and caused no problems. All in all it's a very simple way to get a new computer up and running.

The software must be activated via the Internet or by telephone. This links the software to the first PC you use it on, preventing you from using it again on any other PC. So if you buy a new PC or laptop in a year's time, you won't be able to use the software to do another transfer from your current PC – at least not without buying a new licence for £20.

A multi-licence version is aimed at business users, but this single-user version is effectively a one-shot piece of software that can only be used for that initial transfer. The £40 price for a program that you can only use once doesn't seem like very good value for money to us.

Cliff Joseph

DETAILS

RRP £39.99 (£34 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Orlogix 00 353 6122 6585
www.orlogix.com
SYSTEM REQUIREMENTS
486 processor or higher • Windows 95 or higher • Parallel or USB port • Internet connection for product activation
PROS Easy-to-use tool for transferring files and settings to a new PC
CONS Use it once and throw it away
VERDICT
From a technical point of view, it works perfectly well. However, the one-use-only activation process seems like a rip-off

EASE OF USE	★★★★★
FEATURES	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★½★

BACKUP

Retrospect Disk-to-Disk

Affordable server backup solution

There are several versions of the Dantz Retrospect backup program, for individual users and businesses of various sizes. The single-user version of Retrospect costs about £70, but then there's a big leap to the Small Business Server edition, which costs more than £500.

This new Disk-to-Disk edition is designed to plug that gap, offering a more affordable backup solution for small businesses or workgroups. Rather than backup features for individual PCs on the network, it focuses on protecting data stored on a network server running applications such as Microsoft's Exchange Server or a central database.

The program provides a good range of options for automating and scheduling regular backups, but it has a few rough edges. The interface isn't very tidy, often putting multiple overlapping dialogue boxes on screen.

Because of its low price, Disk-to-Disk only lets you back up files onto external hard disks, CD-Rom or DVD-Rom. There's no support for the high-capacity tape drives used by many larger businesses, yet there's still a 'tape' option in the main Backup dialogue box.

You may also be confused by the rather generic manual, which covers the entire Retrospect product range but seems to have been written before the Disk-to-Disk version was released. As a result, it's not always clear which features are available in this version of the program.

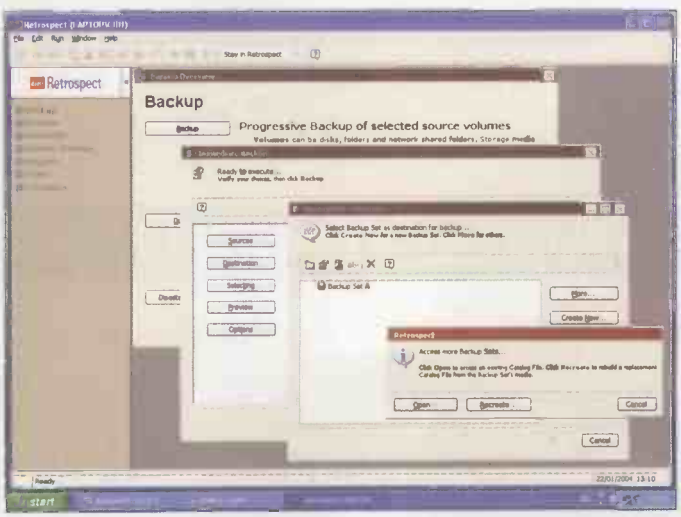
It's useful and reasonably priced, but Retrospect Disk-to-Disk is let down by sloppy presentation.

Cliff Joseph

DETAILS

RRP £218.55 (£186 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Computers Unlimited
020 8358 2009
www.dantz.com
SYSTEM REQUIREMENTS
Pentium processor • 256MB Ram • 50MB hard disk space • Windows 98 or higher
PROS Affordable server backup software; good scheduling and automation features
CONS Poor documentation and untidy interface
VERDICT
Works well enough and provides good backup features, but clumsy presentation mars its ease of use

EASE OF USE	★★★★★
FEATURES	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Disk-to-Disk provides good backup features, but its interface and documentation are a bit of a mess

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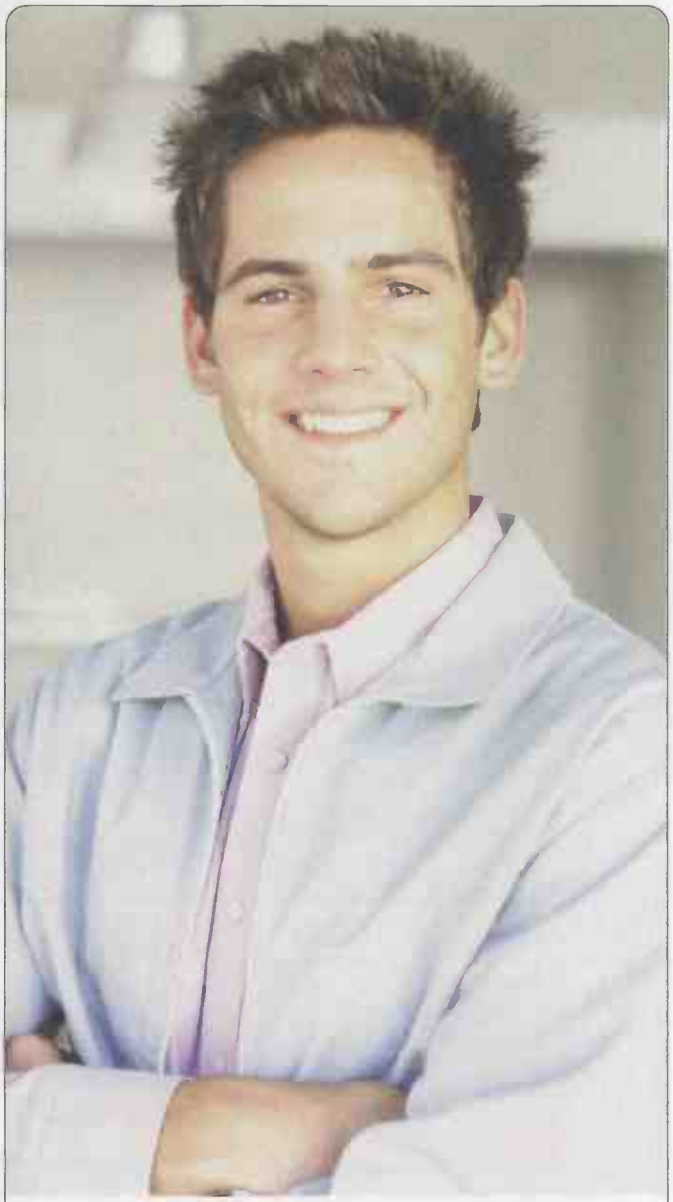

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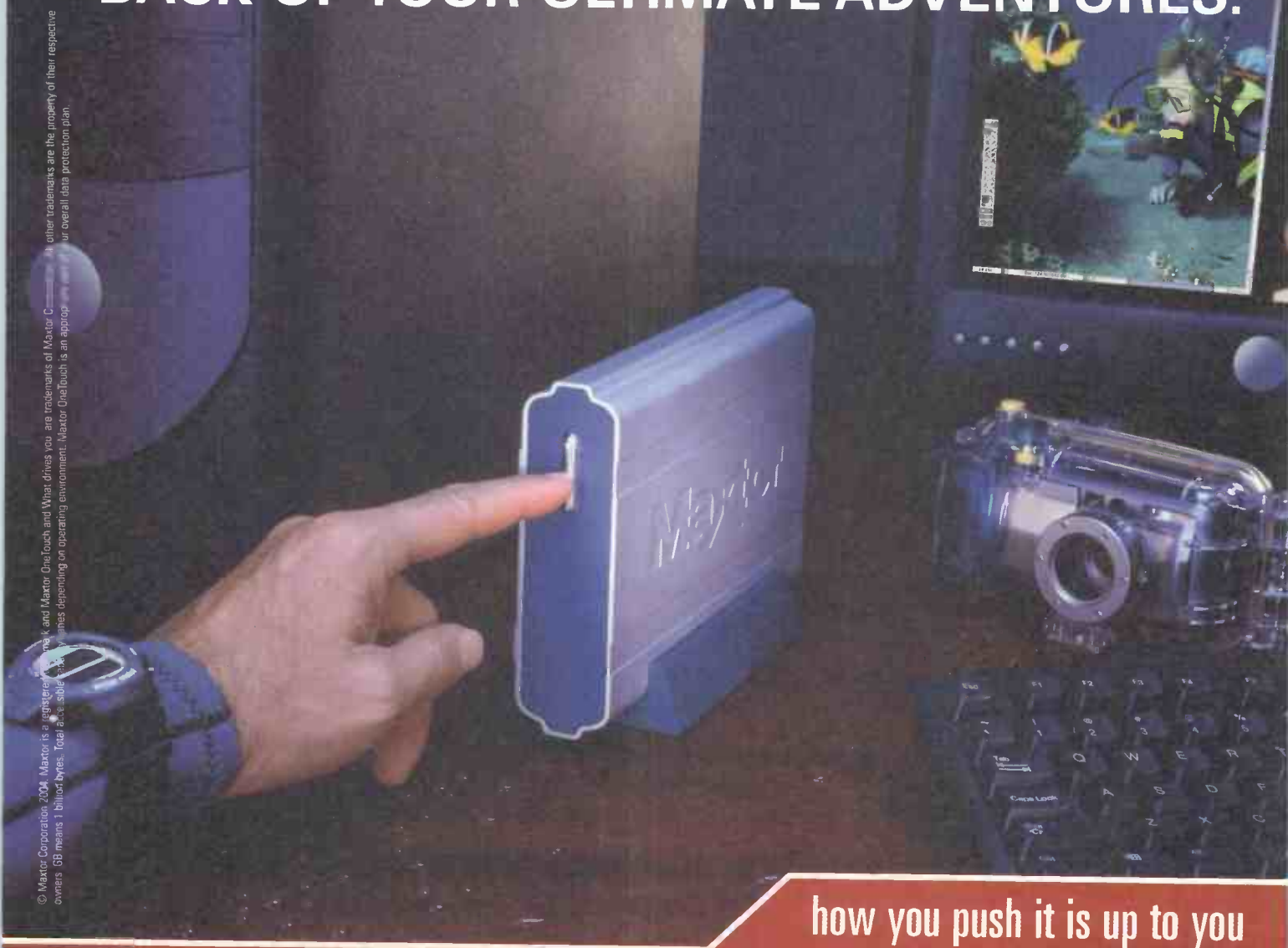

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ENTRY-LEVEL PC

Microland Technology PCW 27.05

REVIEW May 2004, p114 **RRP** £821.32
(£699 ex VAT) **PRODUCT INFORMATION**
Microland 0870 443 0399 www.microland.com

Considering the low price of this system, it's amazing that Microland managed to cram so much into it. Along with an Athlon 64 and 512MB of Ram, you get a lightning-fast Radeon 9800 Pro.

MID-RANGE PC

Poweroid 3302

REVIEW February 2004, p113 **RRP** £1,173.83
(£999 ex VAT) **PRODUCT INFORMATION**
Poweroid 0870 220 0444 www.poweroid.com

Housing the brand new Athlon 64 3200+ processor from AMD and a whopping 1GB of Ram, this system from Poweroid offers high-speed at a truly affordable price.

HIGH-END PC

Evesham Evolution 3.2P

REVIEW May 2004, p43 **RRP** £1,526.35
(£1,299 ex VAT) **PRODUCT INFORMATION**
Evesham 0870 160 9500 www.evesham.com

Featuring Intel's Prescott processor, this PC shouldn't give you any performance problems. It's backed up by 1GB of Ram and a Radeon 9800 Pro, all at a decent price.

FULLY FEATURED NOTEBOOK

Hi-Grade M6700

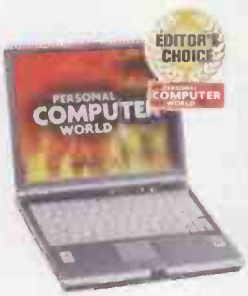
REVIEW September 2003, p48 **RRP** £1,643
(£1,399 ex VAT) **PRODUCT INFORMATION**
Hi-Grade 020 8532 6123 www.higrade.com

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.

ULTRAPORTABLE NOTEBOOK

Fujitsu-Siemens S6120

REVIEW March 2004, p99 **RRP** £1,714 (£1,458 ex VAT)
PRODUCT INFORMATION Fujitsu-Siemens
0800 004 003 www.fujitsu-siemens.co.uk



With a decent set of features and weighing in at just under 2kg, the high-performance S-6120 from Fujitsu-Siemens is the perfect choice for anyone who wants a truly portable business notebook.

BUDGET NOTEBOOK

Rock Quaddra XT

REVIEW September 2003, p116 **RRP** £1,173
(£999 ex VAT) **PRODUCT INFORMATION**
Rock 0870 990 9090 www.rockdirect.com

It might be heavy, but this notebook combines excellent battery life with all the trimmings you need. The three-year collect and return warranty offers peace of mind and there's even a built-in webcam.

TABLET PC

Fujitsu-Siemens Lifebook T-3010

REVIEW April 2004, p129 **RRP** £1,467
(£1,210 ex VAT) **PRODUCT INFORMATION** Fujitsu-Siemens 08706 066 677 www.fujitsu-siemens.co.uk

This tablet PC from Fujitsu-Siemens is one of the best we've seen. It offers great features, flexibility and performance, and comes in at under £1,500. The graphics performance isn't the greatest, however.

15IN FLAT-PANEL MONITOR

LG Flatron L1510P

REVIEW December 2003, p128 **RRP** £257.33
(£219 ex VAT) **PRODUCT INFORMATION**
LG Electronics 0870 607 5544 www.lge.co.uk

The image quality of this monitor is excellent but that's only the tip of the iceberg. There's an auto-setup feature, colour calibration software and a two-port USB hub. Connection is by either DVI or D-Sub.

17IN FLAT-PANEL MONITOR

Philips 170B4BB

REVIEW December 2003, p135 **RRP** £374
(£318.30 ex VAT) **PRODUCT INFORMATION**
Philips 020 8781 8372 www.consumer.philips.com

Giving excellent results with the Windows default colour profiles, the Philips 170B4BB flat-panel monitor automatically detects whether it is connected to an analogue or digital input.

Best Buys >> For the latest best prices go to www.pcw.co.uk/bestprices

PDA

Palm Tungsten E

REVIEW January 2004, p60 **RRP** £149
(£126.81 ex VAT) **PRODUCT INFORMATION**
Palm 0118 974 2700 www.palmone.com/uk

With a low price, we didn't expect the Tungsten E to perform so well. It doesn't sport the features of more expensive handhelds, but it's superb value for money.

POCKET PC

HP Ipaq 1940

REVIEW November 2003, p140 **RRP** £269
(£228.94 ex VAT) **PRODUCT INFORMATION**
HP 0845 270 4222 www.hp.co.uk

The 1940 runs the latest Pocket PC 2003 Pro but keeps the excellent screen of its predecessor. Integrated Bluetooth and an SD/MMC slot are a bonus, as is the new low power Samsung processor.

MULTIFUNCTION DEVICE

Lexmark X5150

REVIEW October 2003, p122 **RRP** £149
(£126.81 ex VAT) **PRODUCT INFORMATION**
Lexmark 0870 444 0044 www.lexmark.co.uk

Good software and easy setup make this a very attractive device. Photo quality is excellent with no graininess. Print speeds are a little slow but a good control panel makes up for this.

SCANNER

Canon Canoscan 3000F

REVIEW November 2003, p70 **RRP** £69.32
(£59 ex VAT) **PRODUCT INFORMATION**
Canon 08705 143 723 www.canon.co.uk/canoscan

Clearly the best sub-£100 scanner on the market, the 3000F produces great results with photos and transparencies. It also comes with Canoscan software and gives OCR support.

LASER PRINTER

Oki B4300N

REVIEW February 2004, p124 **RRP** £349 (£297.02 ex VAT)
PRODUCT INFORMATION Oki
01753 819 819 www.oki.co.uk

Bursting with features while being able to cruise along at an impressive speed, the very reasonably priced B3400N from Oki is capable of producing some excellent quality printouts.

INKJET PRINTER

Canon i470D

REVIEW September 2003, p126 **RRP** £149
(£126.80 ex VAT) **PRODUCT INFORMATION**
Canon 0870 514 3723 www.canon.co.uk

This printer offers borderless printing and the ability to read four different Flash cards, along with very fast high-quality printing for an inkjet. Ideal for the business user.

MP3 PLAYER

Philips HDD060

REVIEW May 2004, p48 **RRP** £169
(£143.83 ex VAT) **PRODUCT INFORMATION**
Philips 0870 900 9070 www.philips.co.uk

Stylish and small, this mp3 player from Philips has a 1.5GB hard disk and can keep going for up to 10 hours. The only drawback is that you have to use the Philips Java utility to transfer music to it.

SPEAKERS

Creative Gigaworks S750

REVIEW April 2004, p48 **RRP** £330
(£280.77 ex VAT) **PRODUCT INFORMATION**
Creative www.creative.com

Coming with a wireless remote control, 210w sub-woofer and seven satellites at 70w each, these THX-certified speakers from Creative can completely immerse you in sound.

SOUND CARD

Creative Audigy 2 Platinum EX

REVIEW May 2003, p76 **RRP** £189
(£160.85 ex VAT) **PRODUCT INFORMATION**
Creative http://europe.creative.com

This feature-filled card and external unit provides 24/96 recording, 6.1 sound and loads of software, including Cubasis VST 4.0 CE for music makers, and Ulead Videostudio SE DV for movie buffs.

ATHLON MOTHERBOARD

Aopen AK79G Max

REVIEW August 2003, p114 **RRP** £105
(£89.37 ex VAT) **PRODUCT INFORMATION**
Aopen www.aopen.com

Based around the Nforce 2 chipset, this well-designed board has lots of features. There are extra Parallel and Serial IDE connectors, onboard graphics and plenty of sound options.

PENTIUM 4 MOTHERBOARD

Abit IC7-G

REVIEW August 2003, p118 **RRP** £145
(£123.40 ex VAT) **PRODUCT INFORMATION**
Abit 01438 228 888 www.abit.com.tw

Bringing a host of features to primarily a workstation board, the IC7-G offers Firewire and six-channel integrated sound. Serial ATA is also included, with a Serillel adaptor for parallel hard drives.

GRAPHICS CARD

Gigabyte FX 5900XT

REVIEW April 2004, p67 **RRP** £134.80
(£158.39 ex VAT) **PRODUCT INFORMATION**
Gigabyte 01908 362 700 www.gbt-tech.co.uk

Based on the super-fast Nvidia Geforce FX 5900 Ultra graphics card, this latest card from Gigabyte delivers fast performance but, unlike most high-quality cards, won't cost an arm and a leg.

DIGITAL VIDEO CAMERA

Sony TRV33E

REVIEW July 2003, p142 **RRP** £749 (£637.45 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.

DIGITAL CAMERA

Kodak Easyshare DX6490

REVIEW January 2004, p144 **RRP** £399
(£340.42 ex VAT) **PRODUCT INFORMATION**
Kodak 0870 243 0270 www.kodak.co.uk

With a 4megapixel CCD and 10x zoom, the Easyshare DX6490 delivers quality results with the minimum of fuss. Perfect for beginner and intermediate digital photographers.

HIGH-END DIGITAL CAMERA

Canon EOS 300D

REVIEW March 2004, p52 **RRP** £829.99
(£706.37 ex VAT) **PRODUCT INFORMATION**
Canon 0800 616 417 www.canon.co.uk

The EOS 300D from Canon provides digital SLR photography at an incredibly low price and could be the final nail in the coffin for film cameras. Watch this space.

VIDEO-EDITING CARD

Hercules All-In-Wonder 9800SE

REVIEW January 2004, p77 **RRP** £179.99
(£153.18 ex VAT) **PRODUCT INFORMATION**
Hercules 0870 129 3000 www.hercules-uk.com

Although it can't quite compete with some of the high-end graphics cards on the market, this proves to be an excellent all-rounder, while also being great value for money.

DVD-RW

Teac DV-W50DK

REVIEW April 2004, p66 **RRP** £97.51
(82.99 ex VAT) **PRODUCT INFORMATION**
Microwarehouse 020 8906 9111 www.teac.co.uk

It might not be the fastest available, but with a low price tag and the ability to burn both DVD+R and DVD-R formats this DVD-RW will suit those who aren't too bothered about speed.

PC SECURITY SOFTWARE

McAfee Internet Security Suite 2004

REVIEW April 2004, p69 **RRP** £49.98
(£42.54 ex VAT) **PRODUCT INFORMATION**
McAfee 01753 217 500 www.mcafee.co.uk

While the interface could do with a bit of attention, McAfee Internet Security Suite 2004 holds all the utilities to ensure your PC is protected from anything the Internet can hurl at it.

OFFICE SOFTWARE

Microsoft Office Professional 2003

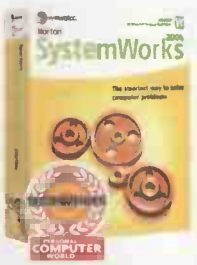
REVIEW May 2004, p150 **RRP** £459 (£390.64 ex VAT)
PRODUCT INFORMATION Microsoft 0870 501 0100
www.microsoft.com

This office suite includes a host of features, including a revamped version of Outlook. There are cheaper options available, but Microsoft's Office 2003 is the clear market leader.

PC MAINTENANCE SOFTWARE

Norton Systemworks 2004

REVIEW March 2004, p68 **RRP** £64.99
(£55.31 ex VAT) **PRODUCT INFORMATION**
Symantec 01628 592 222 www.symantec.co.uk



If you want to keep your PC healthy and safe from harm, Norton Systemworks 2004 certainly gets the job done, and at the reasonable price of a penny short of £65 to boot.

WEB-EDITING SOFTWARE

Macromedia Studio MX2004

REVIEW November 2003, p84 **RRP** £821.33
(£699 ex VAT) **PRODUCT INFORMATION**
Macromedia 0800 169 8216 www.macromedia.com/uk

The latest upgrade brings even greater integration within the suite and better support for cascading style sheets (CSS). Imaging editing is now possible and the Help system is very comprehensive.

IMAGE-EDITING SOFTWARE

Corel Draw 12 Graphics Suite

REVIEW May 2004, p81 **RRP** £421.82
(£359 ex VAT) **PRODUCT INFORMATION**
Corel 01628 589 800 www.corel.co.uk

Available as a £210 upgrade to the previous version, the latest release in the Corel Draw series is still the best all-round business graphics editor and includes a wide range of vector and animation tools.

VIDEO-EDITING SOFTWARE

Ulead Videostudio 7

REVIEW February 2004, p145 **RRP** £60
(£51.06 ex VAT) **PRODUCT INFORMATION**
Ulead 01327 844 880 www.ulead.co.uk

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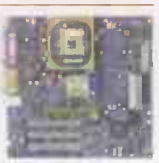

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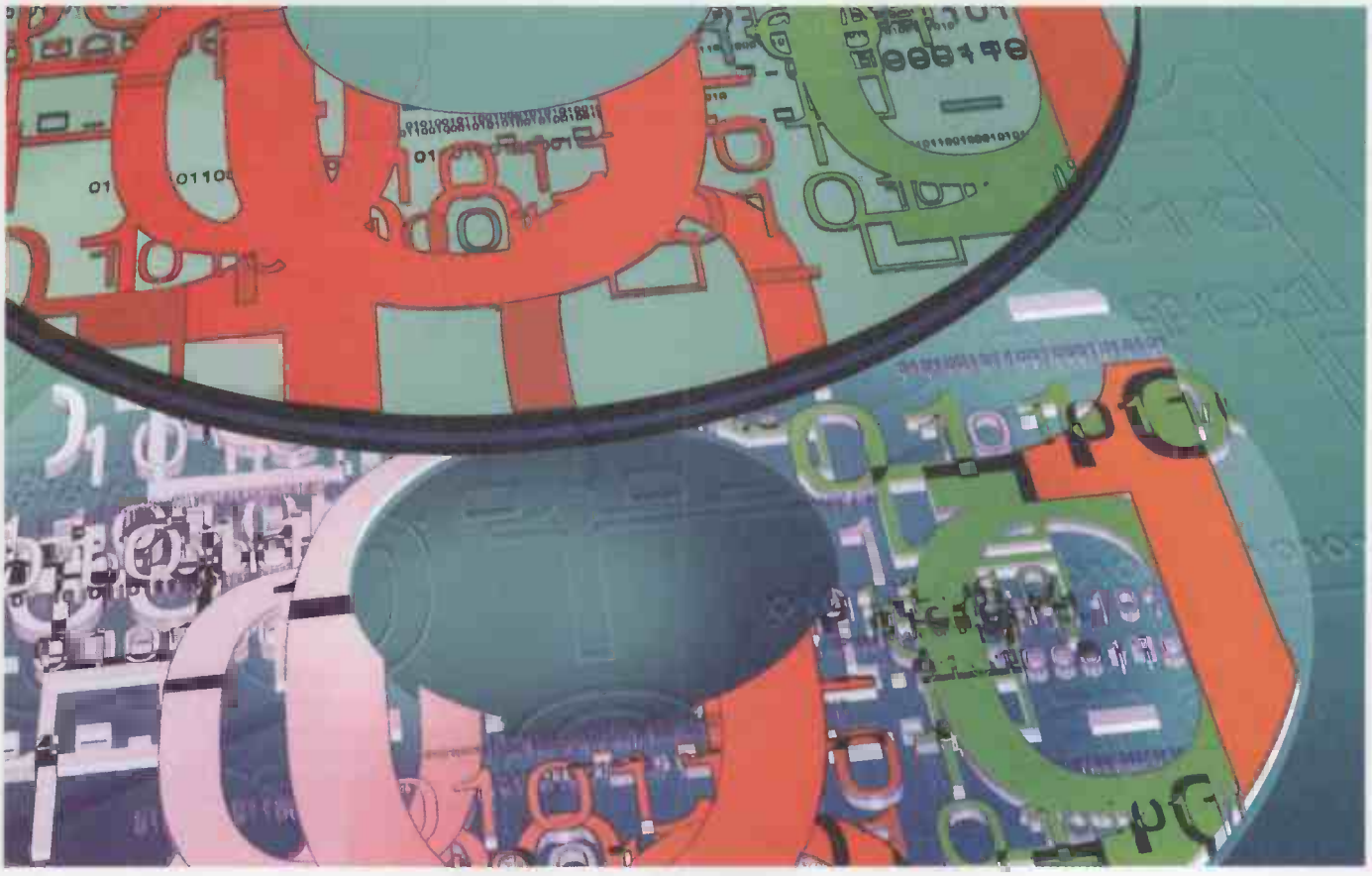


WORDS: CRAIG PATERSON ILLUSTRATION: DAVE ANGEL

Test your safety net

Backing up data and making sure you can retrieve it is a necessary chore, so here's some advice on which method to use and how to do it successfully

Taking proper care of data is an unglamorous business. Although the capacity of modern hard disks is impressive, little thought goes into contingency plans. Here we explain different options for backing up your data, including tape, optical disc and network-based storage. We also look into methods of organising your data to be sure you're getting the best value from your backups.

Taking backups is a form of insurance. Like any other insurance, you decide the coverage based on the risks, and a balance must be struck between the value of your data and the costs of backing up. Hard disk failures are often at the top of people's minds when considering backups, but in reality, hard disks fail relatively rarely, and human error or errant software are much more typical causes of lost data.

System administrators say a backup isn't a backup until you've restored from it. Going through the motions of backing up data is no good unless you also restore that data. Stories of incomplete, corrupted or just plain empty backups are common and it's rare to find a user who doesn't have a first-hand backup horror story.

Different situations call for different strategies and techniques. There is no magic bullet for keeping your data safe, but good planning and preparation maximise the chances of recovering from a catastrophic failure. You also win most from a few basic steps, which are easy to execute; you just have to actually do them.

Even if you use high-speed DVD writers, it can take a while to back up your hard drive

What to back up?

Data falls into many categories. Some data – photographs, letters and so on – is unique, where other data – mp3 and movie collections, for example – could conceivably be replaced. That difference is important when creating a backup strategy; unique data is typically most important to back up simply because it's intrinsically irreplaceable.

Aside from keeping everything neat, categorisation is usually a must for another reason: big hard disks are too large to conveniently back up. A fancy high-capacity tape unit is out of the reach of most users and, even with 9.4GB double-sided DVDs and high-speed DVD burners, spending hours backing up 200GB of data to removable disks is no fun.

Not only is it impractical to back up a large hard disk, it also rarely makes sense. Typically much of the data on a system is non-unique, such as the operating system itself and application programs. And taking a single gargantuan backup isn't just a waste of space; after an equipment failure you may find yourself restoring onto different hardware on which your archived OS install won't work. In fact OS backups do have a place, but it's a different place to your documents and digital photographs.

Start at the beginning

Proper backups start with proper data organisation. If you have the opportunity to partition your hard disk, consider backups when you do it. Do you need a 20GB system partition, or would 8GB be adequate – which would likely compress to fit on a single DVD for backup? Either way, try to keep your OS and programs and your data separate. There will be some exceptions – some application preferences, for example – but keep the bulk of your data on a separate partition or under a specific directory, such as a 'data' directory.

There was a time when you only required a data directory. You could simply back up the data directory and be done with it, since spreadsheets and text documents invariably took up very little space. These days it's more complicated, as multimedia has become a routine duty for desktop machines. Digital pictures, music and video collections are what drive the demand for large storage, and these media files add complexity to organising your data.

Media files, being intrinsically large, should be logically separated from smaller data such as word processor documents and spreadsheets. Even with sophisticated modern packages basic word processor files are still relatively small – the Word file of this article comes in at around 150KB, for example.

Once you've separated your media, subdivide it further into original versus replaceable items. Even if it might be tricky to replace your mp3 collection, it's probably not impossible – unlike your daughter's digital pictures. Making decisions about which data is most important can be tricky, but it's worth thinking about it early; the less you have to back up, the more flexible the options. As part of this process, consider what data you need to keep online. For a home PC, archiving older or infrequently accessed data might not make much sense, since there's an overhead in keeping track of the data once you've moved it from your system to offline storage. But for office servers much data that needs to be kept doesn't need to be instantly available, and instead can be archived to free up space for new data, and keep the overall amount of data on your systems at a manageable level.

Backup technologies

Most storage media is useful for housing backups, but some is largely specific to backup and archiving. Tapes, for example, don't have a role as online storage for workstations and servers, but are invaluable for archival use, and backing up volumes of data where removable disks don't provide sufficient capacity. Available data volumes, costs and speeds of various technologies all come into play when designing backup systems, and you may find a mixture of different options serves you best. In choosing storage technologies also consider where you expect the backups to be restored. You should have no trouble finding a system that can read a CD-R, but if you choose an esoteric tape format be sure you know how and where you'll be able to read its tapes if the worst happens.

Modern PCs often come equipped with a CD burner, providing a handy mechanism for backing up a maximum 700MB of (uncompressed) data at a time. If your data is well separated you may find a single CD has plenty of room to store your most vital information. Even if you need to use two or three CD-Rs or CD-RWs, it can be a good compromise. Modern drives are very fast, and blank CDs are cheap. But the shelf life of burned CDs isn't yet well documented, and some drives have trouble reading CDs recorded elsewhere. Still, for speed and economy with modest data volumes, CDs are a good option.

The next step up from CD is recordable DVD, which is slowly becoming popular on the desktop. After years of format wars, many manufacturers now offer drives that will read all four of the popular formats (-R, -RW, +R and +RW), so it's no longer critical to choose your DVD format so carefully. The exception is DVD-Ram, which is rare and is read only by a handful of multiformat models and DVD-Rom drives, typically from Panasonic. For backup purposes recordable DVD is like CD, just with a larger data volume. The common DVD formats offer 4.7GB per side, with double-sided discs now available. Similar questions about data shelf-life exist for DVD as CD, and are worth a little more consideration because 4.7GB is lot more data to lose.

Besides stock formats, there are several other choices. Zip and other removable storage is still popular in some niches, but unless you have a very specific requirement for compatibility isn't a great choice for backup. First, it's expensive: a blank 750MB Zip disk is much more expensive than a 700MB CD-R and it's less commonly

Many people are using external USB or Firewire hard drives

Tape is useful for backing up large volumes of data and for archival purposes

readable. Any storage format that requires a proprietary drive to read is that little bit less versatile, and at lower data volumes there's no benefit to offset that failing.

As the growth in hard disk sizes has outpaced removable storage additional hard drives have become popular as a backup option. Many PC motherboards come with basic hardware Raid support onboard, and modern operating systems provide software Raid support. The most basic Raid standard that provides data redundancy is Raid 1, which is simple disk mirroring. That's great for protecting against hardware failure of a single disk drive, but not much else. A better choice is to have a second disk of equal capacity and mirror changes to it according to a schedule. That way you're also protected against accidental deletions and – if you disconnect the backup disk – virus activity and the like in the meantime. Hard disks make good near-line backup storage because they're also much faster than tapes or removable media. But additional hard disks are also a lot more expensive by volume than CDs, DVDs or tapes. If you're considering a backup hard disk, look at external models based on Firewire or USB2 full-speed (avoid USB 1.1 or 'high-speed' disks, since they are hampered by slow interface performance). With an external drive, an offsite backup is as easy as taking it from home to the office (or vice versa) each day.

The network option

Another choice is to back up across a network. Larger organisations will often choose to back up via centralised systems, querying individual systems for changes overnight. The advantage is that data is aggregated onto a backup server (or several) for storage. All the individual storage options mentioned above are available, as well as heavy-duty choices such as robotic tape libraries, which can keep terabytes at a time easily available without human intervention.

Over the past several years online backup services such as www.livevault.com have sprung up providing hosted storage on Internet-connected servers to which backups can be sent. Software or dedicated systems at a customer site track data changes and propagate them over a secure connection to the online backup service. The extra logic is to minimise network traffic, partly to reduce costs and partly because even a fast corporate Internet connection is typically a fraction of the bandwidth available on a Lan, so it's simply not practical to back up huge chunks of data across the Internet.

The advantages of network backup come mostly from economies of scale in larger companies. For smaller systems network backup may still be useful, depending on the amount of data on each client machine. And centralised backups are much easier to track than ad-hoc backups occurring on individual workstations.

Doing the deed

By the time you come to consider software you should already have covered the steps described above. Your data should be well organised, along lines of size and

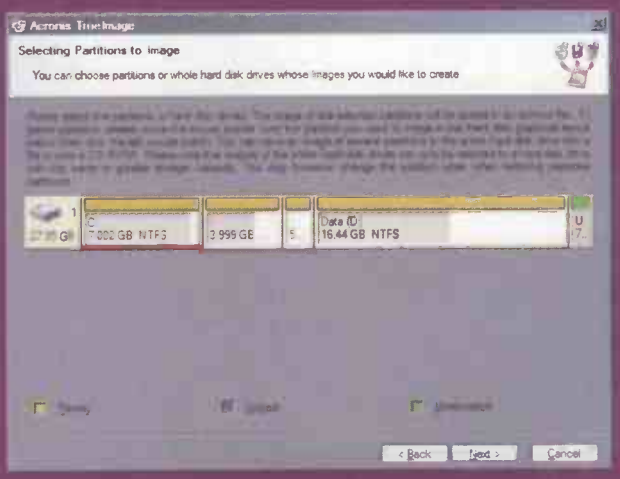
Image backup

So-called 'image' backups are bit-by-bit copies of entire hard disk partitions. A system is rebooted into a special version of Dos, where disk partitions may be backed up or restored.

Image backups are popular for performing multiple installs on the same hardware. It's easier for IT staff to configure one machine with all the preferred software and setups unique to an organisation and then copy that system, rather than hand craft each individual workstation. Combined with Microsoft's Sysprep utility this offers a powerful mechanism for deploying preconfigured systems, and is how manufacturers offer slightly customised versions of Windows preinstalled on new PCs.

There are some drawbacks to image backups for the average user, however. For a start, a backup of a whole partition necessarily includes everything on it, whether it's unique data or not, which costs a lot of space. And if you restore onto different hardware, things may not work properly or at all. Given these caveats, image backups have a big advantage for convenience. If your system suddenly gets corrupted, just boot into your image backup software and recover your latest image archive. There's no reinstalling the OS and hunting around the web for drivers. This is most advantageous on laptops, which often have specialised hardware, making reinstalls arduous. They are also more prone to damage or loss, and typically have smaller hard disks than their desktop counterparts. The investment in an additional drive for your desktop and image backup software on your laptop can downgrade loss or damage to your laptop from major catastrophe to minor frustration.

Norton's Ghost is the most well-known image backup software for Windows. Ghost is a venerable and respected program but has been overtaken by more flexible alternatives. Acronis True Image beats Ghost for convenience largely because partitions – even the active system partition – can be backed up from within Windows itself, cutting out the tedious step of booting into a restricted Dos environment to create a backup.



Acronis' True Image lets you back up partitions from within Windows

Besides recovering from data loss, image backup software makes it much easier to migrate to a new hard disk. Both Ghost and True Image offer the option of restoring to larger partitions and different disks, which alone saves a lot of frustration during hard drive upgrades.

importance, and you should have an idea of how often it changes, how much you generate and roughly when it can be archived offline (if at all). Armed with that knowledge you probably have an idea what options are open to you in terms of storage.

For home and small office users, that's the hard part. The next step is to take a backup, and restore it. This is vitally important, and comes before deciding on how often to back up, whether you need offsite backup and so on. Run through the basic process of getting your data onto your backup medium, and restoring it. Note any little alterations or surprises in the process. This oft-overlooked and very basic sanity check is usually the difference between good and useless backups. Whatever your schedules and policies, you need to understand what's involved in getting data off your system and back onto it.

Once you've run through the process, give some thought to how it could be improved. Do you have all the data you need on the backup, or perhaps even too much data? Does it take an acceptable amount of time, and can it be easily automated or done manually on a regular basis?

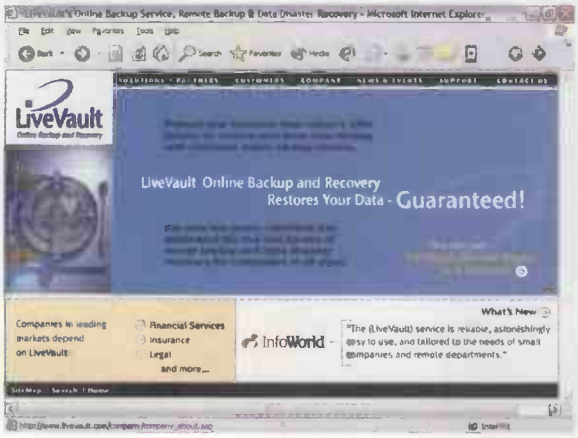
Software options

Modern operating systems usually include some kind of backup utility for defining what to back up and schedule regular backup cycles.

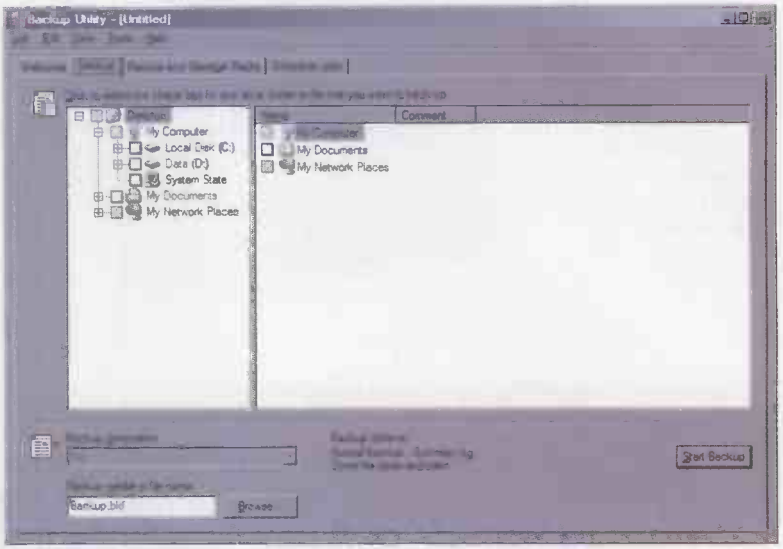
Linux distributions invariably include the Tar archiving utility, and compression utilities like gzip and bzip, which can be combined with a few simple commands to cover basic backup needs, and driven with scheduler software to provide a complete solution.

Windows includes a backup utility, and under XP it's sophisticated enough to cover the needs of most home users and small servers. Usefully, Windows backup includes a 'System state' backup option, which gathers together the system Registry and various other important Windows files, which is much simpler than backing up your whole Windows directory or hunting around for particular files holding important settings. If your Registry becomes corrupted or an important file gets overwritten, you can recover from the most recent system state backup without restoring the whole system or reinstalling. System state backups are especially useful if image backups (see box on previous page) aren't appropriate for your situation.

Experiment with the backup utilities included with your OS before paying for additional software. Often these utilities are all you need to schedule your backups and, even if you need something more sophisticated, the exercise will help clarify your additional requirements.



Online backup services, such as Livevault, provide one way of keeping your data safe



Experiment with the backup tools in your OS, for example Windows' Backup Utility, before buying more software

Again, it's about keeping it simple; don't introduce any more complexity than you need to keep your data safe.

Scheduling

There's a simple rule of thumb to remember when deciding on backup schedules: it's better to back up than not to back up. There's no point in instigating an impressive schedule that's swiftly ignored – and that's equally true on your home PC or a server at the office. Having already organised your data you'll have some idea of how much needs to be backed up, and how often. Consider if the system will always be on; if it will you can probably schedule automatic backups overnight, if not you'll have to perform them manually. As a minimum, plan to back up all your data once a week, and ideally changes on a daily basis in between.

Keeping a copy offsite

It's a good idea to keep some of your backups physically separate from the systems hosting the active data. Fire, flood, theft and terrorism are fortunately uncommon, but should be accounted for nonetheless. The simplest offsite backup is just taking backups from home to the office, or vice versa. For many modest applications this is adequate. You only need to consider specialist data storage services if your data is especially valuable or you require additional security – there's no point keeping your servers in a vault if the backups are on your desk at home.

For on-the-go backups of work at hand, web-based email services can be handy. There's a definite security concern, though. You don't know how secure your data is from prying eyes while it travels back and forth on the Internet or when it's on your email provider's servers. But if that's not a problem, the upside is that, once you've emailed a document to yourself, you have a copy you can access from anywhere with an Internet connection, and that's probably hosted physically distant from your own system.

It's all about the data

Backing up is a boring business. It's time spent grudgingly because it seems mostly to legislate for equipment failure, malice and user error. But once your data is organised backing it up isn't complicated; it just takes a small amount of discipline to create and stick to a schedule. And remember the two most important rules: a backup is better than no backup, and a backup isn't a backup until you've restored from it.

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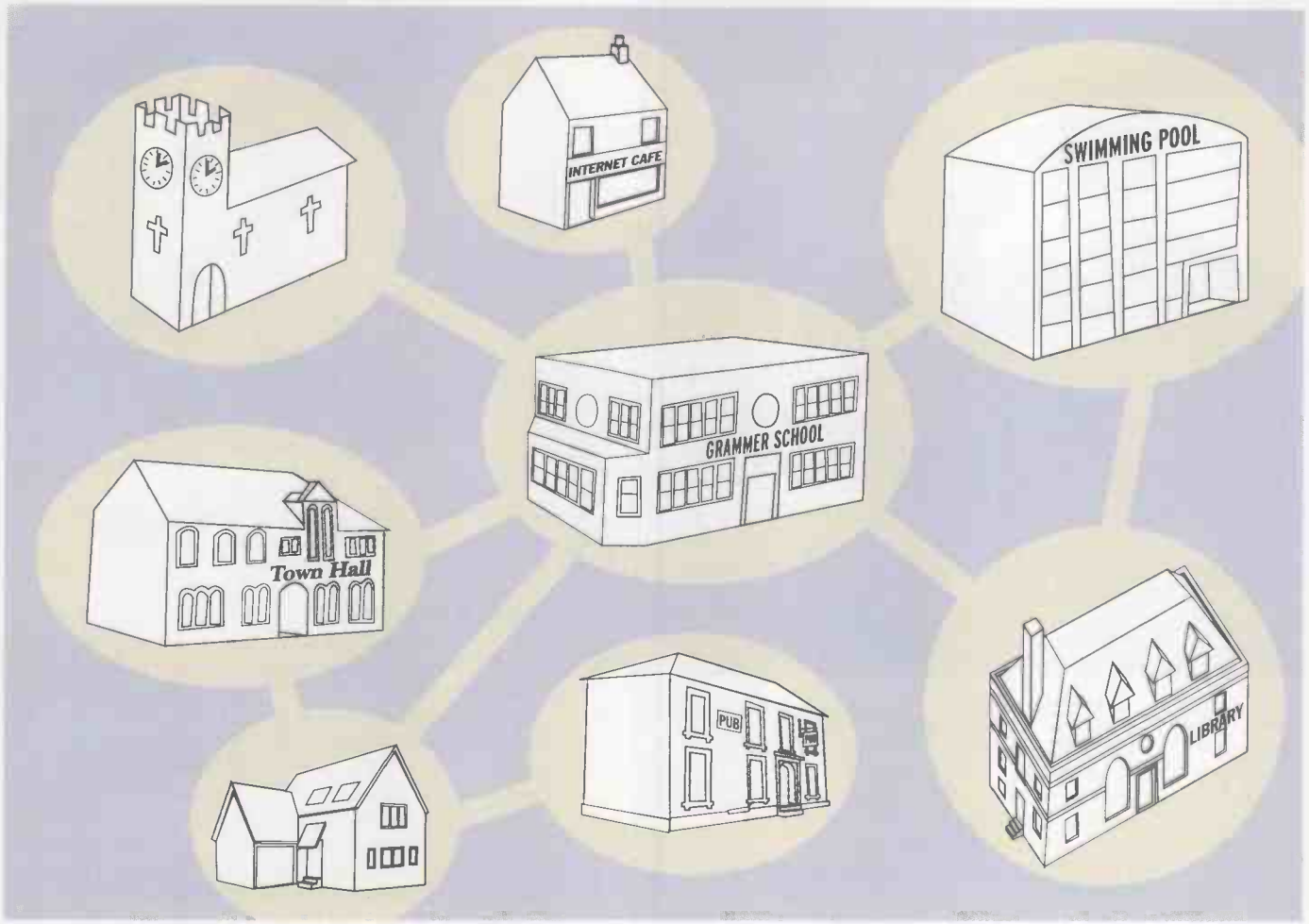


WORDS: SIMON WILLIAMS

Country club

The spirit of self-help is still strong in Britain's rural parishes, as exemplified by Buckfastleigh in Devon, which set up its own wireless broadband network

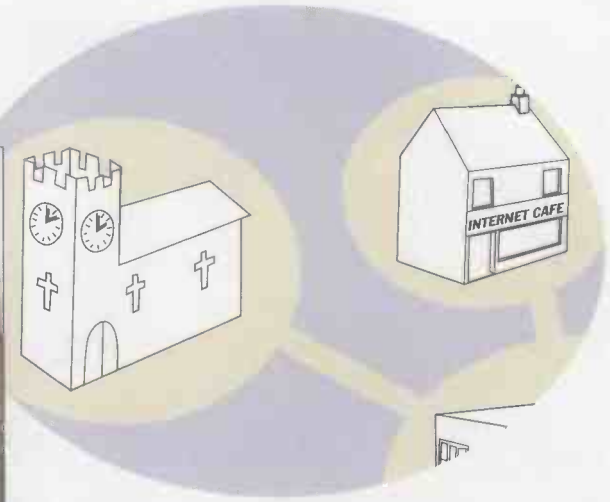
Visit Buckfastleigh on a hot day in mid-summer and you might call it sleepy. Underneath the veneer, though, this small market town just off the A38 in south Devon is a thriving and varied community, from local traders and professionals, to businesses and those who travel to Exeter, Torbay or Plymouth to work.

Historically, Buckfastleigh had a thriving wool industry; for a time it was one of the most important mill and tannery towns in the south west. With much less wool work available today, the town provides a mixture of light industry in a small industrial estate and small businesses ranging from rural craft to IT in and around its centre.

The population of some 3,600 supports a primary school, library, swimming pool, town hall and, for the past two years, an Internet café. It's similar to hundreds of other similarly sized towns in the UK, but differentiates itself by having a broadband network. This broadband service isn't courtesy of BT, though, but is a mixture of cabled and wireless links run by a separate, community-based project.

Buckfastleigh Broadband is the story of two people who wanted better online communications in their town, of a government keen to explore the best way to digitally enfranchise rural areas and of a country community that was surprisingly keen to embrace new technology. It's also the story of some happy coincidences, some unconventional approaches and of Wave, a public access point which became much more than an Internet café.

The broadband nodes are sufficiently unobtrusive that they can be installed within the Dartmoor National Park, without the need for planning permission



Kathryn Hughes has lived in Buckfastleigh for the past 16 years and in April 2001 was conducting her commercial surveys business from a cottage in the centre of the town. Her partner, Gordon Adgey, was working as a telecoms consultant in London and travelling down at weekends.

Adgey could see the start of the spread of broadband in London and the difficulties Hughes had sending and receiving the many email questionnaires which were the backbone of her business. Together they started what Adgey calls 'a hobby project to get fibre to the cottage' – in other words to see how feasible it would be to get broadband in Buckfastleigh, bearing in mind that the main trunk cabling for transatlantic speech and data traffic runs down the side of the A38.

Having checked with all the obvious providers, such as BT and Telewest, and finding they had no plans for Buckfastleigh, Hughes and Adgey were forced to look further afield for help, particularly with funding. Almost on a whim, Adgey rang the DTI, to find that it had just been given £30m of Government money to set up and run rural trials. These were intended to test the possibility of introducing broadband into country areas, often not seen as commercially viable.

Cash in hand

To make a bid for a portion of the £3.8m assigned to the south west, which was being administered by the South West Regional Development Agency (RDA), Hughes and Adgey had to come up with a project fitting the criteria.

This had three essential parts: creating a pilot broadband network, setting up a public access centre for broadband and the Internet (the Wave Internet café) and creating a series of Action Programmes. These Action Programmes should show what could be done with the technology and provide education in its use.

The good news was that the RDA liked their proposal, but the bad news was it took the best part of a year to get accepted and for funds to be released. Hughes said: 'The approach we took was not just a technological one and I think that was key. Because we felt strongly that there needed to be a physical space... Wave and the Action Programmes became a way of capturing people's hearts and minds.'

Armed with a grant of £500,000 over two years, Buckfastleigh Broadband became a reality and work began in parallel on the two main elements, the broadband network and Wave.

Why wireless?

The Buckfastleigh Broadband team looked at several possible technologies for delivering broadband throughout Buckfastleigh and its surrounding area, including satellite, wireless and running cables. The idea of running extra cables along the overhead power or telephone poles soon proved prohibitively expensive and fraught with regulatory hurdles, leaving the options of satellite or point-to-point wireless.

The satellite option had several disadvantages. It is by nature an asymmetric system, with a comparatively slow upload speed, and it has a relatively long latency, making it awkward for games players and others needing a quick response from the Internet. Also, at the time Adgey's team was looking at its options, it would have meant setting up as a commercial reseller, something they didn't want to do.

Point-to-point wireless was looking like a better choice, particularly when Adgey discovered a company called Orthogon Systems, based in nearby Ashburton, whose main business was research and development in wireless technology. In exchange for some assistance in the surveying and installation of the core wireless infrastructure, Orthogon would have a wonderful working test bench for some of its development work.

For the purposes of the pilot scheme, the broadband pipe was provided via Buckfastleigh primary school. A separate Government initiative, the National Grid

Wave's unusual interior was enough to attract many curious locals, who might not otherwise have crossed the IT threshold

for Learning, was due to run a 2Mbits/sec pipe into Buckfastleigh Primary by 2005. There was interest in the feasibility of linking small communities to schools' broadband grids in this way and, with a bit of wangling, the school got its connection early.

The pipe proved fine, technically, and was used for the duration of the pilot project. However, there were access problems, because of the extra security and content restrictions necessary for Internet going into schools. It wasn't possible, for example, to complete some web-based transactions on the schools' grid, limiting its usefulness for online banking and Internet purchases.

Wave

At the same time as the broadband system was being established, with nodes and aerials popping up all over houses in the town, the public access point, Wave, was getting up and running. The venue was a shop in the centre of the town's main street, which had formerly been a launderette and café.

Hughes set out with some deliberately challenging ideas for Wave. For a start, rather than trying to blend in with its surroundings, she decided to make the café look very different from the other shops in the street. She used an interior designer and ended up with a very modern and metropolitan look. Its five PCs and three Imacs sat on trendily curved coloured benches and tables with retro-styled chairs in white glass fibre and orange acrylic.

The reason for this approach, she said, '...was that it makes people far more curious. Using people's curiosity and the gossip network is much quicker and more powerful [at promoting something] than virtually anything else'. Hughes was very keen that Wave should be available as a café, where people could nip in for good coffee, as well as an Internet resource.

Hughes and Adgey also took an unconventional approach to publicising both broadband and Wave. As well as speaking to interested parties in meetings, they both spent a lot of time evangelising and spreading the word one-to-one in pubs and at local events, such as the annual arts festival. The idea was to get as much out of word-of-mouth promotion as possible.

It certainly seemed to work, as within a few months Wave had many customers, and not just young games players and local propeller heads. The centre became widely used for a variety of activities, from people wanting to investigate their genealogy, to those keen to edit video, to groups of young parents on Surestart training schemes.

Increasing knowledge of Wave also brought in what Hughes describes as 'a lot of very technically au fait people', many of whom were prepared to lend a hand helping in Wave or in further promotion. It's this large enthusiast core that is one of the assets so valued by 1st Broadband, the company which eventually took over Buckfastleigh's customer base.

The villages

About three miles away from Buckfastleigh are two villages, Holne and Scoriton, with populations of a few hundred. Each village had several people who pricked up their ears when they heard Buckfastleigh now had broadband. They included teleworkers, farmers and guesthouse owners – this is a popular area for Dartmoor walkers. Although there were probably only a dozen people in total interested in taking on a faster link – and in the long term paying for it – Adgey felt it would make a good extension to the scheme to test the feasibility of linking these two villages to the Buckfastleigh network.

Once the wireless link is in place, all the usual advantages of broadband are available to Buckfastleigh Broadband customers, including video-conferencing

By setting up wireless nodes at key points within the villages, such as pubs, they could provide not only Wifi links to several interested customers, but also set up hotspots in public places. Several Dartmoor walkers, particularly those from urban areas, were amused to find a wireless hotspot in a working pub on Dartmoor.

The tests of the system, running at 3.5GHz, proved the links could work. Beaming from point to point, over about three miles, wireless connection was made to the two villages. Since last summer, people have been able to hook into the Internet over their pints in the Tradesman's Arms.

How to approach your own project

1 Don't approach it only from the technology end – the accent is on the community. You need to sell the project as an advantage to real people.

2 Get as many people involved as possible – if you can find the people in your area who are already interested in broadband, they'll be your best advocates – often much faster and more effective than public meetings.

3 Use the power of gossip – word of mouth is a very effective way to get your message out.

4 Consider all possible customers: home, business, educational, local government – although you may want broadband in your own home, think of all the other people who would find it valuable. Business users will often be able to offset the cost, where individuals can't.

5 Make the message clear and simple – free up your phone line, get permanently-on Internet, get faster downloads. Sell the biggest advantages first. In rural areas, most people will only have one phone line and will share it between voice and data. Broadband's speed may not be its biggest attraction – though it's still good to have.

6 If you're in a village, tie in with a nearby town – it's easier to extend an existing broadband system from a town to a village than to start from scratch in a village.

7 If you're in a town, don't forget nearby villages – with wireless technology, it's not as expensive as you might think to pull in relatively small pockets of interest in nearby villages, and the extra numbers may take you over a threshold level.

8 Unless you're willing to start up a new ISP, try and get an infrastructure provider involved early – too many people who are interested in playing with the technology get bogged down when they realise somebody has to provide support to subscribers.

1st Broadband and Buckfastleigh Broadband joined forces to expand the services

Introducing 1st Broadband

About halfway through the project, at the beginning of 2003, Adgey and Hughes started to consider how it could be carried forward after its two-year funding finished. They needed a commercial broadband supplier that could take over the demand, support their customer base and expand it to take in more as word spread.

1st Broadband (www.1stbroadband.com) is a young company specialising in providing wireless broadband in rural areas, so there seemed to be a near perfect fit. The company's first broadband network was built around the Penwith area, right at the south-west tip of Cornwall, beyond Penzance. There are around 100 homes and businesses hooked up in a Community Broadband Network (CBN).

The company has a rather different approach from many providing broadband connections. It's keen to be involved in providing the hardware infrastructure needed for wireless broadband, but tries to work in collaboration with small local companies and individuals, which it terms 'local partners'. The idea is both to provide a fast connection for local groups interested in broadband and to make use of the enthusiasm and local knowledge of those groups to host wireless broadband nodes, promote their network and attract more customers. A mutually profitable symbiosis.

In Penwith, 1st Broadband worked with its local partner to set up a wireless CBN, which has been running for over a year and covers a 70 square-mile area that encompasses six towns and villages. The wireless CBN normally runs faster than ADSL and, potentially, customers can work at up to 2Mbits/sec. The service is fully symmetrical, so uploads are as fast as downloads.

Hans Scheepers, managing director of 1st Broadband, believes his company can produce a commercially viable network where the big players can't, because '...they are thinking wire only and there are limitations to the wires, and because we co-operate closely with the community'. He believes working with enthusiasts is much easier for a small company than for a big corporate.

Buckfastleigh Broadband came to an agreement with 1st Broadband towards the end of 2003 to deliver a commercial broadband service to Buckfastleigh and to expand it to around 120 customers, hopefully by spring of this year. For the Buckfastleigh project, the company charges a sign-up fee of £180 for a basic link, which includes connection kit (to Ethernet) and installation. After this, it's £25 a month for its residential service, broadly in line with the rates you could expect in many urban areas.

Where we go from here

Government funding for the Buckfastleigh Broadband project has now finished, but many of the people who signed up for the free pilot trial in the town have switched to the 1st Broadband network, though they now have to pay. It's early days, but it looks as if the target of around 120 customers can be achieved, making the network a viable, commercial business.

Sadly, Wave has had to close with the end of the funding, but negotiations are in progress to set up 'Son of Wave' somewhere else in the town, as a community venture. The equipment is there, so it's just a case of finding premises and volunteer staff. It would be a shame to see a resource like this, which has proved so popular, die for lack of council support.

Hughes and Adgey didn't quite get fibre to the door of their cottage, but have got a broadband aerial and a fast connection. So have lots of others in the town, many of whom no doubt thought it would be years before broadband reached south Devon. Thanks to a lot of hard work by local people and good collaboration between individuals, business and government it turned out well.

The couple who set the whole project rolling were after fast internet for their own businesses. 100 other people now benefit, too

Frequency changes

The original Buckfastleigh Broadband system used a core of 3.45GHz wireless links to a series of nodes around the town and was translated down to 2.4GHz for 802.11b hops to customers' houses. Wireless gateways were then all that was needed for individual customers to connect into the broadband network. 3.45GHz was chosen because, at the time, potentially commercial ventures were not allowed to use the 2.4GHz spectrum.

However, during the two years the project was running, the Government auctioned off the franchise for 3.45GHz wireless networks, in much the same way it auctioned the 3G frequencies to the highest mobile phone bidders. The winner of the majority of UK franchises, including the one for the south west, has yet to make an offering in the Buckfastleigh area, but the 3.45GHz band is no longer available to other companies, such as 1st Broadband.

The 2.4GHz spectrum has now been opened up for commercial use, so 1st Broadband has had to reconfigure the network, using entirely 2.4GHz equipment. However, this band is much more line-of-sight sensitive than 3.45GHz, so some of the repeater aerials and nodes have had to be re-sited to continue providing a service to all the current customers.

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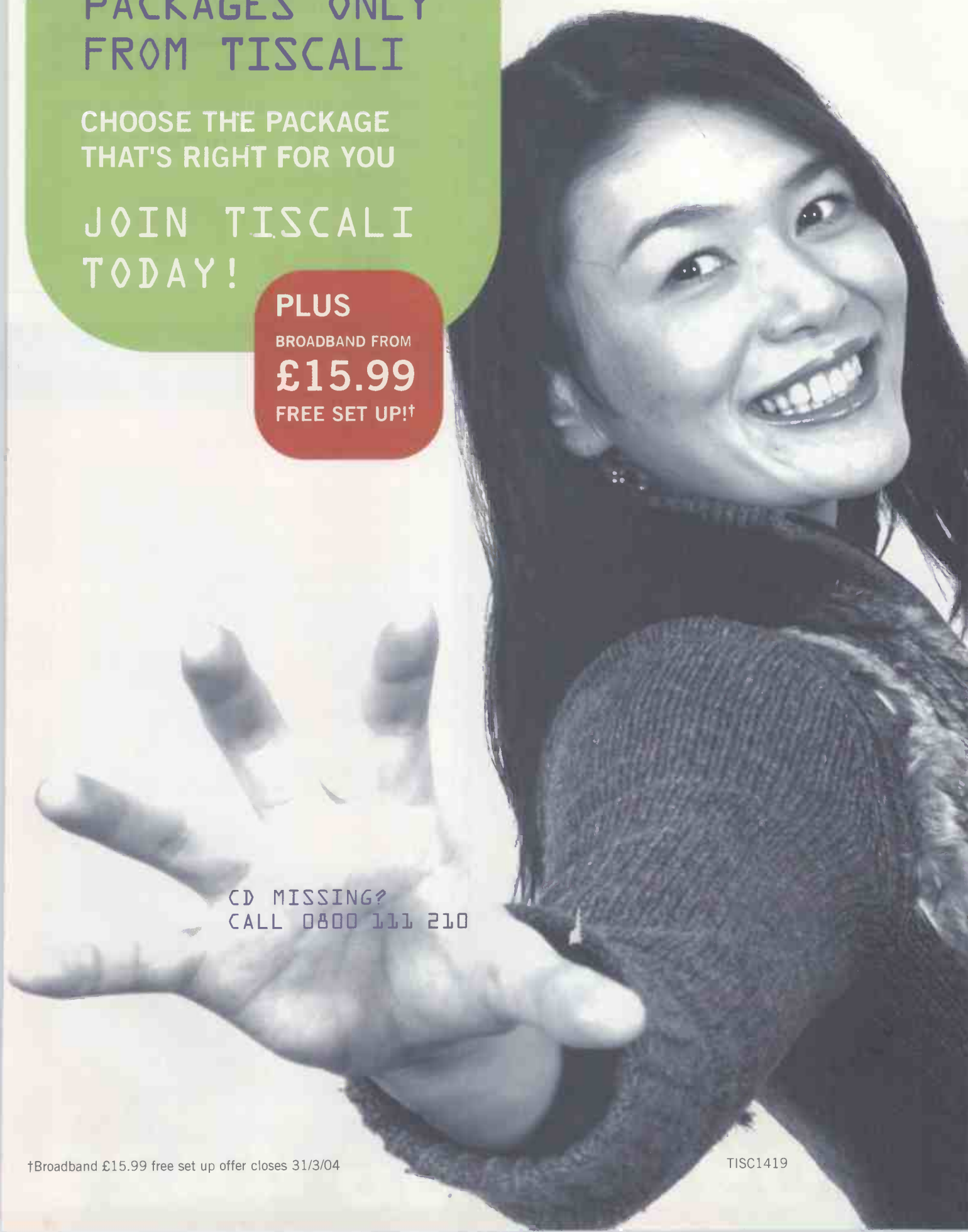

†Broadband £15.99 free set up offer closes 31/3/04

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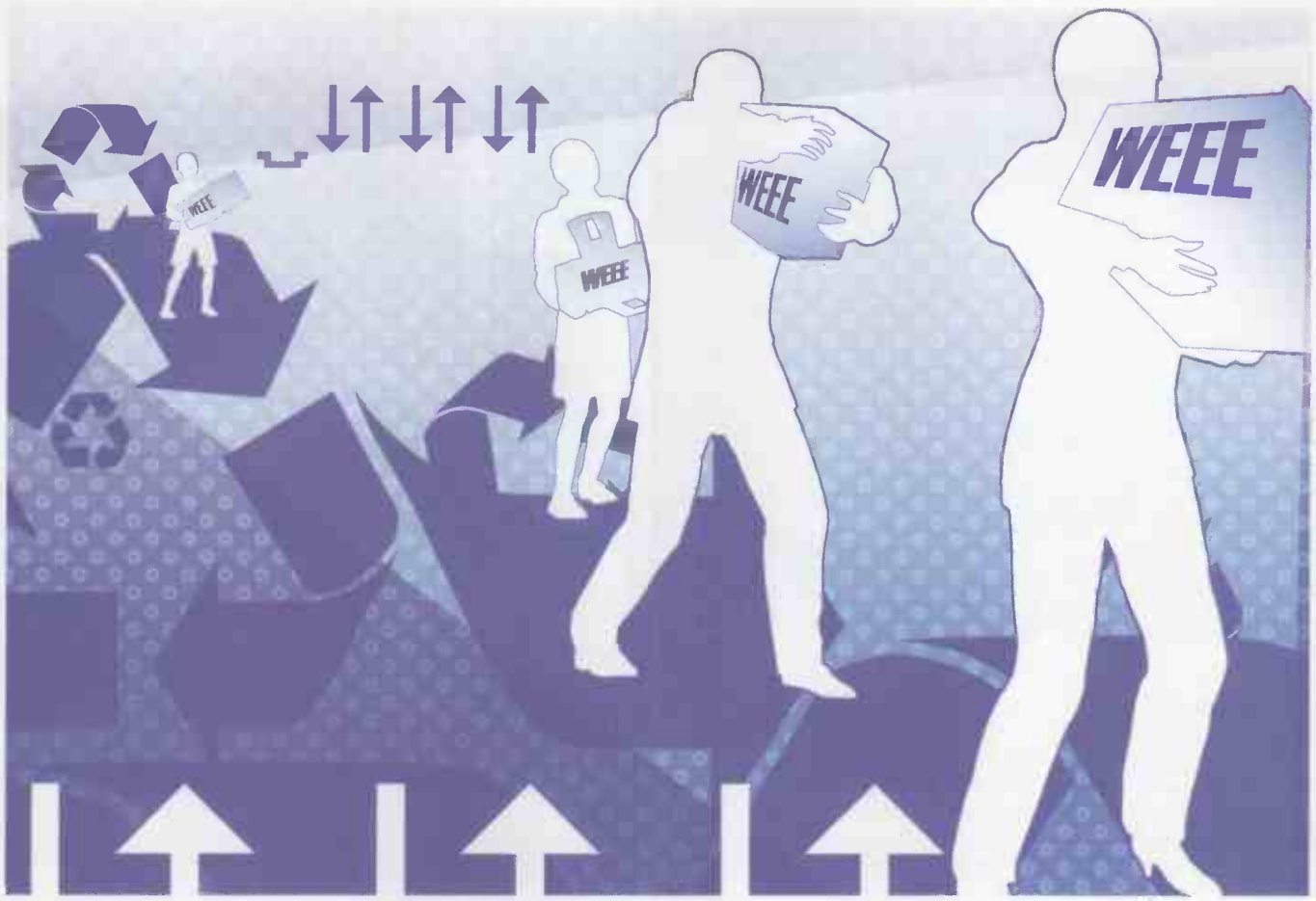


WORDS: DINAH GREEK ILLUSTRATION: VINCENT FRASER

War declared on IT waste

A new EU directive aims to tackle the problem created by the growing mountain of electronic waste, but consumers will be paying the price

In August a new European Union (EU) directive, the Waste Electronic and Electrical Equipment Directive, will be implemented. Better known as WEEE, it may sound as if you are being ordered to implement a form of bladder control or limit screams of delight on the downward trip of a rollercoaster, but in reality its job is to limit environmental damage by ensuring that IT equipment and more is disposed of and recycled in a responsible way.

The WEEE directive doesn't just cover PCs and associated peripherals. It includes your telly, PDA, Ipod, hairdryer and numerous other appliances, gadgets and gizmos: even toys.

Of course, the UK Government has given us some time to acclimatise as the WEEE directive won't be transposed into national legislation until August 2005. The impact of the directive will to a large extent depend on the approach taken by the UK Government. The current catchphrase is 'the producer pays', which means most of the responsibility for disposal will lie with the original equipment manufacturers (OEMs) or retailers. But consumers will also be expected to comply with the regulations. This means there will have to be a fairly comprehensive campaign to educate people in the UK about recycling electrical kit.

The changes to consumers may initially seem minimal. For example you won't be able to leave your old PC at the dump any more. But dig a little deeper and it seems that inevitably it will be the consumer who pays the price and you can expect to see the financial changes hit soon.

European electronic waste is set to be around 12 million metric tonnes per year by 2010

The mountain of computer equipment is becoming a major problem

What is WEEE?

The WEEE directive is one facet of the EU's attempts to tackle the increasing waste mountain that has developed from our growing love affair with gadgets and gizmos. In the UK alone we dump around 1.5 million PCs per year. If you add up the figures from the entire European Union, companies and consumers today generate a hefty six million tonnes of electronic waste annually. With fast-paced technological changes, increased competition, ever lower prices and our desire to have the latest upgrade so we can boast ownership of the meanest, leanest, all-singing, all-dancing gadget, electronic waste in Europe is growing so fast that, by 2010, it is expected to reach around 12 million metric tonnes per year. Again, on current form, most of this would be dumped into landfill sites.

This isn't very good for the environment as you can imagine. As well as most electronic waste being practically non-biodegradeable, much of it, particularly equipment such as monitors, contains hazardous waste such as cadmium and lead. As a result, governments are facing a major problem as landfill sites reach saturation point. Environmentalists also point out that if some of this hazardous waste leaches into the ground water and gets into the human food and water chain, it could have a detrimental effect on us all.

'Most electronic waste is practically non-biodegradeable and can contain hazardous waste such as lead'

This potentially lethal time bomb has taxed the minds of politicians and industry for nearly a decade. So we have been set a target of recycling 4kg of electrical goods per person per year by December 2006 and the WEEE directive is the main way of achieving this.

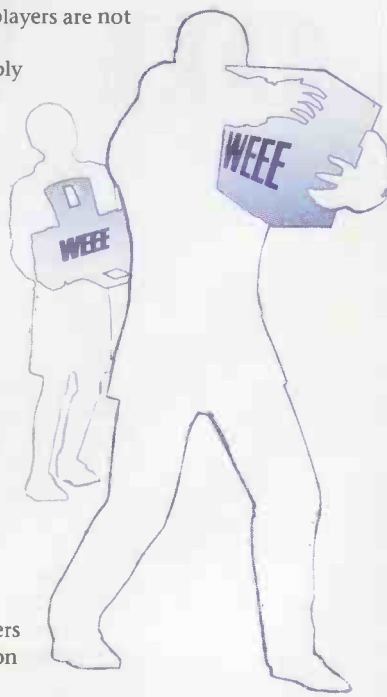
How will WEEE work together?

The directive has gone through a number of changes in its time. Manufacturers argued that the original directive would have put such a serious financial burden on some companies that it could send them into bankruptcy.

Although they have succeeded in softening the directive following a series of consultations with domestic governments and the EU, what they will have to do is honour what is known as the 'cradle to grave' concept. Ultimately it will be their responsibility to ensure that most WEEE waste is recycled or re-used. The bits that can't be, will then be disposed of in an environmentally responsible way.

But local authorities will also have a part to play. They have statutory targets to increase recycling and will be required to handle WEEE waste in the community.

It is likely most of their liability will rest with the huge amount of 'historic and orphaned' waste. Historic waste is the ageing equipment stored in attics to gather dust. Orphaned waste is equipment bought from an OEM or retailer that no longer exists. You have only to look at the case of Multivision, the latest casualty in the fiercely competitive PC builder industry, to realise this could be a problem. With this sort of waste equipment, the major players are not happy to carry the can.



Producers will probably have to pay into a slush fund based on the percentage of market share they have, so local authorities can hand this over to them. That said, this is another area being fiercely argued with the DTI.

'Producers are unlikely to fund a central clearing house unless the forthcoming legislation requires them to do so. In the PC market, increased competition means producers are forced to operate on very tight margins. Those producers that take the initiative on

recycling face the prospect of raising prices and losing market share,' said Jon Godfrey, managing director of recycling company Life Cycle Services.

One final note of caution. There is a proposal that the person or company who imports electrical equipment be considered the producer. People who buy and sell at computer fairs could find themselves having to deal with the WEEE directive as well.

How will WEEE affect you?

In terms of how the directive will impact on consumers, you probably won't see much difference initially. The first thing you may notice is that it should theoretically be much easier to get rid of old equipment. You won't have to go to the council rubbish tip to offload that dusty old beige box. Instead, the producers – be they OEMs, computer builders or retailers – will have to take back products on a like-for-like basis. So if they sell you a new PC, they have to take back your old PC if you want to dispose of it. This means that the supply chain and retailers are also involved. It doesn't matter if you bought your old kit from Dixons and it is an HP PC. Should you choose to buy your next PC from, say Evesham, it will be Evesham that has to pick up and arrange disposal or recycling of the old machine. Or vice versa.

Just how the logistics will be handled is not entirely clear in some circumstances. If the producer is delivering to your door then they will have to pick up old equipment. If you buy from a shop, you may still have the bother of getting the gear to the retailer. The directive currently states that retailers will be allowed to establish alternative collection systems so long as these are no less convenient for householders (you've guessed it, what is convenient is still a matter for consultation).

'Producers will be able to add a charge on new goods at point of sale to cover the costs of future disposal'

Vendors and OEMs will also have to plaster 'environmentally friendly' logos on equipment to remind you, the consumer, as well as the refuse collectors that these bits of kit are not for wheelybins. This means if you are not buying on a like-for-like basis and just want to get rid of old PCs, peripherals or other computer gear, it will have to be collected separately from mainstream household waste.

Hang on, where's the catch?

Ah yes, the catch. While the onus lies mainly with the 'producer', they are only responsible for financing most of the WEEE's activities. The word to note here is most. This means quid pro quo, the consumer will end up footing some of the bill. So although producers will not be allowed to charge you for taking back old waste, they will be able to add a charge on new goods at point of sale to cover the costs of future disposal.

At first this will add around £4 to £5 to cheaper pieces of hardware such as printers. But analysts have predicted that the charges for PCs and peripherals could rise by as much as 15 to 30 per cent over the next five years.

There are also likely to be charges from local authorities for handling this waste. Although the Government has earmarked some money to be released in January 2006, so recycling facilities can be set up by local authorities, this won't cover the ongoing costs of recycling. This could mean council taxes are increased.

One other way to fund the requirements of the WEEE directive is through VAT, an approach that is already starting to happen in mainland Europe.

'Sooner or later the end user will foot the bill – end users pay tax, they buy products and they throw things away, so at some stage yes, they will have to pay,' warned Godfrey.

Are there other ways?

One of the major concerns among recyclers and environmentalists is the emphasis that has been placed on disposal rather than re-use. It has even been said that if the Government does not shift its recycling focus to remarketing, it will be an environmental disaster, provoked by environmental regulation. This lack of emphasis on re-use has also angered charities which point out that they can, for a small fee, refurbish computer equipment and pass it on to those in need. Tony Roberts (pictured below), founder and chief executive of Computer Aid International, urges consumers to think laterally.

'Many people simply don't know what to do with old computer equipment and won't really want to have to pay for disposal. Computer Aid International (www.computer-aid.org) provides a simple and free solution to dealing with old computer equipment and through www.parcel2go.co.uk, people can ship things back to us for under £10.' (Phone 01204 384 426 and quote reference CAID.)

So there you have it – but as the interpretation of the directive is still wide open despite all the consultation that has taken place to date, people are still trying to change processes. Preparing for the WEEE directive is currently based on guesswork alone.

For further reading on the directive see www.pcw.co.uk/specials/1152928.

Tony Roberts says most people don't want to have to pay for disposal of computer equipment

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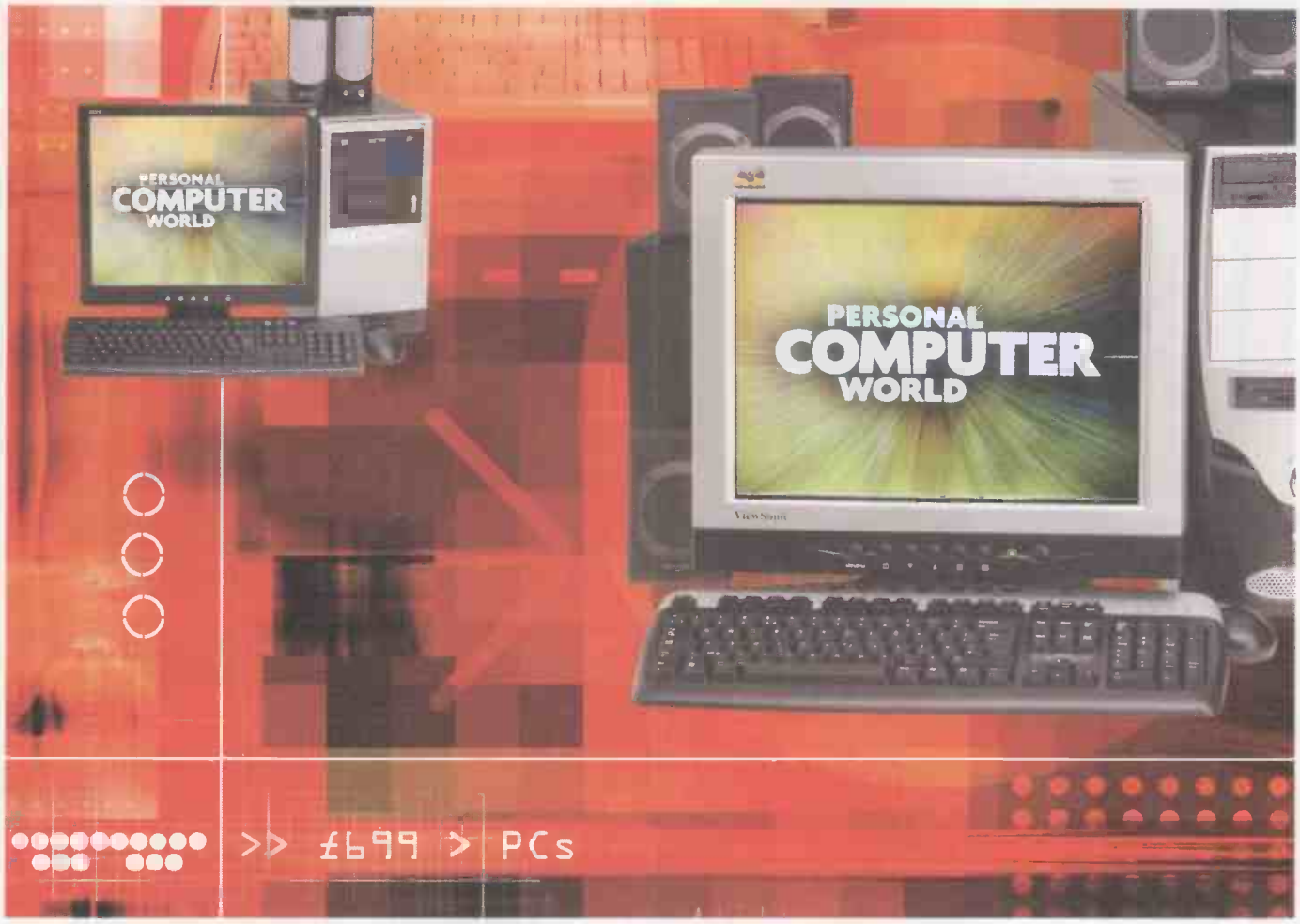

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More for your money

WORDS: RORY REID **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

You might be surprised at the type of PC you can get for £699 these days. So if you are on a budget, but still want a well-specified system, we've tested 10 to help you decide

Now the post-Christmas sales have come and gone, you may not think it's a good time of year to buy a new PC. All is not lost however, as we've challenged 10 manufacturers to provide us with PCs for users on a restricted budget. We've stipulated no other requirement except a maximum price of £699 ex VAT.

You may not expect much in the way of performance components or luxury features for this price, but we think you'll be quite impressed at the range of PCs submitted. With new components being launched all the time, the models they replace begin to fall in price; giving budget systems the opportunity to challenge their better specified counterparts on many levels.

To determine whether each PC is worth your investment, we have, as usual, subjected each of them to VNU Labs' stringent benchmark tests. This month we've introduced the Sysmark 2004 test, but we've also included the Sysmark 2002 results to give you an idea of how they compare.

We've also moved on from 3Dmark 2001 to use 3Dmark03 to test graphics performance. Turn to page 12 for a full explanation of how we tested.

In choosing the overall winners, we examined various factors including value for money, features and the all-important question of performance.

Read on to find out just what kind of system you can get for your money.

Acer Aspire T120

The Acer Aspire T120 is the least well-equipped PC in the group. With 256MB of Ram installed, it has just half the memory of its rivals, and loses even more ground in terms of its relatively low-speed processor. At the helm of the system is an Athlon XP 2600+ CPU which, in this company, is outclassed.

To its credit, the Aspire T120 managed to keep up with the theoretically faster ECS EZ-Buddie, despite its lower specification. Sysmark 2004 returned an overall score of 118 – an acceptable figure for a machine of this configuration, but one that was well below the scores achieved by PCs at the top end of the group. Likewise, the Internet content creation and office productivity scores of 133 and 104 respectively were adequate, but hardly inspiring.

The T120 makes amends for its lacklustre performance by including a 17in flat-panel monitor – one of only four TFTs in this group. LG's versatile GSA 4040-B optical drive adds further value to the overall package. Not only does it provide support for DVD+R/RW and DVD-R/RW, but it also goes one step further by offering DVD-Ram support – an option not offered by any other system here, and one that should appeal to those who wish to ensure maximum compatibility with their home DVD players.

The Western Digital hard drive provides an adequate 80GB of storage, 20GB more than the ECS, but nowhere near the generous 160GB in Evesham's Axis 64 3000+. Likewise, graphics performance is not the best, but most users will be able to extract adequate performance from the 128MB ATI Radeon 9200 SE card.

Despite having a comparitively inferior specification, the T120 still copes well. Its 256MB of Ram will need upgrading sooner rather than later, but Acer can be commended for the inclusion of a large TFT screen and the best optical drive of the group.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Acer 0870 900 2237
www.acer.co.uk
PROS Good DVD writer and monitor
CONS Small amount of Ram
VERDICT
This is a good PC in its own right, but more demanding users may find its performance leaves a lot to be desired

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

Carrera Octan 2800SEW

Carrera makes a welcome return to *PCW* group tests with the Octan 2800SEW, which has a balanced specification on the whole, despite the inclusion of a relatively low-end Athlon XP 2800+ processor. This sits alongside 512MB of DDR memory in a dual-channel configuration, designed to reduce performance bottlenecks.

This combination works well aboard Leadtek's Winfast K7N motherboard, which provides plenty of upgrade potential thanks to its five PCI slots (two are available for use) and a maximum memory limit of 3GB. This configuration was enough to put the Octan 2800SEW in the top half of our performance table.

Perhaps the most notable aspect of the Carrera system is its graphics capabilities; here provided by a 128MB ATI Radeon 9800 All-In-Wonder card, which is always a good performer. In this PC, it achieved a 3Dmark03 score of 3,648. Multimedia enthusiasts will be pleased to find a built-in TV tuner along with a comprehensive remote control and USB receiver.

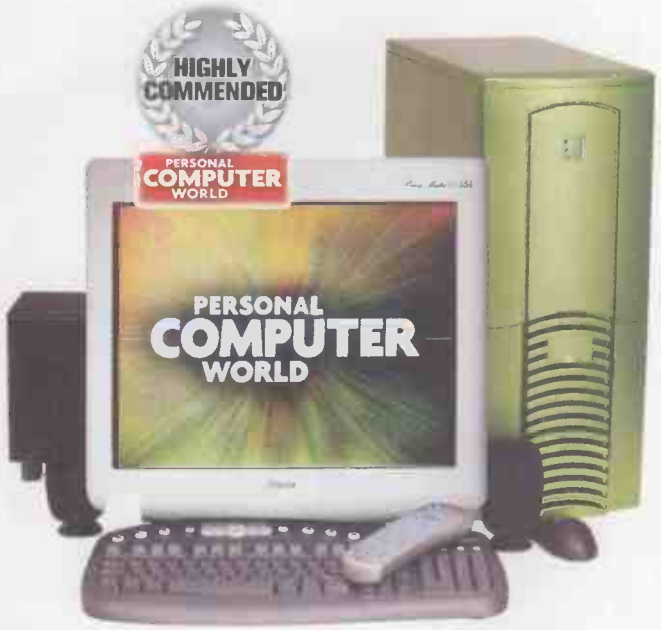
The Sharp LLT17A-4 is an excellent 17in monitor, particularly for a budget system. It has a thin bezel, fast response time and good picture quality. Our only real criticisms are its lack of digital input, and its weak integrated speakers. The external stereo speakers provided by Carrera as an alternative are a better solution, but won't impress sound enthusiasts.

These impressive features are very welcome, but their presence does affect the remainder of the specification. Samsung's CD-RW is useful, but the lack of a DVD writer may discourage some buyers. The Octan 2800SEW is a well-rounded and capable PC with only a few minor omissions. It offers good performance, a solid specification and a five-year warranty, the first three years of which are on-site.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Carrera 0871 222 3456
www.carrera.co.uk
PROS Good monitor and graphics card
CONS No DVD-RW drive
VERDICT
This is a very well-balanced machine with strong performance and a good list of extra features

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



Demonite OverX3200

One for overclocking enthusiasts, the OverX3200 sets itself apart from the group in several ways. Technically, its Athlon XP 2500+ is the least efficient processor in our line-up. Despite its humble roots, however, Demonite has managed to extract a level of performance usually only seen in Athlon XP 3000+ processors or higher.

Analysing the PC's individual CPU performances with PCMark04 revealed some rather telling facts. The humble Athlon XP 2500+ managed to stay on the heels of the Pentium 4 2.8GHz processor in the Nethighstreet machine, and outperformed the Athlon 64 that powers the Microland submission. Full application testing with Sysmark 2004 put the Demonite in third position overall with a score of 150, indicating that bottlenecks elsewhere hindered performance.

As novel as it is, overclocking has its drawbacks, most significantly in terms of the amount of heat generated by any component asked to work beyond its normal parameters. The dangers of this are reduced in the OverX3200 thanks to a large ATX case that gives internal components plenty of room to breathe, and five internal fans including a manually adjustable Zalman CPU cooler.

Graphics are provided courtesy of the ATI Radeon 9800 All-In-Wonder graphics card. This racked up a strong 3Dmark03 score of 3,689 – a slightly higher total than achieved by the Carrera. Graphics are pumped through the 19in Iiyama 454 Pro monitor – which handles its display duties admirably, but takes up a significant amount of space.

We were impressed with the OverX3200, but its overclocked CPU is a double-edged sword. While it offers good performance, we would like to have seen more features due to the savings made on the CPU. Despite this, the Demonite is a strong submission.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Demonite
0871 222 7222 www.demonite.com
PROS Versatile graphics card
CONS Bulky case and monitor
VERDICT
Recommended for those who wish to make a strong impression with the performance and physical look of their PC

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

ECS EZ-Buddie

Those with an appreciation for small, yet eye-catching case designs will find the ECS EZ-Buddie highly attractive. Unlike the rather plain-looking Intellect submission, this PC is housed in a space-saving, small form factor case that users won't want to hide under a desk

It comes as no surprise that ECS has chosen to use many of its own components here. Among these is the tiny KM400 series motherboard, which acts as the foundation for a pair of 256MB Dimms and an Athlon XP 2800+ CPU with a Barton core.

One of the most distinctive aspects of the design is the CPU tuner, an overclocking dial that increases or decreases the processor's clock speed. We got good results from the Barton-based CPU in its standard 2.25GHz configuration, but bottlenecks caused by the sluggish hard drive and memory meant overall performance was uninspiring. Its Sysmark 2004 score of 121 was second lowest of those that completed the tests.

The EZ-Buddie is not well suited to games or multimedia applications. Its Rex Radeon 9200 SE graphics card returned a fairly low 3Dmark03 score of 616, and an Unreal Tournament score of 28 frames per second (fps).

Where the EZ-Buddie comes into its own is in the provision of some welcome extras. These include the built in 4-in-1 multimedia card reader, neatly concealed behind a panel at the side of the unit and a USB floppy drive. Alongside these, ECS has included a TV tuner card and a 17in TFT monitor. These prove to be a good combination, particularly as the screen can be viewed from a wide horizontal angle, which facilitates group viewing.

The EZ-Buddie may fall short of the performance offered by the majority of its rivals, but it does make amends. It is the smallest and quietest system of the group by some margin and its satisfying feature list makes it a worthwhile consideration.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
ECS
0870 120 5370
www.ecs.uk.com
PROS Monitor; multimedia card reader
CONS Graphics card; performance
VERDICT
A small and attractive machine that it is hindered only by a lack of decent performance

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

Evesham Axis 64 3000+

On the surface, Evesham's Axis 64 3000+ looks remarkably similar to the Evolution 3.2P (reviewed on page 43). This is mostly due to the 'splat' case, but less obvious similarities can be spotted.

Its fast PC3200 memory is installed in a dual-channel configuration atop an MSI motherboard, which also sports a passively cooled northbridge. This is fed information by the same Athlon 64 3000+ CPU seen in the Microland submission. As a result, both PCs produced virtually identical performance results to top the group.

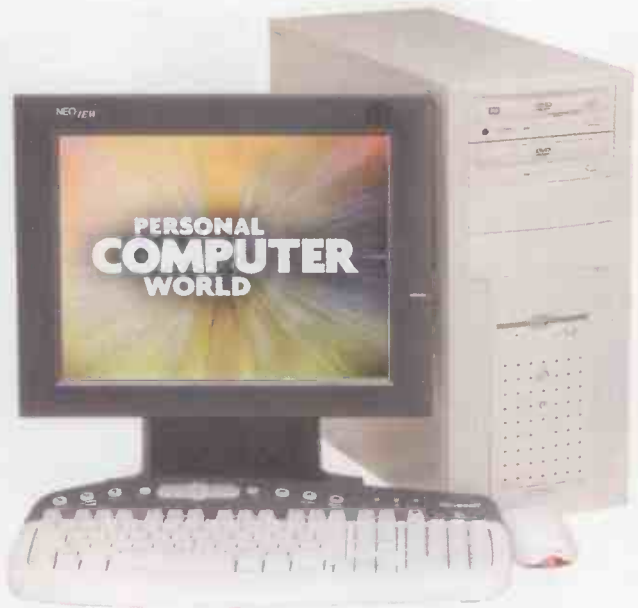
The Axis 64 3000+ is one of just two PCs here that offer a 160GB hard drive – a significant inclusion for a budget system, and a surprise given the remainder of its generous specification. Evesham has also included the 128MB ATI Radeon 9800 All-In-Wonder. In this group, this is only bettered by the Radeon 9800 Pro in the Microland Tech submission. This clocked up a 3Dmark03 score of 3,869 – enough to power Unreal Tournament at a considerable 85fps. The card also includes a useful TV tuner, although some users may find the 17in CRT monitor not to their tastes for watching television. It provides a good, clean picture, but is a far cry from the 17in TFT panels elsewhere. The remainder of the system is fairly well decked out. Creative's Inspire P580 5.1-channel speakers are a positive inclusion, particularly for games or DVD playback. The Axis 3000+ doesn't include a DVD rewriter, but there is a DVD-Rom drive and high-speed Sony CD rewriter.

Evesham has obviously had to cut corners in places in order to include a fast processor and memory configuration, but for users who don't mind the omission of a TFT screen and DVD-RW drive, the Axis 3000+ is a excellent and well-configured PC.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Evesham
0870 160 9500
www.evesham.co.uk
PROS Fast CPU and memory
CONS CRT monitor; No DVD-RW
VERDICT
The Evesham 64 3000+ offers great performance, a strong specification and very good value for money

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



Intellect Prodesk XP2800

The Prodesk is one of four submissions built around an AMD Athlon XP 2800+ CPU. Like the majority of the group, it also includes 512MB of DDR memory, but this is supplied on a single PC3200 Dimm rather than in the more popular dual-channel arrangement. Though this approach could lead to performance bottlenecks, the two vacant memory slots allow 2.5GB of memory to be installed without any modifications.

The remainder of the Prodesk's innards are fairly standard. The 80GB hard disk isn't as impressive as the 160GB offerings elsewhere, but uses a serial ATA connection which gives it some of the fastest access times of the group.

This speed is unfortunately not replicated in the rest of the components. Sysmark 2004 testing indicated that, with its score of 129, it was marginally quicker than the Acer and ECS, but achieved significantly better frame rates in our graphics tests. More impressive results were seen in our graphics benchmarks.

The Prodesk follows the rest of the PCs in this group test by using an ATI graphics card, the Radeon 9600 Pro. Despite it being succeeded by the 9600XT, it is still a strong card with a considerable 256MB of memory. Unreal Tournament frame rates were just below 60fps – a pace many games developers strive to achieve in their products.

The Neoview Atec AL151 is a good entry-level monitor. Considering that some PCs here come with 17in TFTs or 19in CRTs, this 15in display could be seen as a disadvantage, particularly as its maximum resolution is just 1,024 x 768.

Despite this, we were impressed by the inclusion of a DVD rewriter. Many vendors have relied on the commonplace CD-RW, but this Lite-on DVD offering provides good support for DVD creation in both plus and minus formats. Overall, this is a strong contender.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION Intellect
08701 225 590
www.intellect.uk.com
PROS Dual-format DVD drive; graphics card
CONS Core performance; case
VERDICT
This is a strong submission with many positive attributes; let down only slightly by a relatively docile CPU

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

Jal Monarch FX57

Jal's submission is a rather mixed bag. Our initial impression was that it is targeted specifically at gamers. This was mostly because it is built around the DFI Lanparty NF II Ultra B motherboard, which offers a number of features that appeal to this particular audience.

The remainder of the system had us scratching our heads though. Its XP 2600+ processor was among the slowest of the group, and its overall configuration was only marginally more effective than the Acer. It failed to complete our Sysmark 2004 tests, but achieved a rather average Sysmark 2002 result of 206.

Its graphics card was also not as impressive as we'd have hoped. The Radeon 9700 is a sterling performer in its own right, and achieving a 3DMark03 tally of 2,750 in a budget system is no mean feat. However this was a far cry from the 5,722 achieved by the Radeon 9800 Pro in Microland Technology's system.

We were much happier with Jal's huge 160GB Maxtor hard drive. This uses a fast serial ATA connection and should appeal to gamers or those who need to store large quantities of multimedia files. You also get CD rewriter and DVD-Rom drives rather than a DVD rewriter.

To its credit, the Monarch FX57 is one of just four submissions shipping with a 15in flat-panel monitor. The Sharp LLT15A4-B is commendable, as it has a small footprint and a good picture. If you're tempted, you should consider the fact that it has no support for digital input, but on the whole is a good screen.

Despite its mixed specification, the Jal does at least come packaged with a number of games that help make sense of its choice of motherboard. Ghost Recon and Morrowind are both provided, along with a harness designed to help you carry the machine to and from Lan parties.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Jal
08707 525 810
www.jal.co.uk
PROS TFT screen; games
CONS Slow CPU
VERDICT
A good games-oriented PC, but not as effective in this department as some of the other submissions

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

Mesh Matrix 2800+ Value

Mesh has furnished its latest budget offering with some familiar components. It distinguishes itself from the rest of the group, however, thanks mostly to its 19in monitor. The Mitsubishi Diamondpro 930SB produces good picture quality, although some users may find it takes up too much desktop space.

Looking past this, the Radeon 9600XT graphics card is the most modern in the group – although not quite the fastest. It managed a 3Dmark03 score of 3,796 – a very respectable total here but still a far cry from the score achieved by the 9800 Pro in the Microland submission.

The positive trend is continued with a 120GB Maxtor hard drive, and 512MB of PC2700 memory supplied in a dual-channel memory configuration. These components helped the Athlon XP 2800+ CPU to achieve very reasonable scores in our benchmark tests. The system did not fully complete Sysmark 2004, but scored 233 in Sysmark 2002 – which is enough to place the machine comfortably in the middle of the group.

We were pleased that Mesh included a set of five-channel speakers from Creative. This extends the focus of the PC to include the needs of gamers and users who wish to do their DVD movies justice with good-quality audio. Movie playback is provided by the Sony DDU1612, which has been paired with a Sony CRX 230E CD rewriter. Unfortunately neither of these offers DVD writing facilities.

Despite the Matrix 2800+ trailing somewhat behind the faster PCs in our test, it does at least provide users with a resassuring three-year warranty. This may not last as long as the protection afforded to some of its rivals, but it is among the most reassuring levels of cover and even includes the cost of parts in the final year.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Mesh
0870 046 4747
www.meshcomputers.co.uk
PROS Large monitor; graphics card
CONS No DVD writer
VERDICT
Yet another strong Mesh contribution that should appeal to a wide range of users

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

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- 128MB DDR Video RAM & DirectX 9 support
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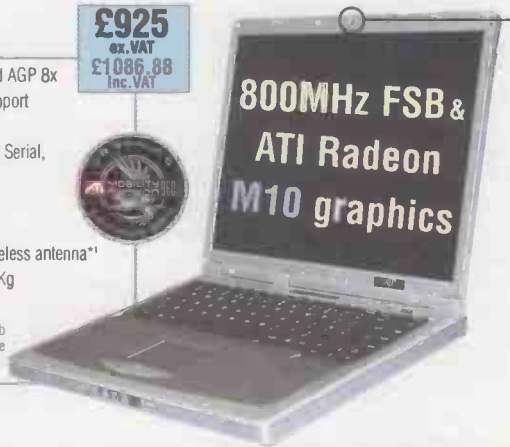
- Ports: 2xUSB 2.0, IrDA, TV-Out, Parallel, Serial, Monitor, PS/2, S/P DIF ouput
- Built in Video Camera
- Built in 6-in-1 Smart Card Reader
- Built in Bluetooth Support & Built in Wireless antenna*1
- 329(W)x275(D)x36mm (H) / Weight: 3.3Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3D Sound & Speakers with 5.1 channel output, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Application), Windows XP Home with CD & Manual, External USB FDD (Optional), Wireless LAN module (Optional)*1, Bluetooth module (Optional)*1, External USB TV Tuner (Optional)

15" TFT | Pentium 4 2.8GHz | 512MB RAM | 60GB HDD | Combo Drive



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- Built in 56K fax/modem
- Built in 10/100/1000-Giga LAN Ethernet Adapter
- ATI Mobility Radeon M10 with Integrated AGP 8x
- 128MB DDR Video RAM & DirectX 9 support
- IEEE 1394 Firewire 400Mbps port
- Ports: 4xUSB 2.0, IrDA, TV-Out, Parallel, Monitor, PS/2, S/P DIF output
- Bluetooth Support & Built in Wireless antenna *1
- Audio DJ onboard
- 329(W)x290(D)x44mm (H) / Weight: 3.7Kg
- Carry Case, 36 months RTB Warranty***

Other Features: Built in 3.5" FDD, Built in 3D Sound & Speakers with 5.1 channel output, 1x PC Card Slot, Smart Li-Ion Battery**, 3 Hot Keys (Email, Web Browser, Media Player), Windows XP Home with CD & Manual, Wireless LAN module (Optional)*1, Bluetooth module (Optional)*1, External USB TV Tuner (Optional)

15.1" TFT | Pentium 4 2.8GHz | 512MB RAM | 80GB HDD | Combo Drive

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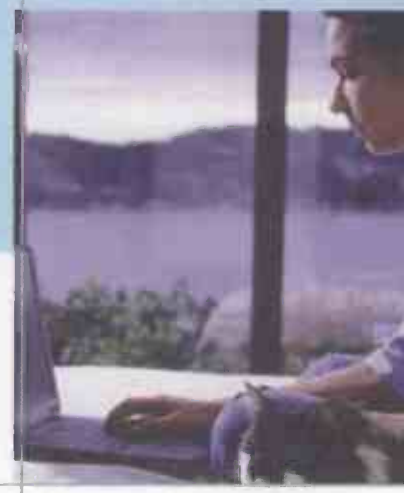

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Microland Tech PCW 27.05

Microland Technology makes an impressive debut in *PCW* with the Tech PCW 27.05, a system that defies its budget classification with a surprisingly impressive specification. Its 512MB of PC3200 DDR memory is among the fastest rated here, but the major surprise was seeing an Athlon 64 3000+ CPU.

We saw some good performance results in our Athlon 64 group test in February and, despite Microland using a slower version of AMD's latest consumer chip, its Sysmark 2002 score of 252 was practically level with that achieved by the NEC Powermate I-Select XL6, which cost £500 more and had a virtually identical specification.

The 120GB Maxtor hard drive provides a generous amount of storage, considering that the system also includes a DVD writer. The NEC ND-2500A is particularly impressive as it one of just two drives in this group capable of writing to both plus and minus formats at eight-speed.

We were expecting to find a bottleneck somewhere in the system, but couldn't help being impressed by the superbly quick ATI Radeon 9800 Pro graphics card – again, the only one of its kind in this test. This separated the Microland system's graphics performance from the rest of the pack by a considerable margin. Its 3Dmark03 score of 5,722 is the fastest we have seen from a PC costing £699 ex VAT, but be aware that the Microland has no TV tuner card.

Bearing in mind the impressive specification, we were not expecting too much from the monitor. Our review system was supplied with a 17in CRT screen courtesy of Viewsonic – which some buyers may consider a poor substitute for a 15in flat-panel alternative. Despite this minor gripe, we were impressed with the balanced overall configuration and excellent performance of this PC.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Microland
0870 443 0399
www.microlandtechnology.com
PROS Fast CPU; high-end graphics card
CONS Lack of software
VERDICT
This PC provides stunning performance and a generous specification for a low price

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

Nethighstreet PCW699

The Nethighstreet PCW699 provides a refreshing alternative to the proliferation of AMD-based computers seen in this group test. The Intel Pentium 4 2.8GHz CPU is a powerful workhorse, and we were eager to see how it stacked up against the Athlon XP, and more significantly, the Athlon 64 processors used by the Evesham and Microland PCs.

Before conducting our tests, we were pleased to note that Nethighstreet has attempted to go for a fairly even specification that should appeal to a wide range of users. Power users will be attracted by the Gigabyte motherboard, which can support a whopping 4GB of memory and processors as fast as 3.2GHz. The inclusion of a four-speed DVD rewriter was also a pleasant surprise, particularly as the Intel foundations of the PC almost certainly represent a large chunk of its price tag. Despite this, Nethighstreet has found space in the budget to include a 120GB hard drive and a 52-speed Samsung CD rewriter. The Creative Inspire P580 speakers are also a welcome addition.

We were, however, slightly disappointed by the choice of graphics and ATI's Radeon 9700 was the talk of the town during 2002, but has long-since been superseded by newer, more effective models. It has a wide 256bit DDR memory bus, but 3Dmark03 test results reveal its inability to keep up with the Radeon 9800 cards in the group.

More impressive results were achieved from the core of the system, with the Nethighstreet finishing among the top four machines of the group in the Sysmark tests. It was unable to keep up with the Athlon 64-based submissions, and even struggled against the Demonite, but represented itself well against the stiff competition. For users who prefer their machines with an Intel processor, the Nethighstreet is a versatile submission that should appeal to a variety of users.

DETAILS

RRP £821.32 (£699 ex VAT)
BEST PRICE & PRODUCT INFORMATION
Nethighstreet
0870 777 5252
www.nethighstreet.com
PROS Quick CPU; ample hard disk space
CONS CRT monitor; software
VERDICT
A fast and well-equipped PC, but outclassed by its Athlon 64 rivals

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

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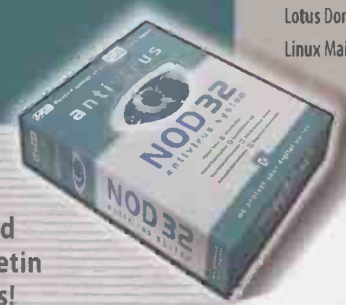

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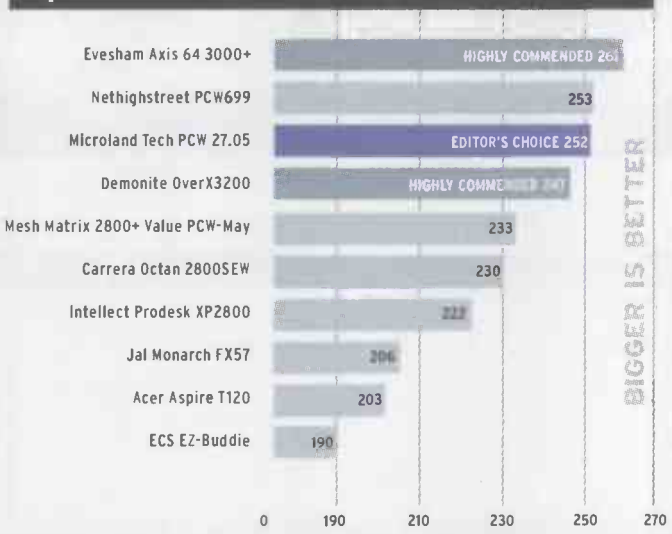
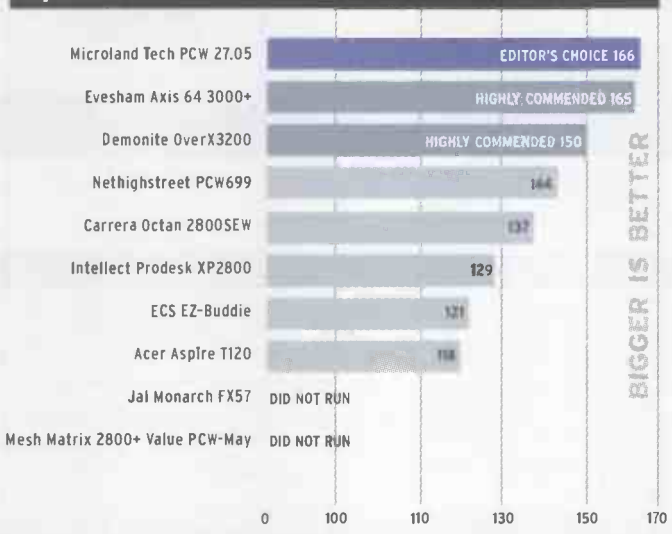
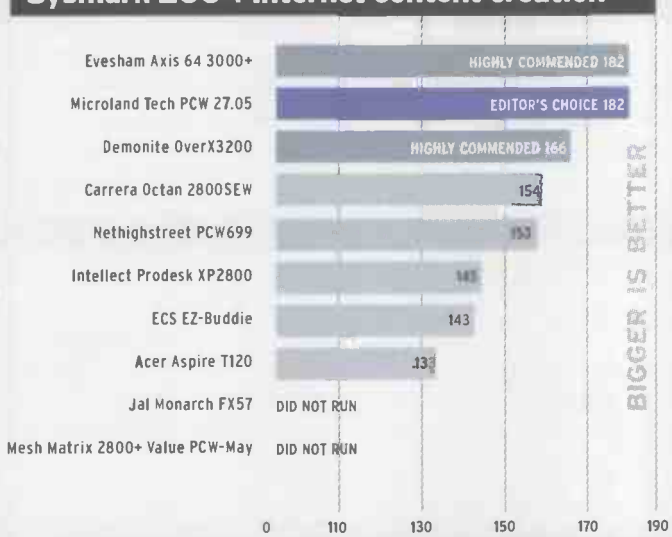


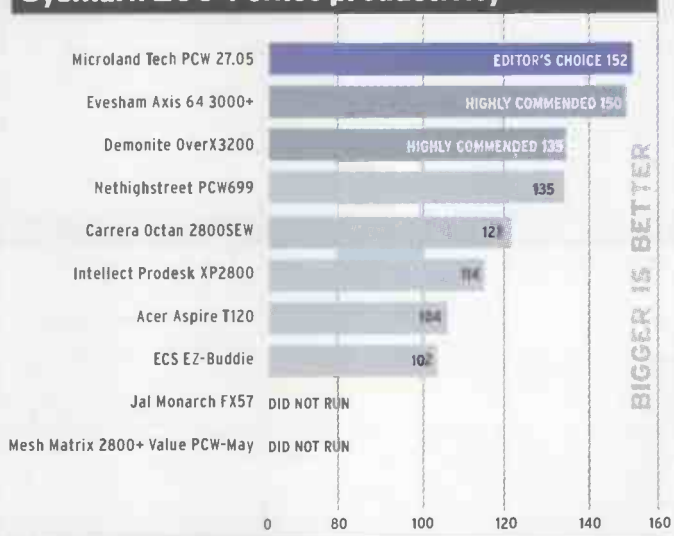
Sysmark 2004



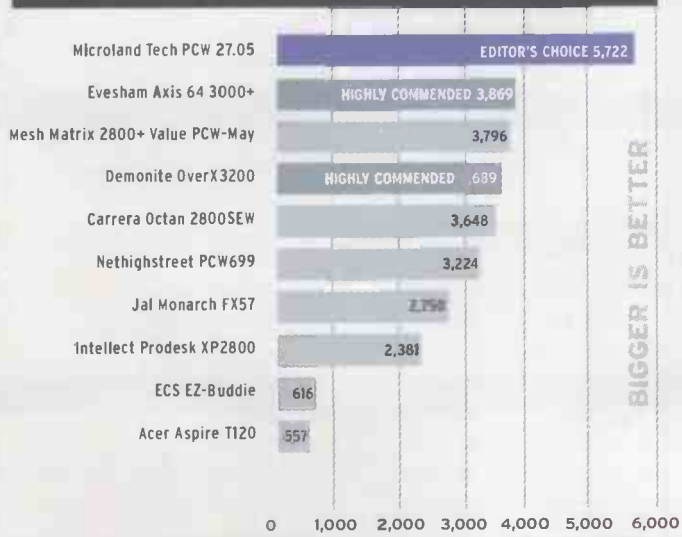
Sysmark 2004 Internet content creation



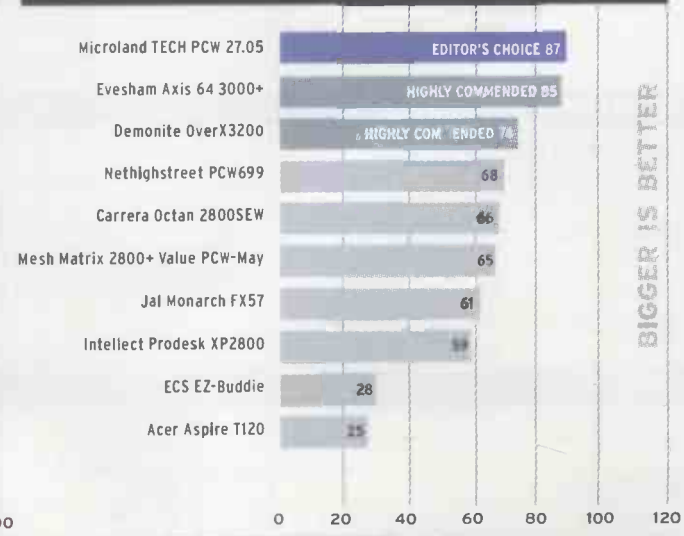
Sysmark 2004 office productivity



3DMark03 (1,024 x 768 at 32bit)



Unreal Tournament (fps) (1,024 x 768)



Please see page 12 for an explanation of how we tested the PCs

Table of features

MANUFACTURER	**ACER**	**CARRERA**	**DEMONITE**	**ECS**	
MODEL NAME	**ASPIRE T120**	**OCTAN 2800SEW**	**OVERX3200**	**EZ-BUDDIE**	
Price inc VAT (ex VAT)	£821.32 (£699)	£821.32 (£699)	£821.32 (£699)	£821.32 (£699)	
Telephone	0870 900 2237	0871 222 3456	0871 222 7222	0870 120 5370	
URL	www.acer.co.uk	www.carrera.co.uk	www.demonite.com	www.ecs.uk.com	
HARDWARE SPECS					
Processor	AMD Athlon XP 2600+	AMD Athlon XP 2800+	AMD Athlon XP 2500+	AMD Athlon XP 2800+	
Memory quantity and type	256MB PC2700 DDR	512MB PC3200 DDR	512MB PC3200 DDR	512MB PC2100 DDR	
Occupied/spare memory (Ram) slots	1/1	2/1	2/1	2/0	
Max memory in this configuration	1.2GB	1.5GB	1.5GB	512MB	
Maximum memory supported by motherboard	2GB	3GB	3GB	2GB	
Hard disk manufacturer and model	Western Digital WD800BB	Excelstor Ganymede 3680	Excelstor Ganymede 3680	Hitachi Deskstar IC35L060A	
Hard disk size	80GB	80GB	80GB	60GB	
Motherboard manufacturer/model	ECS KM400-M2	Leadtek Winfast K7NCR180 Pro2	Leadtek Winfast K7NCR180 Pro2	ECS KM400	
Chipset manufacturer/model	Via KM400-M2	Nforce	Nforce	Via	
EXPANSION AND I/O					
No of 3.5/5.25in bays	3/2	7/4	6/4	1/1	
No of free 3.5/5.25in bays	0/1	5/2	4/2	0/0	
No of PCI/shared/AMR slots	3/0/0	5/0/0	5/0/0	1/0/0	
No of free PCI/shared/AMR slots	2/0/0	3*/0/0	3/0/0	0/0/0	
No of USB2/Firewire ports	6/1	6/3	6/3	4/1	
No of serial/parallel/PS/2	1/1/2	2/1/2	2/1/2	1/1/2	
MULTIMEDIA					
Primary optical drive	LG DVD-RW GSA 4040-B	Samsung CD-RW SW-252F	NEC DVD-RW ND-1300A	Toshiba DVD-Rom SD-R 1312	
Drive speed	DVD+RW: 4x/2.4x, DVD-RW: 4x/2.4x, DVD-Ram: 3x, DVD-Rom: 12x, CD: 24x 16x 32x	52x 32x 52x	DVD-R: 4x DVD-RW: 2x DVD+R: 4x DVD+RW: 2.4 CD-R: 16x CD-RW: 10	DVD:12x, CD:32x 10x 40x DVD-Rom/CD-RW	
Secondary optical drive	N/A	Sony DVD-Rom DDU1612	Sony DVD-Rom DDU1612	N/A	
Drive speed	N/A	16x/30x DVD-Rom	16x/40x DVD-Rom	N/A	
Soundcard manufacturer & model	Realtek AC97	Nvidia Nforce MCP	Nvidia Nforce MCP	Realtek AC97	
Speakers manufacturer & model	2 stereo speakers	2 stereo speakers	2 stereo speakers & subwoofer	N/A	
Graphics card manufacturer & model	ATI Radeon 9200 SE	ATI Radeon AIW 9800	ATI Radeon AIW 9800	ATI Radeon 9200 SE	
Chipset	ATI Radeon 9200	ATI Radeon 9800	ATI Radeon 9800	ATI Radeon 9200	
Memory and type	128MB DDR	128MB DDR	128M8 DDR	128MB DDR	
Monitor manufacturer & model	Acer ALI711B	Sharp LLT17A-4	Iiyama 454 Pro	ECS EZ-17B	
Monitor size/max viewable diagonal	17in	17in	19in	18in/17in	
Maximum resolution	1,210 x 1,024	1,210 x 1,024	1,600 x 1,280	1,280 x 1,024	
OTHER INFORMATION					
Misc hardware/modem	V.90 modem	Creative Webcam NX	N/A	V.90 modem, EZ-TV TV tuner, MMC reader, USB floppy drive	
Bundled software	Windows XP Home, Norton Anti-virus 2003, Cyberlink PowerDVD, NTI CDMaker	Windows XP Home, games album	Windows XP Home	Windows XP Home	
Standard warranty**	1yr RTB	3yrs on-site, 2yrs RTB labour	3yrs on-site, 2yrs RTB labour	2yrs RTB	
SCORES					
Features	★★★★★	★★★★½	★★★★½	★★★½☆	
Performance	★★½☆☆	★★★½☆	★★★★½	★★½☆☆	
Value for money	★★★½☆	★★★★½	★★★★½	★★★½☆	
Overall score	★★★½☆	★★★½☆	★★★★½	★★★½☆	

* One PCI slot must be left free all the time **RTB = return to base, C&R = collect and return

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	EVESHAM	INTELLECT	JAL	MESH	MICROLAND	NETHIGHSTREET
	AXIS 64 3000+	PRODESK XP2800	MONARCH FX57	MATRIX 2800+ VALUE PCW-MAY	TECH PCW 27.05	PCW699
	£821.32 (£699)	£821.32 (£699)	£821.32 (£699)	£821.32 (£699)	£821.32 (£699)	£821.32 (£699)
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	www.evesham.co.uk	www.intellect.uk.com	www.jal.co.uk	www.meshcomputers.co.uk	www.microlandtechnology.com	www.nethighstreet.com
	AMD Athlon 64 3000+	AMD Athlon XP 2800+	AMD Athlon XP 2600+	AMD Athlon XP 2800+	AMD Athlon 64 3000+	Intel Pentium 4 2.8GHz
	512MB PC3200 DDR	512MB PC3200 DDR	512MB PC2700 DDR	512MB PC2700 DDR	512MB PC3200 DDR	512MB PC3200 DDR
	2/1	1/2	2/1	2/0	1/2	2/2
	1.5GB	2.5GB	1.5GB	512MB	2GB	2.5GB
	2GB	3GB	3GB	2GB	2GB	4GB
	Maxtor 6Y160M0	Maxtor 7200	Maxtor 6Y160M0	Maxtor 6Y120P0	Maxtor 6Y120-M0	Maxtor 6Y120M0
	160GB	80GB S-ATA	160GB	120GB	120GB	120GB
	MSI MS-6702	Gigabyte GA 7VT600	DFI Lanparty NFII Ultra B	Asus A7N8X-VM	Gigabyte K8V800PRO	Gigabyte GA81PE1000
	Via KT800	Via Apollo KT600	Nvidia Nforce2 Ultra 400	Nvidia Nforce MCP	Via K8T800	Intel Springdale i865PE
	5/4	5/4	7/4	3/2	7/4	6/4
	3/2	3/2	4/2	2/0	5/3	4/2
	5/0/0	5/0/0	5/0/0	3/0/0	5/0/0	5/0/0
	4/0/0	2/0/0	4/0/0	2/0/0	5/0/0	4/0/0
	6/2	8/2	6/2	6/1	8/2	8/0
	1/1/2	2/1/2	1/1/2	1/1/2	2/1/2	2/1/2
	Sony CRX230E	Lite-on DVDLIT811S	Sony DDU1612	Sony CD-RW CRX 230E	NEC DVD-RW ND-2500A	Pioneer DVD-RW DVR 106D
	CD-RW: 52x 24x 52x	DVD-R/RW:8x DVD+R/RW: 8x	DVD-Rom: 16x/40x	52x 52x 32x	CD: 40x, DVD: 12x , CD: 16x, DVD: 4x, CD: 10x, DVD-RW: 2x, DVD+RW: 2.4x	DVD+RW: 4x/2.4x, DVD-RW: 4x/2x, DVD-Rom: 12x, CD: 16x 10x 32x
	Sony DDU1612	Lite-on	Atapi CD-RW	Sony DVD-Rom DDU1612	N/A	Samsung SM-352B
	16x	16x/40x	52x 32x 52x	16x/40x	N/A	52x 52x 24x, DVD-Rom:16x
	Realtek AC97	Realtek AC97	Nvidia Nforce MCP	Realtek ALC650	Realtek AC97	Realtek AC97
	Creative P580 Inspire 5.1	N/A	N/A	Creative Inspire P580 5.1	Creative P580	Creative Inspire P580 5.1
	ATI Radeon 9800SE AIW	ATI Radeon 9600 Pro	ATI Radeon 9700	ATI Radeon 9600XT	ATI Radeon 9800 Pro	ATI Radeon 9700
	ATI Radeon 9800	Radeon 950	ATI Radeon 9700	RV360	ATI Radeon 9800	ATI Radeon 9700
	128MB DDR	256MB DDR	128MB DDR	128MB DDR	128MB DDR	128MB DDR
	Viewsonic E70f+SB	Neoview Atec AL151	Sharp LLT15A4-B	Mitsubishi Diamondpro 930SB	Viewsonic E70F+SB	Samsung Syncmaster 753DFX
	17in/16in	15in	16in/15in	19in/18in	17in/16in	17in/16in
	1,280 x 1,024	1,024 x 768	1,024 x 768	1,920 x 1,440	1,280 x 1,024	1,280 x 1,024
	Hayes V.92 PCI software modem	V.90 modem	Intel 536EP V.92 modem	V.90 modem	Microsoft premium keyboard and mouse	Microsoft keyboard and mouse
	Windows XP Home	Windows XP Home, Open Office	Windows XP Home, Ahead Nero, Intervideo Wincinema, Farstone Virtual Drive & RestoreIT, games bundle	Microsoft Works Suite 2004	Windows XP Home	Windows XP Home, Open Office, PowerDVD, Nero
	2yr on-site, 1yr RTB	3yrs on-site (hardware only)	2yrs on-site parts & labour, lifetime labour & tech support	1yr on-site, 2yrs RTB (UK mainland)	2yrs on-site, 1yr RTB	3yrs RTB (1yr parts, 2yrs labour only)
	★★★★½	★★★½☆	★★★½☆	★★★★½	★★★★½	★★★½☆
	★★★★½	★★★½☆	★★★½☆	★★★½☆	★★★★★	★★★½☆
	★★★★☆	★★★½☆	★★★½☆	★★½☆☆	★★★★★	★★★★½
	★★★★½	★★★★½	★★★★★	★★★½☆	★★★★★	★★★★½

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Editor's Choice

We weren't expecting a great deal of variation or excitement from this month's submissions because low-budget systems frequently lack power and are sometimes seen by vendors as an opportunity to offload outdated components. Thankfully, we were made to eat our words, as we received a selection of entries that will almost certainly have something for everyone.

We were impressed with the variety in the range of processors powering each system. These varied in speed and ranged from a humble Athlon XP 2500+ (albeit an overclocked one) to an Intel P4 and, impressively, even a couple of Athlon 64-based PCs. This variety reflected the choice vendors made in order to provide systems with a focus on performance or submissions that appeal to a broader audience.

Style-conscious users should take particular notice of the ECS EZ-Buddie. If you're in the market for a PC with a large TFT monitor, this is an obvious choice. Rather more appealing is its base unit, which occupies very little desktop space and shouldn't look out of place alongside more conventional home entertainment devices. The Acer submission deserves a mention too, thanks to its DVD rewriter, but for £821 inc VAT, we were rather disappointed that it featured just 256MB of Ram.

'We were impressed with the variety in the range of processors'

The winners

There were many contenders that could have won an award this month, but three stood out from the crowd. Our first **Highly Commended** award goes to the **Demonite OverX3200**. This was a distinctive submission, particularly in terms of its eye-catching case and overclocked CPU.

We were slightly disappointed that Demonite didn't choose to overclock a slightly faster chip, but the performance it produced was commendable. In our benchmark tests, it outperformed the Pentium 4 2.8GHz CPU of the Nethighstreet PC and even kept pace with both Athlon 64-based submissions.

Microland Tech PCW 27.05

Demonite OverX3200

Evesham Axis 64 3000+

We were also impressed with the 19in Ilyama monitor, which complements the Radeon 9800 All-In-Wonder graphics card well. The card offers strong performance and even incorporates a TV tuner that reinforces the great multimedia potential of the PC. These factors, combined with the audacious overall appearance of the system, make it something of a talking point. Our only criticism of the OverX3200 is that its numerous fans (necessary to help maintain a cool environment for its overclocked innards) generate a fair amount of noise – despite the fact that its Zalman CPU cooler's rotation speed can be manually adjusted.

Our second **Highly Commended** award goes to the **Evesham Axis 64 3000+**. We were impressed that Evesham managed to incorporate a 64bit processor, but were equally impressed with the remainder of the PC's specification. It lacked a DVD rewriter, but made amends with a large 160GB hard drive.

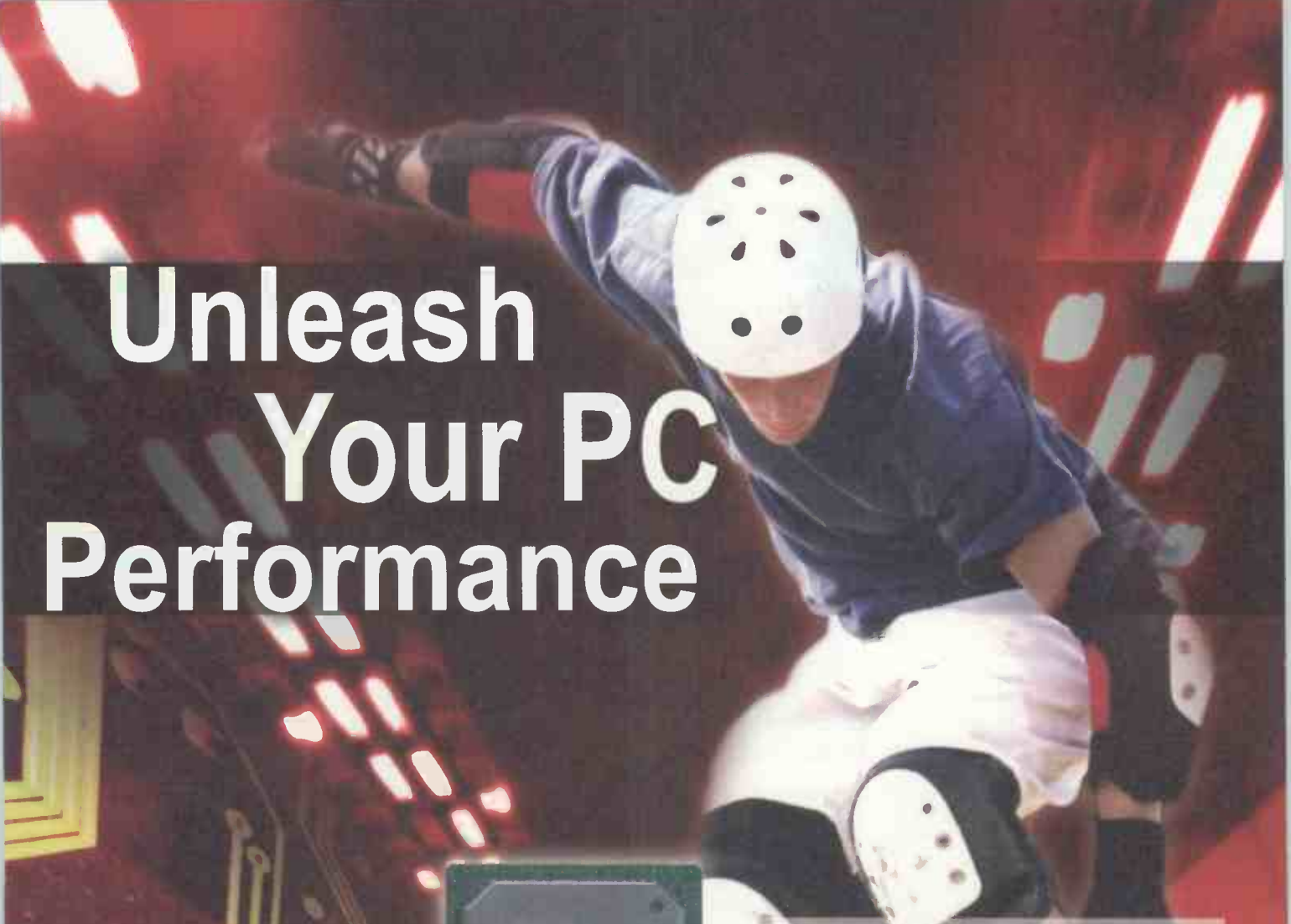
As well as this, it featured a Radeon 9800SE All-In-Wonder graphics card – which won the Editor's Choice award in our January round-up. Games players will appreciate the Axis 64's multimedia focus, which is extended considerably thanks to the commendable Creative P580 Inspire speakers; by far the best audio in our group.

But despite these exciting submissions, our overall group test winner has to be the **Microland Tech PCW 27.05**. This is awarded our **Editor's Choice** award due to a specification that belies its price. Like the Evesham entry, it boasts an Athlon 64 3000+ processor and 512MB of fast PC3200 memory. It is also equipped with a considerable 120GB hard disk, and rather more impressively, a dual format eight-speed DVD rewriter.

It would seem unlikely that Microland Technology would have enough of its budget left over after these inclusions to provide a decent graphics card, but it again managed to humble the rest of the group in this area. Its Radeon 9800 Pro racked up a highly impressive 3Dmark03 score of 5,722. This was enough to propel Unreal Tournament at a blistering 87fps – over 10fps quicker than that achieved by the PNY FX 5900 Ultra card reviewed in our January issue.

This PC's value for money becomes hugely apparent when you realise it outperformed three of the systems in our February Athlon 64 group test – the cheapest of which cost £1,291 and had a very similar specification.

Unleash Your PC Performance



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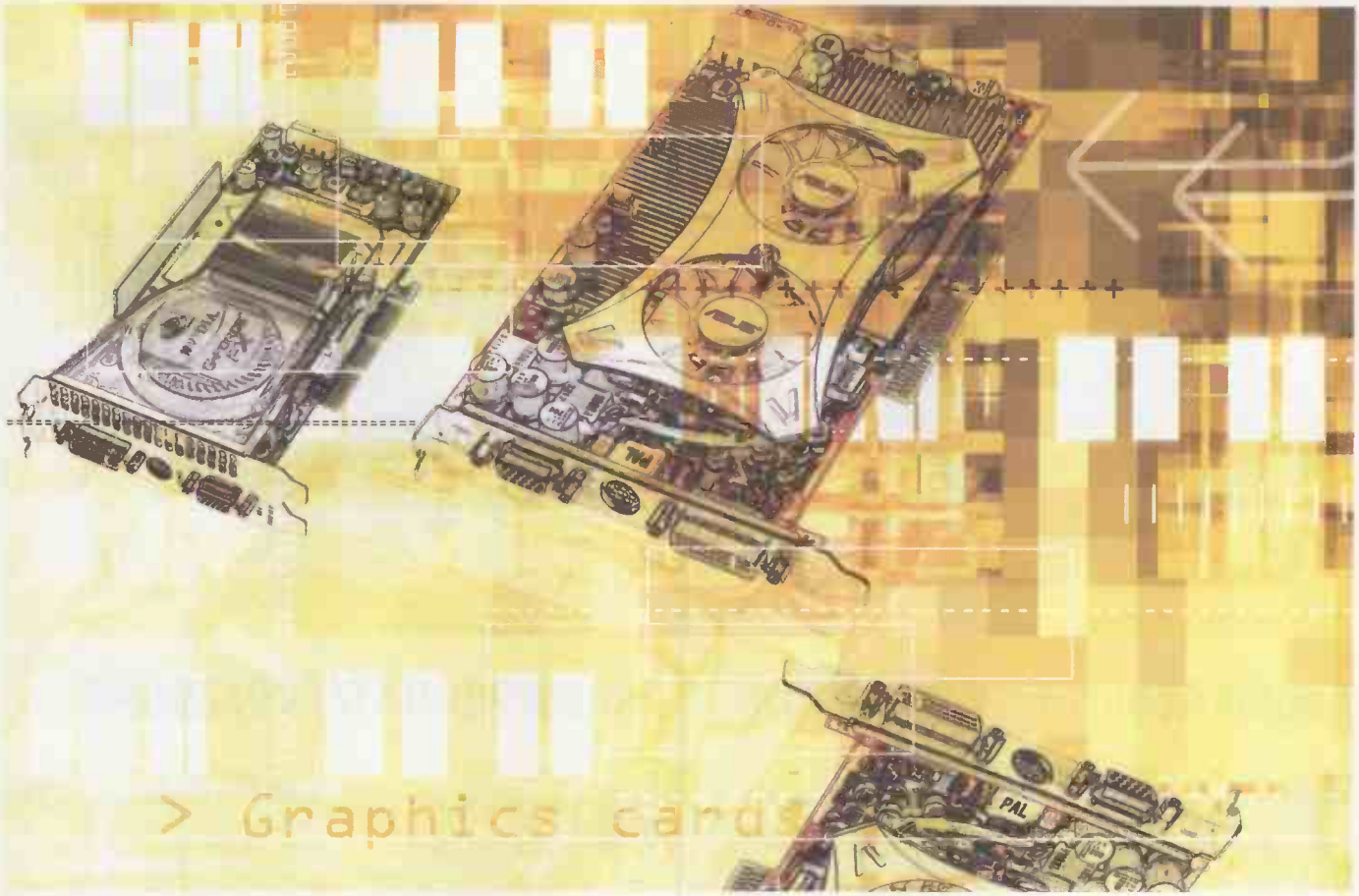

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Quality graphics

If you're looking for a fast, top-quality graphics card, should you choose ATI or Nvidia? And what extras can they offer you? We've reviewed 10 speedy cards to help you make up your mind

WORDS: WILL STAPLEY TESTING: VNU LABS PHOTOS: BRUCE MACKIE

With the two major graphics chipset manufacturers, ATI and Nvidia, battling it out with their latest silicon, we thought it was time to look at what you can get for your money at the top end of the graphics card food chain.

At present, Nvidia's flagship chipset is the Geforce FX 5950 Ultra. With a core clock of 475MHz and an effective DDR memory clock of 950MHz, it manages to outdo ATI's current Radeon, at least on paper. The Radeon 9800 XT is based on the popular 9800 Pro and has a core clock of 412MHz and a 730MHz DDR memory clock. However, this certainly doesn't mean the Nvidia based cards steal the show.

We wanted to find out how each manufacturer makes its ATI or Nvidia card more attractive than its competitors'. Some have adjusted the cooling system, but most have left the card exactly the same as the ATI or Nvidia reference model. The price tag is therefore extremely important, as is the quality of the software and hardware bundle. Are there any games to show off the card's capabilities? Has an overclocking utility been included and, more importantly, will this invalidate the warranty?

Our invitation to graphics card manufacturers had one stipulation – to submit the fastest-performing card in their current range. We received 10 cards, five running with ATI chipsets and five Nvidia models. So, start your engines...

Aopen Aeolus FX 5950 Ultra

The first card in this month's group test comes from Aopen. Based in the Netherlands, the company produces a wide range of cards and sits firmly in the Nvidia camp. With this in mind, it comes as no surprise that its entry uses the Geforce FX 5950 Ultra chipset.

Aopen hasn't made any changes to the bulky Nvidia reference design. A clear plastic cover shields the fan and heatsink combination, and funnels the hot air directly out of the case via an expansion bracket. This means you need to leave the PCI slot next to the AGP slot free, but if you're running an extra-fast graphics card like this you should really make sure there isn't a PCI card right next to your graphics card anyway.

Being one of the more expensive cards in this group test, we had hoped that Aopen would supply a decent selection of software with the Aeolus FX 5950 Ultra. Unfortunately, this wasn't the case. All that's included, along with the driver, is a copy of WinDVD and Win Producer – both Intervideo products. There's nothing wrong with these two applications, but we'd have liked to have seen at least one game in order to show off the card's capabilities.

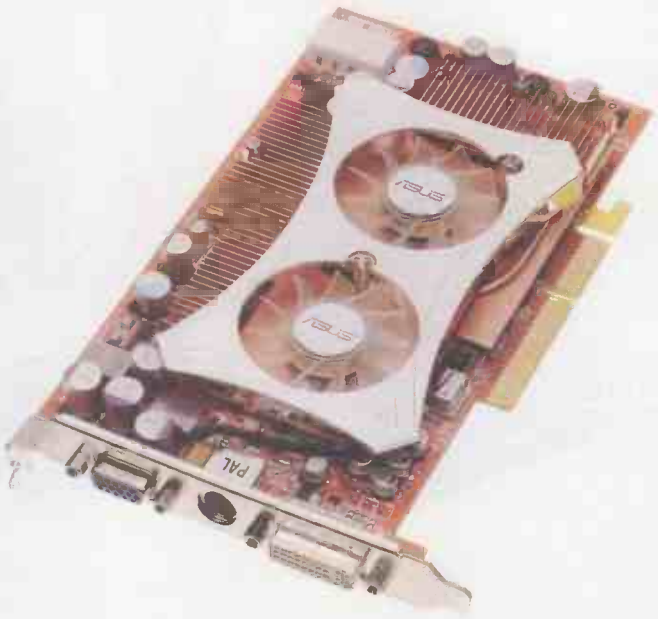
The hardware bundle is equally slim. The standard DVI-VGA adapter is included, along with a Vivo cable, but it's nothing to write home about.

When compared with the other offerings in this group test, you'll see that there are plenty of both Nvidia and ATI models priced a fair bit lower than this offering from Aopen. What's more, some of them manage to include more in terms of hardware and software. If for some reason you've got a soft spot for Aopen, then you might want to consider this model but, as you'll see by reading the rest of the reviews, there are better deals elsewhere.

DETAILS

RRP £389 (£331.06 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Aopen www.aopen.nl
Sales: 08704 293 010 (Dabs.com)
PROS Respectable performance
CONS Expensive; not much included in the bundle
VERDICT
There's nothing wrong with the performance, but considering the price of this card, we expected to find a lot more waiting for us in the Aopen box

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



Asus A9800XT/TVD/256MB

Not so long ago, the letters A, T and I were rarely uttered by the people at Asus – its entire range of graphics cards was based on Nvidia chipsets. However, like many other previously Nvidia-only manufacturers, Asus has now decided that the 9800 XT is far too big a fish to ignore.

What makes this 9800 XT different from the others in this group test is that Asus has decided to alter the cooling system. Instead of the heatsink-plus-one-fan arrangement that you'll see on a standard 9800 XT, Asus has designed its own cooling mechanism. It's still made of copper like the rest, but you'll see Asus has installed two small fans instead one large fan, which aids cooling.

What's more, it also features a Rage Theater chip and is therefore the only 9800 XT in this test to support video-in.

Asus has also included a bundle of utilities, one of which will allow you to monitor temperatures and fan speeds – definitely something those interested in quiet PCs would enjoy using.

As far as games go, you get a voucher from ATI for Half-Life 2 (when it finally arrives on the scene), the sci-fi game Battle Engine Aquila, and the now rather dated Gun Metal. Where Asus really excels is with its utility bundle. Along with Asus' own software DVD player, you also get titles such as the graphics creation package Cool 3D and the photo editor Photo Express, both from Ulead. Asus has also included two titles from Cyberlink, namely the presentation creator Media Show and Power Director Pro, which allows you to edit your videos. All in all, it's a pretty impressive software bundle.

Considering the amount of games and utilities you get, it's not surprising the price tag is quite high compared to the other cards in this test. Nevertheless, three others prevent it from being the most expensive.

DETAILS

RRP £366.60 (£312 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Asus 01908 518 000
www.asus.com
PROS Good software package; video-in
CONS Might be too expensive for some
VERDICT
With the 9800XT chipset and a decent software bundle, this card will appeal to those who want a feature-rich Radeon

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

Creative Radeon 9800 XT

Creative makes a whole host of multimedia devices, such as soundcards and speakers, and has released more than a few graphics cards over the past few years. Historically, the company has always favoured the Nvidia-based graphics cards and a quick look at its product line shows that it still has faith in them, with a grand total of eight to choose from. However, it now also sells three ATI-based cards, with the 9800XT being the flagship model and the one it decided to submit as its best-performing card.

Creative has decided not to alter the reference design for the Radeon and has stuck with the standard Radeon heatsink and fan combination, along with the ATI logo on the heatsink itself.

The software bundle is a bit of a letdown, since all that's included is the drivers and some ATI demos. You don't get any of the extra utilities that are bundled with similarly priced cards. What's more, Creative hasn't supplied any games to show off the 9800 XT's power. You do, however, get ATI's Half-Life 2 voucher that you can exchange for the full game (once it finally appears), along with the free download of the Valve Premiere Pack. There's also a suitable selection of cables and adapters included.

Priced just shy of £400, this card is the most expensive Radeon 9800 XT in this group test and the only card that is more expensive is the Nvidia-based Terratec. Considering the small selection of software, this is a bit disappointing.

Not so long ago, you would expect to pay at least this much for a 9800XT but, as is always the case in the graphics card market, prices soon started to tumble. It seems that Creative is trying to hold on to the old price, but it surely can't be long before it drops the RRP of this model.

DETAILS

RRP £399.90 (£340.34 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Creative
www.creative.com
PROS Great performance
CONS Not a lot of extras provided; expensive
VERDICT
This Creative card performs just as well as the other 9800XTs reviewed in this group test, but the price tag is simply too high

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

Gigabyte GV-N595U256V

With the bitter war between ATI and Nvidia raging on, Gigabyte clearly has no wish whatsoever to take sides. Instead, the company offers a wide range of both Radeon and Geforce-based cards.

The model Gigabyte submitted for this group test isn't its 9800 XT, but instead the snappily titled GV-N595U256V. It's not the most catchy of names, but if you look closely you'll see that it basically means it has an Nvidia Geforce FX 5950 Ultra with 256MB of Ram – the same amount of memory as all the other cards featured here.

Gigabyte has made a sterling effort with the software that's bundled with this card. In terms of utillties you get PowerDVD from Cyberlink, as well as the colourful Gigabyte V-Tuner tool. V-Tuner gives you the power to adjust the speed of the fan and those all-important memory and core clock speeds with ease. What's interesting for speed freaks is that if you use the V-Tuner utility to overclock the card, the warranty will still be valid. Take a look at the MSI offering, for example, and you'll find that if you use MSI Clock and it damages the card, your warranty will be voided.

The games bundle is also pretty decent and includes three titles. The official website says that you get Arx Fatalis, Tomb Raider and Raven Shield, however our review sample had Will Rock instead of Arx Fatalis. As this is an Nvidia card, you don't get ATI's Half-Life 2 voucher.

Considering what's bundled with the card, Gigabyte has done well to price the GV-N595U256V at just a little over £300, and it's certainly a fair bit cheaper than some of the other models. If you think you'd prefer an Nvidia Geforce FX 5950 Ultra card over a Radeon 9800 XT, then this Gigabyte offering is well worth considering.

DETAILS

RRP £313.14 (£266.50 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Gigabyte www.giga-byte.com
Sales: 08704 293 010 (Dabs.com)
PROS Excellent bundle; ideal for overclockers
CONS Not quite the cheapest 5950 around
VERDICT
It might not be able to call itself the cheapest 5950, but it comes with a decent bundle and is good value for money

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

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Recommended Upgrade Offer

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Recommended Upgrade Offer

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£25 PM incl. Del. & VAT* **E-VALUE Code: i10**

Recommended Upgrade Offer

• Upgrade to 60GB Hard Drive	£52.88 incl. VAT
• Dell All-In-One Printer A940	£95.18 incl. VAT
• Upgrade to 3 Years International On-Site Next Business Day Service	£233.83 incl. VAT

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- **DVD+CD-RW Combo Drive**
- Integrated 56Kbps V92 Modem – 10/100 Ethernet
- Microsoft® Works 7.0
- 1 Year Euro Collect & Return Service

~~£799~~ excl. Del. & VAT | **£769** excl. Del. & VAT | **£961.15** incl. Del. & VAT

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£29 PM incl. Del. & VAT* **E-VALUE Code: i05**

Recommended Upgrade Offer

• Upgrade to 80GB Hard Drive	£88.13 incl. VAT
• Dell Laser Printer P1500	£189.18 incl. VAT
• Upgrade to 3 Years International On-Site Next Business Day Service	£233.83 incl. VAT

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Hercules 3D Prophet 9800 XT

As we were going to press, Hercules announced that, after 20 years in the graphics card industry it has pulled out of the market. This card will still be available and supported through resellers while stocks last, but this may have a bearing on whether or not you buy the card.

Hercules only supports ATI-based cards, so we weren't at all surprised to see a 3D Prophet 9800 XT Classic winging its way as the Hercules entry in this group test.

Like most of the other 9800 XT-based cards, Hercules has stuck with the standard reference heatsink and fan design, although the unmistakable 3D Prophet logo sits on the heatsink case.

Utilities include PowerDVD 5, along with a selection of screensavers that show off the card's capabilities. Hercules hasn't bundled any games with the 3D Prophet 9800 XT Classic, but since it's a Radeon 9800-based card you get the standard games bundle from ATI. This includes a free download of the Valve Premiere Pack, which features titles such as Half-Life, Counter Strike and Team Fortress Classic, along with a voucher for Half-Life 2. It's important to note that ATI's offer of a free download of the Valve Premiere Pack will be withdrawn once Half-Life 2 becomes available.

Cables and adapters are thin on the ground with the 3D Prophet 9800 XT Classic. All you get is a simple DVI-VGA adapter that allows you to hook up two analogue VGA monitors to the card.

The price of this Hercules card is pretty average when compared to the rest. However the hardware and software bundle could be improved upon, especially since cheaper cards in this group test manage to offer much more than the standard ATI games bundle and a DVI-VGA adapter.

DETAILS

RRP £334.88 (£285 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Hercules www.hercules.com
Sales: 0870 443 0880
(Overclockers.co.uk)
PROS Good performance from the 9800 XT
CONS Not the best software bundle; product being withdrawn
VERDICT
It's not hugely expensive, but the stiff competition highlights this card's weaknesses

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

HIS Excalibur Radeon 9800XT

You may remember that HIS, known to some as Hightech, supplied a card for review in *PCW* back in the January 2004 issue. The Excalibur IceQ 9800 Pro featured the unique Direct Heat Exhaust System (DHES), which allows efficient and almost silent cooling. Unfortunately, the HIS entry this month doesn't feature DHES due to the slight differences in the 9800 Pro and 9800XT designs. HIS has said, however, that it expects to release a 9800XT IceQ version in the near future. As it is, the Excalibur Radeon 9800XT 256MB Platinum looks just like the other 9800XTs in this group test – although HIS has put its own logo on the heatsink cover.

HIS has managed to muster up a decent package of bundled software, adapters and cables. Software utilities come in the form of PowerDVD and Power Director, both from Cyberlink, while the games Ballistics and Zanzarah are also included – both of which are a little dated. You get a voucher for Half-Life 2, which you can redeem once the game is finally released. There are also DVI-VGA and Minidin-to-RCA adapters, plus an S-video cable.

Overall, HIS has done a decent job putting together this package. It features the ultra-fast 9800 XT chipset from Radeon, and comes bundled with a good range of utilities and games. What puts the icing on the cake is that it's the cheapest graphics card in this group test, managing to undercut some of the other models by around £100.

All in all, it's a deal that simply cannot be overlooked. If you want speed, but don't fancy paying over the odds, the HIS Excalibur Radeon 9800XT 256MB Platinum is well worth considering and wins our Editor's Choice award. Furthermore, with the release of its IceQ 9800XT imminent, the future looks bright.

DETAILS

RRP £292.56 (£249 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
HIS www.hightech.com.hk
0870 467 0753 (Ebuyer)
PROS Bargain price; good software
CONS Games are a little dated
VERDICT
Bargain hunters will instantly be attracted to this 9800 XT, and at this price we can see it selling very well. It is a worthy winner of our Editor's Choice award in this group test

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

MSI FX5950 Ultra-VTD256

Packaged in a hugely oversized box, the FX5950 Ultra-VTD256 from MSI is nevertheless one of the cheaper cards in this test.

Based around the Nvidia FX 5950 Ultra chipset, this weighty card has two large heatsink and fan combinations – one on each side of the card. While having two fans means cooling is enhanced, which will interest overclockers, it also has the effect of increasing the noise levels and the card's footprint.

You get a substantial collection of both utilities and games with this card, but none could be described as amazing. The game collection consists of some fairly old titles such as Duke Nukem: Manhattan Project and Ghost Recon – the latter is oddly described on the back of the box as 'more excited than Counter Strike'.

Those who want to push their card to the limit will be pleased to hear that the MSI utilities include MSI Clock, which allows you to adjust the core and memory clocks. Be warned, though, even though MSI has included this overclocking utility, if you use it and it results in your card getting damaged, your warranty will also be invalidated. Along with MSI Clock, you'll find a selection of other utilities including WinDVD, Photoshop Album SE and both Virtual Drive and RestoreIT from Far Stone.

MSI has included a sizeable manual that covers basic information regarding installation and how to use the MSI Live driver update utility.

With such a good software bundle, you'd expect this MSI card to be sitting at the higher end of the price scale. However, the company has somehow managed to give the FX5950 Ultra-VTD256 an RRP that makes it one of the cheapest in this group test. If you think that you'd prefer an Nvidia Geforce FX card over an ATI Radeon, this is a strong contender and wins a Highly Commended award.

DETAILS

RRP £311.36 (£265 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
MSI www.msicomputer.com
Sales: 0870 727 2100 (Simply Computers)
PROS Excellent software bundle
CONS Bulky and relatively noisy; overclocking invalidates warranty
VERDICT
With a low price tag such as this, we really didn't expect to get such a range of bundled goods, but were pleasantly surprised

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

Sapphire 9800XT Atlantis

Sapphire has turned a blind eye to the Nvidia Geforce chipset and instead only sells ATI Radeon-based graphics cards. It was therefore no shock at all to see it submit the Radeon 9800 XT Atlantis as its chosen model.

No alterations have been made to ATI's reference design, although Sapphire has put its logo on the heatsink cover. Like all the other 9800 XT cards in this test, barring the two-fan Asus, the standard ATI reference heatsink and fan are used.

Sapphire has supplied a decent selection of cables, adapters and software with the Radeon 9800XT Atlantis. Along with a power splitter cable and an S-video cable, you also get both an RCA-to-S-video and a DVI-to-VGA adapter.

Those who want to overclock their cards will be able to use Sapphire's Redline utility. It doesn't feature the colourful graphics sported by the likes of Gigabyte's V-Tuner, but gets the job done. Furthermore, like the Gigabyte offering, Sapphire tells us that use of this overclocking utility won't void the warranty, which is good to hear.

As is common with many other graphics cards, Sapphire has included a software DVD player with the 9800XT Atlantis, namely Cyberlink PowerDVD. It comes with just one game, Tomb Raider – Angel of Darkness, but you also get that little bit of paper from ATI entitling you to a copy of Half-Life 2 when it reaches the stores, along with the Valve Premiere Pack free download that includes Half-Life, Counter Strike and Team Fortress Classic.

With an RRP of £329, the Radeon 9800XT Atlantis is one of the cheaper high-end cards on the market. It's still by no means the cheapest model in this group test, but if you think you'll put the impressive hardware and software bundle to good use, it's definitely worth considering and wins a Highly Commended award.

DETAILS

RRP £329 (£280 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Sapphire www.sapphiretech.com
Sales: 0870 138 3554 (Komplett)
PROS Good hardware and utility bundle
CONS Limited games bundle
VERDICT
If you're looking for high performance along with a decent selection of hardware and software, Sapphire may well have the deal for you

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

Sparkle FX 5950 Ultra

It's clear that Sparkle doesn't like conforming when it comes to product packaging. Quite why the Sparkle FX 5950 Ultra is shipped in an enormous tin we're not quite sure. Indeed, as you delve further the packaging gets even more bizarre. The various cables and adapters are all contained within what look like waterproof cases, and you'll even find a circular metal CD holder complete with a handstrap – this will come in handy if...well to be honest we're not sure.

Despite the odd packaging, the card looks just like the other Geforce FX 5950 Ultras in this test, and you'll need to make sure you've got an adjacent PCI slot free to accommodate the bulky Nvidia cooling system.

The software bundle isn't particularly exciting. You get a copy of the software DVD player Cyberlink PowerDVD 5, along with Power Producer ME, also from Cyberlink. Power Producer is a DVD authoring package, however the ME version won't allow you to burn data to DVDs, which isn't particularly great since anyone who's got one of the fastest graphics cards will probably also have a DVD writer.

Gamers will be a little disappointed to hear that Sparkle hasn't included any titles whatsoever with the FX 5950 Ultra. It's one of only two cards in this group test not to come with any games, the other being the Aopen model.

With the extravagant, and some might even say pointless packaging surrounding the Sparkle FX 5950 Ultra, you'd be forgiven for thinking that it was one of the more expensive models in this test. Well this isn't the case. Helped by the fact that there are no games included in the package, this effort from Sparkle is one of the cheaper models, priced at just over £300. If the lack of games doesn't bother you, this Sparkle effort is well worth considering.

DETAILS

RRP £304.33 (£259 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Sparkle **www.sparkle.com.tw**
Sales: 0870 443 0880
(Overclockers.co.uk)
PROS Cheap; good software
CONS No games; packaging
VERDICT
Forgoing bundled games keeps the price low, but the extravagant packaging surely adds extra cost for little gain. It's still the cheapest 5950 here

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

Terratec Mystify 5950 Ultra

Germany-based Terratec made its name as a soundcard manufacturer, although it now produces a number of Nvidia- and ATI-based graphics cards as well. When asked to submit a model, Terratec decided to submit the Mystify 5950 over its 9800 XT card.

Given the price of this card, and considering what the competition is offering, you'd expect there to be a decent collection of both hardware and software bundled with this card. But, despite the excruciating price tag, the Mystify 5950 Ultra doesn't come with any cables, adapters or utilities, which really is quite unforgivable.

There is, however, a trio of games inside the package. These include the popular but slightly dated Splinter Cell, Gun Metal, and the tactical Warcraft III. It's a colourful selection of games but, to be honest they're not exactly premium titles.

In the end, what concerned us the most about the Mystify 5950 from Terratec was its ultra-high price. It's hard to see quite how Terratec can justify charging well over £400 for this card when the same model is sold for much less by other manufacturers. It's not as if the software bundle is anything special – the three games are enjoyable, but not amazing and other cards have better games bundled with them. What's more, most of the cheaper cards include a far better software and hardware bundle.

There's nothing wrong with the performance of this card – it's just as good as the other 5950s in this test. However, the bottom line is the other cards are available for far less than the Mystify 5950 Ultra. If Terratec wants to make an impact with this card, it will have to drop the RRP or hope that more than a few of its potential customers don't bother shopping around. At this price, we really can't recommend it over some of the cheaper models.

DETAILS

RRP £429 (£365.11 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Terratec 01252 870 726
www.terratec.co.uk
PROS Attractive games bundle
CONS Woefully expensive; no cables or adapters
VERDICT
This graphics card is way too expensive and, while we mention the games bundle as a plus point, it's certainly nothing to shout about

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

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FX5950U-VTD256

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FX5700 Ultra Series

FX5700U-TD128

● nVIDIA Geforce FX5700 Ultra GPU ● 128MB DDR Memory ● TV-OUT / DVI-I ● T.O.P TECH cooling ● Large Game / Utility Bundle ● Live VGA Bios / Driver

FX5700 Series

FX5700-VT2DR256

●nVIDIA FX5700 GPU ● 256MB ●DDRI ●TWIN DVI OUT ● TV OUT ● VIDEO IN ●REMOTE CONTROL ● Large Game / Utility Bundle ● Live VGA Bios / Driver

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ebuyer www.ebuyer.com	Novatech www.novatech.co.uk	RL Supplies 01923 896 996	THX Trade www.thx-trade.com	

How we tested the graphics cards

In order to fully test the capabilities of each card, we decided to use two separate test PCs. One setup was running an AMD processor, while the other housed an Intel model. The first system featured an AMD Athlon 64 FX-51 processor sitting on an Asus SK8n motherboard with 1GB of Kingston registered Ram. The second test PC consisted of the brand new 3.2Ghz Prescott Pentium 4 processor and an Intel D875PBZ motherboard along with 1GB of PC3200 Corsair Ram. Both the Intel and AMD-based test systems had a 120GB Western Digital JB hard disk.

All the cards here can apply advanced techniques to enhance image quality. The screenshots below show the difference some of these techniques can make.

Bump mapping

Although the water looks reasonably good, its flat and motionless surface lacks realism and texture

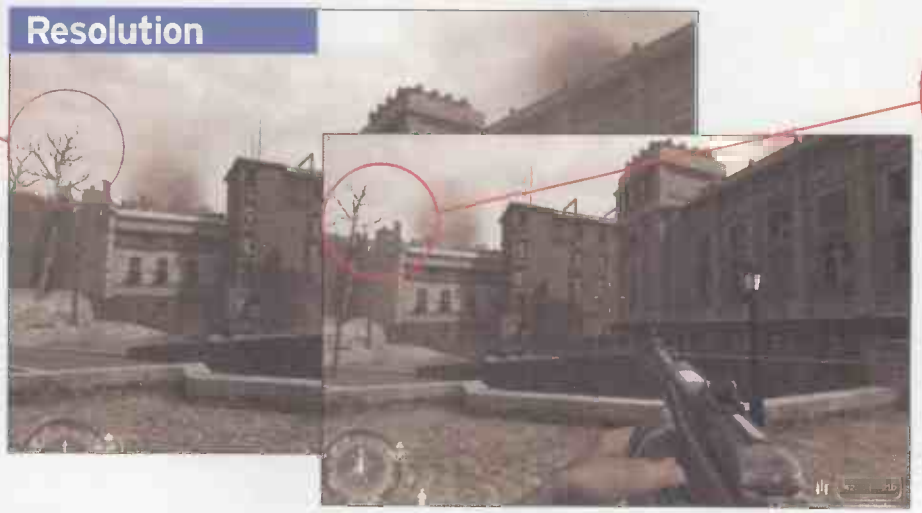
With bump mapping enabled, the water is given a whole new lease of life with the realistic ripple effects

Anti-aliasing

As you can see, the jagged edges are all too obvious in this close-up of the plane's wing

With anti-aliasing enabled, the jagged edges are smoothed and the wing looks a lot more accurate

Resolution



At 1,024 x 768 this tree features more detail, however higher resolutions place more demand on the graphics card

With a reduced resolution of 640 x 480 the same tree is far less detailed, although the game will run faster

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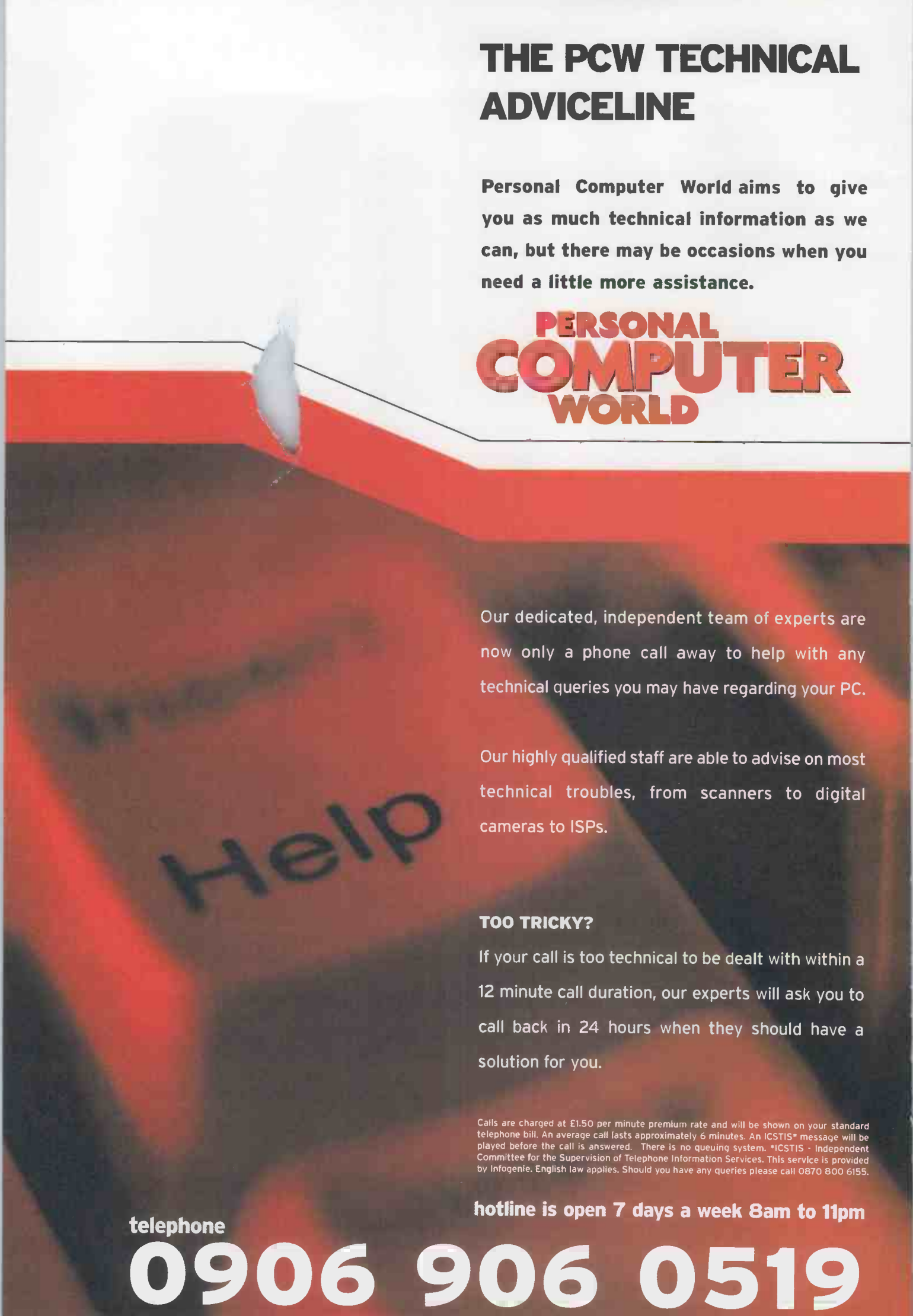

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Lab results

vnu labs

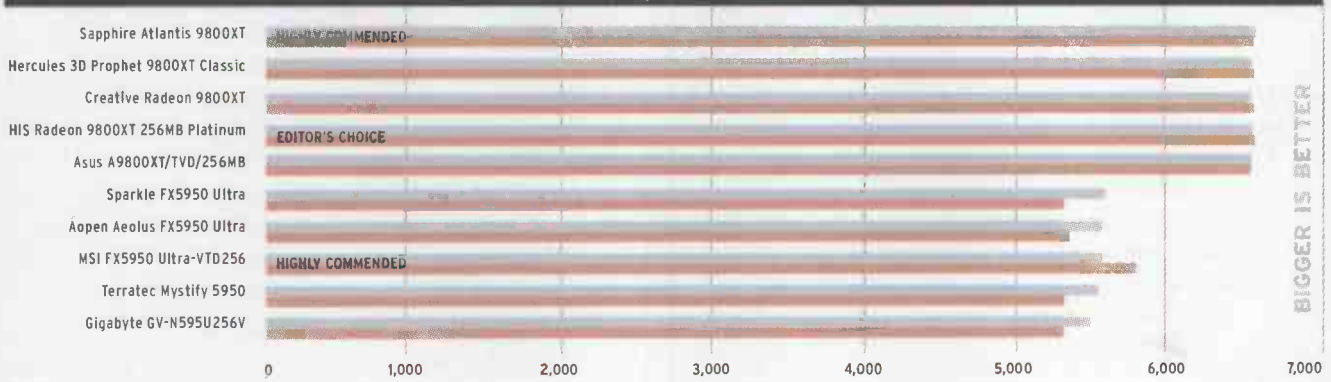
3Dmark03

Comprising four tests, this updated version of the 3Dmark 2001 benchmark will only run on DirectX 9 cards. The final score for each card is generated by taking an average of the four tests. However, the fourth test, which uses DirectX 9, has less weight than the others.

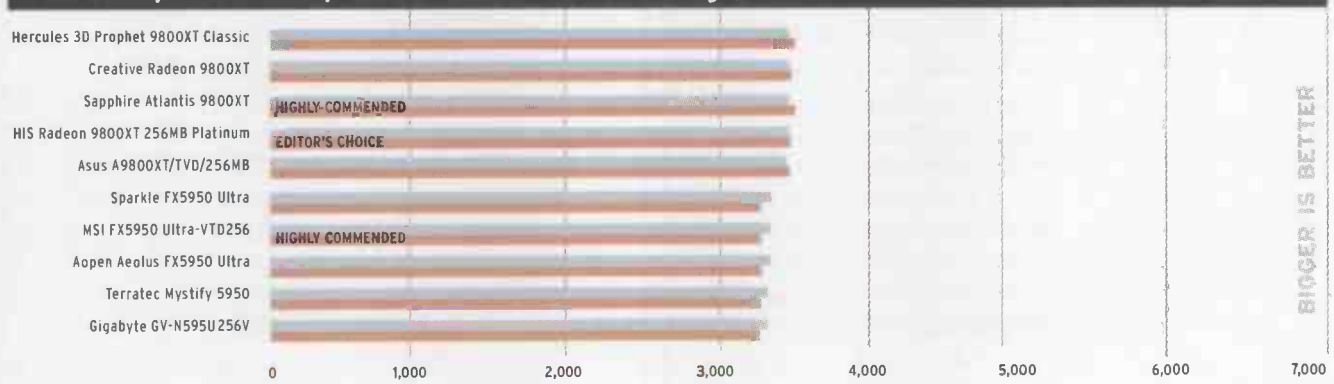
As you can see from the graphs below, we've run the 3Dmark 03 test at resolutions of 1,024 x 768, 1,024 x 768 with 4x full-scene anti-aliasing (FSAA) and 1,600 x 1,200 with 4x FSAA. As the resolution increases, the demands placed on the graphics card also intensify. The addition of the 4x FSAA, where the card attempts to smooth jagged edges in real time, enhances the quality of the display, but also takes quite a toll on performance.

The Radeon cards managed to outperform the Nvidia models at the lower 1,024 x 768 resolution tests, but as the tests got progressively harder the gap between the two chipsets became smaller. When the same tests were run using the Athlon FX-51, there were slight increases in the test results for some of the cards, but these were very small and, on the whole, the same results were achieved throughout the three tests. For full scores see features table.

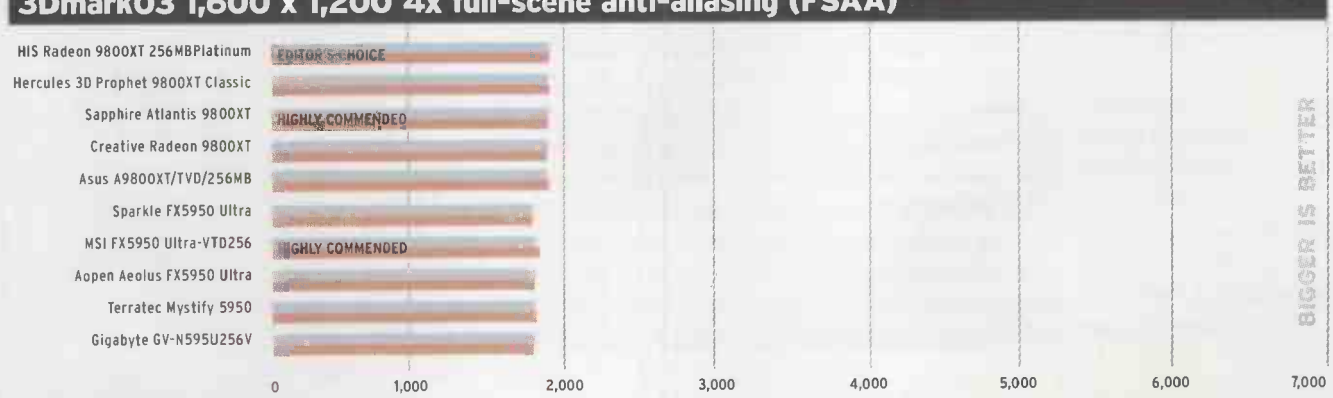
3Dmark overall (1,024 x 768 default settings)



3Dmark 1,024 x 768, 4x full-scene anti-aliasing (FSAA)



3Dmark03 1,600 x 1,200 4x full-scene anti-aliasing (FSAA)



For scores please see features table

KEY: FX-51 processor Prescott processor

Lab results

vnu labs

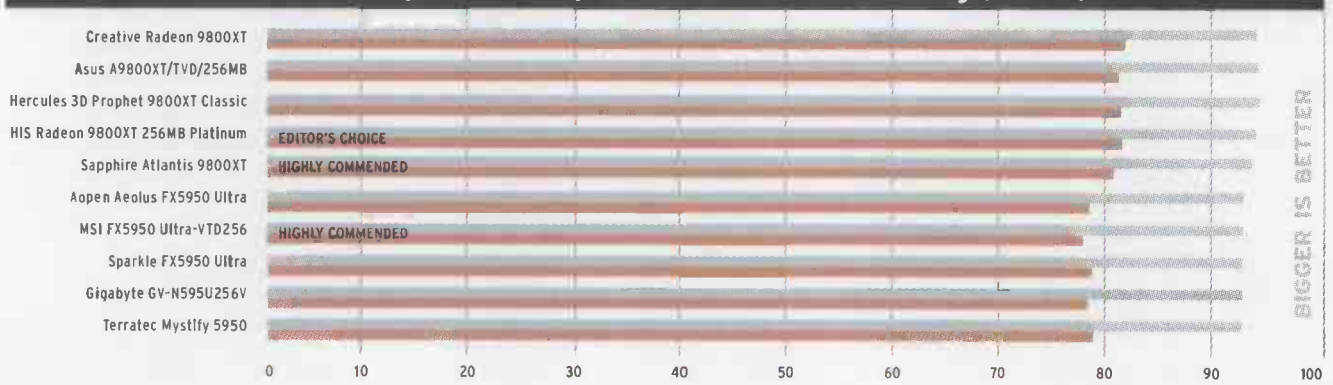
Unreal Tournament 2003

The demo version of Unreal Tournament includes a benchmark that gives another good indication of how each card will cope with demanding 3D games. The results provided at the end of each test are displayed in frames per second (fps), where the higher the frame rate, the better.

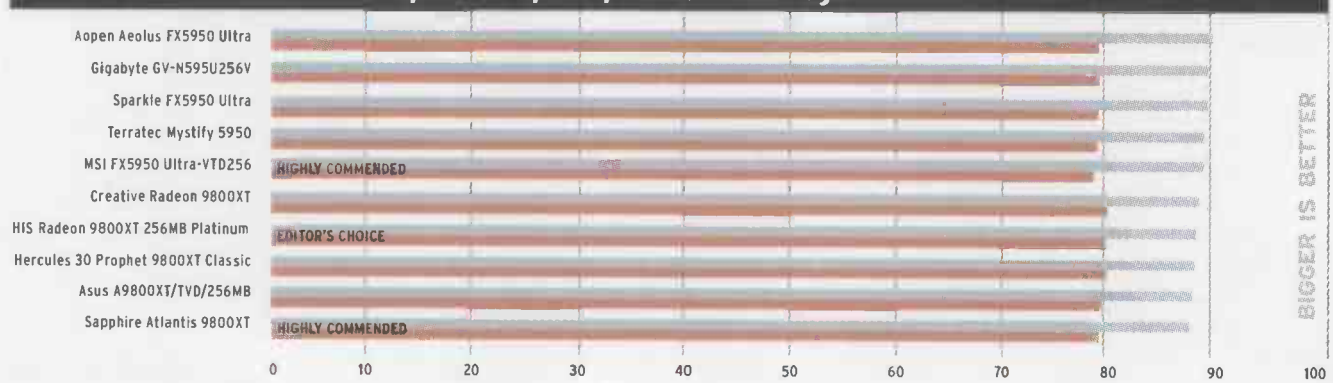
Out of our three benchmarks, the Unreal Tournament 2003 tests showed the biggest difference between the results produced when run with the Prescott processor and those with the Athlon FX-51. As expected, the FX-51 boosted the results. However, in the 1,600 x 1,200 test with 4x FSAA the Prescott managed to get more out of the graphics cards than the FX-51.

Unreal Tournament also features a benchmark that will run at the card's highest possible settings. We have not printed these results since, at first sight, it would look like the Nvidia cards performed far worse than the Radeon models. However, since the Radeon 9800 XT models can only perform 6x anti-aliasing, while the Nvidia FX 5950 Ultra cards are capable of 8x anti-aliasing, this puts the Nvidia cards through a tougher test and, as a result, produces lower benchmark scores.

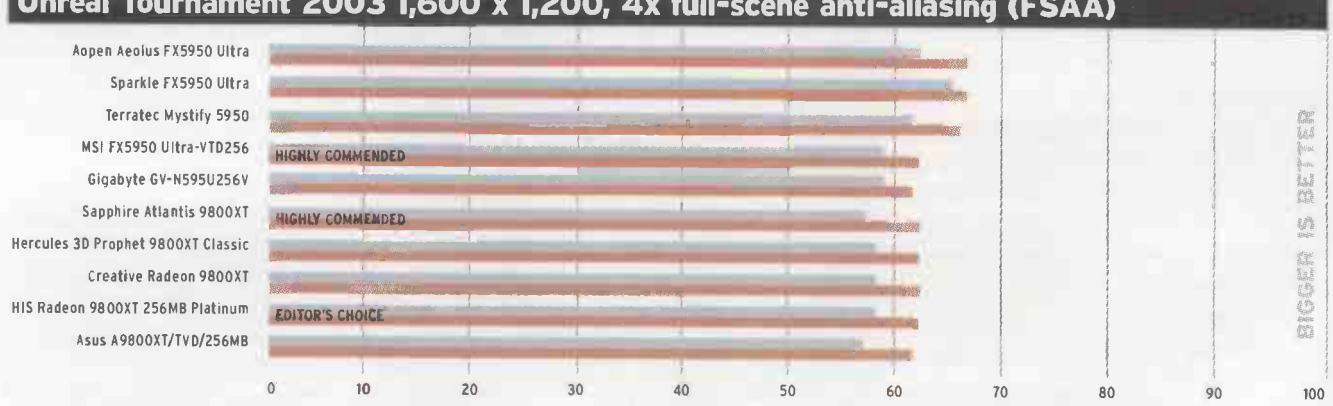
Unreal Tournament 2003 1,024 x 768, 4x full-scene anti-aliasing (FSAA)



Unreal Tournament 2003 1,600 x 1,200, default settings



Unreal Tournament 2003 1,600 x 1,200, 4x full-scene anti-aliasing (FSAA)



For scores please see features table

KEY: FX-51 processor Prescott processor

Lab results

vnu labs

PCmark04

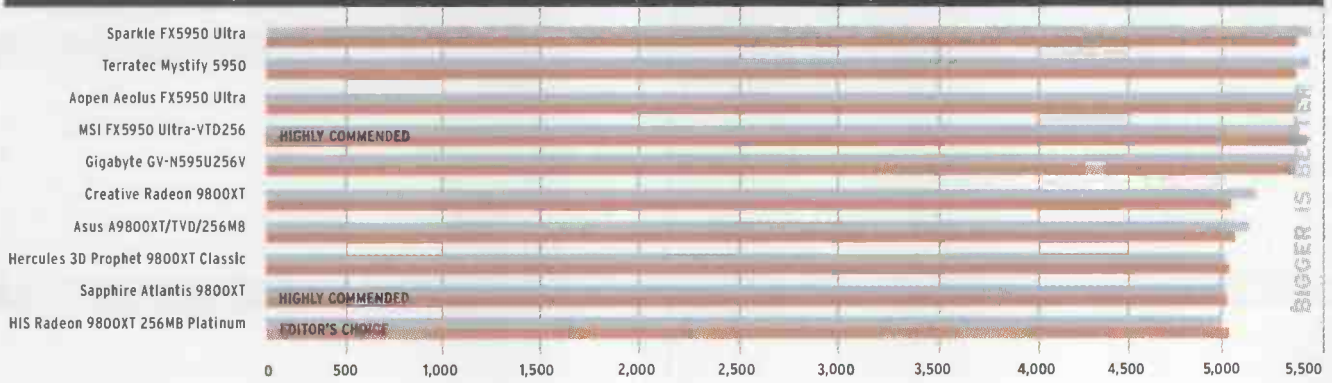
PCmark04 is one of the latest benchmarks to arrive on the scene and runs a series of low-level tests on graphics performance as well areas such as the CPU and hard disk – the results shown here are only from the Graphics Test Suite. This suite, which runs both a series of 2D and 3D tests, measures the likes of DivX playback, polygon throughput and fill rates.

We ran the PCmark04 Graphics suite at three different settings: 1,024 x 768, 1,024 x 768 with 4x FSAA and 1,600 x 1,200 and 1,600 x 1,200 with 4x anti-aliasing turned on.

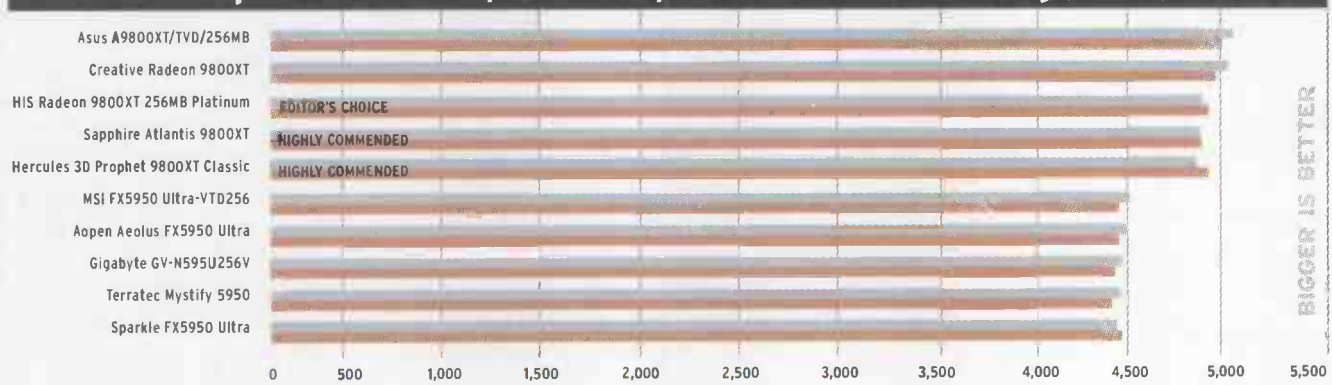
What's most interesting is that, while the Nvidia cards do well on the test that didn't use any anti-aliasing, those tests with the anti-aliasing turned on saw the Radeon cards achieve better scores. There's also very little variation between the scores returned by the Prescott and those with the Athlon FX-51 processor.

Once again, the highest quality test showed the Nvidia cards scoring slightly lower than the Radeons but, just as with the Unreal Tournament 2003 benchmark, this is because the FX 5950 Ultra runs this test with 8x anti-aliasing, as opposed to the 9800XT's 6x anti-aliasing.

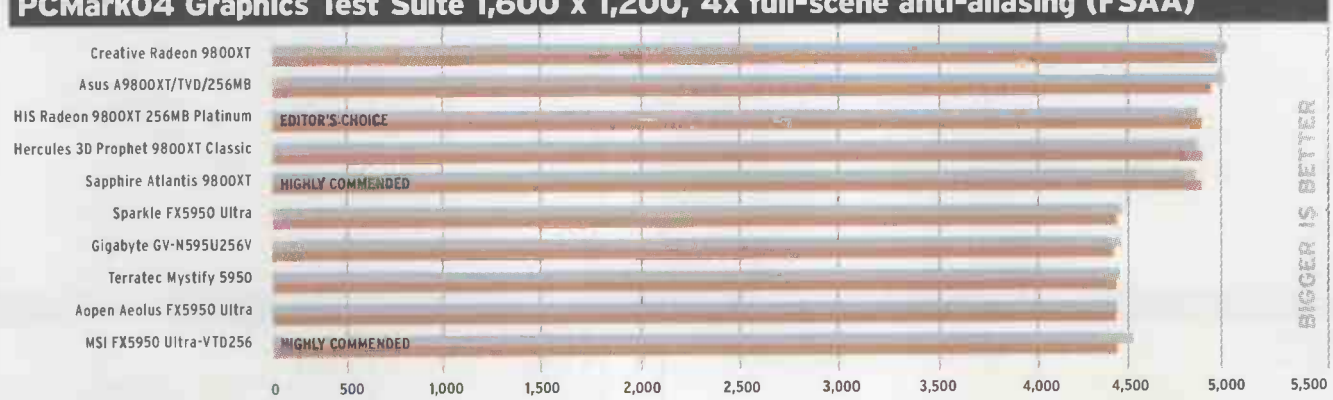
PCMark04 Graphics Test Suite 1,024 x 768, default settings



PCMark04 Graphics Test Suite 1,024 x 768, 4x full-scene anti-aliasing (FSAA)



PCMark04 Graphics Test Suite 1,600 x 1,200, 4x full-scene anti-aliasing (FSAA)



For scores please see features table

KEY: FX-51 processor Prescott processor

Table of features

MANUFACTURER	**AOPEN**	**ASUS**	**CREATIVE**	**GIGABYTE**	
MODEL NAME	**AEOLUS FX 5950 ULTRA**	**A9800XT/TVD/256MB**	**RADEON 9800 XT**	**GV-N595U256V**	
Price inc VAT (ex VAT)	£389 (£331.06)	£366.60 (£312)	£399.90 (£340.34)	£313.14 (£266.50)	
Sales telephone	08704 293 010 (Dabs.com)	01908 518 000	N/A	08704 293 010 (Dabs.com)	
URL	www.aopen.nl	www.asus.com	www.creative.com	www.giga-byte.com	
HARDWARE SPECS					
Graphics chip	Nvidia Geforce FX 5950 Ultra	ATI Radeon 9800 XT	ATI Radeon 9800 XT	Nvidia Geforce FX 5950 Ultra	
Memory quantity & type	256MB DDR	256MB DDR	256MB DDR	256MB DDR	
Core clock (MHz)	475	412	412	475	
Memory clock (MHz)	475 (950 DDR)	365 (730 DDR)	365 (730 DDR)	475 (950 DDR)	
Memory interface	256bit	256bit	256bit	256bit	
DirectX 9	✔	✔	✔	✔	
OTHER INFORMATION					
DVI	✔	✔	✔	✔	
Video out	✔	✔	✔	✔	
Video in	✔	✔	✗	✔	
Number of fans	1	2	1	1	
Number of PCI slots blocked	1	0	0	1	
Operating system	Windows 95/98/ME/ 2000/NT4, Linux	Windows 98/ME/2000/XP	Windows ME/2000/XP	Windows 98/ME/2000/XP	
Cables	Vivo cable	None	S-Video cable, Composite cable, Power supply splitter	TV Output cable	
Adapters	DVI-VGA adapter	DVI-VGA adapter, Vivo adapter	Mini-DIN-to-RCA adapter, DVI-to-VGA adapter	DVI-to-VGA adapter	
Bundled utilities	Intervideo WinDVD & Win Producer	Asus utilities, Asus DVDXP SoftDVD player, Cool 3D, Photo Express, Cyberlink Power Director Pro, Cyberlink Media Show	None	Cyberlink Power DVD 5, Gigabyte V-Tuner	
Bundled games	None	Half-life 2 voucher, Battle Engine Aquila, Gun Metal, 6-in-1 game pack, Valve Premiere Pack*	Half-life 2 voucher, Valve Premiere Pack*	Arx Fatalis, Raven Shield, Tomb Raider	
Extras	None	CD case	None	None	
Warranty	2yrs	3yrs	2yrs	3yrs	
LAB RESULTS (PROCESSOR SCORES: FX-51/PRESCOTT)					
3Dmark03 1,024 x 768 default settings	5,556/5,378	6,517/6,519	6,524/6,548	5,498/5,356	
3Dmark03 1,024 x 768 4x FSAA	3,343/3,296	3,469/3,485	3,485/3,499	3,316/3,281	
3Dmark03 1,600 x 1,200 4x FSAA	1,798/1,784	1,883/1,888	1,892/1,899	1,790/1,776	
Unreal Tournament 2003 1,024 x 768 4x FSAA (fps)	92.75/78.86	93.98/81.38	93.98/81.94	92.66/78.54	
Unreal Tournament 2003 1,600 x 1,200 default (fps)	90.03/79.55	88.32/79.85	88.63/80.29	89.99/79.51	
Unreal Tournament 2003 1,600 x 1,200 4x FSAA (fps)	62.22/66.07	57.49/61.95	57.85/62.32	58.82/61.78	
PCMark04 Graphics Suite 1,024 x 768 default settings	5,397/5,379	5,123/5,069	5,187/5,065	5,390/5,359	
PCMark04 Graphics Suite 1,024 x 768 4x FSAA	4,501/4,447	5,087/5,000	5,049/4,988	4,492/4,422	
PCMark04 Graphics Suite 1,600 x 1,200 4x FSAA	4,442/4,430	5,002/4,938	5,027/4,968	4,466/4,406	
SCORES					
Features	★★★★☆	★★★★★	★★★☆☆	★★★★☆	
Performance	★★★★☆	★★★★★	★★★★★	★★★★☆	
Value for money	★★★☆☆	★★★★☆	★★☆☆☆	★★★★☆	
Overall	★★★☆☆	★★★★☆	★★★☆☆	★★★★☆	

* Valve Premiere Pack is a free download game pack consisting of Half-life, Counter Strike, Deathmatch Classic, Team Fortress Classic and Half Life: Opposing Force and Ricochet,

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	HERCULES	HIS	MSI	SAPPHIRE	SPARKLE	TERRATEC
	3D PROPHET 9800 XT CLASSIC	RADEON 9800XT 256MB PLATINUM	FX5950 ULTRA-VTD256	RADEON 9800XT ATLANTIS	FX 5950 ULTRA	MYSTIFY 5950
	£334.88 (£285)	£292.56 (£249)	£311.36 (£265)	£329 (£280)	£304.33 (£259)	£429 (£365.11)
	0870 443 0880 (Overclockers.co.uk)	0870 467 0753 (Ebuyer)	0870 727 2100 (Simply)	0870 138 3554 (Komplett)	0870 443 0880 (Overclockers.co.uk)	01252 870 726
	www.hercules.com	www.hightech.com.hk	www.msicomputer.com	www.sapphiretech.com	www.sparkle.com.tw	www.terratec.co.uk
	ATI Radeon 9800 XT	ATI Radeon 9800 XT	Nvidia Geforce FX 5950 Ultra	ATI Radeon 9800 XT	Nvidia Geforce FX 5950 Ultra	Nvidia Geforce FX 5950 Ultra
	256MB DDR	256MB DDR	256MB DDR	256MB DDR	256MB DDR	256MB DDR
	412	412	475	412	475	475
	365 (730 DDR)	365 (730 DDR)	475 (950 DDR)	365 (730 DDR)	475 (950 DDR)	475 (950 DDR)
	256bit	256bit	256bit	256bit	256bit	256bit
	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔
	✔	✔	✔	✔	✔	✔
	✗	✗	✔	✗	✔	✔
	1	1	2	1	1	1
	0	0	0	0	1	1
	Windows ME/2000/XP	Windows ME/2000/XP	Windows 98/ME/2000/XP	Windows 98/ME/2000/XP	Windows 98/ME/2000/XP	Windows 98/ME/2000/XP
	None	S-video cable	Power cable splitter	Power cable splitter, S-video cable, RCA cable	S-video cable, 4-1 Vivo cable, Power cable splitter	None
	DVI-VGA adapter	Minidin-to-RCA adapter, DVI-to-VGA adapter	DVI-VGA adapter	RCA-to-S-video adapter, DVI-to-VGA adapter	DVI-VGA adapter, Scart adapter	None
	Cyberlink PowerDVD 5.0, screensavers, demos	Cyberlink PowerDVD & Power Director	WinDVD 5.1 Channel & Creater Plus, Photoshop Album SE, 3D Album, Far Stone Virtual Drive & RestoreIT, MSI Media Center	Sapphire Redline Overclocking/Tweak utility, Cyberlink PowerDVD	Cyberlink PowerDVD 5 & Power Producer ME	None
	Half-Life 2 voucher, Valve Premiere Pack*	Half-Life 2 voucher, Ballistics, Zanzarah, 6-in-1 bundle, Valve Premiere Pack*	Elder Scrolls 3, Ghost Recon, Duke Nukem: Manhattan Project, 7-1 games bundle	Tomb Raider – Angel of Darkness, Half-Life 2 voucher, Valve Premiere Pack*	None	Splinter Cell, Warcraft III, Gun Metal
	None	None	None	None	CD holder	None
	3yrs	2yrs	1yr	2yrs	1yr	2yrs
	6,535/6,545	6,523/6,546	5,554/5,682	6,545/6,540	5,559/5,374	5,537/5,361
	3,486/3,501	3,480/3,499	3,346/3,296	3,481/3,501	3,347/3,297	3,329/3,284
	1,896/1,898	1,897/1,896	1,798/1,806	1,893/1,893	1,799/1,779	1,792/1,799
	93.89/81.76	93.65/81.6	92.69/78.27	93.32/80.96	92.68/78.83	92.56/78.86
	88.46/80.22	88.5/80.12	89.68/79.24	88.18/79.65	89.98/79.56	89.74/79.64
	57.86/62.3	57.85/62.3	59.18/62.06	57.94/62.22	62.17/66.07	61.8/65.7
	5,003/5,016	5,000/5,024	5,393/5,408	5,001/5,011	5,423/5,383	5,416/5,365
	4,871/4,915	4,899/4,918	4,505/4,456	4,890/4,895	4,446/4,472	4,471/4,404
	4,880/4,899	4,884/4,895	4,419/4,436	4,873/4,895	4,474/4,429	4,458/4,428
	★★★★½	★★★★½	★★★★★	★★★★★	★★★★½	★★½☆☆
	★★★★★	★★★★★	★★★★½	★★★★★	★★★★½	★★★★½
	★★★½☆	★★★★★	★★★★★	★★★★½	★★★★½	★★½☆☆
	★★★★½	★★★★★	★★★★½	★★★★½	★★★★½	★★½☆☆

and is only available until Half-life 2 is released.

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.

Editor's Choice

Before you rush out and buy one of these graphics cards, it's important to understand a couple of points. Although these are currently the fastest graphics cards available, if you can afford to take a slight drop in performance or don't have a CPU fast enough to do these cards justice, you'll be able to save a whole heap of cash. The Radeon 9800 XT, for example, is a tweaked version of the 9800 Pro and many home users wouldn't notice the difference between the two. What's more, you can pick up a 9800 Pro for around £100 cheaper than a 9800 XT.

Also, once ATI and Nvidia release new chipsets, the prices of both Radeon 9800 XT and Geforce FX 5950 Ultra-based graphics cards will plummet.

Having said all this, some people will always want the fastest kit they can get their hands on, no matter what the cost.

As you'll see by taking a quick look at the results, the performance of these cards doesn't really vary that much. The Nvidia cards all perform extremely well, but, despite the fact that they sport faster memory and core clock speeds, they just can't quite keep up with the energetic ATI-based models. You'll also notice that the five Nvidia cards perform almost identically, and it's exactly the same story with the ATI ones.

'The Nvidia-based cards can't quite keep up with the ATI-based models'

It's interesting to note that the Athlon FX-51 processor managed to push all the cards a little bit harder in some of the tests at the lower resolutions – take a look at the graphs and you'll see the differences. Furthermore, while the 9800 XT frequently managed to just outperform the 5950s, the Nvidia models seemed to do better than the ATI cards in the PCmark 2004 test.

So, when it comes to handing out awards, we had to take a close look at exactly what each package was offering. While some manufacturers supplied simply the card and maybe a couple of adapters, others really pushed the boat out and included numerous games, utilities and cables as well.

HIS Excalibur Radeon 9800XT

MSI FX5950 Ultra-VTD256

Sapphire 9800XT Atlantis

The winners

In general, the Radeon 9800 XT cards were more expensive than the Geforce FX 5950 Ultra models. However, there was one major exception to this, namely the Excalibur Radeon 9800XT from HIS. With an RRP of just £292.56, not only was it the cheapest ATI-based card here, but it was also cheaper than any of the Nvidia cards. As expected, its performance was slightly better than all the FX 5950 Ultras and matched the other 9800 XTs. Of course, at this price, you'll miss out on a few bundled goodies, HIS still managed to include more than some of the other more expensive cards.

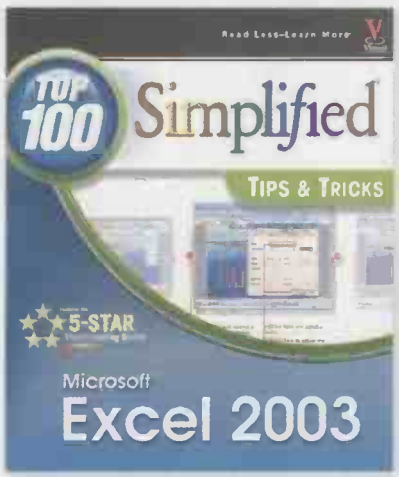
As it's an ATI model you get the voucher that entitles you to a free copy of Half-Life 2 when it is launched, along with the free download of the Valve Premiere Pack. If you're not hugely fussed about having a massive software bundle, the **HIS Excalibur Radeon 9800XT** is definitely worth considering and with such a good blend of performance and a low price it gets our **Editor's Choice** award.

Our first **Highly Commended** award goes to the feature-packed **MSI FX5950 Ultra-VTD256**. As we've already pointed out, there are many people who simply wouldn't notice any difference between the performance of ATI and Nvidia cards, and this model hasn't just got a low price tag to shout about. The people at MSI must have been in a very generous mood when they put this package together, since not only do you get a good variety of games, but you'll also find utilities such as WinDVD, Photoshop Album SE and the MSI Media Center – the latter includes the MSI Clock utility allowing you to overclock your card.

Our second and final **Highly Commended** accolade goes to the **Sapphire Radeon 9800XT Atlantis**. It's not the cheapest card on offer at almost £330, but it does come with a host of cables and adapters, along with Sapphire's Redline overclocking utility (keen overclockers should note that using this doesn't void your warranty) and Cyberlink's PowerDVD. The games bundle perhaps could have been a little better than just Tomb Raider, however since it's an ATI card, you also get the Half-Life 2 voucher and a collection of free games to download.

As a final note, don't forget that all the prices that we've listed here are the manufacturers' RRPs and you'll be able to make significant savings by logging on to www.pcw.co.uk/bestprices.

The answers to all your Office 2003 questions...



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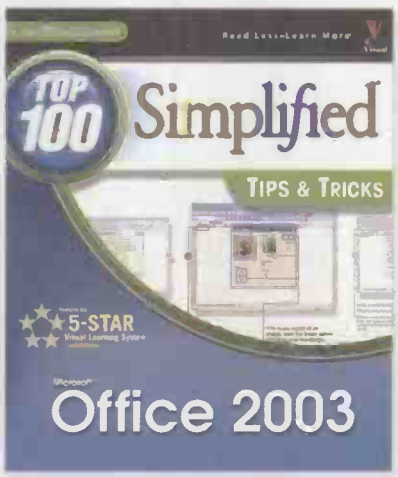

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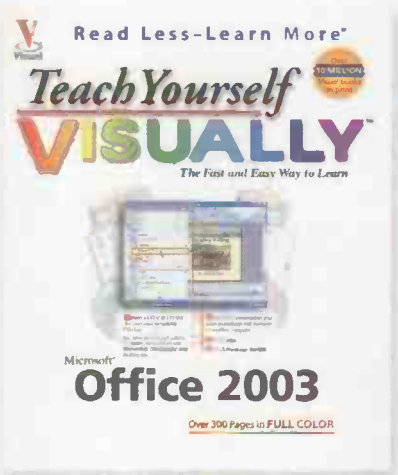

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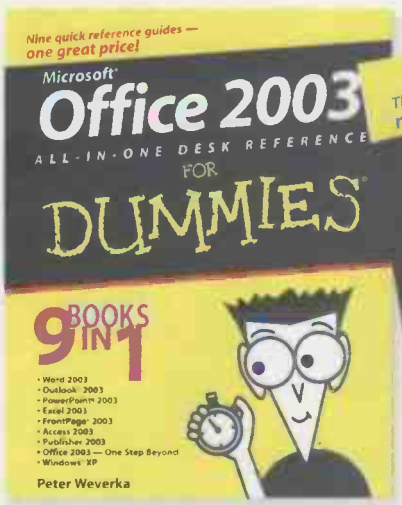

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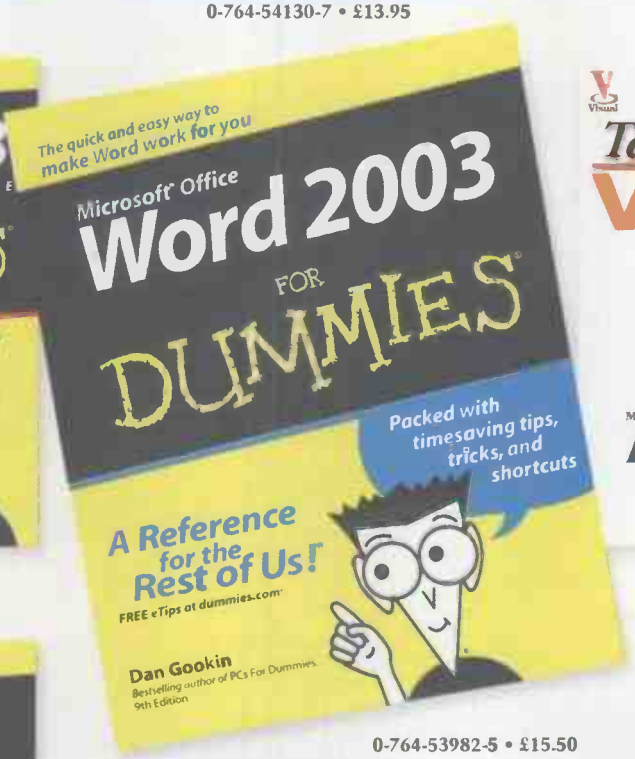

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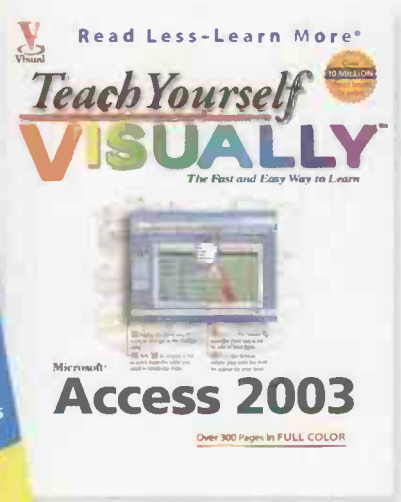

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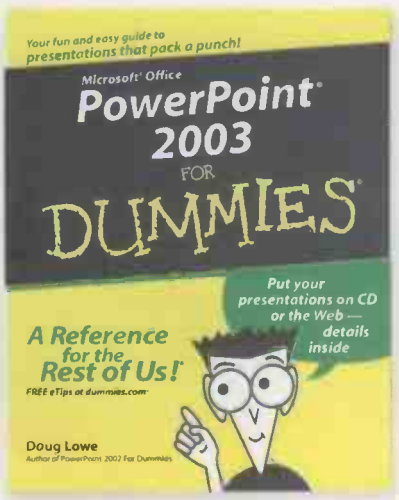

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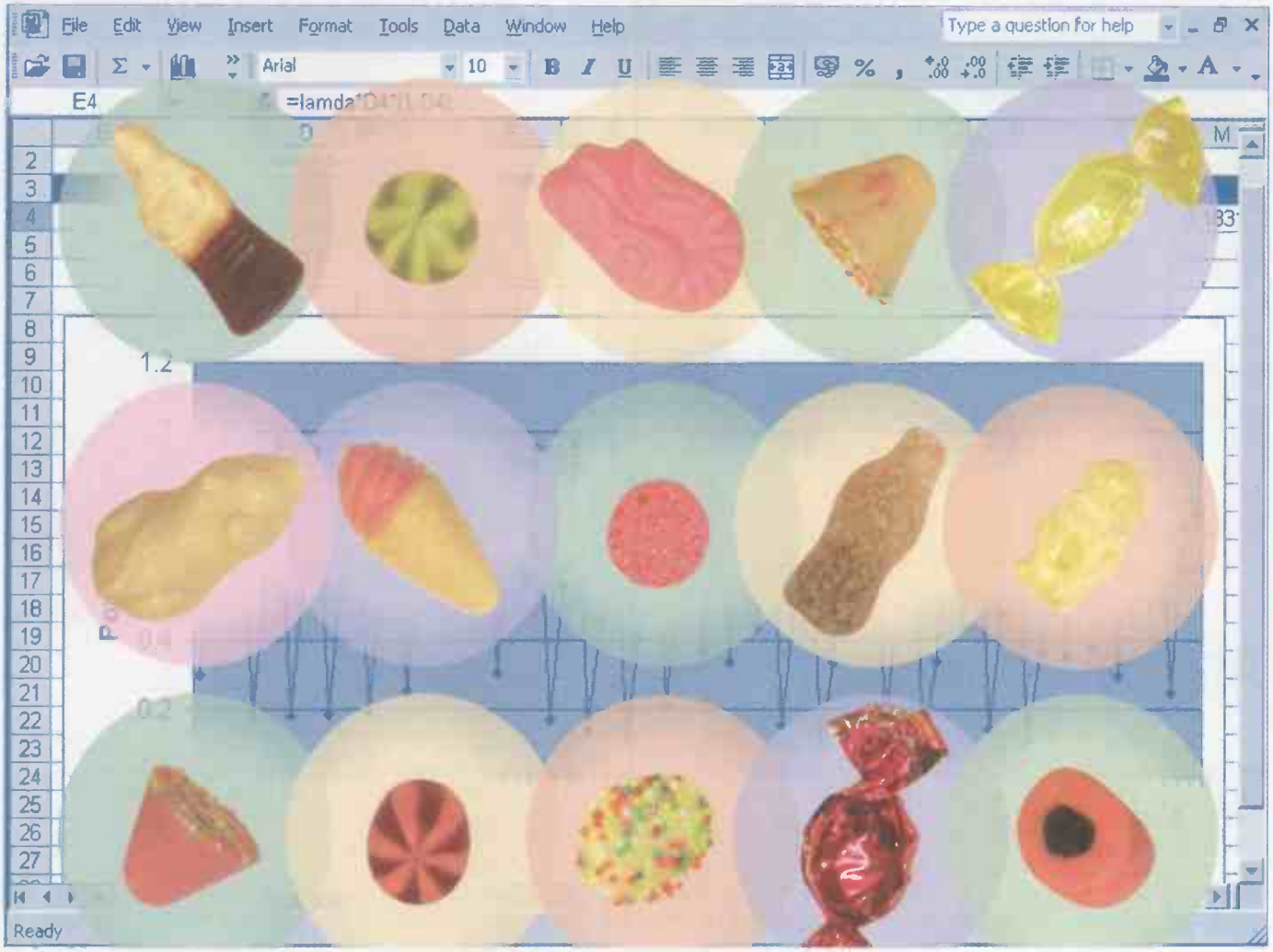

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Suite talk

WORDS: TIM NOTT **TESTING:** VNU LABS **PHOTOS:** BRUCE MACKIE

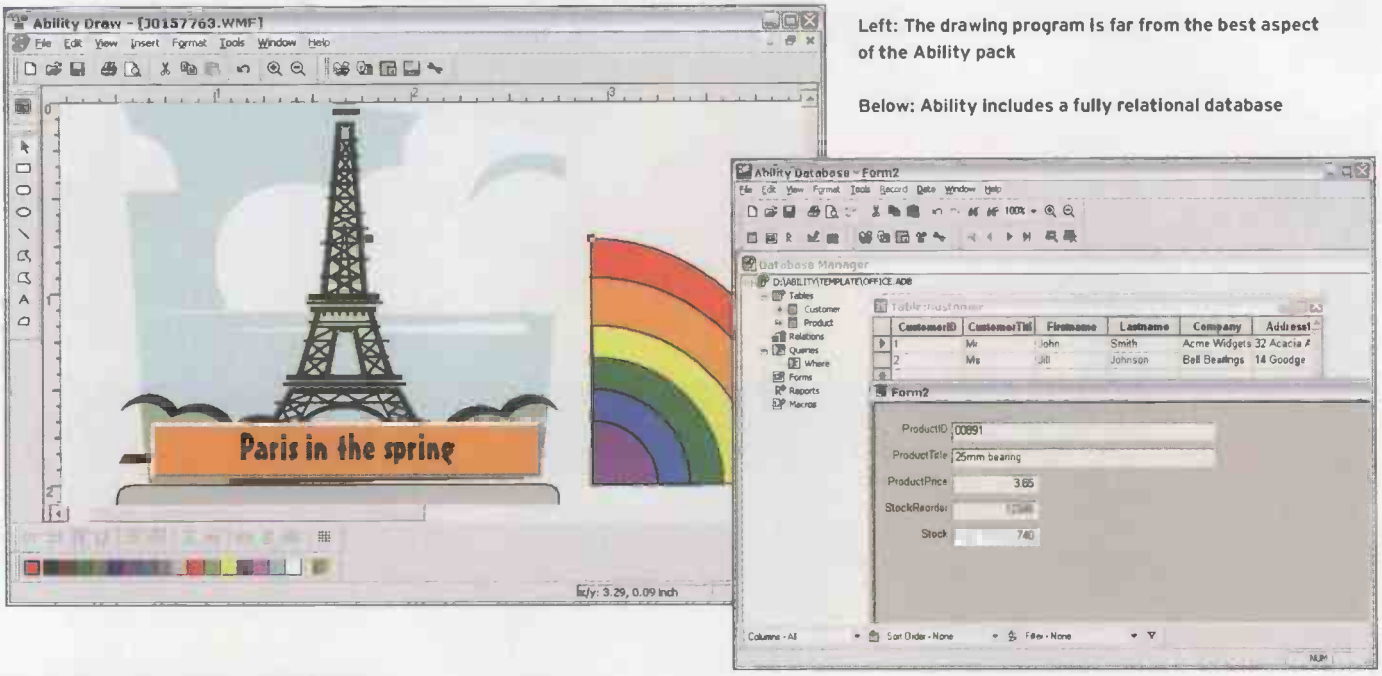
If you need an all-in-one package offering word processing, spreadsheets, databases and more, for Windows, Mac or Linux, these in-depth reviews will help you find the right one

In the early days of PCs, people shopped around for business software. Wordperfect 5.1, Lotus 1-2-3, Foxpro database and Harvard Graphics – all Dos pack leaders – would set you back well over £1,000 in 1992. And, as each had a different interface, you'd be facing a formidable learning experience.

With the rise of the GUI interface, it became inevitable that all-in-one packages or 'suites', offering word processing, spreadsheets, database management and business graphics, would catch on. Some of these, such as the truly dreadful CA Simply Business and the brilliantly quirky Claris Works have fallen by the wayside. But three of the big names – Wordperfect, Lotus and Microsoft – have survived, as has the more modest Ability. They are joined in this group test by the relative upstarts Star Office and Thinkfree.

You can pay anything from under £50 to over £400 for an office suite. Whereas there are no prizes for guessing whose suite is the dearest, never before have we seen such astounding value at the bottom end of the range. It's also refreshing to see some alternative thinking: we have one suite based on open-source architecture and another written entirely in Java. So read on to find the suite that's right for you.

If you've bought the DVD edition of *PCW* you'll find trial versions of most of the packages reviewed here, plus a full version of Open Office, the cut-down version of Star Office.



Left: The drawing program is far from the best aspect of the Ability pack

Below: Ability includes a fully relational database

Ability Office

UK-based Ability first produced an 'integrated package' for the PC in 1985, with a Windows version launched 10 years later. Last year it won our Editor's Choice award and, apart from a few minor upgrades and bug fixes, this is the same product.

Installing Ability Office took around three minutes and 40MB of disk space. Despite this small footprint, you get five main applications – Write, Spreadsheet, Photopaint, Database and Draw. There's a tiny Launcher toolbar, a substantial user guide in pdf format on the CD and a pdf tutorial, and that's it – there are no templates, sample files, clipart or other resources apart from a solitary fax template.

Launch Ability Write, and the first impression is of a standard Word-like interface, with one row of file, clipboard, undo/redo, search, spelling and zoom buttons; a formatting bar below giving the usual style, font and alignment buttons; plus bullets, indents and columns. Less conventional is a button for strikeout text. A third toolbar takes on borders and shading. All the toolbars can be customised and you can create new ones.

The second impression is that for a low-cost, small footprint application, there's a lot here. We were able to open not just Microsoft Word documents, but Lotus Word Pro ones as well – Microsoft can't manage this without a third-party converter. You don't get the XML support seen in the Microsoft, Corel and Star products, but you do get the facility to produce pdf files – another one-up on Microsoft – as well as HTML.

In terms of page layout and formatting, there is pretty much all one could desire, with styles, newspaper-style columns, custom bullets and nested numbering, tables, headers and footers. There are no built-in drawing tools, but you can insert Ability Draw or Paint objects as OLE (object linking and embedding) objects and edit them in-place. You can also use frames to create a page-within-a-page, so the main text can flow around boxed-in text and graphics, and callouts with arrows explain or draw attention to other items on a page. A text effects tool, Write FX, is similar to Microsoft Wordart, and it has a good range of textures, fills, shapes and other text tweaks.

Document management isn't so impressive – there are no tools for indexing or creating tables of contents, although there is a competent footnote generator and a tool to caption pictures, tables and other figures.

A macro facility is included, although sadly you can't record macros, and the documentation is minimal. However, this uses the standard VBScript language, and the help file suggests you search www.amazon.com for books on VBScript. There is a 'Class Browser', so having learnt VBScript you'll be able to address Ability objects and methods. You can also automate documents with fields – a simple example is the current date or author's name – but you can go much further and include any of the functions used in the spreadsheet and database. As well as a standard mail merge, you can also add information from a database anywhere in a document.

Proofing tools

The proofing tools aren't spectacular: you have the choice of UK or US English in the CD product, although nine more languages are available free from the Ability website. There's no autocorrect or on-the-fly checking – but this is promised for the next version – and there is no grammar checking, although you do get a thesaurus. We had to download the latest upgrade to get smart left- and right-handed quotes, but these only seem to work on double quotes, not single quotes or apostrophes.

Although the package claims Microsoft compatibility, this is 'up to a point' – we lost graphics and some formatting when opening Word files in Ability Write. As Ability doesn't support Unicode, we also lost letters and symbols above the Ansi character set. Unlike Lotus and Corel, Ability does not provide any 'pi' fonts for inserting special characters.

Ability Spreadsheet, while not quite matching the might of Quattro Pro, gives you 256 sheets in a workbook, each containing 256 columns and 65,536 rows – the same as Excel. As usual, cells on one sheet can reference those on other sheets, so you are not limited to two-dimensional tables. The 240 built-in functions include maths, finance, statistics and queries to remote databases. A total of 40 chart types include radar, bubble and stock open/close charts, as well as the usual bar, line and pie, and you get another chance to use the Write FX textures and backgrounds in charts. Charts are updated dynamically as you change the referred cell contents.

As with most modern spreadsheets, you can edit cell contents in place or use the formula bar if you want to assemble complex functions.

There's also auto-filling of numbered and time-span series, and you can attach pop-up comments to cells – these show as a red corner. If you want to break with the rigid spreadsheet grid, you can merge or split cells – this is a good way of managing visual relationships between years and months, for example. You can select multiple, non-contiguous regions of a worksheet for formatting and transpose rows and columns of a selection.

Unusually for a spreadsheet, you have a mail merge facility, just as in Write. You can also reference fields or data in a remote database, and go further still in using filters and queries defined in that database while remaining 'in' the spreadsheet. As with Write, you can create and run VBScript macros.

We've mentioned the Ability Database in passing, but it deserves a close-up look. Like Microsoft Access, Lotus Approach and Star Adabas, this is a fully relational database manager. This means that, unlike a flat-file database, which is the digital equivalent of a card file, you can relate different tables of data. You might have a table of customer names and addresses, a table of orders, and a table of invoices: you can then relate these and construct queries to find what orders customer X has made, when they were sent, and if the invoice has been paid.

Ability is also compatible with the Microsoft Access mdb format – and we had no trouble opening the sample Northwinds database from Microsoft Office 2003. It is also compatible with Foxpro, ODBC and Dbase formats. Unlike Approach and Access, however, there are no samples or Smartmasters. When you create a new database, you'll get a tree-like view showing tables, relations, queries, reports and so on. Obviously, all these will be unpopulated until you create your first table of data. Here you do get a bit of help, as there is a wizard to help you set up standard tables for things such as customer and product details. After that, you are left to the mercy of the online help, which is fortunately fairly comprehensive and user friendly.

Sneak preview of Ability 4

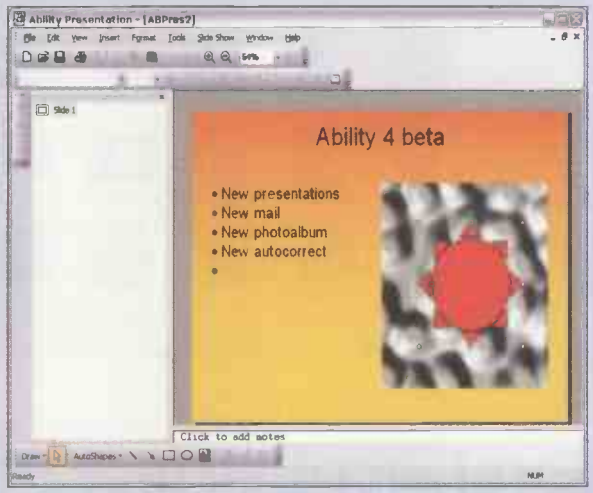
As mentioned in the main review, a new version of Ability Office is due shortly, and in the last minutes before going to press we got our hands on a beta version. Our first impression was amazement, that those cheeky chaps have copied the Microsoft Office 2003 look of curvy toolbars and orange-glow buttons.

As promised, there is a new Presentations program, and it will come as no surprise that this is uncannily like Powerpoint, with the same slide-thumbnail-notes view but without the content and design wizardry.

There's a new mail client – which appeared to be unfinished – and something called Photo Album, which we couldn't get to run. Ability Write seems beefed up, with a grammar checker and checking of spelling as you type. All modules have an autocorrect feature and a 'Save to web' option.

The spreadsheet has a number of improvements, including conditional formatting – you can, for example, colour all cells that have a value between 0 and 9 green.

The database has also seen some enhancements, with Access-compatible security options and an improved database manager window. As you may gather, this version was some way from completion and we look forward to seeing the finished product.



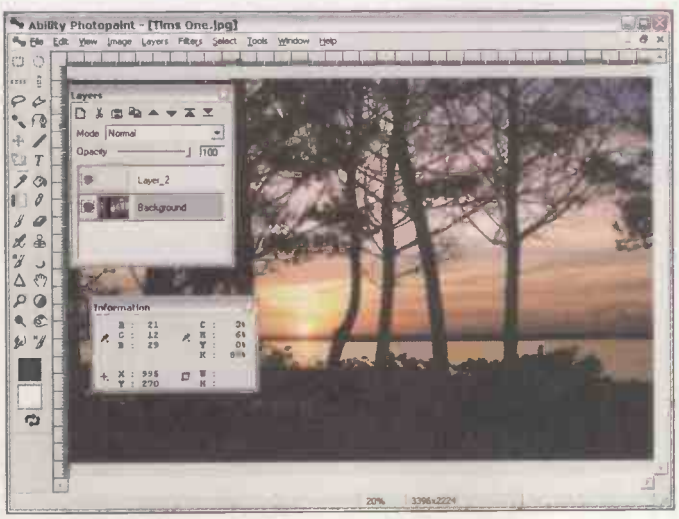
The new version of Ability Office includes a presentations module

Graphics duo

One thing Ability lacks is a presentation creator, although this is another element promised for the next version (see above). It probably isn't a must-have for the smaller business or home user, and there are two graphics applications available. Ability Draw is a vector-based program offering a minimum of tools with basic shapes such as rectangles and ellipses and a text tool. It uses its own file format, although you can import other pictures. There's very little you can do in this application: text is strictly straight-line and horizontal, and there isn't even a proper Bezier tool. Object fills are limited to single-colour and, frankly, there's more artistic abundance in the Write FX applet.

The bitmap-editing tool, Ability Photopaint, outclasses its vector sibling completely. This is a serious image processor, with features such as layers and histogram adjustments that you tend to see in specialist programs such as Paint Shop Pro and Photoshop. There's a splendid set of filters, ranging from sensible things, such as noise reduction and an 'unsharp mask' (which, despite its name, sharpens the edges in an image), to the downright silly, such as discotheque lighting and random kaleidoscope effects. There's a range of hand brushes for painting, highlighting, cloning and so on, and even a red-eye removal tool.

Apart from the sorry excuse for a drawing program, Ability is a good, solid package, and the possibilities of the VBScript and database capabilities will attract those with developmental urges. We would, however, like to see a little more handholding for the less intrepid – a few more templates, wizards and sample files would be very welcome.



Ability Office offers high-power bitmap-editing tools

DETAILS

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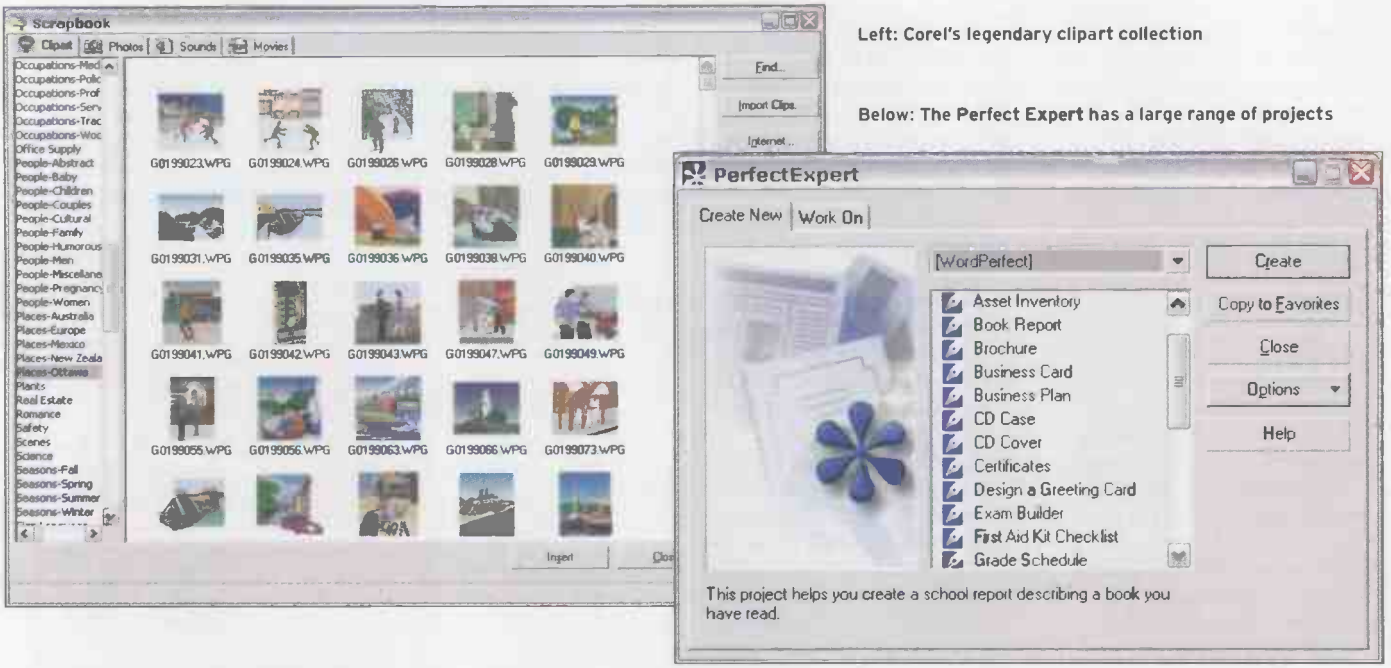
CONS No templates; no Unicode; no presentations
VERDICT
No frills, but solid good value

FEATURES	★★★★★
EASE OF USE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Left: Corel's legendary clipart collection

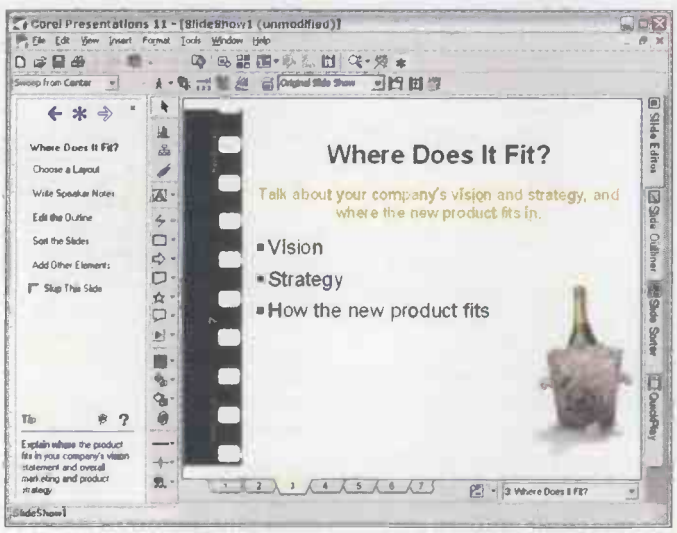
Below: The Perfect Expert has a large range of projects

Corel Wordperfect Office 11

We review here the standard version, which consists of the Wordperfect word processor, Quattro Pro spreadsheet and Presentations. The professional version adds the Paradox relational database manager. Both versions come with a host of extras, including Microsoft Visual Basic for Applications, the Pocket Oxford Dictionary, over 1,000 Truetype fonts, and nearly 10,000 clipart and photo images. Finally, there's Zim: a tool to add SMS functions to Quattro Pro and Microsoft Outlook. When installing the suite, it's worth taking the time to look at the options. By default, the Desktop Application Director is not installed, but if you like loads of tiny icons in the system tray you can include it. You also have a choice of 26 proofing languages, taking a tidy round-the-world trip from Afrikaans to Zulu.

In the days of Dos-based word processing, Wordperfect was the market leader, but its fortunes declined sharply after a poor Windows debut. It took two changes of ownership and three new versions to catch up with the feature lists from Microsoft and Lotus. Start up Wordperfect, click on the little blue flower button, and you'll summon the Perfect Expert. This is a pane that slots in beside the document, much in the manner of the Microsoft Task Pane. However, it has been around longer and is more flexible.

The Start button leads you to a large selection of templates and ready-made projects: you can cross applications here and launch a new presentation or spreadsheet. If you stick with word processing, then the Perfect Expert will change to suit, offering buttons to change the font or layout, add footnotes and so on. The Perfect Expert doubles as a help source, offering tips on the current task and advice on writing the relevant sections of a document. There's also a set of tutorials, but these appear to be limited to changing fonts, using drop caps and adding footnotes and endnotes. The Perfect Expert is also available in a freestanding capacity, where it gives access to a huge range of project templates for home, business and school use.



Default content helps you write presentations on a variety of topics

No Greek

Wordperfect still hasn't taken Unicode to heart, although this has been available since the days of Windows 95. This means that, although the standard Windows Truetype and Opentype fonts contain symbols and alternative character sets such as Greek and Arabic, Wordperfect can't access these or display them in imported Word documents. If you want to add Greek letters or esoteric symbols to a document, you have to use the WP custom fonts, which have two disadvantages. First, they are only available in one typeface: you can't have different Times New Roman and Arial versions of pi, for example. Second, if you send your document as a file, it may be unintelligible to other users unless you 'embed' any special fonts used.

Turning to the other main advance in recent technology, Wordperfect fares better with Extended Mark-up Language with facilities for importing and creating XML documents. It also beats Microsoft with built-in Adobe Acrobat (pdf) creation. It at last catches up with the document map, introduced with Microsoft Word 97, to give users a way of navigating a document by headings and subheadings. The Wordperfect version goes a stage further as it encompasses index and table of contents markers. Another new feature is that you can access an Outlook (but not Outlook Express) address book from Wordperfect.

Wordperfect users have long appreciated features dating from Dos days, such as Reveal Codes, which shows all the formatting codes in text. This version contains another backward look, in that you can see your documents in 'Classic 5.1' white text on blue background view with just the menus and status bar showing, and you also have the option of changing to the 5.1 keyboard commands.

We won't dwell too long on Wordperfect's formatting, page layout and graphic facilities: suffice it to say this is a mature product and has all you could want in terms of columns, picture placement, text-wrap, dropped caps and so on. You have an equation editor, drawing tools and Text Art – a tool for creating decorative 2D and 3D text effects, similar to Microsoft's Word Art. There's also all you could want in terms of automation with both the Perfectscript and Microsoft VBA supported as development platforms. Wordperfect's proofing has long been a cut above the rest – as mentioned earlier, this is available in 26 languages. You also get a proper definition dictionary (the Pocket Oxford) and a thesaurus that easily beats Microsoft's bowdlerised version.

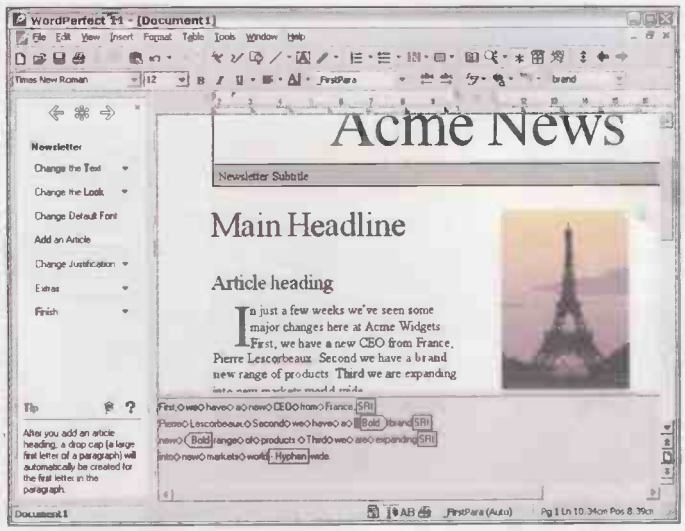
Spreadsheet

Quattro Pro is another Dos veteran, originally developed by Borland. The theoretical capacity is enormous: you can have a million rows and 18,278 columns to each worksheet, and 18,278 sheets to a workbook. It's doubtful that anyone could fill this, even with nearly 500 functions available. There are over 80 ways of displaying a chart – as well as the usual bar, pie, line and so on, you have the exotic scatter, bubble and spectral, all in a range of colour schemes and backgrounds. Fortunately there's a Chart Advisor, which analyses the selected data and suggests the best ways to display it.

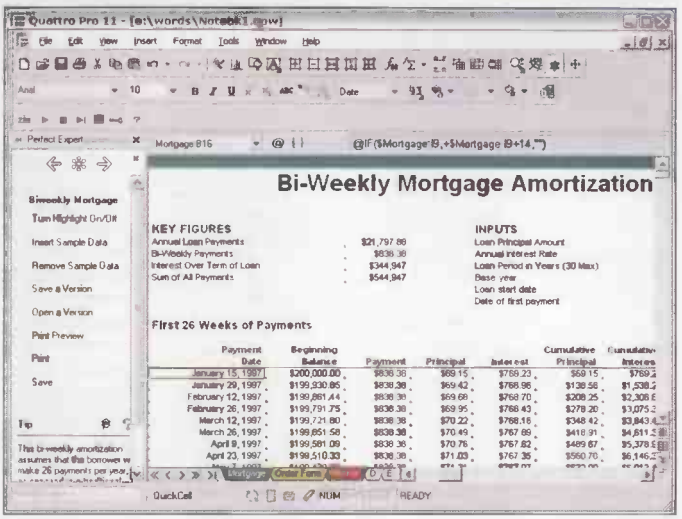
One welcome touch is that, as well as cells with comments flagged with a red triangle, cells with formulae are marked with a blue one. This means you can tell at a glance if a cell contains raw data or the result of a calculation without selecting it. As in Wordperfect, Quattro Pro now lets you open and save files in XML format. There are a few other new features in this release, such as smarter cut and paste that adjusts the destination range to suit, and easier sub-totalling of ranges.

The Perfect Expert again takes a major role in Presentations, prompting you to choose a subject such as Budget Report or Product Launch. It will then populate your presentation with a set of prefabricated slides themed to a master design. You can stick with this or choose a new master – a combination of colour scheme, background images, fonts and other graphic elements. Alternatively, you can design a look from scratch using your own images and graphics.

Having started, you can navigate through your slides, either by the numbered tabs below or by choosing a slide



A popular feature, Reveal Codes shows all the formatting codes in text



Quattro Pro has a huge theoretical capacity of a million rows

title from the pop-up list. To the right of the workspace are tabs for switching between outliner, slide sorter, slide design and a preview of the show. To the left are a set of drawing and charting tools. Although you don't get the same combination of views that characterises Powerpoint, Corel has made things very easy – you can even hide the tool palette and use the Perfect Expert pane to create bulleted lists or add shapes. If you're stuck for what to say in your presentation, then the default content is quite useful – the budget report, for example, takes you through topics such as Estimated and Actual Amounts, Deficits and Surpluses, and all the whys and wherefores, before winding up with a summary and – neat touch – a 'Thank you for coming' slide.

Special effects

There's a huge selection of transitions and special effects to keep your audience awake and you can add sounds in wav, mp3 and wma formats, animated gifs, and avi, mpeg or Quicktime movies. As with Wordperfect and Quattro Pro, you can output to XML or pdf, and you can also create a 'Show on the go' – an executable file that will run the show on a PC that doesn't have Presentations installed.

There are various extra utilities supplied, including an XML project designer, a batch file conversion utility and a Quick Finder for searching files. There's also a multiple clipboard utility that can store 36 items.

If you've installed the Zim add-on, you'll get the Zim toolbar. Once you've signed up, this lets you create a list of contacts using your Outlook addresses, then broadcast messages by email, SMS or both. You get 300 free SMS messages, after which you need to subscribe. Your messages and the replies are collected and tabulated in a Quattro Pro table.

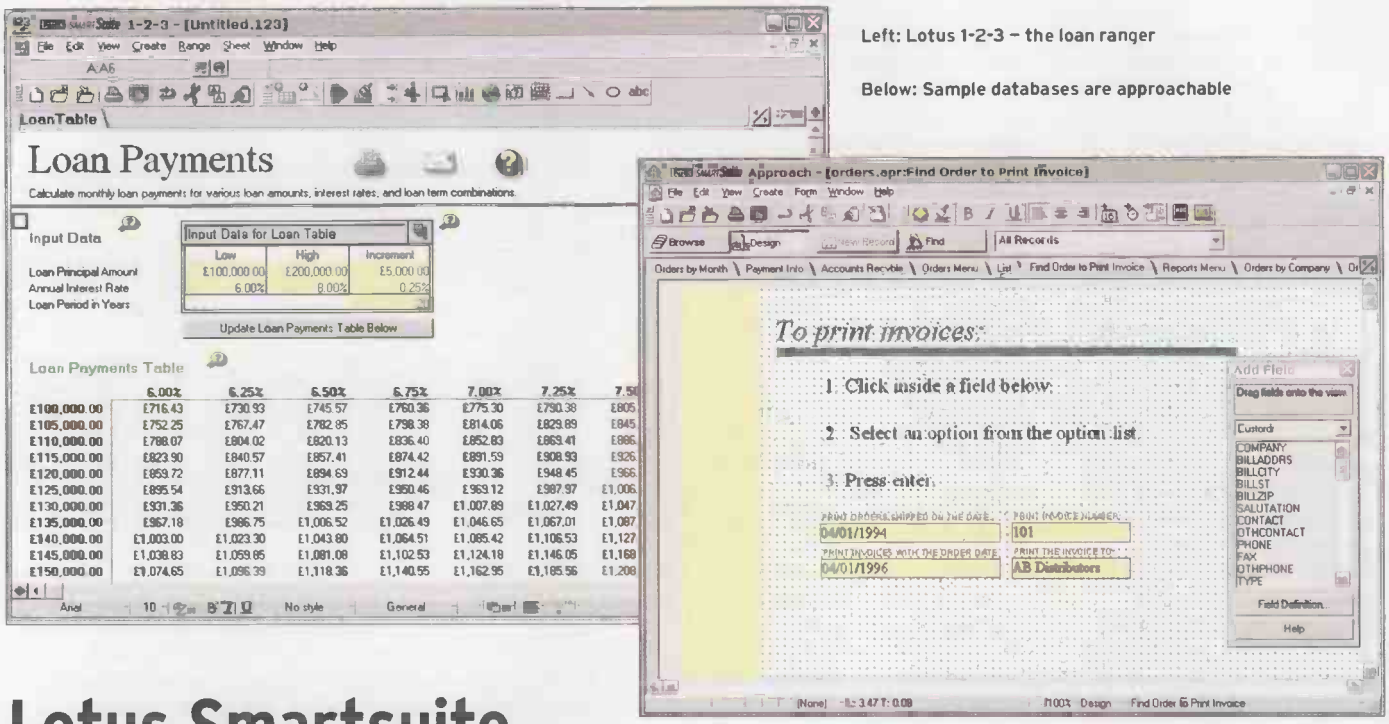
We've mentioned Outlook-compatible features twice, because in this version, Corel has dumped Central, the contact, time management and mail tool. Instead the developers have made efforts to integrate with Microsoft Outlook. That means that anyone wanting to take advantage of this will need to buy a standalone copy of Outlook, which will set them back around £80.

Corel has improved Office 11 but it's still missing a few features we'd like to see.

DETAILS

RRP £276.13 (£235 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Corel 01628 589 800
www.wordperfect.com
SYSTEM REQUIREMENTS
Windows 98SE, ME, NT4 SP6a, 2000 SP3, XP SP1 • Pentium 166, 64MB Ram, 330MB disk space
PROS XML, pdf; runs on Win 98SE
CONS No mail, calendar or Unicode support
VERDICT
Despite the improvements, there's an air of 'could do better'

FEATURES	★★★★★
EASE OF USE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



Left: Lotus 1-2-3 – the loan ranger

Below: Sample databases are approachable

Lotus Smartsuite

Lotus Smartsuite comes well-equipped: as well as the word processing, spreadsheet and database trio of Word Pro, 1-2-3 and Approach, you get Freelance Graphics, Organizer, Smartcenter, Fastsite and 17 proofing languages. You can buy this on CD or save money by downloading it.

After installing Smartsuite and restarting Windows, you get a set of seven Icons in the Windows System tray, known as Suitestart. We found the icons too small and indistinct to serve any purpose than clutter up the tray and, after a brief struggle, managed to get rid of them. The Smartcenter, which, by default, stretches across the top of your Windows desktop, is more useful. Eight buttons each open a 'drawer' that gives access to various parts of Smartsuite and your PC in general. For example, the Smartsuite drawer consists of a set of tabs with shortcuts to the suite applications, templates and your own files. An Internet drawer contains your Favourites and a mini-browser, and other drawers are for your calendar, address book and reminders.

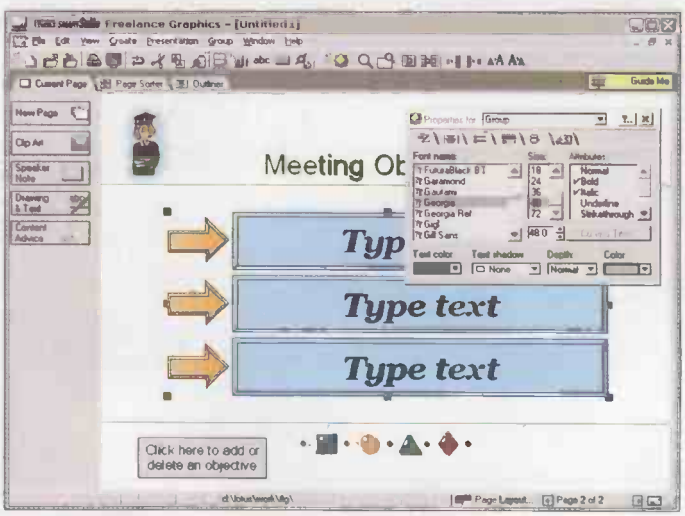
The Business Productivity drawer contains shortcuts to more documents, spreadsheets, presentations and other templates covering topics, from loan amortisation to order tracking. A reference drawer contains a dictionary and thesaurus and, finally, there's a drawer for off- and online help. It's all richly configurable – you can stretch each drawer sideways to see, for example, more days in your calendar; you can add tabs to drawers and drawers to the Smartcenter; and you can while away the time experimenting with colour schemes and sound effects.

Individual tools

Moving on to the individual suite members, Word Pro is the descendant of Samna Ami, the first real word processor for Windows, which appeared in 1988, a year before Word for Windows. As such, it doesn't follow the Microsoft look as closely as any of the other contenders. Instead of multiple toolbars you have a single row of Smarticons along the top of the screen: these change according to context, so you'll have different sets for typing text, working with graphics and so on. At the bottom of the window, the status bar houses buttons for fonts, formatting and styles. Spelling checkers, grammar checkers and so on appear in a large toolbar, rather than a floating dialogue, and there are the usual options of autocorrecting common mistakes and highlighting misspelled words.

Word Pro scores well on document automation, especially for the beginner, with useful features such as 'Click here' boxes to enter text into preformatted placeholders for titles, headings and the like. For the more demanding, there's a macro-scripting language, with plenty of useful sample scripts and, like Microsoft VBA, this is a *lingua franca* for automation in other components of the suite. Teamwork is also emphasised, with tools for group reviewing, and creating or consolidating multiple versions of a document and attaching the current document to an email message. Word Pro will create web pages as well as standard documents, and there is the facility to open documents from, and save to, an FTP site.

As well as a small clipart collection, there are tools for creating drawings, charts and equations. Another feature we liked is the way Word Pro handles section breaks in a document. If you create a section break (for example, to start a new chapter) or insert another document into the current one as a 'division', then you have the option to view



The Lotus Infobox offers one-stop formatting

these on tabbed pages. As well as being able to use the tabs to jump between sections, you can also drag an entire section to another place in the document.

Although version 9.8 has updated import filters for Word 2000 and XP, it won't render Unicode characters – if you want to use special symbols or non-Latin character sets, then you'll have to use the supplied symbol fonts and embed them in the document if non-Lotus users are to be able to read a document. Any Unicode characters in an imported file format will not display correctly.

Lotus 1-2-3 also has a long pedigree as the company's flagship product in the days of Dos, but it has come a long way since. The interface is broadly similar to Word Pro, with a row of Smarticons along the top for such tasks as summing a selection, inserting charts or maps, and creating 'script buttons' that run a script when clicked on. At the bottom of the screen are the formatting tools for changing fonts, colours, number format, alignment and so on. This version has similar team features for review to those in Word Pro, but there are a few irritating differences – the FTP Save and Open is in a different place in the menu structure, for example.

These minor annoyances are outweighed by some cool touches: if you type 'Total' beside an empty cell below a column of figures, you'll get that very thing in the cell. As with Word Pro, there are tabbed dividers at the top of the worksheet but, in this case – as in Excel and Quattro – these dividers serve to switch between worksheets. Each sheet can contain up to 65,536 rows and 256 columns. You can create groups of sheets, and members of the group will take all their formatting attributes from the group 'leader'.

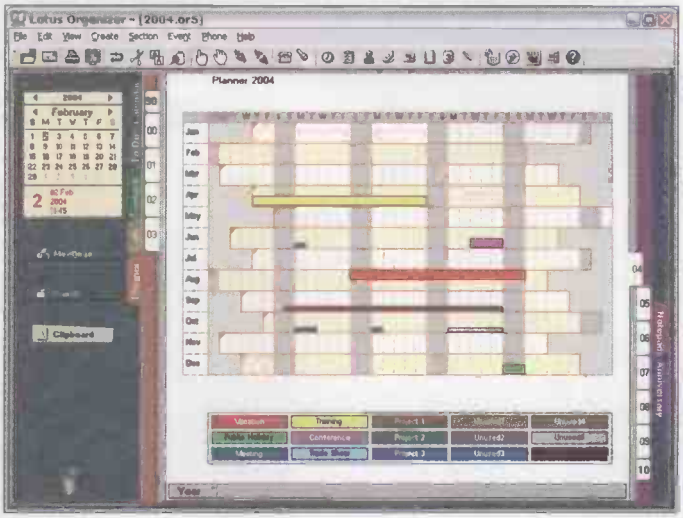
Approach, the relational database manager, follows suit, with tabbed pages allowing access to the various tables, forms, menus and queries in a database. Again the Smarticons at the top control actions such as switching views, adding fields, sorting or filtering data and so on, with formatting controls at the bottom. Also on the status bar is the title of the current page: click on this and you'll get a list of all the forms, tables and so on, which is useful if there are too many to fit in the tabbed section above. There are sample databases to help you get the feel of things, as well as Smartmasters for creating specific databases such as employees or music collections.

Easy-to-use graphics

Freelance Graphics is an easy-to-use presentation creator, having a similar interface to the other main members. This time, the tabs take you through various views of your presentation – single page, thumbnails or an outliner overview. In single-page view you have four buttons at the left to create new pages, insert clipart, add speaker's notes and open a floating palette of drawing tools. There is a wide selection of templates for both content and style, though the latter are starting to look rather dated.

One excellent feature – also seen in Word Pro, 1-2-3 and Approach – is the Infobox. This is a small, free-floating, tabbed palette that can be hidden or rolled up into its own title bar and it provides one-stop access to all the properties of the selected object. The Infobox is tabbed so you can access font properties, alignment and spacing, bullets and numbering, and colours and borders when editing text. It's also context-sensitive, so you get other options – such as headers and footers for pages or colours and patterns for drawing objects.

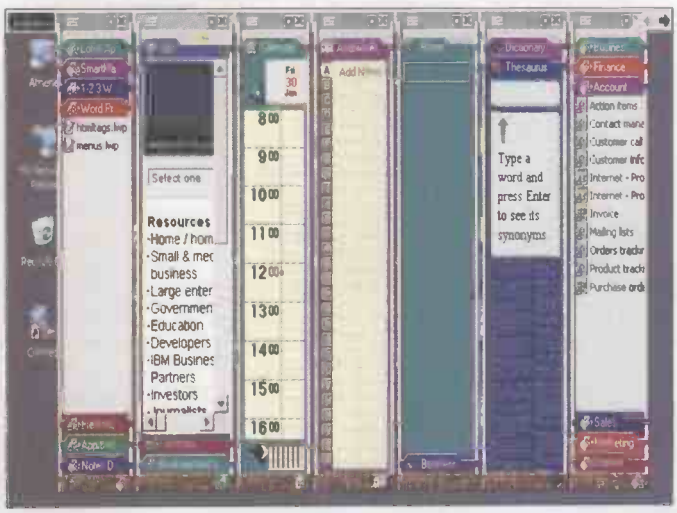
Older readers may remember the Filofax, a paper-based loose-leaf diary and personal organiser popular in the 1980s. Organizer was originally developed by a British company, Threadz, and was acquired by Lotus in 1992. It takes, as you may have guessed, the appearance of a tabbed loose-leaf book, with sections for contacts, planner, notes and so on. It doesn't have a built-in mail client, but will summon Outlook Express to do its bidding.



Get your life in order with a digital personal organiser

Finally, Fastsite is the most recent addition to the suite, and extends the HTML and FTP facilities in the other applications extensively. It has a very easy interface, largely wizard-based, and you can create a new site by specifying an output folder. You then add Smartsuite files in their native format. Having done that, you choose a 'look' for the site and click a button to convert the files to HTML or Jdoc pages. Two tabs let you switch between viewing your new web pages and carrying out further tasks. When you've finished, you can preview the results in your own browser before uploading them to a local or Internet server. It's all fairly painless, apart from the irritating fact that it would not remember the server details from the FTP function in the other modules.

Overall, Smartsuite is friendly and well featured, but it hasn't really staggered out of the 20th Century. Parent company IBM doesn't seem interested in keeping this product up with current technology such as XML and Unicode and the product has a general air of neglect – many of the support files, documentation and other resources date back to 1996, with some even earlier.

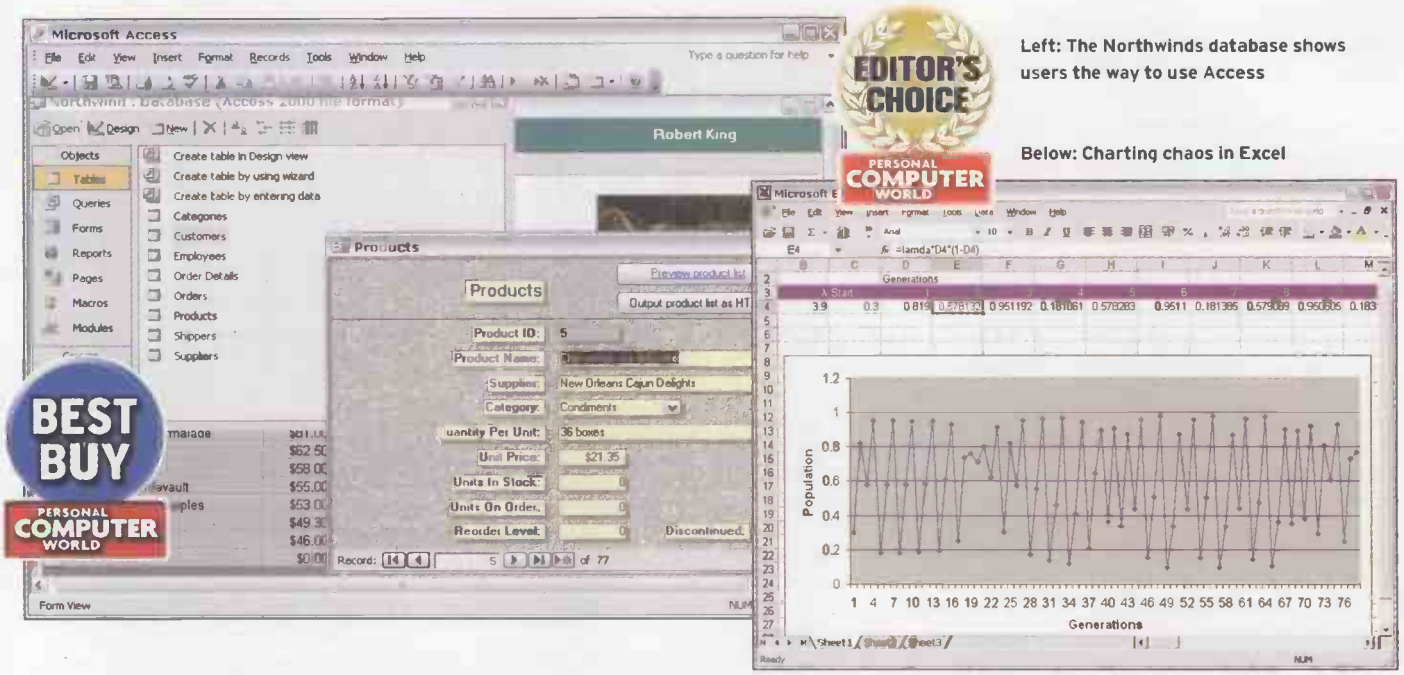


Smartcenter's drawers give access to various parts of Smartsuite and your PC

DETAILS

RRP On disk £225.60 (£192 ex VAT) download £155.45 (£132.30 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Lotus 0800 169 1458
www.lotus.com
SYSTEM REQUIREMENTS
Windows 95, NT SP6 or later, 486, 16MB for Windows 95/98, 128MB for XP, 293MB disk space
PROS Will run on a minimal Windows 95 system
CONS Falling behind the times
VERDICT
Unappealing to all but those 'locked-in' to Lotus

FEATURES	★★★★★
EASE OF USE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★



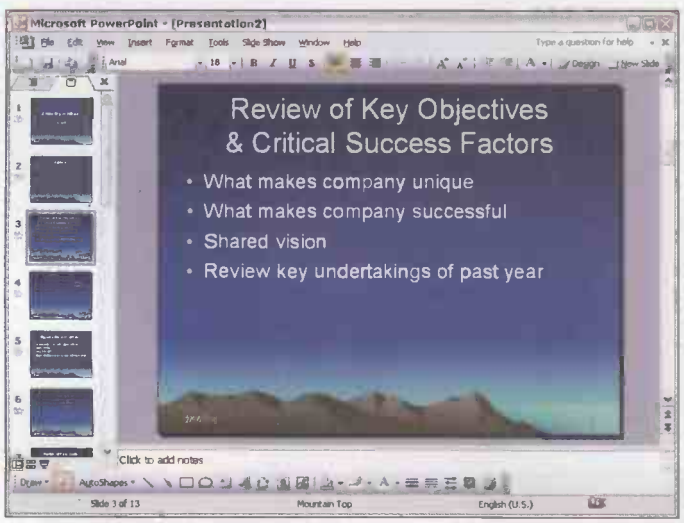
Left: The Northwinds database shows users the way to use Access

Below: Charting chaos in Excel

Microsoft Office Professional 2003

The undisputed market leader in office suites for over a decade, Microsoft rewards – or, depending on your point of view, taxes – its faithful with regular upgrades. Although we saw a beta version of Office 2003 in last April's office suite round-up, the product wasn't available until October last year. In the Professional version that was supplied for review, you'll find Word, Excel, Powerpoint, Outlook (with Business Contact Manager), Access and Publisher. There are various other editions, ranging from an OEM-only Word-Excel-Outlook trio to the top-of-the-range Enterprise, which adds Infopath to the Professional line-up. You'll find full details if you follow the URL in the details box at the end of this review. Office 2003 will only run on Windows 2000 with Service Pack 3 or Windows XP.

The first thing you'll notice about Word – and the rest of the suite – is that Microsoft has abandoned its widely imitated flat-button look in favour of something more voluptuous, with curvaceous toolbars and buttons that glow orange when pressed. Under the skin, however, the arrangement and function of its default toolbars and menus has changed little over the past decade, despite a steady influx of new features.



Powerpoint's wizardry can help you to bluff your way through presentations

Most of what you need is stored in two toolbars – the standard one dealing with file and clipboard operations; undoing and redoing; spelling checks; and the creation of hyperlinks, tables and columns. The formatting toolbar deals with styles (sets of various formatting attributes you can apply with one command); font attributes; alignment and indentation; bullets and paragraph numbering; and borders and colours. You'll find other toolbars, which can either be switched on manually for tasks such as drawing shapes, or which will appear automatically when, for example, you insert a picture. All this is configurable: you can alter the menus, toolbars and keystrokes to suit how you work.

DTP options

If page layout and design features are important to you, you'll find Word has near-DTP capabilities, with newspaper-style columns, dropped caps, text-wrapping around graphics and a set of drawing tools and shapes that are practically an application in themselves. You can link frames of text, just as in DTP programs, so that a story can flow from one frame to a non-contiguous one. Document organisation is also well catered for, with nested numbering of headings and subheadings; footnotes and endnotes; indexes and cross-references; and tables of contents, figures and authorities.

2003 brings some new features to Word. First, in common with the rest of the suite, you can save and open files in XML format. As HTML tags are to formatting, XML tags are to content, and you can create custom schemas of tags that relate to a sphere of activity such as trading stocks or supplying spare parts. The other main innovation for large organisations is Information Rights Management, which lets document authors control viewing and editing rights via Windows Server 2003. Word also gets a new, eyeball-friendly reading view and the task panes of Office XP are joined by the Research Pane which adds access to various on- and offline reference sources.

There's a variety of proofing tools: you can check your spelling as you type or on demand, and a customisable autocorrect feature rectifies common spelling mistakes. There's a similar feature (without autocorrect) for grammar, but this, like most of its kind, is not very reliable. The thesaurus is also poor, having

undergone an Orwellian purge of potentially offensive words.

Word has various tools for automating tasks. As with all word processors, there's a mail-merge feature for sending out 'personalised' circulars, and an Autotext feature for inserting chunks of frequently used text. You can use 'fields' to perform all sorts of tasks, from inserting the date to prompting a user for information. Throughout the suite is the VBA macro language, which can be used for simple automation tasks, such as carrying out a sequence of commands, to 'solutions' for corporate environments.

Many of these features can be turned off, but other irritations prevail: the Word development team lost the plot with tiling documents in the same window two versions ago, though Excel has no such problems, and searching your folders for a document containing a word or phrase is appallingly awkward.

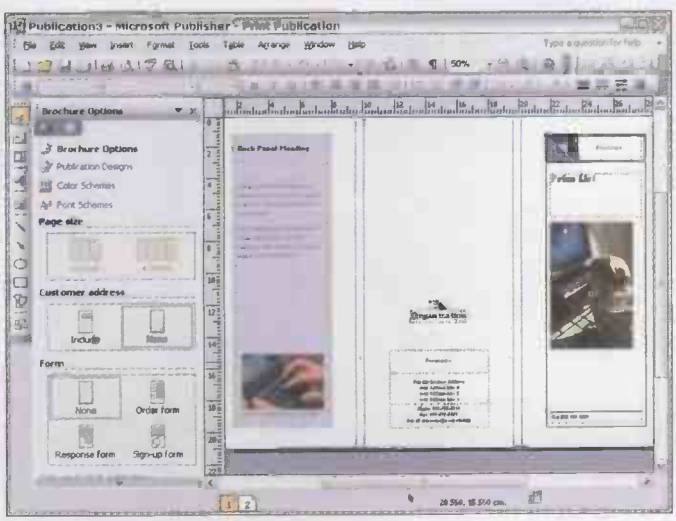
Excel stores your data in tables called worksheets, each having a maximum size of 256 columns and 65,536 rows. Each cell in a sheet can contain text, such as column headings or item descriptions; figures such as dates or costs; or calculations based on the contents of other cells. You can use simple numeric operators or any of over 300 ready-made functions ranging from a simple average to complex statistical and financial formulae. An Excel file is called a workbook and can have 256 sheets – these aren't just like pages in a document but can contain references to cells on other sheets so you can have multidimensional tables. Having entered your data, you have a huge variety of ways of visualising it, with over 70 types of chart ranging from simple bar and line graphs to high-low-close stock prices.

Excel has all the comforts you'd expect in a spreadsheet, such as automatically filling in series such as incremental numbers, days and months, and having the choice of editing cell contents either 'in place' or within the formula bar. There's also the numeric equivalent of a spelling checker to help you track down errors in formulae.

Database wizards

Access takes a lot of terror away from relational databases by the use of wizards. The basic matter of a database is a set of tables consisting of columns of fields – such as name, address, phone number – and rows of records, such as Smith, Jones and Robinson. When you create a new database, the wizard offers you a choice of over 40 typical tables for home and business use, and you can select the fields. Having done that, the wizard creates a primary key for the table – this is a unique identifier, like a car number plate – then creates the table. You can then add records to your table by typing them in directly or by filling in a form, which the wizard will create for you.

There are also wizards to help construct queries and reports on your data, and the sample Northwinds database, with its tables of products, customers, staff, and so on, gives an opportunity to experiment.



Easy but elegant –putting together brochures in Publisher

Word has DTP-type features such as wrapping text round graphics

Powerpoint, Microsoft's presentation creator, also features a lot of wizardry. If you choose the Autocontent Wizard, you get a choice of presentation topics, such as 'Project overview' or 'Reporting bad news'. These generate a set of slides offering subtopics and suggestions which you replace with your own text, charts, and graphics.

Open the Design Task Pane, and you'll find a generous set of templates, colour schemes and animations, which you can apply piecemeal or to the whole presentation. One touch that lifts Powerpoint above its rivals is that you can split the workspace three ways, with room for the current slide, the presentation outline or slide thumbnails, and the speaker's notes.

Microsoft Outlook brings together contacts, calendar, email and task lists. This version has had a major visual redesign, so everything fits neatly into place. Click on one of the buttons to the left, and the main window shows email or appointments, with other navigational aids, such as a list of email folders or a monthly calendar tucked in above the buttons. There are several different ways you can view items, and you can create your own 'Outlook today' page combining lists of mail folders, tasks and appointments. There's a lot of automation in Outlook, with messages sorting themselves into various folders according to sender, size and other criteria.

Outlook has become so entrenched as the *de facto* standard for email and organisation that it has little competition – even Corel has ditched its rival product. However, its very success is also its vulnerability, and it's a juicy target for virus writers, spammers and hackers. Whereas nothing can prevent terminal stupidity, Outlook 2003 does have some good safety features. It will block access to potentially unsafe attachments received and, by default, it won't retrieve images stored as links in email messages that 'phone home' to their place of origin. There's the option to encrypt outgoing messages and a configurable junk email filter.

If you want to go beyond the DTP or web-page capabilities of Word, then Publisher, included in the Professional edition, offers hundreds of ready-made designs – all you need to do is to replace the sample text and graphics.

Even though it's expensive, Office is still top of the pile and wins our Editor's Choice award.

DETAILS

RRP £459 (£390.64 ex VAT)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Microsoft 0870 601 0100
www.microsoft.com/uk/office
SYSTEM REQUIREMENTS
Windows 2000 SP3 or XP, Pentium 133, 128MB Ram, 360MB disk space
PROS Polished; power; ease of use
CONS Expensive; requires Windows 2000 or XP
VERDICT
Sets a high standard for those prepared to pay the price

FEATURES	★★★★★
EASE OF USE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

Left: 3D fun in Star Draw

Below: Star Calc with a data source above

Sun Star Office 7

Star Office 7 is a commercial product from Sun Microsystems. It is based on Open Office1.1 which is open source, and available as a free download or for a nominal media cost on CD (if you've bought this month's DVD edition of *PCW*, you'll also find a full version of Open Office 1.1). Star Office 7 is available for Windows, Solaris and Linux – Open Office adds Mac OSX. There are several other differences, but the bottom line is that this retail product comes in a box with a manual, a collection of clipart and other resources, and has technical support from Sun.

A full install will take 250MB of disk space and give you Writer and Calc for word processing and spreadsheet duties; Impress for presentations; and a graphics application, Draw. You install the Adabas database manager separately: it is not a full version and is limited to three concurrent users and 100MB of data.

Throughout the suite, there are Autopilots (like wizards) for creating letters, reports, faxes and so on, and there's a degree of flexibility here, in that you can start, say, Writer, then choose to run a presentation Autopilot. Similarly, you can be using the spreadsheet, and go to the File menu to open a graphic in a new Draw window. Unlike Microsoft Office, there aren't separate executables for the main components: each uses the same basic shell and you don't get an application name in the title bar, just your file name followed by Star Office. Since the Windows Taskbar icons are rather hard to distinguish, this can be disconcerting.

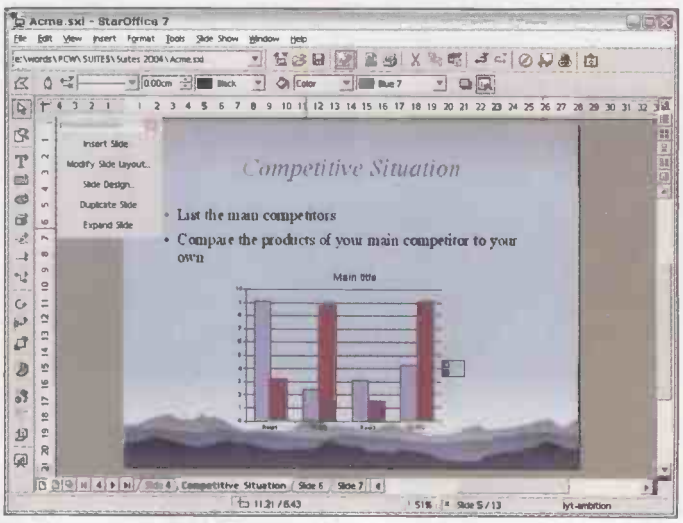
The Writer interface isn't too different from the Microsoft standard. At the left of the top toolbar is a space for the current file path or URL. This doubles as a dropdown history of recently opened files, and again shows all Star Office files, not just those of the module you are using.

Neat navigation

To the right of this are the standard file, clipboard and undo/redo buttons – we liked the way the Save button greyed out when no changes had been made since the last save. The last four buttons turn other palettes on and off. The Navigator is similiar to Microsoft's Document Map, in that it lists the headings and subheadings in your document so you can click on one and go to that section in the document window. However,you can also navigate by graphics, notes, hyperlinks, tables and other entities.

The Style List offers an expanded version of the Styles dropdown; the Hyperlink dialogue lets you add links to other files or URLs; and the Gallery gives access to the clipart collection. All four are non-modal, so that you can continue to edit the document with them open. The Gallery docks itself neatly into the main window but the others float free. You can drag a Navigator pane out of Writer, for example, and share it with other Star Office windows – the contents changes as you switch. The top toolbar is common to all modules: the one below changes to suit the task in hand. Start writing a letter and you'll have a Word-style formatting toolbar: insert a table, and you'll get a set of tools for formatting the table.

Down the left of the window are more tools: you'll find the spelling checker, find/replace, and a button to turn non-printing characters on or off. There's also a set of drawing tools, a table creator and tools for inserting OLE objects, such as charts or equations.



Plenty of guidance means it is simple to create presentations in Star Impress

This highlights Star Office's flexiblity: you can create a chart from the content of a word-processed table just as easily as you can in a spreadsheet. All the toolbars are customisable. You can create your own and access the options for any member of the suite from any other member – another example of the product's integration.

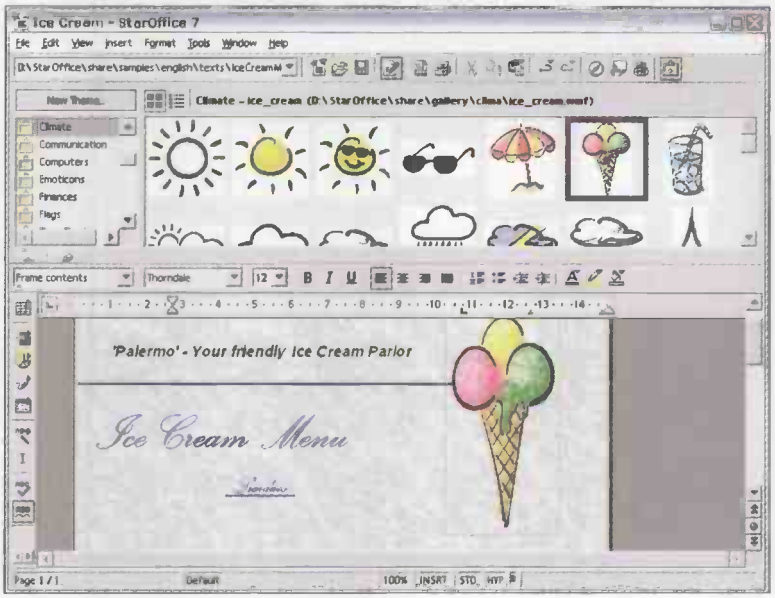
Though Writer won't check your grammar, it does come with 20 spelllng languages and will check spelling as you type. As well as Autocorrect, there's an Autocomplete feature, which takes a guess at the words you are typing. Type 'num', for instance, and it will append 'ber', in grey letters. If this is what you want, press Enter, otherwise just keep typing.

Page layout and formatting features are all you'd expect, with columns, dropped caps, text wrapping and so on. Authors of longer documents are well provlded for, with facilities for creating indexes, bibliographles, tables of contents and concordances. There is a suite-wide macro language: any VBA macros that are imported via a Microsoft Office document have their code preserved, but disabled, so you can rewrite them in the native Star Office Basic. Finally, Writer supports Unicode fonts.

Calc offers 256 sheets in a workbook, each containing 256 rows and 32,000 rows, and you can populate these with around 350 functions and 80 chart variations. All the comforts we have become accustomed to are here – you can edit cells directly, or in the formula bar; you can collapse and expand rows and columns; add notes to cells which are then flagged with a red triangle; and fill ranges with series automatically.

You can smarten up a table with a 'theme' – very much like Excel's Autoformat – and you can use heading names in formulae. For example, if you have a column of figures on your sheet with the word 'Cost' above it, then you can put '=SUM(Cost)' in any other cell to get a total of those figures – you don't have to define 'Cost' as a named range, as Calc will figure this out for itself.

The database facilities are the weakest aspect of the suite. As we have mentioned, Adabas is a limited version and its documentation is minimal. However, you can open several types of data source from within documents and spreadsheets, and have the tables, queries and forms slotted in to a panel above the workspace. There's a sample bibliography to demonstrate this, but the whole thing gets rather more useful when you run the Address Data Source Autopilot. Point this at your Outlook Address book, and it will be added to the available data sources, so you can consult your contacts list from within Star Office. We found we had to do a little manual tinkering with the settings here, as the postal addresses didn't appear when using the default settings.



Starwriter's gallery gives access to the clipart collection

Easy presentations

Creating a presentation in Impress is painless, as there is ample Autopilot guidance to take you through choosing a subject, applying a visual theme and creating transition effects. Having done this, you are left with the ability to switch between slide design, thumbnail sorter, handout, notes and outliner view. In slide design view you can navigate between slides, by using the recorder-style arrows or titled tabs, or by opening the Navigator.

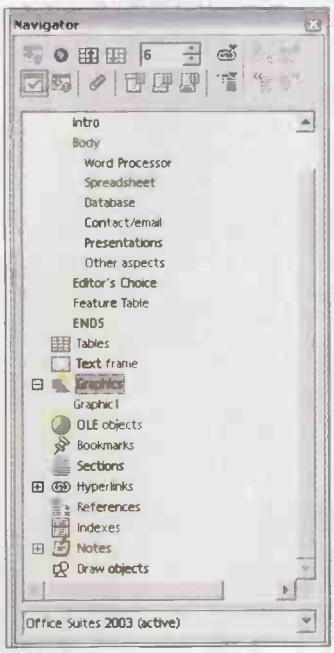
There's plenty of creative scope here, with 3D shading effects, animations and sounds, and the opportunity to export a presentation as a Macromedia Flash file, so you can put it all Into a web page.

Although Draw isn't going to cause widespread panic at Adobe or Corel, it is great fun to use. Basically, it's a subset of Impress, with just the graphics tools, but there are some extra features, such as perspective and mesh warping. We particularly liked the 3D features. As well as creating 'primitives', such as cones, cubes and spheres, you can also manipulate 2D objects in three dimensions. Take a circle, for example, rotate it around a point, and you have a doughnut. You can also change the lighting of 3D objects and apply Phong or Gouraud shading. Draw also has basic bitmap editing tools: although there are no retouching brushes, you can crop photos; change the colour, brightness, contrast and transparency; and apply a small set of effect filters such as sharpening, noise reduction and solarising.

Star Office claims to be Microsoft-compatible, though it admits to limitations with some graphic and OLE objects. We had no trouble with opening and saving Word, Powerpoint and Excel files. The native Star Office file format, however, is XML. Not only does this offer the benefits mentloned in the Office 2003 review, but since the files are stored in a compressed format they are much smaller.

Unlike Microsoft Office, you can export any document, spreadsheet, presentation or drawing to an Adobe Acrobat (pdf) file. Finally, just to show that we read those End User Licence Agreements, note that the 'software is not designed, licensed or intended for use in the design, construction, operation or maintenance of any nuclear facility'.

For those on a budget who can't afford our Editor's Choice this month, Sun Star Office 7 is a good alternative and wins a Highly Commended award.



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DETAILS

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CONS Limited database; no calendar/organiser
VERDICT
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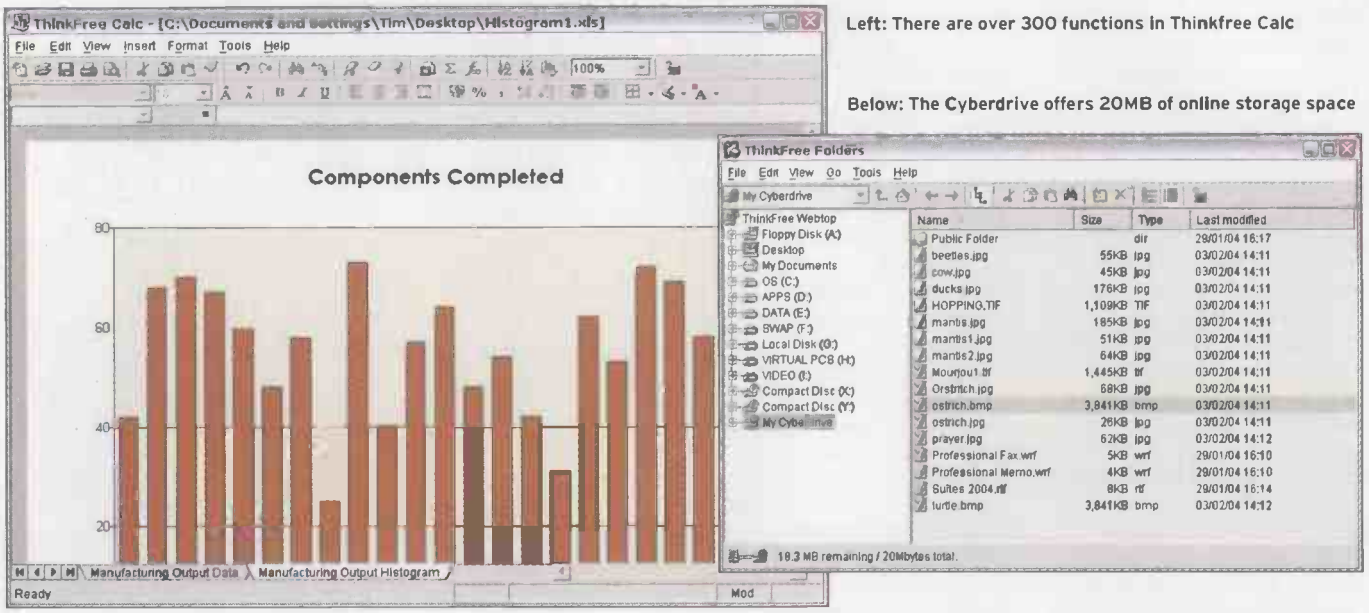
FEATURES	★★★★★
EASE OF USE	★★★★☆
VALUE FOR MONEY	★★★★★
OVERALL	★★★★☆



Left: There are over 300 functions in Thinkfree Calc

Below: The Cyberdrive offers 20MB of online storage space

Thinkfree Office 2.2

The newcomer to our annual office suite round-up is Thinkfree Office 2.2. You can buy this on CD, or save money by downloading it from the US website and paying by credit card. You can also download a 30-day trial.

The CD supplied for our review didn't offer any options at install time – it's all or nothing and everything goes to your C:\Program Files folder. This isn't quite as annoying as it might be, as the total disk space taken by everything is only 25MB. However, we noticed that a later version, 2.2, was available on the website, and when we installed this we did get a choice of destination. This time the total folder size was 36MB, and you'll need about the same again if you don't have the (free) Java runtime environment installed.

Thinkfree is unusual in several respects. For a start it is written in Java, and as well as running under Windows 98 or later, it is also at home with Linux, Apple Macintosh Classic and OSX operating systems. The Thinkfree Office toolbar, although nothing like as extravagantly featured as Lotus Smartcenter, provides access to all the components, as well as the global options for the suite.

One cosmopolitan touch is that you have a choice of interface languages should you care to try your hand at German, Spanish, French or Italian. Portuguese and Icelandic were also on the language menu, but to our disappointment did not appear to be implemented in the menus. The language choice included US and UK varieties of English, which rectified an annoyance we'd found in version 2.0 where all file dates appeared in US 'month-day-year' format.

The components consist of Write, Calc and Show covering the word processing, spreadsheet and presentation slots, and Thinkfree Folders, which is an Explorer-like file manager. There are also standalone viewers for Write, Calc and Show files, as well as an image file viewer that you need to preview pictures in Thinkfree Folders.

Cyberdrive option

An unusual extra is the Cyberdrive. Once you've registered Thinkfree, you get 20MB of online storage space. The first year's rent is included in the price of the software, and you also get a year's access to updates and free email technical support. After that you will need to pay for the storage and support, but the licence for the Thinkfree suite is permanent. You can also pay to increase the size of your Cyberdrive.

Once connected, the Cyberdrive appears as a separate drive in Thinkfree Folders, and in the individual program File Open and Save dialogues. Files are encrypted during transfer, so you won't be giving any secrets away.

Write doesn't rock any boats in terms of menus and toolbars: you'll find most things pretty much in the same position as Microsoft Word, and with similar icons. You can find out about any button or menu icon by hovering the pointer over it: you get a short description in the status bar as well as the usual pop-up balloon.

Although Write opens and saves in the Microsoft Word doc format as well as its native wrf, this has its limitations. It makes a poor job of importing things such as custom bulleted lists, Wordart, drop capitals and drawing objects created in Word, although it is Unicode-compatible and will display symbols and letters from outside the Ansi character set. You can also insert these characters as symbols, just as in Microsoft Word.

Inevitably there's a lot you don't get: there are no drawing tools, no macro language and you can't customise the toolbars and menus. There is no grammar checker, although, given the track record of grammar checkers in other suites, few people will miss it.

Thinkfree Office is all written in Java and runs under various OSs

There are no fields, apart from dates and form fill-ins. Nor do you get any 'as you type' highlighting of spelling mistakes, but again, many people find this a distraction.

There is, however, an Autocorrect facility that will correct common mistakes automatically. You can add your own words to the Autocorrect list and, if you need multilingual capabilities, there is a choice of nine spelling languages. There is a good table editor which sports its own toolbar and can split and merge cells, and there is a substantial clipart collection. This is packed into zip files, according to category – people, architecture, leisure, etc – and, unlike Windows, Write 'sees' thumbnail previews inside the zips. Write can even do some tricks that Word can't do, such as displaying animated gifs in documents, and it does have that essential tool for writers – a word counter.

HTML editor

Write scores well in HTML editing, with support for framesets and cascading stylesheets. If you click on the 'View Source...' button then a separate text editor will open – you can edit the code and there's a find and replace facility. There are also tools to create image maps, so that a graphic can have several 'hot zones', each of which has a different hyperlink.

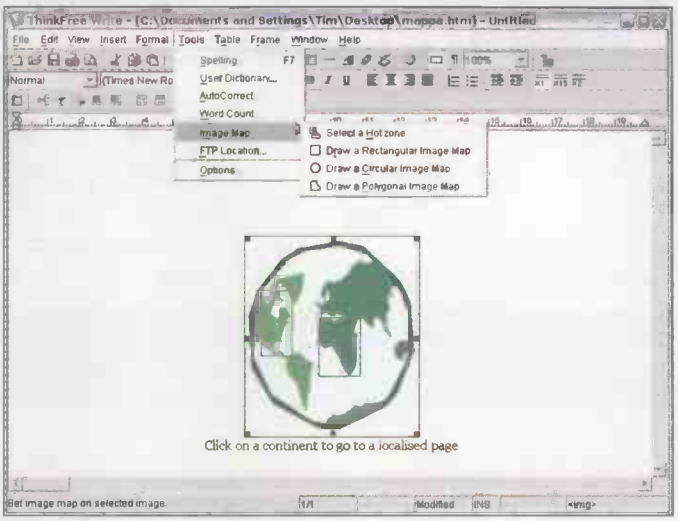
We did find Write a bit buggy. We had problems with headers and page numbers overlapping and, sometimes, when several documents were open, the focus would oscillate rapidly between two windows until we closed one down.

Calc, once again, bears an uncanny resemblance to Excel circa Office 2000 and, like Excel, offers multiple tabbed worksheets each capable of holding 256 columns and 65,536 rows. As with Write, it is 'Microsoft-compatible' but, once again, this is not 100 per cent accurate as there are graphic and functional features from Excel that are unsupported, such as conditional formatting and pivot tables. For many users, these limitations won't be important, so let's look at the positive.

There are over 300 functions available, ranging from financial, through statistical, to engineering. There are also 40 chart types, including exotica such as 3D surface, radar and bubble charts. And there are all the usual comforts we have come to expect from a spreadsheet. You can edit formulae and values either in the toolbar or directly in a cell; you can automatically fill rows or columns with a series, such as dates and numbers: type 'Monday' in one cell and Calc will fill in the other days of the week for you; you can add comments to cells that will pop up when the cell is selected, and there's a smart autosum button that will guess the range you want to total.

Again, there were a few bugs – when we created a chart as a new sheet, we weren't able to resize it: handles appeared but could not be grabbed. Neither could we scroll a chart in a new sheet, though we could zoom in and out of it, and charts created on an existing worksheet behaved normally. You can have multiple files open – just as you can with Write – but strangely, unlike Write, there is no Window menu, so you'll have to rely on the Windows Taskbar to switch between files.

Thinkfree Show is very similar to Powerpoint, but with less wizardry



Thinkfree Write contains tools to create image maps

Show time

It will come as no surprise that the final member of the suite, Show, bears a striking resemblance to Powerpoint, except that you don't get the latter's very useful split display showing thumbnails, current slide and speaker notes. In fact there is no provision for speaker notes at all, and you need to use the scrollbar buttons to navigate between slides.

There is also far less wizardry: when you create a new presentation, you get a choice of six slide layouts, and that's it. You can customise these with bulleted lists, charts, graphics and so on and, unlike the other components in Thinkfree, you have a set of drawing tools very similar to those in Microsoft Office, with a range of 'smart' shapes, text boxes, flowchart symbols, 'sticky' connector lines, speech bubbles and more. Once again, the Windows menu is conspicuous by its absence, and compatibility is less than perfect: we had problems opening Powerpoint files in Show.

Digging further into the Format menu reveals a set of design templates in Powerpoint .pot format, but apparently there is no way to preview these – you have to take .pot luck. However, they do have a professionally designed look, and it's simple to try each one. You also get custom animations and transitions, so you can make your audience dizzy watching text and graphics fly, spiral or shimmer into place. Despite the good set of flowchart and connector symbols we couldn't find an easy way of creating bar charts and other graphs: all the other presentation creators have a mini-spreadsheet tool for this.

Performance was crisp, but we were alarmed to see the memory consumption in Windows XP – with one document open in each of the three applications, the Java environment took up twice the memory of Word, Excel and Powerpoint combined.

If you don't want to be tied to Windows, this is worth a try.

DETAILS

RRP CD version £49.99 (£42.54 ex VAT), download version $49.95 (approx £27)
BEST PRICE
www.pcw.co.uk/bestprices
PRODUCT INFORMATION
Thinkfree
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SYSTEM REQUIREMENTS
Windows 98 or later, Pentium 266, 64MB Ram, 25MB disk space
PROS Small, speedy, cross-platform
CONS A few bugs and annoyances
VERDICT
Definitely worth a try, but needs a little more work

FEATURES	★★★★☆
EASE OF USE	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★☆☆

Table of features

For the best office suite prices go to www.pcw.co.uk/bestprices

	ABILITY	COREL	LOTUS	MICROSOFT	SUN MICROSYSTEMS	THINKFREE
MANUFACTURER						
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Price for download	€69.95 (€59.53)	N/A	£155.45 (£132.30)	N/A	$79.95	$49.95
Telephone	020 7231 1004	01628 589 800	0800 169 1458	0870 601 0100	N/A	N/A
URL	www.uk.ability.com	www.wordperfect.com	www.lotus.com	www.microsoft.com/uk/office	www.sun.com/staroffice	www.thinkfree.com
Windows versions supported	95 or later	98SE, NT4 SP6a or later	95, NT SP6 or later	2000 SP3, XP	98, NT SP6 or later	98 or later
Other platforms	None	None	OS/2 Warp	Macintosh OSX	Solaris, Linux	Linux, Mac Classic & OSX
Memory required under Windows XP	32MB	64MB	128MB	128MB	64MB	64MB
Disk space for typical installation	50MB	330MB	293MB	360MB	250MB	36MB
Downloadable trial	✓	✓	✗	✗	✓	✓
Unicode support	✗	✗	✗	✓	✓	✓
XML support	✗	✓	✗	✓	✓	✗
pdf creation	✓	✓	✗	✗	✓	✗
Proofing languages supplied/available	2/11	26/26	17/41	4/126	20/20	9/9
Grammar checking (UK English)	✗	✓	✓	✓	✗	✗
Relational database management	✓	✗	✓	✓	✓	✗
Voice control	✗	✗	✗	✓	✗	✗
Handwriting recognition	✗	✗	✗	✓	✗	✗
Presentation graphics	✗	✓	✓	✓	✓	✓
Vector drawing module	✓	✗	✗	✗	✓	✗
Photo-editing module	✓	✗	✗	✗	✗	✗
Printed manual	✗	✓	✗	✗	✓	✗
Calendar/Email	✗/✗	✗/✗	✓/✗	✓/✓	✗/✗	✗/✗
Contact management	✗	✗	✓	✓	✓	✗
Worksheet size (columns x rows)	256/65,536	18,278/1,000,000	256/65,536	256/65,536	256/32,000	256/65,536
Worksheets to a book	256	18,278	256	256	256	256
Spreadsheet functions	240	396	332	338	348	320
Autocorrect	✗	✓	✓	✓	✓	✓
Indexing/TOC	✗	✓	✓	✓	✓	✗
Wizards or equivalent	Wizards	Perfect Expert	Smartmasters	Wizards	Autopilots	None
Macro language	VBScript	Perfectscript, VBA	Lotus Script	VBA	Star Office Basic	None
Group review/ version control	✗	✓	✓	✓	✗	✗
Clipart collection	✗	✓	✓	✓	✓	✓
SCORES						
Features	★★★☆☆	★★★★☆	★★★☆☆	★★★★★	★★★★☆	★★☆☆☆
Ease of use	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★☆☆
Value for money	★★★★★	★★☆☆☆	★★☆☆☆	★★★☆☆	★★★★★	★★★★☆
Overall	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆	★★★☆☆

Vendors of group test products are only obliged to sell them at the prices quoted here (which include delivery and credit card surcharges) for the life of this PCW issue. They may also change components under certain circumstances.

Editor's Choice

Of the long-established names, Lotus doesn't seem to be trying very hard – if at all. This is a shame, as it was an original, friendly and versatile product in its heyday. But version 9.x has been with us since 1998, and parent company IBM shows little sign of taking it any further. We can't think of any reason – apart from devoted brand loyalty – for purchasing this product.

Corel is trying a lot harder with the Wordperfect 11 suite: in some respects, such as the XML support, it has caught up with Microsoft, and in others, such as the creation of Adobe Acrobat documents, surpassed it. However, like Lotus, it has yet to implement the Unicode standard, which seems rather shortsighted for a corporation addressing an international market. It's also worrying that Corel has thrown in the towel with its personal organiser, calendar and email package and is encouraging its customers to buy Microsoft Outlook instead.

Microsoft Office Professional 2003

'It is obvious that "budget" is no longer a term of condescension'

Finally, when the packaging lists the number one new feature as the option to return to the 'Wordperfect 5.1 Classic mode', one starts to wonder whether the company is looking back at a glorious past rather than forward to a challenging future.

The winners

Microsoft Office 2003 was disqualified from an award last year, as it was still in beta version. Much as we like to see giant-killers, it's not going to happen this time round. Given the sheer development effort that Microsoft puts into its products and the constant innovation, we would be failing in our duty to readers if we awarded our **Editor's Choice** to anyone else.

Once again Microsoft has tried to please all of the people all of the time – and largely succeeded. The rights management and XML capabilities should keep the corporate users happy, while end users will appreciate the new reading view (especially on laptops), the Research Pane and the suite-wide, wizard-assisted ease of use. Finally, Microsoft is the only contender to offer a complete and integrated contacts, calendar and email package in the form of the redesigned and toughened-up Outlook.

That doesn't mean it's the best choice for everyone, especially if you don't want to pay several hundred pounds for an office suite. In fairness, we would point out that there are reduced prices for upgraders from previous versions of Office, as well as a cut-price version for students and teachers. There are also bargains such as Microsoft Works, which have the full majesty of Word 2002 and 'light' spreadsheet and database capabilities.

This year, we have three strong contenders at the £50 mark, and it has become obvious that 'budget' is no longer a term of condescension. We couldn't help but like the new kid on the block, Thinkfree. It packs a great deal into a tiny footprint, and its Java coding and cross-platform capabilities give it an air of street credibility that the more staid suites don't have.

We're not quite sure how useful 20MB of online storage is – many ISPs give you more than this as part of a dial-up deal – but the Thinkfree Folders utility makes it easy to get at without having to deal with the intricacies of FTP. We did feel that it had a few rough edges and couldn't quite match the feature set of Ability or Star, but we'll definitely be keeping an eye open for the next version.

Last year's Editor's Choice, Ability Office, remains an excellent alternative. Its modest megabyte footprint hides a wealth of powerful features, including a suite-wide development language, and we stand by what we said last year in that it looks very much a long-term contender, with a major upgrade due later this year. It's especially useful for small businesses or other organisations that need fully fledged and comprehensible database management.

The final contestant, Star Office 7, has seen a major overhaul in the past year, and comes with a lot of extras in the form of Autopilots, clipart and the quirky-but-clever drawing application. Like Microsoft and Wordperfect, it supports XML, and outdoes Microsoft by exporting Adobe Acrobat documents. It has Unicode support, which is a great advantage if you don't want to be confined to the Latin alphabet, a comprehensive development language and good multilingual proofing. Despite the intractability and limitation of the Adabas database, we have no hesitation in giving **Star Office 7** our **Highly Commended** award.

Don't forget if you've bought the DVD edition of *PCW* you can try out four of the packages reviewed here.

Sun Star Office 7

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Network

WRITTEN BY ALAN STEVENS

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This month we check out an ADSL router, a tape backup solution and focus on server-based computing

Wimax boost for wireless broadband

Intel has outlined plans to increase the availability of affordable wireless broadband using a mixture of Wifi and 802.16, Wimax technologies. Wimax complements Wifi by connecting wireless hot spots to the Internet and offering a wireless alternative to the last-mile broadband services provided by telecoms companies such as BT.

According to Sean Maloney, vice-president of the Intel Communications Group, the chip maker is set to ship Wimax silicon in the second half of the year. It is also in discussion with Siemens and Proxim, with the aim of using the technology to connect more than five million users to the Internet for whom land-based broadband alternatives are either too expensive or unavailable.

DDS-4 successor

A successor to the DDS-4 tape format has been developed, which extends capacity from 25GB to 36GB per cartridge or up to 72GB with compression. Called Dat 72, tape drives supporting the new format from HP and Certance (Seagate) are backwards compatible with earlier devices and are up to 25 per cent faster.

Internal and external drives are both available. A full review of the HP Storageworks Dat 72 will be included next month.

Check Point secures Lan traffic

Check Point has announced a family of products designed to tackle security inside firewall defences. To do this, the new Interspect appliances monitor Lan traffic and apply a mix of stateful inspection and application intelligence technologies. They can protect systems from a wide range of threats including worms which, if they get past perimeter defences, spread rapidly and are hard to eradicate.

New Interspect appliances provide additional security inside normal perimeter firewall defences

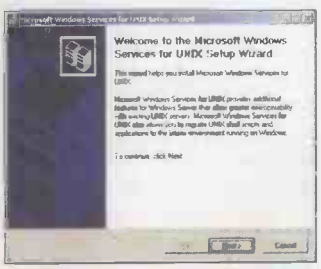
The hardware involved is a self-contained server running the Linux-based Secure Platform operating system. Multiple Ethernet interfaces can be specified for connectivity and the network segmented into a number of different security zones. Customised security policies can then be applied to each zone and suspect computers automatically quarantined when suspicious activity is detected. Among other actions users are notified by the appliance when this happens and advised as to how they can disinfect their PCs, download patches to block further attacks and return to their normal working zone.

Nick Lowe, Check Point UK managing director, said Interspect provided pre-emptive protection and automated clean-up procedures. 'Interspect tracks published vulnerabilities in the leading software environments and provides protection before attacks occur,' claimed Lowe.

The ability to handle a wide range of protocols on the Lan, is another key feature. Interspect appliances can be managed directly via a web interface or together with other Check Point security solutions from a central management console. Prices range from £5,000 to £22,000 ex VAT depending on the amount of bandwidth to manage, with Interspect aimed initially at the medium to large enterprise market.

Unix code on Windows improved

Corporate users wanting to migrate Unix/Linux applications onto their Windows servers will be interested in the latest version of Services for Unix (SFU 3.5). In the previous update in May 2002, Microsoft added a full application subsystem, based on Interix technology, to enable customers to compile and run Unix/Linux code on Windows systems. That's been further enhanced in SFU 3.5, released in January, with support for threaded applications and significant improvements in terms of performance.



SFU 3.5 supports multi-threaded Unix/Linux applications running on a Windows host

File I/O, for example, is claimed now to be within 10 per cent of the native Win32 subsystem, while improvements in multiprocessor scalability offer up to a 50 per cent improvement in native Apache performance on SMP Windows servers. There are enhancements too in the Server for NFS and Server for NIS components, both on the performance and functionality fronts. Telnet and other utilities are also updated and there's better integration with Active Directory.

SFU 3.5 supports a broad range of Unix and Linux platforms and can be installed on Windows 2000 (Professional and Server), Windows XP Professional and all Windows Server 2003 editions. The necessary software can be downloaded free by registering at www.microsoft.com/windows/sfu. However, it's a massive 215MB download, so users without a broadband connection may prefer to order the CD-Rom, available via the same URL.

ADSL ROUTER

Draytek Vigor 2600V

Affordable voice and data for teleworkers and branch offices

It looks like an ordinary ADSL router, but you can also plug in telephone handsets and make VoIP phone calls using the Vigor 2600V (above)

The Vigor 2600V can be used to make voice calls to other SIP-compatible devices, including the popular X-Lite softphone (below)

One of the benefits of ADSL is the ability to use the always-on Internet link to carry voice as well as data traffic. Costly telephone charges can be avoided in this way, making it popular with companies wanting to encourage teleworking or connect satellite offices to the corporate PBX. On the downside, costly Voice over IP (VoIP) handsets and IP-enabled PBX systems are normally required, ruling out the technology for smaller organisations. Which is where the Vigor 2600V – from specialist vendor Draytek – scores by incorporating VoIP processing into a low-cost ADSL router which can be used with ordinary analogue handsets.

No bigger than a standard ADSL router, the Vigor 2600V has two ports at the back into which handsets are attached using supplied adapters. Normal dial, ring and other call tones are then generated by these interfaces but, instead of phone or extension numbers, users dial the IP address of a remote VoIP system. Alternatively, it's possible to use quick dial codes and a built-in directory or a Registrar (proxy) service to locate users without knowing their address.

Of course, the device at the other end needs to support the Session Initiation Protocol (SIP), but you're not limited solely to communicating with other Vigor 2600V routers. Cisco, for example, offers a number of SIP-compatible devices, and you can also get SIP softphones for use on a desktop PCs such as the popular X-Lite utility (available from www.xten.com). Windows Messenger is SIP-compatible too.

In all cases the analogue voice signals are digitised and compressed into an RTP (Real-time Transport Protocol) stream. This is then transmitted peer-to-peer over the broadband Internet connection and decoded back to voice by the hardware/software at the other end. Voice traffic is carried concurrently with data and a number of different codecs (coder-decoders) are supported, optimised for different bandwidth conditions to give good voice quality even on relatively slow ADSL uplinks.

QoS (Quality of Service) options are also built into the Draytek router, to ensure voice traffic always takes precedence over data. On top of that, the 2600V is already a very well-specified small business router. On the hardware front, for example, there's a built-in four-port 10/100Mbits/sec Ethernet switch for local networking, with 802.11g wireless on the 2600VG model (£239 ex VAT) and optional ISDN backup facilities, if required. A USB port also enables a printer to be attached to the router and shared on the Lan, plus there's a built-in firewall and VPN support.

Voice and data can both be carried in secure VPN tunnels, the router supporting both Lan-to-Lan and Lan-to-teleworker tunnelling. A dedicated coprocessor can handle up to 16 simultaneous tunnels using PPTP, L2TP and IPSec protocols, with a choice of pre-shared keys or X.509 digital certificates and Radius authentication.

Content filtering is yet another option and, like most networking products these days, the Vigor 2600V is managed via a straightforward graphical browser interface. It all adds up to what looks like an ideal small business product, the VoIP facilities making an already well-specified, low-cost router even more attractive. However, there are limitations, starting with the use of SIP, a VoIP protocol that isn't as widely implemented as alternatives, such as H.323, which is used by other telephony vendors. Support for H.323 plus MGCP (Media Gateway Control Protocol) and Megaco is planned but could take some months to appear.

In addition, the phone ports on the Vigor 2600V only support FXS (Foreign Exchange Subscriber) mode, which means you can only plug in telephone handsets, not PBX or PSTN (Public Switched Telephone Network) phone lines. However, later this year a version will be available that supports FXO (Foreign Exchange Office) connectivity. You'll then be able to use the Draytek router as an analogue to VoIP gateway, to enable remote teleworkers and offices to be linked into a corporate PBX, and make and receive calls as though locally attached.

In the meantime, the UK distributor is offering customers access to a public SIP gateway using self-financing 0870 numbers to allow calls to and from the public switched network. As one of the first products to tackle the cost and complexity of IP telephony, the Vigor 2600V is well worth watching, with a lot more to come in the next few months.

DETAILS

PRICE £233.83 (£199 ex VAT)
CONTACT SEG Communications 020 8381 5500 www.draytek.co.uk
SPECIFICATIONS
Four-port 10/100 Ethernet switch • USB print server • SIP-compatible VoIP support with 2 FXS ports • Firewall with content filtering • Lan-to-Lan & Teleworker-to-Lan VPN support
PROS Analogue phone ports; choice of codecs; Ethernet switch & USB print server; firewall & VPN
CONS No support for H.323, MGCP or Megaco; FXS mode only
VERDICT
Affordable for teleworkers and branch offices, but lacks PSTN/PBX connectivity

PERFORMANCE	★★★★☆
FEATURES	★★★★½
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★½

WORKSTATION GRAPHICS

Nvidia Quadro FX1100

Good OpenGL performance on a budget

The Nvidia Quadro FX1100, an affordable graphics adapter for Cad and DCC professionals

The FX1100 is aimed at Cad (computer aided design) and DCC (digital content creation) users looking for a high-performance graphics card. Roughly a third of the price of the top-of-the-range Quadro 3000, it has a similar 128bit floating point graphics pipeline and outperforms similarly priced competitors.

Aimed at the same mid-range workstation market as the ATI FireGL X2-256 (*PCW* January page 207), the FX1100 has two DVI-I interfaces for multi-monitor use. Max resolution is lower than the ATI but, at 1,600 x 1,200, still usable. On a single display, digital output rises to 3,840 x 2,400. Analogue displays are supported using dual 400MHz Dacs with a max resolution per monitor of 2,048 x 1,536 at 85Hz.

The 128MB of DDR video memory is half that in ATI's adapter and the memory interface is narrower, but you get similar hardware-accelerated rendering facilities and OpenGL 1.5 and DirectX 9.0 compatibility. Drivers for Windows 95/98, NT, 2000 and XP are available, with OpenGL drivers for Linux, all certified for use with the leading Cad and DCC applications.

Nvidia claims market-leading figures for the FX1100 running the Specviewperf 7.1 benchmark (see www.pcw.co.uk/news/1151558). This measures OpenGL performance and, although we didn't get quite the same figures in our tests, the Nvidia card beat the ATI adapter on two out of the three Specviewperf viewsets we tried.

Priced similarly to the ATI adapter and others in the mid-range workstation market, this graphics card is more than a match in terms of performance. And PNY Technologies is offering an extra year's warranty on top of the standard two.

DETAILS

PRICE £757.88 (£645 ex VAT)
CONTACT PNY 01784 224 220
www.pny-europe.com
SPECIFICATIONS
128bit Nvidia Quadro FX graphics processor • 128MB video Ram • AGP 8x bus • Dual DVI-I interfaces • Max resolution 3,840 x 2,400 (single digital display) • Dual 400MHz Dacs for analogue output
PROS Dual DVI-I interfaces; Open GL performer; drivers
CONS 128MB video memory; resolution; dual digital displays
VERDICT
Good OpenGL performance, but lack of video memory is a shame

PERFORMANCE	★★★★☆
FEATURES	★★★☆☆
ENTERPRISE VALUE	★★★☆☆
OVERALL	★★☆☆☆

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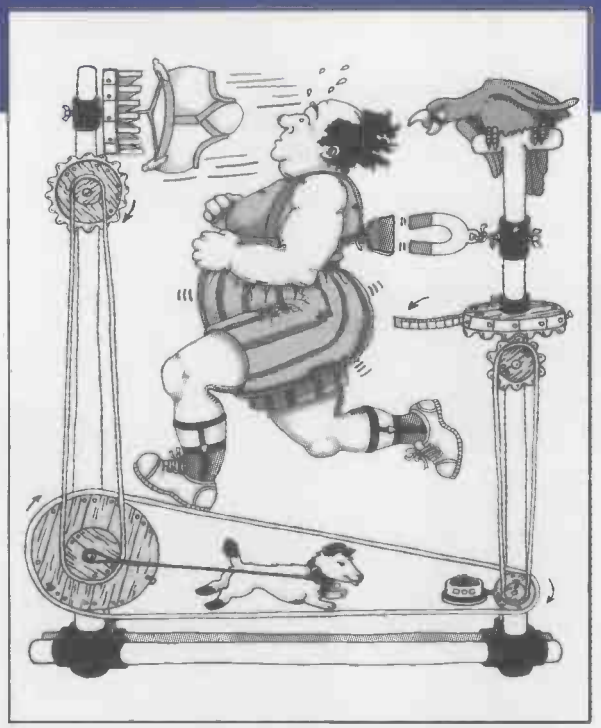

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DESKTOP MANAGEMENT

Vector Networks PC-Duo

Pick and mix small business solution

The benefit of PC-Duo Enterprise 2.1 is its modularity, with inventory, software distribution, remote control and more managed from one console

At the heart of PC-Duo Enterprise 2.1 is the Enterprise Console, implemented as a Microsoft Management Console (MCC) snap-in with a unique graphical look and feel. Agents for Dos and Windows are provided, and clients and console communicate via a shared directory. Collected data is maintained in a site database, which can be the Jet database supplied or any ODBC-compatible product.

Management modules can be purchased to suit a range of needs, with a comprehensive inventory module first. Some 600 hardware and software items can be identified using this module and the information browsed and queried from the console, with facilities to group nodes according to their setup.

Add the diagnostics module to compare configurations and restore damaged applications remotely, or software distribution to push packages and updates out to clients with good facilities to schedule, monitor and manage the process.

Installation is quick and very straightforward with any Windows updates supplied on the CD-Rom. It was easy to navigate the console interface and we were impressed by the reporting, with facilities to export reports in Word, Excel, HTML and other formats. The recently updated remote control module is worth having to enable support staff to take full control of problem systems. There's also an integrated help desk application (£579 ex VAT) with a full web interface to manage support calls and follow up on resolutions.

The fact that you can manage only Dos and Windows PCs is a minor gripe. It's hard not to like this package, which has a lot to offer enterprises.

DETAILS

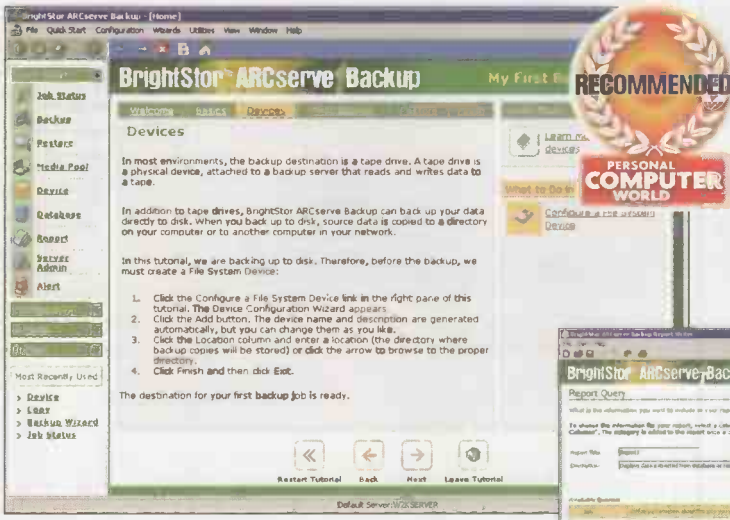
PRICE From £19.79 (£16.84 ex VAT) per user for 10 Inventory licences
CONTACT Vector Networks 01827 67333
www.vector-networks.com
SPECIFICATIONS
Windows 98, ME, NT4, 2000/2003 or XP for the Enterprise Console • 60MB free disk space & optional ODBC database • Dos and Windows clients supported
PROS Modular; helpdesk module; deployment; inventory collection
CONS Windows only
VERDICT
Comprehensive small business desktop management solution

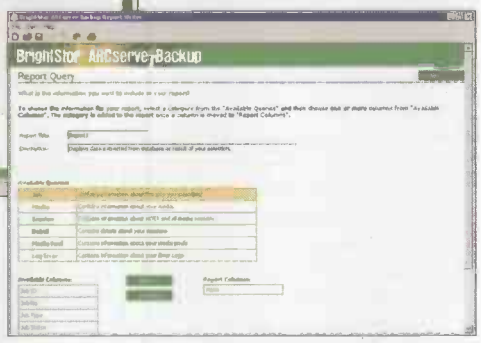
FEATURES	★★★★☆
ENTERPRISE VALUE	★★★★★
EASE OF USE	★★★★☆
OVERALL	★★★★☆

TAPE BACKUP

CA Brightstor Arcserve Backup for Windows 11

Numerous enhancements lead to better, faster backups





RECOMMENDED
PERSONAL COMPUTER WORLD

Left: For new users a 'My First Backup' tutorial has been added to the already very intuitive user interface in Brightstor Arcserve Backup V11

Below: A Report generator and a clutch of standard reports have been added in this release

The latest release of the Brightstor Arcserve Backup application has numerous enhancements requested by customers. These include improvements to the user interface and extended international language support, with optional 168bit 3DES encryption and the ability to handle Worm (write once read many) recording devices. Support for the new VSS (volume shadow copy service) in Windows Server 2003 has been added, as well as a number of performance and scalability tweaks, including the ability to multiplex backup jobs to take full advantage of high-speed tape technologies.

Only a Windows version of Arcserve 11 is available at present, although Netware and Linux implementations will follow later in the year. In the meantime, the Windows software can be used to back up other platforms using the usual optional agents. There are also add-ins to handle Exchange servers, databases and other open files. Although the Windows VSS support is part of the updated Open File add-in, users of Small Business Server 2003 can get a special bundle that includes this and the Exchange and SQL add-ins for just £700 ex VAT.

Upgrades are also available, and full integration with previous Arcserve V9 servers comes as standard. You can also manage V9 and V11 Arcserve servers (there was no V10) from the high-end Brightstor Enterprise backup program.

We tried the new software on a Windows 2000 server with a small tape library fitted. It was easy to use. Backup devices are discovered automatically, library support is built in and the already intuitive user interface is made even slicker with a new 'My First Backup' tutorial for first-timers. Also worth having are a clutch of extra reports and a built-in report generator to create your own.

The documentation has been made easier to navigate and there's a new pre-flight checking option. This makes sure everything needed for a backup is in place, not just in terms of the backup media, but network and security access to the resources involved. There are also scripting changes, with a new redirection facility for when jobs fail, as well as updated command line utilities that wait for backup jobs to complete with a return code indicating success or failure.

On the scalability front, support for 64bit Windows has been added, with enhancements when backing up data held on Nas (Network Attached Storage) devices. In particular, it's now possible to direct the backup of an NDMP (Network Data Management Protocol) compatible Nas server to another Nas device with a tape drive or library attached. The tape copy command has been enhanced to include support for disk-to-disk backup and disk staging prior to copying to tape.

Customers with Windows Server 2003 will appreciate the VSS support that allows volumes to be backed up in real time with minimal effect on applications using them.

The multiplexing option is also interesting. Parallel streaming – where backup jobs write to several tape drives simultaneously – has long been supported, but the reverse happens with multiplexing, with data from multiple backups streamed to a single drive or library.

Previously only available in high-end backup applications, performance is enhanced by multiplexing, as the backup device doesn't have to wait for the software to work out what to send next. This is especially important on tape drives. They have to continually rewind to cope with 'bursty' data, and can give as much as a four-fold improvement in performance which, even if not fully realised, could seriously reduce backup times on multi-server networks. Multiplexing can increase the time taken to perform a restore as the data will be mixed up with other jobs on the same media set, but CA claims to have optimised retrieval to ensure that restores are no slower when multiplexing is employed.

Elsewhere, the optional Lotus Domino agent has had some performance tweaks in this release, as has the Exchange agent. Exchange users also get document-level backup and restore facilities, as well as the ability to migrate data from one version of Exchange to another. Finally, there's full integration with the new Brightstor Arcserve Backup for Laptops and Desktops, formerly called Brightstor Mobile Backup.

There's a lot in this package, but the improvements are all worthwhile and make what was already one of the slickest and quickest server-based backup applications around even better.

DETAILS

PRICE From £642.73 (£547 ex VAT)
CONTACT Computer Associates 01753 242 679 www.ca.com
SYSTEM REQUIREMENTS 350MHz processor • 256MB memory • 350MB disk space • Windows 2000, XP Pro, Server 2003 or Storage Server 2003 • Tape, disk, writable CD/DVD or Nas device for backup
PROS Multiplexing; Windows VSS support; enhanced Nas backup; reports and report writer; Exchange backup/restore
CONS Modular format can be expensive; Windows only initially
VERDICT
Adds useful facilities to suit both small and large enterprises

FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
EASE OF USE	★★★★★
OVERALL	★★★★★

NETWORK SERVER

HP Proliant DL140

High-quality rack-dense solution for server farms

Top left (front view) and bottom left (rear view): The HP Proliant DL140 crams a lot of processing power into its slimline 1U case

As applied by HP to its Proliant servers, DL stands for 'Dense Line', so it's no surprise that the Proliant DL140 is a slim, 1U, rackmount solution. As such, up to 42 DL140s can be crammed into the racks used in most corporate data centres to giving a density only exceeded by blade server alternatives. It's also possible to specify two fast Xeon processors, up to 4GB of memory and two internal hard disks per server. PCI-X expansion is another key feature although, as with many rack-dense solutions, compromises have been made to achieve space and cost savings.

We've come to expect a high build quality with HP Proliant servers, and the DL140 is no exception, housed in a robust metal enclosure with a neat internal layout. There are few trailing cables and power comes from a 325w supply. The only disappointment is the lack of redundancy or hot-plug power options. There's no redundancy or hot-swapping when it comes to cooling, either, but five fans are inside the unit and the airflow is optimised for rack-dense environments. Slide-out, rackmounting rails are optional.

Inside the case is a highly integrated HP motherboard, with sockets for two Intel Xeon processors clocked at 2.4GHz or 3.2GHz. A Serverworks GC-SL chipset provides the multi-processing support, and the model we tested had two of the faster processors, equipped with 1MB of L2 cache memory each and ECC (Error Checking and Correction) protection. Support for Hyperthreading and a 533MHz front-side bus are standard features. Our test server had 1GB of memory, with four Dimm slots to take this up to a maximum 4GB using PC2100 DDR memory running at 266MHz with ECC protection.

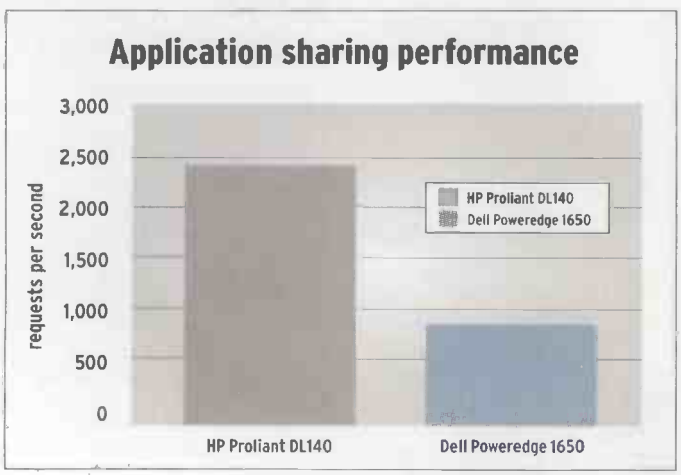
Lan connectivity is handled by an integrated Broadcom dual Gigabit controller, and there's an onboard ATI Rage XL video controller with 8MB of dedicated video memory. You also get four USB ports, with two on the front panel to make it easy to add local peripherals (such as a keyboard and mouse) when in a rack.

The main storage controller is integrated onto the motherboard, so the single expansion slot is free to start with. It is PCI-X compatible and accommodates 64bit full-length cards with a bus speed of up to 133MHz.

Unfortunately most of the compromises have been made in storage. There's no floppy drive, although a CD-Rom can be fitted. There's only space for two hard disks, which is fair enough on a 1U server, but there's no hot-swap facility and the integrated dual-channel controller only supports ATA/100 devices. Two 80GB disks are the only option, giving an internal capacity of just 160GB, and the mechanisms used have a spin speed of just 7,200rpm.

With only two disks, there's little need for hardware-based Raid, but faster drives would boost performance, while larger capacity models wouldn't add significantly to the price. Still, the main use of the DL140 is likely to be as a front-end web server in a load-balanced cluster, where processing power is more important than storage speed or capacity. The DL140 performed well in our Lab tests when running a typical workload for just such a configuration, proving to be the fastest two-way server we've tested to date. And, if you need fast storage, the PCI-X slot can be used to hook the DL140 up to an external array or San (storage area network).

An operating system isn't normally included in the price, but the DL140 is certified for both Windows and Linux use (Red Hat and United Linux), and most resellers will pre-load one to suit. A one-year on-site warranty is provided, which can be extended with a range of service and support plans. Basic remote monitoring and management are also features on what is a capable product for enterprises looking for rack-dense server products.



Much better specified than our reference Dell Poweredge 1650, the HP Proliant with its dual 3.2GHz Xeon processors and 1GB of memory comfortably outpaced the older Pentium III-equipped Dell in the Labs

DETAILS

PRICE £2,990.38 (£2,545 ex VAT)
CONTACT Hewlett-Packard 0845 270 4222 www.hp.com
SPECIFICATIONS
1U rackmount case, 2 Intel 3.2GHz Xeon DP processors, 1MB ECC cache, 533MHz FSB • 1GB PC2100 ECC DDR memory • Dual-channel ATA/100 storage controller • 2 Maxtor 80GB disks • Dual Gigabit Ethernet interfaces • 64bit/133MHz PCI-X slot
PROS Dual Xeon capable; 4GB memory; dual Gigabit Ethernet
CONS Storage capacity and performance; power supply; redundancy; no hot-swap options
VERDICT
Top-quality rack-dense server

PERFORMANCE	★★★★★
FEATURES	★★★★★
ENTERPRISE VALUE	★★★★★
OVERALL	★★★★½

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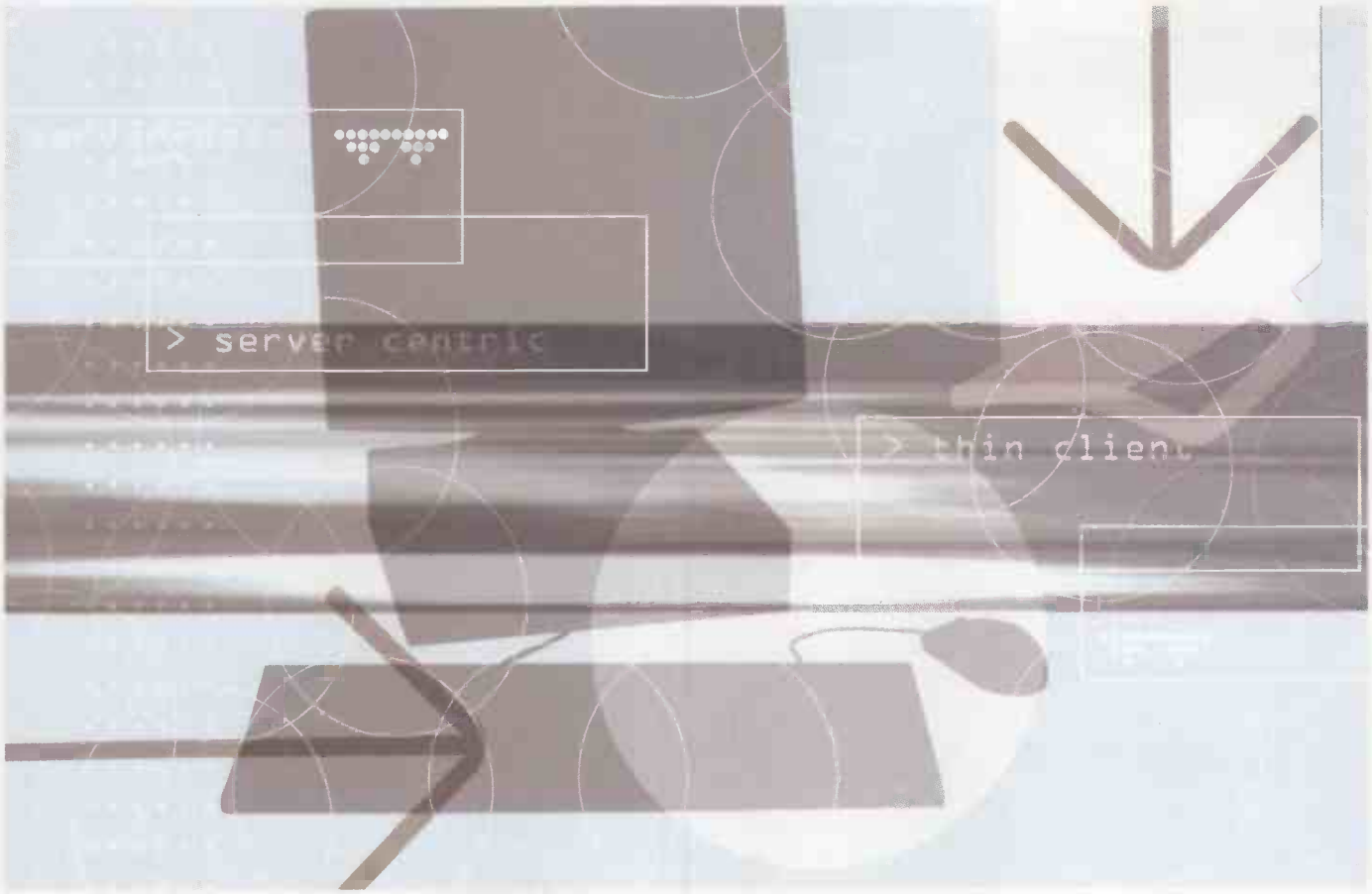


WORDS: ALAN STEVENS

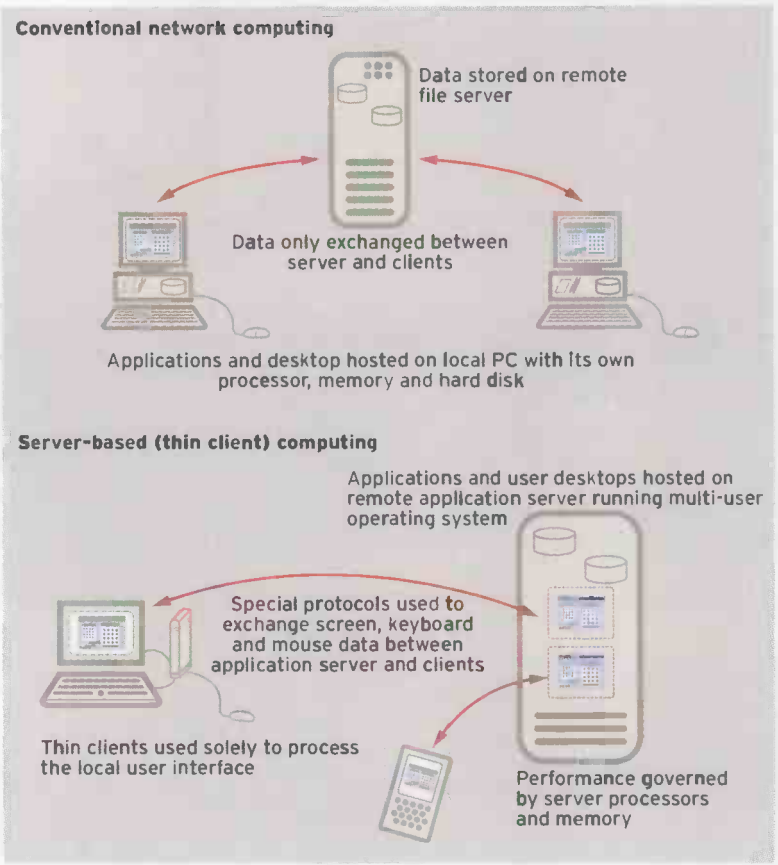
Centre of gravity

Hosting applications and desktops centrally on a remote server is becoming an increasingly viable option, but what are the benefits? We take a look

Whether you call it server-based, server-centric or thin-client computing, interest is growing in the technology that enables applications and desktops to be hosted on remote servers instead of local PCs. Reduced cost of ownership is, typically, cited as the main benefit, most obviously as a result of being able to replace conventional desktop PCs with cheaper thin-client devices. But there are others too, such as being able to manage applications and user desktops centrally, reducing the amount of support required and enabling product rollouts and updates to be accomplished in hours instead of days.

Enhanced security is another key benefit of the server-based approach. And the technology is increasingly used to extend application access to remote and mobile workers, customers and partners. It's these, and other, benefits which appear to be driving renewed interest in server-based computing, causing hardware and software vendors alike to rethink their offerings.

If you've not looked at server-based computing for a while, this feature will provide a good snapshot of what's been happening and what's on offer. In particular it looks at what you get as part of the latest Windows Server 2003 release and at exactly what specialist vendor Citrix has to add. We also take a look at some of the latest developments in thin client hardware, with examples from the leading vendors. And if you're new to the subject you'll learn just what the technology has to offer, how it's implemented and whether it's something you should investigate further.



How server-based computing differs from the conventional networking model

The principles behind server-based computing are best described by comparison with the way more conventional networks operate. In those, employees get their own desktop PC able to run general office applications and custom line of business (LOB) programs locally. The documents these programs work on and the databases they connect to are, typically, held on remote network servers, but almost all of the processing work is performed by the desktop PC.

With the server-based model, users run the same applications, but on remote network servers rather than locally. The servers can run several user sessions concurrently and all the local desktop hardware does is provide the necessary user interface, in the form of a screen, keyboard and mouse, much like old-style mainframe terminals, albeit with a more modern graphical interface.

Thin clients only have to handle the local user interface, so can be smaller and cheaper than a conventional desktop PC.

Special protocols are employed to allow the GUI (graphical user interface) information to be exchanged between the server and its desktop clients. The client hardware is referred to as thin because it doesn't need a powerful processor, lots of memory or even a hard disk to do this job. There's just a modest processor and enough Ram to handle the GUI, plus a small amount of Flash memory to store settings and, on some devices, hold drivers for local peripherals such as printers and scanners. The operating system is also loaded from Flash memory and is typically an implementation of either Windows or Linux (we've looked at some examples, starting on page 172). Either way, it will be a slimmed-down version focused on providing the GUI support, not running applications although, as we'll discuss shortly, there are exceptions.

Along with applications it's possible to host the whole user environment on the server including the desktop, Icons, individual user settings and so on. Nothing at all then needs to be stored on the local device, making it possible to support a range of different thin-client platforms, handheld devices, kiosk access and so on, yet still provide users with the same desktop they're used to.

As far as the benefits are concerned, these would take a lot of space to cover in detail, so we've summarised the chief advantages in the box below, leaving it up to you to draw your own conclusions. Similarly when it comes to the disadvantages there are a number of reasons the server-based approach might not be suitable and, again, we've summarised some of them in the box on page 170.

The type of industry you work in is also relevant, with education and manufacturing often cited as particularly suited to the technology. It's not for everyone though, and bear in mind that moving from a conventional network to server-based computing involves a lot of upheaval and can also be something of a culture shock – especially for those used to having full control of what's installed and run on their desktop PCs.

Pros of server-based computing

Reduced equipment costs
Thin-client hardware can be bought for a lot less than a conventional PC, and because performance is determined mainly by the host server, equipment lifecycles are extended.

Enhanced reliability
Thin-client hardware contains fewer components and is more reliable than a desktop PC. With the cheaper devices it's reasonable to keep hot spares for rapid replacement in the event of a failure.

Reduced management costs
Applications and user settings can all be maintained centrally, reducing the helpdesk/support burden. New applications and updates can be rolled out rapidly with no need to visit individual desktops.

Desktop independence
Because applications, desktops and data are all hosted centrally it doesn't matter what system is used for access. Bandwidth isn't a major issue either, as there's no need to transfer large amounts of data as with conventional remote access, for example.

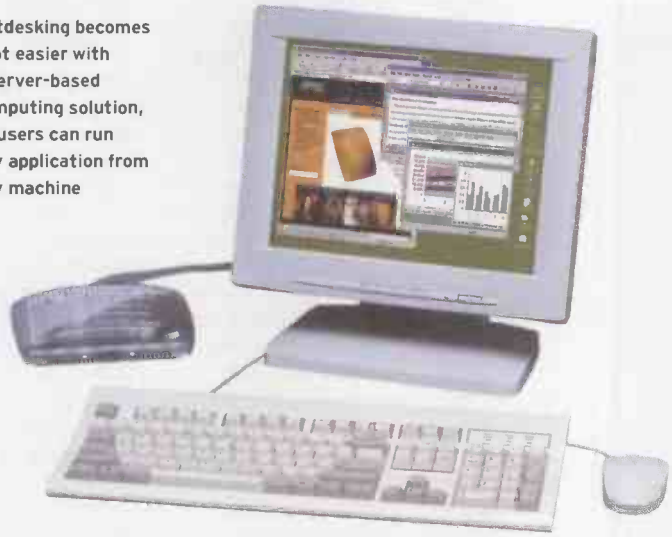
Hot desking becomes a lot easier and users can log in remotely using a variety of different devices, including wireless notebooks, PDAs and kiosk terminals.

Regardless of the device, once authenticated users see their expected desktop and run applications as normal.

Improved performance management
The path between applications and data is local to the server rather than networked so performance is normally enhanced.

Application performance is governed chiefly by the specification of the host servers, making it easy to scale as users and applications are added.

Enhanced security
There are no local desktops to protect and local code can't be modified so firewall, anti-virus and intrusion detection efforts can be concentrated on protecting servers.



Hotdesking becomes a lot easier with a server-based computing solution, as users can run any application from any machine

Server-based computing and Windows

When it comes to real products, Unix was the first platform to offer server-based computing. Already a multi-user operating system, all that was required was the development of an extra layer of technology, called X-Windows, to allow a GUI to be hosted remotely. However, it took until the mid-1990s before Windows got similar facilities and then it wasn't Microsoft that led the way. Instead it was down to independent developer Citrix Systems which used expertise gained implementing server-based computing under OS/2 to produce a product called Winframe for use with the Windows NT platform.

Launched in 1995, Citrix Winframe was based on a custom NT kernel with multi-user extensions added, together with a thin-client communication protocol known as ICA (Independent Computing Architecture) which we'll talk more about shortly. Since then Microsoft has licensed back the Citrix technology, first selling a separate Terminal Server version of NT then bundling the technology into the core server package. Renamed Windows Terminal Services, the built-in multi-user support first appeared in Windows 2000 Server and was further updated recently (and confusingly renamed back to Terminal Server) as part of the Windows Server 2003 release.

Microsoft has also dropped the Citrix ICA protocol in favour of its own RDP (Remote Desktop Protocol). ICA can still be used if you add the Citrix Metaframe product (see The Citrix Connection on page 170), but Microsoft has developed its own clients to use RDP, including an ActiveX client for browser use, and built support for RDP into Windows XP.

As well as a built-in thin client, the RDP facilities in Windows XP are used to support the remote assistance feature whereby users can allow another (expert) access to their desktop over the Internet (see screenshot 1). On XP Pro, RDP supports the remote desktop option, which enables users to access their office PCs when travelling or at home. In both cases the XP system acts as the Terminal Server but is limited to hosting a single remote client session with no extra licensing required.

The Terminal Server software can be employed in a similar manner on a Windows server, specifically to support remote administration (see boxout Remotely possible, on page 172 for details). Used this way, up to two sessions can be supported without the need for any additional licences. However, to get full multi-user computing, additional Windows Terminal Server licences need to be purchased, with a custom licence server included to enforce compliance when configured this way.

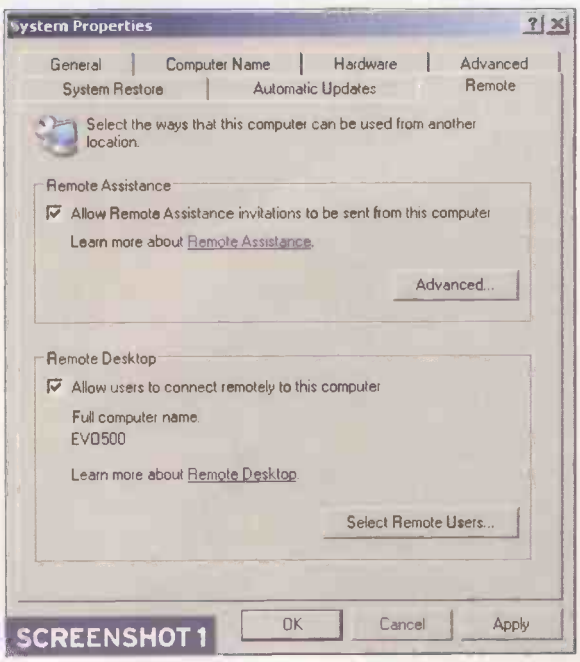
For companies looking to try out Terminal Server, the software can be installed and used for 90 days without licensing and, although straightforward, the way the product is licensed takes a little explaining. The server-side software itself, for example, is covered by the main Windows server licence but you need a Client Access Licence (Cal) for every user, just as when accessing a Windows server from an ordinary network PC. In addition, however, every session hosted by the Terminal Server also requires a separate TS-Cal, which in the Windows Server 2003 version can be purchased on a per user as well as a per device basis. Prices depend on individual licensing agreements, so consult your Windows supplier for details. Also check with thin-client vendors, as licences for Terminal Server may be included.

Terminal Server and 2003

Because it's built into the Windows Server software, Terminal Server is very easy to evaluate. The fact that you can use 'soft' thin clients running on a PC or in a browser also makes it easy to trial. However, anyone considering implementation in anger would be best advised to go for the latest Windows Server 2003 version, as it has been significantly enhanced compared to the implementation in Windows 2000.

To start with, there's the XP-like desktop, added to which the 2003 version takes full advantage of the extra performance provided by the new operating system to support more users on the same hardware. Unfortunately there are no hard and fast limits here and a degree of experimentation is required to get the hardware right. However, tools for sizing Terminal Server hardware are available from Microsoft and there's support in Terminal Server for the latest network load balancing technology in Windows Server 2003 to further help scale the solution.

The RDP protocol has been upgraded for the latest server release too. For instance, with RDP 5 in Windows 2000 clients were limited to 256 colour displays, but with the 5.1 protocol implemented in Windows Server 2003 up to 24bit colour can be selected at a maximum resolution of 1,600 x 1,200 (see screenshot 2 over page). But remember that the



SCREENSHOT 1

Remote Assistance and Remote Desktop in Windows XP are based on an implementation of Windows Terminal Server and the Microsoft RDP protocol

Cons of server-based computing

Single point of failure
The availability of the application server becomes a critical concern. If it hangs or crashes no work can be done by desktop users unless they have access to alternative facilities.

Redundancy must be built in and backup and recovery procedures put in place to prevent such problems

Application requirements
Some applications don't work as well when run on remote servers. Cad/Cam and other graphics-intensive programs, for example, benefit from running locally, using specialist hardware to accelerate the GUI.

Some applications don't support server-based deployment at all, or need to be upgraded to do so.

Network bandwidth
The capabilities of the link between the client and the remote application server can have a big impact on overall performance, especially low-bandwidth remote and wireless connections.

capabilities of the client hardware also play a part here and you can't display a higher resolution or more colours than the local graphics controller can handle.

Another big change in 5.1 is the ability to make local resources on the client system available to a server session. That can include local storage devices such as USB memory sticks, smart cards, audio facilities and printers.

With the Windows Server 2003 implementations most of the standard Windows management tools can be applied equally to both thin-client users and those with desktop PCs. Tools such as Group Policy, software restriction policies and roaming profiles all work regardless of the type of user. However, you get very little extra to help manage Terminal Server users on top of these tools, unless you add extra software, such as that provided by Citrix, to work with the Microsoft product.

The Citrix connection

Given that every copy of Windows Server 2003 includes the enhanced Terminal Server, software and that all you have to do is license it, you might well wonder what Citrix could add to the equation, especially since you have to license the Citrix software and clients separately. The answer is quite a lot, with a high percentage of Terminal Server users opting to add Citrix tools on top of the Windows product, primarily because they provide support for platforms other than Windows. There are also extra benefits to be gained from using the Citrix ICA protocol rather than RDP. ICA support also comes as standard in virtually all the hardware-based thin-client products, which we'll discuss shortly.

Additional application publishing and application-centred management facilities are one advantage, and the company has recently added a slew of new products to its line-up to create the Metaframe Access Suite. These new products build on the facilities provided by the core server-based computing solution, now called Citrix Metaframe Presentation Server, adding the ability to support secure remote access to virtually any application or information source, plus add single sign-on and collaborative team conferencing (see screenshot 3). The company has also recently acquired Internet developer Expertcity and its GotomyPC application, which can be used to access a remote Windows desktop from anywhere on the web.

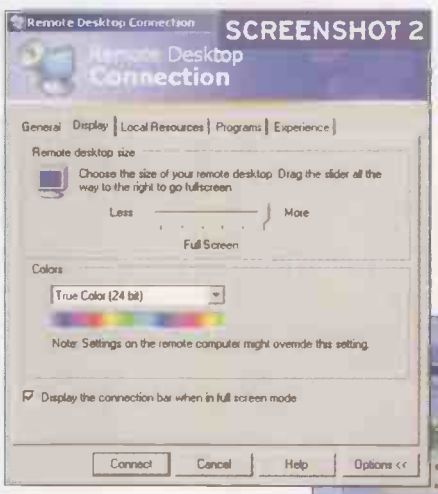
The key component of the Access Suite, however, remains the Metaframe Presentation Server, which can be deployed both on Windows systems and those running Unix. The Windows version works with Microsoft Terminal Server on both Windows 2000 server and Windows Server 2003 hosts, while Citrix Metaframe Presentation Server for Unix can be hosted on AIX, HP-UX and Solaris servers. The Unix version is fully compatible with the Windows-based product and uses the same ICA protocol to communicate with clients. When the two products are deployed together users can be given almost seamless access to applications hosted on both Windows and Unix servers from a single integrated desktop.

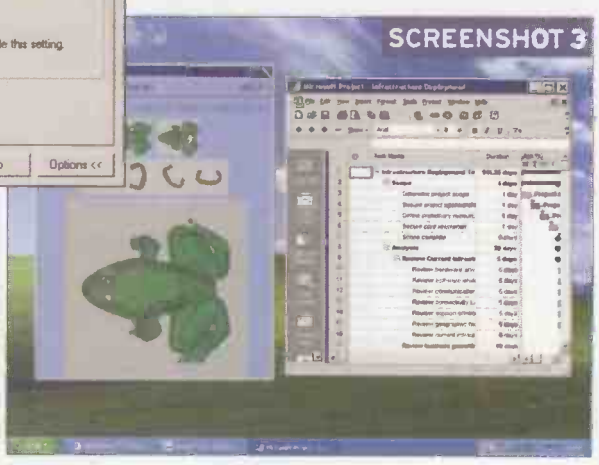
The ICA protocol similarly improves on Microsoft's RDP by supporting a lot more client platforms. For example, there's a zero-install Java client that can be run from any Java-compatible system, as well as an ActiveX ICA client and clients for Linux, Apple Macintosh and Symbian devices. ICA was developed originally to support very low bandwidth connections, and still excels in that respect, consuming as little as 5-10Kbits/sec and making it a better choice than RDP not just for dial-up but also for Internet VPN access and wireless connectivity. ICA can also be used with a range of network protocols such as IPX and NetBEUI in addition to TCP/IP. There are a number of other differences, the most important of which are summarised in the table on the next page.

Another major benefit of the Citrix product suite is the ability to fine tune and manage application access. With Metaframe Presentation Manager new applications, for example, can be published directly to groups of remote users who simply find the new icons on their desktops when they log on. Similarly it's a lot easier to specify who can run what and from where using the Citrix software, which also offers increasingly essential encryption facilities and support for smart card authentication.

Server management, too, is enhanced with the ability to manage multiple servers together from a single remote console, replicate applications across servers and add enhanced, application-based load balancing. Realtime alerting and performance graphing tools are provided along with a management pack for use with Microsoft Operation Manager (Mom) and facilities to allocate and manage bandwidth on a per application basis.

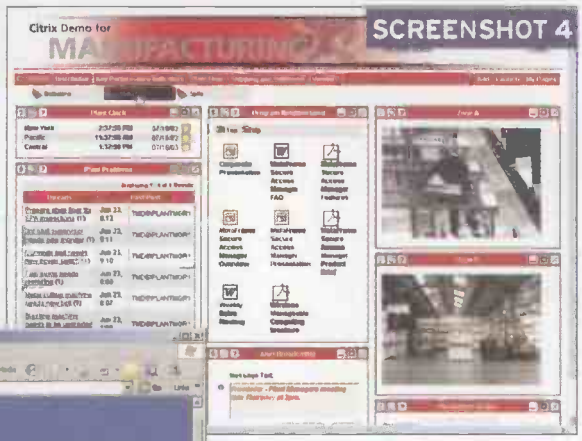
The updated RDP 5.1 protocol used by Terminal Server in Windows Server 2003 now supports 24bit colour displays with a maximum resolution of 1,600 x 1,200





The ability to run applications on both Windows and Unix servers from a single thin client is a benefit of the Citrix Metaframe Presentation Server (right)

There are good reasons for considering some of the other Access Suite products. Add the Metaframe Secure Access Manager, for example, and it's possible to deliver specific information from chosen applications rather than giving free access to the programs concerned (see screenshot 4). Web-enabled, client/server and legacy applications can all be incorporated with simple graphical tools to make light work of producing custom web interfaces for different groups of users, while at the same time enhancing security by prescribing exactly what each group is allowed to see and do.



Right: Secure Access Manager makes it possible to select the information delivered to users rather than allowing free access to the applications concerned

The client choices

No feature on server-based computing could be complete without considering in detail the many associated thin-client products that can be used to provide the physical user interface. These fall into two clear categories, starting with software clients designed to run on a Dos, Windows or Linux PC or in a browser. Of these, the browser-based clients are of most interest, as they provide a high level of device independence, enabling users to access their desktops and run applications from a wide range of platforms including handhelds (see screenshot 5). Browser-based clients are available as ActiveX plug-ins, mostly for use with Internet Explorer, and as Java applets.

Left: Browser-based thin clients provide cross-platform access to server-based desktops and applications

You still need hardware, though, on which to run the software clients and, with cost reduction one of the big drivers of server-based computing, cheap hardware-based thin clients are also available. These come in many shapes and sizes, but typically take the form of a small processing unit into which can be plugged a standard keyboard, mouse and monitor. Most now use USB for this purpose and to allow other local devices, such as scanners, printers and local storage devices to be attached, where this is supported. Audio facilities are often built in too and there will be an integrated Ethernet interface to connect the thin client to the network.

As mentioned earlier, there is no need for a hard disk or, usually, any form of local storage device, and the processor doesn't have to be particularly powerful, as it's concerned solely with managing the GUI. Power is usually supplied via an external AC adapter so there's very little need for a fan, making most thin clients almost silent as well as very small.

The market leader here is Wyse Technology (www.wyse.com) and one of its best-selling Winterm thin-client products, the 1200LE is also its simplest and, at just £189 ex VAT, its cheapest offering.

Accounting for some 35 per cent of Wyse Winterm sales, the 1200LE (pictured below) is housed in a tiny transparent case inside which is a modest Geode processor from National Semiconductor and just 32MB of Ram. The custom BSD Unix operating system is loaded from separate Flash memory and, because it's just 56KB, takes under 10 seconds to initialise with both RDP and ICA clients.

Very little configuration is required, other than specifying the servers to connect to, with the 1200LE very much the Model T of the Winterm range, designed to run general office productivity and LOB applications. It also makes a cheap platform for kiosk deployment although, on the downside, the video interface is limited to 16bit colour, albeit with a maximum resolution of 1,280 x 1,024 and a refresh rate of 85Hz. There's even an integrated audio interface, with a pair of USB ports for the keyboard and mouse.

Despite its modest price and specification, the 1200LE is a sprightly device,

To run basic office productivity and line-of-business applications, a cheap thin-client device, such as the Wyse Winterm 1200LE, can be purchased for just £189 ex VAT

ICA and RDP protocols compared

FEATURE	DETAILS	CITRIX ICA	MICROSOFT RDP 5.1
HOST PLATFORMS	Windows	✓	✓
	Unix	✓	✗
CLIENT PLATFORMS	Windows CE	✓	✓
	Windows XP embedded	✓	✓
	Browser	✓ (Java or ActiveX)	✓ (ActiveX)
	Linux	✓	✗*
	Apple Mac	✓	✗*
	Symbian	✓	✗*
CONNECTIVITY	TCP/IP	✓	✓
	IPX	✓	✗
	NetBEUI	✓	✗
	Wan connectivity	✓	✓
	Dial-up, VPN, broadband	✓	✓
APPLICATION PUBLISHING	Advertise server-hosted applications on client desktops	✓	✗
	Connect to a specific application rather than a desktop	✓	✓
MULTIMEDIA	Audio	✓	✓ (mono)
	Bitmap caching	✓	✓
	Bandwidth controls	✓	✗
	Multimedia streaming	✓	✗
LOCAL RESOURCE MAPPING	Local drives, ports and printers available to server-hosted desktops/applications	✓	✓
USER ACCESS	Client remembers logon name	✓	✗
	Connect to active or disconnected session at different screen resolution	✓	✗

* Other clients may be available from third-party developers

offering performance on a par with and, in many cases, better than software clients running on a full desktop PC. It is very basic and increasingly the trend is to build extra functionality into the thin-client devices, in the form of browsers, legacy terminal emulation and other local applications. Here the products fall into three groups depending on whether they're based on an embedded implementation of Windows (either CE .Net or XP) or a version of Linux.

Windows clients

A typical example of a CE .Net product is the t5500, a member of the HP Compaq Thin Client family (pictured right). The processor in the small yet stylish HP box is a reasonably quick 733MHz Transmeta Crusoe accompanied here by 128MB of DDR Ram. Power, again, comes from an external adapter and, because the Transmeta is a low power chip, there's no need for forced cooling, making for silent operation.

Four USB ports are located at the rear of the t5500 along with a 10/100Mbits/sec Ethernet interface, serial and parallel ports and audio interface. There's an optional PCI expansion module which clips on the side and can, for example, be used to add wireless connectivity. Graphics, meanwhile, are well catered for by an ATI Rage XC controller with 8MB of video memory supporting 32bit colour at up to 1,280 x 1,024 resolution (at a refresh rate of up to 80Hz) or 16bit at 1,600 x 1,200 and 75Hz.

The Windows CE .Net software is quick to load from Flash memory and, as you might expect with a Microsoft product, includes an RDP client for use with Windows Terminal Server. In addition, however, there's full ICA support for use with Citrix Metaframe plus a copy of Internet Explorer 6 which runs as a local application, removing the burden of hosting what can be a resource-sapping application on a remote server. Similarly, local legacy terminal emulation is included to allow the t5500 to be used as replacement for older, green-screen displays. You get a local copy of Windows Media Player and Windows Messenger and an agent for use with the Altiris software used by HP to manage its servers and desktops.

Similar CE Net-based terminals are also available from Wyse and other manufacturers such as Neoware (www.neoware.com), whose products are available from IBM as well as other suppliers, and VXL Instruments (www.vxl.net). Price depends on the model and specification. The HP t5500, for example, sells for £295 ex VAT, with other CE .Net thin clients available between £200 and £400 ex VAT.

The HP Compaq t5500 is a mid-range thin-client device running Windows CE .Net and providing a local browser and legacy terminal emulation alongside the RDP and ICA clients

And XP too

Higher up the scale devices running an embedded version of Windows XP are available, chiefly designed to bridge the divide between no-frills thin-client products and fully fledged desktop PCs. To this end the products usually have faster processors, more memory and can be equipped with local hard disks and other devices, enabling them to run local applications more easily and provide a lot more scope for customisation. The Wyse Winterm 941GXL, for example, looks a lot more like a conventional desktop system and supports the embedding of local customer applications in Flash memory, up to 512MB of which can be found inside.

Remotely possible

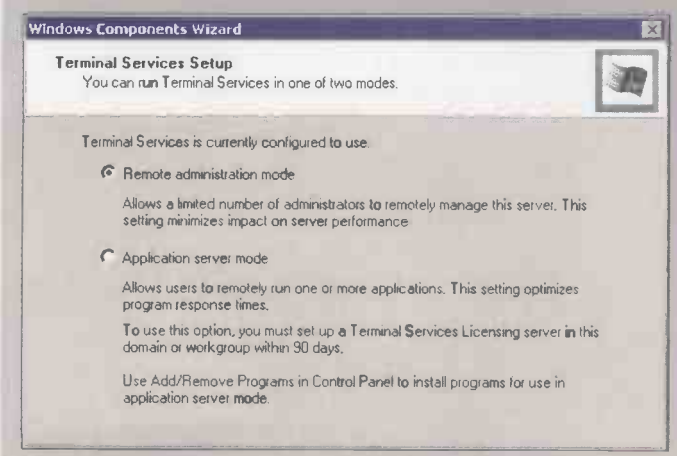
If you've yet to discover remote administration mode in Windows Terminal Server now is the time to check it out. No extra software is needed and it's quick and easy to configure on both Windows 2000 and 2003 servers. Once set up, you'll wonder how you ever did without it, as it cuts out lengthy trips to the machine room enabling users, shares, backups and other server tasks to be managed remotely from the comfort of your own desk.

The Terminal Server software isn't usually installed by default but is very easy to add. Just log onto the server with an administrator account and select 'Add/remove Programs' in the Control Panel, then 'Add/remove Windows Components'. Select Terminal Services from the list of components displayed and a wizard will ask which of the two possible setup modes to configure, either Remote administration mode or Application server. Choose Remote Administration, load up the install CD-Rom and allow the server to be rebooted and that's it.

When the server restarts the Terminal Services software loads and runs in the background with no further configuration work required.

You will need a suitable RDP client to access it and here the easiest option is to use the Remote Desktop Connection utility included in Windows XP, which you'll find on the Windows Start/All Programs/Accessories/Communications menu.

Alternatively, you can download the client from www.microsoft.com/windowsxp/pro/downloads/rdclientdl.asp and use it on XP and earlier versions of Windows. The ActiveX client is also available from the Microsoft download site. Whatever client you use, you just tell it the IP address or name of the server to manage and away you go.



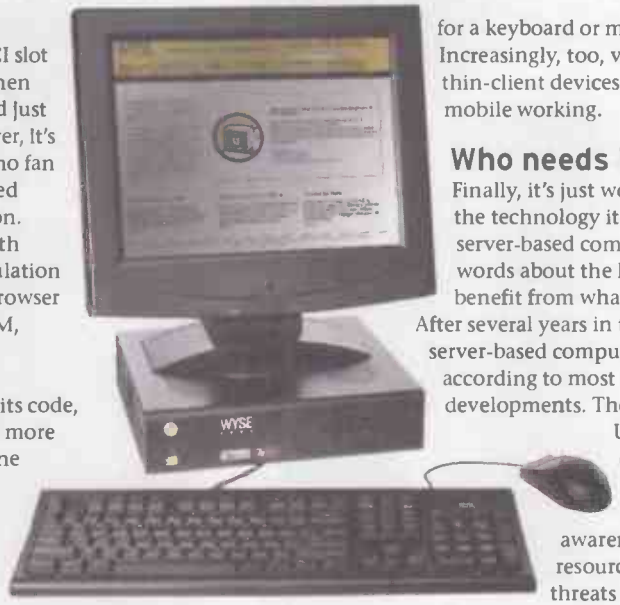
Terminal Services on a Windows 2000 Server (and Terminal Server in Windows Server 2003) can be used for Remote Administration at no extra cost

Tell the RDP client what server to connect to and you can log on and manage it remotely from a desktop window or from a full-screen display

A hard disk is another option on the 941GXL (pictured right), and there's a PCI slot for a wireless card and other adapters. When you boot it a local XP desktop is displayed just as on a standard Windows XP PC. However, it's still very much a thin-client device with no fan and, because the operating system is stored in Flash memory, it's a very secure solution.

RDP and ICA clients are, naturally, both included, alongside legacy terminal emulation and a copy of Internet Explorer 6. The browser even comes complete with a Sun Java VM, something not normally supported on cheaper CE .Net terminals.

Because of the way Microsoft licenses its code, the embedded XP thin clients are a little more expensive than their CE counterparts. The Wyse 941GXL starts at around £400 ex VAT, while an XP-based Compaq thin client, the t5700, costs £379 ex VAT. Add in the price of a monitor, which isn't included in any of the thin client prices, and you're close to the cost of a desktop PC. However, it's worth remembering that they're not PCs, and it's not just the purchase price that matters, with lots of other cost advantages to bear in mind, as outlined earlier in the feature.



Thin clients based on Windows XP embedded, such as the Wyse Winterm 941GXL, can be configured to run custom local applications to bridge the divide between pure thin clients and the desktop PC

Linux clients

For companies that don't want a Windows-based product it's possible also to get thin clients which run an embedded implementation of Linux. In theory these should be cheaper than the Windows devices because of the open source nature of the software involved. In practice the difference can be marginal and in most cases the software itself is pretty irrelevant, with the hardware, features and performance much the same no matter what the platform.

One such is the Wyse Winterm 5125SE (pictured below), which is based on a similar set of hardware to the CE .Net Winterms. It's also priced similarly, at £269 ex VAT, for which you get the ability to run up to four concurrent remote desktop sessions using built-in RDP and ICA clients. As you might expect, X-Windows support is also integrated into the Linux-based device, and there's a locally hosted Netscape browser with full Java support.

As with the CE .Net Winterms a Geode processor powers the 5125SE, supported in this instance by 32MB of Flash memory and 64MB of D-Ram. Network connectivity is provided for by an integrated 10/100Mbits/sec Ethernet controller plus there's support for 802.11b wireless networking, although you do have to plug in a USB adapter to take advantage of this. Maximum video resolution is 1,280 x 1,024, but only with 8bit colour. In addition, 16bit support is available at 1,024 x 768 and if you need better there are other Linux-based models that go beyond this.

As with the Windows thin clients it's possible to customise the local configuration to go straight to a specific application rather than the desktop. The Linux software can also be customised and extra applications and device support added. As with all Thinterm products, the 5125SE comes with Wyse Rapport software for remote management and imaging.

You'll notice, of course, that the examples here are all desktop products to which you need to add a monitor of your own choice. However as an alternative it's possible to get thin clients built into a monitor, reducing the number of desktop components required. Similarly thin clients are available that support touchscreens, eliminating the need for a keyboard or mouse in kiosk deployments. Increasingly, too, vendors are offering tablet-style thin-client devices with wireless networking for true mobile working.

Who needs it?

Finally, it's just worth taking a step back from the technology itself, to examine the market for server-based computing in general and say a few words about the kind of organisations that can benefit from what it has to offer.

After several years in the doldrums the market for server-based computing is suddenly being rekindled and, according to most analysts, that's as a result of two key developments. The first is the recent recession in the US and elsewhere, which has caused companies everywhere to look for efficiencies and reduced IT costs. The second is a heightened awareness of the need to protect IT resources from all manner of external threats in the wake of 11 September and high-profile virus and worm attacks.

Server-based computing saves money on hardware and manpower, and it adds a level of resilience not available with conventional desktop PCs, enabling companies to recover from disasters very quickly indeed. The technology enables IT managers to get off the upgrade and patching merry-go-round and focus their security efforts more effectively on central server resources rather than individual desktops.

As far as vertical markets are concerned, education is often cited as a prime example, but that's not just because of the cost advantages. Rather it's the ability to lock down and protect desktops from student interference that makes server-based computing ideally suited to such environments. The same applies to the healthcare market and to manufacturing, where computer terminals need to be shared by users with differing levels of expertise. It also suits the conferencing and exhibition markets, where terminals are left open to access by all and sundry.

In fact it's hard to think of an industry that couldn't take advantage of what server-based computing has to offer. It may not meet the needs of the home user but it can be used by teleworkers, is a good solution for branch office setups and is equally suited to small business use as it is to large enterprise deployment. It's unlikely to ever push the PC off its perch completely, but server-based computing delivers on its promises, can solve an awful lot of problems very quickly, and is worth looking into no matter what your industry or IT needs.

Linux-based thin clients such as the Wyse Winterm 5125SE can be cheaper than Windows-powered equivalents yet are based on the same hardware with similar functionality

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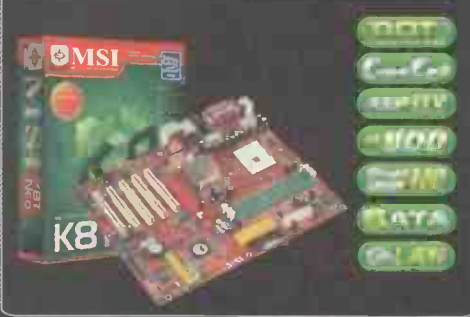

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Hands on

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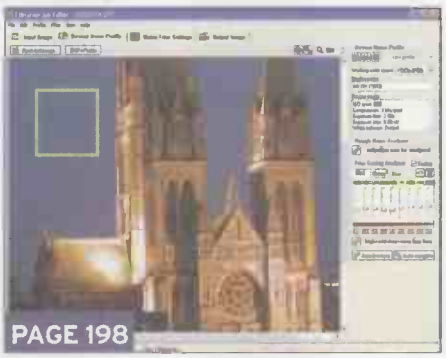
Find out how to reduce the noise in small form factor PCs in this month's Hardware column



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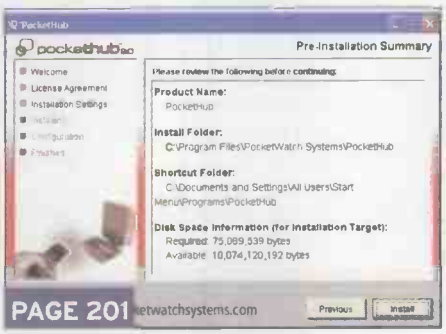
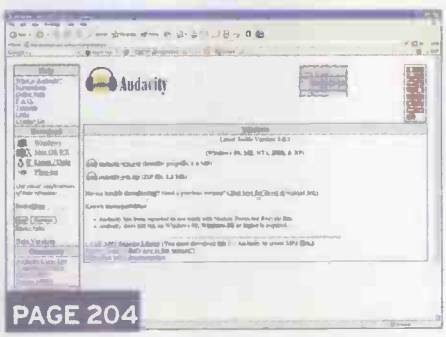
There is a range of solutions to help you remove digital noise from your images



PAGE 201

Find out how to control your PC from your mobile phone without the need to upgrade



PAGE 204

You can change and customise your computer's XP system sounds – we show you how

This month, Hands on covers a wealth of tips, tricks and information. Kicking off the fun, Gordon Laing tracks down the controls and designs to make a realistic replica control panel to use with his arcade game emulator.

It's not just Hardware where we take a look at the unusual, either. Tim Nott investigates the case of the hungry mouse in Hands on Windows, as well as presenting 10 obscure tips, while in Word processing, he has to deal with a space that appears to have mystical properties, and the shortcomings of password-protected documents.

Windows 2000 users can find out more about security from Terence Green as well as a tool for removing the Blaster worm, while in Windows XP we take a look at what's coming up in the next service pack and how to make sense of the built-in firewall. We also answer a popular question: what exactly is the prefetch folder for?

The Office Assistant and its animated paperclip is loathed by many, but did you know you can use it to help prompt users when they fill in your spreadsheets? Stephen Wells explains how, while in Sound, Niall Magennis looks at updating the sound schemes in Windows for a sonic makeover.

Noise – of a different sort – is the issue in our Digital imaging column, where Ken McMahon explains how you can eliminate the inevitable glitches that crop up in digital photography. And if you're looking for ways to catalogue images in a database, Mark Whitehorn reveals that Dos can still have its uses. He also looks at conditional calculations and revisits a problem with attributions.

In the wireless world, Guy Kewney looks at controlling your PC from a mobile phone – without upgrading to the latest smartphone – and discovers where you can find 30MB of storage for your crucial files, absolutely free.

Over in Linux, Barry Shilliday fills you in on any information you've missed about links, and looks at the basics of file manipulation, while Alan Stevens investigates sharing a net connection.

Visual programming takes a look at Java and SQLite under OSX, and the new version of Jbuilder, while in Web development you can find out about syndication using RSS.

And, as usual, we have four pages of your questions and answers, and you'll find the contact details for each of our contributors on page 179. Drop us a line – we're all here to help.

Nigel Whitfield

Advice from our experts

Our Hands on experts answer your questions and solve your problems

Word processing

Q I'm using Lotus Word Pro and the Insert Date box always opens with 'Today's date (system)'. Can I fix it to open with 'Today's date (static)?' And preferably in the long form, with the month spelled out.

Alec Whitfield

A We don't think it's possible to modify the default behaviour of the Insert Date command, but it's easy enough to create your own script to do this. This seems to do the trick

```
Sub StatDate
        sd="dddd, dd mmmm ✓
yyyy"
        .text.inserttext ✓
Format(Now(),sd)
End Sub
```

(Key: ✓ code string continues)

Change the value of sd to suit the format you want – the above gives 'Sunday, 29 February 2004', for example. You can then attach the script to an icon and add that to a Smarticon bar.

Q I have designed a logo in Word and I would like to save it in the computer and retrieve it by pressing Shift & l. How do I do it?

Patrick Nkenga

A Saving the logo is not a problem – just select it, then go to Insert, Autotext, Autotext and type a shortcut into the 'Enter Autotext entries here' line. You can't use Shift & l, as that's already in use, but you could type in 'lg' then click the Add button. Then whenever you type lg followed by F3, your logo will appear.

Q I have been trying for some time to work out how to make a macro run whenever Word 2000 is started. The reply to Doug Harris' problem (February 2004 Hands on) brought forth your response about Autoexec or Autonew macros in Normal.dot. I have found in Word Help that you can stop these by holding down the Shift key when you start Word, but what do I need to do to make a macro run automatically in the first place?

Steve Kirby

A You give it the 'sub' the name Autonew or Autoexec. For example, if this macro is stored in Normal.dot, it will run every time you start Word:

```
Sub Autoexec()
MsgBox "Hello World"
End Sub
```

If you save this rather more useful macro in a template named Letter.dot it will only run when you create a new document based on that template.

```
Sub Autonew()
ChangeFileOpenDirectory ✓
"C:\My Documents\Letters\"
End Sub
```

Unlike the first macro you don't get a silly message, but when you go to save the new document, you'll already be 'in' the specified folder.

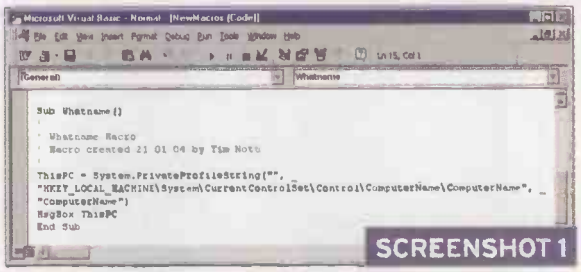
Q Is it possible to retrieve the computer name for use by a macro in Word 97/Windows 98SE? I would like to include an 'IF' statement in the Autoexec macro which checks which machine it is running on. How can I assign the Computer Name (as stored in the Registry) to a variable?

Michael Cooke

A It is possible, and this snip of code should get you started:

```
Sub Whatname()
ThisPC = System.✓
PrivateProfileString("", ✓
"HKEY_LOCAL_MACHINE\✓
System\CurrentControlSet✓
\Control\ComputerName\✓
ComputerName", ✓
"ComputerName")
MsgBox ThisPC
End Sub
```

Note that the underscore characters (preceded by a space and followed by a Return) in screenshot 1 are used to denote the continuation of a logical line of code, so everything from 'This PC...' to '...ComputerName")' is a single instruction. In addition, you can't make breaks this way within a string, ie, inside sets of double quotes.



What's my name – getting it from the Registry

Q A document I produce each week has to be produced in Bookfold format, which means I have to use Word 2002. But since I'm still using Windows 98 my computer takes much longer to load this and for everyday use I'm far happier with Word 97 which I have used for years. I have tried installing 2002 into a separate folder, away from the Program Files\Microsoft one, but my templates (especially one which opens a new document with my personal logo, address and the date) insist on opening in 2002, even though I have tried altering this in 'File options'. Is there any way I can keep these two versions of Word separate – just using 2002 for the Bookfold document and 97 for everything else?

Robin Baxter

A It's perfectly possible to run more than one version of Word, but you can only use the 'New Office Document' menu shortcut, or the 'New' command from a .dot right-click menu to access one of them – normally the later version. The trick is to create a shortcut to the earlier Winword.exe file and start Word 97 from that. If you then go to Tools, Options, File Locations, you'll find you can specify a 'User Templates' folder for each version of Word, or use the same folder.

Databases

Q We are using a set of identical Access databases and emailing them between us to co-ordinate the data. The problem is that the files are getting very large. When we zip them they become tiny. What's with all of the wasted space?

Sarah Richardson

A Access allocates disk space for certain operations that is not automatically reclaimed; over time this can lead to the bloat that you are experiencing. Just select, from the menus, Tools, Database Utilities, Compact and Repair (see screenshot 2). In some cases this can produce quite dramatic results – reducing files from 7MB down to about 400KB. It can also have the side effect of speeding up the database. We have found this utility to be very reliable, but wise people would still take a backup before running the utility.

Hardware

Q I have a Gigabyte GA-7DXE motherboard – how can I find out which USB version it supports?

Raj Bhaskar

A Check the manufacturer's website first. Gigabyte's website at www.gigabyte.com.tw, says the GA-7DXE has a pair of USB 1.1 ports on the back, and headers for an extra pair of USB 1.1 ports. So it doesn't have USB2, but you could always fit a USB2 PCI card. Depending on the card and its drivers, you may need to be running Windows 2000 or XP to support the full speed of USB2.

Q Can I connect a full-sized PCI card to a laptop? I'd like to capture astronomical video using a Matrox Meteor PCI card, and with a laptop, I can do it all in the field.

Malcolm Currie

A A handful of laptops have optional docking stations with PCI slots, but these are increasingly rare, as most high-speed peripherals are now connected using USB2 or Firewire ports. Several analogue video capture devices connect to a USB port, and you could consider these. That said, live video capture may be too demanding for a laptop under battery power, and the last things you want are dropped frames or other technical hitches.

For ease of use and sheer capacity in the field, most video astronomers record camera footage directly onto tape, then get it onto their computers later. Mini-DV recorders are a good option as they deliver excellent-quality, frame-level editing and perform the analogue-to-digital conversion for you; the recorder can then be connected to a computer using Firewire, which eliminates the need for a capture device. While standalone battery-operated Mini-DV recorders are available, a more flexible option could be to use a Mini-DV camcorder equipped with analogue-in ports.

Q I have a motherboard without a games port. Is there a way to get one via a USB adapter?

Sakari Heinonen

A USB adapters with 15pin game ports are available from specialist suppliers, but they're only necessary if you've got old 15pin devices you'd like to connect. New joysticks and Midi adapters are now available with USB interfaces, eliminating the need for the traditional 15pin games port. Another alternative is to fit a PCI soundcard, as many (particularly older) models feature 15pin games ports as standard.

Windows 2000

Q When I select Shutdown my PC restarts. I had this problem with Windows 98SE and am I eliminated it by stopping fast shutdown.

Graham Lay

A A rogue driver can cause this – had you installed any hardware or software when this started happening? Known causes include CD and anti-virus software. If you disable 'Automatic reboot' in Control Panel/System/Advanced/Startup and Recovery (see screenshot 3), and leave 'Write an event to the system log' enabled, you may either find a relevant event in the event log, or see a stop error identifying the culprit when you shut down.

The other cause is more common. As your PC used to run Windows 98SE the Bios may be set to Advanced Power Management (APM). If you look in Device Manager and see Standard PC, open the Power Options Control Panel and disable APM. If this resolves the problem you may be able to effect a more acceptable fix by updating the Bios.

If it is a power management issue, find out if your PC Bios supports ACPI. If it does, convert Windows 2000 to ACPI. First enable ACPI in the Bios then – the order is important – upgrade Windows 2000 in situ following the instructions in http://support.microsoft.com/default.aspx?id=237556. This won't affect data and settings but will upgrade the Hardware Abstraction Layer. Article 237556 describes how to convert from ACPI to Standard but it works either way. Do not switch the Bios from APM to ACPI and then reboot Windows 2000, and do not try to convert to ACPI by switching from Standard PC to ACPI in Device Manager.

Spreadsheets

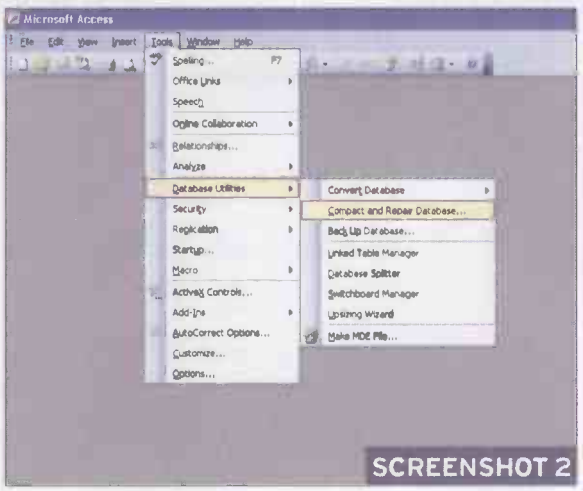
Q I want to create reference numbers out of a current date. If the date in cell A1 is 3/11/04 the number in A2 would be 04308 derived from the 308th day in year '04.

Vince Lopez

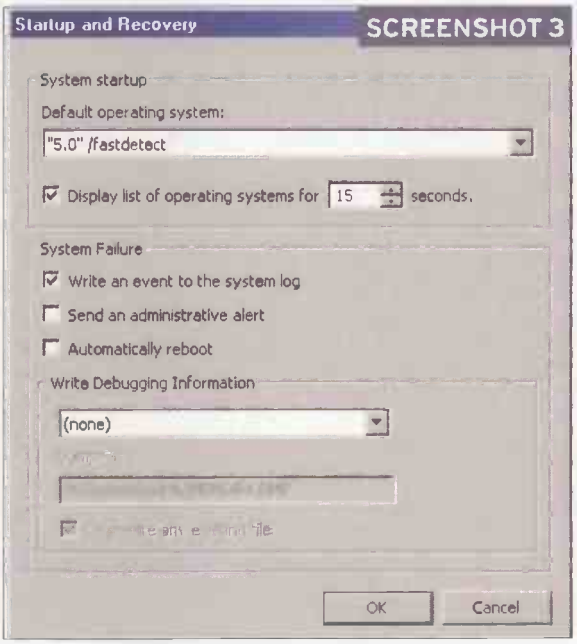
A You can enter the current date in A1 using Ctrl &; (semicolon). Then in cell A2 enter the formula:

```
=TEXT(A1,"yy")&TEXT((A1-
DATEVALUE("1/1/"&TEXT
(A1,"yy"))+1),"000")
```

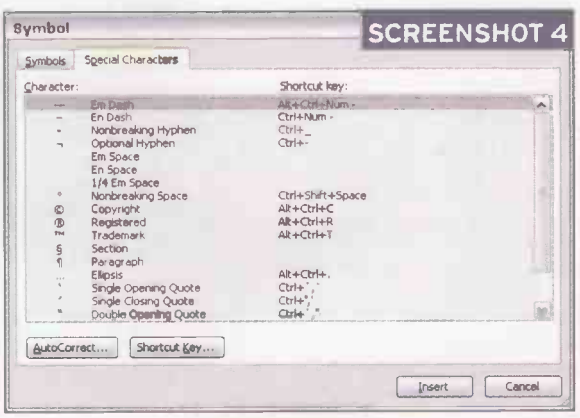
For more special symbols see screenshot 4.



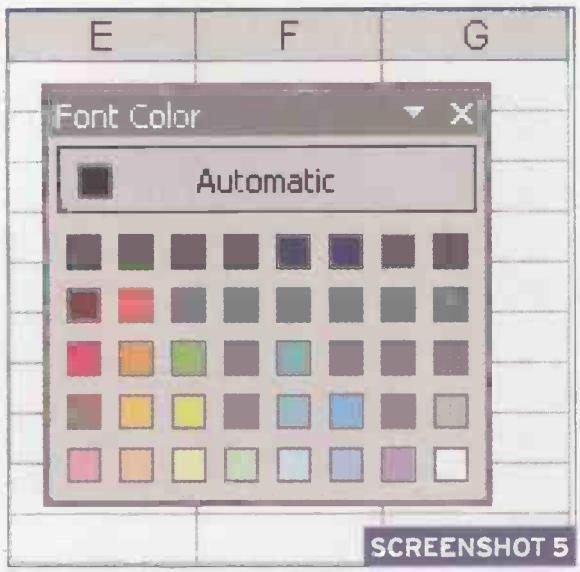
Compacting your database can save a lot of disk space



Disable Auto Reboot to diagnose startup and shutdown problems



Those strange symbols explained

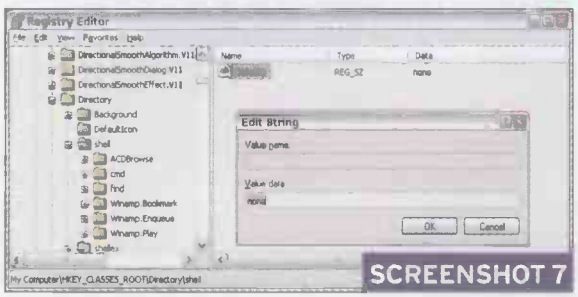


A colour palette becomes a Floating Toolbar

	A	B	C	D
1	Dates	London	York	Norwich
2	22/09/2002	Charles	Debbie	Iris
3	22/11/2002	Debbie	Frank	Charles
4	22/01/2003	Frank	Iris	Debbie
5	22/03/2003	Iris	Charles	Frank
6	22/05/2003	Charles	Debbie	Iris
7	22/07/2003	Debbie	Frank	Charles
8	22/09/2003	Charles	Iris	Debbie
9	22/11/2003	Iris	Charles	Frank
10	22/01/2004	Charles	Frank	Iris
11	22/02/2004	Debbie	Charles	Debbie
12	22/03/2004	Frank	Frank	Iris
13	22/04/2004	Charles		

SCREENSHOT 6

Analysing a roster for radiologists with array formulas



Stop Explorer searching instead of opening

Q Is it possible to keep a colour palette on the screen in Excel?

John Logan

A You can with the various colour palettes on the Formatting and Drawing toolbars. Try it with a Font Colour palette. Click its dropdown arrow and, right at the top, above the Automatic box, you'll see three faint horizontal lines. Drag these anywhere on your worksheet and Excel will create a floating toolbar which you can position wherever you want (see screenshot 5); you can even add other buttons if you like.

Q I prepare a roster for 16 radiologists who rotate through 12 hospital venues. How can I count how many times each radiologist has been to each venue and how many times a particular radiologist has been to a particular venue in 12 months?

Prem Moodley

A This example, which you can adapt and expand, shows four fictional radiologists and three sample venues (see screenshot 6). Name your data under each column heading: Dates, London, York, Norwich then enter:

```
{=SUM(IF(London="Charles",1,0))}
```

in another cell and show Charles has been in London five times. Use Ctrl & Shift & Enter to create the curly brackets as these are array formulas. See that Frank has been in York three times in the last 12 months using:

```
{=SUM(IF(York="Frank",IF(Dates>TODAY()-365,1,0)))}
```

Iris has been in Norwich three times in the last 12 months using:

```
{=SUM(IF(Norwich="Iris",IF(Dates>TODAY()-365,1,0)))}
```

Q What is the measurement used by Excel when row heights and column widths are displayed?

Tony Orsten

A These measurements hark back to traditional printing standards. Typographers measure in points and there are 72points to an inch. The default row height is 12.75 coming from 10point type plus the 2.75 points used for white space with 10point type. The default column width is based on the number of characters displayed in a cell in the font defined for the Normal style. If that font is 10point Arial then the column width will be 8.43.

Q I used to have a box on my Excel menu bar where I could enter a topic to find in the help files. But it's gone. How can I get it back?

Alban Leigh

A This is one of the least intuitive options in Excel. Click the Toolbar Options arrow at the end of any toolbar, then Add or Remove Buttons, then Customise. Or choose Customise on the Tools menu. This will display the box. To keep it displayed you have to right-click on the box and choose 'Show ask a question box'. Close the Customise dialogue box and you're in business.

Q If I select 'Save as web page' on the Excel File menu I can open a worksheet in Internet Explorer. But if I then display the code by choosing Source on the IE View menu I can't paste in an additional Java script. I get an out of memory warning. I've tried selecting Tools, Internet Options, Programs and changing the HTML editor from Notepad to Word but it doesn't solve the problem.

Jon Bell

A The Wizard that creates a web page from a worksheet generates a lot of code. Copy the source code for the page to the Clipboard and paste it into a blank Word document. Save this as a text file and, in Microsoft Explorer, change the file suffix from txt to htm.

Digital imaging

Q I own a Sony DCR-IP7E camcorder which uses the MicroMV format and, although the Movieshaker software which came with the camera is OK, I would like to try something a bit more advanced.

Upon reading your review (*PCW* February 2004), I decided on Ulead's Videostudio 7, however it doesn't appear to support the MicroMV format. Could you suggest a product which is quite simple to use but a bit more advanced than the Sony Movieshaker software and is compatible with my camcorder?

Chris Nixon

A Ulead Videostudio 7 does indeed support capture from MicroMV camcorders. Alternatively, Pinnacle Studio 8 (or the recently released version 9) also supports MicroMV capture, but we've read reports on the Pinnacle user forums that it can be a bit problematic.

Q My JVC DVX camcorder has no Firewire. I assume I will need a video capture box to enable me to get video from the camcorder and from

old VHS tapes onto my laptop's hard drive in order to use the video-editing software. Could you recommend a capture box that I can use with Ulead Videostudio 7 or Microsoft Windows Movie Maker 2, which you recommended in your group test?

Graham Ramsden

A All you need is an inexpensive USB capture device like the Pinnacle Linx USB Plus. The Linx has both composite video and S-video connectors as well as stereo audio inputs. We've tested the Linx using both Videostudio 7 and Windows Movie Maker 2 and got good results with both. Pinnacle has discontinued the Linx, but you can still pick them up on the web for less than £50.

Windows

Q How can I make sure that when I double-click a folder it opens up instead of starting the XP Search function? When I right-click on a file the dropdown menu has 'Search' at the top and 'Open' is second or third.

John Longbottom

A This involves a bit of Registry editing, so make sure you have a recent System Restore point. Start, Run REGEDT32.EXE. Go to HKEY_CLASSES_ROOT \Directory \shell. Double-click on the 'Default' value in the right-hand pane, and change its Value data to none. Close the Registry Editor, and folder behaviour should be back to normal (see screenshot 7).

Q I want to reformat the hard drive and install Windows XP. I have many programs and reckon it will take about three days to set everything up. I want to split the disk into three partitions for Windows, programs, and data, so if I have to reinstall Windows again I will save a lot of time by just reformatting the first partition and reinstalling Windows. Will I be able to run the programs if they are not on the same partition as Windows?

Colin Moon

A You'll be able to run them, but if you reformat the Windows partition you'll have to install them all again, as things such as Registry entries, common files and other settings will be lost.

Q The virus Lovsan.A has attached itself to a file on my Toshiba laptop. The file name and path is C:\System Volume Information \-restore{C1CCD08C-8F31-41E2-AD90-3EC48D37B729} \RP32\A0008316.exe. I am using the free version of AVG anti-virus on Windows XP Home. I regularly update both AVG and Windows XP. All attempts to run AVG to remove the virus have proved futile.

Emmanuel Kwandahor

A You have removed the virus from your system, but there is an infected file lurking in a System Restore Point, which is beyond the reach of some virus checkers. Unless you restore your system to this point, the infected file will be confined there, like a staked vampire, and will eventually be removed for good when that System Restore Point falls off the first-in, first-out cycle. You can consign it to oblivion instantly, by creating a new System Restore point, and then going to Disk Cleanup. Click on the 'More Options' tab, and click the 'Clean up' button in the System Restore section. This will remove all but the last Restore (the one you just made) and with them, the quiescent virus (see screenshot 8).

Q I inadvertently took the option to 'remove unused desktop icons' on my laptop (Vaio with XP Pro). Can I get them back easily? Can I turn off this ludicrous 'feature'?

Jim Livesey

A On your Desktop, you should find a folder named 'Unused Desktop Shortcuts'. This is where your icons have gone. To stop this happening again, go to Control Panel, Display, Desktop, and click the 'Customise Desktop' button. This will reveal an option to stop the Desktop Cleanup Wizard running unbidden every 60 days (see screenshot 9).

Q The excellent article in the March 2004 *PCW* on cleaning out your computer didn't mention all the extra files that Windows Update puts onto one's computer, in particular the multitude of folders starting '$NtUninstal...'. Is it safe to delete these?

Mike Hounsome

A These folders contain the files needed to undo Windows XP hotfixes. If you look in Control Panel, Add/Remove you'll see that the numbers after $NtUninstall...' correspond to entries for Windows XP Hotfixes. If you delete one of these folders you won't be able to 'roll back' the corresponding Hotfix, though it will still be shown in 'Add/Remove'. However, if you try to remove it, Windows will report that this can't be done and offer to remove the redundant entry.

Remove all but the last restore point

Leave my desktop alone!

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address below:

Databases:	database@pcw.co.uk
Digital imaging & video:	digitalimaging@pcw.co.uk
Hardware:	hardware@pcw.co.uk
Networks:	networks@pcw.co.uk
Sound:	sound@pcw.co.uk
Spreadsheets:	spreadsheets@pcw.co.uk
Linux/Unix:	linux@pcw.co.uk
Mobile computing:	mobilecomputing@pcw.co.uk
Visual programming:	visual@pcw.co.uk
Web development:	webdev@pcw.co.uk
Windows:	win@pcw.co.uk
Windows 2000:	win2000@pcw.co.uk
Windows XP:	xp@pcw.co.uk
Word processing:	wp@pcw.co.uk

Please do not send unsolicited file attachments.

Gordon Laing
has been a hardware enthusiast ever since his first Sinclair ZX80 and, as a former editor of *PCW* and contributor for over 10 years, what he doesn't know about technology isn't worth knowing

Quiet Shuttles and authentic arcade kit

How to silence a small form factor PC, and build an arcade machine you'll be proud of

Shuttle is by far the largest manufacturer of small form factor systems and offers a variety of solutions for both Intel and AMD platforms. Shuttle's XPC range features a vast array of connectivity and device support, while the latest models have also addressed earlier concerns over noise levels. But what if you own an older model?

In last month's Hardware column I explained how I replaced the whiney internal cooling fan of an old Shuttle SB51G XPC with a large external fan and funnel which proved to be a highly effective combination. Sadly, my attempts to fit a quieter cooling fan in the SB51G's cramped power supply proved fruitless, but now Shuttle has a simpler answer, first seen in its recent ST61G4 model.

While the main cooling fan on the ST61G4 is slightly quieter than on previous XPCs, the major improvement in reducing noise levels is down to an entirely new power supply. This new PC40 Silent-X PSU (pictured below) can deliver 250w of power compared to 220w on the older PSUs, while operating at a maximum noise level of 32dB. During operation under lower loads, the fans in the PSU decelerate and run much more quietly than the older models.

At the time of writing, only the ST61G4 XPC was fitted with the PC40 as standard, but the good news is the PSU is now available as an upgrade for owners of earlier G or G2 series XPCs. Having recently tested the high-end SB75G2 XPC (pictured above), I decided to try it out for size and sound.

Opening an XPC reveals the compact PSU on the right side of the unit as you face the front panel. As with other aspects of the XPC construction, at first glance it looks like being a little cramped, but in practice it's very well thought out. Since Shuttle designs the PSU for use with specific cases and motherboards, it knows exactly how long each cable needs to be. The two motherboard connectors, for instance, are located close to the PSU and hence only need short cables. The drive power cable can also neatly be routed up and round the inside back of the case into position; there's also a serial ATA (Sata) power plug for anyone using a serial ATA disk.

Shuttle's SB75G2 XPC is a small form factor system using Intel's high-end 875P chipset for Pentium 4 and Celeron processors

Shuttle's Silent-X is a new power supply for its XPC barebones systems which runs much more quietly than the previous model. It's fitted as standard to the ST61G4, but is also available as an upgrade for older G and G2-series XPCs

The PSU itself is secured in place by three screws on the outside and, thanks to the thoughtful cabling, the new model is very quick and simple to replace; it took me about five minutes. When I powered it up there was an immediate audible difference, with the high-pitched whine of the old PSU significantly reduced. As with all quiet modifications though, you subsequently notice other components making more noise than you'd like. In my particular configuration it was now the graphics card cooling fan that was making the most sound.

There are a handful of graphics cards with passive, fanless cooling, which should be selected for the ultimate quiet PC configurations. Alternatively, QuietPC sells a number of hefty replacement heatsinks for passive graphics cooling, although they're all too big to accommodate in a Shuttle XPC (www.quietpc.com).

As with the best PC projects, though, this is a work in progress which I'll return to once I find a better solution. In the meantime, owners of Shuttle G or G2-series XPCs who fancy a quieter life should invest in the PC40 Silent-X PSU, available for around £42 ex VAT from specialist suppliers such as Kustom PCs (www.kustompcs.co.uk).

Speedy memory

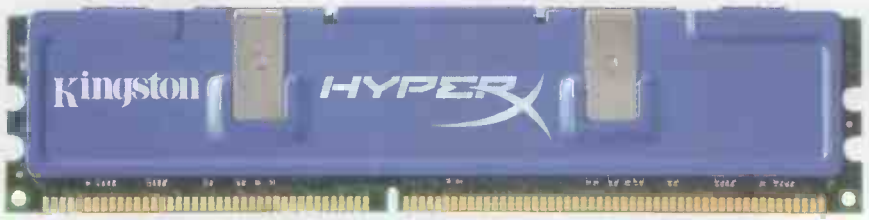
Like all PC components, memory is steadily increasing in speed. The latest DDR modules from premium manufacturers such as Kingston run at impressive speeds of up to 533MHz (see picture opposite), but who needs it when the fastest standard P4 processors are happy with 400MHz memory? The answer is enthusiasts and gamers who push their systems beyond standard specifications for the best performance. While this memory is guaranteed to run at these high speeds, your other components won't be, so doing so will invalidate your warranty and is done at your own risk.

Ideally your memory should run at the same bus speed as the processor, described as a CPU-to-memory ratio of 1:1. For example, the Intel P4A, P4B and P4C or Prescott processors use a bus speed of 400, 533 and 800MHz respectively but, since they use quadruple-data-rate technology, their actual external front-side buses (FSBs) are running at 100, 133 and 200MHz. Since DDR memory uses double-data-rate technology, the matching modules for these processors would be rated at twice these FSB speeds, so 200, 266 and 400MHz respectively.

So far so good, but overclockers push their processors beyond specification by increasing the FSB. While 400MHz DDR modules provide plenty of headroom when overclocking P4A and P4B processors, they're already operating at a ratio of 1:1 for the latest P4C or Prescott processors. Consequently, anyone wanting to overclock a P4C or Prescott processor, while maintaining a CPU-to-memory ratio of 1:1 will need DDR modules rated faster than 400MHz.

Enter the higher-rated 466, 500 and now 533MHz DDR modules, rated for FSBs of 233, 250 and 266MHz, and offering plenty of overclocking headroom for P4C or

Prescott processors. I recently tried out a pair of Kingston Hyper-X modules rated at 500MHz and found they were ideal when overclocking a 2.4GHz Pentium 4C processor to 2.58GHz in a Shuttle SB75G2. In forthcoming issues we'll be publishing benchmark results for a number of overclocked configurations. In the meantime, for more information on Kingston Hyper-X memory, visit www.kingston.com/hyperx.



Kingston's Hyper-X is some of the fastest DDR memory around. The latest modules are rated to speeds up to 533MHz, and are therefore ideal when overclocking Pentium 4s with fast bus speeds

Compact Flash booting

Back in the December 2003 issue I looked into the practicalities of building a diskless PC which booted from a Compact Flash (CF) memory card. While a hard disk will always be top dog in terms of capacity and price-per-MB, the key benefits to booting from a memory card include tiny size, silent operation, low power consumption, mechanical reliability, and a low cost of entry for modest capacities. It's no wonder a steady stream of PC enthusiasts continues to wonder whether it's a practical option for them.

The downsides to using a memory card far outweigh their benefits for traditional installations. Once you've installed a modern operating system and applications, you'll need several gigabytes of storage, which both exceeds the capacity of today's largest memory cards and would still prove prohibitively expensive even if you could squeeze on a minimum configuration.

There's also the thorny issue of lifespan, with most memory cards supporting far fewer write cycles than hard disks, which are designed for constant access. Consequently if you allowed Windows to use a memory card for its virtual memory swap file, you would send it off to a very early grave.

So booting from memory cards is not a sensible option for traditional installations, but what about untraditional ones? In December's Hardware I showed you how to install Dos 6.22 onto a PC booting from a modest 128MB CF card, and found it worked without a hitch. Requiring just a few megabytes of space and not using virtual memory, Dos seemed to be the perfect OS for a memory card installation. Since CF conforms to the standard IDE specification, it requires no drivers or anything clever to get it working – just a simple CF-to-IDE adapter, which I bought from www.cfide.co.uk for £19.99. Your PC and OS will treat it just like a normal, albeit a small hard disk.

The next step is to find some useful applications which run under Dos, such as early games or office applications. One particularly novel suggestion made in last month's issue came from David Keppler, who installed Dos and a Psion Series 3a emulator onto a CF card which he fitted into an old notebook, giving it a new lease of life – see www.foxpop.co.uk/hintstips/psion4.htm for more details.

As a fan of old arcade machines, my ideal Dos application was the superb Multiple Arcade Machine Emulator (Mame), which allows you to play perfect versions of your old favourites – see www.mame.net for more details. I documented the software side of this project back in December but promised I'd return to build some proper arcade controls to do it justice.

'It really is possible to build your own arcade machine that has an authentic look and feel with relative ease'

Arcade Controls for PCs

The most exciting thing about discovering Mame today is the countless enthusiasts who've been there before and solved just about every single problem you can think of. The numerous websites and forums dedicated to Mame show you how to build your own cabinets or integrate a PC into a second-hand arcade machine, even using its ancient monitor and controls. There are even entire sites packed with original artwork to adorn the exterior of your machine. Two ideal starting points on the web include www.mameroom.com and www.arcadecontrols.com.

While my ultimate long-term goal is to build a full-size cocktail arcade cabinet, domestic constraints forced me to downsize my first project to something more modest – just the control panel itself. The idea would be to use my PC, monitor and speakers as normal for running Mame, but to pop the control panel on my desk when it came to playing games. There are, of course, many decent control panels commercially available, but the only way to match the true look and feel, not to mention the scale of an old arcade machine is to refurbish an original or build one yourself.

My project may only have been to build the controls, but it involved much more than just sticking a few buttons on a plank of wood. Beyond the sourcing of artwork and suitable controls, I had to find an appropriate way of interfacing them with my PC and the Mame software. At this point I'd like to thank John Grave-Yard who emailed with some useful tips and contacts following December's article. What follows may be tailored to arcade controls, but involves several techniques which could prove useful to anyone who is building a custom PC.

The goal

Getting the control panel right is arguably the most important part of building the arcade cabinet. The goal is to closely emulate the look and feel of an old machine while still offering the flexibility to play different types of games if desired. The websites mentioned earlier are packed with numerous designs which incorporate the multitude of buttons, joysticks and trackballs required to play the largest variety of games, but I thought I'd go for a more purist approach. My absolute favourite game as a kid was Defender by Williams, and this would be the control panel I'd try to recreate.

Anyone who played Defender might recall that it had one of the most complicated control panels around. There might have only been a single joystick for up and down movements, but it was accompanied by no

Authentic arcade buttons are the icing on the cake of an emulator and cabinet project. These ones come in five colours and cost just £1.40 ex VAT each

fewer than five additional buttons, not to mention an extra pair to select one- or two-player games. Since these had to be positioned in a very specific layout, my initial step was to locate photos of the original machine as a reference.

My first stop was www.arcadewarehouse.com which sells refurbished original machines with photos of many, but I couldn't believe my luck when I later stumbled across a website which had high-resolution artwork to download, including one for the Defender control panel. This gem is at www.arcadecollecting.com/caga, and also includes artwork for marquees and bezels.

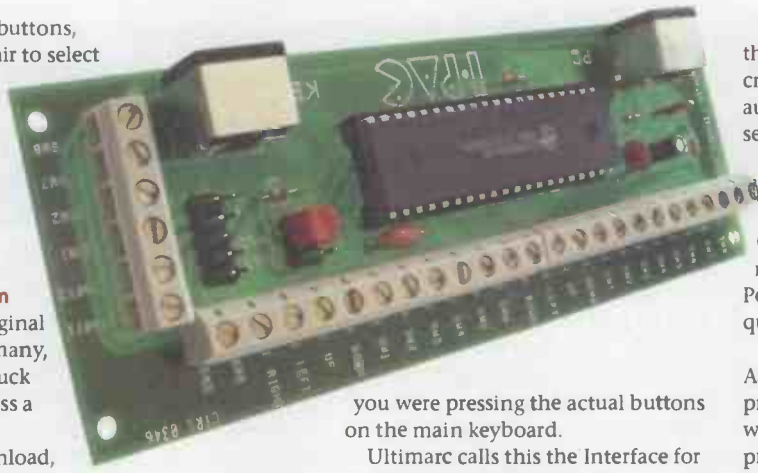
My plan was to use the Defender control panel artwork as a template for the entire construction. I'd print it out in colour on photo paper, then effectively build a wooden box around it, drill holes in the right places for the buttons and joystick, then prepare a sheet of clear Perspex to go over the top for protection.

Buttons and joysticks

Before building the unit itself I needed to source some buttons and a joystick, and feared I'd have to import some from the US or even Japan for authenticity. Fortunately an excellent supplier can be found much closer to home in London: the appropriately named Ultimate Arcade Controls website (or Ultimarc for short) at www.ultimarc.com.

Ultimarc sells a number of authentic joysticks from £8 ex VAT, buttons in a variety of colours at £1.40 ex VAT each (see picture on previous page) and even a trackball for £22 ex VAT. Of particular interest to Mame projects were several circuit boards which essentially took care of the interfacing between the controls and your PC.

Mame uses the PC's keyboard to control games, which led many early console builders to simply tear one apart and wire the buttons and joysticks to the appropriate key locations. Ultimarc's considerably neater solution was to create a keyboard encoder circuit into which you wire all your buttons and joysticks. Pressing the buttons or wiggling the joystick would then generate the appropriate keyboard character; this effectively appeared to Mame as if you were pressing the actual buttons on the main keyboard.



The Ipac from Ultimarc connects to various arcade controls and generates keyboard character 'presses' for use with PC-based emulators

Ultimarc calls this the Interface for PC to Arcade Controls (pictured above), or Ipac for short – no relation to the range of PDAs from HP. The standard Ipac2 board is only a few inches long, but features 28 inputs and either a PS/2 or USB output. This number of inputs is enough to accommodate a wealth of controls for two players, while a 56-input version is available for four-player installations. The 28-input PS/2 Ipac costs £28 ex VAT and the 56-input version £46 ex VAT. There's also an Opti-Pac model for use with trackballs and spinners. I went for the 28-input Ipac with the PS/2 interface.

Ultimarc has also developed an AGP graphics card based on a Radeon 7000 designed to output the fixed 15KHz frequency required by classic arcade monitors. This is ideal if you want to fit a Mame PC into an old cabinet and use the original screen.

Construction

Now it was time to get my hands dirty and build the cabinet to house the controls. I planned to use an Epson Stylus Photo 1290 to print the artwork on an A3 sheet of photographic paper and trim it to size, before covering it with a cut-down sheet of A3 Perspex. The only problem was the artwork measured 20 x 60cm, which was 50 per cent wider than both my A3 paper and the common Perspex stocks of most art shops

A home-made control panel for playing games on Mame. The layout is modelled on the Defender arcade game, but works with other games too

I could have scaled it down, but the buttons would have been too crowded and, besides, I was after authenticity. So, rather than sticking several sheets of paper together, I fitted a roll of photographic paper to my printer and output the entire thing in a single piece. Cutting the MDF to fit as a base was no problem, but finding a piece of Perspex bigger than A3 proved to be quite a challenge.

Most art shops only stock A4 or A3 sheets of Perspex and, while professional suppliers may work with individual hobbyists, their prices can be very high. When asking art shops in London about larger sheets though, one name kept coming up: Hamar Acrylics at 238-240 Bethnal Green Road (there's no website, but you can phone them on 020 7739 2907). One call and a quick visit later, and Hamar had not only cut the right shape of Perspex for me, but even offered to drill the large holes for the controls, using my MDF base as a template. The total fee was just £12, and the job was perfect.

I then built a small box out of MDF with the control panel at the top, painted it black, slipped on the printed artwork, then placed the Perspex sheet on top; finally the buttons were screwed in and wired up to the Ipac circuit board which I'd mounted inside on some spare motherboard spacers. The Ipac is a doddle to wire up, as each input is labelled to correspond to a specific control in Mame, such as up, down, left and right.

Console city

Thanks to keyboard encoders such as the Ipac, proper arcade controls and websites with original artwork, it really is possible to build your own arcade machine that has an authentic look and feel with relative ease. The hardest part was finding a supplier of Perspex, but after that it was a fairly simple DIY and wiring job.

The end result (pictured left) may not be the slickest example of woodworking around, but I'm delighted with it, and feel prepared to take on a full-size cabinet project once space permits. I'd certainly recommend anyone who loved paying old arcade machines to give it a shot. If you've built your own cabinet or are thinking of doing so, I'd love to hear how you've got on.

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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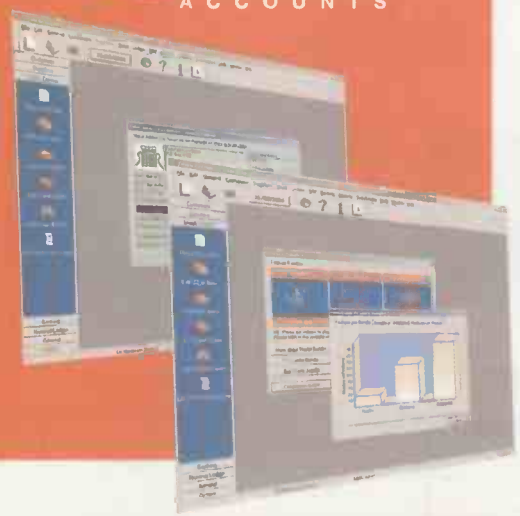

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is a full-time freelance journalist. When he's not writing about Windows and word processing, he tackles many other diverse subjects. He currently lives in France with his wife and family

Quick on the update

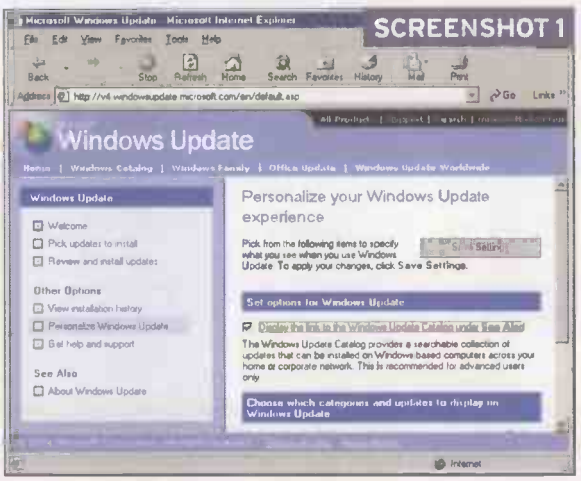
Some news on 98 support, storing update files and a top 10 of lesser-known tips

As previously reported in this column, Windows 98 was to have its life support system turned off on 16 January of this year. However, Microsoft announced on 12 January that the Extended Support phase for Windows 98 and 98SE would carry on until 30 June 2006. Windows Millennium (ME), slated for the chop at the end of this year, will also get Extended Support up to the same date.

During this period Microsoft, in its own words, 'will continue to offer paid phone support and review any critical security issues and take appropriate steps'. You can find full details at **http://support.microsoft.com/default.aspx?pr=LifeAn1**. Microsoft has taken this step to 'accommodate customers worldwide who are still dependent upon these operating systems and to provide Microsoft more time to communicate its product lifecycle support guidelines in a handful of markets – particularly smaller and emerging markets'.

So, is this an altruistic concession to those who can't afford to upgrade to XP? And do you believe in fairies, boys and girls? The Gartner research group clearly doesn't, as seen in a recent report: 'most of the population still running Windows 98 may be less motivated to make, and less able to afford, a quick move to XP and may be more interested in Linux'. The report, which you can find at **www.gartner.com/DisplayDocument?doc_cd=119336**, also reckons that 26 per cent of PCs, globally, are running Windows 98 or 98SE. So whether Microsoft's decision is a benign act towards old customers, or a pre-emptive strike to keep them out of the clutches of open-source operating systems, it looks like you'll be reading about Windows 98 in this column for a while yet.

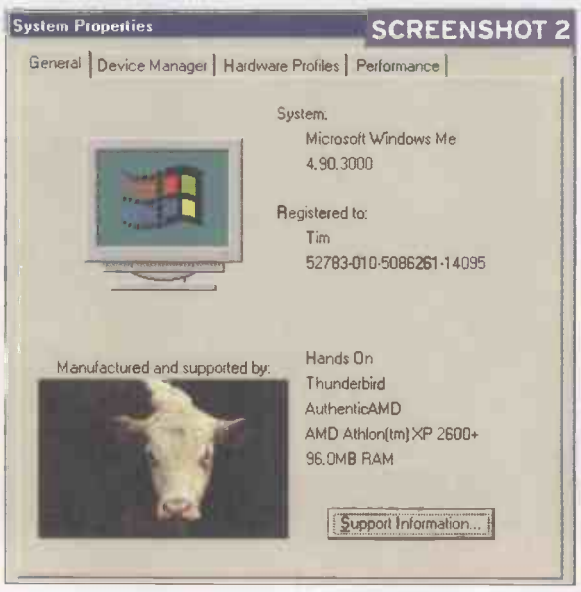
In which case it might be a good time to remind readers that you can collect and keep Windows Updates and Hotfixes for posterity. It doesn't matter if the PC you are using isn't the same as the PC you want the updates for: this works in Windows 98, ME and XP. First, connect to Windows Update. If you are running an older, un-updated version of Windows, you'll be prompted to update Windows Update itself. Having done that, under 'Other options' on the left of the screen, click on 'Personalize Windows update'.



Keep those update files for posterity

Now tick the option 'screen right' to 'Display the link to the Windows Update Catalog under See Also', then click the 'Save settings' button above (see screenshot 1). This, believe it or not, will give you a 'Windows Update Catalog' entry under 'See Also', 'screen left'. If you don't see it immediately, hit F5 to refresh the window. Now click on the 'Windows Update Catalog' and you'll find you can search for upgrades for Windows 98, ME, XP, 2000 and 2003 Server. Any upgrade you decide you want, you just add to the download basket: you can mix items from different versions. It's like online shopping, without the damage to the credit card. When you have what you want in the basket, you download the whole lot in one go – you'll be prompted for a destination folder and you'll have to consent to a licence agreement. After that it's just a question of waiting... depending on the number of files you've requested, the speed of your connection, and the performance of the Microsoft Update site. When we tried, the site was appallingly slow, so this might be a case of picking your moment.

Create your own System Properties info



You'll end up with a structure of folders under your chosen destination folder. At the top level you'll have one named 'WU', which will branch down through two more levels to meaningful folder names such as 'com_microsoft.windowsmillennium edition'. Inside each you'll see two more folder levels, the second of which will have a meaningful name, such as 'com_microsoft.Euro_Patch_5026', and inside each of these will be the Readme and Setup files for the patch. So, with time and patience it wouldn't be too difficult, for example, to create a CD-R with all the available Windows 98 or ME updates on it, and install them at will on any PC.

Of mice and Microsoft

What's grey, with a trunk? Easy – a mouse on holiday. But why is it phoning home, asked reader Kim Rixon, after being told by the firewall that 'C:\Program Files\Microsoft hardware\Mouse\point32.exe' is trying to contact 207.46.249.29:80. As Kim noted, having done a reverse DNS lookup, that address resolves to 'backup12.microsoft.com'. So it would seem to be doing something legitimate, such as checking for updates. Looking through the Registry on a PC with the Intellipoint software installed seemed to confirm this, as there is a key named HKEY_CURRENT_USER \Control Panel \Microsoft Input Devices \Mouse \AutoUpdate. This contains various values, and it seems that a count is kept of each time the machine is restarted after a certain interval. When the count reaches a trigger value, then presumably Point32.exe phones home to check for updates.

Lots of other applications do this, ranging from Real Player to the Google Toolbar, and usually it's possible to disable this from somewhere in the application's settings. However, I could find no such option in the mouse settings, and it's hard to believe that the pace of technological development

in mouse drivers is that frantic – especially as the Intellipoint files on this machine date from April 2002. To force the issue, I took the update count up to the trigger. It reset itself to zero, but nothing else happened. So, it was surprising to go to the Microsoft mouse website and find there was an update available, dated May 2003. Having installed this, the Autoupdate key vanished from the Registry. So I can say in all fairness that there was a causal relationship between the presence of the Autoupdate key in the Registry and getting the Intellipoint update, although probably not in the way Microsoft intended.

If you have version 4.n of the Intellipoint software, there's no rush to update: the only difference I found was that there's now a tab for battery state for cordless mice and you can do more things with the wheel, such as jump between windows. This last is an unannounced default state, so a rather fine practical joke Microsoft has played on us: press on the wheel and 'Hey! Where's my window gone?' There's a similar update for keyboards, again with a battery indicator. Installing this had the side effect of junking all our custom keyboard settings.

One thing I have noticed with the Microsoft wireless optical mouse is its robust appetite: to catch one, bait the trap with AA alkaline batteries. So I was interested to see on the same site (www.microsoft.com/mouse) that the latest models have '3x longer battery life'. Sticklers for grammar might object to the use of the comparative 'longer' without an object of comparison, but one would be forgiven for assuming that the implied object of comparison was 'our previous model'. However, the small print says this comparison is with a major competitor's and you can find an 'independent' report on comparison tests with two products from the no-prizes-for-guessing Logitech range.

Oldies but goodies

Just because a tip isn't new, it doesn't mean it's well known or not worth knowing. So here follows a top 10 of lesser-known tips from Hands on Windows through the ages.

• A shortcut with the command line 'mailto:' will start a new message in your default email program, whether or not it is running at the time. With Outlook Express, for example, if it isn't running you'll just get the 'New Message' window rather than the full caboodle of in- and out-boxes.

• Don't scroll through files in folders, file types, Registry entries and other alphabetically ordered lists – type. If you are looking at the fonts folder, for example, then typing 'tim' will take you to the first font whose name starts with those letters. Type fairly quickly or you'll be taken to the start of the T's, then to the I's and then to the M's.

• Here's a neat way to get a printable list of the fonts installed on your system. Run Regedit, and highlight the HKEY_LOCAL_MACHINE \SOFTWARE \Microsoft \Windows \CurrentVersion \Fonts key. Go to the Registry menu and Export Registry File. Choose 'Selected branch' under 'Export Range' and 'All files' under 'Save as type'. Choose a location and name with the .txt extension and hit the Save button. You'll get a plain-text file listing all the installed fonts by name, together with the corresponding file names.

• Give your fixed disk drives and partitions custom icons. First, catch your icon – let's call it myicon.ico – and copy to the root of the target drive, which we'll assume is C:. Next create a file in Notepad containing just two lines:

```
[autorun]
icon=c:\myicon.ico
```

Save this as autorun.inf, again in the root of the target drive. You may need to reboot to see your new icon.

• Don't bother to take aim at the middle window button if you want to toggle between full-screen and normal window: just double-click anywhere on the title bar.

• If you want to add that custom touch to your home-built machine, then here's how to populate the General tab of System Properties. Create a file in Notepad containing the following

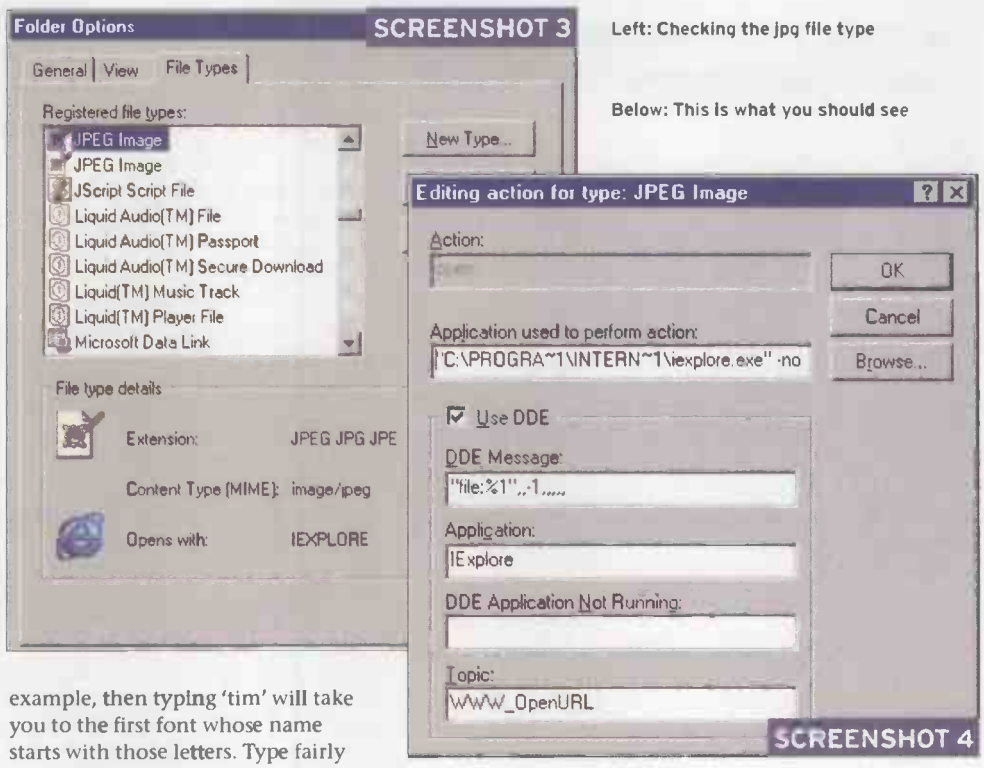
```
[general]
Manufacturer = Hands On
Model = Thunderbird
[Support Information]
Line1 = Phone hotline ↙
xxxxxxx
Line2 = Email hotline ↙
nnnnn@nnnnnn
Line3 = You can have up ↙
to ten lines of this
```

(Key: ↙ code string continues)

Save this in the Windows\System folder as oeminfo.ini, and you'll see the manufacturer and model information in System Properties, together with a button for 'Support Information' that will show the text following in a separate box. To Ice the cake you can add your own image to the box: keep it to 180pixels wide by 114 high and save it in Windows\System as oemlogo.bmp (see screenshot 2).

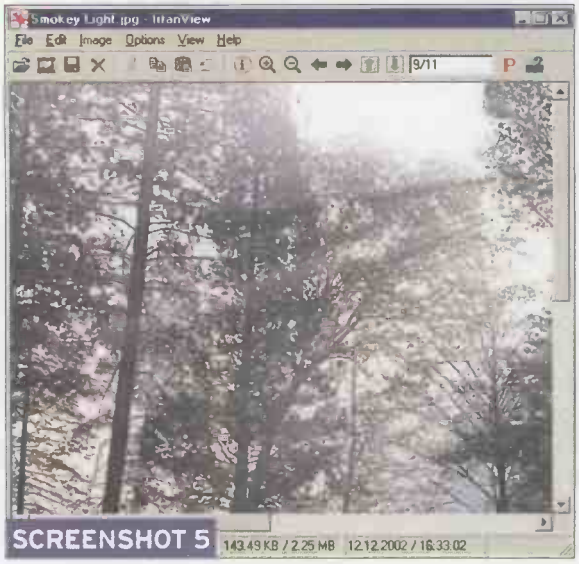
• Ever wondered what all those buttons in the scientific version of the Windows calculator do? Right-click and select 'What's this?' to get a short explanation.

• Create your own Windows boot screen. First get your image in .bmp format, 640pixels wide by 400 high and 256 colours. Now use your image-editing software to reduce the width to 320pixels without changing the height. This will 'squash' the image but don't worry. Save it in the root of C:\ with any name you like. Quit the image editor and change the name of the saved file to logo.sys, ignoring the warning. Reboot, and your image will greet you – stretched back into its correct proportions –



Left: Checking the jpg file type

Below: This is what you should see



SCREENSHOT 5

Free and powerful – Irfanview

instead of the standard Windows 95, 98 or ME start screen. If you want to revert to the standard screen, just delete the logo.sys file.

• If Control Panel, System, Device Manager doesn't quench your thirst for knowledge, type 'hwinfo /ui' into the Start, Run box. This will give you information about your hardware, its drivers and its Registry entries.

• Last but not least, if you're tired of right-clicking on a file, folder or other icon, then selecting 'Properties', hold down the Alt key and double-click, which does the same job.

Corner of weirdness

Regular readers will know that each month we endeavour to bring you news of bizarre Windows problems and their solutions. This month it's the turn of the disappearing Internet Explorer. Reader Jim Dick had been running Windows 98SE for three years, and, with a couple of memory upgrades, it did all he needed – apart from displaying .jpg files. When Jim tried to open these, he got a message saying that Windows couldn't find iexplore.exe. Which was strange, because there it was in C:\Program Files\Internet Explorer. After several exchanges of emails, we found the problem. Somehow the File Type entry for .jpg had lost the path to Internet Explorer. It's strange how the word 'Update' springs to mind at such times.

So, if you have the same problem, here's how you fix it. In Explorer or in any folder, go to View, Folder Options, File Types. Scroll down and select 'JPEG Image' – there should be two entries, and you want the one with the jpeg, jpg and jpe extensions shown (see screenshot 3). Click the 'Edit' button, and in the next dialogue select 'Open' in the 'Actions' list, then 'Edit'. On a working system you should see something like screenshot 4. If you're getting the 'can't find iexplore' problem, you probably will just see "iexplore.exe" –nohome in the 'Application used...' box. You'll need to add the path after the opening double-quote. By default this is C:\Program Files\Internet Explorer, and it is entered using the short, Dos-friendly form as C:\PROGRA~1\INTERN~1\. If your Internet Explorer executable is kept elsewhere, then you'll need to modify this. If you're not sure how to form the short path name, you can copy it from File Manager (Start, Run, Winfile.exe). We found that putting in the full path (in double quotes) also worked.

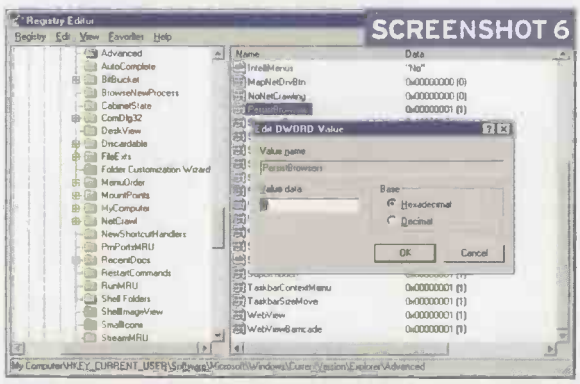
Windows ME has different arrangements for viewing jpgs and other image files: you should see rundll32.exe C:\WINDOWS\SYSTEM\SHIMGVW.DLL,ImageView_Fullscreen in the 'Application used...' box. It's also not compulsory to open jpg images in Internet Explorer: if you have any image-processing or photo-organising software installed, you'll probably find that jpgs – and other file formats such as tiff and bmp, open in that. If you don't have any image-processing software, but would like some, then get yourself a copy of Irfanview (see screenshot 5). It's very versatile as, in addition to every bitmap format you can think of, it also handles movie and sound files. It has some very powerful features: many professional photographers reckon that the Lanczos resampling filter that it uses for enlarging images beats anything that Photoshop has to offer. And, last but not least, it's free. You'll find it at www.irfanview.com.

Another strangeness linked to an IE update is the loss of the ability to remember folders that were open on shutdown and automatically re-open them on the next startup. Many people find this a pain, although others have learned to live with, and even to love, the feature. So, if you find that upgrading to IE6 has robbed Windows 98 or ME of this feature, here's how to bring it back.

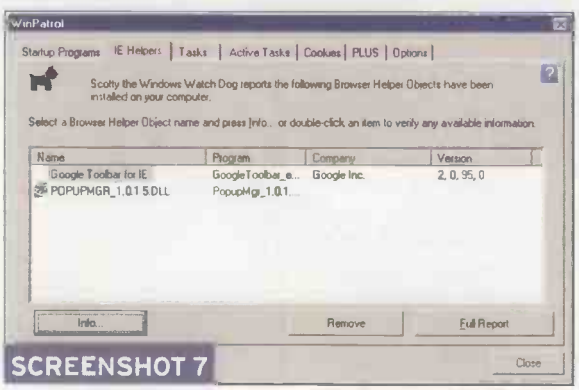
Having taken appropriate measures to back up the Registry, run Regedit and navigate to HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced. Create a new DWORD value, either by going to the Edit menu or right-clicking in the right pane. Give this the name 'PersistBrowsers'. Double-click on the new DWORD and set its value to 1. Close Regedit. The next time you shut down and restart Windows, any open folders will be remembered (see screenshot 6).

Top: Bring back the memory of open folders

Bottom: Scotty sniffs out your IE Helpers



SCREENSHOT 6



SCREENSHOT 7

Scotty on patrol

In February's column, I mentioned two utilities by Mike Lin (www.mlin.net), called StartupCPL and Startupmonitor, that help you control what gets loaded at boot time. Reader Geoff Harris raises the stakes in recommending Winpatrol (www.winpatrol.com). Although this has a rather jokey interface with Scotty the dog and Pinky the squirrel (don't ask) it does some rather useful things. As well as monitoring Startup items, it monitors cookies, additions to scheduled tasks and, most importantly, Internet Explorer 'Helpers'. I put the word in quotes as, although Helpers include things such as the Google Toolbar or pop-up stoppers, both of which are indeed helpful, they can also include things such as homepage hijackers, adware, spyware and other nasties, such as the very unpleasant Coolwebsearch that we looked at last month. Winpatrol works with Windows 95 through to XP. It's free though, if you are desperate to spend, there's a plus version that will tell you further details on a long list of programs that can run at startup (see screenshot 7).

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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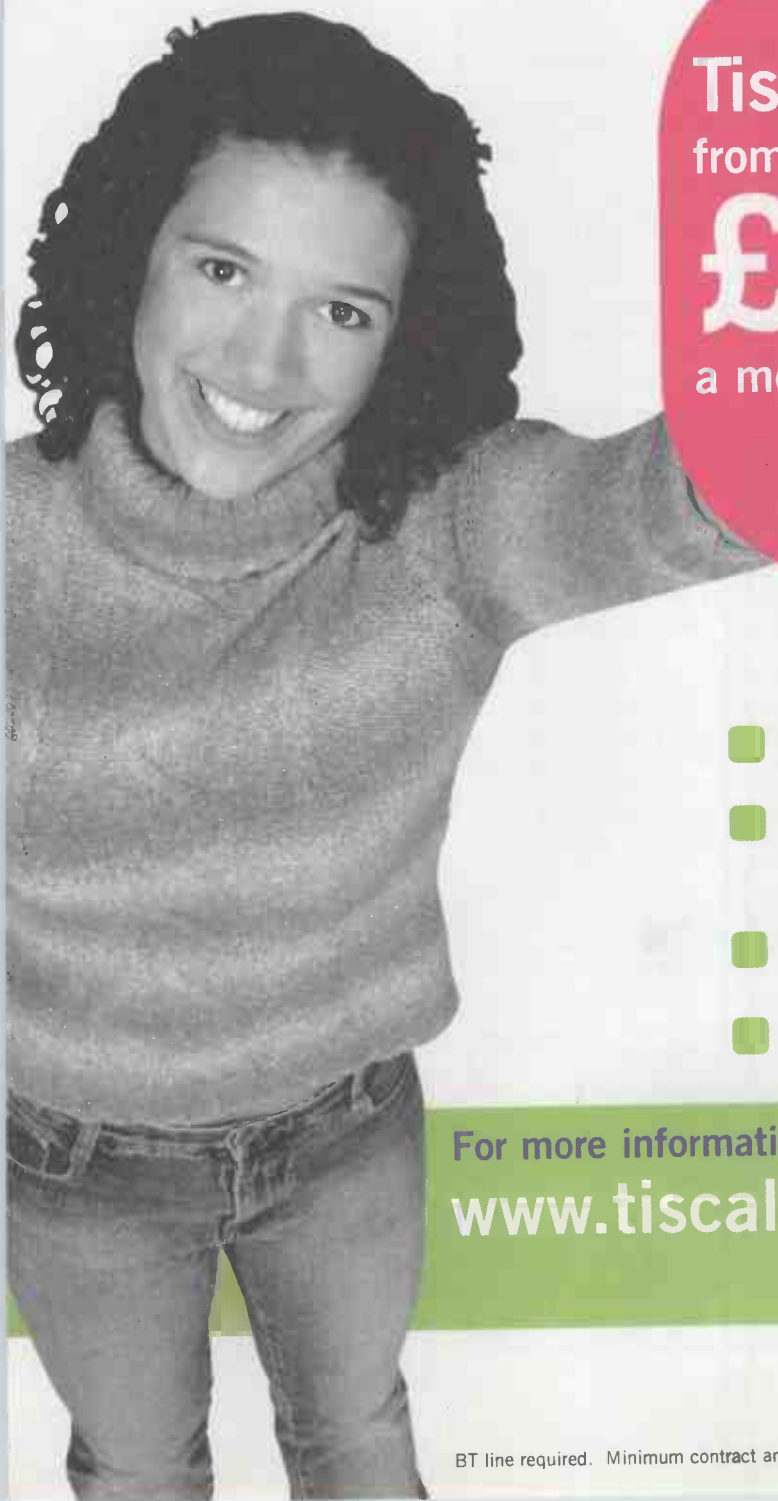

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TISC1452

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Keeping an eye on web traffic

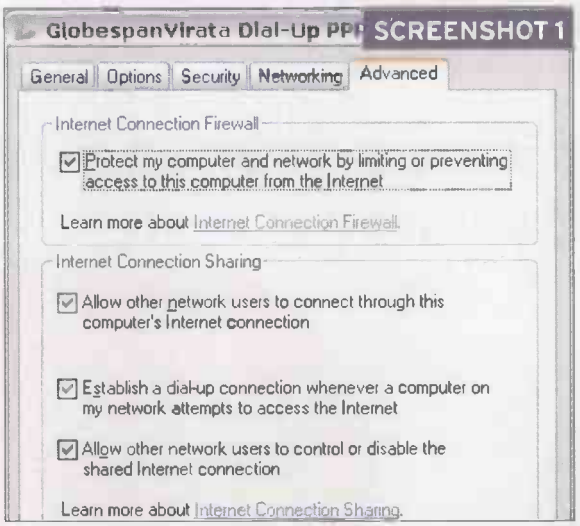
We take a closer look at the XP firewall and examine the benefits of prefetching

With the next version of Windows, codenamed Longhorn, not due for at least another two years, what have we got to look forward to in the interim? Well, don't get too excited, but there's a service pack on the way. This went into beta testing last December and should be released, according to Microsoft, this summer. The main thrust of SP2 is security, and one change is that, unlike XP SP1, the firewall will be enabled by default. This, again according to Microsoft, is because users at present have to run a wizard or navigate through the network settings to manually enable it. Which, apparently, they find difficult. There will also be more configuration options, but we'll return to these when the final code is released. SP2 will also close a window of opportunity that at present exists at boot time, in that unfiltered packets can be received in the period between the network loading and the firewall loading.

Some long-awaited features will appear in Outlook Express and Internet Explorer. The former will have an option to block remote content in mail messages. With the current version of Outlook Express, the sender can code a link to a graphic stored on a server, rather than include the code for the graphic within the message. This, at best, can be a nuisance for those on a dial-up connection as OE will attempt to connect to the Internet every time you view such a message. It also has more sinister implications, in that the content can be used by the sender, for example, to verify your email address. Internet Explorer will have better management of add-ins, which we hope will win a few battles against malware 'helpers'. The other piece of good news is that at long last it will catch up with rival browsers, such as Netscape, Mozilla Firebird and Opera in having a pop-up killer.

Firewall facts

Having mentioned the XP firewall, let's take a closer look. First, if you have an Internet connection then enabling the firewall is a must, as it sets restrictions on the information that is communicated between your computer and the Internet. Go to Control Panel, Network Connections. Right-click on your Internet connection, and choose Properties. Go to the Advanced tab of the Properties dialogue, and tick the box beside 'Protect my computer...' (see screenshot 1). If you have other networked computers using Internet Connection Sharing (ICS) then you only need to enable the firewall on the machine that has the direct Internet connection.

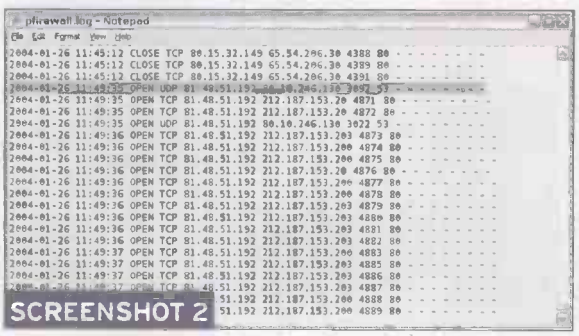


SCREENSHOT 1

Turning on the firewall is a must if you have an Internet connection

So, what does it actually do? Unlike third-party programs such as Zone Alarm, the XP Internet Connection Firewall (ICF) doesn't restrict outgoing traffic – so you don't get messages warning that various applications are trying to 'phone home'. That isn't to say it doesn't monitor outgoing traffic: it needs to do this in order to filter the incoming.

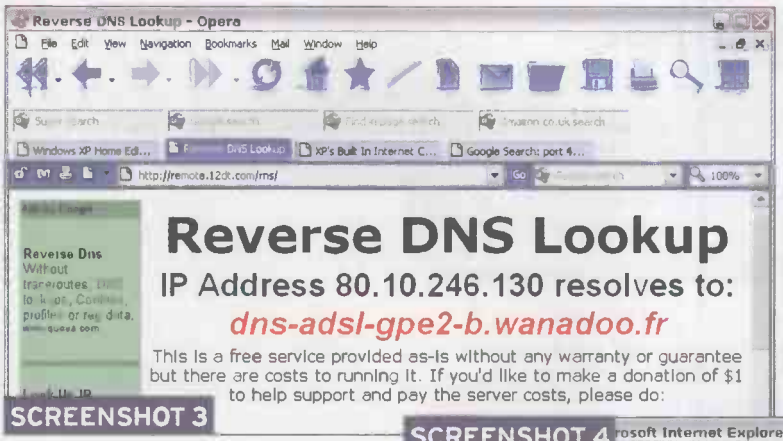
When your PC (or one sharing the Internet connection) originates a communication, such as requesting a web page, a record is kept of the transaction. When a communication is received from the far side of the firewall, the records are examined for a corresponding outgoing request. If there isn't one, then the communication is quietly dropped. When I say quietly, I mean you won't get a warning message or other notification. You can, however opt to keep a log of the firewall's activities. Although this isn't necessary unless you suspect your PC is under attack, it is illuminating in showing how the firewall works.



SCREENSHOT 2

The firewall log can tell you all about your sessions

If you click the 'Settings' button on the ICF/ICS tab, you'll get a further dialogue with three tabs. Turning first to the Security Logging tab, tick the box beside 'Log successful connections' but not 'Log dropped packets'. Keep the size limit at 4,096KB – if you go to the maximum allowed of 32,767KB you'll still be reading it this time next month. If you're really paranoid you can change the name and location of the log file, so the hackers won't know where to look for it, but for now we'll go with the flow. OK out of everything, then close and restart your Internet connection. You can open the log file in Notepad (C:\Windows\pfirewall.log if you accepted the default file location setting) and you'll see something like screenshot 2. If this is the first time you've used the log, then begin at the beginning – if not the timestamps for each entry should tell you when a session is started. In the screenshot example, the highlighted entry shows the session started at 11:49:35 on 26 January 2004, with an action to OPEN a connection from 81.48.51.192 (the local computer's address assigned by the ISP) to the ISP's server at 80.10.246.130. These IP addresses don't mean much to humans, but you can translate them into meaningful addresses using a reverse DNS lookup service, such as that at http://remote.12dt.com/rns (see screenshot 3). This resolves the second address to dns-adsl-gpe2-b.wanadoo.fr. Moving down, the same computer opens a TCP connection with 212.187.153.20. If you look this up, you'll find it resolves to www.guardian.co.uk – the home page for the PC's browser. In fact, as this is a web page you can paste the numbers straight into the address bar (see screenshot 4). You'll also see entries to terminate connections: each 'OPEN' should have a corresponding 'CLOSE' and you may also see 'INFO-EVENTS-



SCREENSHOT 3

Looking up an IP address is easy

LOST' which means the logging procedure couldn't keep up and lost the plot for a while.

For part two of the experiment, disconnect from the Internet; go back to the connection properties Advanced, Settings dialogue and reverse the ticked boxes so only dropped packets are logged. Close your mail program, browser and anything else using the Internet connection and wait a while before opening pfirewall.log again. You should now see nothing but DROP actions for the current session, ie, packets that have been stopped by the firewall.

The second (destination) IP address in each entry will correspond to the address currently assigned to your computer by your ISP – the reverse of the previous experiment. The first (source) IP address – well who are all these people? Again, you can do reverse DNS lookups, but this won't tell you much. What is certain is that there's a lot of it about: I counted an average of 10 dropped packets per minute – hence the 'quiet' blocking. A lot of this seems to be harmless noise, but you could also expect Windows Messenger Service spam, P2P file-sharing enquiries and other stuff. If you see the same IP address trying to connect to a succession of ports on your PC (two columns to the right of the destination IP) then something is trying to break in.

ICF can interfere with some things. For example, Outlook Express can be configured to check a server for new mail at set intervals. No problem, as the request originates from the user's PC, so the reply from the server is expected. Outlook 2000, on the other hand, when used with a Microsoft Exchange Server, waits passively until the server sends a remote procedure call (RPC) saying that new mail awaits. But this message is unsolicited – there's no corresponding prior request, so the firewall blocks the RPC. Hence Outlook users have to use scheduled or manual mail checks in the same way as OE users.

Finding a web page from an IP address

A final point to watch is, as stated earlier, ICF only blocks incoming. If you've been infected with a virus it won't stop your PC sending this on to entries in your address book, or returning your personal information to the perpetrator. So, don't use the firewall as a substitute for common-sense precautions such as using a virus checker and not opening doubtful email attachments.

What is prefetch?

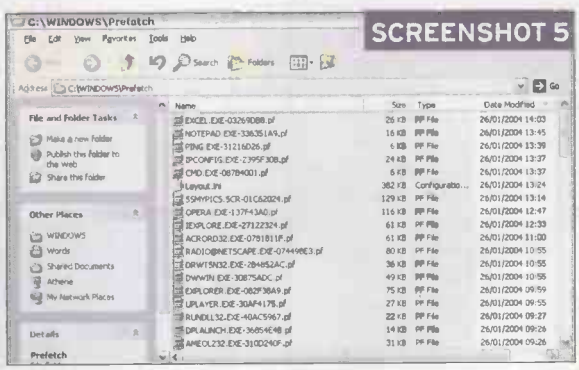
What is the point of the Windows\Prefetch folder? Are the files in there duplicates and is it safe to delete them? I've been asked this several times over the past few months, so here's a rough guide to prefetching. To answer the last two questions first, the files aren't duplicates and though there is no harm in deleting them there's little point in doing so. The first question is rather more complicated. When you start a program, a record is logged to a .pf file in the Prefetch folder. This file contains details of which files are loaded and in what order. There's also a special NTOSBOOT....pf file that contains a similar log of files loaded when you boot the PC (see screenshot 5).

So, next time you start the program, or boot, Windows can consult the corresponding prefetch file and load all the right files into memory without having to be instructed file-by-file by the loader. It's like knowing your way around the supermarket, so you can go straight to what you want without having to keep going back to the centre aisle to read the signs.

It gets better. Windows uses the information in the boot and program .pf files to work out the optimum layout of files on your disk, so that files needed in succession are physically close on the disk. It stores this information in a file called Layout.ini, in the Prefetch folder: this is in plain text, so you can take a look at it. When your computer has been idle for a while, it then shuffles the files on your hard disk, in a process similar to defragging, but conforming with the 'ideal' layout stored in Layout.ini. So, next time your idle PC bursts into frenetic disk activity, that may be what it's up to.

Some believe that cleaning out the prefetch folder is a good thing to be done on a regular basis. There are even utilities to do this for you. But unless something has gone wrong with your PC it isn't necessary or desirable to do this. Windows maintains the prefetch folder contents on a least-used-first-out basis, and it shouldn't occupy more than a few megabytes.

If you do want to disable prefetching, for example to troubleshoot a program or Windows start-up, then go to HKEY_LOCAL_MACHINE \SYSTEM \CurrentControlSet \Control \Session Manager \Memory Management \PrefetchParameters and change the value of the EnablePrefetcher DWORD from 3 (prefetch programs and boot) to 2 (prefetch boot only), 1 (prefetch programs only) or 0 (prefetch neither).



Prefetch files are not just harmless, but useful

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

Precautionary measures

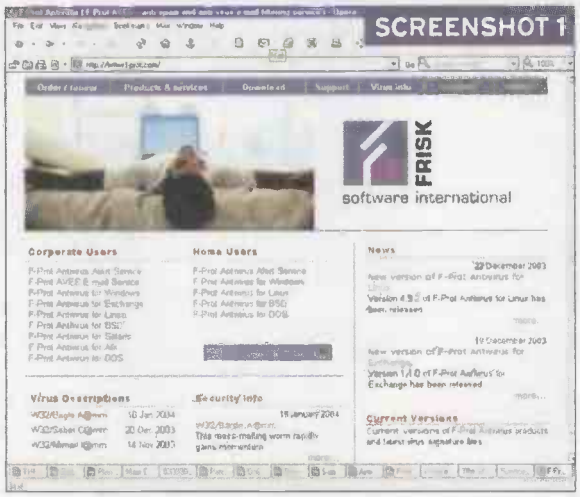
Protecting your PC from the outside world is essential, but which is the best way?

Security is a subject that comes up time and again in these columns. We make no apology for harping on about it, as security measures don't only protect our own computers, but they also help make the Internet less frustrating. Many of us have high-speed connections these days, and yet the Internet often seems to be as slow as it was when we used slow dial-up modems. Part of the reason is that an incredibly high proportion of Internet traffic – more than half – according to sources, is entirely spurious, consisting of spam email and malicious probing by worms and other viral traffic.

The latest example of this is highlighted by Microsoft's release of an MS Blaster detection and removal tool. The Knowledgebase article at http://support.microsoft.com/?kbid=833330 fully explains why this tool has been released and provides a link from which it can be downloaded. This tool has been released by Microsoft because the 823980 and 824146 security updates only close the hole by which the worm enters. Updating a computer that has already been infected cannot prevent the MS Blaster worm family from attempting to propagate by sending outgoing transmissions which try to infect other computers.

The fact that Microsoft released this tool is interesting because most personal firewalls, if properly configured, will block outgoing MS Blaster probes from an infected computer. The only personal firewall which lacks the capability to block outgoing probes is the Microsoft Internet Connection Firewall (ICF) included in Windows XP (for more on XP firewalls, see page 188). A firewall capable of blocking outgoing transmissions is your first line of defence against being an unwitting propagator of MS Blaster. The second line of defence is an anti-virus scanner which will discover and remove malware like MS Blaster.

Many people scoff at personal firewalls and anti-virus scanners, describing them as unnecessary. Few go on to recommend a barrier in the form of a dedicated hardware device sited between your computer and the Internet. Those who do will usually also suggest monitoring tools such as intrusion detection software which detects and reports unusual behaviour. A setup like this can provide more effective security than software running on the computer it is supposed to protect, because local software can be compromised. Numerous exploits try to do this by including code to disable well-known personal firewalls and anti-virus scanners (see screenshot 1).



Monitoring software alerts you when malicious exploits try to subvert your computer

This doesn't mean that personal firewalls and anti-virus scanners are unnecessary, as some suggest, only that there are more effective solutions. But security is always a balance between risk and reward, and for most personal computers not connected to corporate networks, a personal firewall and anti-virus scanner is more than adequate protection. Together they provide a suitable barrier and a monitoring function at a reasonable cost. Monitoring is an important part of security. If you don't know what's happening on your computer, it's impossible to know whether, for example, MS Blaster is secretly propagating itself whenever you're connected to the Internet.

A reputable anti-virus scanner provides a very acceptable monitoring function, provided its signatures are frequently updated. F-Prot Anti-virus (www.f-prot.com) (around £16 per annum, depending on exchange rates) and Etrust Anti-virus (www.my-etrust.com) (around £14 to buy, £7 per annum to renew) are well regarded, unobtrusive, and have minimal impact on system resources. Etrust is a 4MB download and F-Prot is only a little larger.

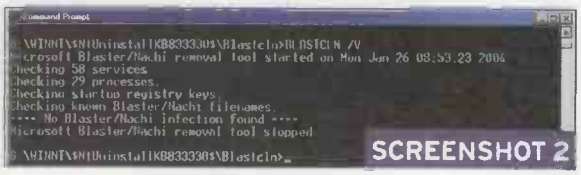
Even if you are protected by a good anti-virus scanner it's probably worth downloading and running the Microsoft Blaster cleaner. When you install it, the setup wizard runs the cleaner silently in the background. This is a little disconcerting as you don't get to see what it's doing and the fact that it completes without incident is the only indication it has done anything, or indeed has rectified any problem. You can, however, run the cleaner in a Command Prompt window (with administrator rights) (see screenshot 2) using the verbose switch as detailed in the Knowledgebase (KB) article.

Services

Speaking of firewalls, Gertrud Walton appreciates our explanation of the function of system files such as svchost, but wants to know when it is OK to allow them to break the filtering rules of a firewall. The simple answer is, always, because that's how Windows works. But this needs more explanation. It's not ideal in terms of understanding what to allow or disallow, but Windows funnels lots of its services through proxies like svchost. The one that Gertrud finds most persistent and worrying, services.exe, is another. Gertrud says her firewall log frequently reports this program as trying to communicate in a way disallowed by the filtering rules. Denying all access to services.exe results in no web pages being available. But, as Gertrud says, programs that behave in this way are suspected of having been taken over by a Trojan. How can you be sure that a program is safe, and what is the point of a firewall if you allow programs to exceed the filtering restrictions?

This is a very good question because it goes to the heart of the issue of whether personal firewalls are a viable alternative to a standalone device, or merely a confusing diversion. Although we recommend the use of personal firewalls, they can be quite confusing. Correctly configuring a firewall is a black art

What does Microsoft Blaster Cleaner really do?



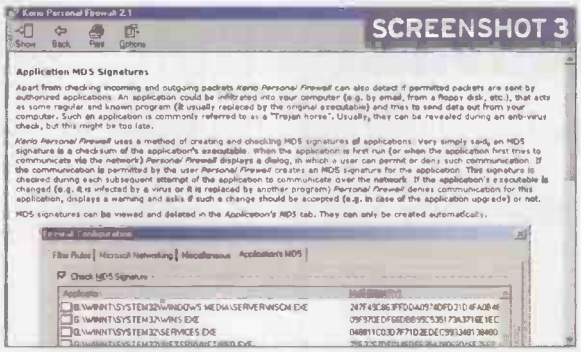
requiring a considerable amount of in-depth knowledge of Internet protocols, as well as the software processes running on your computer. This knowledge is used to create firewall rules which describe allowable actions.

The basic set of rules should deny all inbound and outbound access except for the smallest set that enables your desired tasks. For example, you want to browse the web and send email so you enable only those services. This is fairly simple to do, but there's a catch. To enable web browsing in general you enable the local service and the port it uses. Now you can browse anywhere on the web, but this includes mallcious websites. You could modify the rule to allow browsing only to trusted websites, but now you have to manually add each and every website you wish to visit. This is not only inconvenient but now you have to make a judgement on a website you have never visited in order to add it to the allowed list. That's OK if it is www.apple.com, but what about a website recommended by a friend?

Judgement calls

There's really no way around the fact that you have to make a judgement call that begins with trusting something, but what? You can only begin by trusting the software on your computer. With Windows this is a real problem as there's an awful lot going on under the covers. Microsoft builds in a whole slew of processes which automatically use available Internet connections. Automatic Updates will check for security updates. Messenger will look for buddies online. If you install a new piece of hardware Windows may check the web to see if there's a newer version of the driver. All of these services are legitimate, even if you haven't personally authorised them. And many of them are co-ordinated through higher-level services such as svchost.exe and services.exe. The latter, for example, co-ordinates Internet Explorer and the Domain Name Service which is essential to using the Internet.

So, to use the Internet, you must enable services such as svchost and services. Essentially the dilemma a personal firewall poses is, if it is sufficiently flexible to be tuned for each and every process that is funnelled through svchost and services, you will need to have a precise and complete understanding of each and every aspect of these. That's not something most people have or desire, and frankly, it trips up security experts on a regular basis. As ordinary people making general use of the Internet and being reasonably aware of the risks, it's quite appropriate to give Windows components such as services.exe automatic access rights to the Internet after having confirmed that it is what it claims to be.



A personal firewall using signatures to authenticate applications

Several Trojans (malicious infectors) know this and try to subvert these services by surreptitiously installing similarly named executables (scvhost, service) or by installing identically named executables in other folders. One trojan, for example, installs a file called services.exe in the Windows folder. It does this because Windows 2000 System File Protection will not allow the trojan to replace the legitimate file in the System32 folder, and because good personal firewalls use a signature system to create a unique identifier for each authorised program (see screenshot 3).

If an authorised program is surreptitiously replaced by a trojan, the personal firewall will spot the changed signature and will not allow it to access the Internet until you have verified the new executable. You may have experienced this after applying a service pack or updating a web browser. The basic premise here is that you have to start with a baseline of known applications that you trust and which you can authorise. Obviously, the best time to do this is immediately after installing Windows 2000 because if you can't trust the contents of the Windows 2000 CD produced by Microsoft, what can you trust? But you may only have installed a personal firewall after experiencing an Internet attack. In this case, you have to establish trust by other means. First, make a basic check by locating the executable and looking at its Version properties (right-click on the executable) (see screenshot 4).

Program properties offers a basic check for veracity

It's unlikely that this would be spoofed, but it could be so this is not a guarantee of legitimacy. Next, Google the executable on the Microsoft site by entering services.exe site:support.microsoft.com. This produces a slew of KB articles verifying that the file is part of Microsoft, including this one http://support.microsoft.com/default.aspx?id=263201 which gives it a name you can use to search for a more detailed description.

By now you can be reasonably certain that services.exe is legitimate and required for Internet access. But, even if the executable is kosher, there remains a possibility that it is being subverted by some other program. This is where corporate security monitoring comes in. This usually employs specialist intrusion detection tools but a good anti-virus scanner, supplemented by a specialist spyware scanner such as Adaware from www.lavasoft.de is an alternative on a standalone computer. Ensure that Adaware and the anti-virus scanner are fully updated with the latest signatures, and run a complete scan. If you're particularly concerned, get a second opinion. The F-Prot scanner is highly regarded and offers a free 30-day trial download. Once you have satisfied yourself that your computer is free of malicious software you can trust services.exe.

Now, provided you maintain constant monitoring by keeping the anti-virus scanner on-demand functions enabled and frequently updated, and schedule Adaware to run regularly, you can be confident you have taken the appropriate steps to protect your computer. Obviously there's always the possibility of being tricked by a social engineering exploit, but that's a judgement we all have to make.

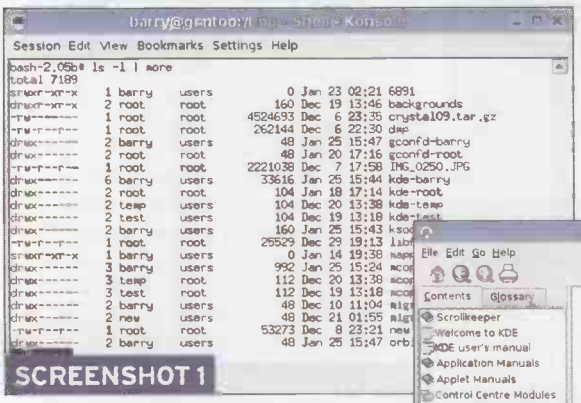
CONTACTS

Terence Green welcomes your comments on the Windows 2000 column. Email him at: win2000@pcw.co.uk. Please do not send unsolicited file attachments.

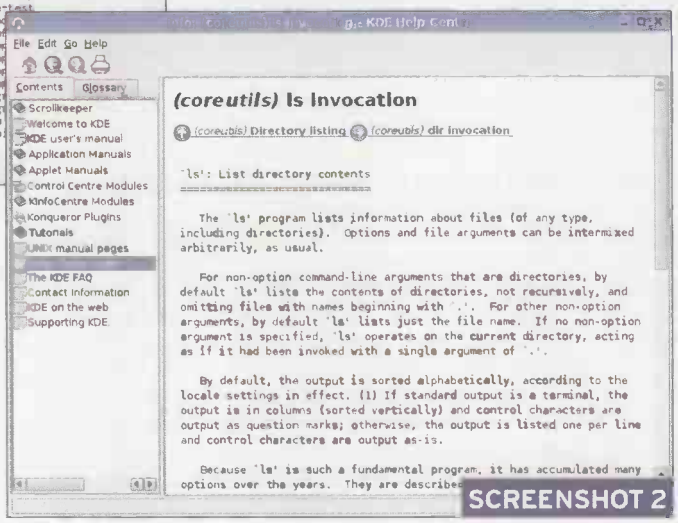
Barry Shilliday
has worked with computers for almost two decades. By day, he is a Linux and Unix consultant, but in his free time prefers to travel the world – and snap it with his camera

A lesson in administration

How to list, delete and copy files, plus a look at hard and soft links



SCREENSHOT 1



SCREENSHOT 2

Left: One of the most common commands, ls lists directories and files, and is controlled through a large number of options

Below: The info pages often go into more depth than the standard man pages

In recent months we have looked at a couple of the fundamental aspects of Unix and Linux, including the tar and gzip commands and the RPM package management utility. In last month's issue, we examined Unix file permissions in detail: how security works and how to modify the permissions on files and directories. This month we will step further back and look at some of the basic Unix utilities associated with file administration. As we've seen before, quite often in the Unix and Unix-like world, commands have identical names, but behave in different ways: sometimes having extra or fewer capabilities, and sometimes entirely different command options. In the case of the rudimentary file commands, the same applies, though fortunately the simplest command options usually remain the same. We will look at the GNU file utilities. These are the standard for free Unix-like systems, including Linux, and tend to be more powerful than their commercial Unix equivalents.

Basic file operations

The most basic operations you will want to perform will be listing, deleting and copying files. There are separate commands for each of these actions. To list a file, use the 'ls' command. In its most basic form, it's equivalent to the DIR command in Dos but, as with all the utilities here, it offers a substantial amount more. To get a simple list of the files and directories in the current working directory, just run ls by itself:

```
$ ls
file.txt  pic.jpg
```

Without options, ls produces a list sorted alphabetically. To obtain more details about the files, use the -l option, meaning a 'long list'. If you have more than a few files to display, pipe the output into the more command.

Have a look at screenshot 1 for an example. This is the typical output in the system temporary directory, /tmp. As you can see, the shell window displays the current working directory in the titlebar – this is the case for the KDE and Gnome desktops. The first column shows the permissions on each file or directory, as we saw last month. The second column indicates the number of hard links to the file (see later). The third and fourth columns give the file's owner and group – again examined last month. The remaining information provides the size in bytes, the date and time the file was last modified (or created if applicable) and, of course, the name of the file or directory itself.

The ls command takes a series of Posix (standard) options. In addition to -l, these include -a to list files beginning with a dot (usually hidden), -R to list recursively through directories and not just the current one, -r to reverse the sorting order and -t to sort by modification date instead of alphabetically. So to list the contents of the directory, in long format and in reverse order of modification (so the final file was the most recently changed), you'd type:

```
$ ls -lrt
```

To examine one or more files specifically, instead of the entire directory, just list the files or directories at the end of the ls command. You can use pattern matching in the list. These can be quite complex, from '*.jpg' to select all jpeg files, to something like '[a-d,r-z]*.???' to match any file beginning with the characters 'a' to 'd' or 'r to z', and ending in any three-character extension.

The GNU version of ls supplies many more options. Unlike the Posix options, these may only work with this particular version. You're already using the GNU versions if you're using Linux. The options include -h to make the size output more (humanly) readable in conjunction with the -l option, displaying size letters like M for megabytes, instead of showing bytes, which is particularly useful for very large files. Also provided is the –color option, which outputs files in different colours, depending on their type. Check the man or info page for full details (see screenshot 2).

Deleting files is something we all regularly do. On Unix systems (perhaps as in life) it's wise to be cautious, especially at the command line, as there is no undelete function. If you use KDE's Konqueror or Gnome's Nautilus file managers to delete files, you have the option to move to trash, just like Windows and OSX. The delete key on Konqueror is in fact bound to the trash option, rather than the delete one. In the shell there is no such thing; once you delete a file it's gone for good. The good news is that you can't ever do any damage to the system if you're logged in as a normal user, since you simply don't have the privilege to delete any system files or directories. Your own files and directories, on the other hand, are not so well protected. See last month's column for ways of making your files read-only.

Now the warnings are out of the way, let's look at the command. Many of the basic commands in Unix

are two letters long. Why type 'remove' or 'del' when you can just type 'rm'? The rm command is much simpler than ls – there's not a lot you can do differently when deleting something. In option-less form, it deletes a file:

```
$ rm file.txt
```

Like most Unix commands, you see no output if everything's fine – only errors are reported. The most typical error reads "rm: cannot remove 'file.txt': Operation not permitted". The message is clear: the permissions on the file or directory don't allow you to delete it. If you remember from last month, the ability to delete a file normally depends on whether the directory it's in is writeable, and not on the file itself.

The rm command only takes a couple of options. Use 'r' or 'R' to remove through directories recursively – always be careful before running with this option, especially with root! The -i option introduces a safety net, making the deletion interactive: you will have to type 'y' with each file before it is removed. So for example:

```
$ rm -R pics a*
```

Here any files or directories beginning with a, and any called pics are removed. It includes all files and directories beneath these matches, so if there was a directory called 'jpegs' in the 'pics' directory, this would go too.

Unless deleting directories recursively like this, the rm command deletes only files. Use the 'rmdir' command instead for directories; running 'rm pics' gives the error "rm: cannot remove 'pics': Is a directory".

Copying and moving

To create an identical copy of a file, use the cp command. It's common practice with Unix commands for the source file to be specified first, before the destination file, when two files are involved. So, as before, the simplest way of running cp is as follows:

```
$ cp file.txt new.txt
$ cp file.txt /tmp
```

Here, file.txt is duplicated with the name new.txt in the first example, and in the second, file.txt is copied to the /tmp directory with an identical file name, as no new one was specified. When cp creates a new file, it is independent of the original – it is owned by the user who copied it, and will have a current date stamp. In order to maintain the original ownership, permissions and time stamp, the -p Posix option is available. This is more effective when run as the root user, since only root can set the owner of the new file to something other than the user who ran the command. Any user can set a file's modification date stamp, so this and the security permissions, are maintained using the -p option.

Other Posix options include -f to 'force' a create – in other words, to overwrite existing files; -i to behave interactively, similar to the rm command, when attempting to overwrite a file; and -R, to copy directories recursively. This last option is useful in combination with -p to make quick and dirty backups.

```
$ cp -fpR imgs imgs.bak
```

Here the imgs directory, and all its contents, are copied to a new directory called imgs.bak. The files and directories maintain all the original time stamps and permissions. If imgs.bak already exists, the cp command won't give an error. That's because it treats imgs.bak as a directory path rather than a new directory, and therefore imgs is copied into a new 'imgs' directory inside the existing imgs.bak. You can see this more clearly in screenshot 3.

'We all regularly delete files, but on Unix systems it's wise to be cautious, especially at the command line'

The GNU version of cp has more to offer. The -a (archive) option makes it easier to perform quick backups, as this implies several other options like -R and -p. There are several more options for better control of backups and which directories to copy; see the man and info pages for more details.

Moving a file from one place to another is like a two-step process: copy the file, then remove the original. There's absolutely nothing stopping you from doing this, but the mv command is there to do it for you. There are some subtle differences, however, as we'll see. The mv command is somewhat of a variation on the cp command and has more or less the same format. Here are a couple of simple examples:

```
$ mv file.txt /tmp
$ mv /tmp/pic.jpg ~/me.jpg
```

The first example is similar to one we saw using cp earlier – file.txt is moved from the current directory into /tmp. In the second example, pic.jpg is moved from the /tmp directory into the user's home directory (~/ is the standard way to represent that) and renamed to me.jpg.

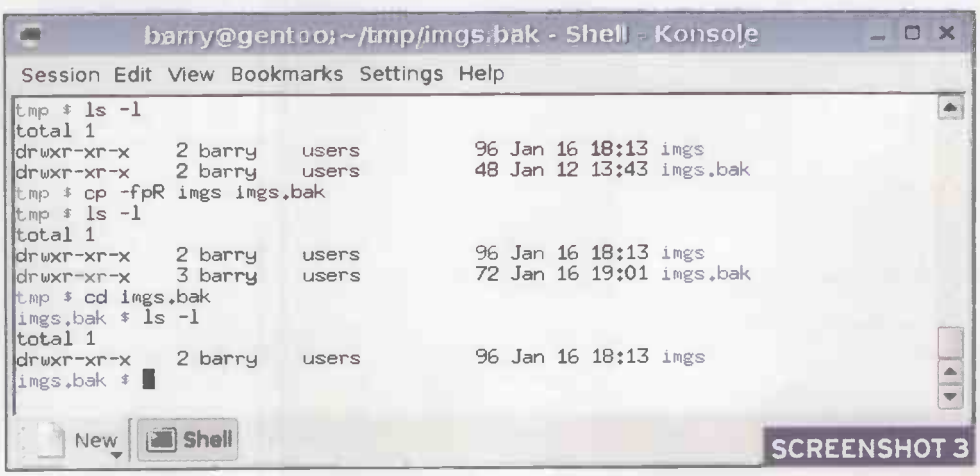
Unlike cp, mv attempts to preserve all the original attributes of the source file, and there is no -p option. In fact, if the source and destination are on the same filesystem (such as a disk partition), no files are removed or created – even if it's a different directory – the name or location is just changed, and the new file is physically exactly identical to the old. If you move files between different filesystems, the equivalent of 'cp -p' is implied. The -f and -i options still apply in the same way as a copy.

To rename a file within the same directory, just use the mv command. For the reasons listed above, it makes no sense to have a separate command for renaming alone.

Links

So that's how to remove, copy and move files about. All these concepts are familiar to anybody used to dealing with computers. Links are a little different, as these don't exist on Windows or non-Unix-based versions of the Mac OS (anything before OSX). There are two kinds of links: hard and soft. We'll look at the latter first.

A soft link (also known as a symbolic link) is a special type of file. All it does is point to another file. That's all there really is to it. As far as the kernel (and the operating system



The cp command can do quite a bit more than a straightforward copy

SCREENSHOT 4

```
barry@gentoo:~/tmp/my_imgs - Shell - Konsole
Session Edit View Bookmarks Settings Help
tmp $ ls -l
total 1
drwxr-xr-x    2 barry    users          96 Jan 16 18:13 imgs
drwxr-xr-x    3 barry    users          72 Jan 16 19:01 imgs.bak
tmp $ ln -s imgs my_imgs
tmp $ ls -l
total 2
drwxr-xr-x    2 barry    users          96 Jan 16 18:13 imgs
drwxr-xr-x    3 barry    users          72 Jan 16 19:01 imgs.bak
lrwxrwxrwx    1 barry    users           4 Jan 19 20:05 my_imgs -
tmp $ cd my_imgs
my_imgs $
New  Shell
```

Left: Soft links are convenient and commonly used for a variety of reasons

Below: Hard links behave similarly to soft links, but at a lower level are very different

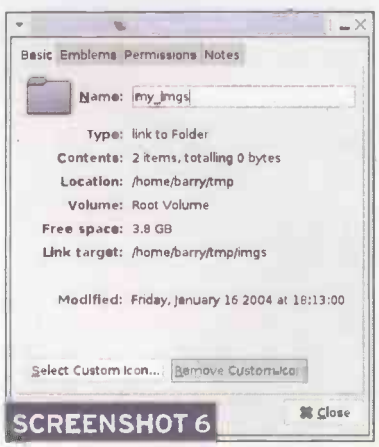
SCREENSHOT 5

```
barry@gentoo:~/tmp - Shell - Konsole
Session Edit View Bookmarks Settings Help
tmp $ ls -lh
total 14K
-rw-r--r--    1 barry    users         9.5K Jan 20 18:23 file.txt
drwxr-xr-x    2 barry    users           96 Jan 16 18:13 imgs
drwxr-xr-x    3 barry    users           72 Jan 16 19:01 imgs.bak
lrwxrwxrwx    1 barry    users            4 Jan 19 20:05 my_imgs -> imgs
tmp $ ln file.txt stuff.txt
tmp $ ls -lh
total 26K
-rw-r--r--    2 barry    users         9.5K Jan 20 18:23 file.txt
drwxr-xr-x    2 barry    users           96 Jan 16 18:13 imgs
drwxr-xr-x    3 barry    users           72 Jan 16 19:01 imgs.bak
lrwxrwxrwx    1 barry    users            4 Jan 19 20:05 my_imgs -> imgs
-rw-r--r--    2 barry    users         9.5K Jan 20 18:23 stuff.txt
tmp $ rm file.txt
tmp $ ls -lh
total 14K
drwxr-xr-x    2 barry    users           96 Jan 16 18:13 imgs
drwxr-xr-x    3 barry    users           72 Jan 16 19:01 imgs.bak
lrwxrwxrwx    1 barry    users            4 Jan 19 20:05 my_imgs -> imgs
-rw-r--r--    1 barry    users         9.5K Jan 20 18:23 stuff.txt
tmp $
```

as a whole) is concerned, the link refers directly to the file it points to. So what's the difference between a symbolic link and a copy? A copy creates a duplicate of a file, which can be modified independently; a link, on the other hand, refers to another file and itself has no substance. Actions performed on a link affect the file it points to, so if you modify a link, you modify the file. One exception is deletion – rm removes the soft link and not the target file. The link requires no disk space other than a few bytes to store the path to the linked file. If you delete the file a symbolic link points to, the link becomes invalid. So to create a soft link:

```
$ ln -s file.txt stuff.txt
$ ln -s /tmp ~/mytmp
```

By default ln creates a hard link, so you must use the -s option to create a soft one. As usual, the source file comes first, and the first command creates a link called stuff.txt that points to file.txt in the same directory. The second example creates a link in the user's home directory called mytmp which points to the /tmp directory. There's no distinction between files and directories for soft links. Take a look at screenshot 4 for another example. Running ln creates a new soft link called my_imgs. With 'ls -l', the soft link shows up as a type 'l' (the first character in the permissions block) and ls helpfully shows us which file or directory the link is pointing to.



SCREENSHOT 6

Nautilus tells you my_imgs is a link to another directory

You can then treat the new link as a normal file (or directory in this case), as demonstrated by entering my_imgs with the cd command.

Hard links share the same concept as soft, but are a completely different thing altogether. Every file has at least one hard link; the filename is in fact just a hard link. In contrast to soft links, which point to other filenames, a hard link points to physical data on the filesystem (usually a disk). When you create a new file, be it by saving something or copying an existing file, the system sets up a new hard link for you automatically. When you create new hard links to existing files, each of these points to the same physical data and has equal status; if you remove the original file, its hard link is removed but the file is still accessible through the other hard links. It's therefore the case that a file is only really lost if all its hard links are removed; the rm command really just deletes a hard link.

'A file is only lost if all its hard links are removed: rm just deletes a hard link'

Creating hard links is easy:

```
$ ln file.txt stuff.txt
```

In this example, stuff.txt becomes a new hard link to the same data as file.txt. Both filenames are now equal and point to the exact same physical data. In screenshot 5 you can see a file 9.5KB in size called file.txt. It has one hard link, as shown by the second column, and it's a normal file, as shown by a minus sign for its type in the first column. Next the ln command is used to create a new hard link. The hard link count increases by one; both links show a count of two, since each represents the same data. Now the first link is removed, and the hard link count drops back to one as expected. If you recall from earlier, you might notice we've just manually performed the same as a move or rename; no data was copied, removed or created.

Hard links are used sparingly in practice. For one thing, they're more difficult to spot, but more importantly, they can only exist on the same filesystem. This makes perfect sense; hard links point to physical data only. Symbolic (or soft) links, on the other hand, point to existing files, or as we now see, existing hard links. These can be across filesystems, and are commonly used and easy to spot, both in the command line and in graphical file managers like Nautilus (see screenshot 6). Another thing to remember is that both soft and hard links can only be created on Unix filesystems, and not on mounted Fat partitions, for example. It is, however, possible to create a soft link to a file on a non-Unix (or even networked) filesystem, as a soft link is just a pointer to another file's path. Next month we will see how links can affect a file's operation, and another couple of ubiquitous commands.

CONTACTS

Barry Shilliday welcomes your comments on the Linux/Unix column. Email him at: linux@pcw.co.uk. Please do not send unsolicited file attachments.

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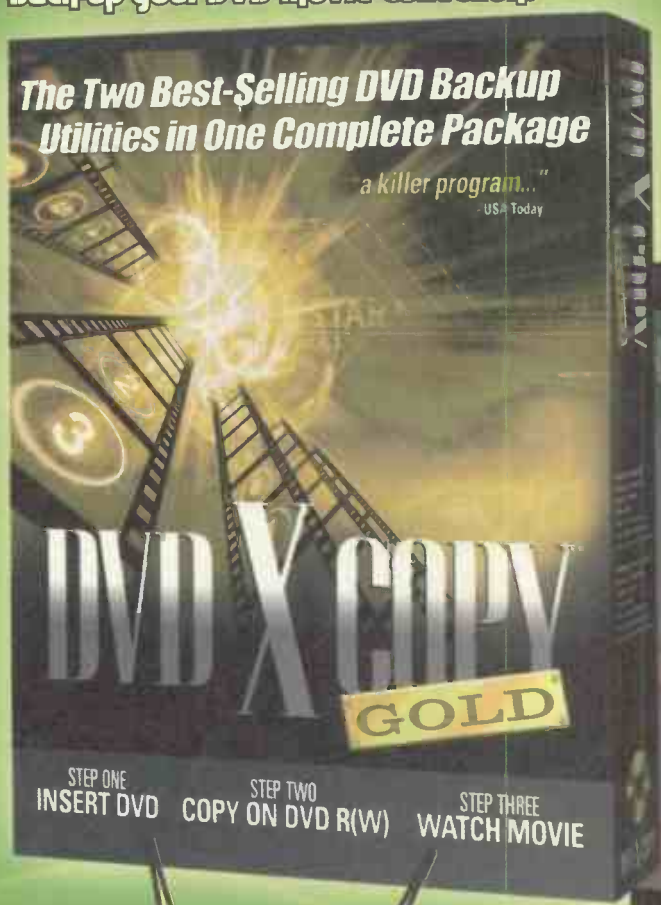

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Tim Nott
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Space, the final frontier

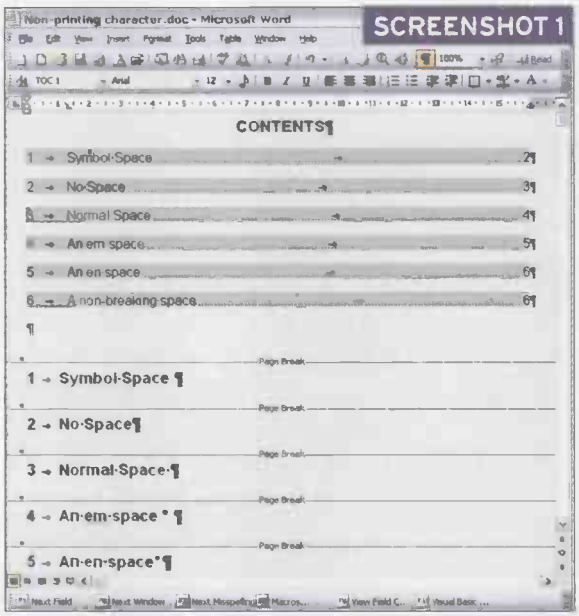
How to handle mysterious space formatting, and we crack a protected document

When using 'long' tabs, such as those in a table of contents (TOC) where the chapter or section headings are aligned left and the page numbers aligned right, it can be a good idea to use a leader – a row of dots or dashes – to guide the eye between the corresponding elements. In any version of Word, this isn't difficult: go to Format, Tabs and choose the tab type, position and leader from the dialogue. Reader Robert Kletz thought that leaders look better with a space separating them from their connected elements, and I agree. Again, this is simple – type 'text-space-tab-space-number'.

However, this all starts to go to pot with automatically generated tables of contents. If you type a space after a chapter heading, the space is stripped out when the TOC entry is created. Although you can manually edit the TOC to put spaces either side of the leader, these again are stripped out every time the TOC is updated. However, Robert had a distant memory of being able to keep the space between the chapter title and the leader. Sure enough he found an old document that retained the space, and was able to copy and paste the space into a new document, where it behaved in a similar fashion, surviving the journey from a trailing space in a chapter title to a TOC entry.

This space had other magical properties. If he turned on the viewing of non-printing characters, the space stayed as a space, instead of the usual dot for a normal space or small circle for an em, en or non-breaking space. I asked Robert to send me a file containing the magic space, so I could work out if there was another way of inserting it other than passing it on from document to document.

None of the formatting revelation techniques in various versions of Word would say anything about the magic space, so I tried saving the file as rtf. This preserves the content and formatting (in theory) of the doc file, but encodes it in a plain-text rather than a binary format, so you can read all the formatting codes in a text editor. This revealed the key to the mystery. The magic space was actually a field, according to the rtf code, but didn't show as a field with 'Show field codes' enabled, and inside that field was – a space from the Symbol font.



Top: An invisible space that never disappears

Bottom: Don't rely on this for security

That's the way to create it – Insert, Symbol, choose the Symbol font and the very first character, which is the space character. That just leaves us with the problem of getting the space between the leader and the number (see screenshot 1).

Password shock horror

A recent exposé of a security flaw in Microsoft Word 2003 has been brought to my attention. If you create a form in Word you have the option of 'locking' it so only the form fields can be edited – much as in a paper form – and this locking can be password-protected (Tools, Protect Document...). Thorsten Delbrouck-Konetzko, CIO of Guardeonic Solutions, Munich, showed how you can remove the password protection and edit anywhere in the document. Form protection – which also applies to tracked changes or comments – is designed to stop people messing up the form. It's not designed to make documents resistant to malicious or fraudulent alteration, so don't use it for that (see screenshot 2).

Create a document in Word 2003, put in a form field or two and some text, then go to Tools, Protect Document. Under 'Editing Restrictions' select 'Filling in forms' or 'No changes', then 'Start enforcing protection' and follow the prompts to supply a password. Save the document, then Save As... a single Web Page (.mht). Close the document and open the mht file in Notepad. Look for a pair of 'UnprotectPassword tags. The eight hexadecimal characters between the tags form the checksum of the password. Now, reach for your favourite hex editor and open the original, protected doc file. If you haven't got a hex editor you can get a free one at www.chmaas.handshake.de/delphi/freeware/xvi32/xvi32.htm. The next step is to search for the same eight-character checksum – but it will be in reverse pair order, so if you find D780825F in the mht file you must look for 5F8280D7 in the doc. Change all these to zero, then save and quit the hex editor, re-open the protected doc in Word and you'll find you can remove the protection without a password. What's insidious about this discovery is that it's possible to reverse the process and put the password back, without ever having to know what the password is.

If you're not bothered about covering your tracks, there's an easier way of cracking a protected document, which also works in Word XP, 2000 and 97. Save the protected form as an rtf file then close it. Open the rtf file and go to Tools, Unprotect Document. You won't need a password, as only the protection state is saved in the rtf file, not the password.

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.

Stephen Wells
Is a freelance journalist and a regular contributor to computer magazines. He's been writing *PCW*'s Spreadsheets column for many years. A US citizen, he now resides on the Essex coast

Making the balloon go up

How to program the Office Assistant to help guide your Excel workbook users

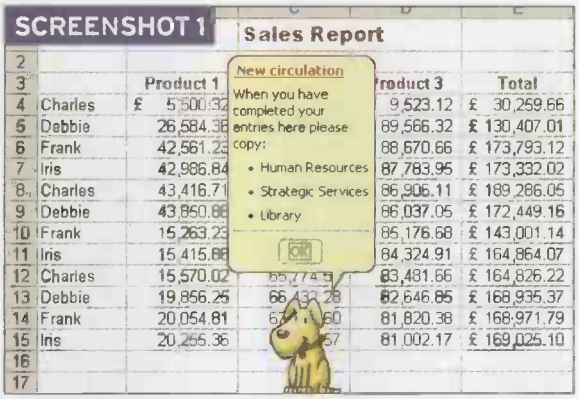
It's easy to create a pop-up window on a website page using Javascript, a reader writes, but how do you do it In Excel? This is where the Office Assistant comes into its own. That animated paperclip may make redundant comments, but you can program it to pop up and be helpful. When staff members tend to forget a necessary procedure, you can program it to show them how.

If you can write a simple macro you can create an Office Assistant balloon. Let's say you want people who've made entries in a file to circulate it to others, as shown in screenshot 1. Press Alt & F11 to start the VBA for Excel editor. Choose Module on the Insert menu and in the right-hand box enter the 14-line macro shown in figure 1 below.

As the macro is called Auto_Close() it will automatically run when the user tries to close the file. The next line establishes that you are creating a new message balloon. The Mode is Modal, meaning you can't enter anything on a worksheet while the balloon is displayed. An OK button is created to close the Assistant. The heading will be New circulation, underlined, and in font colour red (cf 249). Then there is a line of text to make the request followed by three bulleted labels In blue (cf 4), specifying to whom the information should be circulated.

Save and close the VBA editor. When you close the Excel file the

SCREENSHOT 1



Office Assistant will appear and you will have to click OK, confirming you have read it before closing the file.

To offer some choices when the file is opened, first create a heading style. Anywhere in a blank area of your worksheet temporarily enter a title and format it, say in Arial Black, 12pt, Alignment Left, Vertical Centre Aligned, colour Brown. Select this cell and choose Style on the Format menu. In the Style name box enter, Heading and click OK. The code is much the same. Figure 2 shows the full macro.

It starts with Sub Auto_Open() so it will run when your file is opened. Again there are Heading and Text sections. Although there is some duplication between the entries for the three checkboxes, this offers you the flexibility to change the worksheet selected, the cell where the heading is entered, the wording, style and row height for the heading. If the user should select all three boxes, 'Profit Report' would appear on Sheet 3. But it would be easy to change the code so each worksheet will have a different heading if all three boxes are checked. You could rewrite the code so each sheet was referred to by the name on its tab. But if you use Sheet1, Sheet2, and so on as here, VBA for Excel will recognise the worksheet you want whatever the tab name.

The Office Assistant can pop up with personalised reminders

At the moment, the file opens and stays with the worksheet displayed when the workbook was last saved. You can see what has happened after using the Auto_Open macro by clicking on the tab for Sheet3. But it Is easy to change the code so the focus is shifted to Sheet3 automatically. Just delete the single lines like:

```
Sheet3.Range("C1")↙
 Value = "Sales Report"
```

and replace with the two lines:

```
   Sheet3.Activate
Range
("C1").Value = ↙
 "Sales Report"
```

(Key: ↙ code string continues)

While writing the macro you don't have to keep opening and closing the workbook to see if it works. Just press Alt & F8, choose either Auto_Open or Auto_Close and click the Run button. To make changes click the Edit button.

CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Email him at: spreadsheets@pcw.co.uk. Please do not send unsolicited file attachments.

FIG 1

```
Sub Auto_Close()
Set balNew = Assistant.NewBalloon
With balNew
  .Mode = msoBalloonModal
  .Button = msoButtonSetOK
  .BalloonType = msoBalloonTypeBullets
  .Heading = "{cf 249}{ul 1} New circulation {ul 0}↙
{cf 0} "
  .Text = "When you have completed your entries here ↙
please copy:"
  .Labels(1).Text = "{cf 4}Human Resources{cf 0}"
  .Labels(2).Text = "{cf 4}Strategic Services{cf 0}"
  .Labels(3).Text = "{cf 4}Library{cf 0}"
 ret = .Show
End With
End Sub
```

FIG 2

```
Sub Auto_Open()
With Assistant.NewBalloon
    .Heading = "To get started"
    .Text = "Select your department"
    For i = 1 To 3
       .CheckBoxes(i).Text = "Dept. " & i
    Next
    .Button = msoButtonSetOkCancel
    .Show
    If .CheckBoxes(1).Checked Then
       Sheet3.Range("C1").Value = "Sales Report"
       Sheet3.Range("C1").Style = "Heading"
       Sheet3.Rows(1).rowheight = 19.5
    End If
    If .CheckBoxes(2).Checked Then
       Sheet3.Range("C1").Value = "HR Report"
       Sheet3.Range("C1").Style = "Heading"
       Sheet3.Rows(1).rowheight = 19.5
    End If
    If .CheckBoxes(3).Checked Then
       Sheet3.Range("C1").Value = "Profit Report"
       Sheet3.Range("C1").Style = "Heading"
       Sheet3.Rows(1).rowheight = 19.5
      End If
End With
End Sub
```

(Key: ↙ code string continues)

Ken McMahon
is a freelance journalist and graphic designer. His involvement with digital graphics began with a Commodore 64. He graduated to Macs and now works mostly with PCs. Draw your own conclusions

Keep the noise down

Reducing noise on your images can be tricky; we show you how with a range of solutions

Are you bothered by noise? The bloke next door may be keeping you up by playing music at full volume from dusk 'til dawn, but aside from the fact that it's bad manners that's not my concern.

The kind of noise I'm talking about is digital; there's a degree of noise present in all digital images. Like the grain in photographic emulsions, it's an imaging fact of life.

Noise is produced by image sensors when they convert light into an electrical voltage, which is then sampled to produce a digital value. The amount of noise a sensor produces depends upon its physical properties, not least of which is its size, and is expressed as its signal-to-noise ratio or SNR. Generally speaking, the smaller a sensor is, the less efficient it is at capturing light.

One problem for manufacturers is that to produce a high-resolution scanner they need to squeeze a lot of sensors – 1,200 or even 2,400 – onto a linear sensor array measuring the width of a sheet of A4 paper. Paradoxically, a scanner with higher optical resolution might produce inferior-quality images due to the high SNR.

Of more practical consequence for digital photographers is what happens when you increase the ISO setting – the equivalent of choosing a higher film speed on a film camera, or use very long exposures to capture detail in low light. Once again, the sensor is attempting to capture more light and the result is a reduction in the SNR or, to put it another way, more noise.

In this case, we're not talking about a few barely noticeable specks. A lot depends on the camera, but beyond 400 ISO, image noise becomes a very real and visible problem.

Several camera manufacturers have included noise reduction modes in an attempt to alleviate the problem. Generally these work by making several exposures and comparing them to identify and eliminate noisy pixels.

Noise reduction

Noise caused by long exposure can be easier to deal with than noise caused by using a high ISO setting. Long exposure noise is caused by 'hot pixels' which produce inappropriately high values that show as white, red or green dots. Pixels that are hot during one long exposure tend to exhibit the same problem in subsequent exposures and so can be identified by making a second 'black frame' exposure.

The blue channel (left) shows the most noise (the original is on the right)

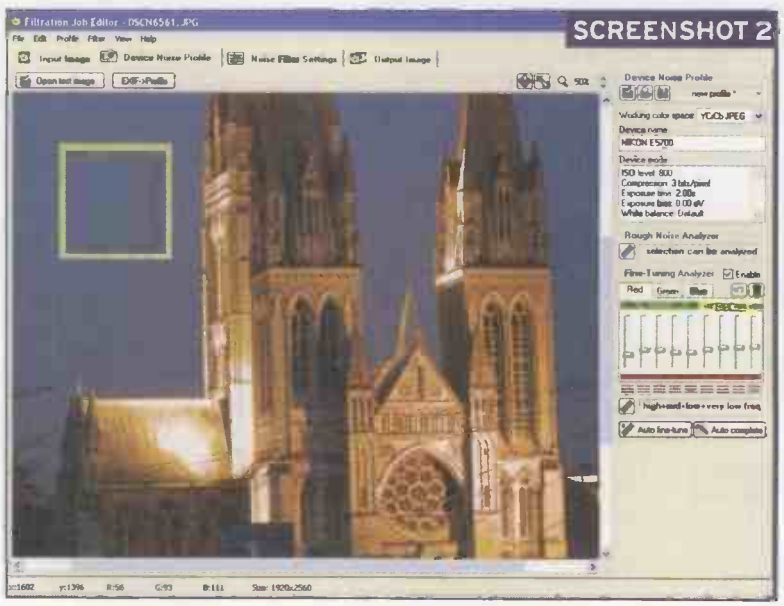
Nikon's Clear Image mode takes three exposures – two with the shutter opened and one with it closed. The problem with these solutions, apart from their limited effectiveness, is that they usually impose restrictions on how you can shoot and the images take a long time to process in the camera. Clear image mode doesn't work well with moving subjects, is restricted to 960 x 1,280 resolution and a tripod is recommended. If your camera doesn't have a noise reduction mode, or you don't want to use it for the reasons I've just mentioned, there is always the option of post-processing in an image editor. This not only means you can shoot however you want, but being able to see what's going on and make a few critical judgements gives you a big advantage over the in-camera algorithms.

To eliminate hot pixel noise in long exposure images you need to make an additional exposure with the lens cap on, using exactly the same settings as for the original. This black frame can then be used to isolate noisy pixels in the original.

But before we get on to that it's worth considering that, if the best possible image quality is your goal, you should shoot in raw mode if your camera provides it. This will avoid exacerbating the noise problem with in-camera sharpening and jpeg compression.

It's quite a simple process. Open the two pictures in Photoshop and drag the black frame image on top of the original to create a new layer. Hold down the Shift key while doing this to position it exactly above the underlying layer.

Next, apply the gaussian blur filter to the black image layer with a radius of about 0.5pixels. Finally change the blend mode to difference. Toggle the layer on and off using the eye icon in the layers palette to see the before/after view.



Creating a device noise profile using Neat Image

ISO noise

Removing noise resulting from a high ISO setting is less straightforward. This kind of noise is introduced because of the degree of amplification required to produce images in low light conditions and is, by its nature, more random and more widespread than hot pixel noise. Hot pixel noise is something you may never have to deal with, but ISO noise is there in every picture you take, even at low ISO settings.

Because you can't isolate high ISO noise a more general approach is called for. The problem is how to get rid of (or at least reduce) the noise without degrading the overall image quality.

First duplicate the background by dragging it onto the new layer icon at the bottom of the Layers palette. Rename the new layer 'noise blur' and apply the median filter with a radius of between six and 18 pixels. Then change the blend mode of the layer to colour and you'll see a marked reduction in the noise.

If you're not convinced this is making much difference, you can get a better look at just how much noise there is in an RGB image by examining the channels individually. Press Ctrl & 1, Ctrl & 2 and Ctrl & 3 to view the red, blue and green channels, or use the channels palette to toggle them on and off. You'll probably see most noise in the blue channel (see screenshot 1).

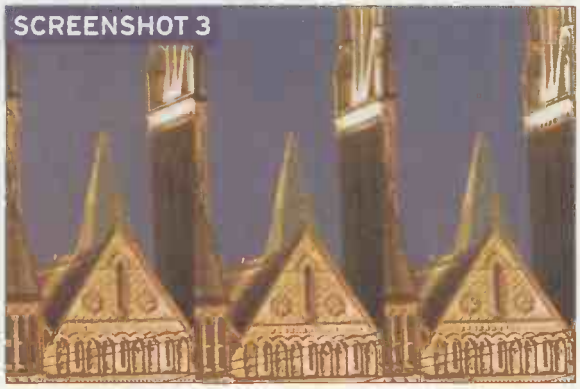
Because sensors are least sensitive to blue, (actually they are least sensitive to green, but this is overcome by placing twice as many green pixels in the filter array) the blue channel undergoes greater amplification and hence generates more noise. With just the blue channel visible, toggle the noise blur layer on and off and you'll get a better idea of the effectiveness of this technique.

Plug-in solutions

If you do a lot of low light photography it might be worth considering a noise reduction plug-in. There are quite a few of these around; some are shareware, most are reasonably inexpensive and they all offer approaches of varying sophistication and effectiveness.

Neat Image offers some very sophisticated tools, but to make effective use of them requires a degree of perseverance. Having said that, you can get reasonably good results in a few minutes. As always it's the fine tweaking to get that extra improvement that takes time and a little skill.

Neat Image is available in three versions – Home, Pro and Pro+. In addition to the features available in the Home version, the Pro version offers full batch processing and 16bit support. The Pro+ version is supplied as a Photoshop plug-in as well as the standalone application.



Left: original image; centre: noise reduction using my image-generated profile; and right: using a calibration chart-generated profile downloaded from the Neat Image website

Screenshot 2 shows the Neat Image workspace – a resizable four-tabbed panel with a big preview window. Neat Image works by analysing areas of the image that don't (or shouldn't) contain any detail and building a profile that describes the noise characteristics of the camera.

Creating a profile is pretty straightforward. Define a suitable square area of the image with a rectangular marquee and click the rough noise analyser, which produces the basic profile. This is then refined by clicking the auto fine-tune button which measures the dependence between the level of noise and the local brightness in different image areas. This is to take account of the fact that noise levels vary throughout the tonal range – for example noise may be stronger in darker parts of the image. The auto fine tuner adjusts a bank of sliders that represent estimation of noise levels in 10 tonal bands. You can also set these sliders manually. So if you could see there was no noise in the highlights you might try setting the three sliders on the far right to zero.

With the profiling complete it's time to move on to the filtering stage. The controls here are split into three panels – Noise filter settings, Noise reduction amounts and Sharpening settings. Each of these provides controls for reducing noise in the high, medium and low-frequency parts of the image – or to put it another way, areas with fine, medium and coarse detail.

Like the profile analysis, filter settings work in a YCrCb colour space, which makes it possible to distinguish between and apply different settings to noise that affects pixel brightness and that which affects pixel colour.

For a quick fix you can use the default preset, though you may find

Noise reduction plug-ins

Neat Image www.neatimage.com
Available in Home ($29.90) (£16 approx), Pro ($59.90) and Pro+ ($74.90) versions.

Visual Infinity Grain Surgery www.visinf.com
A Photoshop plug-in with a sophisticated interface similar to Neat Image, but with better preview facilities. As well as 'grain' removal you can add grain and match grain for consistency across several images. Quite expensive at £179, the free demo download is fully functional, but renders a grid over images to which it's applied. There's also a film and DV version for After Effects.

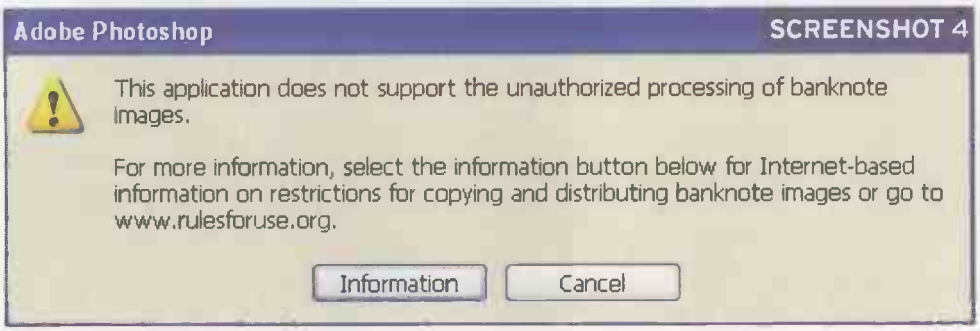
Alienskin Image Doctor www.alienskin.com/idoc/idoc_main.html
Image Doctor is a suite of four filters – Smart Fill, Scratch Remover, Spot Lifter and Jpeg Repair – from the people who brought you the renowned Eye Candy suite of effects plug-ins. As well as reducing jpeg artefacts caused by over-compression, Jpeg repair makes a good fist of noise reduction. The suite costs $129 or $99 if you already have Eye Candy, Xenofex or Splat and there's a free 30-day fully functional trial download on the website.

Inovalabs ISO Denoise Filter www.digitalsecrets.net/secrets/denoiseISO.html
No banks of sliders or even presets to think about, this is a one-hit wonder that produces pretty good results with extreme ease of use – and it's free.

Digital Deluxe Toolbox version 1.0 www.2morrow.dk/75ppi/coolpix/actions
A suite of free Photoshop actions designed for real hands-on treatment of ISO noise. The denoise action is general-purpose denoiser designed for DDC-based cameras which maintains edge detail by creating masks to preserve edge and highlight details and avoid colour banding.

Power Retouche Noise Filter www.powerretouche.com/Noise-filter_plugin_introduction.htm
A photoshop plug-in with four customisable noise reduction methods. The full plug-in costs £32 and includes excellent documentation. The demo download adds a watermark to filtered images.

To save you the download time, you'll find trials of many of these on this month's cover disc.



this a little heavy handed and the other presets provide ample options for most situations.

The final stage is the Output Image tab, where the filtration is applied with the selected settings to the image, using the profile created at the first stage. If all this sounds like a lot of work, I should add that, once you're familiar with the program, it's possible to get to this stage in a few seconds.

Applying the filtration took roughly 40 seconds for this 1,920 x 2,560 24bit image on a 2GHz P4, but if you have a lot of images to process and are happy to use the same profile, even the demo version supports limited batch processing.

Screenshot 3 shows side-by-side views of the same section of a) the original image, b) noise reduction using an image-generated profile and 'remove half noise' preset and c) noise reduction using a user-generated profile downloaded from the Neat Image website and the same filtration settings as b. Noise detail doesn't always reproduce well in print, so if you want a better look at this image you can find it at www.mooli.co.uk/pcw/noise/comparison.jpg.

Even on the half-strength setting, Neat Image does a good job of reducing noise both in the flat sky area and the stonework detail. It is possible to eliminate the noise with stronger filtration, but at the cost of lost detail.

The downloaded profile was created using the calibration target available on the Neat Image website. This consists of a number of greyscale swatches. You print the target then photograph it (or scan it if you want to profile your scanner). As the noise characteristics of your camera will vary at different ISO settings you need to create a profile for each one. Then you analyse the calibration chart in Neat Image in a process similar to the one just described.

What surprised me about this comparison was that's it's almost impossible to tell my quick profile effort from the downloaded one produced using the calibration chart.

Photoshop CS – the CS doesn't stand for Currency Snitch

There are differences, but I had to superimpose the two images using the difference blend mode to spot them. Depending on how you look at it, this either means that Neat Image works very well with image-generated profiles, or that profiles made with the calibration chart method aren't worth the bother, or both.

It may of course be that, like 'canned' colour profiles, noise profiles aren't all that accurate unless they're made for specific devices. So you may get better results generating your own calibration chart profile than using a downloaded one.

If I was to make a criticism of Neat Image it would be that it doesn't provide a side-by-side comparison preview. It provides some pretty good visual analysis tools – like a variant selector which allows you to save preview swatches for given filter settings and a component viewer which displays previews of the filtered Y, Cr and Cb channels. But what you need to see is a side-by-side before and after comparison.

'At the risk of sounding like a conspiracy theorist, what else is in Photoshop CS that we don't know about?'

It might be asking for a lot, but some method of defining a selection mask would also be a good thing, or at least the ability to import one in the form of an alpha channel. It may be that you can do this with the Photoshop plug-in version. With this shot of the cathedral, for example, I'd be quite happy to restrict the filter to the sky area and maintain the detail in the stonework where the noise isn't that much of a problem.

Counterfeiting

I was surprised recently, not to say a little disappointed, to read on www.slashdot.org and www.siliconvalley.com that Adobe has added currency detection code to Photoshop CS that prevents opening images of US and other currency bills (see screenshot 4). The issue was brought to light on the Adobe forums, where a poster complained that Photoshop CS refused to open an image of a $20 bill, instead producing an alert box with a link to a US Secret Service web page outlining restrictions on the use of illustrations of US currency.

In addition to US $20 bills, users have reported problems with bills of other denominations and currencies. According to Slashdot, Photoshop treats euros in the same manner and Ken Bradner, a Harvard University consultant, found that the software recognised and blocked British £20 notes, but not £5 and £10 notes.

However, my experience proved otherwise, Photoshop CS recognised and refused to open scans of a £5 and £10 note, instead presenting an alert box with the message: 'This application does not support the unauthorised processing of banknote images.' In my copy of Photoshop, the currency alert box includes a link to www.rulesforuse.org, a portal with links to websites of central banks in a number of countries including the Bank of England. The US Secret Service website previously mentioned is the US link.

It's interesting to note that the law in the UK is much more restrictive regarding reproducing banknote images than in the US. It's not allowed without the Bank of England's permission. My guess is they won't be handing out software keys to disable the block.

What's more interesting is why Adobe should have chosen to do this when, in the US at least, under certain circumstances currency reproduction is not illegal and designers frequently have legitimate reasons for using images of currency (type currency into a photo library search engine and you'll see what I mean.)

At worst, this will cause a lot of inconvenience to a small group of designers – if I worked in the design department of a finance and investment magazine, I wouldn't be in a hurry to upgrade to Photoshop CS. But the bigger worry is why was Adobe so reticent to say anything about this new 'feature'. At the risk of sounding like a conspiracy theorist, what else is in CS that we don't know about?

CONTACTS

Ken McMahon welcomes your comments on the Digital imaging & video column. Email him at: digitalimaging@pcw.co.uk. Please do not send unsolicited file attachments.

Guy Kewney
has been reporting on all aspects of IT since long before the first personal computers arrived on the scene. He now believes the wireless revolution will change the world

Pocket control

How easy is it to access your PC on the move with your mobile? We investigate

A recent column – about remote control of your home PC via wireless – was a bit discouraging for some. 'You make it seem like it's so hard it's not worth doing,' was one response.

This time, I hope I have two answers to that. First, I've got a system for remote control of your PC from your phone – and you don't even really need a smartphone – any phone that is capable of Wap will do.

Second, if you think it's probably more effort than most people will be prepared to put into it, you're right. Remote control, in any rational analysis, is not what we will be doing in future. What will work in 10 years' time will be an integrated wired and wireless system accessible worldwide, which allows you to read and write your data without ever knowing where it is, and without caring what you are using to access or edit it.

At present, storing your data somewhere on the web can be expensive. I'm fortunate in having access to CIX at www.ameol.co.uk – a conferencing system where most of my colleagues hang out.

The conferencing is great. I can discuss anything from homeopathic treatment of discouraged carrots, all the way to Islamic fundamentalist dentistry. There's also email and a reasonably good ISP. But there's more: for less than a tenner a month I get all that, plus a place where all my text is stored.

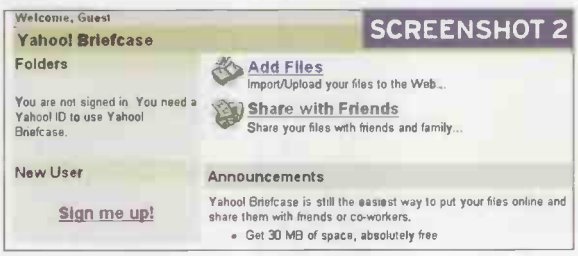
But most people don't want a CIX account for some reason – maybe to avoid chatting to me? They want another way to store files. And I've just found one which is free.

It's called the Yahoo Briefcase. Not heavily publicised, it's a system where you can store 30MB of data for absolutely nothing.

To set this up, go to www.yahoo.com and look for the briefcase symbol, along with the mail one and you'll be taken to http://briefcase.yahoo.com (see screenshot 1).

You may already be a user of Yahoo Messenger or have a Yahoo email address. In both those cases, all you have to do is log in and create a briefcase. Otherwise, use the new user button to sign up and create a briefcase of your own (see screenshot 2).

Not well advertised, but the Briefcase is easily accessible from the Yahoo Home page



For those without Yahoo Messenger or email accounts, Briefcase can be easily installed by signing up

So far, so obvious (you may say) but there's a dodge. So far, I have not found a limit on the number of Yahoo accounts you can create, and each one gets its own 30MB. And yes, each one is accessible from your Wap phone or PDA.

These days, of course, you can stick a 128MB SD (Secure Digital) memory card into a lot of phones, which makes 30MB look pretty thin. But an SD card can be easily dropped on a floor, where it will vanish between the cracks. This way your data can be stored safely online, so you can recover it anywhere you like.

Something tiny

It was my judgement (see last issue) that, while GotomyPC and Laplink Everywhere were really remarkably clever for mobile PC users, they were not very practical when it came to mobile phone users.

Naturally, I have a solution: it's a product called Pockethub, from Pocketwatch Systems at www.pocketwatchsystems.com, and it's specifically designed for mobile phone users. There is nothing to stop you using this from a PC and, with the greatest respect to Pocketwatch Systems, it has to be admitted that it works far better if you use a PC to run it remotely, just like its rivals. There really is a limit to how well you can operate a high-res PC image with 1,024 x 768 pixels when examining a text-only Wap display.

But it works. Setting up the system was pretty much automatic. The software is downloadable on a two-week free trial – which I recommend, because it is not going to be for everyone. Even better; there's a live demo on the website, which lets you see how it works, actually controlling a real PC at the Pocketwatch office (see screenshot 3).

If that looks good, download the 46MB trial software from www.pocketwatchsystems.com/try/trial.html. Run the install executable, and use the default settings (see screenshot 4)

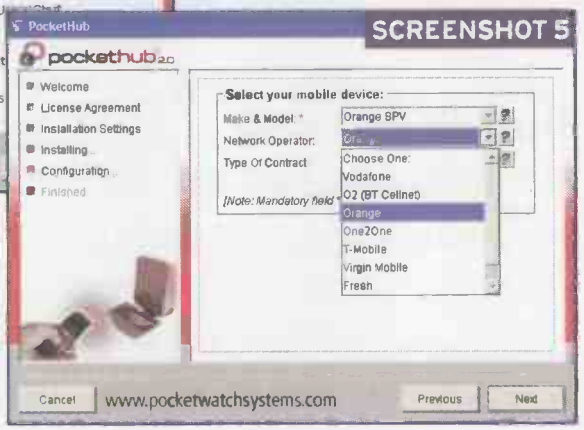
The first important detail to watch is the Register screen. I know most of us have got used to skipping this on the grounds that it generates useless spam, but in this case, you need to do it, because it needs to know what device you're using to access your PC.

The next important detail is when you start entering your personal data. I know that security is quite important when setting up your home PC so that it's accessible from the web, but even so, there are security tricks which are appropriate when working from a full keyboard, but which you will hate yourself for when using the 12 keys of a mobile phone.

For example, a punctuation character is a great idea when setting up a password, which should be long, have letters and numbers, no words which a dictionary would provide and be impossible to pronounce.

But unless you know where to find the punctuation characters on your phone keyboard my earnest advice is to skip that bit.

The live demo online lets you get a feel for the software before downloading



Left: Use the default settings for installation

Below: For UK-based users, Pockethub supports a huge number of phones. Overseas users may have to use trial and error

I used one, and by the time I was finished testing the thing, I was ready to shoot whoever created the password (me, of course). Tip: pick letters which are the first option on a keyboard, avoid letters like C, F, or I – and, of course, S or Z which take four key-presses. If you think that restricts you too much, then at least make sure you pick consecutive letters which occur on different keys, so you don't have to sit and wait for the recogniser to time out before you select the next one – ABC is a no-no, as is DEF.

The same applies to your username. I tried using my complete name on the grounds that firstmiddlesurname would be unique, but it takes weeks to type that in if you aren't a fast texter. Worse still, in order to log in, I had to enter the URL of my pockethub node, which was: **http://firstmiddlesurname.pockethub.net** – a real thumb-burner.

Would-be crackers please note: my trial name and password expired two weeks after I did this review, so even if you think you know my middle name, don't waste time seeing if you can hack my PC with it.

The next trap is in selecting what applications you are going to use. The point is that you won't be in remote control mode unless you select the browse PC option, so you won't be able to fix things which aren't working.

By default, Pockethub expects you to use Outlook for mail, calendar, notes and contacts. On my test machine, it turned out, I hadn't set up Outlook for mail, so when I dialled in the first time, the system froze. On the home screen was a standard Outlook dialogue box asking me to run the first-time setup wizard. And there was nothing I could do about that until I got back home.

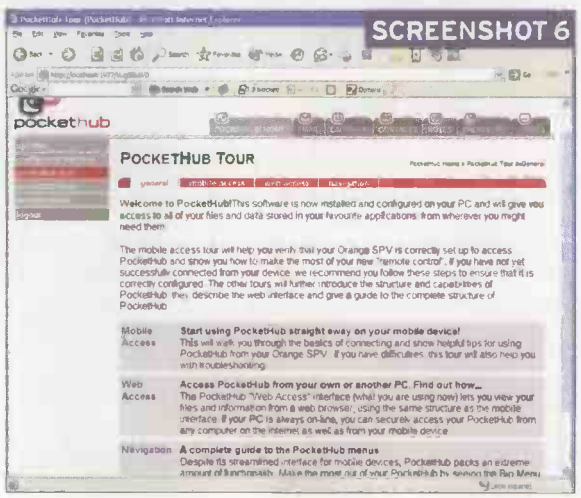
In each case, Pockethub has its own application, and it's worth setting that up for a start. The list of devices you can use to connect to it is enormous, and includes selecting which phone carrier you have, too (see screenshot 5). I set it up on an Orange SPV for fun; but the list is long, so make sure you know which model your phone is.

After setup, you can run the tour and get tuition. I found this to be useful, but you can do that any time, as long as you are in front of the host PC – not on the remote phone (see screenshot 6).

Give it a go; it's pretty painless. That's not to say it's ideal, simple or foolproof. You may, for example, have a phone with a camera, but it may take you a while to work out which combination of keys allows you to upload pictures using your Wap link to your PC, and it may vary enormously, depending on where the phone keeps the files.

I found this was useful, and I've decided to set up a subscription. Being able to access the home machine over GPRS/Wap from a phone is, frankly, not going to be something I do often enough to justify the pound per week it costs; but having remote control from another PC certainly is. For £50 for outright purchase, I can't see a problem. If the terms and conditions were to change, obviously that would be another question – but I'm not expecting that to happen.

There's a tutorial which runs on the host, not on the remote viewer



Pockethub worked for me. Used over broadband from one PC to the other, it wasn't the fastest remote control system I've used. However, over a GPRS phone-based link, the speed of the Wap connection was the bottleneck, and I suspect most people will only use that for checking email on the home machine. But for that, it's invaluable, because you can leave the home machine, with all its broadband speed and power, to handle the downloads, while you just examine the list of senders, using tiny amounts of data across the air.

Of course, there are other ways of looking at your email over the air, and in a future column, we'll look at things like Smartner's Duality server and Rim's Blackberry. They're good, professional systems, much used by corporate IT departments. However, as you'll discover, they require more than just a nodding acquaintance with Pop3, Imap and SMTP authentication, setup and redirection, and are most certainly not designed for the home user with nothing except a broadband link.

By contrast with most other remote-email systems for private users, Pockethub is within the capability of the clumsiest amateur to configure and use; and as a remote control system, it is about as cheap and simple as you could hope for.

An IT professional would say: 'Set your machine up as a web server and use a dynamic DNS system like Hammernode' and if you're up to that, then yes. But if that goes wrong, you won't have the Pockethub helpline to fall back on; you'll have to be your own sysadmin, and your own boss at the same time. I don't recommend trying it unless you have a lot of confidence.

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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3+ mega pixels

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Kyocera Finecam SL300	3x zoom...	£299.99
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Minolta Dimage E323	3x zoom...	£149.99
Minolta Dimage Xi	3x zoom...	£179.99
Minolta Dimage Xt	3x zoom...	£229.99
Minolta Dimage Z1	10x zoom...	£279.99
Nikon Coolpix 3200	3x zoom...	£229.99
Nikon Coolpix SQ	3x zoom...	£279.99
Olympus C310	3x zoom...	£149.99
Olympus C350	3x zoom...	£179.99
Olympus Mju 300	3x zoom...	£249.99
Olympus C720	8x zoom...	£249.99
Panasonic Lumix LC33	3x zoom...	£249.99
Panasonic Lumix F1	3x zoom...	£279.99
Pentax Optio 33L	3x zoom...	£189.99
Pentax Optio 33LF	3x zoom...	£229.99
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Sony DSC P52	2x zoom...	£154.99
Sony DSC P72	3x zoom...	£209.99
Sony DSC P8	3x zoom...	£229.99

4+ mega pixels

Canon Ixus i Silver	fixed lens...	£269.99
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Canon Ixus 400	3x zoom...	£349.99
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Casio Exilim Z4	3x zoom...	£299.99
Kodak DX6490	10x zoom...	£349.99
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Minolta Dimage S414	3x zoom...	£249.99
Minolta Dimage G400	3x zoom...	£269.99
Nikon Coolpix 4300	3x zoom...	£249.99
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Olympus Mju 400	3x zoom...	£299.99
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Pentax Optio S4	3x zoom...	£299.99
Samsung Digmax V4	3x zoom...	£269.99
Sony DSC F77	fixed lens...	£309.99
Sony DSC FX77	fixed lens...	£349.99

5+ mega pixels

Canon Ixus 500	3x zoom...	£PHONE
Canon Powershot S50	3x zoom...	£299.99
Canon Powershot G5	4x zoom...	£399.99
Canon P'shot G5+1 Gb	4x zoom...	£549.99
Contax TVS Digital	3x zoom...	£699.99
Fuji Finepix S7000	6x zoom...	£499.99
Jenoptik JD-5200Z3	3x zoom...	£199.99
Konica KD 500Z	3x zoom...	£329.99
Konica KD 510Z	3x zoom...	£399.99
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Nikon Coolpix 5700	8x zoom...	£599.99
Nikon Coolpix 8700	8x zoom...	£879.99
Olympus C5000	3x zoom...	£279.99
Olympus C50	3x zoom...	£279.99
Olympus C5060	4x zoom...	£599.99
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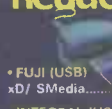

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Niall Magennis
has been dabbling in Midi and digital audio since the days of the Atari ST. He writes on a freelance basis for a number of music magazines and lives in London in a flat overrun with music equipment

Get personal with XP sounds

Create your PC's own bank of sounds for event notification

The Control Panel is the place to go if you want to change your Windows System sounds

The chances are that when you switch on your PC and it boots into Windows it will play some kind of sound. If your PC has a standard Windows XP install then it will bleat out an ambient flourish, but your computer could be loaded with another set of sounds installed by its manufacturer.

However, it's not just at boot-up time that Windows makes noises. If you do something you shouldn't then you're likely to get the audio equivalent of a slap on the wrist from a harsh chord sound. When a mail arrives your email application will most likely greet it with the sort of fanfare usually reserved for state visits by foreign dignitaries, and when you empty the Windows trash can you'll hear all those discarded Word documents being scrunched together.

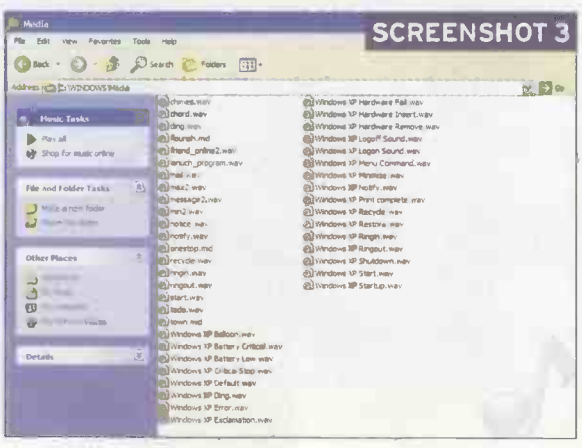
The fact is that Windows has a sonic bank of noises that are sounded off when different events occur. But what if all this banging and clanging is getting on your nerves and you'd like to replace the whole shebang with noises of your own choosing? What if that stab chord that notifies you you've done something wrong makes you want to pick up your PC and drop it out of a fourth-floor window? Luckily you can change pretty much any of the sounds that Windows triggers for different events. If you want you can simply turn them off, but you can also swap them for samples you have downloaded off the net or even for ones you've recorded yourself. So if you want to get rid of that annoying chord sound and replace it with the wrong answer sample from *Family Fortunes*, you can.

To get started you'll need to open the sound schemes folder in Windows Control Panel (see screenshot 1). To get there click on the Start menu, select Control Panel and then select Sounds, Speech and Audio Devices. You'll now be presented with a list of three tasks. Choose the second one, named Change the sound scheme. This will open the 'Sounds and audio devices' properties box on the Sounds tab.

In the bottom half of the window you'll see a box marked Program events. This contains a list of all the events in Windows that can be assigned to a sound. Events that already have a sound linked to them are shown with a small speaker icon next to them. If you click to highlight one of these you'll see that the Play button beside the Sounds box becomes active. You can click on this to audition the assigned sound. As you scan down the Program Events list, you'll see that by default not all events have audio triggers attached and many are left blank. Obviously you won't want Windows to make a fanfare every time you click your mouse somewhere in an application, but you may see items you'd like to add a sound to (see screenshot 2). You may also see items that already have a sound assigned but that you would like to change. Luckily you can easily achieve both of these tasks.

When you scan down the Program Events list you'll see that not all events have audio triggers attached to them

The default Windows alert sounds are stored in the C:\Windows\Media folder



The sounds are actually stored on your hard drive as individual wav files and, although events can use sounds located anywhere on your drive, the ones installed by default can be found in the C:\Windows\Media folder (see screenshot 3). Often when you load a new application it will also install new sounds on your computer. If you scroll down through the Program Events list you should come across entries for applications you have installed yourself, such as Microsoft Active Sync or AOL Instant Messenger. These sounds will usually be stored in the program's own folder rather than being added to C:\Windows\Media. This is to stop programs from overwriting one another's sounds. If you click on a sound for an installed application you will see the file path for the sample appear in the Sounds box.

Scheming with sounds

Although you can apply changes on a per event basis, Windows also allows you to quickly jump between different sets of assigned sounds. Microsoft calls these sound schemes. If you click on the sound scheme dropdown box at the top of the Sounds tab you'll see any sets already installed on your PC. On our machine there were just two entries – Windows Default and No Sounds – but your computer may have more. In fact if there are a number of sound schemes installed, just selecting one of these may be enough to relieve the monotony of the standard Windows sound scheme. However, you may still want to tweak those settings so you'll need to learn a bit more about adding your own touches to a sound scheme.

Now we've got the basics of how Windows uses sounds for events we can delve into the process of changing the settings to suit our own tastes. Before you make any changes, however, we'd advise you to save the existing set of sounds you are using. This will allow you to quickly revert to your default settings if you get bored with your new sound scheme at a later date. You may, of

course, already be using the Windows Default scheme but it's worth saving the current sound set anyway just in case (see screenshot 4). Sounds sets don't actually take up a lot of room so you won't be wasting hard drive space.

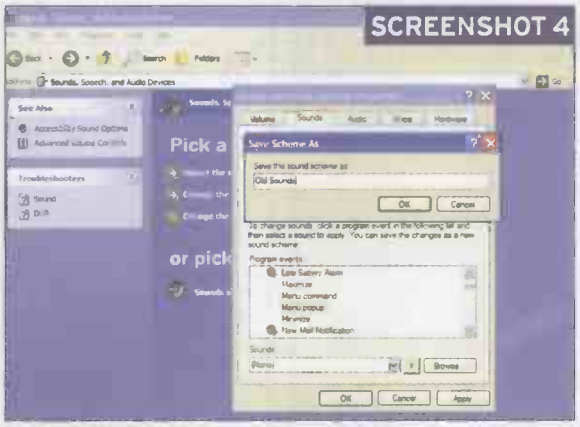
The beauty of the Sounds Control Panel is that it allows you to assign any sound you want from anywhere on your hard drive to an event in Windows. To link a new sound to an existing event, start by clicking once on the event you want to edit. Next, click on the Browse button to open the file browser. You can now navigate to any .wav file on your hard drive and select it. Once you've selected it you can preview the sound using the Play button on the left-hand side of the file browser window. When you're satisfied with the chosen sound, click OK to assign it to the event (see screenshot 5).

While you might think it a good idea to have funny quotes from John Cleese as the sound that announces an incoming mail, you'll soon start to find the line that once made you chuckle really grates after repeated listening. It's best to keep sounds for alerts as short as possible – familiarity definitely breeds contempt. In fact you should stick with very short sounds for everything bar Windows startup and shutdown.

The easiest way to source new sounds is to just download them from the Internet. There are so many sites on the web offering free downloads of short wav files that you'll be spoilt for choice. If you want to use samples from movies and TV shows then a good place to start is **http://funwavs.com**. However **www.wavcentral.com** tends to have a broader range of samples available. Unfortunately at the moment these are gradually being converted to mp3 format so you'll have to convert them back to wav files using an audio editor like Audacity if you want to use them as system sounds.

Audacity can be downloaded for free from **http://audacity.sourceforge.net/windows.php** (see screenshot 6). Because you're going to be working with mp3 files, you'll also need to download the Lame mp3 codec from **http://mitiok.free.fr**.

When you've downloaded the files, start by installing Audacity. Then unzip the Lame archive and extract the Lame.dll file into the main Audacity directory. Once that's done, start Audacity, press Ctrl & P, click on the Formats tab and press the Find Library button. Finally point Audacity to the Lame.dll file.



Changing sounds

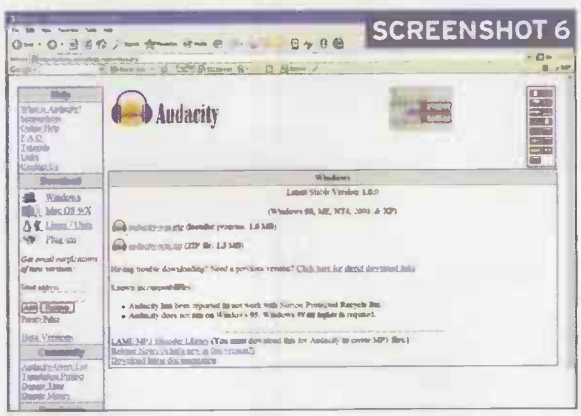
To convert between mp3 files and wav files, all you have to do is load in the mp3 file you want to convert and then click on the File menu and chose Export as wav. It's as simple as that.

Naturally you can also use Audacity to edit existing sounds or even to just record your own. For example you could take an existing sound such as the chord.wav file found in C:\Windows\Media and tart it up a bit. Here's how.

Start by loading the file into Audacity. Click on the File menu and select Open. Then navigate to the C:\Windows\Media folder and open the chord.wav file. If you play the file in Audacity you'll hear the standard 'you've done something naughty' sound in XP. However, we're going to change it into something different using the effects in Audacity.

Top: You should save your existing sound scheme before you start making changes

Bottom: It's very easy to change a sound that's linked to a particular Windows event



Audacity is an easy-to-use audio editor that can be downloaded for free

First of all press Ctrl & A to select the entire waveform. Now go to the Effects menu and choose Reverse. If you now play the file it's already starting to sound quite different. To make it sound really strange we're going to add a wah wah effect. With the waveform still selected, click on the Effects menu and pick wah wah from the dropdown list. In the box that appears, increase the resonance setting to 4, up the resonance frequency to 4 and then set the depth to 100 per cent and click OK. Now if you play back the file you'll hear that it has an added warble to it.

For our next trick you need to click the cursor at the end of the file and then click on the Edit menu and choose Insert silence. Enter three seconds as the length. Press Ctrl & A again to select the whole file, go to the Effects menu again and select Echo. Enter 0.5 as the delay time and 0.5 as the delay factor and click on the OK button. Now when you click Play you'll hear the sound gradually fade in and then echo out at the end in a spooky *Doctor Who* fashion. Save the file as something like chord2.wav and attach it to an event in XP's Sound control panel.

You don't have to just edit existing sounds. You can, of course, just use Audacity to record new sounds from the microphone or line-in sockets on your soundcard. Once you have the sounds recorded, you can use the edit tools to trim them to the right length, add effects and save them in the C:\Windows\Media folder ready to be attached to various events. Along the way you'll also be learning the basics of audio editing, which will stand you in good stead for tasks you'll need to perform at a later date, such as adding sounds to a website.

When you are choosing sounds remember that adding a flushing toilet sample to your recycle bin or various Hal samples from *2001* to the rest of your system may be amusing for five minutes, but it's all been done a million times before. We hope that at least some of you will be able to come up with some more original ideas.

CONTACTS

Niall Magennis welcomes your comments on the Sound column. Email him at: **sound@pcw.co.uk**. Please do not send unsolicited file attachments.

Nigel Whitfield
edited computer magazines before going freelance in 1995. A specialist in Internet and consumer issues, he has a degree in Computing Science from Imperial College

Ringing in the changes

How to use RSS feeds to let people know something's altered on your website

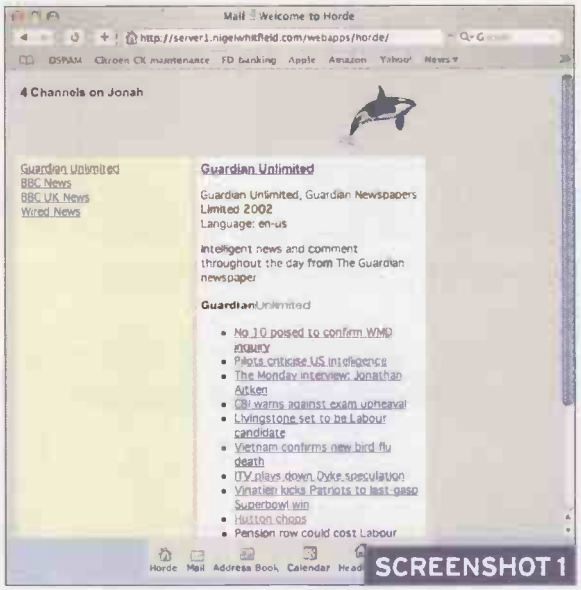
Most of us, after we've been browsing through the web, have a list of bookmarks that's full of things we probably thought were useful when we looked at them. We might even have taken the trouble to organise the bookmarks (or Favourites, if you must call them that) into categories, so we can easily find the page that explains how to service the car, and check back from time to time to see if anything useful has been added to it.

More likely, of course, we tend to forget about half the things we've bookmarked, or get fed up when we visit a site only to find that it has not changed. It's not a new problem, and in the early days of the web, it was quite common to find sites that had forms for you to enter your email address and receive a notification when they were changed. Some of that was done by the site admins themselves, while in other cases it was done by dedicated services, that would automatically check pages, and email you. It's still possible to do that, of course, but you don't see it quite as often these days.

For an individual user, it's a lot of work to keep up to date with a mailing list – not to mention the people who'll sign up for a list, fail to read the instructions that tell them how to unsubscribe, and then greet each posting with a torrent of abusive demands that you stop spamming them.

But there is a better way to let people know when parts of your site have changed: RSS, or Really Simple Syndication. By creating an RSS file on your site, and telling people the URL, they can subscribe to it using a wide variety of programs, called RSS browsers. You'll find these for just about every operating system; they're a great tool for news junkies.

What they do is check each of the RSS 'feeds' that you've subscribed to, at whatever interval you've selected. They grab the contents of that feed, and display the number of new items. Typically you'll see a list of article headings, sometimes a short extract from the text, and when you click on the heading you'll be taken directly to the full text on the appropriate website. Most major news sites provide an RSS feed, so you can keep an eye on new stories, and just visit the ones you want, without having to wade through the rest of the site. There are feeds for music news, technology and just about anything you can think of. *PCW* has such a feed and we covered much of the basics of RSS in our February issue (see www.pcw.co.uk/Features/1152354).



SCREENSHOT 1

As well as browsing on your computer, RSS feeds make it easy to add headlines to your site from elsewhere

You can take feeds and use them to provide a list of headlines on your own site – as long as the terms of the source site allow it. For instance, we've talked about the Horde webmail system before; the Jonah module (see screenshot 1) can be configured so that people have headlines supplied via RSS, along with their email and calendar. And, most importantly for us, you can also make an RSS feed for your own site.

By doing that, you can create a way for people to find out what's been added to your site very easily. If you want to direct people to a 'hidden gem' on your pages, just add an entry to the RSS file, and it'll be flagged up as new for the visitors. Of course, if lots of people subscribe to the feed, and you have a large file, it can potentially add up to a significant amount of data being downloaded – but it'll still be less than if they all checked your home page each day, downloading all its graphics.

How it's done

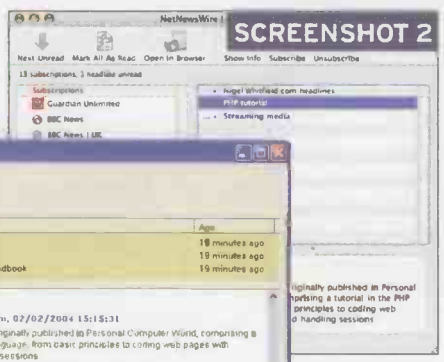
The Simple in Really Simple Syndication is potentially something of a misnomer. RSS is based on XML. And there are quite a few different versions of it, with varying degrees of complexity. Some are better than others at particular things. We're going to look, for now at least, at version 0.91; there's actually a version 1.0 and version 2.0. Version 2.0 follows on from the 0.9x versions, while 1.0 has a different provenance.

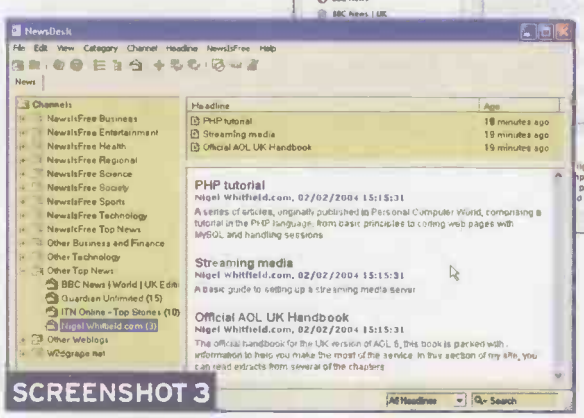
If you want to do complex things, such as specify different authors for each item in your feed, then 0.91 isn't going to be enough for you. But for simply listing the various things on your site, and providing short extracts with links, it's good enough. And more importantly, it's very straightforward to create. It's good enough, frankly, for the BBC news feed and several others.

Calling your RSS information a 'feed' makes it sound as if it's quite complex, involving scripts and live updates of information. But that's not necessarily the case. An RSS feed can simply be a text file uploaded to your server. Visitors just need to know the URL so that they can add it to their RSS browser – screenshots 2 and 3 show two browsers accessing the same feed; Newsdesk is one of several available for Windows, and

Below right: Mac people can use the free, and excellent, Netnewswire Lite to access hundreds of RSS feeds

Below: On the PC, there's a wide range of RSS browsers, of which Newsdesk is just one of the free options


SCREENSHOT 2



SCREENSHOT 3

Netnewswire Lite is a free browser for Mac OSX. Both, as you can see from the screenshots, provide a similar interface, with a list of feeds in one window, headlines in another, and text in a third; clicking on a headline takes the reader to the appropriate page of your site.

Of course, you can make this fancy and more complicated; many pieces of blogging software will automatically create an RSS feed for your site, so that those who hang on your every word can easily see summaries of the new material you've added to the site. And if you're creating a content management system of your own, it's not that hard to add a script that picks headlines and links out of the database, to create an RSS feed on the fly.

Look through the details of subscriptions in your RSS browser, and you'll see a variety of types of link – the BBC links to an XML file, while some sites have .cgi or .php on the end of their links, suggesting a feed that's created anew each time it's accessed.

For now, we're going to start with the simplest of feeds, creating a file to put in the home directory of a website, with the name nwcom.rss.

Making your feed

All we need is a text file; since it's based on XML, it's no surprise that it looks a bit like HTML, with matching pairs of opening and closing tags. Figure 1 shows the first version of our sample feed, which created screenshots 2 to 4.

The file opens with the <rss> tag, specifying which version of the format is being used; that's obviously 0.91; other versions tend to look much more terrifying and XML-like. Your feed is called a channel, and so the channel tags enclose all the rest of the information.

First up, you'll find title, link and description of the channel itself; these are the basic details you might want people to refer to when they're trying to remember, for example, what the channel they've subscribed to is for. Screenshot 4 shows the results of looking at the information for our feed in Netnewswire Lite.

If you look at some of the other sites, you'll see logos and other information. To add a logo, simply include an image element in the feed; it's not quite the same as in HTML, though. You need to have something like this:

```
<image><url>http:↙
//myserver.com/image↙
.jpg</url>
<title>My image ↙
title</title>
<link>http://www.↙
myserver.com</link>
</image>
```

(Key: ↙ code string continues)

The title and link elements are required – you can't miss them out.

Once you've set out the basic description of your feed, the next step is to add an item entry for each of the stories or articles on your site that you want to appear in people's RSS browser. As you can see from figure 1, it's a very simple format – each story has a title, link and description. And that's it.

All you have to do is update the file with new information, and everyone who's subscribed to your RSS feed will see the new entries, and be able to go straight to them, helping to keep visitors coming back to your site.

Validation

Of course, you need to tell people that there's a feed there in the first place; how do you do that? One way is by adding a prominent link to your front page, perhaps with a helpful icon to tell people that you have a valid RSS feed. And how do you know that your feed is valid?

Easy – go to **http://feedvalidator.org**, type in the URL of your RSS file, and click Validate. If all is well, you'll see a confirmation that you've got everything right, and there's an icon to download and use on your own website too. If there are any mistakes, the site will give you a clear explanation of what's wrong, so you can easily solve any problems that arise.

Now all people have to do is add the URL of your feed to their RSS browser, and they can see when you've changed things – it's a much better solution all round than simply having a bookmark lost in the depths of an untidy web browser menu.

FIG 1

A simple RSS feed

```
<rss version="0.91">
<channel><title>Nigel Whitfield.com</title>
<link>http://www.nigelwhitfield.com/</link>
<description>Nigel Whitfield.com is the home page for an English technology ↙
journalist. The site includes tutorial material on PHP, and a selection of ↙
previously published features and columns</description>
<language>en-gb</language>
<item>
<title>PHP tutorial</title>
<link>http://server1.nigelwhitfield.com/pcw-php/</link>
<description>A series of articles, originally published in Personal ↙
Computer World, comprising a tutorial in the PHP language, from basic ↙
principles to coding web pages with MySQL and handling sessions</description>
</item>
<item>
<title>Streaming media</title>
<link>http://www.nigelwhitfield.com/exclusive/streaming.html</link>
<description>A basic guide to setting up a streaming media ↙
server</description>
</item>
<item>
<title>Official AOL UK Handbook</title>
<link>http://www.nigelwhitfield.com/work/aolbook/index.html</link>
<description>The official handbook for the UK version of AOL 6, this book ↙
is packed with information to help you make the most of the service. In this ↙
section of my site, you can read extracts from several of the ↙
chapters</description>
</item>
</channel>
</rss>
```

(Key: ↙ code string continues)

SCREENSHOT 4

The channel description and title can be viewed in the RSS browser

CONTACTS

Nigel Whitfield welcomes your comments on the Web development column. Email him at: webdev@pcw.co.uk. Please do not send unsolicited file attachments.

Alan Stevens
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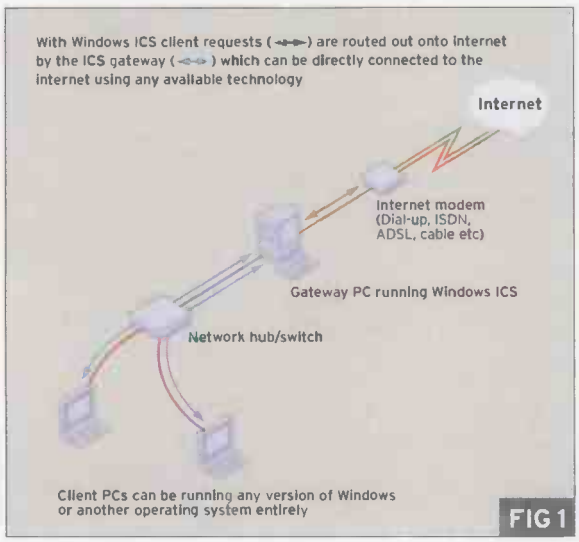
Share and share alike

A step-by-step guide to configuring Internet Connection Sharing



How Internet Connection Sharing works

The majority of letters and emails sent into this column are to do with Internet connectivity, with connection sharing topping the list, so I've decided to dedicate the next two columns entirely to this subject. I'll begin with how to share an Internet service on a small home or business network using the software included for free in Windows.

Windows ICS

The software involved here is called Windows ICS (Internet Connection Sharing), first introduced in Windows 98 SE and included with all versions of ME, 2000 and XP. All work in much the same way, although the later 2000/XP implementations are easiest to use.

ICS is a very simple bit of software and only needs to be installed on one system – the PC directly connected to the Internet (see figure 1). This is termed the gateway and can be configured to use virtually any technology to connect to the Internet, from a dial-up modem or ISDN terminal adapter, to ADSL and cable broadband services. You can even use ICS with a satellite Internet link.

Remember that the Internet bandwidth will be shared by everyone on the Lan, so on a home network with a 56Kbits/sec dial-up modem, two users would get just 26.5Kbits/sec each. If one user were to start a large download the other might not get a look-in for a long time. Although dial-up modems can be shared, ISDN and broadband are a better bet.

Another consideration applies if you have a broadband modem with an Ethernet rather than USB interface. Here you'll need two Lan adapters in the gateway, one for the modem and the other to connect the gateway to the local network. ICS setup is more complicated and you might want to use a dedicated router instead. No extra adapters are needed when a router is employed – I'll cover this in more depth next month.

In the meantime, it's worth understanding just how the ICS works, the software involved being made up of several components, starting with a DHCP (Dynamic Host Configuration Protocol) allocator. Effectively a mini DHCP server, this assigns IP addresses automatically to the other client PCs on the network when they start up. By default, these will be in the range 192.168.0.1 – 254 with a subnet mask of 255.255.255.0. The gateway itself assumes the first of these addresses (192.168.0.1), with a DNS proxy also included to resolve network names and URLs on behalf of local network clients. It is possible to change the addressing scheme used, but there's no reason you should need to, and if you start messing about with addresses manually the software may not work.

Lastly, ICS provides Nat (Network Address Translation) services, mapping the various private IP addresses assigned to clients (192.168.0.2, 192.168.0.3 and so on) to the single public IP address assigned by the ISP to the Internet connection on the gateway PC. It's this that enables several users to share the one connection and public IP address, with the Nat software tracking which station is making a request and editing the related IP header information on the fly as packets leave or enter the network via the gateway.

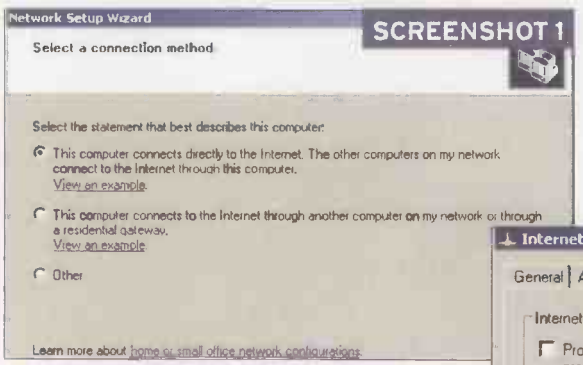
A couple of caveats

ICS is both quick and easy to configure especially on an XP or 2000 system. The process for 98/SE, though, is a little more involved and as I haven't room to cover all implementations I'd suggest 98/SE users start by referring to the relevant OS documentation. Failing that, help can be found on the Microsoft support website (http://support.microsoft.com) and there are a number of tutorials elsewhere on the web.

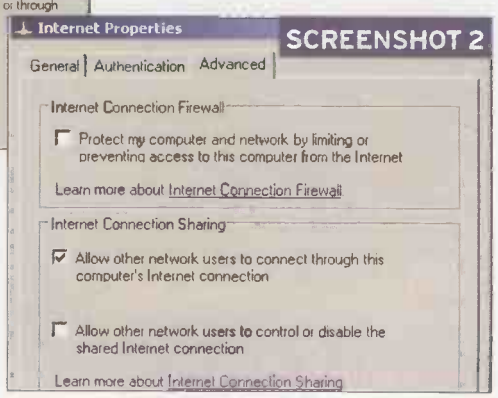
In all cases, start out by making sure the gateway itself can connect to the Internet. The service provider will provide instructions on what to do and you can use virtually any connectivity product from any ISP. The one major exception, however, is AOL. Because it modifies the network setup on the client PC directly, this makes life difficult when it comes to connection sharing. Some customers have apparently managed to get round this, but what's required varies depending on the version of AOL used and the host operating system. The official line from AOL at present is that sharing isn't supported. Try it, but I can't guarantee it will work.

At the gateway

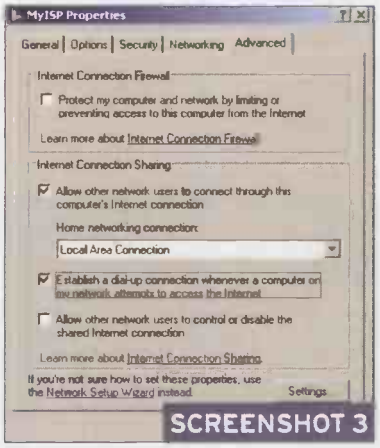
Assuming you're not using AOL and that the gateway PC has been connected to the Internet successfully, XP users can configure



Above: The Network Setup Wizard can be used to share an Internet connection on a Windows XP system



Left: Enabling Internet Connection Sharing is as easy as clicking on a tick box in the properties sheet of the connection you want to share



With dial-up you should tell ICS to dial the connection automatically whenever a client computer needs to connect to the Internet

ICS in two ways. One is to use the Network Setup Wizard, the other is to make the necessary changes yourself. The wizard takes care of a lot of the hard work (see screenshot 1), but to give you a compete picture of what's going on, the examples here are of a manual setup.

The changes required are initiated by first editing the Windows network connection for the Internet service. On an XP machine that can be done by opening the Control Panel, and double-clicking Network Connections. You should then see at least two icons, one for the Lan and the other for the Internet which, if it's not dial-up, could look like another Lan connection. Next, right-click the icon for the Internet connection and choose Properties. On the Advanced tab select the option marked 'Allow other network users to connect through this computer's Internet connection', as in screenshot 2.

If you have more than one Lan connection, you'll be asked which to use for sharing. Only one can be selected and its IP address will be automatically changed to 192.168.01 – the default gateway address. However, other Lan connections can be bridged to enable users on those networks to access the Internet too, either manually or as part of the setup done by the network wizard.

If you're using a dial-up modem you'll also see an option marked 'Establish a dial-up connection whenever a computer on my network attempts to access the Internet'. This should be selected unless you only want to allow access when the gateway is already connected to the Internet. You'll also see a box marked 'Allow other network users to control or disable the shared Internet connection', which should be left unticked (see screenshot 3). The integrated firewall, included in XP, can also be used to protect the local network and, unless you specify otherwise, will automatically be turned on when configuring ICS using the Network Setup wizard. However, it's a good idea to disable this until after you've made sure ICS is working, as it can cause problems.

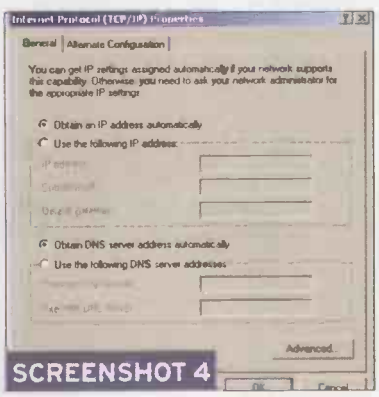
At the client

That's about it as far as the gateway system is concerned and, as already mentioned, you don't need to enable ICS on any of the other client PCs on the Lan. Just make sure they are properly connected to the network and able to communicate with the gateway system using the TCP/IP protocol. Older Windows 98 machines might be set up to use NetBEUI instead of TCP/IP, in which case you'll need to install the protocol before continuing. Macs and Linux systems can also connect to the Internet via ICS just as long as they're configured to use TCP/IP and the gateway.

The easiest way of doing this is to configure each client to use DHCP, to obtain its addressing information dynamically. On startup, the DHCP allocator on the gateway will then give each client an address to connect it to the local 192.168.0.xxx subnet. It will also instruct the clients to use the address of the gateway (192.168.0.1) to both resolve network names using DNS and route non-local traffic out onto the Internet.

Exactly how you go about configuring a client for DHCP will depend on the operating system involved, but on an XP system you start by editing the network connection. From the Properties window you should then double-click Internet Protocol (TCP/IP) and make sure the boxes marked 'Obtain an IP address automatically' and 'Obtain DNS server address automatically' are checked, as in screenshot 4.

Alternatively, if you prefer to manage client addresses manually, you should assign each one an unused address on the 192.168.0.xxx subnet. You also need to tell the clients to use 192.168.0.1 as both the default gateway and as a default DNS server.



Client PCs should be configured to use DHCP to obtain network addresses automatically from the ICS gateway

In some cases you may also need to alter the browser settings on the client PCs, particularly if you have both a Lan connection and a local modem. In Internet Explorer select Tools from the main menu bar and click Internet options. Then on the Connections tab make sure the option marked 'Never dial a connection' is selected. This will force the browser to use the Lan for Internet connectivity. On a notebook you may want to use dial-up, in which case you should select 'Dial whenever a network connection is not present' instead. Finally, click the Lan Settings button and make sure there are no ticks in the boxes next to 'Automatically detect settings' or 'Use automatic configuration script'. According to Microsoft, you should also clear the 'Use a proxy server' box.

Not so perfect

Once you've made these changes at the client it should be possible to connect to the Internet from any PC on the Lan. When a client PC needs to surf the web or collect emails, it will automatically pass the requests to the ICS gateway using the local network. The gateway will then apply Nat to the request and route the packets via its Internet connection, optionally dialling the ISP if a dial-up service is involved. Any inbound traffic will be routed back via the ICS gateway which will use Nat to direct information to the requesting station.

Of course for this all to happen the ICS gateway has to be turned on, and it's the need to keep the gateway powered up all the time which is the biggest drawback. If the gateway is switched off or hangs for some reason, then none of the other PCs on the Lan will be able to connect to the Internet unless they have their own modems. The processing involved can also interfere with normal operation of the gateway PC, and ICS is incompatible with VPN (Virtual Private Network) technology. It may also need tweaking to handle gaming and other applications.

For these reasons, a dedicated Internet router is a better approach. If you go about it methodically it's no harder to set up and isn't too expensive. Next month we'll go through what's involved.

CONTACTS

Alan Stevens welcomes your comments on the Networks column. Email him at: networks@pcw.co.uk. Please do not send unsolicited file attachments.

Mark Whitehorn
is one of those lost souls who actually likes databases. He splits his time between consultancy, writing, working for two universities and tinkering with old cars

Figuring out the charges

Conditional calculations under the spotlight, and we revisit attributions

Reader Alan uses a query in Access 2000 to calculate the number of days a car is in storage and hence the charge to the customer. He subtracts the date-in from the date-out and multiplies the result by the daily charge.

Easy enough, but he also wants to apply a minimum charge of, for example, £7. So, assuming that he charges £1 per day, an instance of three days' storage would be charged at £7, as would five days' storage. However eight days' storage would be charged at £8.

Suppose that we start with table 1 (below). Note that the dates for the GT40 are strange and may represent a data entry error of some kind.

The easiest way to solve Alan's problem is to use a query. We can start with a simple query that calculates, for example,

```
SELECT [dateout]-✓
[datein] AS DaysInStorage,
[DaysInStorage]*1 AS ✓
BasicCharge
FROM Storage;
```

(Key: ✓ code string continues)

That calculates the days that the car has been in storage and the basic charge. This will yield an answer table like this:

Query1

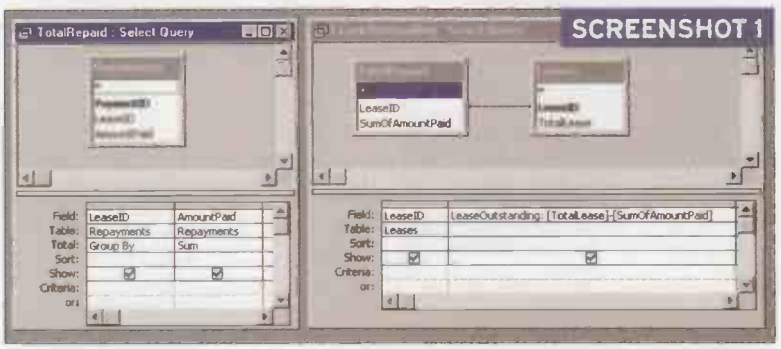
DaysInStorage	BasicCharge
2	2
3	3
121	121
-28	-28

Hmmm. We appear to owe the owner of the GT40 £28 for the privilege of storing his fine motor car.

Now for the minimum charge. One way to express this requirement would be as follows. If the number of days in storage is less than seven, the charge is £7, otherwise it is equal to the number of days multiplied by the charge per day.

Most programming languages have what is known as an IF statement (sometimes IIF – Immediate IF) which allows us to do just this.

This shows the two queries (in Design view) that are required to work out how much of a lease is as yet unpaid



The basic syntax of an IIF statement reads rather like our English version above, just slightly more formally:

```
IIF(condition is true, ✓
then do this, otherwise ✓
do this)

IIF(the value in ✓
[BasicCharge] is less ✓
than 7, set the charge to ✓
7, otherwise set it to ✓
the BasicCharge)
```

All we need to do is to add a field called ChargeIncludingMinimum to our query which is defined as:

```
IIf([BasicCharge]<7,7,✓
[BasicCharge])
```

So, the complete SQL we need is:

```
SELECT [dateout]-✓
[datein] AS DaysInStorage,
[DaysInStorage]*1 AS ✓
BasicCharge,
IIf([BasicCharge]<7,7,✓
[BasicCharge]) AS
ChargeIncludingMinimum
FROM Storage;
```

See table 2 for the results.

One advantage of the IIF statement is that at least we aren't paying the owner of the GT40 £28 for what is probably a data entry error. If I were to put this into production, I'd want to add more error checking.

Finally we can add a few fields to make the answer table more readable:

```
SELECT StorageID, ✓
[Car Name],
Registration, DateIn, ✓
DateOut,
[dateout]-[datein] AS ✓
DaysInStorage,
[DaysInStorage]*1 AS ✓
BasicCharge,
IIf([BasicCharge]<7,7,✓
[BasicCharge]) AS
ChargeIncludingMinimum
FROM Storage;
```

Handling publications

In the March issue I looked at a question from John Harding, who works with references for scientific publications, many of which have multiple authors: Laird, JE Newell, A and Rosenbloom, PS (1987) *'"SOAR": an architecture for general intelligence'*, Artificial Intelligence, MIT, Cambridge, MA, pp833-842.

John wanted to record each author separately, but storing data in a fully normalised way made the concatenation of several names into a single reference difficult and slow. We discussed several solutions, but there is no clear winner. Geoff Goddard emailed to say that he found an answer via a bulletin board in the form of a VB function for concatenation. He says it works well and offers flexibility over how you separate the names. He can't remember the author's name, but recalls her helpfulness when a few problems arose using it with Access 2, and under later versions it runs like clockwork, he said.

The code is well documented so I present it without further comment for the delectation of those who want to investigate it further. It is located in this month's mdb (available from www.penguinsoft.co.uk). However, it is

TABLE 1 – Storage

StorageID	Car Name	Registration	DateIn	DateOut
1	Bentley Special	AA12345	07/06/2004	09/06/2004
2	Range Rover	AA12346	01/01/2004	04/01/2004
3	Spitfire	BB12345	04/05/2004	02/09/2004
4	GT40	CC12345	01/05/2004	03/04/2004

TABLE 2 – BasicChargeQuery

DaysInStorage	BasicCharge	ChargeIncludingMinimum
2	2	7
3	3	7
121	121	121
-28	-28	7

simply there as a code sample; there are no supporting tables or function calls.

Please re-lease me...

Sumit Pradhanang emailed with a query query (if you see what I mean). He manages lease information and has two tables, the first of which holds the total value of the lease. The second table contains records of payments made against each lease, and he needs a query to work out how much of a lease remains outstanding.

This is possible and is most easily performed using two queries, the first to determine how much of each lease has been paid off, and the second to subtract that value from the total value of the lease (see table 3).

The first query is based on the Repayments table and requires the LeaseID and AmountPaid fields. We want to group all the payments which are associated with the same lease, and then add up the values in each group. In the Total: row of the query grid, therefore, we want to GroupBy the LeaseID and Sum the amounts paid.

```
SELECT LeaseID,
Sum(AmountPaid) AS
SumOfAmountPaid
FROM Repayments
GROUP BY LeaseID;
```

Screenshot 1 shows this and the subsequent query. The answer table gives us this:

LeaseID	SumOfAmountPaid
1	£4,550.00
2	£2,400.00
3	£500.00
4	£450.00
5	£12,950.00

Now we want to subtract the SumOfAmountPaid values from the TotalLease values in the Leases table, which means another query.

Add the Leases table and the TotalRepaid query to the query grid and select the LeaseID field from the former. For our second field we want to use an expression to perform the calculation: this should do the trick:

```
LeaseOutstanding:
[TotalLease]-
[SumOfAmountPaid]
```

This is the answer table:

LeaseID	LeaseOutstanding
1	£7,950.00
2	£71,600.00
3	£5,800.00
4	£9,550.00
5	£11,250.00

```
SELECT Leases.LeaseID,
[TotalLease]-
[SumOfAmountPaid] AS
LeaseOutstanding
FROM TotalRepaid
INNER JOIN Leases
```

TABLE 3 – Leases & repayments

Leases		
LeaseID	TotalLease	
1	£12,500.00	
2	£74,000.00	
3	£6,300.00	
4	£10,000.00	
5	£24,200.00	
Repayments		
PaymentID	LeaseID	AmountPaid
1	2	£2,000.00
2	1	£1,500.00
3	3	£500.00
4	5	£950.00
5	1	£750.00
6	4	£450.00
7	2	£400.00
8	5	£12,000.00
9	1	£2,300.00

```
ON TotalRepaid.LeaseID =
Leases.LeaseID;
```

A brief mental arithmetic sortie proves that everything is working as we'd expect and we have the answer.

As a general rule, if you're having trouble persuading a query to do what you want, it's worth looking at breaking down the problem into a series of queries which, together, will give you the answer.

A Dosing solution

Adam Brailsford is trying to organise the files stored on his PC. Over several years he has taken advantage of his scanner and stored copies of letters and bills as images.

He would now like to enter details of said files into a database and make links to the actual files. Clearly he doesn't want to do this by hand and asks if there is way of getting Access 2000 to search out several specified folders and subfolders and enter these details into a table which can be saved.

The answer is that I have never looked to see if Access has a specific way of doing this because, many years ago, I found a generic solution that can be applied to virtually any database, including Access. The only problem with this solution is that it shows my age because it is based on Dos. However, it still works.

In Dos there is a very versatile command called DIR which will give you a list of file names. To see it in action, pop up the Start menu, select Run, and type in CMD and click OK. This will open up a weird window which is a Dos command window.

Type the following and press Enter.

```
CD\
```

This should give you a prompt at the left-hand side of the screen:

```
C:\
```

Now type:

```
DIR *.JPG
```

This should produce a list on your screen of all of the files in C:\ that have a jpg extension.

You can add so-called switches to this command. For example the /s will show you the same information for all subdirectories (folders). So try:

```
DIR *.JPG /S
```

This should produce some file names on virtually any machine (since most machines have some jpegs). This is great, but the complete name of the file isn't being produced. Instead each folder name appears and then each file within that folder is listed below. We want the complete name of each file. No problem, we just add another switch:

```
DIR *.JPG /S /B
```

This lists the files in 'bare' format; in other words it lists the complete file name including the folder name.

Now we want to capture this output so that we can import it into a database. First, check that you DON'T have an important file called C:\PENGUIN.TXT; because the next step will overwrite any such file without warning! Assuming that you don't, extend the command to read:

```
DIR *.JPG /S /B >PENGUIN.TXT
```

The greater than symbol causes the text output that used to appear on the screen to be redirected to a file called, in this case, PENGUIN.TXT.

Now we can import this data into a database, for example an Access database. Open up a new Access file. Then select File, Get External Data, Import and navigate to the file called C:\PENGUIN.TXT. Select it and a dialogue box appears. Click on Next and, if there are any line breaks showing, double-click on them to remove them (make sure you scroll far enough to the right to find them all).

Click on Next and accept the rest of the defaults. You should end up with a table called PENGUIN that has a single field containing the complete file name of every jpg on your C: drive.

Once you get it working, you can try playing around with the DIR command. For example, Adam says that he has been quite methodical when naming files such as '0001_company name_date_invoice.jpg'. So he might try using:

```
DIR 0*.JPG /S /B
>PENGUIN.TXT
```

Or possibly:

```
DIR *_*.JPG /S /B
>PENGUIN.TXT
```

CONTACTS

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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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

Working with open-source tools

A Java wrapper for SQLite gives a new look to a database, and we investigate JBuilderX

Open-source and free software is now well established as an alternative to commercial software. You can put together a complete office network without paying a penny in software licences. Much of the Internet runs on open-source software. As a group, developers are particularly well served. It starts with GNU C++, used to compile Linux and the majority of open-source C and C++ projects. It includes Apache, if you think of it as a development platform, and PHP, the hugely popular server-side scripting language, as well as Perl, which is more challenging to learn but concise and powerful. If you move from truly free and open-source programs to software that is merely free to use, the list is much longer. The Java SDK from Sun or IBM, and Microsoft's .Net SDK all fall into this category and come with all you need to build applications. There are free IDEs as well, such as the IBM-sponsored Eclipse, the Sun-sponsored Netbeans, or for .Net the independent SharpDevelop project. Overall, there are few if any development projects that cannot be accomplished using open-source or free-to-use tools and libraries.

This is great news for hard-up students or hobbyists, but there are wider implications. With the free stuff offering so much, it's harder for commercial tools vendors to compete. For example, Codewarrior used to be the leading development tool for the Apple Macintosh. The folk at Metrowerks, which produces Codewarrior, are probably not pleased that Apple is now promoting a suite called Xcode Tools, free with the operating system, including notes on how to convert your existing Codewarrior projects. The pay-off for Apple is obvious. Strong free development tools encourage more applications, which sells more boxes. The hidden cost is less choice, as independent commercial vendors may retreat from the market.

Xcode Tools is a good illustration of the influence of commercial interests on the world of free software. There are some open-source advocates and activists who, like the Free Software Foundation's Richard Stallman, are driven by a vision of unencumbered software. However, this is not the reason for the success of the most prominent open-source projects. Companies such as IBM, Sun and Apple invest in free software because it is in their interests to do so. They can make money in other ways, through hardware, services, and by selling premium software that builds on what is available for free.

Last Name	First Name	Title	Address	City	R...
Davolio	Nancy	Sales Represe...	507 - ...	Seattle	WA
Fuller	Andrew	Vice Presiden...	908 W...	Tacoma	WA
Leverling	Janet	Sales Represe...	722 M...	Kirkland	WA
Peacock	Margaret	Sales Represe...	4110 ...	Redm...	WA
Buchanan	Steven	Sales Manager	14 Gar...	London	
Suyama	Michael	Sales Represe...	Coven...	London	
King	Robert	Sales Represe...	Edgeh...	London	
Callahan	Laura	Inside Sales C...	4726 ...	Seattle	WA
Dodsworth	Anne	Sales Represe...	7 Hou...	London	

This Access database has been converted into a Java application using the SQLite database library, running on Mac OSX

> **'Companies such as IBM, Sun and Apple invest in free software because it is in their interests to do so'**

Another key factor is that the open-source model enables commercial developers to pool resources. For example, imagine you develop custom applications for a niche market such as estate agents or dental practices. Your application needs a database engine, but your customers do not care what it is so long as it works. Other developers all around the world are in the same position. Open source means that if enough developers contribute a little to a database engine project, then in the end everyone gets a well-tested and debugged library for free. It does not damage your market, because the engine by itself is no use to an estate agent or dentist. They still need your custom application. The Internet has enabled this kind of co-operation, resulting in the rich array of open-source libraries now available.

Good though it is, free software has its own frustrations. Once you leave the safe haven of something like Apache.org or Eclipse.org, it is a jungle. There are over 50,000 projects hosted on Sourceforge.net, in varying states of alpha, beta, and abandonment. Code quality varies from excellent to abysmal. If you have a problem and send an email to the developers, or post a message to a forum, there is no guarantee that anyone will respond, and nobody to complain to if there is silence. What you see is what you get. The projects that work best are those where there is a sufficient community to provide peer-to-peer support, and one or more committed developers to respond to problems. It also helps if you, as a developer, are willing to put in a little extra effort to get the results you want, and to contribute back to the community when you find solutions.

Some developers are understandably concerned about component licences that might require them to open-source their own applications. Licensing is a complex issue, but most libraries come with licences that allow use in a closed-source application. You may be required to share any changes you make to the library itself, but that's not unreasonable. There is also the arcane subject of licence compatibility, and a good starting point for investigation is the GNU website.

SQLite, Java, and OSX

In last month's column I looked at SQLite, a free and open-source database engine written in C. As an open-source project, it meets the criteria I outlined above. There are plenty of users, and the forthcoming bundling of SQLite with PHP 5.0 means there will be many more. The main developer, Richard Hipp, is responsive to technical problems. For example, in early January he came up with a fix to a locking issue on Linux a couple of days after it was reported. However, Hipp is not responsible for the various wrapper libraries that have sprung up around SQLite, to make it easy to use from languages such as C#, Visual Basic and Java.

One of the interesting things about Java is that it offers an easy route into Mac compatibility, so I checked out the use of SQLite in this context.

Now, there is only one Java wrapper for SQLite that I'm aware of, offered by a guy called Christian Warner under a BSD-style licence. It is a good wrapper, including a simple JDBC driver. However, the JDBC driver is described as 'experimental', and at the time of writing the library had not been updated since June 2003. Still, users reported good results from the wrapper so I gave it a try.

SQLite is a native code database. The source has to be recompiled for each target platform. To make this work with Java, you need a JNI (Java Native Interface) wrapper. This piece is also a native code library. Finally, you need a set of Java classes to wrap the JNI functions behind an easy-to-use Java API. When you compile code on Unix-like systems, such as Mac OSX or Linux, there are typically three steps:

```
./configure
make
make install
```

The first command runs a script that inspects the system and builds a makefile. The second command executes the make build utility, which executes the steps in the makefile. The final command again parses the makefile, this time to carry out the steps necessary to install the compiled code. Often these three commands work like magic. However, they only work because someone has done the job of creating the configure script. This can be automated, but some manual code is also needed. In the case of the SQLite Java wrapper, the provided script knew nothing of Mac OSX so, although it worked fine on Linux, it didn't work on Apple's system. Another issue is that, although SQLite works fine on the Mac, there seem to be problems installing it as a shared library. Overall, this meant some work was required in order to build the wrapper. The solution was to compile SQLite with sharing disabled, then work out how to modify the configure script to fit the Mac's requirements. For example, JNI libraries on the Mac must have the extension .jnilib. It goes without saying that you have to have Apple's development tools installed, including the GNU C++ and the Java SDK.

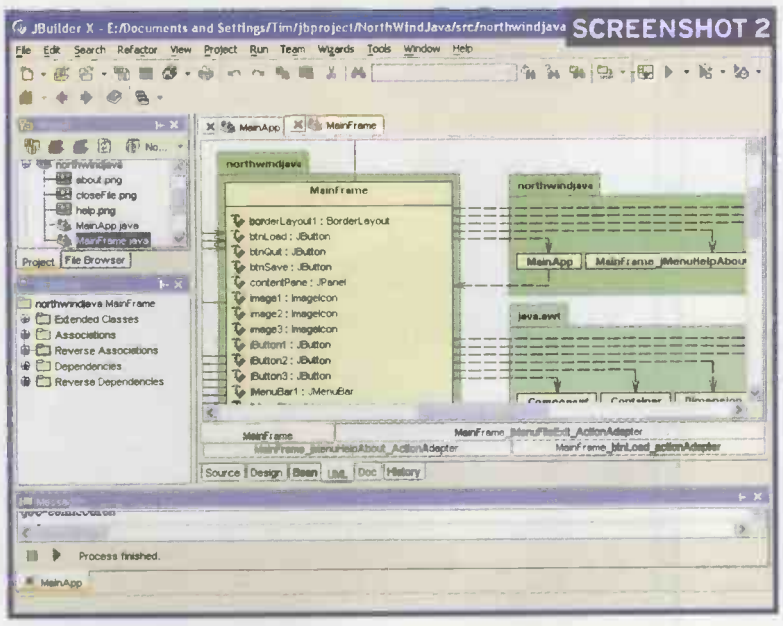
The good news is that it works. Screenshot 1 shows Microsoft's Northwind sample database converted to SQLite format and running on Mac OSX 10.2. The Java implementation does a good job of replicating the Mac's look and feel, although the menu bar is in the wrong place. This, too, can be overcome. This particular sample was put together using Borland's JBuilder, which has a handy GUI designer, but it uses only standard Swing components. If you have, say, a Visual Basic application using JET and your users are asking for a Mac or Linux version, this is a viable route to take.

Borland JBuilderX

The tenth JBuilder is one of the most worthwhile upgrades to this popular Java IDE for some time. It's also a large product, which is a mixed blessing. During a JBuilder session I happened to open task manager and noticed that it had grabbed 145MB of Ram, which makes even Visual Studio look lightweight. Still, there is a lot here. One notable new feature is the visual web services designer, for both creating and consuming XML web services. A lot of work has also gone into web application support, particularly if you are using the Struts framework. Struts is a way of building web applications using a model-view-controller design, unlike the typical mix of logic and presentation that causes problems in maintaining code There are visual designers for Struts configuration and wizards to convert Javaserver Pages to Struts applications. Another aspect of JBuilder is as part of Borland's wider tool suite. Both JBuilderX (see screenshot 2) and C++BuilderX are built on the same core IDE, known as Primetime. This is fully extensible, and Borland provides hooks into team development tools, requirements analysis, profiling tools, and UML modeling.

These features have their value, but many developers are most concerned with the business of writing code. JBuilderX is a great upgrade for those who spend all their time in the editor. Many of the new features are small touches that are genuinely helpful without getting in the way. For example, if you import a package but don't use it, the import statement appears in grey type. Another neat feature is the scope line, which indicates the block within which code elements are visible. JBuilder also has code folding, automatic error detection, context-sensitive help that works, and a right-click option to find the definition of a method. Refactoring is another strong point, with an extended list of code improvements you can apply automatically. If you've got JBuilder but not bothered to upgrade for a version or two, this one is well worth considering, provided, of course, you have a hefty PC to run it on.

Examples from this column are posted at www.itwriting.com/pcw. GNU C++ is at http://gcc.gnu.org http://sourceforge.net is the largest repository of open-source software projects. The Java wrapper for SQLite is at www.ch-werner.de/javasqlite. Download the compiled Mac OSX version at www.itwriting.com/sqlitenotes.php. JBuilder: www.borland.com/jbuilder.



SCREENSHOT 2

Borland's JBuilderX, showing its automatic UML diagram view

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.

Leisure

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LOADING...

Gangland

Gangland puts you in charge of Mario as you arrive in the US looking for revenge. Problem is, you're looking to kill your brothers.

The action is played out from a third-person perspective, as you work your way up through the Mafia. Most noticeable is the full 3D environment. The map can be rotated to make sure you've got an eye on the action. This solves the problem of characters disappearing behind buildings.

Gangland is not all about shooting, though. Other elements include extortion, protection rackets and speakeasies. There's also a multiplayer mode, where you can battle it out for supremacy of the city. Gangland should be on sale by the time you read this.

The Simpsons: Hit and Run

Take on a variety of missions as your favourite character

Most games based on TV shows or movies tend to be awful conversions but, thankfully, The Simpsons: Hit and Run isn't one of them. Simply put, this game crosses Grand Theft Auto with everyone's favourite cartoon family. It's your job to play as Homer, Marge, Bart and Lisa, as you investigate dark doings in Springfield.

The town and characters have been brought to life, and driving around the Simpsons' home town is just as we imagined. The 3D graphics are bright and colourful while remaining true to their cartoon roots.

It helps that the actors on the series have been drafted in to record new speech for all of the characters. All the favourites are in there, including the Comic Shop Guy, Professor Fink and the evil Mr Burns.

The plot is a little silly and involves crop circles and mysterious cameras spying on the people of Springfield. However, in the context of the game it all fits in well.

Finishing the game involves driving round the city in a variety of cars completing the given missions. These range from collecting doughnuts for the world's worst policeman, Chief Wiggum, to racing principal Skinner to school. While all this is going on the character you're playing shouts out comments on your driving. Needless to say, it's a lot more fun racing round as Homer.

The only problem is that the missions can get a little samey after a while. To spice things up there are a few missions where you have to go on foot, but they're not a lot of fun thanks to the bizarre control system.

The camera pans round you as you run, which alters what the direction keys do. For example, if the camera is directly behind you the up-key makes you run forwards, but if the camera is facing you the same key makes you run backwards. The odd camera angles can also make it difficult to judge jumps.

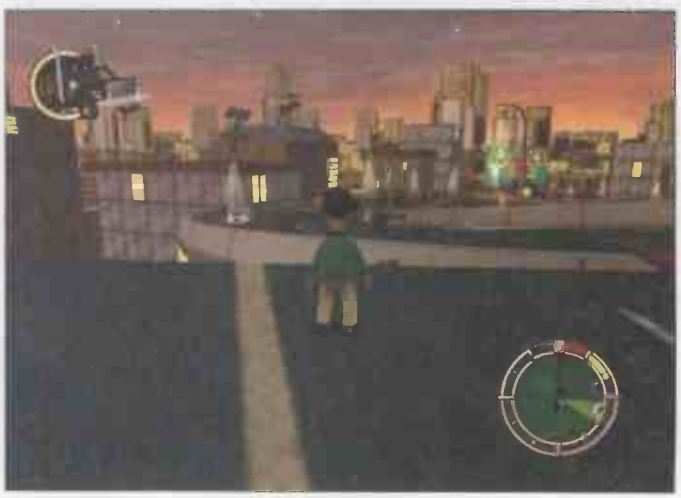
Fortunately, things get a lot better in the cars and you'll soon be racing round the streets pulling handbrake turns or doing a doughnut in a car park. As you progress through the game you collect coins and can race or buy newer faster cars.

Overall, it's not perfect and doesn't have the longevity of Grand Theft Auto, but it's a solid bit of fun to while away an afternoon or two.

David Ludlow

DETAILS

PRICE £34.99
CONTACT Vivendi 01189 209 100
www.vugames.com
SYSTEM REQUIREMENTS
Windows 98 or above • Pentium III 700MHz • 1.5GB hard disk space • 32MB 3D graphics card
VERDICT
Despite the action getting a little samey, it's an excellent, well-executed game
OVERALL ★★★★☆

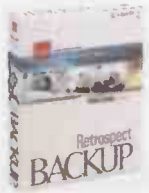


Some of the missions have to be conducted on foot

Competitions

216 Win 3 copies of Dantz backup software and 2 Iiyama Prolite monitors

For your chance to win one of these prizes, turn to our competitions pages



X2: The Threat

Trade, fight and travel through the galaxy

Any game that combines trading, combat and diplomacy in one melting pot is instantly setting itself a high target. However, X2: The Threat more than meets it. The game takes its inspiration from the classic Elite and offers a trading game based in a space station, which is better than anyone expected.

Unlike its predecessor (X: Beyond the Frontier) the character you play is a former pirate, unexpectedly given a chance to be clean by the Argon Secret Service. Starting the game reveals more about his past and a forthcoming invasion by an unknown race.

As well as the main missions, there are plenty of side quests that offer allegiance with different empires, which is crucial for trade. If your reputation is too low, some space stations will not even let you board, let alone trade.

Like any game that focuses on several skills, you must achieve a certain level of competency in all of them to excel. The computer might not fight as well as you do, but without diplomatic trading, you cannot afford the combat upgrades.

The plot of X2 is excellent. There is always something to work towards, keeping interest levels high. The graphics are fantastic with impressive lighting effects, while the music keeps the excitement going.

The save system has also been improved. Now, saving your progress while in a space station is free. However, if you need to save anywhere else, you will need to dish out the space bucks. Although this sounds harsh, it requires tactical thinking and always keeps you on your toes.

At the time of going to press we had an early version of the game, which wouldn't let us install any patches. However, the full game will allow this, letting you introduce new features.

X2 is an excellent space simulator with a great plot, realistic trading and challenging combat. It may be early days, but we think this could be one of the biggest games of the year.

Tim Smith

DETAILS

PRICE £34.99
CONTACT Egosoft
www.egosoft.com
SYSTEM REQUIREMENTS
Windows 98 or above • 128MB of Ram • Pentium III 800MHz • 32MB video card • 800MB hard disk space
VERDICT
An enthralling space game that improves on the original
OVERALL ★★★★★

Total Club Manager 2004

Football management, but not for purists

Reading through the features list, you'd be forgiven for thinking that Total Club Manager 2004 from EA Sports might just be able to steal the crown from Championship Manager as the king of football management simulators.

The ability to control the growth of your stadium, ticket prices, advertising boards and merchandise is something that Championship Manager leaves well alone. What's more, you can choose what role you want to play in your chosen club, be it the manager, coach or chairman, or if you prefer you can simply take a back seat and only intervene when you see fit.

However, within a few seconds of testing the game we were woefully disappointed. It appears that EA was less than careful when it came to populating each team. Some players who were sold before the 2003/2004 season still remain, especially in the lower league teams.

Another major gripe about Total Club Manager 2004 is the transfer system. You can only approach players who are already on the transfer list and there's no way of finding out if they're interested in a move in the first place. In short, you really get the feeling that very little time was spent developing it.

It's not all bad news though. Owners of Fifa 2004 will be pleased to hear that Total Club Manager 2004 is able to play out each match using the Fifa 2004 engine, allowing you to watch your players in action.

While Total Club Manager 2004 might interest those who aren't fanatical about football, it really doesn't pose any threat to Championship Manager's dominance of this market. The extra detail, such as pricing your club's merchandise, is good, but it lacks depth in the more important areas. The inaccurate team stats and far too simplistic transfer system quickly ruin any realism.

Will Stapley

DETAILS

PRICE £29.99
CONTACT EA Sports
www.uk.ea.com
SYSTEM REQUIREMENTS
Windows 98 or later • Pentium III 600MHz • 128MB of Ram • 1GB of hard disk space
VERDICT
Some interesting features, including the Fifa 2004 link-up, but inaccurate stats and a poor transfer system let it down
OVERALL ★★★★★

>> Data backup
How to keep your data safe – see page 91

Three copies of Dantz Retrospect Multiserver 6.5

We all know that data loss is one of the most inconvenient things that can happen to a computer user, and that backing up data is good practice and can save a lot of time, money and effort. Yet many people don't bother, or don't know how to back up, despite today's harsh digital climate of malicious viruses.

Dantz Retrospect Multiserver 6.5 performs backups quickly and with 100 per cent accuracy, so you'll have no problem restoring precious files. We're giving three lucky readers the chance to win a copy of this useful software, which normally retails for £686 ex VAT.

It uses proven automated technology to deliver complete protection for servers, desktops, notebooks and business-critical applications. Retrospect's patented Progressive Backup saves time because it only backs up new and changed files after the initial full backup.

Network users will appreciate its Proactive Backup system, which features an adaptive scheduler that monitors operations to ensure that all computers are backed up even if there's not enough time in a scheduled backup session. It will recognise missed computers and files and reschedule them to be backed up at the next opportunity.

For more details, visit www.dantz.com, and for your chance to win a copy, answer the question below and follow the instructions on how to enter.

Which feature does Retrospect Multiserver 6.5 not include?

a) Proactive Backup
b) Powerpoint Slideshow
c) Progressive Backup

PCW MAY 2004 DANTZ COMPETITION ENTRY FORM

What feature does the Retrospect Multiserver 6.5 not include?

.....

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Address: .....

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Email address: .....

Daytime telephone number: .....

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PERSONAL COMPUTER WORLD

Rules of entry

This competition is open to readers of *PCW*, except for employees (and their families) of VNU Business Publications, Dantz and Ilyama. *PCW* is the sole judge of the competition and the Editor's choice is final. Winners will be selected at random from all correct entries received. No cash alternative is available in lieu of prizes. VNU will use all reasonable endeavours to notify the winner(s) within 14 days of the close of the competition. Prizes will be dispatched direct by the competition sponsor(s) and the winner(s) name(s) and address(es) will be provided to the competition sponsor(s) for this purpose. No purchase of the magazine is necessary to enter the competition. VNU will use all reasonable efforts to ensure that the prizes are as described on this page. However, VNU cannot accept any liability in respect of any prize, and any queries regarding a prize should be taken up directly with the sponsor of that prize.

March winners

The winners of the Gigabyte bundles are: J Turber and Les Hayward (first prize); Ross Sargent and Les Briggs (second prize); Wilson Brabban (third prize); Sean Downham (fourth prize); Linda Van Heerden, Ricky Patel, AK Desai, Marcus Pett (runners up). The HIS graphics cards were won by Nicola Kimpton, Daina Addullah and Geoffrey Lawrence.

Three Iiyama Prolite E431S monitors

It's fair to say that many PC users are well aware that having an LCD flat-panel monitor is a great accompaniment to any computer system. They provide numerous benefits, not least the fact that they consume a fraction of the space on your desktop, and look far more attractive than their CRT counterparts.

This month we've teamed up with Iiyama to give three of you the chance to win an Iiyama Prolite E431S monitor. These 17in flat-panel LCD screens are loaded with extras, including analogue and digital inputs, as well as the best built-in stereo speakers we've heard in any flat-panel monitor.

The E431S has won numerous awards thanks to its brightness of 250cd/m^2, and 450:1 contrast ratio. This gives it a good level of performance and ensures it is versatile enough for use in a variety of fields. It handles DVD movie playback well and, thanks to its 16ms response time and 1,280 x 1,024 maximum resolution, playing games is not a problem.

For more details, visit www.iiyama.com and for a chance to win one of your very own, answer the question below and follow the instructions on how to enter.

What is the maximum resolution of the Iiyama Prolite E431S?

a) 800 x 600
b) 1,280 x 1,024
c) 1,600 x 1,400

How to enter

Fill in the coupon and send to the following address by 23 April 2004:
Dantz or Iiyama competition, *PCW*, VNU Business Publications, 32-34 Broadwick Street, London W1A 2HG
Or **enter online** at **www.pcw.co.uk/Competition**.

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Please state in your email if you do NOT wish us to contact you BY POST about products or services available from *PCW* or the VNU Business Publications Group, and if you do NOT wish us to pass your dtails on to other carefully selected companies to contact you BY POST about their products or services.

Competition open to UK residents only.

PCW MAY 2004 IIYAMA COMPETITION ENTRY FORM

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.....

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Mindbenders

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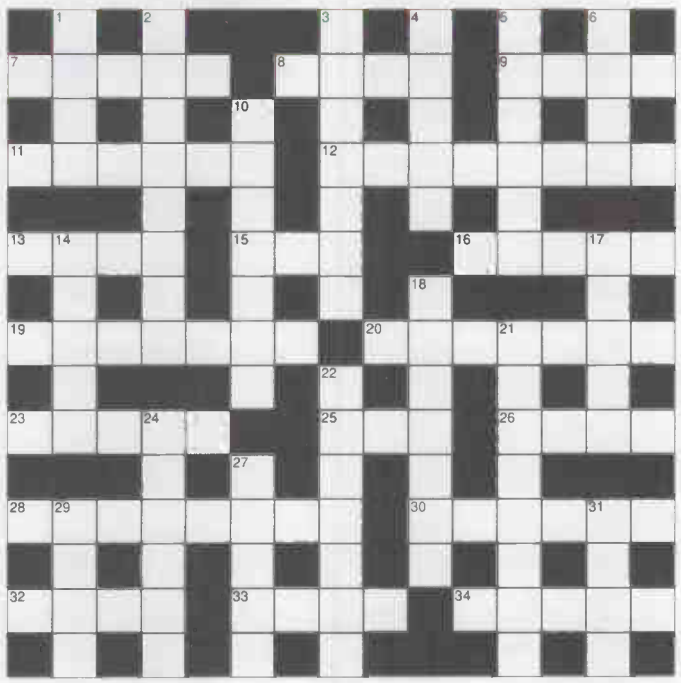
Prize crossword



ACROSS

7 IBM backup package for OS/390 mainframes (acr) (5)
8 James' power unit? (4)
9 Mac version of Ethernet connector (acr) (4)
11 Language's grammar (6)
12 ___ distribution, a Bernoulli process (8)
13 One tenth (prefix) (4)
15 ___ file, one that contains startup information (acr) (3)
16 Means of paying over the Internet (1-4)
19 Value-reversing logic switch (3, 4)
20 ___ coding, early data compression method (7)
23 ___ queuing, 3D-like from 2D (5)
25 Intel standard for extension boards (acr) (3)
26 Otherwise in programming (4)
28 Move data to another location (8)
30 Half a byte (6)
32 Key below Shift (4)
33 Dial-up standard (acr) (4)
34 Object-oriented language for Windows programming (5)

DOWN

1 Dubious, risky (coll) (4)
2 Leaving out (8)
3 Green vegetable (7)
4 Singer with the Police (5)
5 Road material (6)
6 Brass band instrument (4)
10 Perform (7)
14 Bring to mind (5)
17 Shuts forcibly (5)
18 Dangle (7)
21 Public response (8)
22 Modernise (7)
24 Thrilling sensation (6)
27 Tack on (5)
29 *Educating* ___, play/film (4)
31 Country of south-east Asia (4)

WIN!

Each month, one *PCW* crossword entrant will win a copy of *The Concise Oxford English Dictionary*, and the brainteaser winner gets a CD version of Route Finder United Kingdom and Ireland.

Send your completed crossword to: '*PCW* May – Prize Crossword', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive no later than 23 April 2004. Send the answers to the brainteaser to: '*PCW* May – Prize Puzzle', VNU, 32-34 Broadwick Street, London, W1A 2HG, to arrive by 23 April 2004.

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.

March winners

The winner of the crossword was RA Parr from Warrington, and David Kendrick from Poole won the brainteaser.

Latin square

Each cell of the square (right) has one of the digits from 1 to 7. Each row and each column has exactly one of each digit. The clues give the total of two, three or four cells. From these clues, can you figure out what number is in each cell?

ABC3=18
ABC6=18
BC4=4
C567=11
CDEF7=13
D345=15
DE6=6
DEF1=17
E12=12
EF5=6
F456=14
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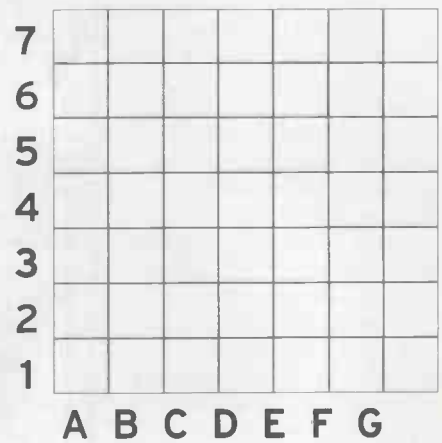

March solutions

Brainteaser

Horse	Race no	Fell at
Bush Baby	5	6
Dynamite V	3	12
Eggburt	8	5
Heltaskelta	9	1
Not My Fault	4	9
Poppkorn	7	2
Queen Jenny	1	7
Rameses II	6	11
Thanks a Million	10	3
Zambezi Lake	2	8

Crossword

ACROSS: 7 Moire 8 Ones 9 IEEE 11 Skewed 12 Rerouted 13 Kilo 15 Pop 16 AD LIB 19 Edit key 20 Activex 23 Excel 25 URL 26 Volt 28 Drop-dead 30 Issues 32 Fair 33 Tree 34 Mouse

DOWN: 1 Hock 2 Crowfoot 3 Unwraps 4 Usurp 5 Liquid 6 Gere 10 Adopted 14 Index 17 Ideal 18 Acclaim 21 Investor 22 Hurdler 24 Export 27 Tents 29 Ryan 31 Esso

>> War on IT waste
Turn to page 103 for the full story

MAY 1984

In case you were in any doubt, technology progresses at a rapid rate. Take our May 1984 issue, which answered a reader's enquiry about storing TV pictures on a computer by saying: 'I'm afraid that your question, let alone the answer, is still in the realms of science fiction.'

May was also the month that we exclusively laid our hands on the Amstrad CPC4 64, which was offered with a colour monitor (if you were prepared to pay for it) and faster processing than the Spectrum. It went on to sell healthily and remains a fond favourite with enthusiasts.

For games programmers there was an opportunity to win £500 from the Greater London Council (GLC) for creating an anti-racist computer game. The ad stated that the game should consist of questions about minority groups within 'an intergalactica voyager game'. Nobody at *PCW* remembers seeing the final entries, but it's a safe bet that they were all lame.

The Amstrad CPC4 64 was a popular system in 1984, and is still a favourite with enthusiasts

That said, our games section wasn't a lot better. It carried a review of Boogaloo, where you had to help a flea escape from an alien cave full of pterodactyls. Bizarre doesn't even come close.

MAY 1989

The cover of our May 1989 issue proudly boasted the world's first benchtest of a true 33MHz 386 PC. Acer's 1100/3 arrived to a rapturous reception, complete with a whopping 140MB hard drive and 256KB graphics card. Elsewhere, we took an in-depth look at the origins of the stars and planets, and how computer modelling could play a part in helping us discover the origins and destiny of the universe.

We also investigated the Dynabook – essentially an ancestor of the modern tablet PC. While it may have been as large and unwieldy as many of today's desktop systems, it featured an innovative pressure-sensitive LCD screen that could be detached from the main unit, and a CD-Rom drive that could read discs containing 550MB of data.

Elsewhere, Derek Cohen waxed lyrical about the philosophy of learning. Among his musings was an enjoyable experience he had while experimenting with Xtree: the creation of a directory structure consisting of folders and subfolders called either 'Bum' or 'Titty'.

Finally, Chris Cain embarked on an adventure with the Sword of Sodan. This side scrolling beat-'em-up allowed the player to perform a number of Barbarian-type moves including 'overhead blows', 'straight slashes' and 'low thrusts'.

MAY 1994

Virtual reality was causing a big stir in the entertainment world back in May 1994. The promise of being able to enter an artificial environment and interact with your surroundings, just as you would in the real world, certainly got pulses racing. However, having to slap a 3kg helmet on your head meant that anyone using one of the new Virtuality headsets would have to make sure they carefully monitored their gameplay time, or suffer the consequences of a broken neck.

The news pages featured a story that would apparently offer help to the unlucky, forgetful, unmotivated or even flabby. A company calling itself Transformation Publishing, based in Florida, claimed to be able to delve into your subconscious with its Subliminal Persuasion application. By flashing up positive messages on the screen, it hoped that its customers would soon be rid of the need to smoke or overeat, as well as giving them the power to attract the opposite sex. Sadly the application never lived up to its expectations.

Also in the news section was a story proclaiming that within three to five years people would be able to receive software updates and custom-made programs via 'a type of super data highway' – nowadays more commonly known as the Internet.

However, we also predicted that shrinkwrapped software would disappear from store shelves forever. Ten years on, although plenty of software is available online, we're still not short of the good old-fashioned boxed software.

MAY 1999

The May 1999 issue burst onto the shelves carrying a great value for money CD with software worth £399, including full versions of Borland Delphi Developer 2 and Intuit's Quicken 6 SE. Within the covers we carried group tests on 10 £799 400MHz PCs, 18 motherboards from £49 and 10 zoom-lens digital cameras.

Although our group tests helped keep readers up to date with the latest products in the market, one feature advised hanging on to old PCs with a focus on recycling. There are a number of ways your old PC can still be useful; one of which is to pass it on to a charity. The PCs are cleaned up and then passed on to schools and charities in the UK or further afield. For more information see www.pcw.co.uk/CA/ncd/recycling.jsp. Turn to p103 for our feature on recycling.

From features on the uses of old PCs we moved onto your opinions of current manufacturers in our service and reliability survey. This was our second survey, which offered prizes including digital cameras, copies of Microsoft Money 99 and Office 2000 to those who completed it. The survey provided the ultimate guide to the best brands for technical support, service efficiency and product reliability.

Finally an amusing column by one of our then regular columnists, Mike Hewitt, tried to alleviate concerns over the Millennium Bug – obviously a big concern at the time – claiming it all to be fear mongering. Well, perhaps he was right after all – we're all still here aren't we?

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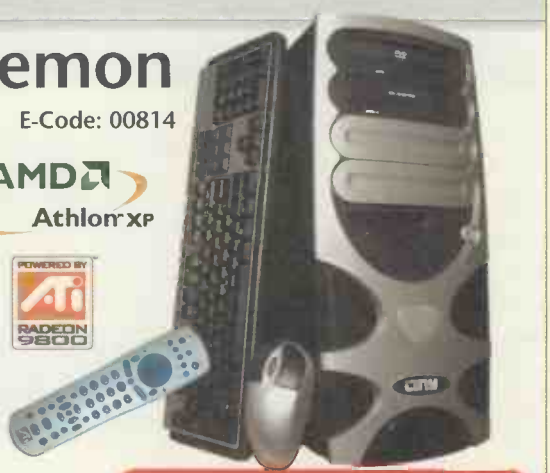

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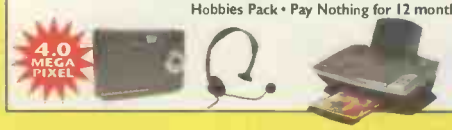

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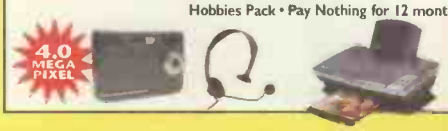

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Picture courtesy of the Museum of Computing, www.digitalhistory.org.uk

The TI-99/4 and the TI-99/4A will both be remembered as successes

TI-99/4

Texas Instruments created one of the most popular home computers of the 1980s

When the world's largest semi-conductor company, Texas Instruments (TI) announced it was going to launch its own home computer in 1979, the industry trembled; this was, after all, the same company that invented the integrated circuit. But TI misjudged the market with its TI-99/4 computer: it was too expensive, difficult to expand, tough to program and employed a keyboard style inherited from a long line of calculators. TI did, however, act on it criticisms to subsequently produce a winning formula. This is the story behind the TI-99/4 and its successor the TI-99/4A.

TI was originally founded on 16 May 1930 as the Geophysical Service by John Clarence 'Doc' Karcher and Eugene McDermott. Headquartered in Dallas, Texas, it specialised in oil exploration. In 1939 it changed its name to Coronado Corporation, but kept Geophysical Service Incorporated (GSI) as a subsidiary.

In early December 1941, GSI employee John Erik Jonsson received a phone call that Coronado was being sold. The oil side already had a buyer, but Jonsson was offered the geophysical side. He called McDermott fearing that if they didn't buy it, Stanolind would take over and they could be out of jobs. So with employees Cecil Green and HB Peacock, the four found funds and bought GSI. They became owners on 6 December 1941.

During the war, GSI adapted its technology to help the US Navy, and afterwards the company grew. To reflect its product diversity, it was renamed General Instruments Incorporated in January 1951, but due to confusion with another, the company name was changed again that year to Texas Instruments. In 1954 TI produced the first commercial transistor radio and in 1958 Jack Kirby joined the company and invented the first integrated circuit.

By the 1970s, TI was the world leader in semiconductors, with its chips featuring in a vast array of devices including its own range of calculators. Its prowess was demonstrated by chips like the TMS 9900, which in 1975 was the first 16bit microprocessor. That said the TMS 9900 didn't prove very popular outside of TI. While used in the company's own 990/4 and 990/5 minicomputers, both were too expensive to attract developers.

TI set out to design three affordable microcomputers for home, business and professional markets. As with calculators, its key motivation was to sell chips; indeed TI's management insisted the new machines use the 9900 processor. The professional and business models never came to market though, so efforts were centred on the home model.

The plan was to sell it cheaply and make money on software. Many have said TI made it impossible for anyone other than itself and licensees to develop software or peripherals. While ensuring TI would enjoy good software sales, it was risky.

The TI-99/4 was launched in June 1979, featuring 16KB of Ram and a TMS 9900 processor running at 3MHz, although bottlenecked by an 8bit data bus. TI's calculator-style 'chiclet' keyboard annoyed many potential buyers, but a more serious problem was with the RF modulator which should have allowed a TV to be used as a cheap display. The modulator failed to pass FCC tests and TI was forced to sell the system with an expensive monitor. TI's plan to launch a cheap computer had backfired, as with a monitor it cost $1,150. Worse, there wasn't much software available for it, while lack of expansion and production problems caused trouble. Despite later being granted a waiver to sell the machine without the monitor, the damage had been done.

TI took the criticisms on board and set to work on a successor. The TI-99/4A was launched in June 1981, featuring a better keyboard and a lower price of $525, although this didn't get you a display. It proved to be a more attractive proposition and earned a 35 per cent share of the home market.

Sadly for TI though, Commodore's Jack Tramiel had a business plan which pitched the two companies in a price war. Despite TI making some price reductions, Commodore won the battle and, in October 1983, TI pulled out of the market. Discontinued the following March, the TI-99/4A may have been a casualty of the home computer war, but nonetheless racked up impressive sales of 2.8 million units. It will be remembered as a success.

Gordon Laing

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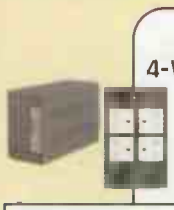

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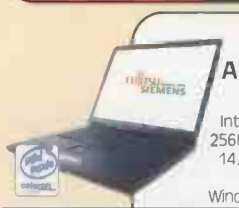

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SONY VAIO

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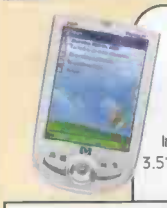

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- 3.6 x Digital Zoom
- Pictbridge compatible
- 3 minute movie clips

£252.62 inc
£215.00 exc
quicklinx 31M6PW

Ixus 500
Supreme in every sense.
- 5.0 Megapixels
- 3 x Optical Zoom
- 4.1 x Digital Zoom
- Pictbridge compatible
- VGA movie mode with sound

£304.32 inc
£259.00 exc
quicklinx 31MDPW

DCR-TRV265 D8 Handycam

£299.99 inc
£255.31 exc
quicklinx 3172PW
www.dabs.com/sony

- 20x Optical Zoom
- 990x Digital Zoom
- 2.5" LCD Screen
- Super Steadyshot

SONY
MEMORY STICK PRO

DCR-TRV460 D8 Handycam

£399.99 inc
£340.42 exc
quicklinx 3180PW
www.dabs.com/sony

- 20x Optical Zoom
- 990x Digital Zoom
- 2.5" LCD Screen
- Super Steadyshot
- Nightshot plus Infrared System

SONY
MEMORY STICK PRO

MV700i Digital Camcorder

£374.82 inc
£319.00 exc
quicklinx 3164PW
www.dabs.com/canon

NEW

you can Canon

Highest zoom ranges of any camcorder in its class.
- Lightweight design
- 18 x Optical Zoom
- 360 x Digital Zoom
- 2.5" LCD
- Night mode

Fujifilm FinePix F610 Zoom

£379.99 inc
£323.40 exc
quicklinx 30SJPW
www.dabs.com/fuji

NEW

The FinePix F610 is the latest in Fujifilm's signature series of upright-styled digital cameras. The F610 is the first compact digital camera to offer 6 million effective pixels. Super CCD HR technology enables the F610 to output images with 12 million pixels – meaning users can enlarge to unprecedented print sizes without loss of quality.

- 6.3 Megapixels
- 3 x Optical Zoom
- 3.2 x Digital Zoom
- Two LCD screens (1 to view images, 1 for settings)
- Pictbridge compatible

FUJIFILM

CX7300 Digital Camera

£116.32 inc
£99.00 exc
quicklinx 31R1PW
www.dabs.com/kodak

NEW

Capture a smile and so much more with the CX7300
- 3.2 Megapixels
- 3 x Digital Zoom
- Video Clip Capture
- Point & Shoot simplicity

Kodak

HP Photosmart 945 Digital Camera

As seen on dabs v tv www.dabs.tv

£344.99 inc
£293.61 exc
quicklinx 2PTJPW
www.dabs.com/hp

The HP Photosmart 945 is a precision 8x optical zoom digital camera delivering superior image quality. With 56x total zoom and 5 MP resolution, it also has "Digital Flash".
- 5.3 Megapixels
- 56x Total Zoom (8x Optical, 7x Digital)
- 5 cm (2") Colour LCD Display
- 32 MB SD Memory Card Supplied
- Optional Docking Station
- HP Photo & Imaging software with HP Memories Disc Creator

hp invent

Pentax Optio S4

£279.99 inc
£238.29 exc
quicklinx 2VBDPW
www.dabs.com/pentax

The Optio S4 comes in a small package. The 4 million pixel quality and diamond tooled case finish this gem off a treat.
- 4.0 Megapixels
- 3 x Optical Zoom
- 4 x Digital Zoom

PENTAX

Digital Cameras

quicklinx		inc VAT	ex VAT
	CANON		
31M8PW	Powershot A75	210.32	179.00
2QDZPW	Powershot A80	270.00	229.79
31M9PW	ixus IIs	229.12	195.00
31MDPW	ixus 500	339.57	289.00
	FUJIFILM		
2TDQPW	Finepix A205S	96.35	82.00
2VGLPW	Finepix S3000	209.99	178.72
2Q86PW	Finepix S5000	257.32	219.00
2SRHPW	Finepix S7000	444.99	378.72
	HP		
2PTHPW	Photosmart 435	86.95	74.00
2N5DPW	PhotoSmart 635	112.99	96.17
2G9BPW	Photosmart 735 Camera 3.2 MP	149.98	127.65
2R77PW	Photosmart 735 And Docking Kit	198.50	168.94
2G99PW	Photosmart 935	234.00	199.15
2PTJPW	Photosmart 945	344.99	293.61
2G9CPW	Photosmart 935 Camera & Dock	304.32	259.00
	KODAK		
2FCZPW	Easyshare DX6340	169.99	144.68
2Q73PW	Easyshare CX6200	75.00	63.83
2Q72PW	Easyshare CX6230	104.99	89.36
	OLYMPUS		
2FC9PW	C-350	144.99	123.40
2VPCPW	C-5060WZ	484.99	412.76
	SONY		
2FG4PW	DSC-P32 Cyber-shot	139.82	119.00
2Z31PW	DSC-U40 Cyber-shot U Silver	151.57	129.00
2Z32PW	DSC-U40 Cyber-shot U Blue	151.57	129.00
2Z33PW	DSC-U40 Cyber-shot U Graphite	151.57	129.00
2CWNPW	DSC-P52 Cyber-shot	163.32	139.00
2QL1PW	DSC-U50 Cyber-shot U	182.12	155.00
2P2BPW	DSC-U60 Cyber-shot U	182.12	155.00
2D39PW	DSC-P72 Cyber-shot	186.82	159.00
2FG9PW	DSC-P8 Cyber-shot	233.82	199.00
16MZPW	MVC-FD200 Digital Camera	269.07	229.00

Digital Camcorders

quicklinx		inc VAT	ex VAT
	CANON		
3163PW	MV700	327.82	279.00
3164PW	MV700i	374.82	319.00
3165PW	MV750i	457.07	389.00
2QDLPW	MvX3i	999.99	851.06
2QDNPW	MvX10i	889.99	757.44
	SONY		
317VPW	DCR-TRV255 Handycam DB	279.99	238.29
2CP7PW	DCR-TRV265 handycam DB	299.98	255.31
2CP6PW	DCR-TRV14 Handycam MiniDV	370.12	315.00
2CPBPW	DCR-TRV22 Handycam MiniDV	439.97	374.45
2G1DPW	DCR-TRV60 Handycam	868.32	739.00
2CVFPW	IDCR-IP1 Handycam MicroMV	868.32	739.00
2M2ZPW	DCR-PC103 Handycam MiniDV	569.87	485.00
2M31PW	DCR-PC105 Handycam MiniDV	734.37	625.00
2CP9PW	DCR-TRV33 Handycam MiniDV	586.32	499.00

NEW

OLYMPUS
C150Z Luxury Kit
kit includes; Digital Camera, 64MB X-D Case, Charger

£123.37 (£105.00 ex VAT)
Collect 123 Dabspoints
www.dabs.com/olympus | quicklinx : 31CNPW

Memory

quicklinx		inc VAT	ex VAT
	PNY		
292MPW	128MB Compact Flash Card	20.00	17.03
292PPW	256MB Compact Flash Card	40.00	34.05
292QPW	512MB Compact Flash Card	80.00	68.09
2CGPPW	1GB Compact Flash Card Type II	155.00	131.92
2LRGPW	128MB Compact Flash Card 21X	26.00	22.13
2LRHPW	256MB Compact Flash Card 21X	52.00	44.26
2LRJPW	512MB Compact Flash Card 21X	105.00	89.37
292TPW	128MB Smart Media Card	20.00	17.03
292XPW	128MB Multi Media Card	32.00	27.24
2931PW	128MB Secured Digital Card	35.00	29.79
2DFNPW	256MB Secured Digital Card	55.00	46.81
2LRLPW	512MB Secured Digital Card	179.00	152.34
2Q6WPW	128MB USB 2 Drive	30.00	25.54
2Q6XPW	256MB USB 2 Drive	45.00	38.30
	SONY		
YZVPW	128MB Memory Stick	44.99	38.29
2DMKPW	128MBx2 memory Stick	69.99	59.57
2DMLPW	64MB Memory Stick Duo	31.72	27.00
2HDPPW	256MB Memory Stick Pro	85.98	73.18

HP DeskJets from only £45.82 (£39.00)

Inkjet Printers

quicklinx		inc VAT	ex VAT
	CANON		
2PPMPW	i350	49.00	41.71
2SP7PW	i455	68.99	58.72
2TF4PW	i965	233.82	199.00
	EPSON		
2LZXPW	C44UX	43.47	37.00
2Q9CPW	C64	61.10	52.00
2Q9DPW	C84	92.82	79.00
2TDXPW	Photo R300 With Monitor	116.32	99.00
	HP		
2PT6PW	Photosmart 145	90.47	77.00
2PT5PW	Photosmart 245	130.42	111.00
2PT7PW	Photosmart 7260	79.99	68.08
2PT8PW	Photosmart 7660	137.47	117.00
2PT9PW	Photosmart 7960	229.94	195.70
	LEXMARK		
2H9JPW	Z705	52.87	45.00
2TDBPW	P707 Photo Printer	64.62	55.00

Laser Printers

quicklinx		inc VAT	ex VAT
	BROTHER		
2QSLPW	HL-1430	123.37	105.00
	EPSON		
2SRVPW	EPL-6200	245.57	209.00
2SRZPW	EPL-6200L	158.62	135.00
	KYOCERA		
2ONNPW	FS-1010	205.62	175.00
2VL3PW	FS-1020D	243.22	207.00
	OKI		
2CTHPW	B4200	210.32	179.00
2CTJPW	B4300	233.82	199.00
	OMS		
22T1PW	Pagepro 1250e	198.57	169.00
	SAMSUNG		
2F9FPW	ML1510	99.87	85.00
2F9GPW	ML1710	158.62	135.00

Scanners

quicklinx		inc VAT	ex VAT
	CANON		
2483PW	Lide 20	39.99	34.04
24N2PW	Lide 30	49.99	42.55
2889PW	Lide 50	64.00	24.47
2TF5PW	3200F	63.45	54.00
24N3PW	5000F	119.99	102.12
24N4PW	8000F	174.99	148.93
2CXJPW	9900F	269.00	228.94
	EPSON		
2Q9FPW	Perfection 1670 Photo	70.50	60.00
2Q9GPW	Perfection 3170 Photo	175.07	149.00
2444PW	Perfection 2400 Photo	116.32	99.00
	HP		
2PTGPW	Scanjet 4670	154.99	131.91
2R84PW	Scanjet 5530C	184.47	157.00

Multi-function Devices

quicklinx		inc VAT	ex VAT
	CANON		
2HVFPW	MPC 700 Photo	198.57	169.00
2G0SPW	MPC 730 Photo	276.12	235.00
	EPSON		
2572PW	CX3200	86.95	74.00
2TF2PW	CX5400	116.33	99.00
2S7CPW	CX6400	143.35	122.00
2SQRPW	RX-500	206.80	176.00
	HP		
2BD3PW	OfficeJet 5110	158.62	135.00
2C6MPW	OfficeJet 6110	225.60	192.00
2CCHPW	PSC 1205	92.82	79.00
21XZPW	PSC 2110	123.37	105.00
2HY2PW	PSC 2175	139.98	119.14
2R80PW	PSC 2410	219.99	187.23
	LEXMARK		
2ZB0PW	X125 Grey	128.07	109.00

SMARTDISK

3600 Slide Scanner

High-resolution 35mm slide and negative film scanner

£304.32 (£259.00 ex VAT)

Collect 304 Dabspoints

www.dabs.com/smartdisk | quicklinx : 2LPKPW

to see the full range go to www.dabs.com/hp

HP DeskJets provide quality and performance at an affordable price.

DeskJet 3550c Photo Printer
Designed for families and individuals who are looking for an affordable, reliable printing solution to suit a range of personal, study and home office needs.
£45.82 inc £39.00 exc
quicklinx 2PJ0PW

DeskJet 5150c Photo Printer
Ideal for families and sophisticated personal users who are looking for a reliable, stylish and feature-rich printing solution.
£79.99 inc £68.08 exc
quicklinx 2PC4PW

DeskJet 5850 WFI Enabled Photo printer
Ideal for users who want true-to-life photo quality at up to 4800-optimised dpi colour. Optional 6-ink colour printing.
£183.30 inc £156.00 exc
quicklinx 2R82PW

to see the full range go to www.dabs.com/hp

HP LaserJets give you reliability with lower running costs.

LaserJet 1010
Compact, reliable and easy-to-use personal printer, ideal for creating high quality documents. HP's instant-on fuser lets you print your first page in less than 10 secs!
£128.07 inc £109.00 exc
quicklinx 2PTQPW

LaserJet 1300
For personal users in any sized office or working at home, offers proven reliability, unrivalled ease of use and an expandable communication solution.
£245.57 inc £209.00 exc
quicklinx 2FBJPW

LaserJet 2300L
The printer that grows with your business needs, delivers superior laser performance and provides an advanced printing solution.
£386.57 inc £329.00 exc
quicklinx 2D9VPW

to see the full range go to www.dabs.com/epson

The award-winning Epson Stylus Photo range offers outstanding performance.

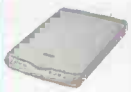
Stylus Photo R200
The EPSON Stylus Photo R200 is the perfect solution to photo printing at home. Providing enormously realistic 6-colour photos and a wealth of features like direct CD/DVD printing, it makes printing your own photos quick, easy and affordable too.
£89.30 inc £76.00 exc
quicklinx 300MPW

NEW

Stylus Photo R800
Bringing photography out of the darkroom - revolutionary A4 Photo inkjet Printer featuring groundbreaking photographic quality, durability and flexibility. The Stylus Photo R800 sets a new benchmark for A4 photo printers. Its new ultrachrome hi-gloss pigment ink.
£269.07 inc £229.00 exc
quicklinx 300KPW

to see the full range go to www.dabs.com/epson

The EPSON perfection range of scanners are ideal for the home/office and photo enthusiasts.



Perfection 1670 Photo
The Perfection 1670 and 1670 Photo are Epson's new generation of flatbed scanners specifically designed for the home user. Enhanced quality, performance and ease of use, perfect for the beginner.
£81.08 inc £69.00 exc
quicklinx 2Q9RPW

NEW

Perfection 4870 Photo
If you're serious about film and photo scanning, you'll appreciate the quality, flexibility and sheer scanning power of the EPSON Perfection 4870 Photo. It recognises detail so fine you can even see the grain of the film.
£313.72 inc £267.00 exc
quicklinx 300LPW

to see the full range go to www.dabs.com/epson

EPSON's latest printing and scanning technologies plus quick & easy standalone copying facility.

RX500 All in One
The first all-in-one home photo centre to scan, copy and print premium quality photos from digital or analogue collections. The Rx-500 offers premium photo printing and high performance scanning in one space and cost saving solution.
£176.00 inc £206.80 exc
quicklinx 2SQRPW

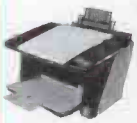
NEW

RX600 All in One
Allowing users to reproduce images from both digital and traditional film sources. The RX600 also features a number of standalone printing features to facilitate quick and intuitive operation by both photo enthusiasts and non-PC literate users.
£251.45 inc £214.00 exc
quicklinx 31KHPW

to see the full range go to www.dabs.com/canon

Canon's inkjet and all-in-one range providing excellent quality and performance.

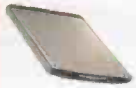
i965 Inkjet Printer
Unsurpassed speed and ultra high quality resolution makes the Bubble Jet i965 the ultimate photo printer for professionals. It offers true cost and time-saving efficiencies and extensive features including borderless and CDR printing as standard.
£233.82 inc £199.00 exc
quicklinx 2TF4PW



MP390 All in One
The stylish SmartBase MP390 delivers photo quality printing, fast flatbed Super G3 faxing and superb colour scanning and copying. It provides camera and card direct photo printing - no PC required.
£186.82 inc £159.00 exc
quicklinx 31N8PW

to see the full range go to www.dabs.com/canon

The Canon scanners offer excellent quality and performance.



Lide 80
CanoScan LiDE 80 brings together stunning design and outstanding quality in the world's most compact film-capable flatbed scanner. Outstanding 2400 x 4800 dpi resolution, a super compact hand-held film adapter unit.
£129.99 inc £110.63 exc
quicklinx 2Q97PW

3200F Film Scanner
The CanoScan 3200F is an ultra-fast film capable flat-bed scanner. Transparencies & documents scan at 1200x2400 dpi resolution with record speed via a USB 2.0 Hi-Speed connection, then CanoScan 3200F will appeal to home users with film scanning requirements.
£54.00 inc £63.45 exc
quicklinx 2TF5PW

X6150 All-in-One

quicklinx 2MHWPW

www.dabs.com/lexmark

£182.12 inc £155.00 exc

With high quality printing and scanning, exceptionally quick print and copy speeds, 33.6Kbps stand alone fax and stand alone copying, the X6150 is the perfect solution for the demanding user.

- 4800 x 1200 dpi
- Upto 19/15ppm print speed
- 33.6Kbps fax speed

LEXMARK

See our website for latest prices

Creative WebCam NX Pro
Video, stills and audio – ready to go!
quicklinx 2QF2PW
www.dabs.com/creative
CREATIVE
£28.99 inc £24.68 exc

HP all-in-one with built in PhotoREt from £92.82

to see the full range go to www.dabs.com/hp

HP All-in-One products help you conserve space, money and time.

PSC1205 Printer, Copier, Scanner
Small, economical and easy to use. Delivering high quality results. A perfect solution for printing, scanning & copying.
quicklinx 2CCHPW
£92.82 inc £79.00 exc

PSC2175 Printer, Copier, Scanner
Designed for creative home users who want to print photo quality images and require high-quality scanning and copying.
quicklinx 2HY2PW
£139.99 inc £119.14 exc

PSC2410 Printer, Copier, Scanner
Designed for space conscious users who want all the features of a digital photo print/copy solution with none of the drawbacks.
quicklinx 2R80PW
£219.99 inc £187.23 exc

to see the full range go to www.dabs.com/hp

HP ScanJet series - value for money combined with ease of use.

ScanJet 2400c
Affordable, easy and fun, start scanning today! 1200dpi scan and copy in colour at the touch of a button. Scan photos, text, graphics and even 3D objects.
quicklinx 2HY3PW
£45.82 inc £39.00 exc

ScanJet 4670
Perfect for people who appreciate how imaginative design can lead to new ways of working. Free up of desk-space with this sleek see through scanner.
quicklinx 2PTCPW
£154.99 inc £131.91 exc

ScanJet 5530c
Ideal for home users/photo enthusiasts wanting fast, high quality results and the ability to batch scan packs of photos without the fuss.
quicklinx 2R84PW
£184.47 inc £157.00 exc

Belkin Wireless Router

quicklinx 2CS8PW
www.dabs.com/belkin
£76.37 inc £65.00 exc

New 802.11g technology provides you with networking speeds nearly five times faster than the current Wi-Fi (802.11b) standard 54Mbps. 802.11g is the easiest wireless network to implement and is interoperable with existing 802.11b Wi-Fi networks.

quicklinx	BELKIN	inc VAT	ex VAT
2CS7PW	54g Wireless Access Point	68.08	59.00
2CS5PW	54g Wireless PCI Adapter	39.95	34.00
2CS4PW	54g Wireless Notebook Card	39.95	34.00

Linksys Wireless-G 54mbps PCI Card

quicklinx 2D13PW
www.dabs.com/linksys
£38.77 inc £33.00 exc

Wireless-G connectivity at 54Mbps lets you network at high-speed from anywhere in the building. Also interoperates with Wireless-B (802.11b) networks at 11Mbps.

quicklinx	LINKSYS	inc VAT	ex VAT
2CM7PW	Wireless-G Broadband Router	65.80	59.00
2CM9PW	Wireless-G PCMCIA Card	47.00	40.00
2D12PW	Wireless-G Access Point	63.45	54.00
2Z9MPW	Wireless modem/router	104.57	89.00

ADSL Modem & Router

quicklinx 2B9NPW
www.dabs.com/dlink
£76.37 inc £65.00 exc

The DSL-604+ Remote Router is a versatile all-in-one networking device that provides high speed broadband Internet connection, wireless user access and dedicated LAN bandwidth server connection.

DG834G Wireless Modem

quicklinx 2VCDPW
www.dabs.com/netgear
£116.32 inc £99.00 exc

- Modem & Router
- Wireless ADSL modem and firewall router
- Built-in 4-port 10/100Mbps switch
- Share internet connection for upto 253 users, inc. up to 32 users

OfficeConnect Wireless Modem/Router and PC Card

quicklinx 311VPW
www.dabs.com
£111.62 inc £95.00 exc

The 3Com® ADSL Wireless 11g Firewall Router combines an ADSL modem, router, 802.11g wireless access point, four-port switch with a Wireless PC Card.

Wacom Graphire 3 Classic

quicklinx 2S0LPW
www.dabs.com/wacom
£69.99 inc £59.57 exc

Designed to allow you to get so much more from your images. The ultimate tool for the digital imaging enthusiast, lets you work with the accuracy of the pen, draw, select, sketch and navigate your images or video with precision and ease. Pressure sensitivity, the darker the colour of your line or the larger the brush, depending on the application and your choice, the possibilities are near endless.

quicklinx	WACOM	inc VAT	ex VAT
2S0MPW	Graphire 3 Studio	99.99	85.10
2S0NPW	Graphire 3 Studio XL	179.99	153.19

USB Starter Kit

quicklinx 178HPW
www.dabs.com/actiontec
£49.35 inc £42.00 exc

Transform your home or office into a wireless network.

- USB Solution Provides Mobility
- Transfer Network Data Upto 11Mbps
- Simple Interface & Installation

4-Socket SurgeMaster®

quicklinx 2C9XPW
www.dabs.com/belkin
£19.97 inc £17.00 exc

This 4-Socket Home series model also offers Telephone/Modem/DSL protection and 2-metre power cable. This model includes £50,000 connected equipment warranty.

460LR Wireless Mouse

quicklinx 2PX4PW
www.dabs.com/trust
£29.37 inc £25.00 exc

- 6 button ergonomic wireless optical scroll mouse with special office button for quick access
- Optimised design

Easy Scroll Keyboard

quicklinx 2D3CPW
www.dabs.com/trust
£17.62 inc £15.00 exc

- Multimedia keyboard with 33 function keys
- Special scroll wheel
- Integrated ergonomic armrest
- Exclusive black and metal design
- USB connection

Microsoft
Wireless Intelli Explorer-Platinum
Tilt Wheel Technology and state-of-the-art optical tracking and true wireless freedom.
£37.60 (£32.00 ex VAT)
Collect 37 Dabspoints
www.dabs.com/microsoft quicklinx: 2QNDPW

Microsoft
Black Multimedia Keyboard
A keyboard that maximises your digital experience! with one-touch buttons
£22.32 (£19.00 ex VAT)
Collect 22 Dabspoints
www.dabs.com/microsoft quicklinx: 2PKWPW

Microsoft
Wireless Optical Desktop Elite
Top Performance Total Style in a Wireless Desktop
£59.99 (£51.06 ex VAT)
Collect 59 Dabspoints
www.dabs.com/microsoft quicklinx: 2PXDPW

Logitech
MX900 Optical Mouse Bluetooth™
8 convenient buttons and a Cruise Control™ scrolling system.
£69.32 (£59.00 ex VAT)
Collect 69 Dabspoints
www.dabs.com/logitech quicklinx: 2T84PW

Logitech
Cordless Click! Optical Mouse
USB or PS/2 connection for PC and Mac Fits either hand 5-year guarantee
£34.07 (£29.00 ex VAT)
Collect 34 Dabspoints
www.dabs.com/logitech quicklinx: 2Q41PW

Cymotion Master Xpress Keyboard
Featuring 29 Additional keys, inc. 10 patented side mounted Xpress Keys for instant access
£27.02 (£23.00 ex VAT)
Collect 27 Dabspoints
www.dabs.com/cherry quicklinx: 2WCCPW

GeForce Ti 5200 cards from £56.50 (£48.09)

AGP Video Cards

quicklinx	AOPEN GeForce FX	inc VAT	ex VAT
2S02PW	MX400-32 32MB DDR	22.50	19.15
30L8PW	MX4000 VO 64MB DDR	32.50	27.66
2S09PW	FX5200-V128 DVI VO 128MB DDR	46.50	39.58
2W69PW	FX5600XT 128MB DDR	77.50	65.96
2W6BPW	FX5600XT 256MB DDR	94.50	80.43
2W6TPW	FX5700 128MB DDR	113.00	96.17
2W6VPW	FX5700 Ultra 128MB DDR	136.00	115.75
30MMPW	FX5900XT DVI VO 128MB DDR	199.00	169.37
2W6WPW	FX5950 Ultra 128MB DDR	318.00	270.64
	CONNECT 3D		
2W4HPW	Radeon 7000 VO 32MB SDR	24.50	20.86
2DB9PW	Radeon 7000 VO DVI 64MB DDR	30.00	25.54
2RXFPW	Radeon 9200SE VO 64MB DDR	36.50	31.07
2RXGPW	Radeon 9200SE VO 128MB DDR	39.00	33.20
2G9XPW	Radeon 9200 DVI VD 64MB DDR	47.00	40.00
2G9YPW	Radeon 9200 DVI VO 128MB DDR	54.50	46.39
2RXSPW	Radeon 9200 DVI VO 256MB DDR	61.00	51.92
2VDPPW	Radeon 9600SE DVI VO 128MB DDR	65.50	55.75
2LJMPW	Radeon 9600 DVI VO 128MB DDR	81.00	68.94
2RXRPW	Radeon 9600 DVI VO 256MB DDR	86.50	73.62
2VDRPW	Radeon 9600 XT DVI VO 128MB DDR	121.00	102.98
31G5PW	Radeon 9600 XT DVI VO 256MB DDR	130.00	110.64
2G9ZPW	Radeon 9800 Pro DVI VO 128MB DDR	236.00	200.86
2VDSPW	Radeon 9800 XT DVI VO 256MB DDR	365.00	310.64
2W4KPW	All-in-Wonder 9200SE 64MB DDR	125.00	106.39
2VDTPW	All-in-Wonder 9600 Pro 128MB DDR	179.00	152.34
2RXWPW	All-in-Wonder 9800 Pro 128MB DDR	345.00	293.62
	HERCULES		
2LHBPW	Radeon 7000 DVI VO 64MB DDR	33.00	28.09
2LHCPW	Radeon 7500 DVI VO 128MB DDR	43.00	36.60
2QJ5PW	Radeon 9200SE VO 128MB DDR	52.50	44.69
2LK0PW	Radeon 9200 DVI VO 128MB DDR	67.00	57.03
2SC8PW	Radeon 9600SE VO 128MB DDR	86.00	73.20
2Z3KPW	Radeon 9600SE+Game X111 128MB	87.00	74.00
2QJBPW	Radeon 9600 DVI VO 256MB DDR	113.00	96.17
2QJ9PW	Radeon 9600 PRO DVI VO 128MB DDR	149.00	126.81
2WR6PW	Radeon 9600XT + Half Life 128MB DDR	149.00	126.81
2RX9PW	Radeon 9800 DVI VO 128MB DDR	206.00	175.32
2LK3PW	Radeon 9800 Pro DVI VO 128MB DDR	251.00	213.62
2SC9PW	AIW Radeon 9800SE DVI VIVO 128MB DDR	168.00	142.98
2TFGPW	Radeon 9800 XT 256MB DDR	349.00	297.03

Sound Cards

quicklinx	CREATIVE	inc VAT	ex VAT
27RYPW	SoundBlaster 4.1 Digital OEM	13.25	11.28
2S1DPW	SoundBlaster Live 5.1 Digital	26.00	22.13
18C2PW	SB Extigy	126.00	107.24
2LJTPW	SB MP3+ USB	34.50	29.37
2S2QPW	Audigy LS	51.50	43.83
2S2RPW	Audigy 2 ZS	85.50	72.77
2S2SPW	Audigy 2 ZS Platinum Pro	167.00	142.13
2S2TPW	Audigy 2 NX	83.50	71.07
	HERCULES		
2217PW	Gamesurround Muse LT	10.00	8.51
2SC1PW	Gamesurround Muse 5.1 DVD + HeadSet	16.50	14.05
2WJKPW	Muse Pocket USB	36.50	31.07
2SDHPW	Gamesurround Fortissimo III 7.1	30.50	25.96
2FMLPW	DIGIFIRE 7.1	47.00	40.00
2SC6PW	DJ Console USB	128.00	108.94
2SC3PW	16/12 FW	330.00	280.86
	PURE DIGITAL		
282YPW	SonicXplosion RP	40.00	34.05
2830PW	SonicXplosion DVD RP	60.00	51.07

Networking

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2J7VPW	8 Port 10/100Mbps	13.00	11.07
1Y30PW	16 Port 10/100Mbps	35.00	29.79
1Y31PW	10/100 RJ45 PCI	5.75	4.90
28V1PW	10/100 CardBus	11.50	9.79
2BV3PW	10/100 USB2	15.00	12.77
2MBCPW	802.11b 11Mbps PCMCIA	20.25	17.24
2Q2ZPW	802.11b 11Mbps USB Stick	55.00	46.81
2SPFPW	802.11b 11Mbps PCI	85.00	72.34
2W03PW	Bluetooth Class 2 USB	15.50	13.20
2Q8MPW	Bluetooth Class 1 USB	22.00	18.73

Modems/ADSL

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14XBPW	56k PCI Controllerless Voice Intel	10.00	8.51
14XFPW	56k Serial Voice Intel	17.00	14.47
25BWPW	External USB	16.00	13.62
86LPW	PCMCIA	21.50	18.30
14XKPW	ADSL PCI Conexant	21.00	17.88
17P6PW	ADSL USB	19.00	16.17
17P8PW	ADSL Conexant Router 4Port	39.00	33.20
2LPZPW	802.11b ADSL 4 Port Router	69.00	58.73

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30RJPW	Radeon 9200SE DVI VD PCI 128MB	24.99	21.27
30RHPW	Radeon 9200SE DVI VO 128MB DDR	34.00	28.94
2ZZWPW	GF MX4000 VO 128MB DDR AGP	35.00	29.79
2GM9PW	GF FX5200 DVI VO 128MB AGP	40.00	34.05
30N5PW	GF FX5700 DVI VO 256MB DDR AGP	95.00	80.86
30RRPW	Radeon 9600XT DVI VO 256MB DDR	108.00	91.92
30RTPW	Radeon 9800 Pro DVI VO 128MB DDR	215.00	182.98
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2RY0PW	COM4824 IDE 16xDVD 48r 48w 24rw	41.00	34.90
0X9PW	DVD-1648 Bonus IDE 16xDVD 48xCD	24.50	20.86
30S3PW	DVD-1648 Multicol IDE 16xDVD 48xCD	25.50	21.71
28P8PW	EHW-5224U Bonus USB2 52r 52w 24rw	49.99	42.55
2PSDPW	DRW-4410 Pro IDE DVD+R/RW 4x	69.00	58.73
	ASUS		
2J6NPW	CRW-5224U USB2 52r 52w 24rw	49.00	41.71
	LITEON		
21T9PW	LTN-5265-02VYC IDE 52xCD	14.25	12.13
30M6PW	XJ-HD-166 Retail IDE 16xDVD 48xCD	23.50	20.00
30M7PW	Retail IDE 16xDVD 52r 52w 32rw	45.50	38.73
30M8PW	Retail USB2 8xDVD 24r 24w 12rw	105.00	89.37
2Z3NPW	LDW4515 Retail IDE DVD+-R/RW 4x	74.00	62.98
2QC6PW	SDW200DX Retail USB2 DVD+-R/RW 2x	149.00	126.81
30M9PW	LDW-S411SX Retail USB2 DVD+-R/RW 4x	135.00	114.90
2Z3PPW	LDW-8515 Retail IDE DVD+-R/RW 8x	95.00	80.86
	LG		
2BHJPW	GRD-B161BB OEM IDE 16xDVD 48xCD	23.00	19.58
29SMPW	GRD-B161B RP IDE 16xDVD 48xCD	28.00	23.83
30V8PW	GRD-B161 Black IDE 16xDVD 48xCD	22.00	18.73
2T21PW	GCE-B525B IDE 52r 52w 32rw	32.00	27.24
30N0PW	GCE-B525BB OEM IDE 52r 52w 32rw	25.00	21.28
2QBQPW	GSA-4040B IDE DVD+-R/RW/RAM 4x	81.00	68.94
2WV7PW	GSA-4040B OEM IDE DVD+-R/RW/RAM 4x	79.00	67.24
300YPW	GSA-4081B OEM IDE DVD+-R/RW/RAM 8x	90.00	76.60
30P8PW	GSA-4081B IDE DVD+-R/RW/RAM 8x	95.00	80.86
	MSI		
2M3PPW	C52 IDE 52xCD	14.00	11.92
2M3QPW	C52-Black IDE 52xCD	14.00	11.92
2M3MPW	D16 IDE 16xDVD 48xCD	21.50	18.30
2M3NPW	D16-Black IDE 16xDVD 48xCD	21.50	18.30
2Q7PPW	CR52-M IDE 52r 52w 32rw	25.50	21.71
2VYBPW	CR52 Active Panel IDE 52r 52w 32rw	27.50	23.41
2TDJPW	CR52-M-Black IDE 52r 52w 32rw	25.00	21.28
2WH0PW	CRE52-M EXT USB2 52r 52w 24rw	50.00	42.56
2RB6PW	X4B-A IDE 16xDVD 48r 48w 24rw	38.00	32.34
2T31PW	DR4-A IDE DVD+-R/RW 4x	75.00	63.83
2THBPW	DR4-A Black IDE DVD+-R/RW 4x	75.00	63.83
2Z9TPW	DR8-A IDE DVD+-R/RW 8x	89.00	75.75
2ZBVPW	DR8-A Black IDE DVD+-R/RW 8x	95.00	80.86
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2HVGPW	ND-1300A OEM IDE DVD+-R/RW 4x	70.00	59.58
30SKPW	ND-1300A Black IDE DVD+-R/RW 4X	70.00	59.58
2ZD6PW	ND-2500A IDE DVD+-R/RW 8x	89.00	75.75
3095PW	ND-2500A Black IDE DVD+-R/RW 8x	89.00	75.75
	OPTORITE		
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30M3PW	DC-4801 IDE 16xDVD 48r 48w 24rw	36.00	30.64
30M4PW	DD-0201 IDE DVD+R/RW 4x	78.00	66.39
30M5PW	DD-0401 IDE DVD+R/RW 8x	99.99	85.10
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2CCTPW	JR32RWDVK USB2 12xDVD 40r32w10rw	125.00	106.39
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2LSHPW	PX-54TA/T3 IDE 54xCD	16.00	13.62
2VP0PW	PX-116A/T3 IDE 16xDVD 48xCD	32.50	27.66
2WKFPW	PX-W5224TA/T3C IDE 52r 52w 32rw	46.00	39.15
2LSRPW	Premium/T3 IDE 52r52w32rw	81.00	68.94
2LSSPW	Premium/T3B IDE 52r52w32rw	81.00	68.94
2LSTPW	Premium-U/T3UK USB2 52r52w32rw	124.00	119.00
2WKGPW	PX-W40125E External SCSI 40r40w12rw	228.00	194.05
2FQYPW	PX-504A IDE DVD+R/RW	83.00	70.64
2THWPW	PX-708A/T3B Black IDE DVD+-R/RW 8x	142.00	120.86
2S17PW	PX-708A/T3 IDE DVD+-R/RW 8x	142.00	120.86
2THXPW	PX-708UF USB2 DVD+-R/RW 4x	255.00	217.03
	PIONEER		
2DH6PW	DVD-120 IDE 16xDVD 40xCD	25.00	21.28
2RW7PW	DVD-121 IDE 16xDVD 40xCD	26.00	22.13
2G9FPW	DVD-120S IDE 16xDVD 40xCD	26.50	22.56
2NB5PW	DVR-106 IDE DVD+-R/RW 4x	80.00	68.09
2NB6PW	DVR-A06 IDE DVD+-R/RW 4x	105.00	89.37
2VRRPW	DVR-106 Black IDE DVD+-R/RW 4x	85.50	72.77
	SAMSUNG		
2ZDPW	SC-152AEB OEM IDE 52xCD	13.25	11.28
2GZFPW	SC-152LRBS Retail IDE 52xCD	13.50	11.49
2DDJPW	SC-152AEBB Black IDE 52xCD	15.00	12.77
2X5FPW	SD-616EEB OEM IDE 16xDVD 48xCD	21.00	17.88
2ZZHPW	SD616EEBB BLACK IDE 16xDVD 48xCD	23.00	19.58
2ZZGPW	SD-616ERP IDE 16xDVD 48xCD	25.00	21.28
2VHHPW	SW252FEAB Black OEM IDE 52r52w32rw	22.50	19.15
2VHCPW	SW252FEN OEM IDE 52r 52w 32rw	21.50	18.30
2VHDPW	SW252FRN5 RP IDE 52r 52w 32rw	26.00	22.13
2HTMPW	SM352BRN5 IDE 16xDVD 52r52r24rw	45.00	38.30
2M9ZPW	SM352BEN OEM IDE 16xDVD 52r52r24rw	38.00	32.34
2N28PW	SM352BEAB OEM IDE 16xDVD 52r52r24rw	41.50	35.32
	SONY		
2T3DPW	CD-RW 52x32x52x Int IDE OEM	29.37	25.00
2W4RPW	CD-RW 52x32x52x Int Black	30.55	26.00
2W04PW	CD-RW 52x32x52x Int IDE Retail	38.77	33.00
2VCJPW	CRX-300E-B2 Combo Black OEM	41.12	35.00
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27THPW	180GXP 120GB UDMA100 2MB 7200rpm	60.00	51.07
27TJPW	180GXP 120GB UDMA100 8MB 7200rpm	69.00	58.73
2PH7PW	7K250 40GB UDMA100 2MB 7200rpm	41.50	35.32
30QPPW	7K250 60GB UDMA100 2MB 7200rpm	44.50	37.88
2PH8PW	7K250 80GB UDMA100 2MB 7200rpm	46.50	39.58
2PH9PW	7K250 80GB SATA150 8MB 7200rpm	54.00	45.96
2PHDPW	7K250 120GB UDMA100 2MB 7200rpm	61.50	52.34
2PHFPW	7K250 120GB UDMA100 8MB 7200rpm	69.00	58.73
2PHLPW	7K250 120GB SATA150 8MB 7200rpm	76.00	64.69
2PHMPW	7K250 160GB UDMA100 2MB 7200rpm	74.50	63.41
2PHNPW	7K250 160GB UDMA100 8MB 7200rpm	80.50	68.51
2PHPPW	7K250 160GB SATA150 8MB 7200rpm	86.00	73.20
2VN3PW	7K250 200GB UDMA100 8MB 7200rpm	121.00	102.98
2PHQPW	7K250 250GB UDMA100 8MB 7200rpm	148.00	125.96
2PHRPW	7K250 250GB SATA150 8MB 7200rpm	184.00	156.60
	SAMSUNG Spinpoint P80		
2QD2PW	80GB UDMA133 2MB 7200rpm	48.00	40.86
2ZDNPW	80GB SATA150 8MB 7200rpm	55.00	46.81
2SQTPW	120GB UDMA133 2MB 7200rpm	64.50	54.90
2ZDPPW	120GB UDMA133 8MB 7200rpm	66.50	56.60
2ZDQPW	120GB SATA150 8MB 7200rpm	70.50	60.00
2S6SPW	160GB UDMA133 2MB 7200rpm	79.50	67.66
2ZDRPW	160GB UDMA133 8MB 7200rpm	83.50	71.07
2ZDTPW	160GB SATA150 8MB 7200rpm	85.50	72.77
	WESTERN DIGITAL		
2WPVPW	Caviar 120GB UDMA100 2MB 7200rpm	63.50	54.05
2WPWPW	Caviar 120GB UDMA100 8MB 7200rpm	69.50	59.15
18HFPW	Caviar 120GB UDMA100 8MB 7200rpm	69.50	59.15
2N58PW	Caviar 120GB SATA150 8MB 7200rpm	77.50	65.96
12NMPW	Caviar 160GB UDMA100 2MB 7200rpm	82.00	69.79
2WQ1PW	Caviar 160GB UDMA100 2MB 7200rpm	82.00	69.79
2WQ4PW	Caviar 160GB UDMA100 8MB 7200rpm	86.50	73.62
2J7ZPW	Caviar 160GB UDMA100 8MB 7200rpm	86.50	73.62
2ST3PW	Caviar 200GB UDMA100 2MB 7200rpm	104.00	88.51
2WQ9PW	Caviar 200GB UDMA100 2MB 7200rpm	104.00	88.51
2WQBPW	Caviar 200GB UDMA100 8MB 7200rpm	111.00	94.47
2ST5PW	Caviar 200GB UDMA100 8MB 7200rpm	111.00	94.47
2WQCPW	Caviar 250GB UDMA100 2MB 7200rpm	157.00	133.62
2WQDPW	Caviar 250GB UDMA100 8MB 7200rpm	187.00	159.15
2N7DPW	Caviar 250GB SATA150 8MB 7200rpm	168.00	142.98
2GKZPW	Raptor 36GB SATA150 8MB 10000rpm	92.50	78.73

External Hard Disks

quicklinx	MAXTOR	inc VAT	ex VAT
2LYRPW	3000DV 80GB FW 2MB 7200rpm	89.50	76.17
2LYTPW	5000DV 160GB U2/FW 8MB 7200rpm	147.00	125.11
2VDGPW	One Touch 120GB USB2 2MB 7200rpm	115.00	97.88
2VDHPW	One Touch 200GB U2/FW 8MB 7200rpm	178.00	151.49
2VDKPW	One Touch 250GB U2/FW 8MB 7200rpm	205.00	174.47
2VDLPW	MAC 250GB Fire 8MB 7200rpm	182.00	154.90
2VDMPW	One Touch 300GB U2/FW 2MB 5400rpm	228.00	194.05
	LACIE		
30FHPW	PocketDrive 60GB 4200rpm FW & USB2	198.00	168.51
2BDSPW	PocketDrive 60GB 5400rpm FW & USB2	222.00	188.94
2M7DPW	PocketDrive 80GB Firewire & USB2	264.00	224.69
30FNPW	Data Bank 20GB USB2	150.00	127.66
30FPPW	Data Bank 40GB USB2	191.00	162.56
30FJPW	Data Bank 20GB Firewire & USB2	173.00	147.24
30FMPW	Data Bank 40GB Firewire & USB2	229.00	194.90
2BDVPW	Mobile 20GB USB2	95.50	81.28
2BDWPW	Mobile 40GB USB2	132.00	112.34
255PPW	d2 80GB 7200rpm Firewire	114.00	97.03
255LPW	d2 120GB 7200rpm USB2	119.00	101.28
255QPW	d2 120GB 7200rpm Firewire	125.00	106.39
2G6PPW	d2 160GB 7200rpm Firewire	144.00	122.56
2ZD7PW	d2 160GB 7200rpm Firewire800 & USB2	162.00	137.88
2G6LPW	d2 200GB 7200rpm Firewire	173.00	147.24
2ZD8PW	d2 200GB 7200rpm Firewire800 & USB2	191.00	162.56
2G66PW	d2 250GB 7200rpm Firewire	198.00	168.51
2ZD9V	d2 250GB 7200rpm Firewire800 & USB2	211.00	179.58
2ZDKPW	d2 320GB 7200rpm Firewire800 & USB2	258.00	219.58
2N9FPW	d2 320GB 7200rpm Firewire	245.57	209.00
2ZDLPW	d2 400GB 7200rpm Firewire800 & USB2	350.00	297.88
2G6MPW	d2 400GB 7200rpm Firewire	360.00	306.39
2ZDMPW	d2 500GB 7200rpm Firewire800 & USB2	420.00	357.45
2G61PW	d2 500GB 7200rpm Firewire	421.82	359.00
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2SDJPW	P3 80GB USB2	92.00	78.30
2SDLPW	P3 80GB Firewire	86.95	74.00
2SDKPW	P3 80GB 7200rpm USB2	120.00	102.13
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SHHPW	128MB 168Pin	DIMM PC133	SDRAM Non-Parity	CL2
178JPW	512MB 184Pin	DIMM PC2100	DDR RAM Non-Parity	CL2.5
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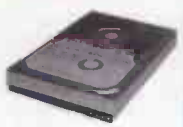

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2FZQPW	7200.7 80GB UDMA100 2MB 7200rpm	52.00	44.26
2FZRPW	7200.7 80GB SATA150 8MB 7200rpm	59.00	50.22
2FZSPW	7200.7 120GB UDMA100 2MB 7200rpm	65.00	55.32
2FZVPW	7200.7+ 120GB UDMA100 8MB 7200rpm	70.00	59.58
2FZWPW	7200.7 120GB SATA150 8MB 7200rpm	76.00	64.69
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2CYHPW	2600+ 512Kb Socket A 333Mhz	66.00	56.17
2CYKPW	2800+ 2.08Ghz 512Kb SoA 333Mhz	95.00	80.86
2CYLPW	3000+ 2.17Ghz 512Kb SoA 333Mhz	135.00	114.90
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215KPW	Celeron 1.7GHz	46.50	39.58
215YPW	Celeron 1.8GHz	45.00	38.30
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30XWPW	U8668-D VIA P4M266A S478 MATX	33.00	28.09
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30XZPW	M7VIZ VIA KM400 SoA uATX	37.50	31.92
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2LQBPW	A600A 350W ATX 12v	109.00	92.77
14P1PW	H600A Super Tower 300W ATX12V	59.00	50.22
2PVBPW	H600B Black Pearl 350W ATX 12v	79.00	67.24
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2N15PW	V1000+ Xaser III Black	75.00	63.83
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2SJSPW	VM2000A LanFire Silver	69.99	59.57
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2SJTPW	VM3000A Skull Silver	85.00	72.34
3179PW	VM1000C Romeo Silver	55.00	46.81

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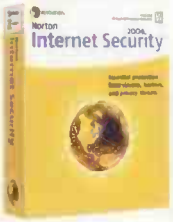

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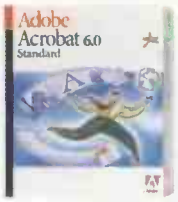

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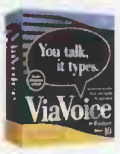

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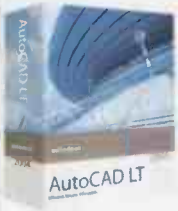

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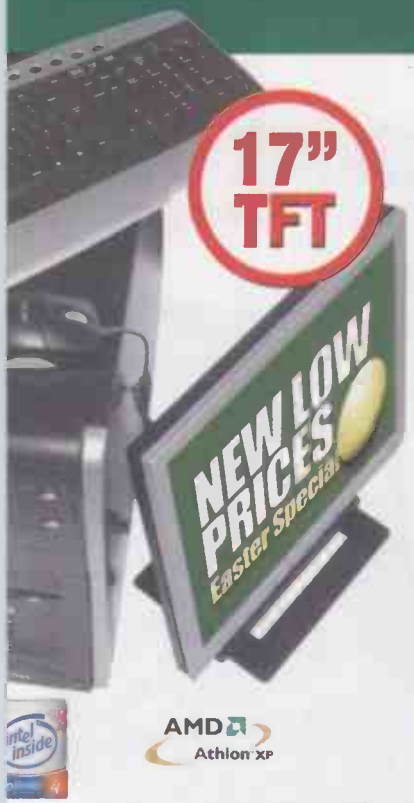

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- 5.1 Surround Sound 6 Channel Audio
- Creative Inspire P580 5.1 Surround Sound Speakers + Sub-Woofer
- 56K Data/Fax/Voice Modem
- USB 2.0 Ports; Gigabits LAN
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10268144	Samsung SM152V 15" Ivory TFT	199.00	233.83
10268154	CTX S501A 15" TFT	203.00	238.53
10233519	Iiyama AX3835U 15" TFT	303.00	356.03
10224223	Aries 17" TFT Slimline	229.00	269.08
10264471	Iiyama E430 17" TFT	285.00	334.88
10268079	ADI A715 17" TFT	309.00	363.08
10273752	BENQ FP747 17" TFT	229.00	269.08
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Aries SpaceCube 3500

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- 16x DVD ROM Drive (Combo)
- CD-RW Drive 52x24x52 + Burn Proof Technology
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- 5.1 Surround Sound Spport, built in Stereo Speakers
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- Ability OFFICE SUITE
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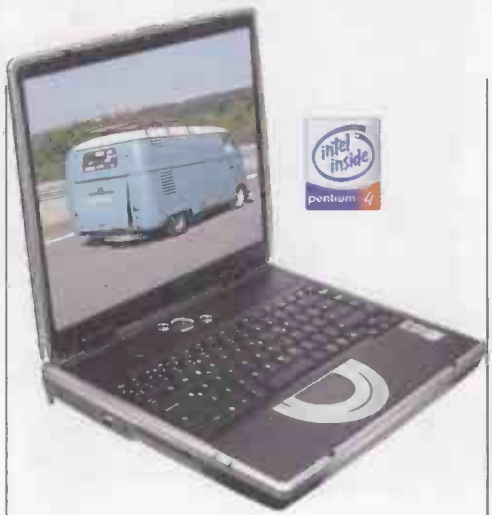

Aries Precision 2733

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- 256Mb Hi-Speed DDR RAM upgradeable to 1Gb
- 15" TFT SGA Display
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- DVD / CD ReWRiter ROM Drive
- ATI Mobility Radeon M9 64MB DDR AGP Graphics
- 5.1 Surround Sound Spport, built in Stereo Speakers
- MS Windows XP Home
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- 15" TFT Display
- 20Gb Ultra ATA-100 Fast Hard Drive
- DVD/CDRW Combo Drive
- ATI Mobility Radeon 9000 64Mb
- MS Windows XP Home
- Ability Office Suite
- 3 Year RTB Warranty

Feb 2004

■ I/O Port USB 2.0 x2 ■ Parallel ■ CRT connector ■ RJ-11 ■ RJ-45 ■ FIR ■ 1394A ■ MIC-in ■ S-video ■ TV-out ■ Headphone jack ■ Type II PCMCIA ■ 56Kps V90 Modem with FREE Internet Access ■ AC Adapter 90 watts, Universal ■ Lithium-ion 8 Cell Battery ■ 10/100 Ethernet Network LAN onboard ■ Size 339.4 x 282 x 48mm

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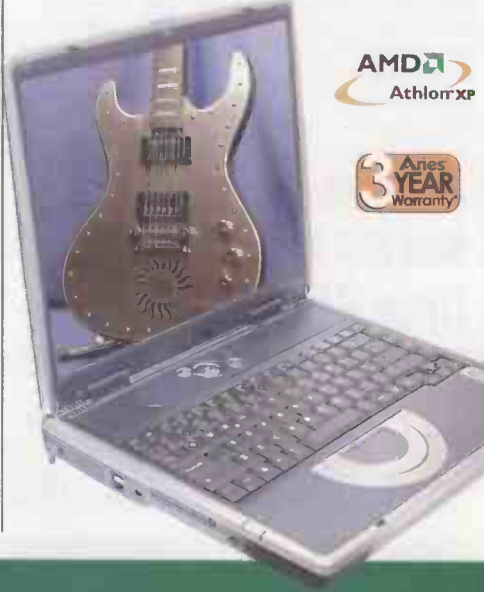

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- IEEE 394a Firewire Port ■ TV-Out ■ head phone(SPDIF)
- Type II PCMCIA slot ■ Li-Ion battery ■ 10/100 Base-T LAN
- Fax/modem V.90/V.92 ■ Weight 2.3Kgs
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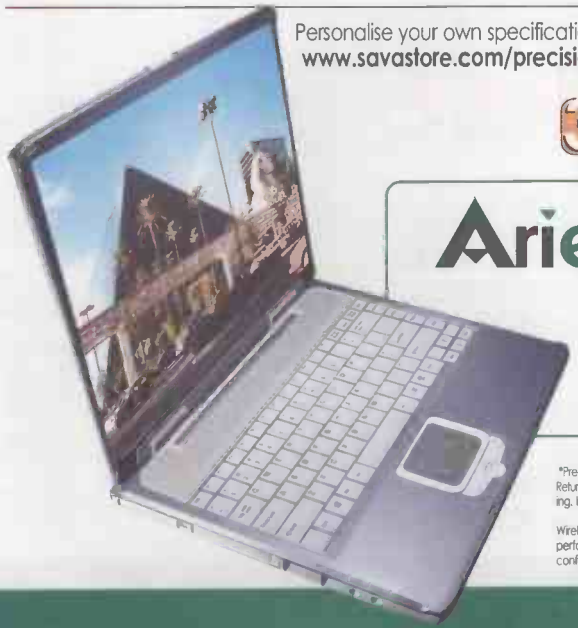

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- ATI Mobility Radeon M11 128Mb DDR AGP Graphics
- Intel 855GM Dynamic 64MB SMA Video
- Intel Integrated Wireless LAN (802.11b) Card
- 5.1 Surround Sound & built in Stereo Speakers
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- I/O Port 2 X USB2.0 ■ Parallel Port ■ VGA port ■ RJ-11 ■ RJ-45
- FIR ■ 1394a ■ TV-Out ■ head phone(SPDIF) ■ Type II PCMCIA slot
- Li-Ion battery ■ 10/100 Base-T LAN ■ Fax/modem V.90/V.92+802.11b on board Intel® PRO/Wireless 2100/2100A (MiniPCI solution) ■ Size : 326(W) x 258(D) x 25.3(H) mm/32mm (front/back)

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Wireless connectivity and some features may require you to purchase additional software, services or external hardware. Availability of public wireless LAN access points limited. System performance measured by MobileMark* 2002. System performance, battery life, wireless performance and functionality will vary depending on your specific hardware and software configurations.

EASTER EGG HUNT

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RD, London

Welcome to the April edition of the Green Pages, as always packed full with all the latest product offerings from top brands at great prices. Don't miss our great Easter savings on all the Aries PC systems - prices have been even further reduced! (see pages 1-2).

At www.savastore.com the Easter Eggstravaganza is upon us once again!!!

No! Stop it! No! If I was to tell you where they were, everyone would want to know!

I am of course talking about eggs. Not the normal yolky variety, but Easter Eggs of the colourful variety. Simply visit www.savastore.com and find the eggs hidden around the site. Find six eggs, answer a few questions and you could win an eggcelent prize!

So go on — go egg hunting and you could win anything from a Lexmark X1150 printer, a copy of the New Quickbooks 2004 regular from Intuit or even a Palm Zire 71! But hurry, the eggs will disappear on Friday 16th April!

On a more serious note I do value your feedback about us, our products and our performance so if you have any comments please feel free to contact me personally at: sj@watford.co.uk

Shiraz Jessa *Managing Director*

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10262575	Brother P-Touch 220 Hand held & Carry	74.00	86.95
10273125	IPAQ H4150 400MHz 64MB Bluetooth	220.00	258.50
10273124	IPAQ H1930/EN 32MB WPC	164.00	192.70
10268193	IPAQ H1940 200MHz 32/64 SDIO Bluetooth	155.00	182.13
10268195	IPAQ H5550 400MHz Intel X-Scale	335.00	393.63
10273195	Tungsten W - Dragonball VZ	338.99	398.31
10271874	Palm Tungsten E PDA/Handheld 32Mb	119.00	139.83
10268307	Palm Tungsten T2 Colour Handheld 32Mb	189.00	222.08
10272026	Palm Tungsten T3 Colour Handheld 64Mb	218.50	256.74
10273198	Sony Clie TJ35 Colour Palm	135.00	158.63
10265245	Sony Clie TG50 Colour Palm	214.50	252.04
10268234	Sony Clie NX73 Handheld	289.00	339.58
10271876	Sony Clie UX50 PDA/Handheld	435.00	511.13
10248354	Toshiba PocketPC e740 - Wireless	339.00	398.33
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10266262	DC2410	105.00	123.38
10271237	DC3410 - Silver	75.99	89.29
10273131	DC C50	239.00	280.83
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10275098	IXUS 500	278.31	327.01
10275099	IXUS 430	231.68	272.22
10271tba	IXUS IIs	192.00	225.60
10270551	Powershot A80	231.00	271.43
10275101	Powershot A310	113.03	132.81
	CASIO		
10271066	EX-S20DDA Exilim	135.99	159.79
10273335	EX-M20DDA Exilim	169.00	198.58
10271068	EX-Z3DDA Exilim inc Cradle	176.00	206.80
10271tba	QV-R41 3x Zoom 4MP	199.99	234.99
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10268608	PhotoPC L-300	153.00	179.78
10270552	PhotoPC L-400	190.00	223.25
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10262428	FinePix A204	132.99	156.26
10272487	FinePix A205	79.99	93.99
10268530	FinePix A210	98.00	115.15
10268190	FinePix A310	157.00	184.48
10272488	FinePix S3000	159.00	186.83
10268531	FinePix S5000	216.50	254.39
	HEWLETT PACKARD		
10270370	Photosmart 635	99.00	116.33
10268183	Photosmart 735	129.00	151.58
10265330	Photosmart 935	199.00	233.83
	KODAK		
10268598	CX6200 EasyShare	62.99	74.01
10268599	DX6440 EasyShare	174.99	205.61
10273674	Easyshare DX6490	242.99	285.51
10268600	DX4530 EasyShare	172.00	202.10
	MINOLTA		
10272490	Dimage A1	514.00	603.95
10272491	Dimage Z1	213.00	250.28
10272492	Dimage X20	95.00	111.63
10267628	Dimage S414	216.00	253.80
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10268189	CoolPix SQ	243.00	285.53
10275102	Coolpix 2200 3x Zoom 2MP	111.66	131.20
10275103	Coolpix 3200 3x Zoom 3.2MP	171.18	201.14
10275106	D70 Digital SLR Kit	793.80	932.72
	OLYMPUS		
10263881	Mju-C300	174.00	204.45
10275108	C-770 10x Zoom 4.2MP	347.43	408.23
10275109	C-360 3x Zoom 3.3MP	127.98	150.38
	PENTAX		
10273842	Optio 33-LF 3x Zoom 3.2MP	159.00	186.83
10273843	Optio 33-WR 3.2MP Weather-Proof	209.00	245.58
10273845	Optio 550 5x Zoom 5MP	311.00	365.43
10273846	Optio 450 5x Zoom 4MP	278.00	326.65
	SAMSUNG		
10273702	Digimax V3	174.00	204.45
10271111	Digimax V4	199.00	233.83
	SONY		
10265393	DSC-P10 5 Megapixel	249.00	292.58
10268233	DSC-P12 5 Megapixel	276.11	324.43
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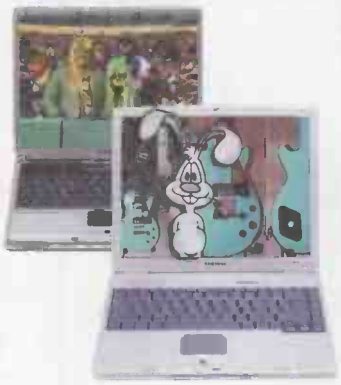

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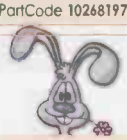

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10270525	A7V8X-MX Skt A KM400 8X LAN.	35.30	41.48
10268523	A7V600 KT600 DDR 400	51.10	60.04
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10271825	XP2500+ Barton SocketA OEM	52.75	61.98
10255654	XP2600+ Thoroughbred SktA OEM	57.00	66.98
10271826	XP2600+ Barton SocketA OEM	56.16	65.99
10261466	XP2700+ Thoroughbred SktA OEM	68.99	81.06
10264493	XP2800+ Barton SocketA OEM	75.98	89.28
10264494	XP3000+ Barton SocketA OEM	95.99	112.79
10267636	XP3200+ Barton SocketA OEM	164.50	193.29

AMD DURON

PCode		Ex VAT	Inc VAT
10271047	Duron 1.6 Ghz Socket A 200mhz FSB CPU	23.95	28.14
10275078	Duron 1.8 Ghz Socket A 200mhz FSB CPU	24.95	29.32

AMD Retail Packs

Athlon 64 3200 Processor

XP 3200+ Processor
Heatsink & Fan

£199 Ex VAT
PartCode 10271823
£233.83 Inc VAT

ATHLON PROCESSORS

PCode	ATHLON64 OEM	Ex VAT	Inc VAT
10271843	Athlon 64 3200+ OEM	165.99	195.04
10271844	Athlon 64 FX-51 OEM	468.00	549.90

XP 2600 Processor

XP 2700+ 1.47GHz Processor
Heatsink & Fan

£62.99 Ex VAT
PartCode 10261484
£74.01 Inc VAT

XP 2800 Processor

XP 2800+ 1.47GHz Processor
Heatsink & Fan

£78.99 Ex VAT
PartCode 10264495
£92.81 Inc VAT

XP 3000 Processor

XP 3000+ 1.47GHz Processor
Heatsink & Fan

£122.95 Ex VAT
PartCode 10264496
£144.47 Inc VAT

AMD RETAIL CPU/HEATSINK/FAN

PCode	AMD	Ex VAT	Inc VAT
10261480	Athlon XP2000+ Thoroughbred 1.67Ghz	41.90	49.23
10261482	Athlon XP2200+ Thoroughbred 1.8Ghz	42.99	50.51
10261483	Athlon XP2400+ Thoroughbred 2.0Ghz	48.95	57.52
10271812	Athlon XP2500+ Barton	54.50	64.04
10261484	Athlon XP2600+ Thoroughbred 2.08Ghz	62.99	74.01
10261485	Athlon XP2700+ Thoroughbred 2.17Ghz	72.99	85.76
10264495	Athlon XP2800+ Barton	78.99	92.81
10264496	Athlon XP3000+ Barton	122.95	144.47
10267993	Athlon XP3200+ Barton	129.95	152.69
10271823	Athlon 64 3200+	199.00	233.83
10271824	Athlon 64 ADAFX51+	473.50	556.36
10263606	Athlon MP2200+	82.86	97.36
10271813	Athlon MP2400+	80.85	95.00
10268164	Athlon MP2600+	126.10	148.17
10271814	Athlon MP2800+	137.45	161.50

IBM Deskstar 7K250 7200RPM 120Gb

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IBM HARD DRIVES

PCode	Deskstar 7200RPM	Ex VAT	Inc VAT
10268538	7K250 80Gb 2Mb Cache IDE	39.50	46.41
10268539	7K250 120Gb 2Mb Cache IDE	59.00	69.33
10268540	7K250 160Gb 2Mb Cache IDE	69.90	82.13
10268541	7K250 120Gb 8Mb Cache IDE	62.00	72.85
10268542	7K250 160Gb 8Mb Cache IDE	73.00	85.78
10268543	7K250 250Gb 8Mb Cache IDE	138.00	162.15
10268544	7K250 80Gb 8Mb Cache SATA150	52.55	61.75
10268545	7K250 120Gb 8Mb Cache SATA150	69.00	81.08
10268546	7K250 160Gb 8Mb Cache SATA150	79.20	93.06
10268547	7K250 250Gb 8Mb Cache SATA150	189.00	222.08

Samsung 160Gb Hard Disk 7200rpm

£69 Ex VAT
PartCode 10268407
£81.08 Inc VAT

SAMSUNG HARD DRIVES

PCode		Ex VAT	Inc VAT
10264984	40Gb UDMA100 7200rpm 8.9ms	33.95	39.89
10268107	80Gb UDMA133 7200rpm 8.9ms	40.20	47.24
10268406	120Gb 8mb cache UDMA133 7200rpm	56.50	66.39
10268407	160Gb 8Mb cache UDMA133 7200rpm	69.00	81.08
10274122	80Gb SATA 150 UDMA133 7200	46.50	54.64
10274123	120Gb SATA 150 UDMA133 7200	59.95	70.44
10273144	160Gb SATA 150 UDMA133 7200	72.00	84.60

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£64.05 Inc VAT

Seagate

SEAGATE HARD DRIVES

PCode	BARRACUDA 7200RPM	Ex VAT	Inc VAT
10214112	ST340014A 40Gb Ultra ATA 100 8.2ms	32.05	37.66
10262267	ST360011A 80Gb Ultra ATA 100 8.2ms	38.99	45.81
10264497	ST3120023A 120Gb 2Mb 100 8.2ms	56.95	66.92
10270187	ST3120026A 120Gb 8Mb 100 8.2ms	53.55	62.92
10265361	ST3160021A 160Gb 2Mb 100 8.2ms	61.75	72.56
10268213	ST3160023A 160Gb 8Mb 100 8.2ms	69.50	81.66
10263521	ST380023AS 80Gb 8Mb 7200RPM	54.51	64.05
10267056	ST380023AS 120Gb 8Mb 7200RPM	60.99	71.66
10268212	ST3160023AS 160Gb 8Mb 7200RPM	72.09	84.71

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PCode	PLUS 9 7200RPM	Ex VAT	Inc VAT
10250133	40GB UDMA133 12ms	32.35	38.01
10257559	80GB UDMA133 12ms	40.95	48.12
10260217	80GB 8Mb UDMA133 12ms	44.95	52.82
10257560	120GB UDMA133 12ms	52.95	62.22
10260218	120GB 8Mb UDMA133 12ms	54.45	63.98
10260219	160GB UDMA133 12ms	69.85	82.07
10268551	200GB UDMA133 12ms	92.50	108.69
10261143	250GB UDMA133 12ms	138.95	163.27
10268548	80GB SATA 150 UDMA133	46.95	55.17
10261147	120GB SATA 150 UDMA133	59.50	69.91
10268550	160GB SATA 150 UDMA133	72.10	84.72
10261517	200GB SATA 150 UDMA133	95.95	112.74
10268549	250GB SATA 150 UDMA133	139.99	164.49

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PCode	7200RPM	Ex VAT	Inc VAT
10251316	WD400BB 40Gb Ultra ATA 9ms	31.25	36.72
10248530	WD400JB 40Gb 8Mb Ultra ATA 9ms	34.25	40.24
10003031	WD800BB 80Gb Ultra ATA 9ms	36.55	42.95
10248075	WD800JB 80Gb 8Mb Ultra ATA 9ms	41.95	49.29
10234835	WD1200BB 120Gb 2Mb Ultra ATA 9ms	51.95	61.04
10234830	WD1200JB 120Gb 8Mb Ultra ATA 9ms	55.95	65.74
10265310	WD1600BB 160Gb 2Mb Ultra ATA 9ms	59.25	69.62
10265311	WD1600JB 160Gb 8Mb Ultra ATA 9ms	64.95	76.32
10248528	WD2000BB 200Gb Ultra ATA 9ms	87.95	103.34
10248529	WD2000JBB 200Gb 8Mb Ultra ATA 9ms	93.95	110.39
10265312	WD2500JBB 250Gb 8Mb Ultra ATA 9ms	139.50	163.91
10266690	WD360GD 36.7Gb 8Mb Sata150	78.50	92.24
10273868	WD360GD 36.7Gb 8Mb Sata150	154.95	182.07
10273869	WD1200JD 120Gb 8Mb SATA150	65.90	77.43
10273870	WD1600JD 160Gb 8Mb SATA150	75.25	88.42
10273871	WD2000JD 200Gb 8Mb SATA150	98.95	116.27
10273872	WD2500JD 250Gb 8Mb SATA150	131.80	154.87

2.5" IDE HARD DISKDRIVES

	FUJITSU		
10009431	IBM Travelstar 2.5" 30Gb	72.00	84.60
10234691	IBM Travelstar 2.5" 40Gb	79.00	92.83
10267434	IBM Travelstar 2.5" 80Gb	129.00	151.58
	FUJITSU		
10204453	Fujitsu 30.0Gb 2.5" 12ms 4200rpm	59.00	69.33
10266097	Fujitsu 40.0Gb 2.5" 12ms 4200rpm	75.00	88.13
10266098	Fujitsu 60.0Gb 2.5" 12ms 4200rpm	99.00	116.33

USB HARD DRIVES

PCode	LACIE	Ex VAT	Inc VAT
10273569	320GB ext Firewire USB2 HDD 7200rpm	219.50	257.91
10273570	400GB ext Firewire USB2 HDD 7200rpm	297.85	349.97
10273571	500GB ext Firewire USB2 HDD 7200rpm	357.20	419.71
	WESTERNAL EXTERNAL HDD		
10273748	WD 80gb 7200rpm USB 2.0	78.10	91.77
10266691	WD 200gb 7200rpm USB 2.0	145.22	170.63
10273750	WD 200Gb USB 2.0 & Firewire Ext 7200rpm	144.50	169.79
10273751	WD 250Gb USB 2.0 & Firewire Ext 7200rpm	179.00	210.33
	MAXTOR ONE TOUCH EXTERNAL HDD		
10274756	80GB USB 2.0 7200rpm 2MB Cache Ext	79.95	93.94
10271807	120GB USB 2.0 7200rpm 2MB Cache Ext	94.95	111.57
10271808	200GB USB 2.0 + FireWire 7200rpm 8M	143.00	168.03
10271809	250GB USB 2.0 + FireWire 7200rpm 8M	165.60	194.58
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10271811	300GB USB 2.0 + FireWire 5400rpm 2M	192.95	226.72

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PCode		Ex VAT	Inc VAT
10011337	Socket A Athlon/Duron/S370/Skt7 & Heatsink	4.00	4.70
10011811	Coolermaster ScktA upto AMD XP1900	4.98	5.85
10234416	Coolermaster ATA100/133 Round IDE Cable	12.00	14.10
10234417	Coolermaster Round Floppy Cable Retail	3.75	4.41
10234415	Coolermaster Thermal Compound Kit Retail	2.00	2.35
10213971	P4 Socket 478 2.0Ghz Heatsink + Fan	6.50	7.64

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10000953	Aries 56x EIDE CD ROM Drive	17.00	19.98
10268280	Amacom CD x24 Drive only	68.00	79.90
10265461	Benq 56x IDE Int CD-ROM Retail	10.80	12.69
10267113	Lite-On 52x CD Rom IDE Retail	12.99	15.26

CD-R/CD-RW DRIVES

10263477	Aries CDRW 52x24x52x Internal IDE	21.00	24.68
10270333	Amacom EZCDRW 48x12x48	117.50	138.06
10272969	Benq CDRW 52x-5232W IDE Retail	24.00	28.20
10262477	Archos Cesar CDRW 8x8x24	133.00	156.28
10262481	Archos 16x10x24 Mini CDRW	79.50	93.41
10271027	Freecom FX-5 CDRW 52x24x52	79.50	93.41
10267074	Freecom FX-1 CD-RW 52x24x52	74.50	87.54
10264272	Iomega CD-RW Drive 54x24x52 Ext	49.00	57.58
10273612	Lacie Firewire 52x32x52x CDRW	69.00	81.08
10268363	Lite-on 52x24x52x Int Ide CDRW	21.30	25.03
10265867	Plextor 32x52x52x EIDE CDRW	64.80	76.14
10270999	Sony 52x24x52 IDE Internal	20.95	24.62

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10271029	Lite-on 24x12x24x8x ext USB2 Slimline	79.00	92.83
10267112	Lite-on DVD/CDRW 48x24x48 16x DVD	35.99	42.29
10261910	Philips jack rabbit 32x10x40x12	99.00	116.33
10265368	Samsung DVD / CDRW 52x24x52x16x	37.50	44.06
10267994	Samsung CDRW / DVD 52x24x5	42.00	49.35
10263495	Sony 16x DVD/40x DDU1621 Int IDE OE	19.50	22.91
10273627	Lacie USB2 DVD+/-RW 2x P Slim	198.50	233.24

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10263932	Amacom DVD 8x32 Drive Only	118.00	138.65
10262532	Archos Mini DVD 8x	120.00	141.00
10213964	Aries 16x DVD Internal IDE	17.50	20.56
10011336	Pioneer 16X Int DVD Drive ATAPI	25.65	30.14
10214093	Plextor 16x EIDE internal DVD-ROM	20.90	24.56
10270354	Plextor DVD Combo +/- 8x DVD IDE	118.95	139.77
10265369	Samsung 16x 48x DVD Internal IDE	23.50	27.61

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10274419	8x DVD+/-R/RW IDE Internal OEM	88.49	103.98
10267088	Freecom DVD Multiformat +/-/R/RW 4x	84.25	98.99
10271004	Freecom Classic 4x DVD+/-R/RW Ext	119.86	140.84
10272700	Lite-On 8x Dual DVD +/- R/RW IDE Int	73.50	86.36
10265927	NEC ND-1300ASW DVD +/-R/RW OEM	57.50	67.56
10267976	Philips DVD ReWriter DVD+R/RW Int	95.00	111.63
10274104	Sony DVD +/- RW Drive 8x4x4 Int	113.00	132.78

CD MEDIA & ACCESSORIES

10262464	Benq 80Min 700Mb 48x 10Pk slim case	2.95	3.47
10273774	Benq 80Min 700Mb 52x 50 pk spindle	10.00	11.75
10005115	Memorex CD Label Starter Kit	6.80	7.99
10266441	Memorex 700MB 80min 52xcertified	9.04	10.62
10247921	Blank DVD-R Media 4.7Gb 100pk	39.00	45.83
10265015	Datawrite 4x DVD-R 4.7gb 25pk spindle	14.95	17.57
10266169	Aries Single DVD Blank Case	0.15	0.18
10266573	DVD 4.7GB Re-Writable plus General	3.50	4.11
10270917	Datasafe DVD-RW 4.7GB media 10pk	9.99	11.74
10263781	CD/DVD printer Black ink cassette	4.90	5.76
10270915	DVD+RW 4.7GB media 10 pack	17.99	21.14

EXTERNAL HARD DRIVES

10273576	Lacie 120GB 7200rpm ext USB 2	101.25	118.97
10273593	Lacie FireWire/USB2 PocketDrive 40GB	139.00	163.33
10273600	Lacie FireWire mobile 20GB Hard drive	79.00	92.83
10212697	Iomega Zip 100Mb USB External Drive	39.00	45.83
10205857	Iomega Zip 250MB Parallel Port Ext	49.00	57.58
10271061	Freecom FDH-1 40Gb 7200 rpm Ext	75.38	88.57
10271017	Freecom FDH-1 80Gb 7200 rpm Ext	107.20	125.96
10268268	Amacom EZ-2-Disk Enclosure	59.00	69.33
10197393	Amacom EZ Disk 40Gb Ext USB	119.00	139.83
10268251	Amacom Flip2Disk 20GB	147.00	172.73
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10272518	BENQ Joybee 120 - 128Mb Silver	77.00	90.48
10273120	BENQ Joybee 150 - 128Mb Silver	94.00	110.45
10270970	Creative Muvo Squared 1.5GB	144.45	169.73
10271575	Creative Muvo Squared X-Trainer 512MB	140.40	164.97
10274298	Creative Jukebox Zen Xtra 40GB	239.00	280.83
10271576	Creative Jukebox Zen NX Xtra 60GB	250.00	293.75
10262690	Archos Jukebox Multimedia 20Gb	253.00	297.28
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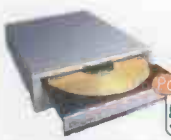

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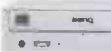

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The Creative Radeon 9200SE is the 3D graphics card for users who want performance and value. It delivers high-quality images in home entertainment, games and office applications thanks to its 128MB DDR memory, advanced quad-pipe architecture and support for graphics platforms up to AGP 8x. It comes with a portfolio of powerful tools such as SMARTSHADER™ for DirectX® 9.0 feature sets and cinema-quality lighting.

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PartCode 10274521
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ALTEC LANSING

2100 2.1 Speakers

- 26wrms with remote control

£44 Ex VAT
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£51.70 Inc VAT

TERRATEC

DMX 6Fire 24/96 Sound System

£133 Ex VAT
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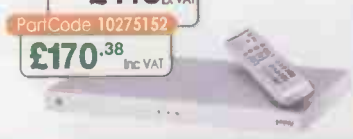
PINNACLE SYSTEMS

ShowCenter

Watch all of your digital media files on your TV

- ShowCenter supports a wide range of formats, including the latest DivX formats
- ShowCenter intelligently searches your PC for all media content and organizes them by type
- Create playlists with mixed media
- Wired ready & wireless b network compatible



£145 Ex VAT
PartCode 10275152
£170.38 Inc VAT

128Mb ATI Radeon 9600XT

ATi

- Full support for DirectX® 9.0 and the latest OpenGL® functionality
- Supports the AGP 8X and AGP 4x standard
- Highly Optimized 128-bit 2D engine with support for new WindowsXP GDI extensions
- 3rd Generation Visual Processing Unit (VPU) comprised of 4 rendering pipelines and 2 geometry engines
- Fully compliant with PC 2002 requirements

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GAINWARD

FX PowerPack! Ultra/1100XT TV-DVI

- 128 MB of the latest high-speed DDR memory
- Gainward's unique powerful cooling Heat Sink
- Support two monitors simultaneously, enabled by the NVIDIA nView Multi-Display Technology for office applications, 3D gaming.
- Supports 8x, 4x, and 2x AGP.
- TV-out support (NTSC/PAL) TV system

£115 Ex VAT
PartCode 10270979
£135.12 Inc VAT

PNY

Verto GeForce FX5200 AGPX8 128Mb DDR

- 250 MHz Core Clock • 256-bit Graphics Core
- 400 MHz effective memory clock
- Memory Interface 64-bit
- Dual VGA + TV-out
- NVIDIA CineFX engine : Delivers film-quality effects and studio-quality colour for every application.

Unique 5 year manufacturer warranty

£47.50 Ex VAT
PartCode 10268625
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benQ

Joybee 120

Everyone needs a little joy in their lives, and at 57 x 38 x 12mm, the BenQ Joybee 120 is certainly little. The MP3/WMA is available with 128MB of Flash memory The music player also includes FM stereo radio, voice recording, FM recording and a language learning function that allows rolling playback of a recording. The rechargeable Lithium-Ion battery provides up to 16 hours of power, with a room for up to 60 songs. Available in Autumn leaf, Lime Green and Silver.

256MB VERSION AVAILABLE

£77 Ex VAT
PartCode 10272518
£90.48 Inc VAT

Hauppauge

WinTV PVR-USB 2

WinTV PVR-USB 2. Watch and Record TV/video on your PC. Playback to your TV (s-video to scart output). Free 1 year EPG+DVD authoring software

Watch TV, Record, pause and burn DVDs, S-Video to scart output, Stereo, FM radio, remote control. Comes with Ulead Movie factory DVD authoring software and 1 year Electronic Program Guide (EPG) to schedule automatic recording to hard drive.

£89 Ex VAT
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128Mb ATI Radeon 9600SE

SAPPHIRE

Makes short work of todays most demanding multimedia and gaming applications but absent is the sharp crushing pain in your chest that is often induced by the sight of our competitors pricetag!

- Supports the new AGP 8X standard, providing a high-speed link between the graphics board and the rest of the PC (2.0 GB/sec)
- Full support for DirectX® 9.0 & the latest OpenGL® functionality

£55 Ex VAT
PartCode 10273897
£64.63 Inc VAT

FX5950U-VTD256

MSI

The winner of Editor's Choice Award by PC Mag-Greece

- GeForce FX5950 Ultra chipset
- 256MB DDR Memory
- TV-Out/DVI-I/Video-In
- Live VGA BIOS/Driver update
- TwinFlow cooling

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connect3D

9600XT Radeon 128Mb

Explore stunning new worlds of cinematic gameplay with the unprecedented combination of power, performance, and Microsoft® DirectX® 9 optimised support featured in RADEON™ 9600XT visual processors. Maximize your long-term entertainment value with its Quad-pipe architecture and high precision cinematic shaders that will upgrade expectations for devoted gamers and casual fans alike - and push the most compelling next-generation games to their limit. Includes Half Life 2.

£95.45 Ex VAT
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PHILIPS

A3.610 Acoustic Fusion 610

High Power 5.1 Channel Soft Flat Panel Audio System

- Active 200 Watts (RMS) HiFi Multi-Channel Flat Panel Speaker System
- 5.1 channels for Dolby™ & EAX™ multichannel reproduction
- Soft Flat Panel speakers incorporating 3 Philips patents to produce incredibly spacious sound.

£25 Ex VAT
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Hauppauge

MediaMVP

New from Hauppauge - Media MVP network to video out net player . Playback all your Mp3 music, digital videos and digital Pictures to your TV through our Media MVP net player.

Product Description: Watch Videos and pictures and listen to your MP3's on your TV through our Media MVP net player, RJ45 network multimedia player. Comes with remote control and all network and Scart cables.

£69 Ex VAT
Code 10274612
£81.08 Inc VAT

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10270932	Creative Labs SoundBlaster Audigy 2 NX	73.60	86.48
10263605	Philips psc605 sonic edge 5.1	28.50	33.49
10270971	Philips psc805 Aurillium External USB	55.00	64.63
10263825	Terratec Aureon 5.1 Sky PCI	59.00	69.33
10263826	Terratec Aureon 7.1 Space PCI	69.00	81.08
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10263803	Altec 221 3pc 2.1 25WRMS	28.00	32.90
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10270322	Creative I-Trigue 2.1 L3450	82.30	96.70
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10270499	Creative Inspire P580	44.20	51.94
10261299	Creative Labs inSpire 5.1 Digital 5500	94.45	110.98
10259841	Creative Labs MegaWorks THX 2.1 2500	98.60	115.86
10247935	Creative Labs Travelsound	38.00	44.65
10270500	Creative Inspire 7.1 T7700	84.75	99.58
10274300	Creative Inspire T07700	189.00	222.08
10273305	Creative TravelSound MP3 128Mb	89.00	104.58
10255651	Philips A2.310 Rhythmic Wave 310	25.00	29.38
10266092	Philips A5.600 Seismic Power 600	64.60	75.91
10262236	Videologic DigiTheatre ZXR	127.31	149.59
10257767	Videologic DigiTheatre ZXR 200	30.00	35.25
10263994	Videologic ZXR-550 Retail	55.00	64.63

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	CONNECT3D		
10268365	Radeon 9200 SE 64Mb DDR + TV	28.80	33.84
10268366	Radeon 9200 SE 128Mb DDR + TV	29.95	35.19
10268367	Radeon 9200 SE 64Mb DDR + DVI + TV	29.00	34.08
10268368	Radeon 9200 SE 128Mb DDR + DVI + TV	32.50	38.19
10267620	Radeon 9200 64MB DDR + DVI + TV	39.00	45.83
10267619	Radeon 9200 128MB DDR + DVI + TV	45.00	52.88
10268369	Radeon 9200 256MB DDR + DVI + TV	49.00	57.58
10271878	Radeon 9600SE 128MB DDR + DVI + TV	54.00	63.45
10267618	Radeon 9600 128MB DDR + DVI + TV	64.00	75.20
10268370	Radeon 9600 256MB DDR + DVI + TV	69.00	81.08
10271879	Radeon 9600XT 128MB DDR + DVI + TV	95.45	112.15
10275141	Radeon 9600XT 256MB DDR + DVI + TV	105.00	123.38
10264979	Radeon 9800 Pro 128MB DDR + DVI + TV	179.00	210.33
10271880	Radeon 9800 XT 256MB DDR + DVI + TV	289.00	339.58
10274767	All-in-Wonder 9200SE 128MB No Remote	94.00	110.45
10275142	All-in-Wonder 9600 Pro 128MB No Remote	144.00	169.20
10268371	All-in-Wonder 9800 Pro 128MB DDR	259.00	304.33
	CREATIVE		
10274521	3D8 9200SE 128MB DDR AGP8X TVO	39.00	45.83
10274522	3D8 9600 256MB DDR AGP8X DVI/TVO	89.00	104.58
10274523	3D8 9800XT 256MB DDR AGP8X DVI/TVO	319.00	374.83
	GAINWARD		
10271652	FX PwrPk! U/1800 XP GS FX5950U 256MB	275.00	323.13
10271653	FX PwrPk! U/1800 XP, FX5950U, 256MB	245.00	287.88
10268350	FX PwrPk! U/1600 XP GS FX5900U 256MB	239.00	280.83
10268351	FX PwrPk! U/1200XP GS FX5900 128MB	199.00	233.83
10270401	FX PwrPk! U/1300 TV-DVI FX5900 256MB	199.00	233.83
10270979	FX PwrPk! U/1100 TV-DVI FX5900 128MB	115.00	135.13
10271656	FX PwrPk! U/980Pro DVI FX5700 256MB	129.00	151.58
10273134	FX PwrPk! U/960 TV-DVI FX5700U 256MB	110.00	129.25
10271659	FX PwrPk! U/860 TV-DVI FX5700 128MB	84.00	98.70
10270501	FX PwrPk! U/760 XP GS LE FX5600 128MB	121.00	142.18
10265397	FX PwrPk! U/760 XP GS FX5600 128MB	114.00	133.95
	MSI		
10272011	NvidiaFX5950 Ultra 256Mb, DVI/TV-Out	289.00	339.58
10268521	NvidiaFX5900 128Mb, DVI/TV-Out	237.00	278.48
10272013	NvidiaFX5700 Ultra 128Mb, DVI/TV-Out	125.00	146.88
10272014	NvidiaFX5700 128Mb, DVI/TV-Out	99.00	116.33
10272016	Nvidia FX5600 XT 256MB DVI / TV out	79.00	92.83
10272017	Nvidia FX5600 XT 128MB DVI / TV out	69.00	81.08
	PNY		
10265922	Verta Geforce FX5200 128MB DDR PCI	58.50	68.74
10273874	Verto GF FX5600XT 128MB DDR 8X AGP	79.00	92.83
10275151	Verto GeForce FX 5900XT 128MB 8X AGP	139.00	163.33
10268150	Verto GF FX5900 128MB DDR 8X AGP	209.00	245.58
10273876	Verto GF FX5950 Ultra 256MB DDR 8X AGP	299.00	351.33
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10266213	128Mb Radeon 9200 DDR VIVO TV O Lite	49.00	57.58
10275147	256Mb Radeon 9200 DDR TV Out DVI	50.00	58.75
10268468	128Mb Radeon 9600 DDR DVI TV O Lite	65.00	76.38
10273897	128Mb Radeon 9600SE DDR DVI TV Out	55.00	64.63
10268604	256Mb Radeon 9600 DDR DVI TV Out Lite	65.00	76.38
10275148	256Mb Radeon 9600 PRO DDR TV O DVI-I	95.00	111.63
10271459	64Mb All in Wonder Radeon VE Pro - PCI	80.00	94.00
10275149	128Mb All in Wonder Radeon 9600 Pro	129.00	151.58
10271460	128Mb All in Wonder Radeon 9800 Pro	242.00	284.35
10275150	128MB Radeon 9800SE DVI TV Out	109.00	128.08
10266215	128Mb Radeon 9800 Pro DDR DVI TVO	189.00	222.08
10271456	128Mb Radeon 9800 Pro Ult DDR DVI TVO	250.00	293.75
10271457	256Mb Radeon 9800 Pro Ult DDR DVI TVO	289.00	339.58
10274250	128Mb Radeon 9600 XT DDR DVI-I TV O	109.00	128.08
10272021	256Mb Radeon 9600 XT DDR DVI-I TV O	110.00	129.25
10271458	256Mb Radeon 9800 XT DDR DVI TV O	287.00	337.23

VIDEO / TV CARDS

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10010137	Hauppauge WinTV PRIMIO FM	40.30	47.35
10224822	Hauppauge WinTV USB FM	37.75	44.36
10247955	Hauppauge Win TV PVR250 PCI TV	79.00	92.83
10263776	Hauppauge Win TV PVR350 PCI TV	103.00	121.03
10198098	Hauppauge WinTV Nova-t PCI	68.00	79.90
10198170	Hauppauge WinTV Nova-T USB	70.20	82.49
10011911	Hauppauge WinTV Nova	89.00	104.58
10010135	Hauppauge WinTV DVB-s	148.00	173.90
10009776	Hauppauge DV Wizard Pro	90.00	105.75
10273000	Hauppauge DEC1000f Digital Silver	62.30	73.20
10249851	Hauppauge DEC2000f Digital	92.00	108.10
10248165	Pinnacle PCTV Rave PCI TV Teletext	24.00	28.20
10270850	Pinnacle PCTV Stereo	39.00	45.83
10260226	Pinnacle PCTV Pro PCI Card	52.00	61.10
10268372	Pinnacle PCTV Sat CI	93.45	109.80
10263449	Pinnacle PCTV Deluxe External TV PVR	119.00	139.83

'Item arrived exactly as promised and I am very happy to recommend Watford and its Savastore.com on-line order system to others'

BT, Horsham, W Sussex

Savastore.com Customer Survey

EMP-S1 Projector EPSON

Best value-for-money multipurpose projector

- 1200 ANSI lumen, fully featured SVGA
- Ultra quiet 33db
- 2000hrs lamp life
- Brand new stylish silver design
- Presentation remote control kit
- Electronic keystone correction
- Fast start-up and shut down time
- New user-friendly menu

£679 Ex VAT
PartCode 10267942
£797.83 Inc VAT

BenQ PB8220 Projector

"State of the Art Technology"

The latest digital projector from the BenQ line of digital media products. Supporting the latest DLPTM DDR, DCMS (Dynamic Colour Management System), the BenQ PB8220 delivers high contrast digital images, consistently producing flawless pictures and maintaining its original clarity for true reliability.

£1285 Ex VAT
PartCode 10270338
£1509.88 Inc VAT

PHILIPS bClever - Multimedia Projector

Enduringly economical

Positioned in an affordable price bracket, the bClever provides users with all the functions they are likely to need.

- Brilliant picture quality (1100 ANSI Lumens)
- Ultra long lamp life (6000 hours)
- Ultra silent operation (29 dB)
- Ultimate ease of use
- High connectivity

£699 Ex VAT
PartCode 10271896
£821.33 Inc VAT

TOSHIBA MT100 SVGA Projector

The MT100 is a dual purpose projector that complements the home cinema market as well as appealing to the business user on a budget.

- DLP SVGA (800x600) resolution
- Faroudja DCDi Video Processor built-in
- 1000 ANSI lumens
- 2000:1 Contrast Ratio
- 3.1 kg
- 16:9 or 4:3 switchable

Free Surround Sound System worth £300*

£999 Ex VAT
PartCode 10267924
£1173.83 Inc VAT

*Whilst stocks last.

PLC-XW20 XGA LCD Projector

SANYO

- 1100 Ansi Lumens brightness
- Ultra compact design - weighing only 2.8kg
- Super quiet operation - just 37dB
- Component inputs for DVD
- Automatically adjusts for 16:9 images
- XGA data resolution
- Free softcase
- Built-in speaker
- Electronic keystone correction

£1098 Ex VAT
PartCode 10263399
£1290.15 Inc VAT

PROJECTOR UNITS

PCode	BENQ	Ex VAT	Inc VAT
10271480	PB2120 DLP SVGA	698.99	821.31
10265324	DX650 1600 Ansi SVGA	1073.30	1261.13
10271484	PB8120 DLP SVGA	972.16	1142.29
10270338	PB8220 2200 Ansi XGA	1285.00	1509.88
	CANON		
10263208	LV7350	1643.00	1930.53
	EPSON		
10270919	Epson EMP-TW10 Home LCD	785.90	923.43
10271492	Epson EMP-54 LCD	1175.00	1380.63
10264049	Epson EMP-73 LCD	1298.50	1525.74
10271495	Epson EMP-74 LCD	1779.00	2090.33
10258813	Epson EMP-720 LCD	1814.00	2131.45
	NEC		
10274675	LT10 DMD XGA 1100 ANSI	1945.00	2285.38
10274676	LT170 DMD XGA 1500 ANSI	1495.00	1756.63
10274679	VT46 LCD SVGA 1200 ANSI	649.00	762.58
10274680	VT460K LCD SVGA 1800 ANSI	945.00	1110.38
	PHILLIPS		
10265848	Philips bSure SV2 1500 ANSI SVGA	1084.00	1273.70
10271151	Philips bSure XG2-Brilliance 2200 ANSI XGA	1965.00	2308.88
10271152	Philips bSure SV2-Brilliance 2500 ANSI SVGA	1501.00	1763.68
10271896	Philips bClever SV1 - SVGA 1100 ANSI	699.00	821.33
	SANYO		
10263398	PLC-SW20A 1100 Ansi SVGA	989.00	1162.08
10263399	PLC-XW20A 1100 Ansi XGA + FREE LAMP	1098.00	1290.15
10264973	PLC-XU40 2000 Ansi XGA	2009.00	2360.58
10264975	PLC-XU46 2500 ANSI XGA	2419.00	2842.33
	TOSHIBA		
10272570	TLP S10 LCD 1200 ANSI, SVGA	730.00	857.75
10272571	TLP S40 LCD 1600 ANSI, SVGA	908.00	1066.90
10272572	TLP S41 LCD 1600 ANSI, SVGA	1216.00	1428.80

Projector Accessories available for ALL BRANDS. Visit www.savastore.com

INKJET PRINTERS

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10271032	i455 Bubble Jet	62.00	72.85
10265909	i470D Bubble Jet USB	99.00	116.33
10271033	i475D Bubble Jet	99.00	116.33
10268587	i560 Bubble Jet	106.95	125.67
10271034	i865 Colour Bubble Jet	118.00	138.65
10271279	i905D Colour Bubble Jet	199.00	233.83
10271461	i965 Colour Bubble Jet	197.00	231.48
	EPSON		
10267921	Stylus C44UX	37.00	43.48
10270326	Stylus C64	51.10	60.04
10270327	Stylus C84 Photo	77.00	90.48
10008850	Stylus Color 1160	192.00	225.60
10008851	Stylus Color 1520	315.00	370.13
10274562	Stylus Photo R200	76.00	89.30
10272500	Stylus Photo R300 Monitor Edition	122.00	143.35
10274532	Stylus Photo R800	229.00	269.08
10255656	Stylus Photo 1290S	233.40	274.25
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10257178	Deskjet 450ci	119.00	139.83
10270381	DeskJet 5850	156.00	183.30
10268237	DeskJet 3550	39.00	45.83
10268238	DeskJet 3650	46.80	54.99
10248364	Photosmart 7150C	97.50	114.56
10270382	PhotoSmart 7260	68.00	79.90
10270383	PhotoSmart 7660	114.00	133.95
10270384	PhotoSmart 7960	190.98	224.40
10271147	Business DeskJet 9650	275.00	323.13
10273823	Business DeskJet 9670	325.00	381.88
10274506	Business DeskJet 9680	449.00	527.58
	LEXMARK		
10267125	Z601 USB	23.99	28.19
10267623	Z605 USB	32.00	37.60
10273824	Z703	42.00	49.35
10266111	Z705	45.00	52.88
10267126	P706 Photo	39.00	45.83
10275070	P707	59.00	69.33

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	BROTHER		
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10274507	MFC-3220C	90.00	105.75
10274508	MFC-3420C	119.00	139.83
10264065	MFC-890	184.95	217.32
10262609	MFC-9070	239.00	280.83
10262603	MFC-9180	275.00	323.13
10268191	MFC-4820C	161.95	190.29
10262564	MFC-9660	299.00	351.33
10262607	MFC-9880	309.00	363.08
	CANON		
10268007	MP700 Photo	169.00	198.58
10268008	MP730 Photo	235.00	276.13
10245406	PC1210D Digital Laser	456.00	535.80
10245407	PC1230D Digital Laser	496.00	582.80
10265474	MPC190	119.00	139.83
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10260126	Stylus CX3200	74.00	86.95
10272479	Stylus Photo CX5400	98.40	115.62
10272480	Stylus Photo CX6400	121.25	142.47
10272481	Stylus Photo RX500	172.00	202.10
	HEWLETT PACKARD		
10264027	PSC 1205	78.00	91.65
10271148	PSC1350	100.00	117.50
10268347	PSC 2175	117.05	137.53
10271149	PSC2410	187.00	219.73
10271150	PSC2510	255.00	299.63

PCode		Ex VAT	Inc VAT
10268184	OfficeJet 4110	118.95	139.77
10264024	OfficeJet 5110	134.95	158.57
10274510	OfficeJet 5510	156.00	183.30
10264025	OfficeJet 6110	190.00	223.25
10264026	OfficeJet d125	229.00	269.08
	LEXMARK		
10271142	X1150	49.00	57.58
10275072	P3150	79.00	92.83
10275074	X5150 Multifunction	76.00	89.30
10264064	X125 Multifunction Inkjet	94.00	110.45
10274511	X5190 Professional	129.00	151.58
10275075	X6150 Professional	159.00	186.83
10275076	X6170 Professional	199.00	233.83
10274512	X6190 Professional	249.00	292.58
	PANASONIC		
10268204	UF490 Business	241.00	283.18
10268206	UF590 Business	415.00	487.63
10198523	Workio DP-150P	729.00	856.58
10198524	Workio DP-150PP	965.00	1133.88
10234441	KX-FLB751	289.00	339.58
	SAMSUNG		
10264078	SCX-1150F Multifunction	208.00	244.40
10264079	SF-430 Colour	198.50	233.24
10264081	SCX-4116 Multifunction	212.75	249.98
10264082	SCX-4216F Multifunction	289.20	339.81
10264083	SCX-5112 Multifunction	398.50	468.24

LASER PRINTERS

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10268614	HL-1430	99.00	116.33
10274117	HL-5130	126.68	148.85
10274118	HL-5140	149.20	175.31
10262122	HL-1850	311.00	365.43
10274112	HL-6050	275.45	323.65
10263964	HL-7050	549.00	645.08
	CANON		
10259825	Laser Shot LBP-1120	99.00	116.33
10249655	Laser Shot LBP-1210	186.00	218.55
	EPSON		
10272494	EPL-6200	209.00	245.58
10273812	EPL-N3000	679.00	797.83
10261751	AcuLaser C900	339.00	398.33
10261770	AcuLaser C1900	679.00	797.83
10247410	Colour Laser AcuLaser C4000	769.00	903.58
	HEWLETT PACKARD		
10270378	LaserJet 1015	165.00	193.88

Connect and Go with the BELKIN Cable Wizard

www.savastore.com/belkin

10264562	LaserJet 1300	209.00	245.58
10264565	LaserJet 2300	369.00	433.58
10260161	LaserJet 4200	585.00	687.38
10260165	LaserJet 4300	839.00	985.83
10265317	LaserJet 1500	499.00	586.33
10257166	LaserJet 2500 Colour	639.00	750.83
10273818	Colour LaserJet 3500	494.00	580.45
	KONICA MINOLTA		
10268456	Magicolour 2300	449.90	528.63
10268455	Magicolour 2300W Colour	335.00	393.63
10271108	Magicolour 2350	744.72	875.05
	LEXMARK		
10266112	E321	149.50	175.66
10266113	E323	199.00	233.83
10266115	T630	479.00	562.83
10266118	T632	649.00	762.58
10266122	T634	959.00	1126.83
	PANASONIC		
10230009	KX-P7100	139.00	163.33
10230013	KXP-710S	121.00	142.18
10268383	KX-CL500 Colour	650.00	763.75
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	SAMSUNG		
10264072	ML-1710	114.95	135.07
10264073	ML-1750	110.00	129.25
10247774	ML-1450	240.80	282.94
10274505	CLP-500N A4 Colour	510.00	599.25

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10268535	S2W 5450U USB	55.00	64.63
10265319	ScanWit 2740S Film	219.95	258.44
	CANON		
10259818	Canoscan LiDE 20 600x1200dpi	35.48	41.69
10260723	Canoscan LiDE 30 1200x2400dpi	41.99	49.34
10262243	Canoscan LiDE 50 1200x2400dpi	53.35	62.69
10259817	CanoScan 5000F	102.12	119.99
10259819	CanoScan 8000F	148.90	174.96
10264285	CanoScan 9900F	228.90	268.96
	EPSON		
10270326	Perfection 1670	60.00	70.50
10270329	Perfection 1670 Photo	69.00	81.08
10248126	Perfection 2400 Photo	99.00	116.33
10270330	Perfection 3170 Photo	149.00	175.08
10262108	Perfection 3200 Photo	191.00	224.43
10272960	GT-15000 A3	688.00	808.40
	HEWLETT PACKARD		
10268246	HP Scanjet 2400c	39.00	45.83
10270387	HP ScanJet 3670C	53.95	63.39
10270388	HP Scanjet 3690C	61.95	72.79
10270389	HP Scanjet 3970	76.00	89.30
10271155	HP Scanjet 4600C	111.95	131.54
10271156	HP Scanjet 4670C	132.95	156.22
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DeskJet 3650

Designed for families and individuals who are looking for an affordable, easy-to-use and productive printer. True-to-life photo quality and crisp black text.

- True-to-life photo quality at up to 4800-optimised dpi colour* • Optional 6-ink colour printing. Compact, reliable, and fast • Up to 17 ppm in black, 12ppm in colour Innovative tools and features to save time and money • On-screen ink-level indicator lets you know when it's time to replace ink cartridges.

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Deskjet 5150

The HP Deskjet 5150 is a fast and versatile printer, offering true-to-life photo quality — with or without borders — at up to 4800-optimised dpi colour. Prints screenshots at the touch of a button. Print cancel button halts unwanted print jobs. On-screen ink-level indicator warns you when you run low on ink.

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Canon

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Stylus C64

Mid range, general purpose inkjet printer

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- USB and Parallel ports for maximum connectivity options
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- The ToUcam FUN II packs a great performance webcam into a stylish housing to help you get the best from fast broad-band internet connection
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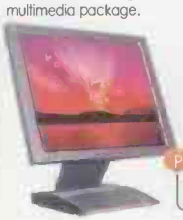

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*PCW May 2003

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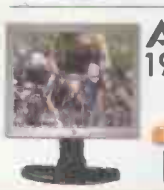

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10264170	17" AL707	284.00	333.70
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10264455	101715 17" Analogue	265.00	311.38
10264460	101910 19" Digital/Analogue	445.00	522.88
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10271248	FP991 19"	439.00	515.83
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10271142	S700A 17" Beige Multimedia	253.00	297.28
10272972	S962A 19" - Black/Silver	389.00	457.08
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10270626	H950 19" Silver	357.00	419.48
10271597	HW1710 17" Silver TV	407.00	478.23
	IIYAMA		
10233517	15" AX3819U	215.00	252.63
10233521	17" AS4315U	366.00	430.05
10249915	18" AS4821DT	510.00	599.25
10271552	19" E481 ProLite	375.00	440.63
10274485	20" C510TS with Built in TV Tuner	620.00	728.50
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10248599	19" 1920NX	539.00	633.33
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10267939	Philips 170S4FG 17"	255.00	299.63
10248607	Philips 180B2S 18.1"	352.00	413.60
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10271935	17" SDM-S73B - Black	335.00	393.63
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10271591	19" SM192N Silver swivel	409.00	480.58
10271595	21" SM1100DF Ivory Flat	275.00	323.13
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10268027	VG500 15" - silver/black	221.00	259.68
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10010828	17 EnergyPro	69.00	81.08
10010834	19" EnergyPro	96.00	112.80
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10268534	MicroScan V77 17"	59.00	69.33
10264487	MicroScan P900 19"	127.78	150.14
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10197544	VL700 17"	69.00	81.08
10009938	VL 950T 19	102.00	119.85
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10004167	CTX EX700F 17" Flat	79.99	93.99
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10212294	15" VisionMaster 1352	72.00	84.60
10224855	17" Vision Master Pro 413	117.00	137.48
10265765	19" Vision MST Pro 455 Black	157.00	184.48
10265766	21" Vision Master Pro 514	365.00	428.88
10274478	22" Vision MST Pro 513	315.00	370.13
	PHILIPS		
10266485	17" 107E51 FST	78.00	91.65
10272520	19" 109B50 FST-NF	141.00	165.68
10000360	201B40 21"	299.00	351.33
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10233809	Sony CPD-E530 21" FD Trinitron 24	495.00	581.63
10004514	Sony GDM-FW900 24" FD Trinitron	1136.99	1335.96
	SAMSUNG		
10212314	SM753S 17" DynaFlatX	70.00	82.25
10263566	SM957P 19" DynaFlat	116.00	136.30
10265894	SM1200NF 22"	392.00	460.60
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10261505	Aries Wireless Bdbnd Lan USB Adaptor	17.99	21.14
10261506	Aries W/less Brdbnd Lan PCMCIA Adptr	14.50	17.04
10272973	Dlink Wireless Brdbnd Internet Gateway	42.58	50.03
10249757	Dlink Wireless Brdbnd Internet Gateway	61.00	71.68
10274377	Dlink Wireless Brdbnd Internet Gateway	117.00	137.48
10271327	Dlink Wireless Brdbnd Internet Gateway	59.00	69.33
10261438	22Mb Wireless Router	55.00	64.63
10257764	22Mb Wireless Access Point	52.00	61.10
10257765	22Mb Wireless PC Card	27.50	32.31
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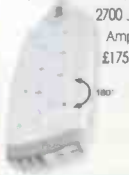

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40GB

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Key stroke 1.5mm

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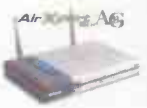

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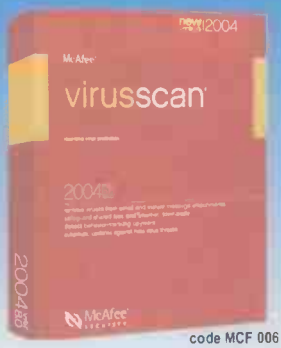

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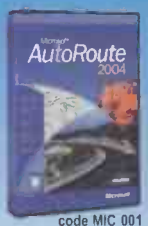

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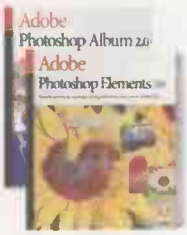

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HP Laserjet 4000/4050	(C4127X)	£64

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Canon

Inkjet Supplies

Canon Inkjet Cartridges		Black	Colour
BJ10E/EX/20	(BC01)	£14	
BJ200/E/X/230	(BC02)	£14	
BJC210/240/250	(BC02/BC05)	£14 ..	£18
BJ30/BJC50/70/80/85	(BC10E)	£22	
BJ30/BJC50/70/80/85Tanks 3's	(BC11D)	£12	
BJC50/70/80/85	(BC11E)	£25	
BJC50/70/80/85	Tanks 3's (BCI11)	£10 ..	£13
S200/S300	(BCI24BK/BCI24C)	£6 ..	£11
S200/S300 TWIN Pk	(BCI24BK/BCI24C)	£11 ..	£20
BJC2000/4000/5000	Series (BC20E/21E)	£21 ..	£28
BJC2000/4000/5000	SeriesTanks (BCI21)	£5 ..	£12
BJC3000/S400	(BC33)		£38
BJC3/6000/S400	Tanks(BCI3B/3C/3M/3Y)	£7 ..	£6
BJC6000/6100/6200/6500	. (BC30/31)	£26 ..	£29
BJC7000/7100	(BC60/61)	£26 ..	£28
BJC7000/7100	Colour Ink Tank (BCI61)		£18
BJC7000/7100	Photo Cart (BC62)		£39
BJC7000/7100	Photo Ink Tank (BCI62)		£24
S800/BJC8200	Photo Ink Cart (BC50)		£75
S800/BJC8200	Tanks(BCI6BK/6C/6M/6Y)	£8 ..	£8
S800/BJC8200	Photo Ink (BCI6PC/6PM)		£8

Canon Inkjet Paper Media	A4	A3
Coated Paper (200) (LC101)	£22 ..	£42
High Resolution (200/20) (HR101)	£22 ..	£6
Glossy Paper.. (20) (GP301)	£9 ..	£15
Photo Paper Pro (8200) .. (15) (PR101)	£11	
Photo Paper Pro 4"x6" .. (20) (PC101)	£10	
Glossy Photo Card 4"x6" (20) (FM101)	£6	

Compatible Cartridges

Compatible Inkjet Cartridges		Black	Colour
Epson 400/600	(JT093/JT089)	£5 ..	£8
Epson 800/1520	(JT108/JT089)	£6 ..	£8
Epson 440/640	(JT187/JT191)	£5 ..	£8
Epson 740	(JT189/JT191)	£6 ..	£8
Epson 480/580/C20/40	(JT013/JT014)	£5 ..	£8
Epson 680	(JT017/JT018)	£9 ..	£12
Epson 880	(JT019/JT020)	£6 ..	£9
Epson P 790/870/890 ..	(JT007/JT008)	£9 ..	£8
Epson Photo 810	(JT026/JT027)	£9 ..	£11
Epson C42	(JT036/JT037)	£5 ..	£8
Epson C60/C61	(JT028/JT029)	£9 ..	£11
Epson C62/CX3200	(JT040/JT041)	£9 ..	£11
Epson C70/80	(JT032140/C24/M34/Y44)	£14 ..	£7

Conqueror Colour Plus (Inkjet) A4	A3	A3+
Brilliant White Glossy (127gsm) 50's	£20	£34 .. £38
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Diamond White Matt (110gsm) 100's	£11	£17
Brilliant White Satin (190gsm) 20's	£11	

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Deskjet 816/825/840/845	(6615D/25A)	£18 ..	£19
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Deskjet PSC750/PSC950	(15D/6578D)	£18 ..	£20
Deskjet 820/50/70/1100	(45A/41A)	£19 ..	£20
Deskjet 720/815/890/1120 .	(45A/23D)	£18 ..	£20
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Deskjet 930/950/970/1220 .	(45A/78D)	£18 ..	£20
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Deskjet CP1700	(44A/36C/37M/38Y)	£22 ..	£23
Deskjet 3320/3420	(6727A/28A)	£12 ..	£14
Deskjet 5550/PS7000 Series	(56A/57A)	£14 ..	£20
Deskjet 5550/PS7000 ..	Photo (6658A)		£18
CP1160/OJ 7110/D Series	(5011D/10D)	£14 ..	£18
CP1160/OJ 7110/D .	(Printhead No.14)	£28 ..	£28
Designjet 10/20/50PS	(36C/37M No.11)		£23
Designjet 10/20/50PS ..	(84K/C/M/82Y)	£29 ..	£29

HP A4 Paper Media	Pack	Price
Premium+ Glossy Photo ...	(C7040A)	50 .. £19
Premium+ Photo Glossy ...	(C6832A)	20 .. £13
Premium+ Photo Matte	(C6951A)	20 .. £14
Premium Glossy Photo	(Q1992A)	10 .. £7
Premium Glossy Paper	(C3831A)	10 .. £9
Premium HeavyWeight 2-Side	(C1853A)	100 . £12
Photo Quality Inkjet Paper ..	(C6984A)	20 .. £6
Premium Transparency	(C3832A)	20 .. £14
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HP 10x15cm Paper Media	Pack	Price
Glossy Photo 10x15cm	(C7894A)	60 .. £10
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Professional Brochure/Flyer (50)	(C6818/21A)	£9 .. £18
Premium Inkjet (A4-200/A3-100)	(51634/1856A)	£14 .. £22
Premium Photo ... (A4-15/A3-20)	(C6040/59A)	£7 .. £29
Bright White .. (A4-500/A3-200)	(C1825/1858A)	£7 .. £10

HP A3+ Proofing Paper Media	Pack	Price
Proofing Semi Gloss (150gsm)	(7884A)	50 .. £96
Proofing Gloss & Proofing Matte		POA

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Apple/Lexmark/Olivetti		Black	Colour
Apple S/Writer I/II/1200	(8041)	£16	
Apple S/Writer 1500	(8041/4609)	£16 ..	£20
Apple S/Writer 2200 & 2400/2500 ..		AS CANON	
Lexmark 150/1000/2000	(13400/13619)	£20 ..	£22
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Lexmark X73/X83/X85	(A1970/M0120)	£19 ..	£24
Lexmark Z12/Z22/Z32 ...	(17G0050/60)	£20 ..	£20
Lexmark Z13/23/33/X75	(10N0016/26)	£19 ..	£22
Lexmark Z55/Z65/Z65N	(18L0032/42)	£21 ..	£25
Olivetti JP170/190/360/450	Mono/Col	£24 ..	£32

EPSON

Epson Inkjet Cartridges	Black	Colour
Stylus All Older Models	POA .	POA
Stylus 440/460/640/660/670 (187/191)	£15 ..	£16
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Stylus C60/C61 (T028/T029)	£22 ..	£18
Stylus C62/CX3200 (T040/T041)	£22 ..	£18
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Epson Stylus Paper Media	Pack	Price
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Premium Semi-Gloss Roll 329mm (41338)	1x10m	£44
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A4 Premium Glossy (41287)	20 ..	£11
A4 Premium Glossy (41624)	50 ..	£24
A4 Premium Semi-Gloss (41332)	20 ..	£11
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A4 Photo Glossy (41126)	20 ..	£8
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A3+ Premium Glossy (41316)	20 ..	£31
A3+ Premium Semi-Gloss (41328)	20 ..	£32
A3+ Glossy Photo Weight (41347)	20 ..	£29
A3+ Glossy Film (41074)	10 ..	£48
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Epson AcuLaser C4100	(50149/46C/47M/48Y) £99 CM £179
Epson AcuLaser C8000/8200	(50019/16Y/17M/18C) £65 CM £119
Samsung ML1650/1651	(ML1650) . £79
Samsung ML2150/2151N/2152W	(ML2150) £79
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HP Laserjet 5P / 5MP / 6P / 6MP ..	(C3903A) . £47
HP Laserjet 1010 / 1012/1015	(Q2612A) . £46
HP Laserjet 1100 / 1100A	(C4092A) . £37
HP Laserjet 1150	(Q2624A) . £45
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HP Laserjet 4000 / 4050 .. High Yield	(C4127X) . £75
HP Laserjet 4100 . High Yield	(C8061X) . £75
HP Laserjet 4200 . High Yield	(Q1338A) . £91
HP Laserjet 4300 . High Yield	(Q1339A) POA
HP Laserjet 5Si / 5SiMX / 8000	(C3909A) £105
HP Laserjet 5000 / 5000N/5000GN	(C4129X) . £95
HP Laserjet 8100 / 8150/M320	(C4182X) £112

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HP Color Laserjet 15/2500 (9700A/01A/03A/)	£56 CM	£68
HP Color Laserjet 3500 (Q2670A/71A/73A/)	£79 CM	£79
HP Color Laserjet 3700 (Q2670A/81A/83A/)	£79 CM	£ -
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HP Color Laserjet 5500 (C9730A/31A/33A/)	£149 CM	£209

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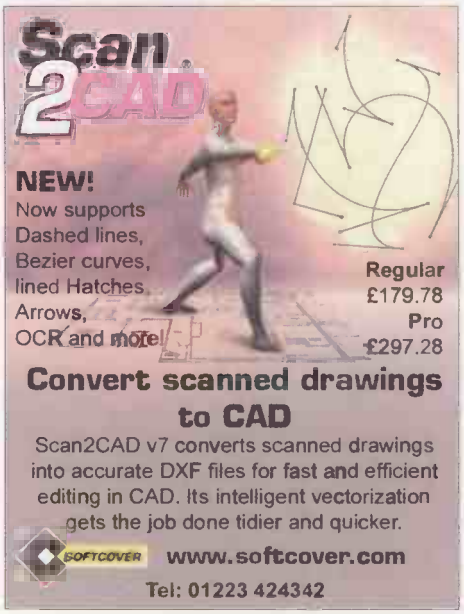

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92291A	EPN Series IIISi/4Si Toner Cartridge	72
92291X	HP 3si Toner Cartridge High Capacity	76
92295A	EPS Series 2 Toner Cartridge	61
92298A	EPE Series 4/4M/5/5M Toner Cartridge	59
92298X	EPE Series 4 - Maximum Capacity	61
C3900A	EPB Series 4V/4MV Toner Cartridge	76
C3903A	EPV Series 5P/5MP/6P/6MP Toner Cartridge	49
C3906A	EPA Series 5L/6L Toner Cartridge	38
C3909A	EPW Series 5si Toner Cartridge	105
C3909X	EPW Series 5si High Capacity Toner Cartridge	111
C4092A	Laserjet 1100 Toner Cartridge	36
C4096A	Laserjet 2100 Toner Cartridge	62
C4127A	Laserjet 4000 Toner Cartridge	62
C4127X	Laserjet 4000 High Capacity	78
C4129X	Laserjet 5000 Toner Cartridge	102
C4182X	Laserjet 8100/Mopier 320 Toner Cartridge	115
C3102A	Color Laserjet 5 Toner Bottle - Cyan	26
C3103A	Color Laserjet 5 Toner Bottle - Yellow	26
C3104A	Color Laserjet 5 Toner Bottle - Magenta	26
C3105A	Color Laserjet 5 Toner Bottle - Black	7
C4149A	Color Laserjet 8500 Black Toner Cartridge	70
C4150A	Color Laserjet 8500 Cyan Toner Cartridge	108

CODE	HP Original Laser Toners	Price
C4151A	Color Laserjet 8500 Magenta Toner Cartridg	108
C4152A	Color Laserjet 8500 Yellow Toner Cartridge	108
C4153A	Color Laserjet 8500 Drum Kit	98
C4154A	Color Laserjet 8500 Transfer Kit	248
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51625A Colour	310/320/340/540/550/560	£11.75
51629A Black	600/660/690C/695C	£ 9.15
51649A Colour	600/610C/612C/660C/690C/695C	£13.49
51645A Black	710C/720C/820CXI/850CXI/870CXI	£ 8.50
51633A Black	310/320/340	£10.45
C6614ABlack	610C/612C	£ 9.39
C6615ABlack	810C/840C/843C	£10.29
C1823AColour	710C/720C/810C/815C/820C/895C	£13.89
C6578AColour	970CXI/930C/950C/1220C/P1000	£15.49
C6625AColour	840C/843C	£14.89
C6656Black	HP 56	£15.49
C6657Colour	HP 57 (tri-colour)	£16.49
C8727Black	HP 27	£15.49
C8728colour	HP28	£16.49

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13400HC Black	1000/1020/1100/2030/2050/3000/ 4076/Execjet 11/11C	£15.06
12A1980 Colour	3200/5000/5700/5770/7000/7200/ Z11/Z31/Z43	£16.46
12A1970 Black	3200/5000/5700/5770/7000/7200/ Z11/Z31/Z42/Z51/Z52/Z53/X73/X83	£15.06
15M0120 Colour	Z42/Z43/Z51/Z52/Z53/Z83/X73/X83	£17.46
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T0322,323,324,422,423,424 Cyan, Magenta, Yellow	£10.49
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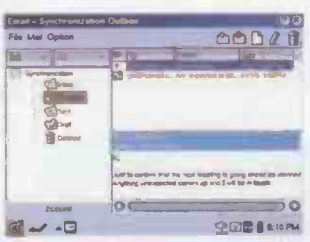

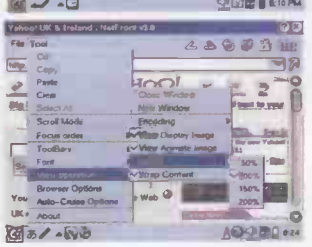

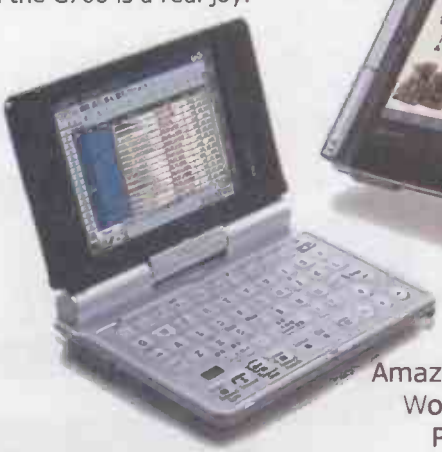

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51633	black	£9.25
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51649	colour	£13.75
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C4844	black	£14.95
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C6615**	black	£10.50
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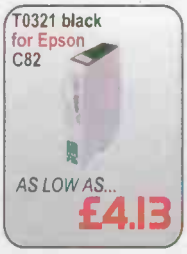
17G0060	colour	£14.25



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Computer Active, Issue 121

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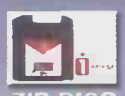
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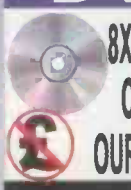

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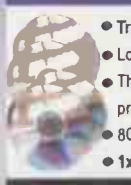

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Starting the disc

The CD-Rom (or DVD) should auto-start. If it doesn't, double-click the CD-Rom/DVD icon in My Computer, or open the terms.htm file on the root of the disc.

Problems?

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PCW May 2004 cover disc
ABT, 306 St Mary's Lane
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quoting reference '*PCW* Vol 27 No 5'.

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Trial versions
Cyberlink Cinema 3
Cyberlink PowerDirector 3
Director MX 2004

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Avast Antivirus 4.1.335
Crimson Editor 3.60
Firefly Softphone 1.4.3049
FreshUI 6.90
Girafa 2.10.23
HydraIRC 0.3
OE Tweaker 1.01
POP Monger
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XML Fox 1.1.2

DVD

Everything on the CDs PLUS...

Full programs
Alcohol 52%
Open Office 1.1

Trial versions
Office suites trials
Ability Office 2002
Corel Wordperfect Office 11
Star Office 7
Thinkfree 2.2

Linux
Fedora Redhat Core 2 Test 1
KDE 3.2
KOffice 1.3
Phrealon Linux

Other
Adobe Illustrator CS Tryout
Corel Draw Suite 12
Adobe Indesign CS
602 Pro Suite 4

Resources
Dreamweaver MX 2004
Internet Explorer 6
MySQL

Sonic MyDVD for CD 5

Put home movies on CDs that can be played in most home DVD players

FULL PROGRAM

Need to know

System requirements
Windows 98SE or later (2000 or XP for the full video editor), Media Player 7.1 or later, Internet Explorer 5 or later, 128MB of Ram, 66MB of disk space for installation

Information
www.sonic.com

Registration
http://sonic.com/VNU

Limitations
mpeg2 (DVD) codec not included in MyDVD for CD

Just about every CD burner comes with bundled mastering software, so why try anything else? There may be no reason if you only ever perform simple tasks, such as creating an audio CD or backing up a few files, but creating video CDs is much more complex. For that you need a specialist movie management tool, and Sonic MyDVD is one of the market leaders.

The program can capture footage directly from your digital camcorder, for instance, or other video and audio sources. There are settings to tweak recording quality or capture length, along with an automatic scene detection mode.

Your existing movie files aren't forgotten, and the program can import lots of different file formats. mpeg-1, mpeg-2, avi (but not DivX) and wmv files (unless they're copy-protected) are fully supported. Mov and mpeg-4 files may also be used if you've got the free Quicktime Player version 6 installed.

Or perhaps you'd like to share your best digital photos with friends? There's a built-in slideshow creation tool, which accepts images using all the main graphics formats. You can have an audio track playing in the background while each slide is displayed, and optionally archive the original pictures on the disc as well.

MyDVD for CD is supremely easy to use. When you're beginning a VCD project, for instance, there's no need to specify lots of complex, technical settings. Just locate your files in Explorer, then drag and drop them onto the MyDVD screen.

If the movie file is raw and unedited, then this may not make for the best presentation. It would be much better to convert it into scenes, and make each one a separate chapter, so viewers can jump straight to the bit they'd like to see.

Once again, MyDVD makes this very straightforward. Right-click a movie file, select 'Edit video', and you'll be taken straight to the Scene Editor. Click 'Detect scenes' and MyDVD will try to pick out the individual scenes for you.

If this doesn't work properly, select Change Settings and increase Detection Sensitivity (move the slider to the right). Or just manually pick out the transition frames yourself, and click Mark Scene for each one in turn.

MyDVD then presents each scene in a timeline, and lets you further trim their start and end positions. So if you started filming too early, you can cut the dead portion from the beginning of your scene and the viewer will jump right in where the action starts.

You may also choose to add a backing track, a narration), or titles, apply filters or special effects, or use special fades or dissolves from one scene into another.

By now you've sorted out your video files, but there's still one problem to address: their on-screen presentation. You probably won't want to use the file names as chapter titles, for instance, so just click on them and type an appropriate caption.

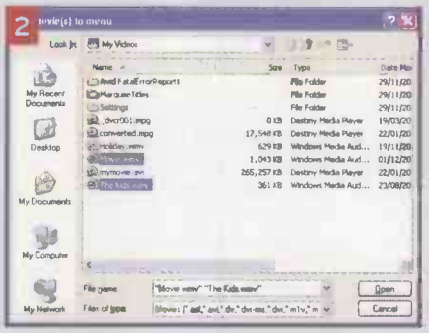
The default Allegro menu probably isn't going to appeal either, so click 'Edit style' and pick something new (including fancy motion menus). If you don't like the themed options (birthday, wedding etc) then customise your own style, by changing text, background and music to whatever you like.

Key features

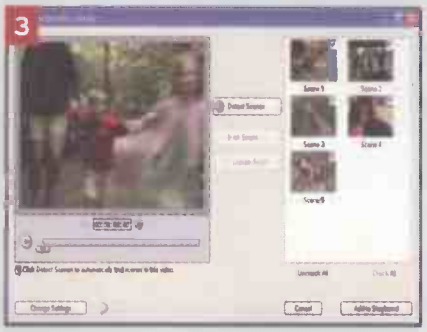
- Creates 650MB or 700MB Video CDs
- Capture video and audio to your hard drive
- Import movie files in common formats
- Automatic scene detection
- Edit scenes, apply special effects and more
- Add a new soundtrack and titles
- Build slideshows from digital photographs
- Choose or customise a menu template
- Supports NTSC and Pal/Secam standards
- View your work on standalone DVD players

Author a classy Video CD in minutes

1 By default Sonic MyDVD displays the project wizard when it first loads. Do you want to create a video CD, edit one, or capture video directly? Make your selection here, or click Tutorial if you need some help. (Select File > Preferences and clear 'Show the wizard...' for more manual control).



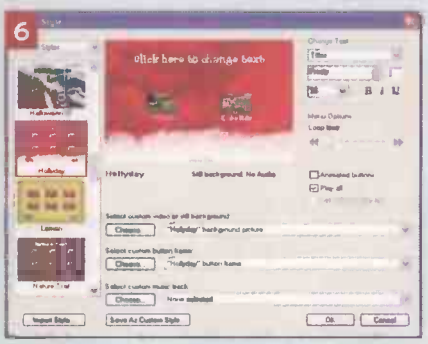
2 No matter what option you chose in the wizard, it's still possible to import files from other sources. To read in existing movie files, for instance, click 'Get movies', then navigate to and select the files you need. (But beware, you can't mix Pal and NTSC files within the same project).



3 If your movie needs a little work before it's ready for prime-time, right-click its icon and select 'Edit video'. Click 'Detect scenes' and MyDVD will scan through the video footage, picking out the transitions from one scene to another. Click the 'Add to storyboard' button when you're happy.

4 Now trim the length of a scene by clicking on it, then adjusting the green (start point) and red (end point) sliders. Drag a fade or dissolve to the icon between scenes to add a transition, or apply special effects directly to each scene. The text tool is ideal for captions and titles.

5 Normally MyDVD uses the first frame of each clip as its 'button', the image that displays on the CD menu. That's probably not the best choice, so right-click on this and select 'Set button image' to change it. Scroll through the movie until you find a still you like, then click Set.



6 You don't have to put up with MyDVD's standard menu, either. Click 'Edit style' and find something more suitable (including stylish motion menus under the 'Default styles' list). Or customise the existing menu to produce the effect you need. Click OK, then Burn to create your finished CD.

Upgrade offer >> MyDVD Deluxe & Studio

New features

- Video editing
- DVD movie-style menus
- Dolby Digital encoding
- mp3 ripping & music library
- DVD player and label maker
- Disk copying and archiving

To work with DVDs as well as CDs you'll need to upgrade. The basic version of MyDVD 5.2 can burn DVDs, but doesn't include the integrated video editor.

MyDVD 5.2 Deluxe adds video-editing, DVD movie-style menus and Dolby Digital encoding.

And MyDVD Studio Deluxe 5.2 includes extras, such as mp3 ripping, a music library, disk copying and archiving, a DVD player and label maker.

SAVE 10% OFF RRP

Normally the prices range from £27.74 to £55.49, but you can get 10 per cent off by quoting the coupon code **VNUPUB10**. Place your order at www.estore.sonic.com.

Font Expert 2003 5

FULL PROGRAM

Keep your fonts in order with this typeface manager

Need to know

System requirements
Windows 98 or later, 1.5MB disk space

Information
www.proximasoftware.com

Registration
www.proximasoftware.com/vnu

Limitations
None

How many fonts are installed on your PC? Don't worry if you have no idea, most people don't. Fonts are a forgotten side of Windows, and usually left to manage themselves. That's a shame, because taking just a little time to explore installed fonts can make a big difference to your system.

In its initial display Font Expert 2003 acts as a detailed font viewer. Choose a font of interest from the Workspace or Font Face list, and you'll see a table of all the characters it makes available. Apart from being a useful visual aid, this may also point out potential problems. Not every font supports all the regular printable Ascii characters, so making the wrong choice in an application may produce some odd effects.

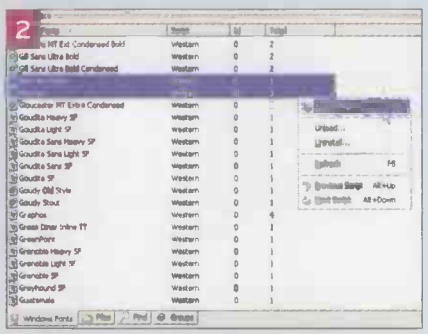
It's also entirely likely that you have some fonts you don't really need. This can result in a performance penalty as Windows and applications may keep font information in memory, as well as cycling through the list of available fonts every time they load.

If you locate fonts you don't need in Font Expert, highlight them and select Edit > Uninstall. Font Expert makes backups of uninstalled font files for you, so it's easy to add them back later. Click Tools > Options > General to locate this backup folder, or point it somewhere else.

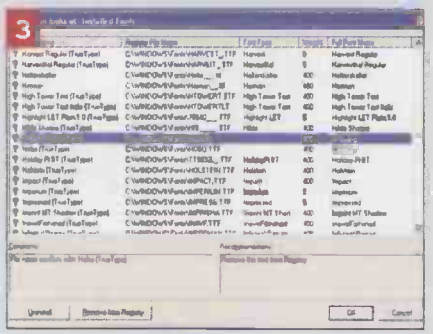
Even if you have no interest in font management, it's worth installing Font Expert 2003 for access to its Dr Fontson diagnostic tool. This utility scans installed fonts looking for technical problems, then helps you fix them with one mouse click.

Become an instant Font Expert

1 You're looking for a new font to suit your latest document, but which one is best? Launch Font Expert for a quick text preview, and a table of all the font's characters. Click on any character with the left mouse button to see it full-screen, or right-click to copy it to the clipboard.



2 The Workspace view initially displays an alphabetical list of all your fonts. You may also view all the Arabic, Cyrillic, Greek or other font groups by making a new selection at the top of the screen. It's even possible to create font groups of your own (right-click, 'Add to Group').



3 Missing font files and related Registry problems can have strange effects, including crashing applications. Click on Tools > The Advice of Dr Fontson and Font Expert 2003 will scan your system for problems, then offer recommendations (and, usually, a one-click solution).

Upgrade offer >> Font Expert 6

ONLY £19 (APPROX)

New features

- Font Faces view displays more fonts
- Create font catalogues
- Groups can include child folders
- Improved printing capabilities
- Smart renaming of fonts

If you appreciate the control offered by Font Expert 2003, just wait until you see what's coming up in the next version. The new Font Faces view will display all font files in the selected folder or group; you can create font catalogues; groups can include child folders; a Worklist view allows you to save an arbitrary list of fonts in a file and open it again later; you get improved printing capabilites, and loads more.

The new version is yours for $35 (around £19), and you can find out more at www.proximasoftware.com/vnu.

Form Artist Presto 3.2

FULL PROGRAM

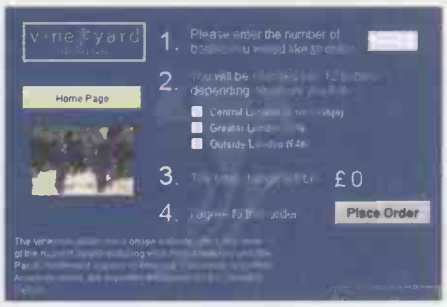
Need to know

System requirements
Windows 98 or later, 43MB disk space

Information
www.quask.com

Registration
Visit www.quask.com/purchase, click the Presto purchase button (you won't be charged), and enter the coupon code **PCWUK** (which is case-sensitive)

Limitations
None



Forms are constructed from objects

Got a website? Then bring it to life with some interactive content. Personal sites benefit from polls and surveys (everyone loves to share their opinion), while businesses can learn a lot from employee feedback forms and market research.

Form Artist Presto makes it easy for anyone to create web forms, and we don't just mean basic multiple-choice pages. Complete control over layout, background and graphics means you'll have the best-looking surveys around.

Don't worry if you're artistically challenged, colour blind, or totally lacking in any web design skills, Form Artist Presto comes with a sizeable library of predesigned forms, so it's just a matter of picking one of these, and customising it to suit your needs.

Customisation in Form Artist means more than adding an extra text box. Scripting support lets you validate user selections, introduce question-skipping logic, and much more. You can enter Javascript code directly, or use the program's own dialogue-driven system.

The finished form can be deployed via email, by link to a pop-up window, or embedded inside a web page (no server-side database support is required). Forms work on all major browsers, are easy to fill in, and the results are automatically emailed back to you for analysis.

Upgrade offer >> Standard/Pro version

Form Artist Presto is great at creating forms, but database management and statistical reporting tools make the Standard version better for larger surveys. Quask is offering it for £104.58, that's £47 off the regular price.

The Professional version integrates with software such as ACT, Goldmine and MS-CRM, and features advanced exports like SPSS and HTML. Normally £645.08, you get it for a special price of £351.33.

Visit www.quask.com/purchase and enter the coupon code **PCWUK**.

Blackice Defender 2.9

FULL PROGRAM

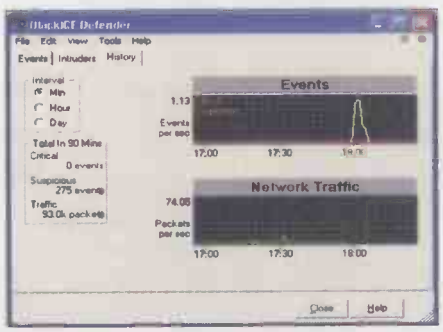
Need to know

System requirements
Windows 98 or later, 6.5MB disk space

Information
www.guildsoft.co.uk

Registration
Enter offer code **403GUPCW1** at www.guildsoft.co.uk/cmp/403GUPCW1

Limitations
None



The History tab quickly displays recent clusters of hacker attacks

Keeping yourself safe online can be complicated, with lots of firewall rules to create and manage. Blackice Defender offers a different approach. Rather than purely managing ports (block traffic here, let it through there), the program monitors all your network packets for the tell-tale signs of an intrusion attempt.

When Blackice detects suspect behaviour, it performs a back trace to find out more about the possible attacker. Their IP, DNS and MAC addresses may all be collected. Double-click the Blackice system tray icon, then select the Intruders tab to view any information that's been collected recently.

You don't have to do this, of course, and one of the benefits of Blackice is it's very low maintenance. Just leave the program running in your system tray and you'll stay protected. But there are tweaks available, which may come in useful if Blackice blocks legitimate traffic.

Choose Tools > Edit Blackice Settings > Firewall, for instance, to adjust the Protection Level and allow Netbios traffic.

If your system is on a local network, then the options at Tools > Advanced Firewall Settings could be particularly useful. Here you can choose to allow traffic by IP address, so you can let local PCs access your system, but block everything else.

Upgrade offer >> Blackice 3.6

New name, new features – Blackice PC Protection 3.6 now comes with built-in Application Protection. This looks for and blocks your PC from Trojans, worms and other threats, whether they're delivered by email, instant messaging, or even your browser. Communications Control now checks outgoing connections, too, so only authorised applications can get online. Interested? Enter offer code **403GUPCW1** at www.guildsoft.co.uk/cmp/403GUPCW1 to upgrade for only £19.95.

Ultralingua Express

FULL PROGRAM

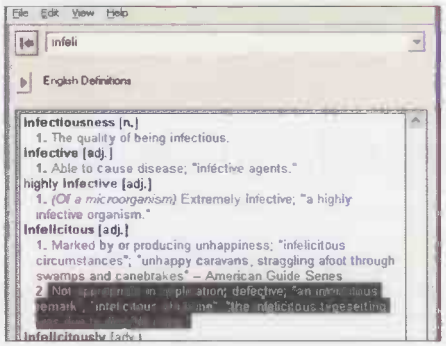
Need to know

System requirements
Windows 98 or later, 12MB disk space

Information
www.ultralingua.com/en

Registration
www.ultralingua.com/en/promo/pcw.html

Limitations
None



Right-click on any selected text if you want to copy it to the clipboard

Are you known for your infelicitous lexical decisions? Is your articulation up to the standards of a colloquy, or do you inevitably resort to the vernacular? And what, exactly, are we talking about?

The next time you're confused about a word definition, don't go off to search online, or reach for that dictionary on the bookshelf. There's no need, because Ultralingua Express English Definitions contains all the definitions you'll need. It's also supremely easy to use, and you'll be looking up information within seconds.

Start by typing your word at the top of the screen. Not sure how to spell it? That doesn't matter, the program dynamically updates its list as you type. So typing 'infeli' is enough to bring up 'infelicitous', for instance, because it's the only word available that begins with those six letters.

Once you've found the right word, Ultralingua can help make sure it's spelled correctly. Click on the word to highlight it, right-click and choose 'Copy', then paste it into your document.

And don't miss the History feature. Click the arrow to the right of the word entry box, and you'll find a list of all the terms you've searched for recently, particularly handy for quickly locating a definition again.

Upgrade offer >> Ultralingua Pro

Move on from Ultralingua Express and you'll benefit from tens of thousands more terms, as well as powerful new search tools to help track them down. Automatic verb conjugation is available for thousands of verbs, and you can even customise the dictionary with your own entries.

The Pro upgrade for English Definitions costs £14.99, while other languages may be added for £19.99. Find out more at the Ultralingua site (www.ultralingua.com/en/promo/pcw.html).

Alcohol 52% 1.4.8.1222

ON OUR COVER DVD

FULL PROGRAM

Need to know

System requirements
Windows 98 or later, 3MB disk space for software, plus additional space for each emulated drive

Information
www.alcohol-soft.com

Registration
Not required

Limitations
None

The Image-making wizard has the tools to copy just about any CD or DVD

Look around the average desktop and you'll see CDs littered everywhere, often not even in their cases. Why? Because many packages need their CD in your drive before they'll run, so you're always switching discs.

If you're tired by all this, then Alcohol 52% can help clear away all your desktop clutter. The program reads your key discs, then creates an emulated CD or DVD-Rom drive to hold each drive image. The application then reads from the Alcohol 52% drive, instead of the real one, so your disc can stay safely in its box.

There's another big advantage to the emulated drives – they're based on your hard disk, therefore performance is far higher than a regular CD or DVD. Applications that regularly access these emulated drives should run much more quickly than before.

Much of the program's work is carried out in the Image-making wizard, which creates the drive image for you. In principle this is very straightforward, and you can begin the imaging process with a couple of mouse clicks. But if you have problems later, there are a number of tweaks that may help you get a fast, accurate copy. Choose the disc you're copying from the 'Datatype' list to set these up correctly.

Upgrade offer >> Alcohol 120%

Although 52% is great, Alcohol 120% ships with a host of extra features. There's an image burner (CD or DVD), direct CD or DVD copying tool, and an erase tool for wiping CD-RW, DVD-RW, DVD+RW or DVD-Ram discs. It supports a wide range of image formats, including MDS, CCD, BIN, CUE, ISO, CDI, BWT, BWI, BWS, BWA, too.

All this emulation and burning power is yours for £26.40. Visit the Alcohol Software website to order your copy of Alcohol 120%, or find out more at www.alcohol-software.com.

PERSONAL COMPUTER WORLD

Next Month

on sale 22 April 2004

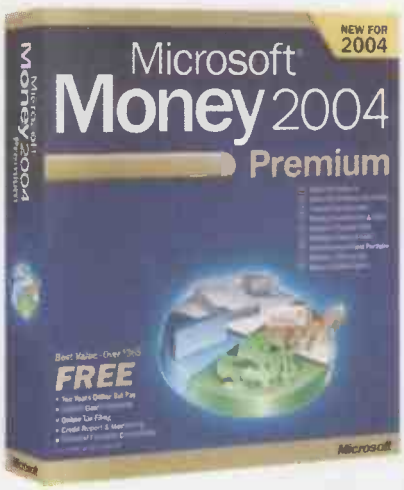
If you've got a new PC and want to transfer all your data, our guide to migrating Windows will tell you all you need to know

Reconditioned PCs
Increasing numbers of vendors are offering refurbished PCs at knock-down prices, but should you be tempted by them? We investigate exactly what's on offer from the major outlets and see whether the bargains are all they're cracked up to be.

Intel motherboards
In the first of a two-part group test, we put the latest crop of Pentium 4 motherboards head to head in the labs.

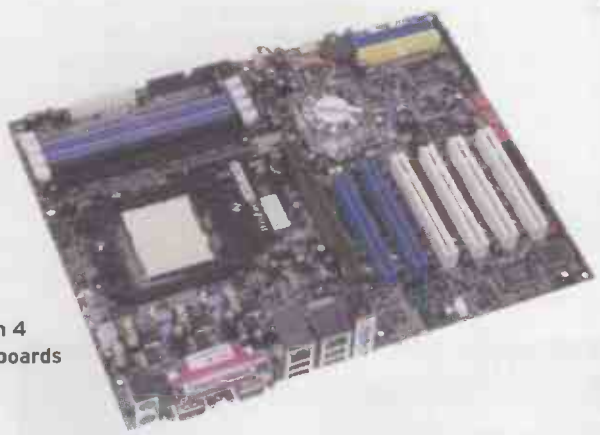
Accounting software
Whether you're a home or a small business user, managing your finances is a task that's hard to escape. We review the best packages for both home and office use to see which one takes away most of the pain.

Migrating Windows
Buying a new PC is great fun – until you have to move all your data and applications from your old system. Our special expert guide will show you how to accomplish this with the minimum of fuss.



We put some of the best accountancy software on trial in our group test

There's lots more in June's PCW, don't miss it...



Pentium 4 motherboards on test

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PERSONAL COMPUTER WORLD

Ulterior motives and misinformation

Backbiter reveals why MSN is scrapping pop-ups, how Claranet upset some journalists, and much more

backbiter@pcw.co.uk

Oh, the jubilation! Microsoft's net arm MSN has announced that it is to scrap the use of pop-up adverts on a number of its European home pages. And it's not just the pop-ups that are for the chop: pop-unders will also be barred from the firm's web portal. Hallelujah! Apparently, years of research has resulted in the same conclusion conjured up by just a moment's common sense – that web surfers hate these annoyances.

MSN's approach is seemingly laudable and the world's media organisations have been quick to praise the initiative. But hold on a moment. Sooner than you can say 'hidden agenda', Backbiter has figured out Microsoft's true intentions. The company has good reason to want to rid the portals of pop-up adverts, as it has discovered an even more infuriating way to vex visitors – so-called 'rich media' commercials. Rather than relying on easily closed (not to mention software-blockable) pop-ups for its ad revenue, MSN is offering advertisers TV-style commercial slots. These hog the middle of the browsing window for up to 30 seconds before the user can read the content obscured beneath. You can experience this horror yourself by visiting **http://advertising.msn.com/adproducts/3rdpartyrichmedia.asp**. Pop-ups were never this bad. Still, Microsoft's marketing people had most of the media fooled for a moment.

'Sooner than you can say "hidden agenda", Backbiter figured out Microsoft's true intentions'

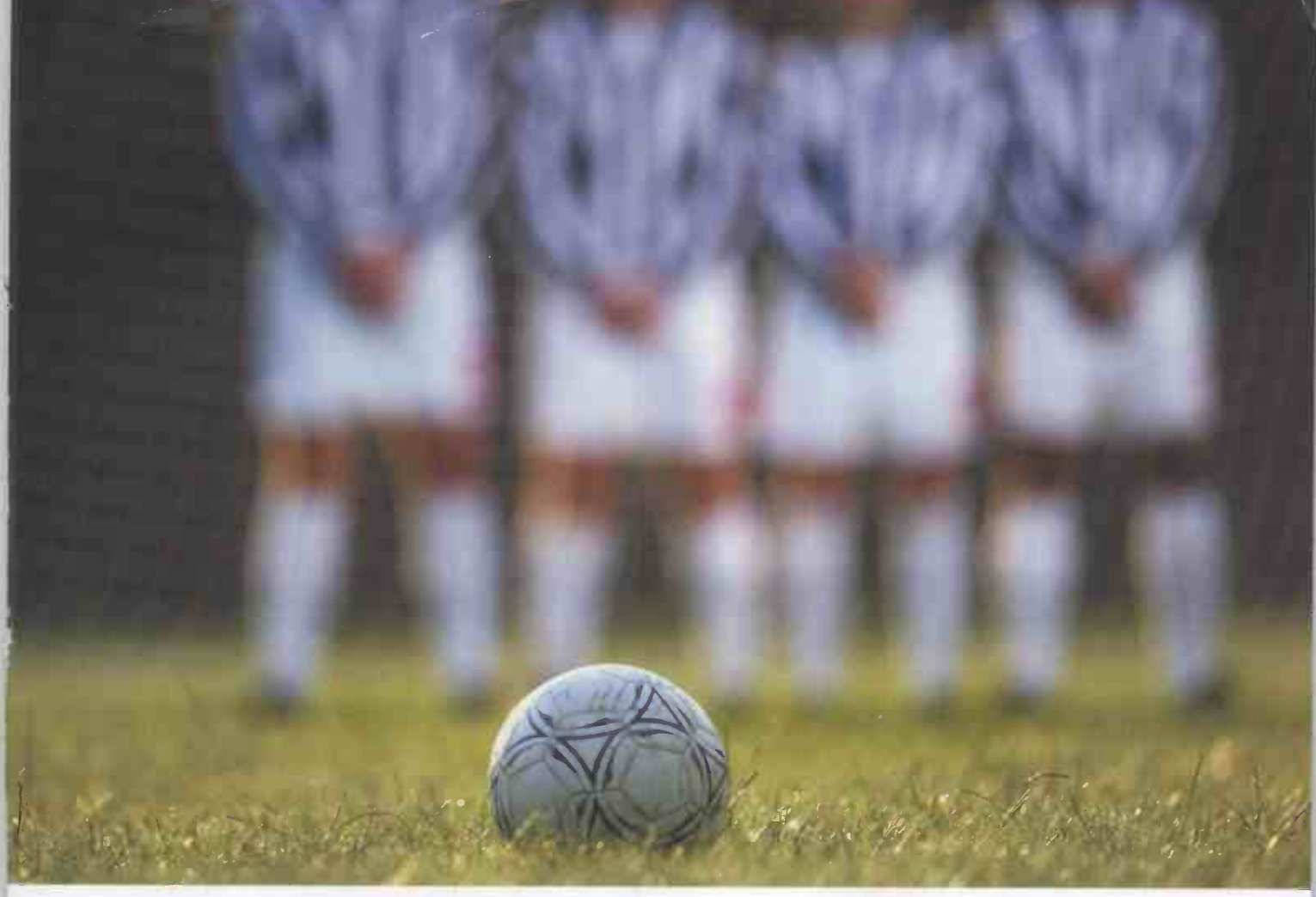
From MSN to misinformation, and the question: which highly respected Internet service provider seems to have been misleading would-be customers with a promise of an email service unbounded by restrictions on attachment size? Enter industry veteran Claranet. Backbiter can exclusively reveal that the company seems to have been leading subscribers up the garden path for some time. The company's website boasts that: 'If you are sending an attachment and it is large, ensure that the person at the other end will be able to retrieve it. Some Internet service providers impose a limit on the size of their customers' mailboxes and will not allow them to go over a certain size. This is not the case with Claranet customers.' Except that it is the case – and Claranet knows it.

In fact, in common with many of its contemporaries, the firm imposes a limit of 50MB on received attachments. Backbiter knows that at least two subscribers have been taken in by Claranet's assurance, only to discover that the service isn't as described, and therefore useless for their purposes. The customers in question happened to be journalists and duly brought the problem to the company's (oh, and Backbiter's) attention, whereupon the firm promised to alter the service description at 'the earliest opportunity'. Backbiter is now tempted to label the firm Claranot.

Prompted by my lambasting last month of Coca Cola's flat launch of its legal-music-downloads service, Mycokemusic, a Stateside reader informs me that our American cousins are bubbling with excitement over an Itunes-related promotion run by rival drinks seller Pepsi. No sooner had the buy-a-bottle-for-a-free-song giveaway begun, than canny Itunes users were applying a nifty hack to download dance, jazz and rock without paying for Pepsi's pop. For once, though, it's not fancy-but-flawed web technology that's let the side down, but good old-fashioned stupidity. Why, many Itunes devotees pondered, pay good money for a bottle of Pepsi when simply peering through the bottle to view the promotion code under the lid will suffice? The answer's hardly the Pepsi challenge, is it? Let's hope the firm repeats the low-tech clanger on this side of the pond, should us Brits ever be fortunate enough to have access to Apple's Itunes service.

With freebies in mind, PC owners who use or are considering switching to the Linux operating system might want to set aside a few hundred quid to pay for it. I beg your pardon? Pay? As mentioned previously in this column, the open-source OS that's considered to be a not-for-profit giveaway by its creator, Linus Torvalds, and the rest of the sane world, is currently the subject of conflicting claims of ownership. The latest twist in this saga of corporate silliness is that SCO has set up an 'Intellectual Property Licence' scheme, requiring Linux users to cough up for continued use of the operating system without fear of legal action. For desktop users, the fee is $199 for a permanent licence, more than the cost of an upgrade to Windows XP Home. Is it any wonder that Distributed Denial of Service attacks have intermittently rendered SCO's website (**www.sco.com**) inaccessible? Backbiter wonders when the perpetrators of these electronic assaults will realise that SCO has set up a new online home at **www.thescogroup.com**, which is functioning just fine. For now.

If you have any moans, groans or gossip that you think might interest Backbiter, you can email him at: backbiter@pcw.co.uk



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ADSL guide said "the configuration via the web interface is easy and intuitive", so you don't even need to be a techie to install a Barricade™ product.

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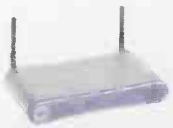

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