High flyers

contents

• *PCs reviewed by Jason Jenkins.*
• *Tested by Lars-Goran Nilsson.*

ratings

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

If you're looking to buy a business machine that will have few problems running Windows 2000, we've tested the pick of the crop.

Windows 2000 has been in the news a lot recently. The launch of the new operating system, the successor to NT4, was accompanied by blanket media coverage and a lot of opinion on the merit or otherwise of upgrading. But what are the PCs that run this new operating system like?

To find out, we invited manufacturers to submit their higher-end machines, focused specifically at the business market. We set a price limit of £2,000 ex VAT, but encouraged them to come in below this if they so wished. All the prices should include delivery to mainland UK and a credit card surcharge if one is charged.

We were looking for Windows 2000-compatible machines, so it was important that the manufacturers submitted PCs that had approved hardware, drivers and software. It was also necessary for each PC to come with a good monitor, and all but one of these reviewed feature at least 19in models. And since these PCs are at the higher end, we were looking for boxes that could be upgraded in the future. If you're thinking of buying a new system for your business, read on to find out what is the best buy for you.

PHOTOGRAPH DAVID WHYTE

Carrera **Cygnus 800**

CARRERA HAS CLEARLY read the invitations we sent out for this group test, as it has supplied us with a machine that suits its intended purpose, but still comes in at a low price. This is the first PC we have had in the group test section to feature Intel's new Flip Chip processor. The Socket 370 processor is clocked at 800MHz and has the letters E and B at the end of its name. This means that not only does it have on-die cache but it also runs at a front-side bus speed of 133MHz. There's 128MB of PC133 memory in one of the two memory slots to back it up.

Unfortunately, this doesn't make much of a difference in SYSmark terms as the 820 chip in the Supermicro main board stunts the performance. You'll still be able to use the supplied Lotus SmartSuite software at speed, though. A dual-head Matrox G400 graphics card is included, which has 32MB of memory on board. The excellent generic Aureal Vortex 2 sound card that includes an optical out port provides sound. There's no modem, which could be a bit of a drawback for some small businesses, but there is an Intel Pro 100+ network card for connection to your LAN. A Matsushita DVD drive is provided, which plays DVDs using the supplied Cyberlink software. A Matsushita CD-RW is also included as the backup solution for the large 27.3GB IBM Deskstar hard drive. Build quality is generally good, but we would make one criticism: the power supply to the extra fan at the rear has been piggybacked on to an ATX power lead. This should really be connected to the motherboard. There's plenty of room for expansion: one 3.5in and two 5.25in bays are free, and there's space for another four PCI cards, including the one shared slot. The Iiyama VisionMaster 451 screen is a good example of a 19in shadow-mask model, but there are better aperture-grille examples on test here. For the money Carrera's asking, though, it is a good buy and definitely worth a look. You even get a full two-year on-site warranty.

DETAILS

PRICE £1,878.83 (£1,599 ex VAT)
CONTACT Carrera 020 8307 2800
www.carrera.co.uk
PROS DVD and CD-RW drive included, good price
CONS Some users may prefer Microsoft Office, and there are better monitors here
OVERALL A great system that's definitely worth a look

BUILD QUALITY	★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Dell **Dimension XPS B800**

DELL HAS UNFORTUNATELY been the victim of its own optimism by submitting a machine that it initially thought it would sell for under the £2,000 price point, but later calculated it would not. Despite this, though, it is still a good machine with some unique features. This PC takes the fully-Intel approved route: the Pentium III 800EB rests on an Intel motherboard and is powered by a massive (and expensive) 256MB of 700MHz RAMBUS memory. This is all on one RIMM, leaving another slot free for the future. However, in SYSmark terms, the performance of this system is less than others that use Intel's older chipset – a telling damnation of the 820.

The most interesting aspect of this machine is its graphics card. Dell is the first vendor to sell a 64MB version of nVidia's GeForce card – and that 64MB is DDR memory, too. It's been produced by a secret manufacturer to appeal to extreme gamers and very high-end professional users. Looking at the results, it may appear that the extra memory has helped it to outperform everything else in Quake III.

This is probably an erroneous conclusion, though, as there are so many different versions of the nVidia graphics card drivers floating around in this group test (and Dell is the only company to have digitally signed graphics card drivers) that it's difficult to tell. Aside from this, there is an OEM version of the SoundBlaster Live! 1024 (with a CD SPDIF port) and a 3Com Etherlink network card inside. This leaves three PCI slots free. An NEC DVD player is present at the top of the case. A Quantum Fireball hard drive with 30GB capacity is mounted vertically against the front of the case, and for backup there's an Iomega Zip 250. We would have preferred to see a CD-RW, particularly considering how expensive this system is. You do, however, get Microsoft Office 2000 SBE thrown in. The Dell-badged Ultascan P991 monitor is also a good choice. The 19in aperture-grille model is one of the best in this test.

DETAILS

PRICE £2,642.58 (£2,249 ex VAT)
CONTACT Dell 0870 152 4850
www.dell.co.uk
PROS A huge amount of memory, unique graphics card, Office 2000 SBE included
CONS Too expensive for this group test, no CD-RW drive
OVERALL If you are one of the few who needs 64MB of video memory, it's worth a look

BUILD QUALITY	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

Evesham.com **Platinum PIII 800**

UNUSUALLY FOR Evesham, it has decided to submit a Pentium III-based machine. The 800E at the core of this system is outstanding in SYSmark terms, beating Dell's entry by a clear seven points. We put this down to the motherboard – the Chaintech 6BTM, which utilises the older BX chipset. The Dell, despite using the latest RAMBUS memory and an 820 chipset, can't compete. One small disadvantage with this board is that it does not support the UltraDMA66 standard. However, the fact that there is only one drive present – a 20GB Maxtor – means that the overall performance of this system is not affected. There are a further three DIMM slots free on the motherboard, making the total memory capacity of this machine a whopping 1GB. Elsewhere, graphics are provided by the excellent Matrox Millennium G400 Max. It has a total of 32MB of SGRAM on the card, and support for dual monitors. It outputs an excellent image to the crisp 19in Taxan Ergovision 980 TCO99 monitor. Evesham has also included a Pioneer DVD-ROM in the uppermost 5.25in bay. This may seem a little strange for a business system, but given the fact that Windows 2000 supports DVD playback and that you can load DVD software using it, we think it's a good thing.

A basic SoundBlaster 128 card and a pair of generic speakers provide sound. This is adequate for the intended use, and the SoundBlaster has digitally-signed drivers, along with all the other components (with the exception of the graphics card). Unforgivably, though, Evesham has forgotten to include a CD audio cable that would have you reaching for the free-phone support straight away. Backup is also left a little wanting in this system – there's only an LS-120 drive. A 3Com 10/100 network card is included but no modem, which may be a problem for some. Moreover, there's no office suite, which we thought was a bit cheap. It's value for money that lets this system down unfortunately.

DETAILS

PRICE £1,937.58 (£1,649 ex VAT)
CONTACT Evesham 0800 038 0800
www.evesham.com
PROS Good monitor, clever choice of motherboard
CONS Only has an LS-120 for backup, no bundled office suite
OVERALL A good system that combines old and new technology well, but a bit overpriced

BUILD QUALITY	★★★★
PERFORMANCE	★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

Testing your existing system's compatibility

The easiest way to get Windows 2000 on your desk is simply to buy a new PC, but if you don't want to do that, what have you got to consider before upgrading?

The first thing to stress is that Windows 2000, as the successor to NT4, is a business OS and hence not intended for home users. It is more reliable and stable than Windows 98, but if you want to use your PC to play games then stick to 98 – it'll be faster and more games support it.
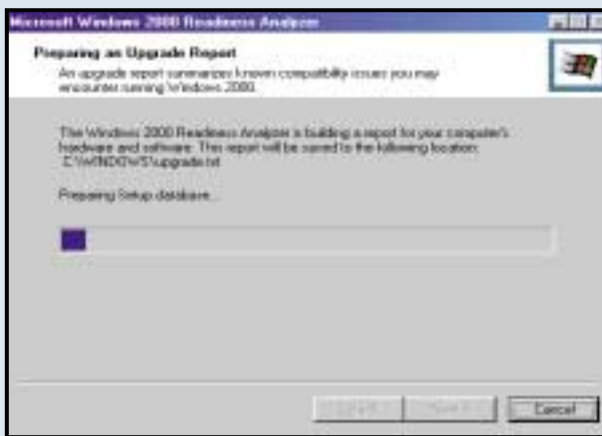
If you want to take the plunge, though, check your system meets the minimum hardware requirements: Pentium 133, 64MB of RAM (more recommended) and a 2GB hard disk.

If you get past this hurdle, there are still other things to check. First, your hardware must be compatible with Windows 2000. There are loads of potential hardware configurations and it would take a very long time to trawl through Microsoft's website to find them all. Luckily, the company has produced a useful tool that checks your system for any potential problems. This was featured on last month's cover CD, or you can download it from the Microsoft site.

It's important to make sure that not only is the hardware itself compatible with Windows 2000 but also that the drivers are. Microsoft bundles a lot of digitally signed drivers with the operating system, but if your hardware isn't among them, you'll have to check with the manufacturer to see if there has been an update.

Unfortunately, the process doesn't end there. You'll also have to make sure that any software you have installed will work with Windows 2000. At the moment, there's quite a lot that doesn't, but as time goes by patches are bound to be released. It's a good idea to know exactly what you might lose before you install, though, as this will affect your upgrade decision. The same tool from Microsoft also checks for any software incompatibilities, but it's a good idea to check with the product vendor for up-to-date information.

One further aspect that can affect the stability of your system is the system BIOS. One of the most important aspects of Windows 2000 management is the Advanced Configuration and Power Interface (ACPI). Your BIOS doesn't necessarily have to support this for Windows 2000 to work, but if it does it'll be a big help. You may need to update your BIOS to get ACPI to work properly with Windows 2000, or even simply to get Windows 2000 working at all – check with your motherboard manufacturer for the latest news.

HP **Vectra V1600 (D8649N)**

HP HAS GIVEN US a reasonable machine, but unfortunately it is way below the specifications of other machines for the price, so it loses out on the value for money front. There's a Pentium III 600EB processor at the heart of the PC, mounted onto an FIC motherboard. This has an Intel 820 chipset, and is one of only two machines to use RAMBUS memory. 128MB of RAMBUS running at 600MHz sits in a single RIMM slot, leaving one free for future expansion. There's a single-head Matrox Millennium G400 graphics card in the AGP slot loaded with 32MB of memory. There's only one other card in the motherboard – a 3Com Etherlink 10/100 network adaptor. This leaves three further PCI slots free and two ISA slots.

There's one nice surprise in the case – HP has decided to pack its own power protection device into a 5.25in bay. This acts as a UPS: if there is a power failure it will automatically put the PC into hibernate mode. We liked this feature a lot, and it doesn't add much (£52) to the overall cost of the system. Sitting above this is an HP CD-RW. This is a good choice for a backup device, but we would have preferred to see the addition of another drive to enable copying on the fly. The 30GB Maxtor hard drive is mounted in an internal bay that faces to the side of the case, making it very easy to remove should you need to, and also to add a new drive to the bay above it.

The biggest disappointment, however, is the monitor. We asked all the manufacturers to supply us with a 19in model, but HP simply wasn't able to do this and keep under the price limit. The HP75 monitor is a fairly uninspiring 17in shadow-mask affair, and it represents poor value for money. On top of this, HP sent us a US keyboard, but we presume this was just a simple mix-up and it will sell the correct model to consumers. Build quality could also be improved upon, as the cables were messy inside our review unit.

All in all, we were not impressed with the Vectra – it simply isn't in the same class as the machines which scooped our awards this month.

DETAILS

PRICE £2,009.25 (£1,710 ex VAT)
CONTACT HP 0990 47 47 47
www.hp.com/uk
PROS Power-protection device included
CONS Small monitor, poorly specified for the price
OVERALL Doesn't excel in this company

BUILD QUALITY	★★★★
PERFORMANCE	★★
VALUE FOR MONEY	★★
OVERALL RATING	★★

Mesh **Matrix 800 Pro**

MESH'S PC IS a good system, but unfortunately it loses out in the value for money stakes. Starting with the processor, there's an 800MHz Athlon inside the case, mounted on an MSI K7 Pro motherboard, using AMD's 750 chipset. There's 256MB of PC100 SDRAM contained in a single stick, and this leaves two further memory slots free for future expansion.

A large 34.2GB IBM Deskstar sits in a 3.5in drive that will be more than enough for most. For backup, you can turn to the Iomega Zip 250 drive. This will be of use to some people, but for the money we would have preferred to have seen a CD-RW. There's a Pioneer DVD drive in a 5.25in bay at the top of the case. The Zip has been mounted in a 5.25in bay underneath, leaving two 3.5in bays and a single 5.25in bay free.

A 32MB Matrox Millennium G400 graphics card sits in the AGP slot. This has dual-head support, but others have put in Matrox G400 Max cards. Although 3D performance isn't an issue when deciding who wins a business machine group test, if you are buying a new PC you might as well get the best value for money.

Full marks go to Mesh for inserting a modem and network card – a Diamond SupraExpress 56i modem and Intel Pro 100+ network card. This ensures that you can connect to the Internet, while still connecting to your LAN. A SoundBlaster 128 card and some Labtec 1030 speakers provide adequate sound. The drivers for this card have been approved and signed by Microsoft.

Build quality is exceptional as usual. The monitor is the excellent Taxan Ergovision 980 TCO99 19in aperture-grille monitor. Mesh bundles MS Office 2000 Professional (OEM) with this PC, giving you all the office programs you're likely to need, while ensuring maximum compatibility.

Overall, it is a good PC, but it just loses out to other manufacturers who have supplied higher-specified machines at a lower price.

DETAILS

PRICE £1,999 (£1,701.28 ex VAT)
CONTACT Mesh 020 8208 4706
www.meshplc.com
PROS Monitor, build quality, Office 2000 Professional included
CONS No CD-RW, processor and graphics card not as good value as others here
OVERALL Worth some consideration, but other manufacturers are offering more for less this month

BUILD QUALITY	★★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Panrix **Magnum 850**

THIS MACHINE benefits from excellent build quality and is a joy to behold. It's at the right price, too. Panrix has gone down the AMD road with a fast Athlon 850MHz processor. Until now, system builders have been forced to employ motherboards that use AMD's own chipset. VIA has come up with its own equivalent, the Apollo KX133, which adds support for AGP 4X and PC133 memory. The NMC-7VAX board in this PC uses this chip, although it doesn't appear to have affected the SYSmark scores dramatically. We put this down to the Athlon's off-die cache.

Two sticks of 128MB PC133 SDRAM sit in the memory slots, leaving one free. As always, we would prefer to have had this included on a single stick. Panrix has gone for a fast graphics card: a 32MB DDR nVidia GeForce card sits in the AGP slot. This has an S-Video out port. Below this is a Diamond modem and an Intel 10/100 Pro+ network card. The appropriate cable is connected for wake-on-LAN support. This leaves two PCI slots free and a single shared slot.

The excellent build quality is helped in no small part by the mammoth case. Each of the drives is secured with plastic clips that insert metal rods into the appropriate holes, making it very easy to add and remove extra devices. There should be no problem with cooling, as two extra fans have been included, and there are dual fans on the Athlon itself. The 300w power supply will ensure they are all adequately supplied.

The Mitsubishi Diamond Plus 91 monitor is an excellent choice, with the 19in Diamondtron NF tube displaying a picture that's easy to look at for extended periods. The large 27.3GB hard drive can be backed up to the Ricoh DVD/CD-RW combo drive. We would have preferred a CD-ROM drive as well, but it's not a huge issue. The bundling of MS Office 2000 SBE confirms its status as a high-end business machine, and secures this month's *Editor's Choice* award.

DETAILS

PRICE £1,991.63 (£1,695 ex VAT)
CONTACT Panrix 0113 244 4958
www.panrix.com
PROS Great monitor, speedy performance, Office 2000 SBE included
CONS Could do with a separate optical drive, 256MB of memory on two sticks instead of one
OVERALL A system aimed squarely at the business market, and a bargain to boot

BUILD QUALITY	★★★★★
PERFORMANCE	★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★★

Simply **Systemax A850A-DRW-R**

SIMPLY'S MACHINE IS well-rounded and combines a fair amount of functionality with good performance. The company has chosen to supply a fast 52-speed Creative CD-ROM, and has also thrown in a Ricoh DVD/CD-RW combo drive. You'll be able to copy CDs on the fly thanks to the bundled Nero Burning ROM 4. Sound is provided by an OEM version of the SoundBlaster Live! 1024 card, but this one is without a CD SPDIF connector. This is a shame as both optical drives have connectors for this facility. Simply has provided a three-piece speaker set from Cambridge Soundworks. These produce a fair sound and are more than adequate for business needs.

There's an amply-sized 27.2GB Maxtor hard drive situated in a 3.5in bay. Simply has joined Panrix and Mesh in going down the AMD route by supplying an Athlon 850. It uses the old faithful Gigabyte GA-7IX motherboard, utilising the AMD 750 chipset. This achieves a better SYSmark score than the Panrix machine with the latest VIA chipset. The ample 256MB of PC100 SDRAM is on two separate sticks, leaving only one slot free for future expansion. External connectivity is well catered for. There's both an HFC V.90 modem and an LNE 100TX Fast Ethernet card.

We can't agree with Simply's choice of input devices – Logitech's wireless keyboard and mouse. While this may have some appeal to home users who don't relish the idea of wires trailing everywhere, we feel that most business users will be put off by the idea of having to replace the batteries every so often.

For graphics, there's a 32MB Matrox G400 Max in the AGP slot with dual-head support for multiple monitors. This helps show off the excellent Mitsubishi Diamond Plus 91 – one of the best in this test. Build quality is good, and there's enough room for future expansion inside – one 3.5in bay and two 5.25in bays are free. The bundled office suite is the excellent Microsoft Office 2000 SBE.

All in all, this is a good machine that just fails to make it this time around.

DETAILS

PRICE £2,056.25 (£1,750 ex VAT)
CONTACT Simply Computers 0870 729 7366 **www.simply.co.uk**
PROS Good monitor, two optical drives for copying on the fly
CONS Wireless keyboard
OVERALL It just misses out on an award but is still worth consideration

BUILD QUALITY	★★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Tiny **Powerhouse 2000**

TINY'S MACHINE is fair enough as far as it goes, but it is simply outclassed by other Windows 2000 machines here. The best thing that can be said about this system is that it comes with a massive 21in monitor. The CTX EX1200 is an above-average example of a shadow-mask model with an easy-to-use OSD and a sharp, clear screen.

Inside the case is a Pentium III 700E with on-die cache but no support for a 133MHz front-side bus. 128MB of PC100 SDRAM sits in a memory slot, leaving one free. Graphics are provided by a WinFast 3D S325 based on the nVidia TNT2 M64 chipset. Unfortunately, the drivers shipped with the system were unable to cope with our Quake III test, and even when we had updated these it still performed very poorly. As this is a business group test, though, this is not a major issue. The sound comes from an onboard Creative chip. Combined with the average Tiny-badged speakers it produced an acceptable sound.

A Mitsumi CD-ROM drive sits in the uppermost 5.25in bay – fine as far as it goes, but we would have preferred to see a DVD drive for compatibility with upcoming software.

Where this machine really differs from the rest is in its backup facilities. Tiny was the only manufacturer to offer a DAT drive. The HP CI537A DDS-3 drive has a 24GB compressed capacity. Although the IBM Deskstar drive is a larger 27.3GB, this backup tape drive will still be enough to handle the storage needs of most people. This is a SCSI device, so it's connected to an Adaptec card situated in a PCI slot directly below the AGP slot.

Tiny has opted for a Micro ATX motherboard (an MSI 6156) and case, and we felt this was a mistake in this group test. It means that Tiny has been hard pressed for space inside the smaller case and this has resulted in a messy interior, although the cables are secured to prevent them interfering with any fans. There's very little scope for upgrading – only one shared slot and a single internal 3.5in bay are free. On top of that, no office suite has been supplied with the PC.

Ultimately, this machine is too expensive and under-specified to win any awards here.

DETAILS

PRICE £2,348.83 (£1,999 ex VAT)
CONTACT Tiny 01293 821 555
www.tiny.com
PROS 21in monitor
CONS Expensive, no office suite, Micro ATX case
OVERALL Not one we would recommend

BUILD QUALITY	★★★
PERFORMANCE	★
VALUE FOR MONEY	★★
OVERALL RATING	★★

Windows Millennium on the horizon

It's not just NT that is getting a Microsoft makeover – an update to Windows 98 will also launch later this year. Called Windows Millennium, it is supposed to include a raft of new features, as well as being more stable and boasting faster performance. We've taken a sneaky look at an early second beta, and at the new features it contains.
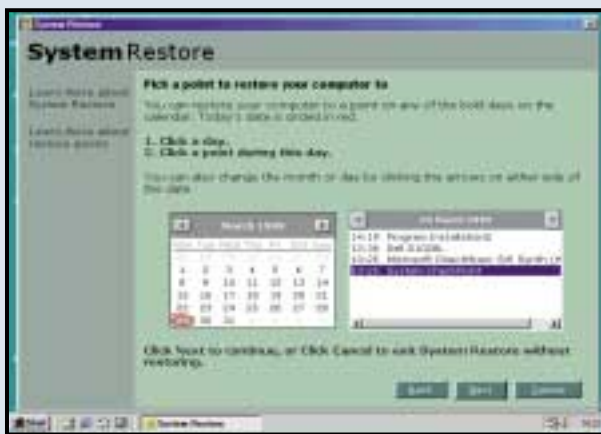
The GUI has had a bit of a makeover, and at this stage it looks like a carbon copy of Windows 2000 with the My Documents, My Network Places and My Computer in the same positions and with the same icons.

Underneath, however, things are very different to Windows 2000. Millennium is still based on the same old DOS/Windows hybrid code as Windows 98, although Microsoft appears to be trying to remove as much of the legacy code as possible. DOS is still there, but it's hidden from the user – there's no option to boot into it at startup and it's been removed from the Start menu. To access it you have to create a Millennium boot disk.

Dial-up networking also gets a revamp, as will Internet Connection Sharing. There will be a series of handy wizards to help you set up a home network, and everything is in place to support high-speed Internet access. The help files have undergone a serious redesign, and actually look as though they may be of some use this time around.

Internet Explorer and Outlook Express get updates and you can download the current beta of this (version 5.5) from the Microsoft site to see the differences for yourself. In exactly the same way as Windows 2000, Explorer will include a thumbnail preview of image files, and you can zoom in and out of these if you want.

System management is taken a bit more seriously as well. The best new program will be the System Restore utility. This is similar to the GoBack and Secondchance products on the market today and it aims to restore your hard drive to a point in time where everything worked fine. This will doubtless save Microsoft money on a lot of technical support calls.

Msconfig is more powerful in Millennium and covers extra aspects of your system such as static Virtual eXtended Drivers (VXD). Some form of Dynamic Link Library (DLL) protection will be there, although exactly what form it will take is unclear at the moment.

It's still too early in the day to say whether the final version will be worth buying or not, but keep an eye on *PCW* for a full review soon.

Viglen **HomePro P3-866JJr**

VIGLEN HAS submitted an attractive system at a competitive price. It has managed to steal the prize for the highest-clocked processor in the group – a Pentium III 866MHz. This is supported by a massive 256MB of PC100 SDRAM on one stick, leaving a further slot free for expansion. The Intel board onto which they are mounted appears to have stunted the fast chip's performance slightly though, as this comes seventh in the SYSmark league. This is probably due to the fact that the 820 chipset the motherboard uses was never designed with SDRAM in mind and can't show off the processor when this type of memory is used. However, it is still a fast machine that would be well able to perform any of its intended tasks.

The onboard sound has been disabled in the BIOS, and Viglen has covered it up with an explanatory sticker to avoid confusion. A SoundBlaster Live! 1024 OEM card with CD SPDIF-out takes its place. A 3Com Winmodem sits in a PCI slot together with an Intel Pro 100+ network card. This gives all users the ability to connect to the Internet and to share files and printers in the office. Both a Pioneer DVD and a Sony CD-RW are present, so all the bases are covered. Both of these drives have audio cables connected to the sound card – an excellent touch that no other manufacturer has remembered.

A very good Viglen-badged 19in Trinitron monitor sits on the desk. This is bright and clear, managing 85Hz at 1,600 x 1,200. A Guillemot 3D Prophet supplies the image. This nVidia GeForce card has 32MB of DDR memory on board, helping it to get right up there in Quake III with a score of 63.7fps.

A large 34.2GB IBM Deskstar drive will keep you going for some time, and Works Suite 2000 comes pre-installed to get you productive from day one. There's a three-piece speaker set bundled, as well as a Microsoft Sidewinder Precision Pro joystick – a bit strange for an office system but it does represent good value for money.

Overall, this is a fantastic buy and gets this month's *Highly Commended* award.

DETAILS

PRICE £1,996.33 (£1,699 ex VAT)
CONTACT Viglen 020 8758 7000
www.viglen.co.uk
PROS Latest technology at an affordable price, superb build quality
CONS Only comes with Works Suite
OVERALL It has more of a multimedia focus than a business one, but an excellent buy nonetheless

BUILD QUALITY	★★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★★

Watford **Aries 72000**

WATFORD HAS CHOSEN a slightly unusual route for entry into this group test. It has combined a very interesting motherboard with Windows 2000 to produce a system with a difference.

The excellent Gigabyte BX2000+ motherboard has a Promise PDC20262 chip onboard. This has allowed Watford to package three huge 40GB Maxtor hard drives. One has all the program files and data on it, while the other two are configured as striping to give the system a performance boost. The board utilises a BX chipset, which gives it an extra performance lift in the same vein as the Evesham machine. The Promise chip also means that the hard drives can be run on the UltraDMA66 standard.

A Pentium III 733EB – plus 256MB of PC133 SDRAM – form the system's backbone. This helps it outperform Dell's 800MHz machine with 700MHz RAMBUS memory. Unfortunately, the memory is on two separate sticks, but at least there are still two further memory slots left for expansion.

A Ricoh DVD/CD-RW combo drive is provided, although again we would like to have seen another drive to enable copying on the fly. It's not a huge issue, though. A VideoLogic Aureal Vortex 2 sits in a PCI slot. This comes with an optical out port, and the CD cable has been connected as it should be. An HCF modem and Intel Pro 100+ networking card provide connectivity to the outside world, giving users the ability to connect to the Internet whatever their corporate setup. A Creative Labs GeForce card with 32MB of DDR memory is also included. This gives the machine a good Quake III score – not strictly necessary for a business machine. The AOC Spectrum 9GIrs 19in shadow-mask monitor is under par compared to others here. We found the display to be quite average. There's no office suite bundled, which is a bit of a let down.

This machine is a fast mover overall, but most people won't need the striping functionality. We would have preferred the money to have gone on a better monitor and a full office suite.

DETAILS

PRICE £2,232.50 (£1,900 ex VAT)
CONTACT 0780 729 5600
www.watford.co.uk
PROS Well built, interesting to see a system with hard disks set as striping...
CONS ...but hardly anyone needs it, monitor needs improvement, no office suite included
OVERALL It could appeal to a few potential customers, but it wasn't quite what we were looking for here

BUILD QUALITY	★★★★★
PERFORMANCE	★★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

How we did the SYSmark 2000 tests

SYSmark 2000 allows comparisons between systems based on the performance of real applications running on Windows 2000, NT4, 98 and 95. It comprises 12 application workloads and a management program, which sets up the workloads, times their execution, and reports performance results. Each workload consists of a real application and a test script that sends commands to the application.
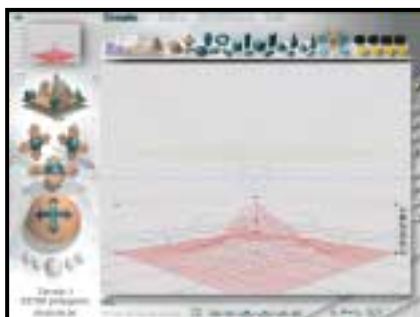
The workloads are divided into two categories: office productivity and Internet content creation. We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It loops three times, rebooting between each workload.

After SYSmark 2000 is run, it assigns the system a performance rating for each application, for each of the two categories, and an overall rating. Application ratings are based on a comparison of workload run-times between the system being tested and a fixed calibration platform. A rating of 100 indicates the test system has performance equal to that of the calibration platform, 200 indicates twice the performance, and so on. The calibration platform is based on a Pentium III 450MHz processor, an Intel 440BX chipset motherboard, 128MB of SDRAM, a 32MB Diamond Viper V770 Ultra graphics card, an IBM DJNA 371800 and Windows 98SE.

Each category rating is a geometric mean of the workload ratings in that category. The overall rating is a weighted geometric mean of the category ratings.

Office productivity
Corel CorelDraw 9.0
This script first takes an abstract design, applies a Corel Art Stroke to it and runs various filter effects. It then creates and manipulates a

scene composed of vector graphics. Next, it takes a raster image and applies effects. It also creates several 3D objects and performs 3D manipulations. Finally, it collates several of the images it created and publishes them as a website.

Corel Paradox 9.0
Paradox imports a large text file and creates a database table. It does SQL-style queries on this table and runs a find duplicates query. Next, it continues to import other text files, formatting and exporting each to HTML. Then it opens up some query forms, enters additional data and produces reports based on queries. Reports are exported to HTML.

Microsoft Word 2000
This workload invokes word processing functions including editing, spell checking, search and replace, font change, copy and paste, print preview, merge mail fields, insert hyperlinks, background and table formatting plus opening and viewing HTML pages.

Microsoft Excel 2000
Operations include closing and opening spreadsheets, HTML pages and data in text files, spell checks, editing, formula calculation, plotting data in a chart or histogram,

OpenGL performance tested via Quake

Bryce 4 script manipulates wire frame scenes

formatting charts and cells, analysing data in pivot tables and naming a cell and inserting hyperlinks.

Microsoft PowerPoint 2000
Operations include spell checking, editing, formatting and moving pictures, applying templates, formatting tables in slides, inserting hyperlinks, applying header and footer data formatting charts, applying graphic and sound effects and adding movie files.

Dragon NaturallySpeaking Preferred 4.0
The script plays a pre-recorded wave file using Dragon's PlayWave function. The utility feeds this wave file into NaturallySpeaking, which then converts the wave file to text.

Netscape Communicator 4.61
The script simulates a user loading, viewing and navigating common web pages. First, it opens a website of Shakespeare plays and selects and loads the entire texts several times. Then it loads a page consisting of large tables, thumbnails and images, and cycles through viewing the images. Next pages with mixes of graphics, tables and text are loaded and the script carries out some text searching.

Internet content creation
Adobe Premiere 5.1
This script composes pictures, video and audio clips into a movie. It creates an animation of about 16 BMP files and other AVI clips and puts transitions between them. It also superimposes two audio tracks and runs the audio through several filters.

Adobe Photoshop 5.5
The script loads, resizes, zooms out of images, applies filters to the images, changes mode and colour settings, adjusts image brightness and contrast and saves the image to a JPEG file for web use.

Avid Elastic Reality 3.1
The workload sets up and renders a morph between two MPEG2-sized images (720 x 480 pixels, roughly 750KB).

MetaCreations Bryce 4
This script opens an assembled wire frame scene and renders it to the final image. Then a new image is opened and saved in Metastream video format. Another image is opened and saved in an HTML-compatible format.

Microsoft Windows Media Encoder 4.0
The input file is an AVI clip that is encoded using the MPEG-4 Video Codec.

Quake III
We use the shipping version of Quake III: Arena (1.11) to test each system's OpenGL performance. The settings were: video mode: 1,024 x 768, colour depth: 16bit, full screen, highest possible texture detail; texture quality: 16bit; texture filter: bilinear, lighting, lightmap. At the command prompt we typed:

```
timedemo 1
demo demo001
```

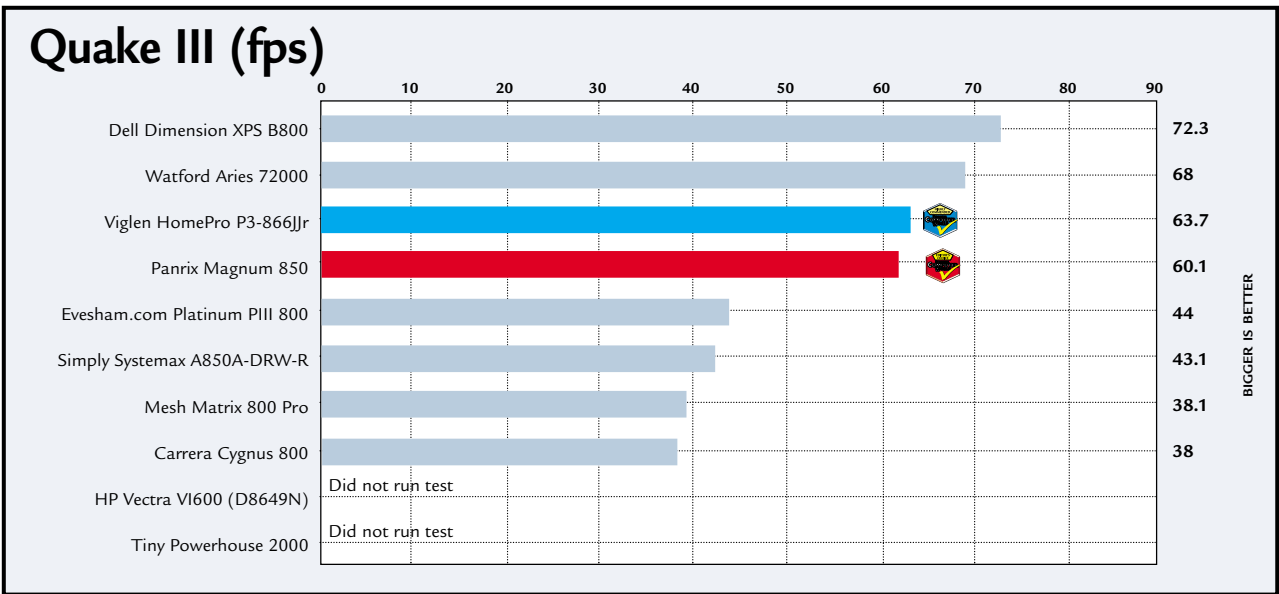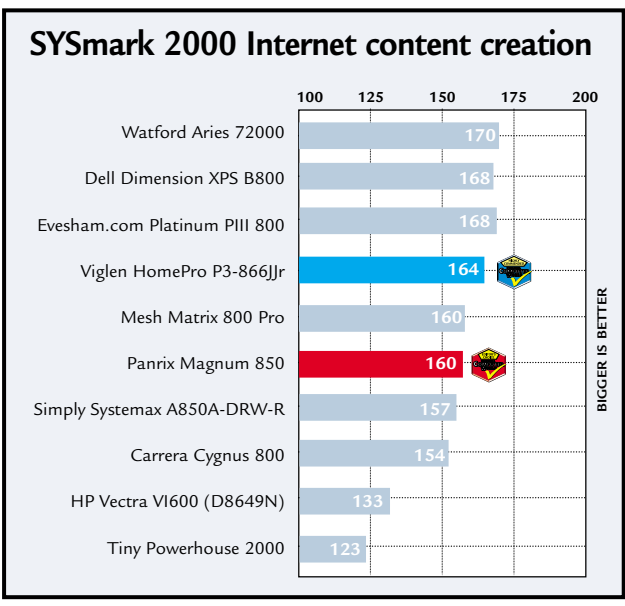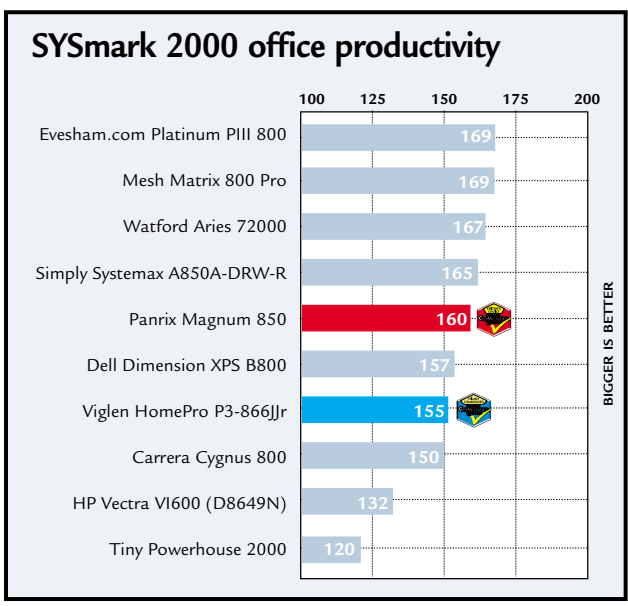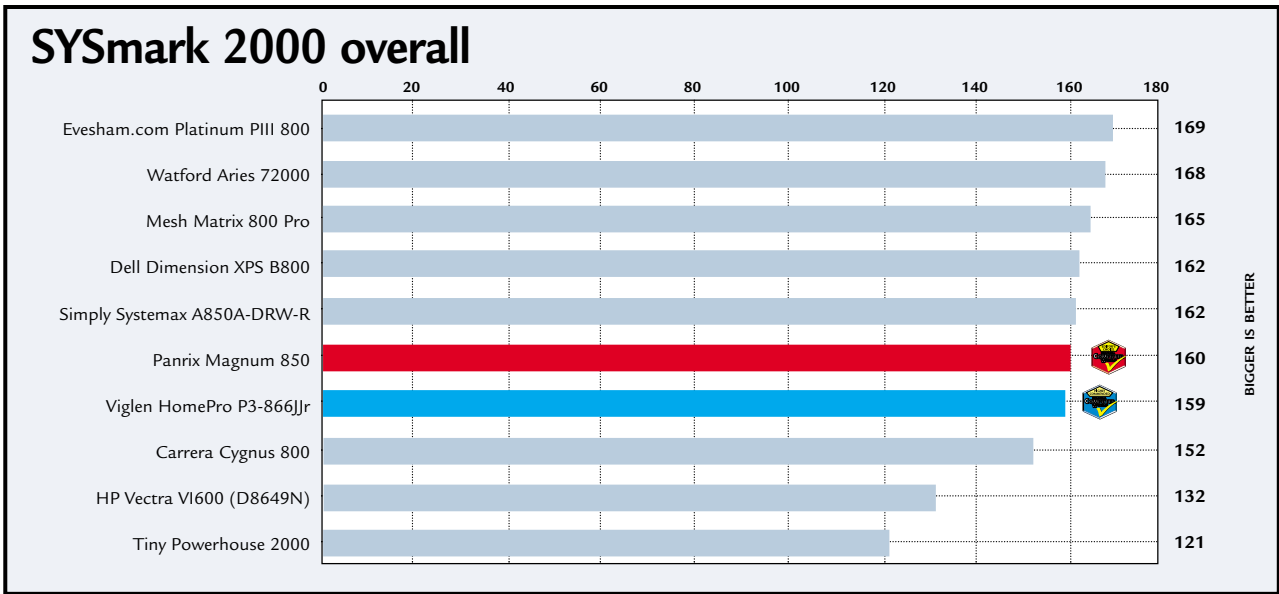This runs demo 1 and records the frames per second (fps).

SYSmark 2000 overall

	Score
Evesham.com Platinum PIII 800	169
Watford Aries 72000	168
Mesh Matrix 800 Pro	165
Dell Dimension XPS B800	162
Simply Systemax A850A-DRW-R	162
Panrix Magnum 850	160
Viglen HomePro P3-866JJr	159
Carrera Cygnus 800	152
HP Vectra VI600 (D8649N)	132
Tiny Powerhouse 2000	121

BIGGER IS BETTER

SYSmark 2000 office productivity

	Score
Evesham.com Platinum PIII 800	169
Mesh Matrix 800 Pro	169
Watford Aries 72000	167
Simply Systemax A850A-DRW-R	165
Panrix Magnum 850	160
Dell Dimension XPS B800	157
Viglen HomePro P3-866JJr	155
Carrera Cygnus 800	150
HP Vectra VI600 (D8649N)	132
Tiny Powerhouse 2000	120

BIGGER IS BETTER

SYSmark 2000 Internet content creation

	Score
Watford Aries 72000	170
Dell Dimension XPS B800	168
Evesham.com Platinum PIII 800	168
Viglen HomePro P3-866JJr	164
Mesh Matrix 800 Pro	160
Panrix Magnum 850	160
Simply Systemax A850A-DRW-R	157
Carrera Cygnus 800	154
HP Vectra VI600 (D8649N)	133
Tiny Powerhouse 2000	123

BIGGER IS BETTER

Quake III (fps)

	Score
Dell Dimension XPS B800	72.3
Watford Aries 72000	68
Viglen HomePro P3-866JJr	63.7
Panrix Magnum 850	60.1
Evesham.com Platinum PIII 800	44
Simply Systemax A850A-DRW-R	43.1
Mesh Matrix 800 Pro	38.1
Carrera Cygnus 800	38
HP Vectra VI600 (D8649N)	Did not run test
Tiny Powerhouse 2000	Did not run test

BIGGER IS BETTER

Table of features

Manufacturer	Carrera	Dell	Evesham.com	HP
Product	**Cygnus 800**	**XPSB800**	**Platinum PIII 800**	**Vectra VI600 (model D8649N)**
Price (ex VAT)	£1,599	£2,249	£1,649	£1,710
Price (inc VAT)	£1,878.83	£2,642.58	£1,937.58	£2,009.25
Telephone	020 8307 2800	0870 152 4850	0800 038 0800	0990 47 47 47
Fax	020 8307 2857	0870 907 4695	08707 299 795	None
URL	www.carrera.co.uk	www.dell.co.uk	www.evesham.com	www.hp.com/uk
Hardware specs				
Processor	Pentium 800EB	Pentium III 800EB	Pentium III 800E	Pentium III 600EB
RAM/type	128MB/PC133	256MB/RDRAM PC700	256MB/PC100	128MB/RDRAM PC600
Occupied RAM slots/spare RAM slots	1/1	1/1	1/3	1/1
Max memory in this configuration	384MB	512MB	1GB	384MB
Maximum memory supported by motherboard	512MB	512MB	1GB	512MB
Hard disk (manufacturer and model)	IBM Deskstar	Quantum Fireball Plus LM	Maxtor 52049U4	Maxtor 53073U6
HD size/interface	27.3GB/EIDE	30GB/EIDE	20GB/EIDE	30GB/EIDE
Storage drive model and manufacturer	Matsushita CD-RW CW-7585	Iomega Zip	Panasonic LS120	HP 8000 CD-RW
Size of storage drive media	650MB	250MB	120MB	650MB
Storage drive interface	EIDE	EIDE	EIDE	EIDE
Motherboard components				
Motherboard manufacturer	Supermicro	Intel	Chaintech	FIC
Model/chipset	370SCD/820	Dell OEM/820	6BTM/440BX	KC19+/820
Expansion and I/O				
No of 3.5/5.25in bays	3/4	5/2	4/2	3/3
No of free 3.5/5.25in bays	1/2	2/1	2/1	1/1
No of PCI/ISA/shared slots	5/0/0	5/0/0	3/2/1	4/2/0
No of free PCI/ISA/shared slots	3/0/0	3/0/0	1/2/1	3/2/0
No of USB/Serial/Parallel/PS2	2/2/1/2	2/1/1/2	2/2/1/2	2/2/1/2
Multimedia				
CD/DVD manufacturer and model	Matsushita DVD SR8585	NEC DV-5700A	Pioneer DVD-114	None
Sound card manufacturer	Videologic	Creative	Creative	Crystal onboard
Sound card model	Sonic Vortex 2	SoundBlaster Live! 1024 OEM	SoundBlaster 128	Soundfusion
Speakers (manufacturer and model)	Altec Lansing ACS54	Altec Lansing ADA 885	Zyfi 2 Piece	Genric HP badged
Graphics card manufacturer and model	Matrox G400 Dual Head	Dell OEM GeForce	Matrox G400 Max Dual Head	Matrox G400 Single Head
Chipset	G400	GeForce	G400	G400
RAM/max RAM and type	32MB/32MB/ SGRAM	64MB/64MB/DDR	32MB/32MB/SGRAM	32MB/32MB/SGRAM
Graphics card interface	AGP	AGP	AGP	AGP
Monitor manufacturer/model	Iiyama Vision Master 451	Dell badged P991	Taxan Ergovision 980 TCO99	HP 75
Monitor size/max viewable diagonal	19in/18in	19in /17.98in	19in /18in	17in/16in
Maximum resolution and refresh	1,920 x 1,440/75Hz	1,600 x 1,200/85Hz	1,600 x 1,200/75Hz	1,280 x 1,024/75Hz
Other information				
Modem manufacturer and model	None	None	None	None
Misc hardware	Intel Pro 100+ NIC	3Com 3C900B-TPC NIC	3Com 3CR990 NIC	3Com 3C905C-TX NIC HP Power protection D7524A
Bundled software	Lotus SmartSuite Millennium	Microsoft Office 2000 SBE Norton AntiVirus	None	Easy CD Creator
Standard warranty	2 years on site	1 year on site, 2 years C&R	2 years on site	1 year RTB

KEY: * = No CD SPDIF port; **RTB** = return to base; **C&R** = collect and return

	MESH COMPUTERS	PANRIX	SIMPLY COMPUTERS	TINY	VIGLEN	WATFORD
	MESH MATRIX 800 PRO	MAGNUM 850	SYSTEMAX A850A-DRW-R	POWERHOUSE 2000	HOMEPRO P3-866JJR	ARIES 72000
	£1,701.28	£1,695	£1,750	£1,999	£1,699	£1,900
	£1,999	£1,991.63	£2,056.25	£2,348.83	£1,996.33	£2,232.50
	020 8208 4706	0113 244 4958	0870 729 7366	01293 821 555	020 8758 7000	0780 729 5600
	020 8208 4493	None	0870 727 4002	None	020 8758 7080	0870 729 5648
	www.meshplc.co.uk	www.panrix.com	www.simply.co.uk	www.tiny.com	www.viglen.co.uk	www.watford.co.uk
	Athlon 800	Athlon 850	Athlon 850	Pentium III 700E	Pentium III 866E	Pentium III 733EB
	256MB/PC100	256MB/PC133	256MB/PC100	128MB/PC100	256MB/PC100	256MB/PC133
	1/2	2/1	2/1	1/1	1/1	2/2
	768MB	512MB	512MB	384MB	512MB	768MB
	768MB	768MB	768MB	512MB	512MB	1GB
	IBM Deskstar	Maxtor 92732U8	Maxtor 92720U8	IBM Deskstar	IBM Deskstar	3 x Maxtor 54098U8
	34.2GB/EIDE	27.3GB/EIDE	27.2GB/ EIDE	27.3GB/EIDE	34.2GB/EIDE	40.9GB/EIDE
	Iomega Zip	Ricoh CDRW/DVD MP9060	Ricoh CDRW/DVD MP9060A	HP DAT C1554A	Sony CDRW CRX140E	Ricoh DVD/CDRW MP9060A
	250MB	650MB	650MB	24GB Compressed	650MB	650MB
	EIDE	EIDE	EIDE	SCSI	EIDE	EIDE
	MSI	NMC	Gigabyte	MSI	Intel	Gigabyte
	6195/AMD 750	7VAX/VIA KX133	GA7IX/ AMD 750	6156/Via	CC820/820	BX2000+/BX
	4/3	4/2	3/4	3/2	4/2	4/5
	2/1	2/2	1/2	1/0	2/0	2/4
	5/0/1	4/0/1	4/1/1	2/0/1	5/0/0	5/0/1
	2/0/1	2/0/1	1/1/1	0/0/1	2/0/0	3/0/0
	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2
	Pioneer DVD 114	See above	Creative 52x CD-ROM	Mitsumi CD-ROM FX482OT	Pioneer DVD 114	See above
	Creative	VIA onboard	Creative	Creative Onboard	Creative	Videologic
	SoundBlaster 128	N/A	SoundBlaster 1024 OEM *	64V	SoundBlaster 1024 OEM	Sonic Vortex 2
	Labtec 1030	LCS-1030 SEWU	CSW100 Speakers & Sub/w	Tiny OEM CPR-50	Altec Lansing ACS33	Yamaha YST-M555D
	Matrox G400 Dual Head	Absolute Multimedia Outrageous 3D GeForce	Matrox G400 Max Dual Head	Winfast 3D S325	Guillemot 3D Prophet	Creative Annihilator Pro
	G400	GeForce	G400	TNT2 M64	GeForce	GeForce
	32MB/32MB/SGRAM	32MB/32MB/DDR	32MB/32MB/SGRAM	32MB/32MB/SDRAM	32MB/32MB/DDR	32MB/32MB/DDR
	AGP	AGP	AGP	AGP	AGP	AGP
	Taxan 980	Mitsubishi Diamond Plus 9I	Mitsubishi Diamond Plus 91	CTX EX1200	Viglen 19in Trinitron	AOC Spectrum 9GLRS
	19in/18in	19in/18in	19in/18in	21in/20in	19in/18in	19in/18in
	1,600 x 1,200/75Hz	1,600 x 1,200/75Hz	1,600 x 1,200/75Hz	1,600 x 1,200/75Hz	1,600 x 1,200/85Hz	1,600 x 1,200/75Hz
	Diamond SupraExpress 56i Pro	Diamond V.90	Dynanet 56K V.90	None	3Com winmodem	Diamond SupraExpress
	Intel Pro 100+ NIC	Intel Pro 100+ NIC	HFC10/100 Network card	Intel Pro 100+ NIC	Intel Pro 100+ NIC	Intel Pro 100+ NIC
			Logictech cordless keyboard + mouse	Adaptec AHA-2940U SCSI controller	MS Sidewinder Precision Pro Joystick	
	MS Office Pro 2000 (OEM)	Microsoft Office 2000 SBE	MS Office 2000 SBE Nero 4	None	Works Suite 2000	None
	1 year on site, 2 years RTB	1 year on site, 2 years RTB	3 years on site	1 year on site	3 year on site	First year C&R

Editor's **Choice**

We gave the manufacturers a fairly free rein in this group test. We wanted a Windows 2000 machine, but it was important to us that all of the components in it were fully compatible with the new operating system. A lot of this came down to drivers – Microsoft puts some of the stability problems NT4 has had in the past down to the fact that some hardware drivers were unstable. This time around it's taking no chances and has imposed strict conditions on third parties. By digitally signing each driver required for each piece of hardware, Microsoft has ensured that they will work under Windows 2000 with no problems.

All the manufacturers managed to achieve this with one exception – the graphics card. The drivers that ship with Windows 2000 have fairly limited 3D functionality, so at the moment you're often forced to use versions that haven't been approved. At the time of writing, though, there was clearly some work that needed to be done on them. Take a look at Panrix's and Watford's Quake III scores and compare them to the Time machine in last month's group test. You'll see that, despite having equivalent or faster processor and graphics cards, they both scored lower frame rates. It's a good job, then, that Microsoft is

pitching Windows 2000 as a business and not a home user operating system – if you need fast 3D performance then you'll have to go for the faster, more flexible, but less reliable Windows 98SE.

The test itself was as closely fought as always. Most of the machines were well built and had few flaws. In the final analysis it all came down to a question of value for money.

☛ This month one manufacturer managed to beat the rest on price with a very sharply focused system. The Panrix Magnum 850 combines speedy performance with a great monitor and excellent software package. It has an Athlon 850MHz, a massive 256MB of RAM, a 32MB DDR GeForce graphics card, both modem and a network card and a large 27.3GB hard drive. Backup and DVD playback are both taken care of in the shape of the Ricoh DVD/CD-RW combo drive. The Mitsubishi Diamond Plus 91 monitor it comes with is a fantastic example of a 19in aperture-grille model, with the Diamondtron NF tube producing an excellent picture.

With Microsoft Office 2000 Small Business Edition bundled as standard, there's no reason you can't be productive from day one. Build quality is

outstanding with a case that will give you room to upgrade for years to come. Combine that with a bargain basement price of £1,695 ex VAT and it's a clear winner of this month's **Editor's Choice**.

☛ Coming up closely behind was the Viglen HomePro P3-866JJr, taking this month's **Highly Commended** award. This machine had more of a multimedia focus than the Panrix so if that's what you are after then this could be an option. Built around the fastest-clocked processor in the test, a Pentium III running at 866MHz, it also has a huge 256MB of memory, modem and network card, 32MB DDR GeForce graphics card and a 34.2GB hard drive.

On this machine, in addition to the CD-RW drive, you'll also find a separate DVD drive, allowing you to copy from one disk to another on the fly. The aperture-grille monitor is a very good 19in model, and you get a good three-piece speaker set and joystick, too. The bundled software is Microsoft's Works Suite 2000, which will suffice for most users, although you may prefer a more fully-featured software suite as seen in the Panrix machine.

On the whole, it's a great package and it also comes in at a good price, costing £1,699 ex VAT.

The Panrix Magnum 850 is a sharply focused system with a great upgrade potential and a very good price

Viglen's HomePro P3-866JJr leans more towards multimedia with its sound card and speakers, and also offers a separate DVD drive