REVIEWS

NEW PRODUCTS ››

contents

Beware your Colvin OSR2

Nik Rawlinson
DEPUTY EDITOR

RSI, eye strain and carpal tunnel syndrome have had more than their fair share of press in recent years. Employers are quickly realising that they are the cause of several thousand lost (wo)man hours each year, but there is something potentially more disruptive in every large office in the UK and beyond – a Colvin. If you work in an organisation with 50 or more PCs there is a good chance that you are running a Colvin OSR2 or above.

If you didn't install Colvin yourself there's a good chance your employer set it up as a shared resource. It's a hardware device most likely sited in the vicinity of your servers, soothed by the strains of Jean Michel Jarre. It has the ability to invoke automated relocation routines to undertake autonomous 'audits' or 'installation base authorisation routines' on your notebook or desktop PC. Often, though, these seem to do little more than hamper your workflow for 10, 20, 30 minutes and give little in the form of useful feedback. Colvin OSR2 has been known to delete or move files and data without first obtaining user confirmation and is often criticised for its unfriendly user interface.

If you didn't install a Colvin there's a chance your employer set it up as a shared resource

Sound familiar? Perhaps I should explain: Colvin OSR2 is not something you can actually buy. Installation is free, but your organisation will have signed a service contract, usually with a one- or three-month notice period. If you've not yet worked it out for yourself, Colvin is an IT support department employee. Of course, your particular installation might not be a Colvin – that's just a name I picked at random – but it's likely the effects will be much the same.

Don't get me wrong – systems engineers have a vital part to play in the smooth running of any large corporate's IT strategy. End users have neither the time nor, in many instances, the ability to maintain their own machines. The trouble starts when systems departments impose draconian rules company-wide with little apparent comprehension that users, whether on an individual or a departmental basis, have differing needs.

Rolling out NT across 1,000 desktops is a sensible move as far as stability and security are concerned, but if Colvin's aim is to use it as a way of restricting users' ability to tailor their machines to work in a way with which they are happy, then clearly something is wrong. He is doing little more than encouraging them to format the drive in favour of an unauthorised copy of Windows 9x.

The systems department has a fairly tough job here at VNU, maintaining a network of 500 or so desktop machines, of which around a quarter will be subjected to the installation of anything up to half a dozen or so new applications each week for 'testing'. We work in the heart of Soho's media district, yet I can think of few other organisations that would have such demanding requirements on the stability and flexibility of its network hardware and support staff. Yet even those departments that support far less demanding users often fail to see the importance of a flexible corporate IT strategy.

Preventing users from rearranging the Start menu may make life easier for the small number of people working in the systems department, but if it made life easier and more productive for the end users then is that policy not back to front? Surely the needs of the many outweigh those of the few and Colvin ought to realise that an indication of a job well done is not necessarily that the support department has very little left to do in the way of a job.

VNU European Labs

VNU Labs tests all kinds of hardware and software, from PCs and modems to databases. All our tests simulate real-world use and for the most part are based on industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for Windows 98, NT and 2000 are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

ratings

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

Mesh Matrix 900 GT Live

A 900MHz Athlon machine that is not quite cutting edge, but a real winner all the same.

Mesh is no stranger the the cutting edge of computing, as last month's 1GHz Athlon proved. This month, however, Mesh has decided to take a small step back from the cutting edge and produce a great high-spec machine at a reasonable price.

It's common knowledge that dropping the processor spec a generation or two will save a lot of money without sacrificing a huge amount of performance. In testament to this Mesh has equipped this PC with a 900MHz AMD Athlon CPU and backed it up with 128MB of PC100 SDRAM. This specification produced a SYSmark score of 158, which is very reasonable when you consider that last month's 1GHz Mesh machine scored 171.

As far as 3D performance goes, the Matrix managed to beat its 1GHz sibling turning in a score of 5,514 compared to 4,653, although there is a very good reason for this. Sitting in the AGP slot is a graphics card sporting the new GeForce 2 chipset from nVidia. We've had a good look at this new chipset (see page 96) and it's a very fast graphics solution. As well as sporting 32MB of DDR memory running at 333MHz, it also has the ability to apply multiple textures to a single pixel. There's also the second-generation transform and lighting engine on board, ensuring that you're well and truly future-proofed.

Making the most of the graphics card is a Mitsubishi Diamond Plus 91 monitor. This is a great display with a 19in natural flat aperture-grille tube producing a sharp and vibrant image. You shouldn't have any trouble spending hours sitting in front of this screen, without the slightest hint of eye strain. Even running a resolution of 1,280 x 1,024 results in a clear, well-focused and easy-to-read image.

All three of the 5.25in drive bays are occupied, but with this array of peripherals you're unlikely to want to install anything else. In the top bay is the Creative Live! Drive II that provides digital and analog input and output ports for the SoundBlaster Live! Platinum hiding within the case. To cater for all your devices you get optical digital in and out, co-axial digital in and out, MIDI ports and headphone and microphone sockets. This is one of the best sound cards you can buy and the Labtec speakers do a good job of amplifying its output.

The other two bays are filled with optical devices. The Pioneer DVD-ROM drive provides 10-speed DVD performance and 40-speed CD performance. The other optical unit is a Panasonic CD-RW drive which provides eight-speed CD-R, four-speed CD-RW and 32-speed CD-ROM performance. The internal storage is taken care of by a 34GB IBM hard disk, which should be more than ample for quite some time.

Input devices are also first rate with a Microsoft Internet keyboard married to a Microsoft IntelliMouse Explorer. The latter is a great device and sports Microsoft's new optical mouse design, so you never have to worry about the mechanics getting clogged up. It also has five buttons as well as the scroll wheel.

The inside of the case is up to Mesh's usual high standards with all the major components unobstructed. The only sore point is the digital DIN cable that stretches from the Live! Drive II to a backing plate at the bottom of the case. Obviously Mesh was limited in its options for keeping this cable tidy since it's not very long, but it's a shame to spoil an otherwise faultless interior.

On the whole this is a stunning machine with just about every base covered well. Mesh is shooting for the high-tech enthusiast with the Matrix, and it's got the balance just about perfect.

Even though the CPU is a step down from cutting edge it's still more than fast enough for almost anything you're likely to throw at it. Add to this the incredible price of only £1,599 ex VAT and you've got a real winner.

RIYAD EMERAN

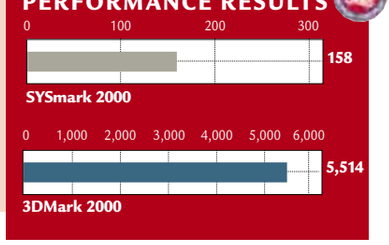
DETAILS

★★★★★

RECOMMENDED Computer World

PRICE £1,878.82 (£1,599 ex VAT)
CONTACT Mesh 020 8208 4706
www.meshplc.co.uk
PROS Fast, feature-packed, great value
CONS None
OVERALL A great PC at an amazing price. If you're looking for a high-spec system this should be top of your list

PERFORMANCE RESULTS



Carrera Cygnus M933 S

This 933MHz PC offers lightning-fast speed, lots of power and great graphics.

Like Mesh, Carrera has seen the benefit of stepping the CPU down from the 1GHz cutting edge (see previous page). However, Carrera has gone for an Intel solution rather than an AMD one. Strangely, though, this 933MHz Pentium III chip is brand new, newer in fact than the 1GHz we saw last month. Basically the race to release the 1GHz chip meant that Intel made the faster chip available first.

Unlike the 1GHz Dell we saw last month, this Carrera uses a Flip Chip incarnation of the Pentium III. The CPU resides in a Supermicro FC-PGA motherboard with two DIMM sockets. Even though the motherboard sports the Intel 820 chipset, Supermicro has not included support for RAMBUS memory due to the high price premium that RIMMs carry. One of the DIMM sockets is filled with 128MB of PC100 memory. This will slow the system down somewhat since the memory translator will have to be employed to allow the system to talk to the SDRAM. That said, the Cygnus is anything but slow.

Also like the Mesh, the Cygnus sports the cutting edge of graphics card technology. Filling the AGP slot is a 3D Power graphics card that incorporates the nVidia GeForce 2 chipset. This is the ultimate 3D card of the moment and it helped the Cygnus score an amazing 5,916 in the 3DMark benchmark. It also managed a very impressive 87.9fps in Quake III at 1,024 x 768 and 77.3 at 1,280 x 1,024, both in 16bit colour, making this a fantastic machine for games. As well as lightning-fast performance, the GeForce 2 has the richest feature set that you'll find in a graphics card.

Obviously a good graphics card needs an equally good monitor to make the most of it. Carrera has gone for a 19in Iiyama Vision Master 451. Although this doesn't sport the NF aperture grille tube of the Vision Master Pro version, it's still a great display and a fine example of shadow mask technology. With a screen this size you can easily work at a resolution of 1,280 x 1,024 without hurting your eyes. It also makes the most of the high-resolution 3D performance of the GeForce 2. You could even try playing Quake III at 1,600 x 1,200 – we got a score of 55.5fps at this resolution.

Two of the five PCI slots are occupied, one with a sound card and the other with a V.90 modem. The sound card is a Creative SoundBlaster Live! 1024, a decent card that will be more than adequate for playing the games this machine is so good at. A set of Altec Lansing surround speakers continues the entertainment feel. The combination complements the high-tech graphics well.

Another very impressive aspect of the Cygnus is the storage solution. Residing on the primary EIDE channel is the latest hard disk from IBM sporting a massive capacity of 45GB. It's fast, too, with a 7,200rpm spindle speed and a 2MB data buffer. The eight-speed DVD-ROM drive shouldn't take long to install your applications to the hard disk. It also reads CD-ROM media at a very respectable 40-speed.

There's loads of expansion room in the case, with three 5.25in bays free and one free external 3.5in bay.

The Key Tronic keyboard and Microsoft mouse are standard Carrera fare. Both are quality items although we would have preferred a wheel mouse. There is also a two-year on-site warranty.

Carrera has built a very fast system, as fast as the 1GHz Athlon machine we saw last month. Had there not been the performance hit caused by the memory translator on the 820 chipset it would have been even faster. With a price of £1,799 you're getting a lot of power for your money and you're only a small step away from the 1,000MHz mark.

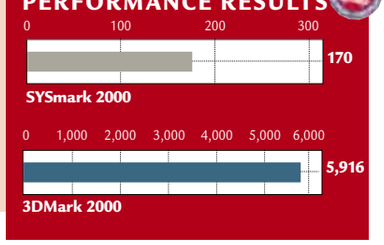
RIYAD EMERAN

DETAILS

★★★★

PRICE £2,113.82 (£1,799 ex VAT)
CONTACT Carrera 020 8307 2800
www.carrera.co.uk
PROS Very fast, cutting-edge components, ideal for the hard-core gamer
CONS No removable storage, a little pricey
OVERALL Carrera has proved once again that it's at the cutting edge of PC technology. If you want a lightning-fast machine, especially for games, this should be right up your street

PERFORMANCE RESULTS



Hi-Grade UltiNote L8400

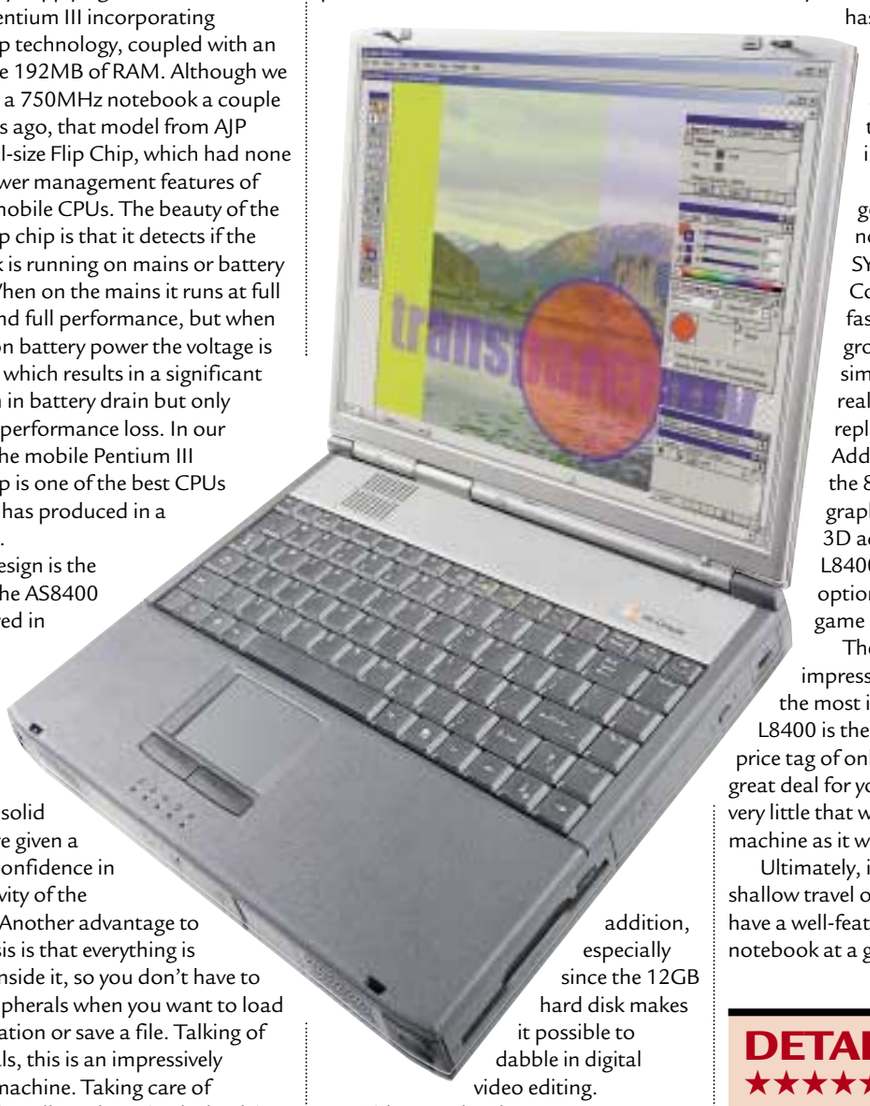
A fast and well-specced portable that can really claim to be a desktop replacement.

Hi-Grade managed to ship us the first mobile Pentium III notebook for review back in our December 1999 issue. Now the company has held onto its cutting-edge position by supplying the first 700MHz mobile Pentium III incorporating SpeedStep technology, coupled with an impressive 192MB of RAM. Although we looked at a 750MHz notebook a couple of months ago, that model from AJP used a full-size Flip Chip, which had none of the power management features of the true mobile CPUs. The beauty of the SpeedStep chip is that it detects if the notebook is running on mains or battery power. When on the mains it runs at full voltage and full performance, but when running on battery power the voltage is dropped, which results in a significant reduction in battery drain but only marginal performance loss. In our opinion the mobile Pentium III SpeedStep is one of the best CPUs that Intel has produced in a long time.

The design is the same as the AS8400 we reviewed in our April issue. This is no bad thing since the chassis is solid and you're given a sense of confidence in the longevity of the product. Another advantage to this chassis is that everything is resident inside it, so you don't have to swap peripherals when you want to load an application or save a file. Talking of peripherals, this is an impressively specced machine. Taking care of software installs and movie playback is an eight-speed DVD-ROM drive. This is a fast unit for a notebook computer and it validates the L8400's aspirations as a desktop replacement. Next to the DVD-ROM drive is the floppy drive, so getting files off the machine should be as easy as putting them on.

On the opposite side of the case you'll find two stacked PC Card slots that will accept one Type III or two Type II PC Cards. Also there's an IR port and the power socket.

At the rear is a very impressive complement of ports. There are two USB, two PS/2, D-SUB monitor out, parallel, serial, network/modem and audio ports. This makes it a very well connected machine, although a FireWire port would have been a welcome addition, especially since the 12GB hard disk makes it possible to dabble in digital video editing.



With a notebook computer, ergonomics are very important, and the two main areas of concern are the screen and the keyboard. The screen is a 14.1in affair with a native resolution of 1,024 x 768. As far as TFT notebook displays go, this is a fine example and the lighting is even across the surface with no dead pixels present. We found the display fine to work at for extended periods of time, which is good for a desktop replacement unit like this.

Unfortunately, the keyboard isn't quite up to the standard of the screen. The overall feel is light and it rattles during use. Also, the return key is a little too small and is easily missed. The touchpad is superb and pointer manipulation is simple. Unfortunately, the utility to disable touchpad tapping hasn't been loaded, although the touchpad is positioned far enough away from the space bar to avoid too much inadvertent activation.

As far as performance goes this is a very fast notebook, turning in a SYSmark score of 142. Considering that the fastest PC in this month's group test produced a similar score, the L8400 really does offer desktop replacement performance. Add to this the fact that the 8MB S3 Savage/MX graphics chipset offers full 3D acceleration, and the L8400 will even give you the option of playing the odd game as well.

The performance may be impressive, but without doubt the most impressive aspect of the L8400 is the price. With an ex VAT price tag of only £1,775, you're getting a great deal for your money and there's very little that won't run as well on this machine as it will on a desktop.

Ultimately, if you can get used to the shallow travel of the keyboard, you'll have a well-featured and very fast notebook at a great price.

RIYAD EMERAN

DETAILS

★★★★★

RECOMMENDED Personal COMPUTER WORLD

PRICE £2,085.62 (£1,775 ex VAT)
CONTACT Hi-Grade 020 8532 6100
www.higrade.com
PROS Very fast, well featured, great price
CONS Disappointing keyboard
OVERALL This is an incredibly fast notebook at a great price. The keyboard could be better, but that's not enough to take away its shine

PERFORMANCE RESULTS

Gateway Select 1000

A lacklustre mid-range PC despite its 1GHz processor and respectable components.

With AMD and Intel locked in their spiralling dogfight, each instantly matching the other with processor clock rates, new processor speeds are pouring out of their factories almost before PC vendors have had a chance to sell the old lot. And so, we have another machine with a 1GHz processor, in this case an AMD Athlon, for under £2,000 ex VAT.

Along with the 1GHz Athlon, the core components of the Select consist of 128MB of SDRAM and a 20GB Western Digital Caviar EIDE hard drive. The Caviar's latest incarnation keeps pace with the competition by spinning at 7,200rpm and providing a 2MB data buffer. But while its capacity is plenty to keep most people happy, it is at the lower end of the scale relative to the drives other manufacturers are shipping in new systems. The single SDRAM DIMM sits in one of three sockets on the system's motherboard, Gateway's own Kodoko, which unusually sports three USB ports on the rear connector array.

We were appalled by the monitor included with the Select. The 17in shadow mask EV700, with its less than pin-sharp image and poor power regulation, would be an acceptable if unexciting choice for a £1,200 system. But for one costing £2,231 inc VAT, it's unacceptable. With the price of flat-screen aperture grille monitors plummeting, there's no excuse for this kind of tired technology in a new system that supposedly represents the state of the art.

If the quality of the monitor was an unpleasant surprise, however, we were positively stunned by the graphics card to which it was attached. The Select 1000 uses an anonymous card based on the standard nVidia TNT2 chipset, with 32MB of on-board RAM. Nothing wrong with that in a 466MHz Celeron system, but if you're a gamer who's just shelled out for the Select, a good portion of those one thousand million CPU clock cycles per second that you've paid for will go to waste as the Athlon sits around waiting for the graphics card to redraw the frame.

Open the Select and the bad news continues. Unlike most other big manufacturers, Gateway didn't neatly route the power supply, EIDE and audio cables around the case, so they're left hanging limply across the insides, restricting access to the CPU and DIMM sockets and making the prospect of upgrading anything an unpleasant one. Even the good points of the machine's construction are tempered by poor forethought. The tower case has stacks of potential for expansion, with an almost unprecedented total of eight free device bays: three front panel 5.25 areas, plus three internal 3.5in bays beneath those, and another two in a cage attached to the floor of the case. But to power all these devices, Gateway gives you a total of two power connectors. You do the sums.

On the positive side, supporting components are pretty reasonable, starting with Toshiba's newest DVD-ROM drive, a 12-speed unit. There's no CD-RW in the Select, which some would justifiably view as an essential part of a new mid-range system, but you do get an LS120 floppy drive, which will take 120MB Superdisks as well as standard floppies. Not as good as a CD-RW, but considerably better than nothing. A Creative SoundBlaster Live! Value sound card provides audio to a set of Boston BA735 speakers, with two satellites and a small subwoofer. Add the 56K PCI modem and you're left with three spare PCI slots, but the Kodoko is a legacy-free and thus ISA-free motherboard. A standard Microsoft three-button IntelliMouse and a responsive Gateway-badged keyboard complete the peripheral picture.

In the SYSmark 2000 application benchmarks, the Select falls significantly below the level of the 1GHz machines from Dell and Mesh that we looked at last month, with a score of 160. Its 3DMark graphics score – half that of Dell's B1000SE from last month and easily bettered by systems costing £500 less – reflects the questionable wisdom of partnering a cutting-edge processor with yesterday's graphics hardware.

The Select 1000's software bundle, Microsoft's Works Suite 2000, does at least provide you with a decent array of applications to get you going, including Word 2000.

Gateway is a big company with a big reputation, but the Select does little to solidify Gateway's standing in the market. It may include the fastest processor on the planet, but that's only a part of the equation, and the rest of the machine just doesn't measure up.

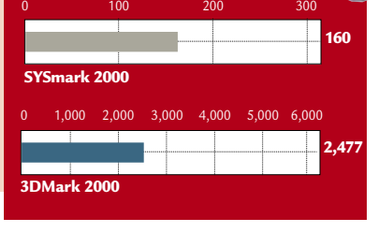
DAVID FEARON

DETAILS

★★

PRICE £2,231 (£1,899 ex VAT)
CONTACT Gateway
0800 973132
www.gateway.com/uk
PROS Cheap for a 1GHz system
CONS Poor monitor, dated graphics card and disappointing build quality
OVERALL There's no point in having a 1,000MHz processor if the rest of the machine can't cut the mustard

PERFORMANCE RESULTS

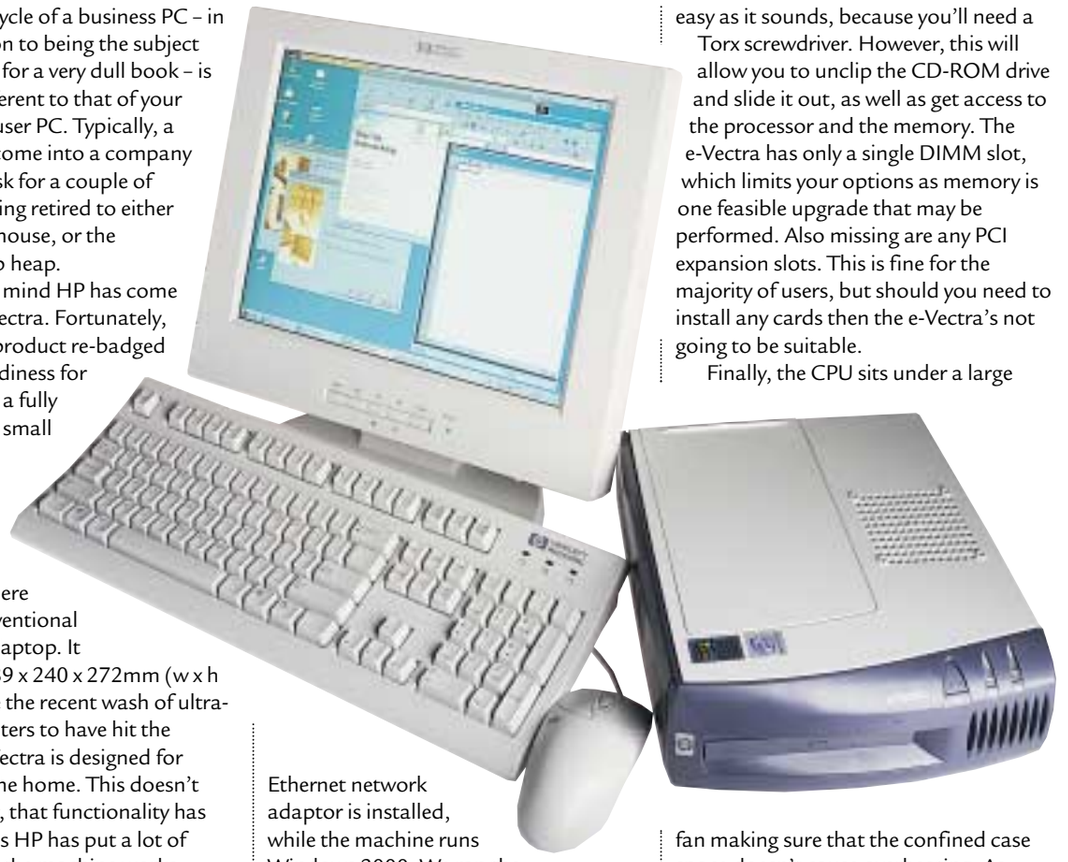


HP e-Vectra

A good-looking and powerful machine that should keep the business user happy.

The lifecycle of a business PC – in addition to being the subject matter for a very dull book – is completely different to that of your average home user PC. Typically, a computer will come into a company and sit on a desk for a couple of years before being retired to either an employee's house, or the computer scrap heap.

With this in mind HP has come up with the e-Vectra. Fortunately, it's not an old product re-badged to signal its readiness for e-business, but a fully fledged PC in a small form factor. Perhaps the best way to describe it would be as a hybrid somewhere between a conventional desktop and a laptop. It measures just 89 x 240 x 272mm (w x h x d), and unlike the recent wash of ultra-slimline computers to have hit the market, the e-Vectra is designed for the office not the home. This doesn't mean, however, that functionality has replaced style as HP has put a lot of effort into how the machine works. As well as being able to sit on the desk like a standard desktop PC, the machine can sit upright using a bundled stand in a fashion similar to the Playstation 2. A second plastic clip keeps the cables tidy at the rear of the machine. Unfortunately the small case size means that an external power supply is needed. This takes the 'figure of eight' style two-pronged plug not the standard kettle lead.



Our review model was kitted out with an Intel Pentium III 600MHz Flip Chip processor – Celeron processors are also available – 128MB of RAM, an 8.4GB hard drive, and a 24-speed CD-ROM drive. Two USB ports make sure that the latest peripherals can be used without problem. Less emphasis has been placed on the graphics processors – an integrated 4MB Intel i810 chipset that's no good for the latest games, but is more than enough for business applications, email and surfing the web. The e-Vectra also sports on-board sound which, if nothing else, will please users wanting to listen to music. For the business environment an on-board 3Com Fast Ethernet network adaptor is installed, while the machine runs Windows 2000. We ran the SYSmark 2000 benchmark on the machine, which gave us the rather impressive score of 127. This puts it just a couple of marks back from a 600MHz desktop HP Vectra. Clearly this is more than a good-looking machine, it's got the power as well.

Despite the fact that this PC isn't meant to be upgraded, HP hasn't ignored the fact that maintenance sometimes means you'll have to get inside the machine. A flap on the top allows access to the hard drive which pulls out on a caddy. HP recommends in the documentation that the hard drive should be removed in the event that the machine develops a fault, and just the base unit sent back for repair. This also means that the hard drive can be replaced easily should the need arise. Access to the drive is controlled through a key, which is handy as apart from the theft aspect you also need to consider that the CMOS password clear switch is located directly beneath the drive.

The other components require that the case be removed entirely. This isn't as easy as it sounds, because you'll need a Torx screwdriver. However, this will allow you to unclip the CD-ROM drive and slide it out, as well as get access to the processor and the memory. The e-Vectra has only a single DIMM slot, which limits your options as memory is one feasible upgrade that may be performed. Also missing are any PCI expansion slots. This is fine for the majority of users, but should you need to install any cards then the e-Vectra's not going to be suitable.

Finally, the CPU sits under a large fan making sure that the confined case space doesn't cause overheating. As with everything else in the machine, the fan can simply unclip allowing access to the processor. In all, with the e-Vectra HP has done well. It's a simple machine that will serve the needs of those who rarely do more than send emails or word processing.

DAVID LUDLOW

DETAILS

★★★★

PRICE £775.50 (£660 ex VAT) for system only, £813.10 (£692 ex VAT) for 15in panel
CONTACT Hewlett-Packard 0990 47 47 47
www.hp.com/uk
PROS Powerful, small and cheap
CONS Only a single memory slot, external power supply
OVERALL This is definitely a business PC, and for that use it's perfect for the email-sending, word-processing employee

PERFORMANCE RESULTS

Viglen Incepta

An easy-to-use PC that will appeal to the novice user, but lacks expansion potential.

Intel's 'Easy PC' guidelines should have given computer manufacturers the impetus to ignore the design rule book and banish traditional beige boxes forever. Instead, with a few notable exceptions, all we've seen are a few otherwise average PCs gain curvy edges and iMac-style plastic cases. It's hardly the revolution we were promised.

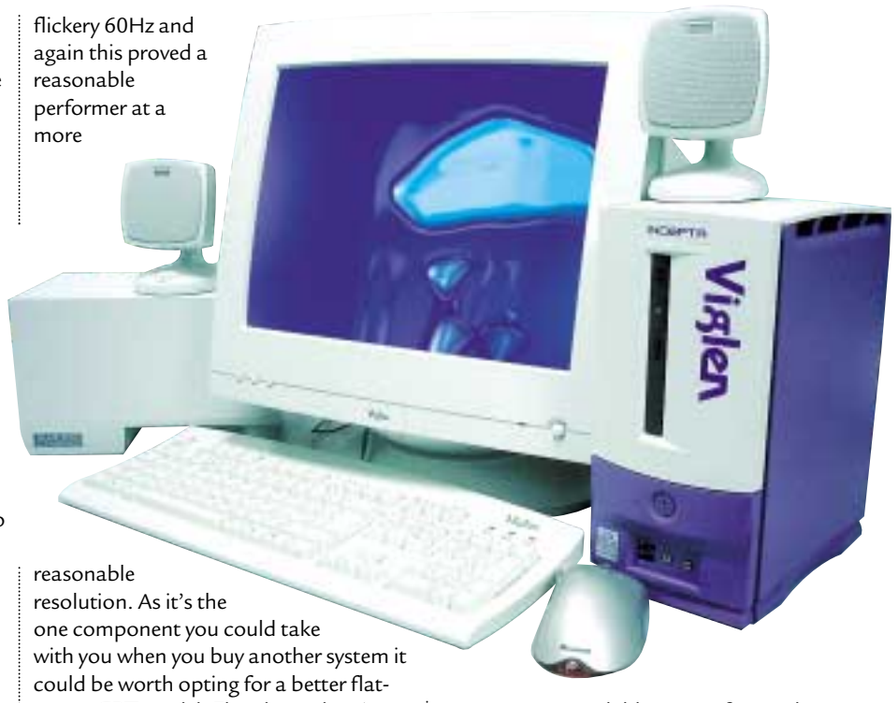
Enter Viglen's Incepta, a prime example of this new breed of plug-and-play 'throwaway' PC. This one's very much in the mould of AST's Century City as it comes in a compact white box and all you have to do is attach the supplied USB keyboard and IntelliMouse, hook up the VGA monitor and switch on the power. It may sound very much like a normal tower-case PC so far but if you believe the hyperbole, the machine is innovative, easy to use and even lowers the total cost of ownership.

As you'd expect from an 'Easy PC', set-up is straightforward, but we were surprised that Viglen didn't think a set-up poster was necessary for the uninitiated. The USB and VGA connections were fairly easy to fathom, but the RJ-45 network port and modem connection could prove trickier for novice users, especially as they were only identified by symbols. However, this was a minor complaint as we were up and running within two minutes.

Viglen supplies the Incepta with processors up to an 800MHz Pentium III. The unit we looked at came with a 650MHz Pentium III processor backed by 64MB of SDRAM and when subjected to SYSmark 2000 turned in a respectable score of 119. Although it's more than able to cope with the latest office suites, running several programs at once slowed the system significantly.

Graphics are taken care of by an on-board Intel 810 chipset and although our 3DMark 2000 test refused to run, with just 1MB of dedicated RAM (although the chipset can access the main system memory) it's definitely not the best PC if you want to play the latest 3D games. Sound is also handled by an on-board chipset – this time from Soundmax. It proved an average performer, but the speakers from Altec Lansing were capable of delivering good quality sound.

The Incepta comes with a 17in monitor from ADi that can handle resolutions of 1,280 x 1,024 but only at a flickery 60Hz and again this proved a reasonable performer at a more reasonable resolution. As it's the one component you could take with you when you buy another system it could be worth opting for a better flat-screen CRT model. Elsewhere, there's a 56K modem to get you on the Internet, this time an AMR device from 3Com. There's even an on-board network adaptor and, although home users will probably have no need for it, schools and small businesses will be well served by this addition.



The Incepta boasts a reasonable specification by today's standards, but that won't always be the case and this PC is definitely not designed with upgrading in mind. For a start there's no PS/2 connection or parallel port, so it's USB or nothing when it comes to adding extra peripherals. Two ports are located at the front of the unit, with a further two at the back. The front ports are a good idea as they're ideal for attaching peripherals such as digital cameras, which are frequently 'hot-swapped', but on a system that relies so much on USB for expansion, four ports seems a little mean.

Getting inside the unit is a Herculean task and even after we'd removed all the obvious screws we had great difficulty. Once inside, only the RAM could be easily upgraded with two free DIMM slots. There are no free drive bays so you can't add a CD-RW drive and you're stuck with the eight-speed DVD-ROM drive that comes with the machine.

The Incepta isn't a bad machine and by today's standards it's quite well equipped, but the fact remains you can get a more expandable system for much the same price. While the plug-and-play credentials of this PC could appeal to novices, more experienced users or those with non-USB peripherals will probably be better off looking elsewhere. This said, with specifications changing all the time if you plan to upgrade your PC every few years, the Incepta is definitely worth considering, but please forgive us if we don't share Viglen's view that the machine is 'a milestone in PC design'.

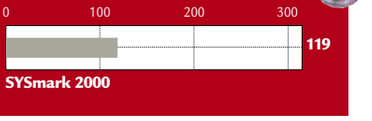
RICHARD MCPARTLAND

DETAILS

★★★

PRICE £999 (£850 ex VAT)
CONTACT Viglen 020 8758 7000
www.viglen.co.uk
PROS Easy to set up and use, ideal for computer novices, design
CONS Integrated sound and graphic capabilities, very limited expansion potential, difficult to get into, price
OVERALL A plug-and-play 'throwaway' PC, with the emphasis on ease of use but your money will get you a more expandable PC with a better specification elsewhere

PERFORMANCE RESULTS



Amstrad e-m@iler

A pay-per-use email solution that doesn't quite hit the mark.

The Amstrad e-m@iler is set to change the online world as we know it. No longer do you have to buy an expensive computer or pay a monthly subscription charge to an ISP to get connected to email. You may have noticed the first problem with this proposal – subscription-free ISPs have been popping up all over the place for the past couple of years, with Freeserve probably the most notorious in the UK. Internet access is becoming increasingly important and the ISPs have realised this. Soon we'll be seeing flat-rate access either in the form of fast always-on connections like ADSL and cable, or from the traditional dial-up providers. So while charging structures are moving away from the per use model, Amstrad has decided to head in the other direction. Not only do you have to pay for your online time, there's also a standing charge each time you connect to Amserve.

Looking at the other side of the equation there's the cost of the unit. At £80, it may seem like a good deal at first, Amstrad even claims to be making a loss on the unit itself, but it's got to make this money back somehow. Amstrad has two sources of revenue from the e-m@iler. First, there's a 12p service charge for sending or receiving email, added invisibly to your phone bill. This means that every email you send will cost 12p plus the associated phone call charges. Each time you dial up to collect your email there's also a 12p charge. It may cost over twice as much to send a letter, but in the Internet society email is virtually free and should remain so. The second source of income for Amserve is targeted advertising. In the middle of the night when you're tucked up in bed your e-m@iler is furiously downloading the next batch of adverts. Of course you don't pay for this privilege, but you still have to look at them.

Just to make sure you don't forget it's there, it has the annoying habit of flashing its screen to and from inverse video. After having the unit on the desk for three days we had to cover the screen with Post-It notes, as the constant attention seeking was getting increasingly annoying.

The e-m@iler also has another trick up its sleeve; it can receive messages from the mother ship via CLI (Caller Line Identification), the system used to send the telephone numbers to caller display units. This means when a new email arrives the unit can automatically collect it for you (and put another 12p on its tab). If you're not lucky enough to have CLI then the unit is quite happy to check with the servers regularly to see if it can earn another 12p for the pot.

In the pack you'll also find the 'Pocket Dock-it' organiser, which allows you to keep a mobile copy of all the contact details you've carefully entered into the e-m@iler's memory. A word of caution though – if you don't send enough emails per week ('approximately five' the manual states) then your advanced features privileges will be revoked and the e-m@iler will pretend it's just a normal phone. According to the manual, Address Book, Voicemail, Fax and Calculator are classed as advanced features. As we went to press we were informed by Amstrad that this restriction has now been removed from the service.

Bearing in mind you can get a Sega Dreamcast, with email capability, for £159 if you hunt around, then it's hard to recommend the e-m@iler on price grounds. Add to this Digital TV providers that have either released, or are about to release, email services and the e-m@iler doesn't seem like such a good deal. If the unit had been launched a couple of years ago then it may have been a viable proposal, but given the current climate and the advances that broadband and digital television will bring, it's a case of too little too late.

WILL HEAD

DETAILS

★

PRICE £79.99 (£68.08 ex VAT)
CONTACT Amstrad 01277 228888
www.amstrad.com
PROS None
CONS 12p service charge, retro styling, no web browser, automatic advert download, not particularly cheap, better options available
OVERALL This may have had a market a couple of years ago, but now there are better and cheaper alternatives for gaining access to email

HP Jornada 545

A huge improvement over the old Jornada, users will find that the 545 performs numerous tasks.

Hewlett-Packard is the only hardware manufacturer to have new hardware ready for the launch of Microsoft's Windows Powered Pocket PCs, and it is certainly a huge improvement over the old Jornada. The Jornada 545 uses Microsoft's new operating system, Windows CE 3.0, which was reviewed in last month's issue. HP has customised this slightly and has solved the few problems contained in Microsoft's version. For example, it is much easier to manage the available memory with the HP task switcher, giving the user the opportunity to switch between open applications and close those that are open if the program does not have this facility itself.

HP has shunned Microsoft's Today screen in favour of its own Home Menu (although the Today screen is there if you want to use it). The Home Menu consists of a series of program shortcut icons to stop you having to go through the Start Menu.

The hardware is not perfect, but it is a huge improvement on what went before. A 133MHz Hitachi SH3 processor packs a big enough punch to keep all of the applications moving at a useable pace. 16MB of RAM is provided, which we found to be sufficient. A 32MB version, the Jornada 548 is also available for an extra £70 inc VAT. The colour display is excellent. The 16-bit 240 x 320 touch-sensitive LCD display is easy to read and even does a fairly acceptable job in sunlight. The cover, when open, acts as the screen's shield and helps keep the display bright outside. To extend the battery life, the backlight dims after a user-defined period.

On the side is an action wheel that rocks up and down to scroll through the current window or menu, and you can press it inwards to select the current option. A button for recording memos is situated below. This is more difficult to press accidentally than the previous Jornada and it is recessed. An IrDA port has been placed at the top left of the device, and next to this is a Type I Compact Flash slot. We would have preferred a Type II slot. It is difficult to see how HP could have achieved this while maintaining the Jornada's thin form, though – the device is only 2cm thick. A headphone jack is located next to this. Four hot keys are positioned on the front of the device, that open frequently used applications.

It is easy to connect the device to your PC. Both serial and USB cables are supplied as standard. These can either be plugged into the bottom of the Jornada or into the supplied cradle. If the cradle is plugged into the mains it will recharge the batteries at the same time. This method of connection is excellent – if you leave the cradle plugged in at your desk, all you have to do is insert and remove the device as needed and information such as your contacts is automatically synchronised with your PC.

It is not all good, however. The lid will not fold flush with the rear of the unit – it sticks up like the lid on the Palm III. This is useful if you intend using the Jornada outdoors a lot, but a bit irritating if you don't. The stylus feels cheap, thin, plastic and lightweight – about the same weight as the average coffee shop disposable spoon. It is stored inside the lid, in a well created in the centre. We thought this was a terrible idea and makes the stylus fiddly to remove and store. What makes this doubly disappointing is the fact that the main unit's alloy casing works so well. You can remove the lid completely, though, and we recommend doing just that and buying a heavy-duty leather case and decent stylus.

HP has provided a massive amount of software that covers most conceivable uses of this device. In addition to the standard Pocket PC software, such as Outlook, Word, Excel, Internet Explorer and Media Player, HP has thrown in programs such as MusicMatch Jukebox, Peacemaker and ZIO Golf.

The decision to buy this as opposed to another handheld really depends on what you plan to use it for. If you are simply after a device with a good PIM, then a Palm-based device probably has the edge, and a monochrome version would certainly be lighter and cheaper than the Jornada. But if you are after a pocket-sized machine that can do a lot more, then this would be a good choice as, despite the problems with the lid and stylus, the Jornada 545 can perform so many more tasks. It is a true Jack-of-all-trades.

JASON JENKINS

DETAILS

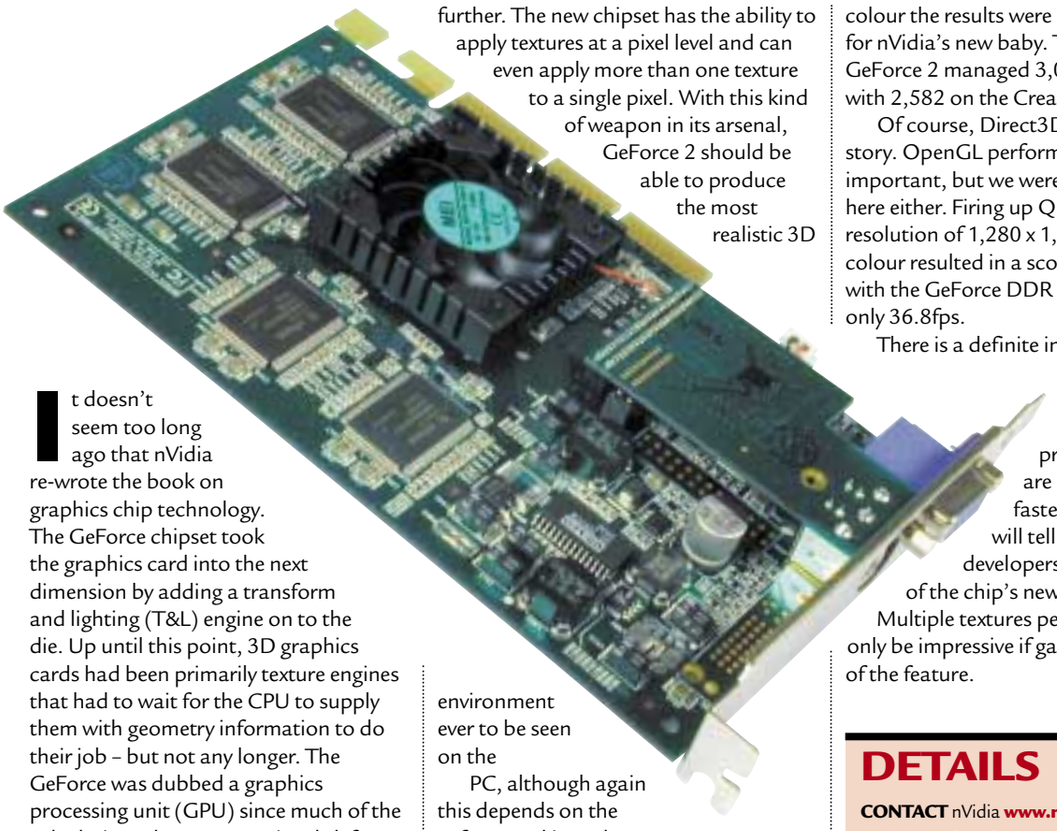
★★★★

PRICE £369 (£314.04 ex VAT)
CONTACT HP 0990 47 47 47
www.hp.com/uk
PROS Good screen, responsive, easy to connect to your desktop, lots of software
CONS The lid and stylus are annoying
OVERALL It does have its problems, but the Jornada 545 can do so much that for such a good price it is easy to overlook the down side

PREVIEW

nVidia GeForce 2

This company is at the cutting edge of graphics chip technology and GeForce 2 is proof of that.



It doesn't seem too long ago that nVidia re-wrote the book on graphics chip technology. The GeForce chipset took the graphics card into the next dimension by adding a transform and lighting (T&L) engine on to the die. Up until this point, 3D graphics cards had been primarily texture engines that had to wait for the CPU to supply them with geometry information to do their job – but not any longer. The GeForce was dubbed a graphics processing unit (GPU) since much of the calculations that were previously left up to the CPU were now done by the graphics chipset. The upshot of this scenario is that the CPU is left free to work on other tasks such as improved artificial intelligence in the non-player characters within a game.

Of course, any hardware feature is only as good as the software that makes use of it, and as yet we haven't seen many games that really exploit the T&L capabilities of the GeForce chipset. That said, the software support will undoubtedly come since taking the graphics load from the CPU can only be a good thing. It did, after all, take a while for software to fully utilise any hardware 3D acceleration at all.

Even though the GeForce chipset is ahead of the competition in terms of performance and features, nVidia hasn't sat back on its laurels. Instead, while the competition is still playing catch-up, nVidia has already produced the follow-up to its award-winning chipset, imaginatively named the GeForce 2.

This incorporates all the features of its predecessor, but the second-generation transform and lighting engines push the 3D performance even further. The new chipset has the ability to apply textures at a pixel level and can even apply more than one texture to a single pixel. With this kind of weapon in its arsenal, GeForce 2 should be able to produce the most realistic 3D environment ever to be seen on the PC, although again this depends on the software taking advantage of the features.

One thing that doesn't have to wait for software advancement is the raw power of the chipset. The GeForce 2 reference card we received from nVidia has been beefed up considerably in the performance department and the CPU runs at a core clock speed of 200MHz, while the memory speeds along at 333MHz. Unlike the original GeForce, this chipset uses DDR memory as standard, providing two data transfers per clock cycle instead of one. This is quite an improvement on the previous GeForce DDR chipset that sported a CPU clock speed of 120MHz and memory speed of 300MHz.

We tested the GeForce 2 using an Intel Pentium III 733MHz machine with an 820 motherboard and 128MB of RDRAM. The results were impressive. As a comparison, we ran the same tests on a Creative Annihilator Pro incorporating the GeForce DDR chipset. Running 3DMark at 1,024 × 768 with 16bit colour resulted in a score of 6,132 on the GeForce 2, compared with 4,976 on the standard DDR GeForce card. Pushing the settings up to 1,280 × 1,024 in 32bit colour the results were equally impressive for nVidia's new baby. This time, the GeForce 2 managed 3,087, compared with 2,582 on the Creative GeForce card.

Of course, Direct3D is only half the story. OpenGL performance is just as important, but we weren't disappointed here either. Firing up Quake III at a resolution of 1,280 x 1,024 with 32bit colour resulted in a score of 44.6fps, with the GeForce DDR card managing only 36.8fps.

There is a definite increase in performance with the GeForce 2 chip, and the production boards are likely to be even faster. But only time will tell if the games developers will make use of the chip's new features. Multiple textures per pixel will only be impressive if games make use of the feature.

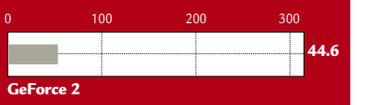
RIYAD EMERAN

DETAILS

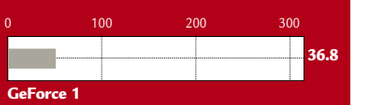
CONTACT nVidia **www.nvidia.com**
PROS Very fast, feature packed, cutting edge
CONS Remains to be seen whether the industry will use the new features
OVERALL While the competition is catching up with the original GeForce chip, nVidia has already produced the next one. The 3D card market is starting to look like a one-horse race

PERFORMANCE RESULTS

Quake III 1,280 x 1,024 32bit colour & textures

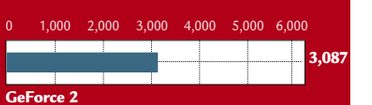


GeForce 2

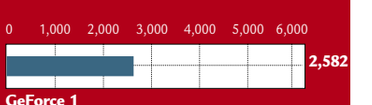


GeForce 1

3DMark 1,280 x 1,024 32bit colour



GeForce 2



GeForce 1

Ericsson R320 and Mitsubishi Trium Geo

These two stylish WAP phones prove you don't always get what you pay for.

IT buzzwords come and go, but one of the most prevalent of the moment seems to be WAP, or Wireless Application Protocol in its expanded form. WAP allows certain Internet content to be accessed via an equipped GSM mobile phone but, as with so many things, you shouldn't believe the hype.

Cellnet is pushing its WAP service in a big way right now, including a high-profile television advertising campaign. However, branding WAP phones as Internet phones is not entirely accurate, and the TV image of a guy on a surfboard navigating the Internet is far from the reality. As it stands, WAP has some useful features, but it's far from a mature technology, so don't expect the functionality from your phone to match that of your PC.

The first WAP phone to gain exposure was the Nokia 7110 (reviewed March 2000 p73). This stylish model boasted Nokia's famous menus as well as a spring-loaded key cover for those users who wanted to pretend they were in *The Matrix*. As is always the case, it hasn't taken too long for the competition to catch up. Consequently we're looking at two new WAP phones, the Ericsson R320 and the Trium Geo Phone, manufactured by Mitsubishi. These two phones are at the opposite end of the marketing spectrum. The Ericsson is a top of the range product aimed at the high-end, style-conscious user, while the Trium is Cellnet's new 'Pay as You Go' pre-pay phone.

The first thing that strikes you about the Ericsson is how slim it is. The body thickness of the R320 is only 1cm. Our review model shipped with a lithium-ion battery that protruded slightly, but lithium-polymer batteries are available and they lie flush with the phone itself. However, the aesthetics of the thin design did not appeal to all. Some of the *PCW* team felt that the R320 looked as though it had been sliced in half. Another issue with the design of the phone is the large aerial. Aerials are no longer necessary on mobile phones, as Nokia has shown with many of its models, and the one on the R320 adds considerably to its size as well as spoiling its looks.

In its favour, the R320 has a large and clear screen, with an attractive Indiglow-type backlight to it. Ericsson has decided not to copy Nokia's scroll wheel design for navigating and instead has positioned four navigation buttons below the screen, allowing up, down, left and right movements. This system works well enough and allows simple navigation through the phone's menus. What is bizarre, however, is the scroll slider at the top left-hand side of the phone. This device is almost impossible to use if the unit is in your right hand so, although it is a great bonus to left-handed users, it's of little help to the majority of the population.

The R320 has a large clear screen, with an attractive Indiglow-type backlight to it

The phone itself is feature-packed, allowing both 900GSM and 1800GSM compatibility. It's blessed with a large array of ring tones and a couple of games to while away long train journeys or meetings. You can also add voice tags to 10 of the numbers in your phone book. You then simply press a button, say the name of the person you want to call and the phone dials them for you.

We used Cellnet's Genie service to test the WAP capabilities of the phones. The R320 took a bit of fiddling to set up, but it was fine once we got the configuration right. This won't be a problem for anyone buying the R320, as it should be configured at the time of purchase. Accessing the Genie WAP service seemed quite slow via the Ericsson, and navigation was also made difficult due to the way the information was displayed. When connected to a WAP service such as Genie, the R320 wraps the list of active options across each line so the up, down, left and right buttons all have to be used to navigate. This is particularly annoying since the large screen lends itself to each option being given a separate line, thus making navigation a far simpler operation.

Like the Nokia 7110, the Ericsson R320 has a built-in infra-red GSM modem. This means that the phone can be connected to a PDA or notebook without the need for cables or external devices. This is great for the travelling business person who wants to keep in touch with the office wherever they are. Ultimately, this is still the preferable way to access the Internet on the move and a suitably equipped PDA will make email far easier than using either of these WAP phones. The IR modem has to be activated before use. This is a neat feature since the battery would not last long if the modem was constantly polling for devices to connect to. You also get PDA functionality with an in-built diary with

alarm reminders, although the infra-red modem would indicate that the phone is aimed at someone who already has a personal digital assistant.

If there's one thing missing from the R320, it's GSM1900 support. Without this the phone is useless if you visit the US, and many potential business users will be looking for this functionality in their next mobile purchase.

Mitsubishi Trium Geo

The Trium is not a phone for the style conscious. It's far from attractive and is not slim in any dimension. That said, it's not too heavy and should fit in most pockets. Considering that the Trium sells for £99 inc VAT as a pre-pay mobile phone package its uninspired design can be easily forgiven. When we first saw the Trium, we were concerned by the small dimensions of the screen, but we soon found that our worries were unfounded. The display is indeed small, but the resolution of the screen is so good that you hardly notice its size. The high resolution of the display has been exploited to its full potential as well with the whole menu system dripping with impressive graphic representations. Even when the phone is in standby you're presented with a picture of a butterfly that flaps its wings when a button is activated. You also get a constant display of the time of day and the date, something that's very useful if your watch is being repaired.

The Trium has a flip cover that hides the numeric pad, although this isn't an active flip, so don't just open it and start talking when the phone rings unless you want to look silly. That said, you don't actually have to open the flip cover to answer the phone, since the basic controls are not covered. Where the Trium scores highly is in its usability. Navigation is so simple that you'd think you were using a far more expensive unit. The two buttons beneath the display take you directly to either Internet or SMS functionality, while the four-way rocker switch gives you access to all the phone's features. The other two exposed buttons are the call and hang-up controls. The beauty of this design is that you rarely have to open the flip. If you want to use the WAP features you can control everything from the exposed controls, and this phone handles WAP very well. When we accessed Genie we were happy to see that each of the possible selections was given its own line, making selection very easy. It also responded far quicker than the Ericsson. We found that performing operations such as checking cinema times were simple and quick, making the WAP capability a useful feature rather than a gimmick.

As far as the features go, you get everything you would expect from a more expensive unit, including several annoying musical ring tones. You even have the option of a vibrating alert instead of a ring tone, if you like that kind of thing. Of course, some of the more advanced phone features are missing, like a scheduler or some games, but all the important stuff is here. The only disappointing aspect of the Trium is the Ni-MH battery. We would have preferred a lithium-ion one which would suffer less from memory effect, but considering the price of the phone it's a fair compromise.

Like the Ericsson, the Trium lacks GSM1900 support, but it's less of an issue in a budget phone like this. It does, however, support both 900GSM and 1800GSM standards.

It has been a few months since we looked at the Nokia 7110, and WAP services have come on a long way since then, but we're still not in a position where it's worth buying a phone purely on the strength of WAP. That said, if you're looking to buy a phone anyway, WAP capability is definitely a bonus.

We expected more from the Ericsson R320. It's not as small and stylish as it could be, especially when you consider how well-designed the Ericsson T28 is. It is, however, a feature-packed phone that will appeal to the business market.

The Trium, on the other hand, surprised us completely. We were not expecting much from a £99 pre-pay phone, but were forced to reassess our opinion, especially as it has a superb feature set. If you're considering a pre-pay mobile phone, consider the Trium, it could be the best deal around.

RIYAD EMERAN

The Trium is far from attractive and not slim in any dimension, but it should fit in most pockets

DETAILS

★★★★

ERICSSON R320

PRICE £150 with a contract (£127.66 ex VAT)
CONTACT Ericsson 08705 237237
www.ericsson.se
PROS Slim, feature-packed
CONS Slow WAP access, clumsy navigation
OVERALL The R320 is a good mobile solution, but its WAP performance is slow and difficult to navigate. It's also larger than it should be

★★★★★

MITSUBISHI TRIUM GEO

PRICE £99 (£84.25 ex VAT)
CONTACT BT Cellnet 0990 214000
www.genie.co.uk
PROS Great value, easy to navigate, fast WAP performance
CONS Not the prettiest phone around
OVERALL A great little phone with all the features most users will need. If you're thinking of getting a pre-pay phone, the Trium is definitely worth checking out

Quantum Atlas V

With a data buffer that is double the size it used to be, Atlas V is streets ahead of its predecessor.

Most new products claim to be faster and better than those that went before but, in the case of the Quantum Atlas V, it's really true. The Atlas V is, of course, the successor to the Atlas IV, and like its predecessor it is a SCSI 7,200rpm drive. That is about as far as the comparisons go, as the Atlas V is streets ahead.

To begin with, Quantum has worked on the areal density, getting it up to a massive 9.1GB per platter. In real terms, this means that all drives up to 36GB in size come in a 1in high form factor. Increased density also means that drive heads have to be moved less to write the same amount of data. More impressive is the non-operating shock the drive can withstand, as this has been upped to a massive 300Gs. Basically, the drive can take quite a shock, although we wouldn't recommend testing it.

Performance-wise the data buffer has been doubled from 2MB to 4MB, and the seek time has dropped to a rather impressive 6.3ms. Of course, all the specs in the world mean nothing if the drive performs badly, so we did some tests of our own on the 18GB drive that Quantum supplied for our review. First we used a RAID-based server with four processors to copy 1GB of data to the drive in order to test sequential write speed. We then used Intel's Iometer version 1998.10.1 to run a random read/write test. The results were impressive, with the data write being completed in just 46 seconds, and the Iometer result showing 1.02Mbytes/sec.

In our recent hard drive group test this result would have put the Atlas V near the top of the range, and certainly within spitting distance of some of the 10,000rpm drives on offer.

DAVID LUDLOW

DETAILS

★★★★★

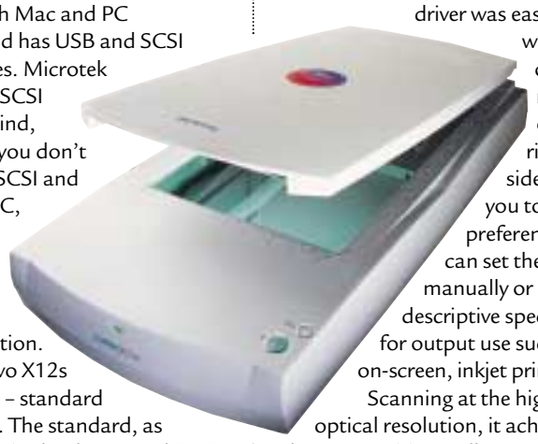
RECOMMENDED PC ADVISOR COMPUTER WORLD

PRICE £399.50 (£340 ex VAT)
CONTACT Quantum 01344 353 500
www.quantum.com
PROS Fast, good value
CONS It still falls slightly behind the 10,000rpm drives
OVERALL A top-notch drive that performs well and is reasonably priced. No other 7,200rpm drive can touch it

Microtek X12USL

This scanner's performance and good colour quality will certainly make a splash in the high end.

Not only is the X12 one of the first 42bit scanners we have seen, it also boasts a staggering optical resolution of 1,200dpi. It's larger than your average unit, capable of handling legal-sized documents of 14in. It supports both Mac and PC connections and has USB and SCSI ports and cables. Microtek even bundles a SCSI card. Bear in mind, though, that if you don't want to go for SCSI and have an older PC, this might not be the scanner for you as it offers no parallel connection.



There are two X12s to choose from – standard or professional. The standard, as tested here, is suited to home and SME users, while the professional includes a light lid for scanning slides and transparencies and a more high-end software package. That said, though, even the home edition comes with a generous bundle of OCR and document management software and a copy of Adobe Photoshop 5.0 LE.

In our tests it performed well. The driver was easy to use with a series of buttons running down the right-hand side allowing you to set your preferences. You can set the resolution manually or use more descriptive specifications for output use such as on-screen, inkjet printing or fax.

Scanning at the highest optical resolution, it achieved fair colour recognition. Yellow was particularly pure, but magenta and cyan recognition was less so, with a fair share of other shades evident across the test square. Composite colours such as red, green and blue were slightly dappled. However, it detected 20 out of a possible 20 distinct greyscale shades ranging from black to white and could differentiate between a series of narrow black lines as closely placed as 180 per inch.

Overall, the X12USL performed well. Its software bundle is second to none and its top resolution is impressive.

NIK RAWLINSON

DETAILS

★★★

PRICE £233.83 (£199 ex VAT)
CONTACT Microtek 01908 317 797
www.microtek.nl
PROS High resolution, good greyscale recognition
CONS Colour performance a little patchy, high price for home users
OVERALL Good for high-end users, but if you primarily want to scan for the Internet or an inkjet printer, there are cheaper options

Agfa ePhoto CL30 Clik!

It's not without its flaws but this feature-rich and well-priced camera is good value for money.

Aimed squarely at the budget market, the CL30 Clik! is the first hand-held device using Iomega's new Clik! disks as a storage medium, rather than the CompactFlash or SmartMedia found in other cameras. Not only does it offer a 40MB capacity, it is also a cheap medium – two disks will set you back just under £22. Housed at one end of the camera, the supplied 40MB disk is capable of storing up to 60, 120, 160 or 360 images, depending on the level of compression selected. There is also a monochrome text-recording mode for use with OCR software. Sporting a 1megapixel CCD, the CL30 can capture a true 1,152 x 864 image but, as with other Agfa cameras, this can be upped through interpolation to 1,440 x 1,080 using Agfa's PhotoGenie technology.

When it comes to styling, the CL30's oblong form fails to inspire, but the layout is clear. On the back, an LCD displays the battery status, resolution setting and the number of images you still have room to take. Below this is a 1.8in colour TFT protected by a beefy Perspex cover. Using the screen indoors is fine except in low light conditions when it reverted to a delayed and jerky refresh, demonstrating the step-down in shutter speed. At the other end of the scale, we found the screen difficult to read in bright sunlight, even when it was set to its highest contrast level.

The CL30 is power-hungry, too, and if you use the screen to frame and review your images the four AA batteries will die after about 40 minutes, cutting short the fun of those who enjoy outdoor photography. That said, Agfa does give you the choice of switching off the TFT and using the in-built optical viewfinder to save on battery life, or using the bundled AC adaptor.

Lens-wise the f2.8 lens has a fixed focal length equivalent to 43mm, making the field of view narrower than what you might expect from a standard compact. No optical zoom is present, although there is a 2x digital zoom facility, but we would always recommend that such editing is done on the PC after the shots have been taken.

Operating the CL30 Clik! is made easy thanks to Agfa's EasyPilot button that works in much the same way as the wheel on a scroll mouse. Using this to navigate the menus, you will notice a wide range of options, depending on whether you are in record or play mode. Among the usual settings for resolution and flash, record mode carries an autofocus macro setting for close-ups. Four fixed-focus settings also exist, and you can manually set the white point to calibrate the RGB balance. We liked the way you can organise your images into albums on the disk, and even connect the camera to a TV for those exciting family slide shows.

On the downside, shutter or aperture priority is not available where you would expect to see these on a more expensive camera. Nevertheless, you can manually adjust the exposure from +4 to -4 using 0.5 f-stop increments. The shutter speeds range from 1/30 to 1/700 of a second, while the aperture opens to f2.8 and stops down to f8.0. In play mode, you can preview the stored images singularly or nine at a time in a thumbnail spread, deleting any unwanted pictures.

Image transfer is quick, thanks to the USB connection. And with the supplied Iomegaware software you can see the camera as a drive, allowing you to open and save images in any application. To fully take advantage of the PhotoGenie interpolation you will have to use the supplied Photowise software to output prints of 8 x 10in.

Picture quality is reasonable, but compression artefacts, even in high-resolution mode, are apparent where sharp edges have become blurry. Colour reproduction is acceptable, but we could notice a faint blue cast similar to that seen with the Clikless CL30 (see *PCW* January 2000, p164). The CCD also had difficulty in very sunny conditions, where steep gradients in contrast resulted in unsightly noise. However, we did push the camera and, for all-round general use, the results are adequate.

Overall, you get a good value, feature-packed camera that doubles up as a Clik! drive. Along with the Clik! disk, AC adaptor and software the ePhoto CL30 Clik! ships with cables (USB and video), alkaline batteries and a case. A range of optional lenses and filters will screw on to the 37mm thread. If you don't want a Clik! drive there are better cameras around.

JALAL WERFALLI

DETAILS

★★★

PRICE £375 (£319.15 ex VAT)
CONTACT Agfa 020 8231 4903
www.agfa.co.uk
PROS 40MB Clik! drive, USB port, optical viewfinder, good range of features for price
CONS Bland looks, poor battery life, no rechargeable batteries
OVERALL A keenly priced, entry-level digital camera that has broken the solid state memory mould, but falls short of the competition

Camedia C-2020Zoom

Olympus' new model has no USB interface and is a bit sluggish, but don't write it off just yet.

Following the heady excitement of the first 3.3megapixel digital cameras reviewed last month, Olympus has just released a new model – the Camedia C-2020Zoom. It's only a 2.1megapixel model and it uses a slow old serial interface, but don't turn this page; the 2020 has more than a few neat tricks up its sleeve that make it well worth considering.

Measuring 107 x 74 x 66mm and weighing 305g without card or batteries, the 2020 may not be as small as Canon's S20, but it's still fairly compact. Olympus throws in a set of four AA alkalines to get you started, but you'll have to shell out for a set of rechargeables. We think these are much more important for day-to-day use than, say, the IR remote control that Olympus includes in the standard package.

The 2020 sports an 8MB SmartMedia card and is compatible with those up to 64MB. At 1,600 x 1,200 top resolution, you will get around five or 16 shots in 8MB, using SHQ and HQ compression respectively. An uncompressed TIFF mode is offered for those who demand the best quality, but the files are around 5.5MB each. Lower resolution 1,024 x 768 and 640 x 480 modes are also offered at two levels of compression.

It's good to see some digital camera manufacturers taking care over their choice of lenses, and Olympus is up there with the best. The 2020 features a precisely controllable 3x optical zoom, equivalent in coverage to 35-105mm on a 35mm camera. The macro mode focuses down to 20cm and a virtually stepless manual focus mode indicates its position using an on-screen bar. Optional lens attachments widen or shorten the coverage.

Pictures are composed using either the optical viewfinder or the 1.8in TFT display. Aperture, shutter speed and exposure compensation (+/- 2EV in 1/3 steps) are clearly indicated at the top of the screen.

Unlike many cameras that either don't let you change exposure settings, or only give you a couple to choose from, we salute Olympus for offering proper aperture and shutter priority modes, along with a totally manual option. There are no fewer than 36 different shutter speeds from which to choose, ranging between 1/800 and four seconds; manual mode lets you further extend exposures up to 16 seconds, which allowed us to capture trailing car headlights, and even stars in the night sky! There are also 16 aperture settings from f2.0 to f11, for proper control over depth of field.

The flash can be forced on or off, but more impressive are the slow synchro functions, with front and rear curtain settings; the latter is perfect when photographing moving objects in long exposures as the flash freezes the action at the end, leaving a satisfying trail of lights or blurred motion behind it. You can even synchronise with an external flash gun.

New for the 2020 is a video recording mode that captures good-quality MJPEG QuickTime movies in either 320 x 240 at 15fps, or 160 x 120 at 60fps – you'll get around 28 seconds of either on the 8MB card, but no sound. The composite PAL video output displays full-screen pictures or video clips on your TV.

In our optical tests, the 2020's lens performed excellently, with square geometry and sharp details right into the corners, unlike many digital cameras that often slightly barrel at the edges. The fine manual control is also welcome, but the 2020 is let down by overall speed. Best quality JPEGs take around seven seconds to record and over two minutes to download, while video clips must first buffer for several seconds before playing.

It would be easy to dismiss the 2020 because of its lack of USB interface and higher resolution models now on the market. However, it does offer great control for the photographic enthusiast and boasts decent optical quality too. This all bodes well for the similarly designed 3.3megapixel/USB 3030 model from Olympus, due out this summer for about £900.

In the meantime, the 2020 delivers decent pictures with superb control, although impatient users may want to invest in a USB card reader, and a set of rechargeable batteries while they're at it. Fortunately, you should be able to find the 2020 on the high street for nearer £550 all-in.

GORDON LAING

DETAILS

★★★★

PRICE £649.99 (£552.34 ex VAT)
CONTACT Olympus 0800 072 0070
www.olympus.co.uk
PROS Excellent manual control, QuickTime video capture
CONS No USB, slightly slow, overshadowed by new 3.3megapixel models
OVERALL Great all-round facilities make up for lack of speed

Roland U-8 Digital Studio

Even though the price is a bit steep, this sound package can turn anyone into a professional mixer.

Musicians are getting a little spoiled by the falling price of semi-pro sound cards, MIDI and audio sequencers. Whereas once musos with bedroom studios dreamed of the power and sound quality of pro studios, now many simply shrug their shoulders and question why anyone would want to pay the exorbitant rental fees of pro studios, when great sounding recordings can be done on a midrange PC.

Well, one of the problems is that you don't get the same hands-on control with software as you would with real hardware recorders and rack units. Also, controlling the transport and virtual faders of midi and audio sequencers with a mouse is less than ideal, especially when working on complex mixes.

Well, Roland has tried to solve all these problems in one fell swoop with the U-8 Digital Studio. The U-8 is actually a software and hardware hybrid. Roland has basically taken the guts of its VS series of hard disk recorders, removed the user interface and hard disk, and added a USB cable to link the unit to a PC.

You get a 16-channel mixer and the ability to record two tracks at a time. You can also replay 16 tracks (arranged as eight stereo pairs).

The first thing you notice about the U-8 is that it's fairly well specified when it comes to inputs. It has inputs at mic, line and instrument level, and also offers optical S/P DIF digital in and out for mastering to DAT or CD-R. The main output is via two RCA phono plugs. You will also find MIDI in and out around the back of the unit, meaning that there is no need for an additional MIDI interface.

Installation was extremely simple, thanks to the unit's USB interface. You simply install the drivers, load up the software and plug the unit into the back of the PC. The drivers are ASIO-compatible, so you get low latency recording when using the bundled Cubasis VST software.

If you're a guitarist, the first thing you'll want to try before recording is the guitar tuner application. It works in much the same way as a standard digital guitar tuner, but the screen updates seemed to lag a little bit behind the actual playing of a note. Nevertheless, the end results were very good.

Recording with the unit really is a piece of cake. All you have to do is load the U-8 controller application, launch Cubasis VST and hit one of the four EZ Recording buttons on the U-8 hardware marked start, guitar/inst, mic and mixdown.

For example, if you press the guitar/inst button, a four-step wizard will pop up and guide you, step by step, through the process of setting the right input level, choosing an insert effect (such as distortion) and adjusting the EQ and mixer settings. It really does make it very easy to record tracks.

Also, you can step through the wizard using the hardware controls on the U-8 so you don't have to reach for your mouse. In fact, most elements of the U-8 software application can be controlled from the hardware unit. The transport controls and jog wheel allow you to completely control recording and playback from Cubasis VST. You can even adjust the loop setting from the unit's function buttons and any movement of the hardware mixer controls are immediately reflected in the mixer window of Cubasis VST.

The overall audio quality is excellent – right up there with professional gear. It also helps a lot to have dedicated mic and guitar inputs.

The unit is no slouch when it comes to effects, either. They are excellent, which should come as no surprise; they are, after all, lifted from Roland's professional VS-series recorders.

All the effects can be edited with the software that has been supplied by Roland and the company has sensibly offered two modes of editing: easy mode, which allows slight tweaking of the most important parameters; and complex mode, which offers total control over all the editing options.

All in all, the U-8 is a breath of fresh air when it comes to using computers to record multitrack audio. It's so simple that anyone can use it, yet the end results are surprisingly professional. It's just such a shame that the U-8's ease of use comes at such as high price. If you've got the money, though, you won't be disappointed.

NIALL MAGENNIS

DETAILS

★★★★

PRICE £499 (£424.68 ex VAT)
CONTACT Edirol 0845 117 2001
www.edirol.com/europe
PROS The hardware offers great control over the software. Mic and guitar inputs are a big improvement on the usual sound card inputs. Great audio quality and effects
CONS Expensive
OVERALL The U-8 really is a great piece of hardware that works extremely well with the bundled Cubasis VST software. It's just a shame that it's a bit over-priced

LaCie PocketDrive

Need extra storage on the move, why not try LaCie's PocketDrive? Just be careful not to drop it.

LaCie has used its expertise in repackaging existing drives to come up with the PocketDrive. This external 6GB hard drive has both FireWire and USB connectors. It is intended for anyone needing extra storage on the move, especially if they need to edit video away from their desks, or transport video to different locations. Inside the attractive case is a standard notebook hard drive – the drive manufacturer will differ depending on capacity. There are currently 6GB, 12GB and 18GB versions available – we tested the 6GB incarnation.

It is not intended to be drop-proof: the drive is only protected by the plastic case and a rubber surround. We were somewhat disappointed that LaCie has not taken greater steps to protect the inside of the drive, but it does help to keep the unit small. It measures a tiny 85 x 142 x 27mm and weighs in at just 360g. LaCie has really hedged its bets when it comes to connectivity: there are two FireWire ports and a single USB port at the rear, in addition to a power connector. If you have four-pin FireWire on your PC or notebook, or you want to use USB, you will need to use the power connector to make the drive function. But if you are lucky enough to have six-pin FireWire, it will be able to draw sufficient power from the device to function.

The inclusion of two FireWire ports means you can daisy chain the device to other FireWire peripherals. Silverlining 98 ships with the drive, allowing you to manage the device with ease, creating partitions and formatting them as necessary. We tested the PocketDrive's compatibility with a notebook and a DV iMac and found no problems. The benefits of the FireWire interface can be seen in our tests: copying a 495MB file to the PocketDrive using USB took 12 minutes, 12 seconds. The same file through FireWire took only one minute, 53 seconds. All in all, it's an excellent product and, should you have the need for it, a good buy.

JASON JENKINS

DETAILS

★★★★★

RECOMMENDED PERSONAL COMPUTER WORLD

PRICE £351.33 (£299 ex VAT)
CONTACT LaCie 020 7872 8000
www.lacie.com
PROS Two FireWire ports, one USB, very fast via FireWire
CONS You will have to be careful not to drop it
OVERALL LaCie has covered all the bases and has come up with a great product

Abit Athlon KA7

This Athlon board is not only reliable, but also easy to set up.

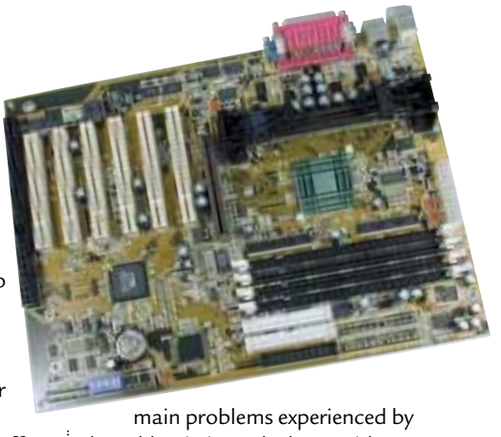
The Athlon is undeniably a good chip and excellent value for money; it is significantly cheaper than a similarly clocked Pentium chip. However, processor alone does not a good machine make. While the processor may provide the oomph, it is the motherboard that provides the electronic glue to make all the components talk to each other. Without a stable board, you can't expect a stable system and, until recently, this has been the bane of the Athlon builder. So, with trepidation, we set about building another Athlon system but this time we were pleasantly surprised.

Installation was a simple matter of plugging in the chip, connecting the relevant parts and throwing the power switch. Using the same components as in the March motherboards group test (750MHz Athlon, 128MB of PC100 RAM, 32MB nVidia TNT2 Ultra-based graphics card) and a fresh install of Windows 98 SE resulted in a SYSmark 2000 score of 139. We also ran SYSmark 98 and here the board scored 286.

The KA7 uses VIA's Apollo KX133 chipset with the capability to run the memory at 133MHz plus support for AGP 4x. There are two Ultra DMA 66 channels plus the standard floppy connector and four DIMM banks providing good upgradability. Five PCI slots are on offer, plus one shared at the bottom of the board with the standard complement of two PS/2, two USB, two serial and one parallel port.

In terms of setup, the default method is the usual Abit affair, with everything left to SoftMenu in the BIOS. Those who prefer to tinker with dipswitches can also specify the bus speed using a bank of switches in a similar manner to the BE6-II. There are advantages and disadvantages to both approaches but, given that modifying multiplier and bus speeds is not an everyday occurrence, there is little to distinguish either method.

Abit has produced a reliable board that is simple to set up, addressing the main problems experienced by the Athlon in its early days. With any luck, we will see more boards like this in future.



WILL HEAD

DETAILS

★★★★★

RECOMMENDED PERSONAL COMPUTER WORLD

PRICE £129.25 (£110 ex VAT)
CONTACT Dabs Direct 0800 138 5240
www.dabs.com
PROS Extremely easy to set up. Reliable performance
CONS None
OVERALL A reliable, easy to set up board with a good complement of features. If only all Athlon boards were this simple

Pagis Pro Millennium

Basic OCR and image manipulation is offered by this a useful software bundle.

This package seems good value at first sight, bundling Kai Photo Soap2 image-manipulation software and Textbridge Pro Millennium optical character recognition (OCR) with Pagis Pro 3.0 document-management facilities – all for less than the price of any two of them. Publisher Scansoft claims Copier and Forms Fill-in are extra bundled 'products' but they're really single features: one sends a scan straight to the printer and the other helps you complete scanned forms electronically.

Even basic OCR and graphics software is now seriously useful, so packages like this stand or fall on how well they help you manage your scans. A common problem is that they force you to cope with two filing systems – their own and native Windows. This can also stop you hyperlinking a document to relevant scans. Pagis Pro 3.0 looks promising because it installs itself within Windows Explorer. When you click on the Pagis Inbox folder, two extra toolbars pop up: one gives you scanning options and the other linked applications. Sadly, the implementation is clumsy. Explorer slows down markedly when you click on the Pagis Inbox and there are subtle changes in the menus – different hot keys to create a new folder, for instance (we found the Pagis hotkey by trial and error as it wasn't marked on the menu). And Pagis crashed twice when we created subfolders.

Pagis Pro – integrated with Windows Explorer

We tested Pagis with a Visioneer 6100C scanner that comes with the latest PaperPort Version 6.0, a similar and apparently more stable product that now supports hyperlinking even though it remains separate from Explorer. So for just £20 more than the Pagis suite you can get comparable document management and basic OCR with a scanner thrown in.

CLIVE AKASS

DETAILS

★★★

PRICE £82.24 (£69.99 ex VAT)
CONTACT Scansoft 00800 722 67638
www.scansoft.com
SYSTEM REQUIREMENTS Twain scanner, Win 9x, NT or 2000 Pentium PC, 64MB of RAM recommended, up to 220MB of disk space
PROS Well integrated in concept
CONS Flaky in parts in practice
OVERALL Worth considering if you plan to buy any one of the bundled products. But take a look at what gets bundled with scanners

WordPerfect Office 2000

Corel confirms its support for Linux with a full office suite that should keep most users happy.

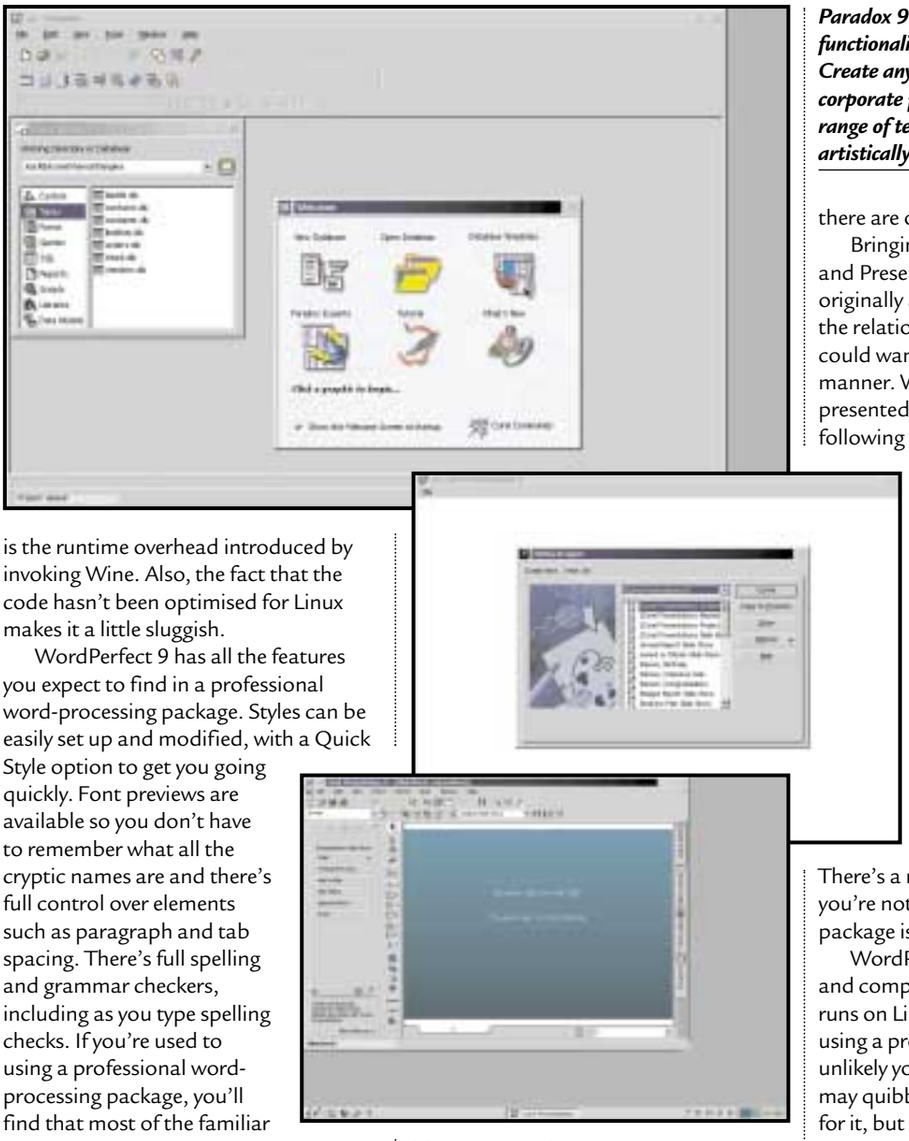
Corel is diving headfirst into the Linux market. WordPerfect 7 and 8 for Linux were quickly followed by Corel's own Linux distribution. Both honoured the Linux attitude that software for personal use should be freely available and as a result they could be downloaded for no charge from Corel's dedicated Linux site http://linux.corel.com.

Corel has confirmed its dedication to Linux with the release of WordPerfect Office 2000, a full office suite. The main components in the package are WordPerfect 9 word processor, Quattro Pro 9 spreadsheet, Corel Presentations 9 presentation package, CorelCENTRAL 9 PIM and contact manager, Paradox 9 database plus a download version of Corel Linux OS.

Although previous releases have been available for free download, WordPerfect Office 2000 for Linux is a retail product, so users will have to pay for it. This may annoy some hardened free software supporters, but at £130 ex VAT it's not exorbitant. Corel is also hardly exploiting the Linux community as WordPerfect 8 is still available for download and its Linux distribution adds many useful and intuitive features to the standard Linux system. On the whole Corel's decision to make some money on a product that has had extensive development is a fair one. In an ideal world all software would be free, but given that this isn't going to happen, then Corel deserves to recoup some of its investment in Linux. While £130 may seem a lot to those who are used to paying nothing, when you compare it to other fully functional office suites on the market it's reasonably priced.

WordPerfect 9 has all the features you need

The release of WordPerfect Office 2000 for Linux has been a fast one, mainly due to Corel's decision to use Wine (a Windows emulator) to allow the bulk of the Windows version to be used with just a few tweaks here and there. This means less code has to be rewritten and modified, and the visual aspects and file formats across the two systems can be kept more or less consistent. The downside of this approach



Paradox 9 gives you all the database functionality you need (top)
Create anything from birthday banners to corporate presentations. There's even a range of templates to guide you if your not artistically gifted (below)

is the runtime overhead introduced by invoking Wine. Also, the fact that the code hasn't been optimised for Linux makes it a little sluggish.

WordPerfect 9 has all the features you expect to find in a professional word-processing package. Styles can be easily set up and modified, with a Quick Style option to get you going quickly. Font previews are available so you don't have to remember what all the cryptic names are and there's full control over elements such as paragraph and tab spacing. There's full spelling and grammar checkers, including as you type spelling checks. If you're used to using a professional word-processing package, you'll find that most of the familiar features are available within an easy to navigate menu structure. One particularly useful function is the 'Publish to PDF' option, which allows you to create Adobe Acrobat PDF documents straight from the application. There's also support for Word and Lotus document formats so you can transfer files between environments, plus the ability to read both Windows and Linux versions of WordPerfect 6.1, 7 and 8.

Quattro Pro, formerly a Borland product, provides all the spreadsheet functionality found in most of the big packages. You can have multiple worksheets within each file and format the cells to your heart's content. The standard array of formulas that you expect to find are present, along with graphing and sorting functions. Even for the most hardened of spreadsheet users, most of the functionality of a professional package is there. Again there's file support for both the Microsoft and Lotus camps plus earlier versions of Quattro Pro.

CorelCENTRAL plays the part of the PIM that users expect in a full Office Suite. Corel has chosen the approach of splitting the functionality into a number of distinct programs, in much the same way that Outlook is split into separate applications on Pocket PC (formerly Windows CE). The set comprises Address Book, Memos and Calendar. Calendar incorporates both an 'at a glance' view of things that must be done today, along with a traditional diary view allowing those all important future meetings, birthdays and reminders to be recorded. The Memos utility is useful for those moments of inspiration that must be noted, with the ability to file and organise the notes at a later date. Topping off the set is the requisite address book with the ability to store all the contact details you could ever need. The only obviously lacking component is an email client, although there are one or two available for Linux.

Bringing up the rear are Paradox 9 and Presentations 9. Paradox, again originally a Borland product, offers all the relation database functionality you could want in a simple and easy to use manner. When you start it you're presented with the option of either following the tutorial, opening an existing database or diving straight in on your own. If you find yourself stuck there's help at hand in the form of 'Experts', the equivalent of Windows' Wizards, to walk you through the operations step by step.

Presentations is a PowerPoint equivalent for creating anything from a frivolous 'happy birthday' banner to a high-powered corporate presentation. There's a range of templates available if you're not particularly artistic and the package is very easy to use.

WordPerfect Office 2000 is a mature and competent Office Suite; the fact it runs on Linux is a bonus. If you're used to using a professional package then it's unlikely you'll be disappointed. Some may quibble that you actually have to pay for it, but for those in the real world, the price justifies the features and functionality on offer. If you want a professional solution running in a Linux environment then WordPerfect Office 2000 does exactly what it says on the box.

WILL HEAD

DETAILS

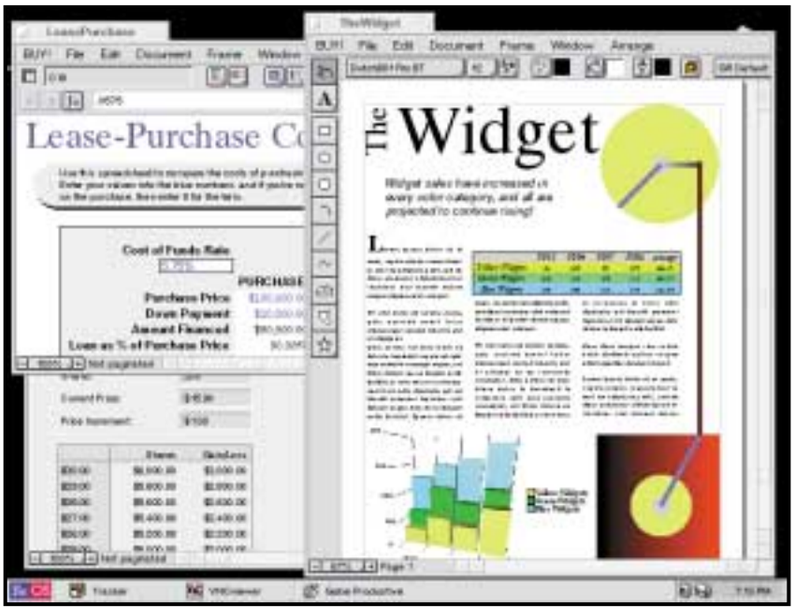
★★★★

PRICE £152.75 (£130 ex VAT)
CONTACT Corel 0800 581 028
http://linux.corel.com
SYSTEM REQUIREMENTS Linux Kernel Release 2.2, X Windows, Pentium 166, 32MB of RAM, 450MB of disk space
PROS Stable, competent office suite with a comprehensive feature set
CONS Performance overhead due to Windows-based components
OVERALL WordPerfect Office 2000 provides a stable and feature rich office suite for the Linux generation. It may cost money, but then most things in life do

BeOS 5 Personal Edition

This super-fast, super-sleek operating system gives a taste of how computing can be.

BeOS is astounding. It's a glimpse of how PC computing ought to be: lightning-fast, colourful, easy and stylish – what it would be like if we weren't fettered by layers of backward compatibility and accumulated detritus. For the first time you'll feel the raw power of your PC, and it's a refreshing experience. It boots in 10 to 15 seconds, and entire applications open faster than documents under Windows, transforming even moderately-powerful machines into snappy, responsive powerhouses, and on recent hardware it screams along. It's a slap in the face for big, cumbersome, hard-to-install OSs like Windows, OS/2 and Linux, free of bloat and the burden of backwards compatibility. It's also nearly free of device drivers and applications compared to Windows, which is its only drawback.



BeOS started on its own hardware platform, the twin-PowerPC-based BeBox, in 1996. A year later it was ported to the Power Macintosh, and a year after that, version 3.0 was released for both PowerPC and Intel systems. Be intended to produce a modern legacy-free system, built cleanly from the ground up to be fast, multi-processor-capable, multitasking and graphical. Not based on anything else, not compatible with anything else, but learning from the errors of other systems – for example, TCP/IP networking was built in from the start. It's fully buzzword-compliant: microkernel-based; has object-oriented design; full graphical operation; and 64bit journalling filesystem.

Entire applications open faster than documents under Windows and the GUI looks similar to that on the Mac

It started to mature with release 4, which switched from MetroWerks to GNU C++ for the Intel version, making it faster but binary-incompatible with previous versions. Release 4.5 improved hardware support and fixed many bugs. The current version 5 is if anything a smaller step, improving device support and adding modest refinements. More than anything, the version number change is a marketing feature, reflecting a business change rather than a technical one. Be is changing its focus from desktop PC OSs to embedded systems for Internet appliances. It has developed a free version of BeOS 5, the Personal Edition, and handed over marketing of the full Professional version to application developers such as GoBe, developers of the only BeOS office suite, GoBe Productive.

There have been free demo versions of BeOS before: both 4 and 4.5 have appeared as bootable demo CDs which can't be installed onto a hard disk. These weren't as impressive as they could have been though. As CD drives are slow and read-only, the system performed badly and, without virtual memory, was extremely RAM-hungry.

BeOS 5 Personal Edition gets round this. The 44MB download is a Windows executable and installs under Windows 95, 98 or NT; a Linux version is also available. It creates a directory called \BEOS on any hard drive with at least 500MB free. This contains a couple of programs and a 500MB 'image.be' file containing a complete installed copy of the OS. The process only takes a few minutes and worked on every system we tried.

BeOS can be started from an icon in Windows 9x, from DOS mode, or from a boot disk for users of NT or Linux. Contrary to some reports, it doesn't run as a Windows program. Windows is shut down and the PC goes into DOS mode before booting BeOS.

After the graphical loading screen, the desktop appears. This is normally a colourful sight – unless your graphics card isn't supported, as we found with a Tseng ET6100-based card. BeOS device drivers are tiny, and most are written by Be and come with the OS, so no configuration is required. If the system can identify your card, it loads the driver, if it can't, there may not be much you can do, although some additional drivers can be found on websites such as the Be Depot (www.bedepot.com). As such, there's no installation process involved: you start with a fully-functional system. BeOS can mount drives from most other operating systems: FAT, FAT32, HPFS, NTFS, Linux Ext2 and even MacOS HFS volumes. You can't readily expand the BeOS boot volume but you can keep applications and documents on other drives, so space isn't a major constraint.

Hardware support is a problem though. BeOS 5 supports many types of

devices, but comparatively few specific models. For example, only a handful of SCSI adaptors and printers are supported. Network cards are restricted to 3Com models, PCI, ISA and PCMCIA NE2000 compatibles, and a few others. FireWire and USB are new additions, as are CD writers and a good cross-section of recent sound cards.

The system looks superficially Mac-like, with elements from other systems. If you've used any GUI, it will be familiar. There's a Start-menu analog and the Deskbar, which lets you start and switch between programs, shut down the system and so on. It even has a 'system tray' containing a clock, volume control, mail notification utility and so on. By default, it's a rectangular stack of buttons at the top right of the screen, but it can be repositioned in any corner or along one edge, just like Windows' Taskbar. It's complemented by the Tracker, which resembles MacOS' Finder. There are neat touches everywhere, and it all feels a lot smoother and better-integrated than Windows.

The journalling filesystem should be resistant to corruption and supports customisable attributes, so you can use a directory of files as a simple database. Rather than just searching, multi-variable queries can be applied. The system uses MIME types for tracking file formats and includes built-in translators for most common sound, image and video formats. It can display almost anything, including animated OpenGL objects using moving video as textures.

BeOS is a complete operating system and can perform most of the tasks that Windows can. Preinstalled components include the NetPositive Web browser, an email client, a dialup networking stack, a media player, file translators, a 3D audio mixer that lets you graphically move parts of a track around in space, and even a few demo programs. More components are available from the website, such as tools for working on a Windows network. Many demonstration and free programs are available, including a demo version of the GoBe Productive office suite, graphics programs such as ArtPaint, BeCasso and Easel, audio packages including Aural Illusion and ObjektSynth, and more. Some of the multimedia packages are best-of-breed: adamation's personalStudio non-linear video editor lets you apply complex effects live in real time in a way that is impossible on Windows or MacOS. This perfectly complements BeOS 5's native facilities for capturing DVD-resolution video from a camcorder via FireWire and sending the edited results back to tape.

Hardware detection can be patchy with the system failing to find supported devices

Be claims about a thousand shipping applications, with more arriving all the time. As parts of the underpinning of BeOS use Unix-style technologies, such as the network stack, porting Unix software is relatively easy. The GIMP photo-manipulation program is currently being ported, as are the Mozilla and Opera web browsers.

There are about a dozen very professional BeOS-oriented websites offering information, hints and tips, downloads and more, all linked from within the HTML-based documentation provided with the Personal Edition.

This edition is cut down from the Professional version in some areas. You don't get commercial components such as RealPlayer and Macromedia Flash, nor the CodeWarrior-based development system, and it's missing many of the demo programs, images, movies and sound clips from the CD version, along with all the third-party freeware and demonstration versions. If you can track down a v4.x demonstration CD, you can use the slightly older versions on there, and many can be downloaded anyway.

There are many demo and free programs available for BeOS including some graphics programs

We found that hardware detection was patchy. Graphics cards are handled well, but the system failed to find supported devices on two machines, including NICs and a SoundBlaster 16. As in the early days of NT, for serious use, you should get a machine built specifically for BeOS using only components from the hardware compatibility list.

Finally, the Personal Edition can't be installed in a hard disk partition in its own right; only the CD version supports this. A skilled BeOS user could get round this, but doing so violates the principle of the freely-downloadable version. This isn't a demo or a crippled version, it's the real deal, just without some non-essential components and running from a DOS partition – something that caused no noticeable performance drop.

The BeOS is a remarkable piece of work. Compared to a behemoth such as Windows 2000, it's low on features, but it does everything most users will need, and does so far better than Windows. It's smaller, faster, runs more smoothly, multitasks better and feels vastly more responsive. Perhaps the Personal Edition will bring BeOS to a wide enough audience to win it the critical mass in the PC market that it needs – and certainly deserves. Over 100,000 people pre-registered their interest in the free version and the official download sites recorded over half a million downloads in the first two weeks after its release.

If you have reasonably high-spec PC you owe it to your computer to let it show you what it's capable of.

LIAM PROVEN

This month's cover disc includes a copy of BeOS and check out the workshop in Hands-on p240.

DETAILS

★★★★

PRICE Free

CONTACT Be **www.be.com**

SYSTEM REQUIREMENTS 32MB of RAM, Pentium CPU, 0.5GB of hard disk space

PROS Sleek, fast, stable, excellent multimedia support

CONS Poor device support, limited software range

OVERALL BeOS is the smoothest and most polished OS around, as long as your hardware supports it and you can find the applications you need – and the free version lets you try it out easily and safely.

BETA

Adobe Illustrator 9

This impressive upgrade promises to make Adobe top choice once again for vector illustration.

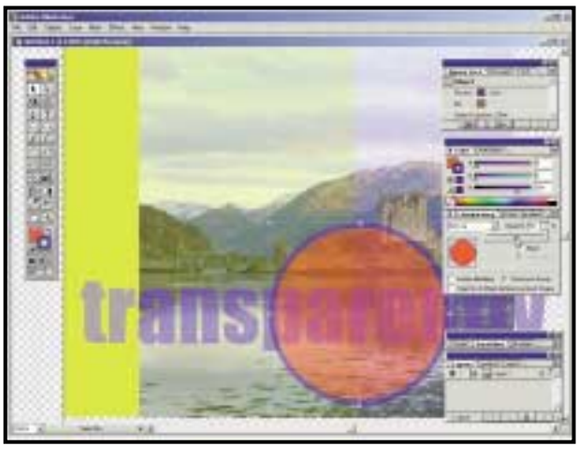
This new release of Adobe Illustrator is astoundingly brilliant. With Illustrator 8, Adobe pulled back lost ground and put the package back in the running as the world's best vector illustration software. Version 9 goes far beyond that.

Over the past couple of years Macromedia has steadily captured the market in tools for creating and delivering web content. Adobe clearly wants that market and much of what's new in Illustrator 9 is aimed at breaking the growing domination of Flash as the delivery format for vector-based high-quality web animation.

A glance at Illustrator 9's new features must make worrying viewing for the people at Macromedia. Output to Flash (SWF) or scalable vector graphics (SVG) format, optimised output to GIF, JPEG and PNG, a pixel preview mode to show how vector art will look when rasterised, live drop shadows and glows, feathering, editable outlined text, object and layer effects, export of layered images to Photoshop and text that remains editable when exported to Photoshop – that's just for starters.

Adobe has finally addressed the transparency issue and, though rather belatedly, makes vastly superior use of transparency features than either Freehand or CorelDraw.

Other significant new features include live shapes that cope intelligently with edits, new lasso tools, graphic styles, web-safe RGB colour workflow, live Photoshop filters, release to layers for animation, and integrated PDF support.

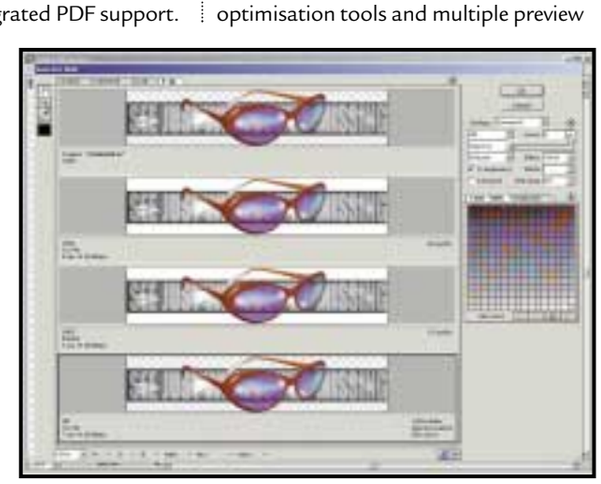


Apply transparency to pictures, object, text or layers using the new transparency palette

Until now, there's only been one way to produce dynamic and exciting web visuals and that's using Macromedia's Flash application to create shockwave Flash format (SWF) animations. With the advent of Flash-enabled browsers the popularity of the format has exploded. Illustrator 9 provides pretty much the same kind of Flash export options as Freehand 9, and more besides. You can export graphics to a single SWF file, export layers to separate SWF files and build layer-based Flash animations.

Adobe is promoting the SVG format as a superior alternative to Flash. SVG is an open standard that uses XML and CSS. Like Flash, it's vector based and therefore scalable, is interactive, and produces small files. Unlike Flash it has no installed user base and isn't supported by the current generation of browsers – Adobe provides an SVG viewer with Illustrator 9 and you can download it from www.adobe.com/svg.

For raster-based web graphics Illustrator has adopted Photoshop's save for web window to provide optimisation tools and multiple preview windows for quality comparisons. You can save in GIF, JPEG, PNG-8 and PNG-24 formats, view four-up side by side comparisons with full control over compression settings, colour palettes and transparency. There's also a lossy GIF option.



Illustrator 9's save for web option works just like Photoshop 5.5's, allowing you to compare quality and performance of different file format settings

One of the problems of producing vector graphics that will be viewed in a rasterised format in a web browser is that the conversion can lead to unpredictable results. Illustrator 9's new pixel preview mode saves having to export files, view them in a browser, then go back to Illustrator to edit. You can leave pixel preview mode on where it has the advantage of snapping objects to a pixel grid and avoiding anti-aliased edges.

Transparency is a feature that's been available in Freehand and CorelDraw for some time. One reason Illustrator has lacked it is that transparency isn't supported in PostScript and so applications have to 'fake' it – usually by defining overlapping areas as new objects and creating appropriate fills to create the effect of transparency.

Adobe has implemented transparency-based features that leave the competition standing. You can apply transparency settings to any layer, group, or object, including raster images, type and spot colours so that underlying objects show through. This is done the same way as in Photoshop – by selecting the object and adjusting an opacity slider in the new transparency palette.

You can apply transparency solely to an object's fill or stroke and the topmost object in a group can be made to knock out objects beneath it in the group to reveal what's below the grouped object.

Transparency can be applied to individual characters, words, or paragraphs in a text block and, as with virtually all other text transformations, the text remains fully editable. You can even create cumulative effects by applying transparency to individual

words and then overall to a text block.

The beta version demonstrated a few display glitches when applying transparency effects to type, hopefully these will be have been sorted by the time the product ships.

Also available from the transparency palette and another crossover from Photoshop are the blend modes, which control how an object's colours interact with the colours of underlying objects. An isolate blend option restricts the blend mode to objects within a group – objects underneath the group remain unaffected.

Opacity masks work like Photoshop alpha channels. You create an opacity mask by placing one object on top of another and selecting the mask option on the transparency palette. Visible areas of the underlying object are determined by the greyscale values of the top object. For example, a circle with a black to white gradient fill could be used to create a vignette of an object below it. Any object can be turned into an opacity mask. Used in combination with the gradient mesh tool, images and text, it has huge potential.

One of the big advantages of raster graphics is that you can create soft-feathered edges. With live feathering you can now achieve the same effects in Illustrator 9. According to Adobe the degree of feathering is specified, as in Photoshop, by a feather radius and can be previewed in the editing window. Even after applying feathering you can still edit the underlying object. We were, however, unable to test this feature, as it wasn't available in the beta review supplied.

Feathering is one of a number of features collectively known as object and layer effects (or 'live' effects), which change the appearance of an object, group or layer without affecting the underlying artwork. The obvious advantage of this is that you can edit the underlying object, be it text, a bitmap image or vector object, without having to start from scratch. Live effects can also be edited themselves to produce variations, or simply if you decide at a later stage that it's not right.

For example, text that has had a drop shadow or glow applied remains editable – you can even change the font or perform a spelling check. Photoshop and third-party plug-in filters applied as live effects are likewise editable. You can apply gaussian blur to text and then edit it. You can even use a live effect to convert text to outlines, so it can be opened without the font, yet it remains editable to anyone who has the font installed.

Object and layer effects are put to further productive use with graphic styles – a sort of graphic style sheet. The starting point for graphic styles is appearance. Any combination of live effects, fills, strokes and transparency settings can make up an appearance. Once applied to an object, they're listed in the new appearances palette where they can be re-ordered, deleted and edited. Appearances can then be defined as graphic styles in the new styles palette. Like the object and layer effects from which they're built, graphic styles change only an object's appearance, not the object itself, which remains editable.

Stroke and fill settings, transparency and live object effects can be defined as graphic styles and dragged from the styles palette onto any object to quickly change its appearance

Object and layer effects, like many of Illustrator 9's new features, will save much of the effort involved in repetitious reworking of raster effects applied to vector artwork when edits need to be made at the vector level – typically copy changes.

Another time saver comes in the form of live shapes – objects that automatically resize in relation to text and other objects. Typically you might use a live shape as a web button incorporating text. The usual approach is to design your button to accommodate the longest word or phrase, then adjust the width of the button to fit other circumstances. A live shape automatically shrinks or grows in proportion to the text it contains.

Other new features have been added either in response to the competition or to tighten integration with other Adobe products. The new lasso tools and simplify path command emulate those of Freehand 9. If you place native Illustrator files in GoLive it calls Illustrator to export the files in the appropriate format and if the file is subsequently edited in Illustrator, GoLive prompts you to update it. Transparency is maintained between Illustrator and Photoshop 5.5 in both directions.

Illustrator's native file format is now PDF, making creation of PDFs from within Illustrator little more than a basic save operation though you still, of course, exercise complete control over compression and other PDF options, The Illustrator file extension remains .ai and version 9 can open previous version files. To ensure your files remain editable you simply check the 'preserve Illustrator editing capabilities' box to preserve file features such as links, swatches, brushes and graphic styles.

Whichever way you look at it, this version of Illustrator is the most comprehensive upgrade in its history. The implementation of transparency and all that flows from it, layer and object effects and the new web authoring features between them push the boundaries of vector illustration into a new dimension. Issues that will have to wait for the full release before we can judge include stability, the reliability of transparency and live effects on display and in print, and performance of export filters in terms of file size and fidelity to the original.On the basis of what we've seen here though, there's only one word for it – awesome.

KEN MCMAHON

DETAILS

★★★★★

PRICE £292.58 (£249 ex VAT)
CONTACT Adobe 020 8606 4001
www.adobe.co.uk
SYSTEM REQUIREMENTS Windows 98/NT4/2000, Pentium processor, 64MB of RAM, 105MB of free disk space, PostScript Level 2 printer
PROS Comprehensive web tools, exciting new object and layer effects, versatile transparency features
CONS As with any beta, performance and stability yet to be determined
OVERALL The most exciting development in vector illustration for years

PREVIEW

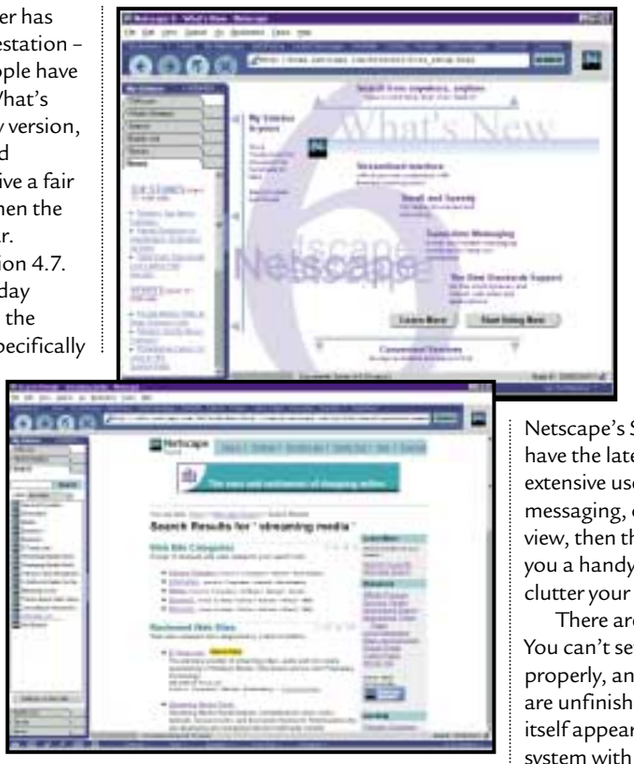
Netscape 6.0

A promising and compact update which offers great integration of net tools and faster browsing.

Netscape's latest browser has endured a very long gestation – so long that many people have simply given up waiting for it. What's finally been released is a preview version, rather than a complete, polished product. Nevertheless, it does give a fair impression of what to expect when the final product ships later this year.

Netscape is presently at version 4.7. Version 5 never saw the light of day and this new release is based on the Mozilla open source project – specifically a new browser engine called Gecko.

Gecko is, so Netscape says, a completely standards-compliant browser engine – something that's long overdue, especially for those developers fed up with programs that aren't even the same across Mac and Windows versions. It's really Gecko that's the point of the preview release, with some solid features wrapped around it to give a taster of the final product. Gecko itself will be used in browser-type products from a range of other companies too, including IBM and AOL.



The new version allows you to customise Netscape's interface to your liking

One of the main claims made for Netscape 6.0 is that it's smaller. It certainly is more compact than Internet Explorer, but it's still a fairly large program, taking up a reasonable chunk of disk space. Don't expect a return to browsers that fit on floppies any time soon. It does, however, run rather more speedily on older systems than version 4.7, though the Mac version appears to take rather a long time to start up. That's especially true the first time, when it spent so long fiddling around that we were convinced the system had hung.

When Netscape starts, the first thing that strikes you is the interface. There's not such a clear demarcation between the buttons, tool bars and the actual window as in earlier versions. The effect is closer to something clever done with frames, which is because most of the interface can be customised using XML. Skins are promised for the final version, so you can completely change how everything looks. For the time being, you'll probably either love or hate the way this looks.

The next thing you'll notice is the sidebar, like a persistent left-hand frame (though you can hide it from the menus) which contains a number of tabs. These give quick access to a number of facilities, like a search system, an Instant Messenger Buddy List, and news headlines. You can customise it with other options, or develop a sidebar for your own site.

The input box at the top of the window lets you search the web, with results appearing in detailed form in the main window, and a list of sites in the sidebar's search tab. That allows you to follow links from the main window, and still go back to search results, without fiddling around – a little like the search option introduced in IE 4.5 for the Macintosh.

At the top and bottom of the screen are links to channels for shopping, information, and tools such as email, web page composer, instant messaging and web mail, making everything you want always close at hand.

The browsing itself appears to work very well. It's faster than the previous version and seems quicker than Internet Explorer, but it's hard to make a completely objective assessment. Certainly, pages like the BBC News were rendered very quickly, and sensibly too, with the layout and text appearing before any pictures, making it much simpler to follow links without waiting for everything to download.

There are other handy things, like a central master password that gives access to all the other ones, and Netscape's Smart Update to ensure you have the latest version. If you make extensive use of tools like instant messaging, or want to keep the news in view, then the browser really does give you a handy one-stop tool that doesn't clutter your screen unnecessarily.

There are rough edges in this preview. You can't set up helper applications properly, and the mail and news facilities are unfinished, but the core browser itself appears to work well, even on a system with limited resources. Oddly, the Mac version appeared less responsive, on a system that's usually nippier than the PC – unless you have a new Mac, you may be better off waiting.

If you want a complete, polished solution, wait for the final release. On the evidence of the preview, it looks like it will be well worth the wait. If you don't mind a few rough edges, and can't wait to get your hands on something that integrates buddy lists, email, news headlines and standards-based browsing, then it's certainly worth experimenting with the preview. You're likely to be pleasantly surprised.

NIGEL WHITFIELD

DETAILS

★★★

PRICE Free
CONTACT Netscape
http://home.netscape.com/
PROS Fast and standards-based, integrates well with instant messaging and other net tools
CONS Sidebar performance is a little sluggish, some areas still need polishing
OVERALL A good-looking browser that shows a lot of promise, but with a few rough edges at the moment. Great integration of common net tools and tasks

BETA

Internet Explorer 5.5

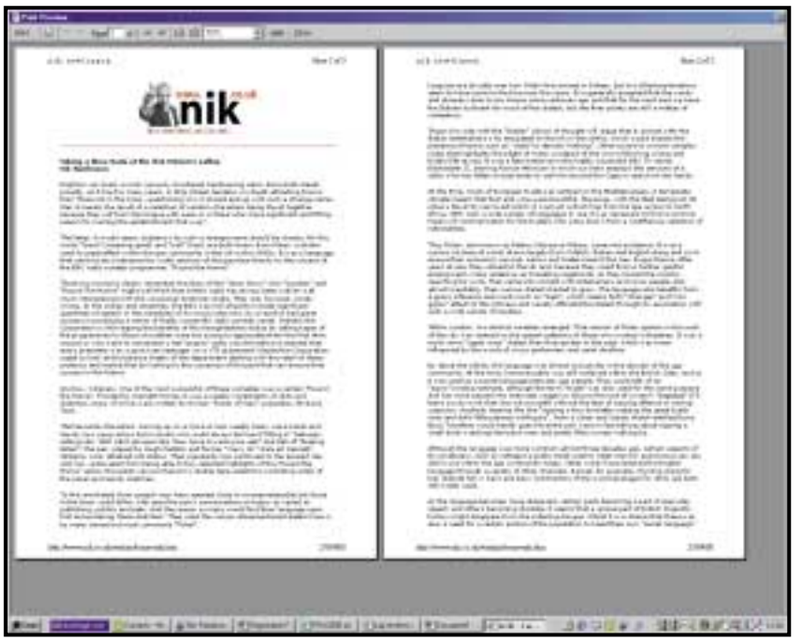
A familiar look and feel for Microsoft's latest browser with a few useful features for web designers.

Nobody likes change, so it's perhaps good news that IE 5.5 looks and feels exactly like version 5. There are no interface tweaks like those found in Netscape 6.0 and end users will probably wonder why they bothered to download. One feature you'll probably welcome, though, is the print preview. This is long overdue and means you'll no longer have to use the hit-and-miss method to guess which page that one important paragraph falls on when you don't want to output a lengthy page.

Installation is painless – download a small installer from Microsoft's site and it will take care of grabbing the rest and writing it to your drive. It simultaneously installs version 2.1 of the MSN Messenger, Microsoft's rival to AOL's Instant Messenger. You may remember a well publicised falling out last year that saw AOL blocking users of the MSN Messenger from chatting with their users so it's worth checking what your friends use before getting too attached to one or the other. The AOL messenger is bundled with Netscape's browser, but there's nothing to stop you using that with IE 5.5. It's a shame Microsoft chose to install version 2.1, which has already been outdated by a new version offering parental controls and, recognising this fact, pops up a message asking you to upgrade every time it starts.

There are many changes targeted at the web designer. Perhaps the most exciting is the new HTML+TIME 2.0 feature that allows for synchronisation of streamed media, timing of HTML elements, animation and so forth and, being largely XML based, conforms to standards ratified by the W3C (World Wide Web Consortium). Further, support for enhanced style sheets cater for vertical text. This may seem frivolous to us, but will be greatly welcomed by Chinese and Japanese developers.

The concept of Element Behaviours has been introduced, allowing development teams to split workloads. In this way, scripting experts can write their work into a separate file that's referenced by the HTML author and eliminates the need to define how every element on a page should behave on an individual basis. The new ViewLink feature also simplifies the incorporation of DHTML components. This is closely tied to the Element Behaviours feature outlined above and allows code written in an external file to be incorporated within a larger HTML document, even if that coding previously would have required installation on the client machine before it would properly render.



Internet Explorer 5.5 includes a long-awaited print preview mode

IE 5.5 should run more quickly and efficiently than its version 5 predecessor as the core architecture has been tweaked to change the way it handles frames. Previously IE had initiated a fresh instance of the browser core to handle each frame, even if it was contained within a pre-existing browser window. Saving on resources, the ViewLink technology built into this latest incarnation allows it to render the new frame within the existing HTML page. The end user will see no difference, but the performance of frames-based pages will be much enhanced and Microsoft promises it will allow designers to create some visually interesting effects such as transparent frames that take on the background image of the HTML document from within which they're addressed.

IE 5.5 has a few smart new graphics filters that will auto-render fades and blends client-side rather than relying on the author generating them first and then saving as a GIF or JPEG. Previously, when you wanted to use a fade as the backdrop to, say, a table cell, you would have to first generate the pattern in a graphics package and refer to it in your code. This version of Explorer lets you describe the fade and even any required transparency directly within your code and let the browser handle it at the user end, cutting down on download time.

In all, Internet Explorer incorporates many enhancements that should work toward cutting download times and enriching your online experience, but until HTML authors are satisfied that there's a sufficiently large installed base to warrant putting them to use in their pages you're unlikely to see any real benefit in the near future. It's still worth upgrading if only to keep your system up to date, but we'd recommend opting for the mix and match approach and supplementing the download with an install of AOL Instant Messenger.

NIK RAWLINSON

DETAILS

★★★★

PRICE Free download
CONTACT Microsoft
www.microsoft.com/windows/ie/
PROS Should cut download times, will be familiar to existing IE users
CONS Outdated version of MSN Messenger bundled with the beta we tested
OVERALL Worth the download but you may have to wait to feel the full effect

Compaq NeoServer 150

A simple package that offers small businesses a network solution and great storage potential.

Small businesses looking to network a number of PCs, printers and laptops could do a lot worse than the Compaq NeoServer 150. Designed to operate as an out-of-the-box server, it offers Internet access and an abundance of storage at a reasonable price.

Also included is a Compaq eight-port 10BaseT Ethernet hub that can be used to link up to seven other devices – more if you daisy-chain hubs together. We have to admit to being a little surprised by Compaq's decision to ship a 10BaseT hub, rather than a switch. After all, the price incentive for doing this has all but disappeared, and the far inferior performance offered by hubs could become an issue over time.

The server itself is built around a 566MHz Intel Celeron processor with 64MB of SDRAM memory. Storage is also well covered with an internal 13GB EIDE hard drive, and two external and removable hard drive slots that support a 17GB and a 13GB EIDE hard drive respectively.

Configuration was slightly flawed. In theory all we had to do was insert the CD-ROM, press play and wait for our new and shiny network to come to life. We tried to do this on a Windows 2000 machine, and were told that the network settings hadn't been configured correctly, which we tried to do manually.

On Windows 2000 this involved configuring our network settings to work with both DHCP (Dynamic Host Configuration Protocol) and DNS (Domain Name Structure). The idea is that the NeoServer acts as the DHCP server, while our Windows 2000 machine would be assigned an IP address each time we logged on. This is a fine idea, as it removes the need to manually configure each device that you want to connect to the network.

Once done, we performed a search from Network Neighborhood for computers called NeoServer and, sure enough, it appeared without a hitch. The next job was to map a network drive so that we could begin to write files to our new server. It then appeared just like a local hard drive in Explorer. It's administered through a standard web browser, and by typing 'neoserver' into the address line we were taken to the main configuration page.

Configuration is well thought out, simple and intuitive. As well as setting up the mundane time and date information, we were also able to set up the more interesting details such as ISP information, user accounts, access permissions and more advanced network settings. Again, we were impressed with its simplicity.

As well as offering the standard file sharing and shared Internet access, the NeoServer also doubles as a backup solution. Through the management console you're able to schedule backups of any work, and then save them to a private file with no write privileges, for example.

Another NeoServer function is to act as a primitive web server. It allows you to set up an internal intranet site with the address http://intranet.neoserver, which is also protected by a built-in firewall.

We found it strange that no HTML editing tools were included however, with only the advice that we should modify our homepage, by editing the contents of the \\disk1\www folder, with FrontPage.

It also allowed us to set up a simple internal email system, so if we wanted to mail a colleague in our new office, it wouldn't involve logging on to the Internet. When you do happen to log on, however, security is offered by way of an integrated firewall. Although a decent addition, we found it a little perturbing that there was no way to configure this.

Overall, the NeoServer is a comprehensive piece of kit aimed at a specific market. Although there are other ways of setting up a network – namely buying a cheap network starter pack (which can cost less than £100 and consist of a switch, cables and NICs) and simply linking your machines together, this method is preferable.

The reason for this is that it's a far cleaner solution, which for less than a grand provides you with a central server as well as shared Internet access and a firewall. If you're looking to expand into a flexible networked environment, and have £1,000 to spend then look no further.

DAVID RAE

DETAILS

★★★★

PRICE £985 (£839 ex VAT)
CONTACT Compaq 0845 270 4222
www.compaq.co.uk
PROS A simple answer to what can be a complex undertaking, well-priced, comes with everything you need to set up a small network
CONS Why provide a hub when a switch would barely have increased the price? No way to configure the firewall, experienced a few problems with the automatic network configuration offered by the software
OVERALL If you want to network a small office, then there are many ways you can go. However, no other method offers this kind of functionality, build quality and simplicity and at such a good price

HP Kayak XM600

A fast entry-level workstation helped along by dual-Pentium III processors, at a reasonable price.

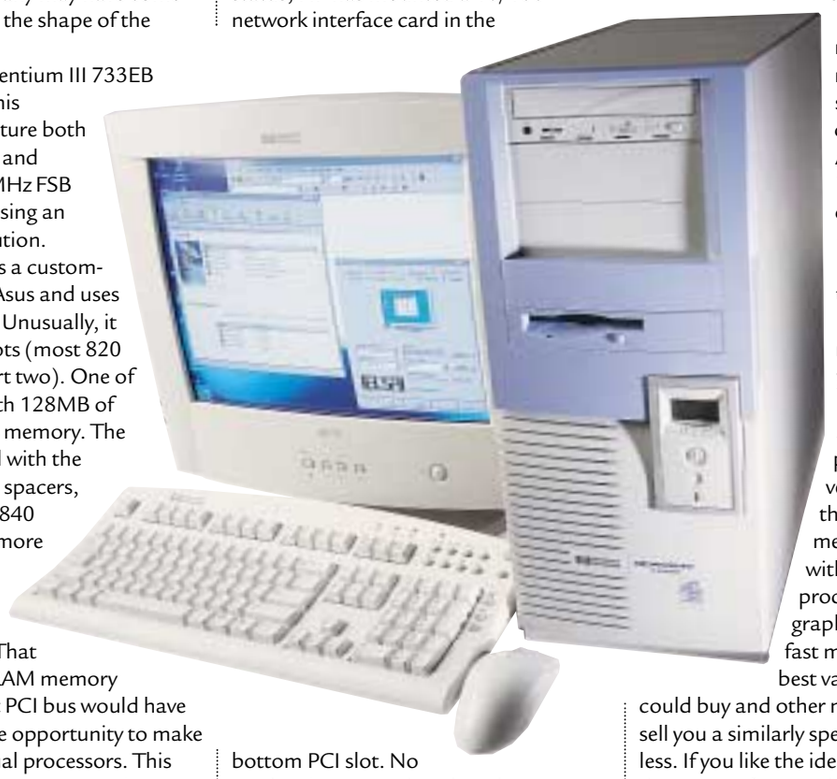
HP's new workstation range is being sold as powerful machines at PC prices, and it looks like the company may have come up with a winner in the shape of the Kayak XM600.

There are two Pentium III 733EB processors inside this machine. These feature both faster on-die cache and support for a 133MHz FSB and are mounted using an Intel-approved solution. The motherboard is a custom-built version from Asus and uses Intel's 820 chipset. Unusually, it has three RIMM slots (most 820 boards only support two). One of the slots is filled with 128MB of 700MHz RAMBUS memory. The other two are fitted with the appropriate RIMM spacers, but we feel that an 840 solution would be more appropriate if multiprocessor performance is important to you. That chipset's dual-RDRAM memory channels and 64bit PCI bus would have given the system the opportunity to make better use of the dual processors. This would have pushed up system price though, and as it stands the 820 manages to attain a good compromise between performance and value.

Sitting in the AGP slot is an Elsa Synergy II card. This has 32MB of SDRAM on board, and uses a standard TNT2 chip. Although this doesn't allow it to break the speed barrier as far as 3D performance is concerned, this isn't a system intended for gamers. NT4 is the operating system of choice, but as this comes pre-loaded we were unable to run our DirectX 7-based 3DMark 2000 benchmark. In Quake III it managed 31.2fps (frames per second) and 33.6fps with SMP enabled. Much more important are the custom Elsa drivers – this is what you're paying a premium for.

The dual processors really helped this machine fly when we ran our test 3D render using 3D Studio. It managed to complete the test scene in 18 minutes 15 seconds. We ran the same scene on the 1GHz machines we reviewed last month – the 1GHz Pentium III took 26 minutes nine seconds, proving that if you're using software that implements multi-threading properly, two processors really are better than one.

In keeping with its workstation status, HP has mounted a 10/100 network interface card in the bottom PCI slot. No modem is present, but then the customers HP is aiming this system at won't need one. This leaves four PCI slots free.



A 15.3GB Maxtor hard disk is mounted in a 3.5in bay. This faces sideways at the bottom of the case, making it very easy to add and remove drives as required. An HP CD-RW is included for backup. There are no other optical drives, leaving two 3.5in and 5.25in bays free for expansion.

The case is an excellent choice and if you need to upgrade, it should be fairly painless. Instead of using screws to secure each of the drives, this case has a series of plastic strips through which metal bars hold everything in place. This makes them much easier to remove – you can simply rip out the rods when you need to work on the bays. A diagnostic panel is located on the front of the case. This monochrome LCD shows information such as the name of the machine, BIOS version and serial number. The diagnostic functions are fairly limited – it displays a smiley face to indicate the status of various conditions.

Build quality is good – a funnel directs air toward the processor, and there's an extra fan at the base to help keep the system cool.

HP supplies machines and monitors separately, so the choice is up to you. As far as this system is concerned, the company recommends its P96, although as this wasn't the monitor sent in for review we can't tell you how good it is.

Overall, this system is very well put together. It's very easy to use, and the RAMBUS memory combined with the dual processors and the graphics card make it a fast machine. It isn't the best value system you could buy and other manufacturers can sell you a similarly specified machine for less. If you like the idea of the support that comes from such a top-quality name though, then it would be an excellent choice.

JASON JENKINS

DETAILS

★★★★★

RECOMMENDED Personal Computer World

PRICE PC £2,811.78 (£2,393 ex VAT), HP75 17in monitor £270.25 (£230 ex VAT), HP P96 19in monitor £493.50 (£420 ex VAT)

CONTACT HP 0990 47 47 47

www.hp.com/uk

PROS Dual processors, excellent build quality and case

CONS Could be cheaper

OVERALL A very good entry-level workstation that combines quality and speed

PERFORMANCE RESULTS