

UPGRADEABLE PC'S >>

# group test



# Business sense

**Just what every small business needs — a **sub-£1,000 upgradeable PC** that will stay the course. There's plenty of room for expansion here, in these ten top systems.**

**P**C 'obsolescence' is always a worry. If you don't buy the latest and fastest PC now, will it still be able to run the new applications which are just around the corner? With the arrival of the Pentium III [reviewed in full on p122] and the imminent revolution in the processor market, what to buy is a vexed decision. Here, we are looking at small-business machines for a modest £999 (ex VAT) but all had to be capable of being upgraded to prolong their lives as long as possible.

**There was an almost equal split** between vendors who opted for the newest versions of the Celeron and those who went for the Pentium II. None opted for the current Socket 7 processors such as the AMD K6-2 and the Cyrix III, as Socket 7 technology is coming to the end of its life and so would not make a good choice for a machine that will be upgraded in future. The Pentium II may also be a relatively old processor but it is a tried and tested, well-supported technology, and if you have the right motherboard you will be able to upgrade. Even the latest Celerons, with performance fast approaching that of equally clocked Pentium IIs, are well placed for expansion. We were also looking for good, core components that would be useful to businesses; some kind of removable storage device, for instance.

All other specifications were left to the vendors' choice, letting them

interpret end-users' requirements, and as you'll see, this resulted in some interesting configurations.

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♦ Tested and reviewed by Ian Robson

## Ratings

- ★★★★★ **Highly recommended**
- ★★★★ **Great buy**
- ★★★ **Good buy**
- ★★ **Shop around**
- ★ **Not recommended**

Illustration by Wendy Latham



# Upgrade paths

**W**ith better and faster components constantly just around the corner, the purchase of a PC is a commitment to what's on offer at the time of purchase. Or will upgrading prolong the life of your PC? At the same time, while you can specify a system with enough upgrade paths to extend its lifeline as long as possible, how many of your options are economically viable? These days vendors appreciate this consumer concern over the potential lifetime of their PC, and cater for it with what seems like

invitations to delve inside their boxes.

One of the simplest and instantly effective ways to increase system performance is to add extra memory. PC100-compatible DIMMs currently cost around £1 per megabyte. These will run equally well on the slower 66MHz front-side bus of the Celeron and can be transferred to future systems using the 100MHz front-side buses of the faster PIIIs and the PIII.

**When running current software**, an upper limit of 128Mb of RAM is sufficient, but all vendors in this test had left free memory slots because realistically the amount of RAM needed to run the new crop of applications can only grow. Equally, new applications are likely to put an increasing strain on your hard disk. With full installations of software packages now reaching around 500Mb in some instances, you may find that dabbling with all that's on offer will leave you in desperate need of an increase in your storage requirements.

**Installing extra hard disks** was once accompanied by the manual configuration of CMOS settings, and in some instances special software was required to overcome inherent limitations in the capacities of the additional storage devices.

In all the machines supplied for this group test the configuration setup utility will auto-detect most EIDE devices including hard disks, and addressing disks larger than 8.4Gb is no longer an issue. Of course, installation of a new storage device requires the

availability of a bay, and although Siemens cut the choice down to just the one, this is probably the most essential device upgrade you'll need in the lifetime of your system.

**SCSI storage devices** are another option to consider but these will require both a free bay and a spare slot for the SCSI controller card. Some of the

***You may feel the need for a DVD-ROM drive***

machines on test here would be hard pushed to provide this. In the past, the rate of data transfer of

SCSI media devices was the main reason to go for this more expensive technology, but current EIDE transfer rates are comparable and certainly the cost ratios support the use of the latter devices in these £999 systems.

More substantial performance gains can be achieved by replacing either the graphics card, in some instances, or the processor. Graphics cards can have their instructions bottlenecked by modest CPUs so if you are thinking of splashing out on the latest and greatest graphics card, consider whether your processor is up to supporting it. You may end up spending more but it may prove more rewarding. And, with CPU jumper settings such as front-side bus speeds and multipliers now available through CMOS, this is becoming an attractive area for upgrading.

**All the systems** supplied to us for this group test came with BX motherboards and so will support upgrades to Intel's

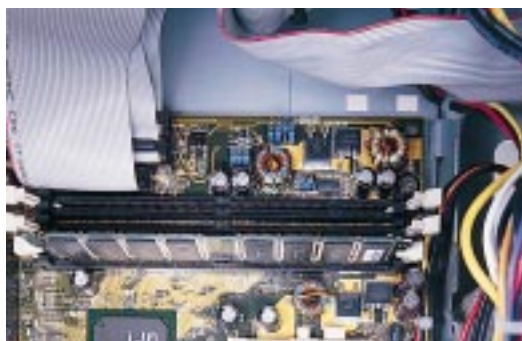
450MHz PII and to the Pentium III 450 and 500. In the case of vendors who supplied 350MHz CPUs you will see dramatic performance gains. Although the Celeron is championed as a budget CPU it currently suffers from having its front-side bus speed restrained to 66MHz. There is speculation that the faster Celerons planned for the last quarter of this year will offer support for a 100MHz front-side bus. It's not clear whether the motherboards supplied with the systems in this group test will need a BIOS flash upgrade or full replacement to support these chips, but hopefully neither will be needed.

## For the small home office

environment you may feel the need for a DVD-ROM drive. DVD is currently regarded as a home entertainment medium but will eventually be used for all software distribution thanks to its massive storage capacity and support for older CD-ROMs. NEC was an early adopter and chose to include a DVD, and all the other vendors have left at least one 5.25in bay free, although the Siemens system will need some internal repositioning.

These are just some of the essential upgrade paths open to you, and with free bus slots in most systems there is certainly room for more.

► **MAKE SURE YOU HAVE SPACE IN THE CASE TO ALLOW FOR NEW DRIVES**  
▼ **LOOK FOR PLENTY OF FREE DIMM SLOTS AND PC-100 COMPATIBLE RAM**



# The Celeron 400MHz: what's new?

In January, Intel extended its popular Celeron processor range to include 366MHz and 400MHz versions, with the latter proving a popular choice for the machines in this group test.

With its Level 2 cache — a modest 128Kb — all the attention is placed on the cache's core speed, which is the same as the processor's. In some instances this can lead to processing power comparable to that of Pentium IIs with the equivalent clock speed.

Even though on the PII the Level 2 cache is a much larger 512Kb, it runs at half the CPU frequency. But it must be pointed out that the Celeron's front-side bus speed is still constrained to 66MHz whereas the Pentium II enjoys a full bandwidth of 100MHz — some might say in an attempt to bridge the gap in those comparable performance results.

Intel has stated that to maintain Celeron as a budget option, this constraint will remain at least until the company can assess the future of the Pentium II.

The complete range of Celeron processors is provided in the single-edge

processor package (SEPP) also known as Slot1, while 400, 366, 333 and 300A megahertz processors also come in a plastic pin grid array (PPGA) form factor. PPGA is compatible with the new Socket 370, which looks like Socket 7 but with an extra row of pins. Socket 370 is proprietary and SuperSocket 7 chips such as AMD's K6-2 are not pin compatible. You will notice from our features table [pp172/173] that in the case of a vendor opting for the Celeron, the technology for motherboard connectivity has been specified.

In this group test, all the vendors opted for Slot1 as it is more readily upgradeable. The SEPP packaging technology is very similar to the Pentium



▲ THE PPGA VERSION OF THE INTEL CELERON PROCESSOR

II's single edge contact (SEC) cartridge. However, without the PII's BSRAM (Burst Static RAM) componentry, it is much cheaper to produce. It has no thermal plate or cover, although Intel claims the 0.25 micron manufacturing process reduces processor heat so that the Celeron can use a smaller heat sink.

## A QUESTION OF CACHE

Cache size is now often quoted in specifications, but what is it, and how much of it do you need?

The system's processor must have data made available to it at high speed, otherwise it will be waiting around before it can complete its instructions. To achieve maximum efficiency there should be no queue of data transfers into and out of the CPU. As the speed of CPUs has increased, the demands on memory to supply at increasingly faster rates has forced up cache speeds to bridge any data vacuum.

The primary, or Level 1 cache, is the fastest available data resource for the CPU. It can achieve these rates of data transfer because it is built onto the processor die

itself, synchronously running at the same clock frequency with no wait-states, or delays, in supplying its contents.

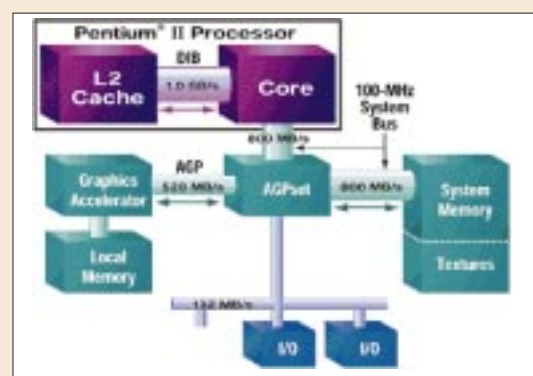
The information contained in cache is dictated by the instructions previously completed, and this data may not always be what is needed next. For this reason the processor has the ability to look beyond this data at the secondary, or Level 2, cache in the hope that the larger capacity may contain something more useful.

There are several methods of implementing Level 2 cache. It may be placed 'off-die' with clock speeds half that of the host processor, as in the PII, but improvements in manufacturing techniques have offered the chance to squeeze large amounts onto the die with clock speeds

equal to that of the CPU. However, two clock cycles can pass as wait-states while the cache is configured for the first retrieval of data, and only the subsequent retrievals will be completed at the actual CPU clock frequency.

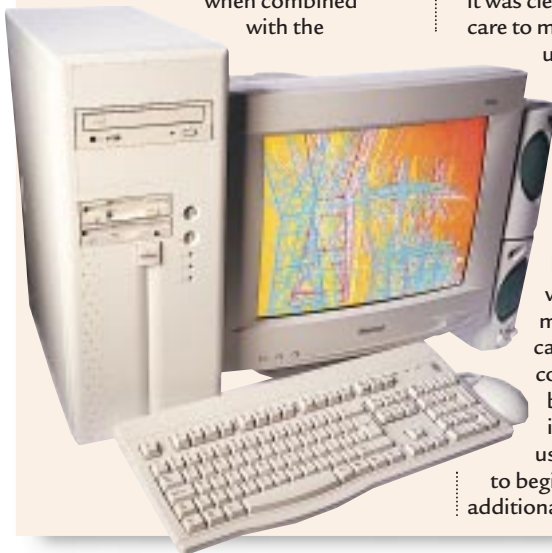
At present, the cheapest method of Level 2 cache implementation is to place it on the motherboard, with sizes ranging from 256Kb to 2Mb, although performance gains between 512Kb and 1Mb may be as low as three percent for some applications. With the on-die 128Kb of the later Celerons

producing results that give the PII a run for its money, the indication is that this is the way forward. As almost all processors are now manufactured using 0.25 micron technology and with even smaller designs imminent, you can expect to see more Level 2 cache being squeezed onto the processor die, performance increases and falling prices.



## Actinet Office 2000

**Along with MAA IT** and Siemens [pp164/166] Actinet provided a PII 350MHz — a slower-clocked processor than the others here — but made up for it by offering just a little bit extra in other areas. The 128Mb system memory runs on the 100MHz front-side bus but this wasn't enough to raise the poor performance scores produced by the processor, even when combined with the



excellent Viper550 video card with its massive 16Mb of video memory. Still, 10.2Gb of EIDE hard disk is generous and combined with an Iomega Zip 100 drive with its 100Mb removable disks, storage is fairly covered for now. Future data transfer devices can be added in the free 3.5in and 5.25in bays. Having loosened a couple of screws it was clear that Actinet has taken care to make future servicing and upgrading trouble free.

Cables are clipped in tidily and Actinet has positioned them sensibly, leaving a long enough length of cable for future components to be easily added. There was enough budget left to include PCI versions of both a 56K modem and an Ethernet card. Although the latter was constrained to just a 10Mbps bandwidth, this should suit its intended small-office usage. And, with five PCI slots to begin with, there's still room for additional cards when required.

**Actinet rounded off** this package with a quality 17in display from Hansol Electronics. Its pin-sharp image manages to extend to all four corners of the screen without lacking in brightness or colour. With a resolution of 1024 x 768 at 85Hz, it is comfortable to work with for long periods.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)

**Contact** Actinet 01952 270703  
[www.actinet.co.uk](http://www.actinet.co.uk)

**Good Points** Generous hard-disk storage. Quality display.

**Bad Points** Slow processor.

**Conclusion** Compromised by its processor.

<b>Build Quality</b>	★★★★
<b>Performance</b>	★★
<b>Value for Money</b>	★★★★
<b>Overall Rating</b>	★★★

## Carrera Charisma

**Carrera provided a tall**, plain functional case with enough space to allow a number of additional drives in future. Everywhere you look, Carrera has left space for future upgrading. All 128Mb of system memory is on a single module, leaving room for two more. Where others have opted for an extra drive for removable backup storage,



Carrera has saved on a bay by providing an LS-120 drive which also reads and writes to 1.44Mb floppies. If the 9.1Gb hard disk proves too restrictive, there are two 3.5in bays above the EIDE channels. The height of the case and the extra space within means access to the components is unrestricted and there are no obtrusive cables. Carrera has kept in mind the small-business user so this PC has the basic components required for a generic office machine, such as an

Ethernet card, and has not wasted money on over-the-top multimedia yet still allows the end-user scope to upgrade.

**Carrera offers** three levels of service module. This system comes with the initial, bronze, option which includes the delivery and unpacking of your system on a prearranged day and on-site testing of additional hardware purchased with the system.



**A 17in LG Studioworks monitor** displays a reasonable image at 1024 x 768. It is bright, and even to its extremities, but only just holds a decent refresh of 75Hz. The OSD is a little tricky to negotiate but provides all requisite functions with highly responsive graphical meters for total control.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)

**Contact** Carrera 0181 307 2800  
[www.carrera.co.uk](http://www.carrera.co.uk)

**Good Points** Powerful processor with decent memory support.

**Bad Points** Not the best monitor on offer here.

**Conclusion** A good package, suitable for most users.

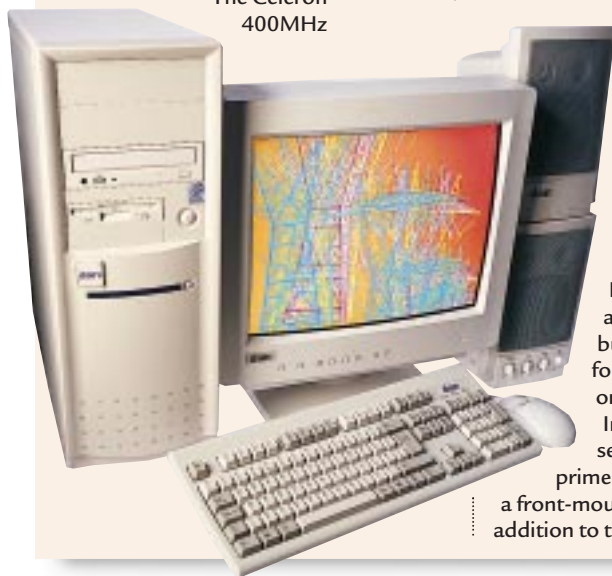
<b>Build Quality</b>	★★★★
<b>Performance</b>	★★★★
<b>Value for Money</b>	★★★★
<b>Overall Rating</b>	★★★★



## Dan Dantum II-C400/C

**The Dan was close** to being given an award in this group test but was let down by its relatively low memory specification of 64Mb rather than the 128Mb provided by most of the others. Two memory module slots are vacant, and at not much more than £1/Mb, memory is too good a bargain to be stinted on.

The Celeron  
400MHz



processor produced lower benchmark scores than the PII 400s in this test, partly because the Celeron front-side bus only runs at 66MHz rather than the 100MHz speed of the PII 400s.

Storage is not a problem on this PC. There is an LS-120 for removable media and an 8.4Gb hard disk

accessed via the EIDE channel. It should be easy to add devices in future as there is good access to the spare 3.5in and 5.25in bays. We didn't ask vendors to supply a network card or a modem but those who did mostly opted for PCI versions, taking advantage of the faster bus speeds. Dan opted for a 56K modem running on the slower ISA bus.

Inside, internal cooling seems to have been a prime consideration. There is a front-mounted full-size fan in addition to the CPU's own mini fan,

and various heat sinks scattered about on main chips.

**Dan supplied** a re-branded CTX 17in monitor with responsive front-mounted buttons. The screen image was acceptable at 1024 x 768 at 85Hz, but when working at higher resolutions the refresh rate drops to 60Hz.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)

**Contact** Dan Technology  
0181 830 1100 [www.dan.co.uk](http://www.dan.co.uk)

**Good Points** Good internal construction. Latest processor.

**Bad Points** Reduced system memory.

**Conclusion** Attention placed equally well to all areas except memory.

<b>Build Quality</b>	★★★★
<b>Performance</b>	★★
<b>Value for Money</b>	★★★★
<b>Overall Rating</b>	★★★

## Evesham EveshamVale Platinum

**Evesham constructed** a sturdy tower around a Celeron 400MHz, with 128Mb of system memory on just one module, leaving three vacant slots to fill with more RAM. Three spare slots should allow you to increase the RAM over time. A 10Gb EIDE hard disk is supplied as permanent storage with an Iomega 100Mb Zip

drive for removable media, although it does take up one 5.25in device bay, leaving only one for additional devices. PC99, the industry specification for development in 1999, dictates that support for the slower ISA bus is no longer required. It's a shame, because this system has room for three ISA cards, including the slot shared with a

spare PCI. It allows you room to add legacy ISA cards, though. Evesham opted for faster PCI versions for its 56K modem and 10/100Mbit Ethernet card. The small office seems to have been catered for but in future you may need to squeeze in a few extra components. Inside the system, individually wrapped groups of cables are clipped tidily,



with just the right length of cable left free on spare connectors.

**A TCO99 version** of Taxan's 17in Ergovision 735 has been chosen as the monitor for this system, and is a wise choice. An OSD provides responsive control over a clean, bright image, fully focused at a resolution of 1024 x 768 at 85Hz.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)

**Contact** Evesham 0800 496 0800  
[www.evesham.com](http://www.evesham.com)

**Good Points** Latest high-speed processor. Generous storage.

**Bad Points** Zip drive placed in a wrong-sized bay.

**Conclusion** Excellent system, still open to upgrade options.

<b>Build Quality</b>	★★★★
<b>Performance</b>	★★★★
<b>Value for Money</b>	★★★★★
<b>Overall Rating</b>	★★★★



## Gateway GP6-400

**Gateway has provided** inspired machines in the past, but this latest was a little disappointing. Supplying a system with a PII 400MHz processor seems to have significantly reduced the amount of money available for other components. While most other vendors in this test opted for 128Mb of RAM, Gateway



provided only 64Mb of system memory on a single module, leaving just one module free to increase the memory quota. The 6.4Gb hard disk will very quickly fill with applications. Even if you only use an application occasionally to read the odd document, it is far easier to keep it on the hard disk rather than messing around uninstalling or customising initial installations to save on space. A removable storage device could have eased this problem but even this had been left out. There is no modem and no network card; even the graphics has been constrained to an on-board chip, as has the sound. So where has all the money gone? Well, Gateway has spent a little extra on a fan and duct system for the CPU but this will be of little comfort to whoever buys this system. There is room for devices on the four vacant PCI slots and you could combat the storage problems yourself by

adding devices into the ample bays available. Nevertheless, Gateway has provided perhaps the best 17in monitor in this test. Its pin sharp display and extremely high refresh rate of 100Hz at 1,024 x 768 is complemented by quality colour registration and an even brightness, right up to the bezels.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)  
**Contact** Gateway 0800 552000,  
[www.gateway.com/uk](http://www.gateway.com/uk)

**Good Points** Excellent monitor. Very upgradeable system.

**Bad Points** Stunted memory and storage.

**Conclusion** A poor balance of components.

<b>Build Quality</b>	★★★★
<b>Performance</b>	★★★
<b>Value for Money</b>	★★
<b>Overall Rating</b>	★★★

## Lexon Maxima 702EL

**Lexon, like others** in this test, opted for Intel's PII 400MHz but it has not stinted on other components to get within our price bracket, especially considering the 56K PCI modem and 10/100Mbit PCI Ethernet card provided. With the addition of a hub, the Maxima could feasibly serve the web to others in a workgroup. The future-proofing aspects of this PC are not



overwhelming. There is room for only one more PCI card and there are only 5.25in bays available for extra hard disks or other devices. The option to replace components is yours, though, and this applies equally to the CPU, which can be notched up to the currently available 450MHz PII or even a PIII.

**For the keen tinkerer**, this model really invites you inside. With the loosening of just one screw you can appreciate the care taken in the construction of this machine. Individually wrapped cables are clipped back and easy access is provided to all components of vital importance. However, it's quite a let-down when you realise that replacing the CPU would mean temporarily removing the power supply or levering out the whole motherboard.

**A 17in Mag Innovision** monitor is provided with a marvellous dial control for sweeping around the OSD using only one finger. But apart from this, working in or above a resolution of 1024 x 768 is quite a strain on the eyes and there is a mild bloom to the characters, creating overall fuzziness on an otherwise bright, colourful display.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)  
**Contact** Lexon Technology  
0181 667 1173 [www.lexonpc.com](http://www.lexonpc.com)

**Good Points** Excellent performance.

**Bad Points** Constrained maintenance options. Poor display quality.

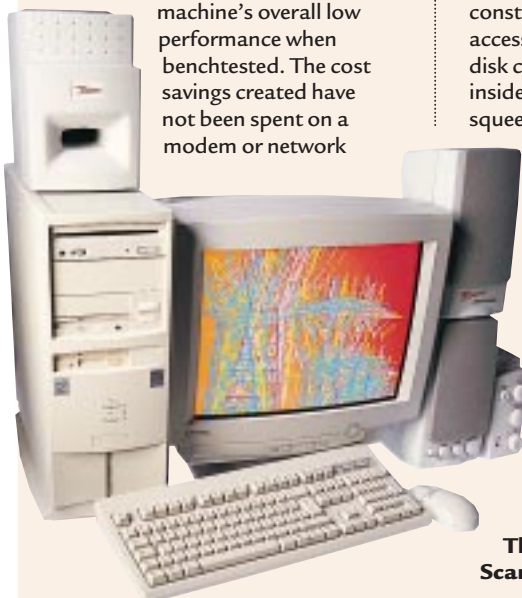
**Conclusion** Efforts to provide speed have left other areas unattended.

<b>Build Quality</b>	★★
<b>Performance</b>	★★★★★
<b>Value for Money</b>	★★★★
<b>Overall Rating</b>	★★★



## MAA IT Rim 6350P

**Best known** for its servers, MAA IT submitted a rather modest system. It generously supplied a full memory quota of 128Mb running on the full 100MHz front-side bus. However, it cut back on processor power with Intel's PII 350MHz which contributed to the machine's overall low performance when benchtested. The cost savings created have not been spent on a modem or network



card but there are enough spare slots to fit both PCI or ISA versions later, depending on the end-user's requirements. Housed in a good-quality case is a generous 10.2Gb EIDE hard disk complemented by Iomega's popular Zip 100 for backup. Adding further devices is constrained to one 5.25in front-accessed bay, although the hard disk could be re-mounted on the inside front of the system to squeeze in another front-facing 3.5in device. Twisting off the one thumbscrew allows access to the inside of the machine via a side panel. Future upgrading will be made easier by the way this PC has been built. There is clear access to all the internal components and the cables have been tidily clipped out of the way, although they have not been shortened so you will not have to add new cables when you upgrade.

**The Mitsubishi Diamond Scan 17in** is an excellent choice of

monitor although a little extravagant, to the detriment of other system components. The image remains rock solid up to 1024 x 768 but the refresh will suffer above that. A colourful subset OSD menu has directories to allow control over all requisite parameters, with good response and levels indicated graphically.

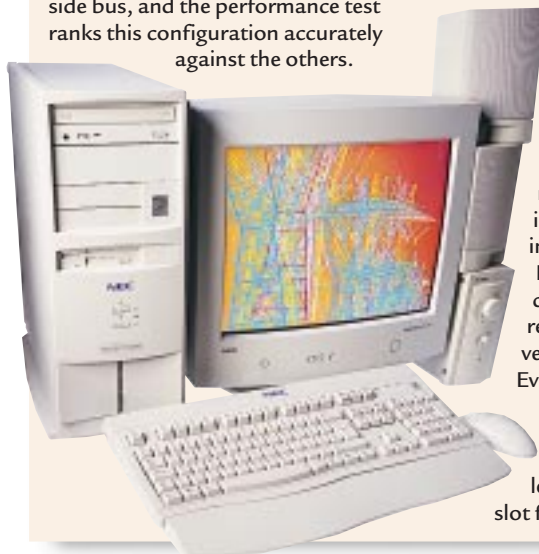
### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)  
**Contact** MAA IT 0870 606 9696 or 0171 646 2000 [www.maa.it.co.uk](http://www.maa.it.co.uk)  
**Good Points** Generous storage. Clear upgrade paths.  
**Bad Points** Slow processor.  
**Conclusion** Slow performer but good construction.

<b>Build Quality</b>	★★★★
<b>Performance</b>	★
<b>Value for Money</b>	★★★
<b>Overall Rating</b>	★★★

## NEC Direct Direction SM 400B

**NEC opted for** a large mini-tower which afforded masses of inner airflow and lots of room for upgrading. The PII 400MHz was the choice of almost half the vendors in this group test yet few seemed to offer a complete supporting package. Likewise, only 64Mb of system memory is on offer from NEC, albeit on the 100MHz front-side bus, and the performance test ranks this configuration accurately against the others.



But there are compensations. This was the only system to be supplied with a third-generation DVD with 4X DVD reading and 24X for basic CD-ROMs. A DVD, although not strictly necessary in a small office, does provide support for reference and other non-entertainment-based DVD titles in future. Storage is a capable 8.4Gb EIDE hard disk but this is not backed up by a removable media device, imperative for backing up data in small offices without network backup.

**One twist** of the thumbscrew removes a side panel for instant access to the system's inner sanctum, wherein lies NEC's forté. A wealth of construction experience has resulted in an 'open-plan' version of the inside of a PC. Everything is accessible and cables are at the ready for additional devices. A 56K PCI version of a modem leaves two PCI and one ISA slot for additional cards.

**NEC's own-brand 17in monitor** is smooth and classy. Its sleekly curved exterior houses a bright, sharp CRT image that won't let you down at a resolution of 1024 x 768 at 85Hz. The OSD pops up as an array of icons, but with a graphical level meter you soon grasp the responsive controls by the horns.

### PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)  
**Contact** NEC Direct 0870 010 6324 [www.necdirec-europe.com](http://www.necdirec-europe.com)  
**Good Points** Quality construction. Good display.  
**Bad Points** Poor memory quota. No removable media.  
**Conclusion** Attention has been paid to construction but not to detail.

<b>Build Quality</b>	★★★★★
<b>Performance</b>	★★
<b>Value for Money</b>	★★★
<b>Overall Rating</b>	★★★



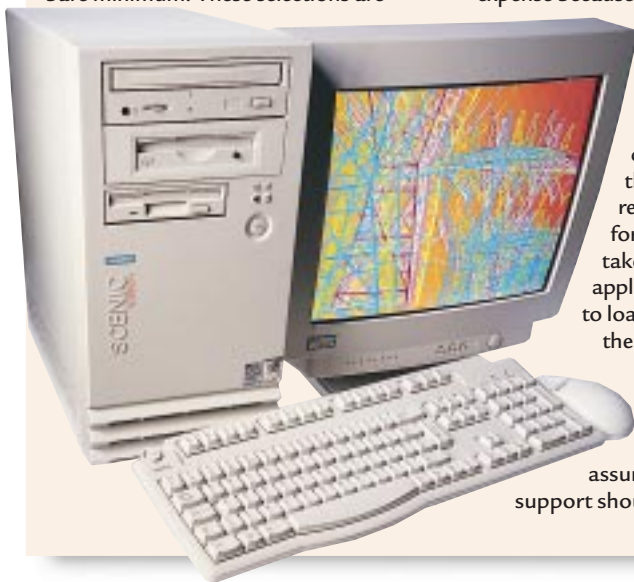
## Siemens Scenic Edition Mi7

It is an understatement to say that we were disappointed with the system Siemens sent us. The compact Scenic was fitted with a Pentium II clocking in at 350MHz and a stunted system memory at 64Mb. Worse, the video card was a 2D-only solution. Today, business graphics require 3D support as a bare minimum. These selections are

fairly reflected in the performance benchmarks. The compromises are extended to the 15in monitor — all the other vendors in the test supplied 17in models. Storage is very low, with only 3.2Gb of EIDE hard disk. Even the Iomega Zip 100 does little to improve things. There is little room for enhancing this at your own expense because of the compact

case: only after a bit of shuffling with the existing setup will you have just one 5.25in device bay. It's likely that owners will just replace the hard disk for something that will take the number of applications they need to load. On the plus side, the Mi7 ran smoothly during testing.

The build is sturdy, and the Siemens name assures you of quality support should the need arise.



### The monitor was disappointing.

Its viewable area is only 13.8in and it is unacceptable to work at a maximum refresh rate of 60Hz, which is all that's on offer at a resolution of 1024 x 768. Even settling for 800 x 600 resolution is not ideal, as weak registration causes a lack of focus on finely detailed characters.

## PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)

**Contact** Siemens Computer Systems  
01252 555312

[www.siemens.co.uk/cs](http://www.siemens.co.uk/cs)

**Good Points** Smooth running.

**Bad Points** Lacking in many areas.

**Conclusion** Very disappointing PC from such a well-respected name.

<b>Build Quality</b>	★★★★
<b>Performance</b>	★
<b>Value for Money</b>	★
<b>Overall Rating</b>	★★

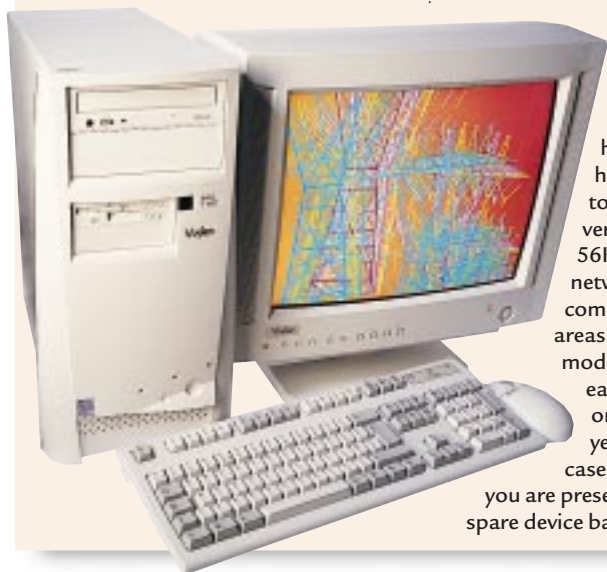
## Viglen BizPro C400AS

Built around the latest Celeron 400MHz, this fullsome package exudes quality. In support is a full 128Mb system memory, albeit running at the restrictive front-side bus speed of 66MHz; the PIIIs have the advantage of running the RAM at 100MHz. However, the Celeron has another advantage over the PII: its Level 2 cache runs

at the same core speed as the processor rather than half the speed, as on the PII. The Velocity 4400 graphics card, with its whopping 16Mb of video memory, can also be plugged straight into a TV and is perfect for big-screen presentations. Removable storage is catered for by the space-saving LS-120 drive both for 1.44Mb floppies

and the larger 120Mb SuperDisks.

Permanent storage is courtesy of a decent 8.4Gb EIDE hard disk. Viglen has also managed to squeeze in PCI versions of both a 56K modem and a network adapter without compromising other areas. Delving inside modern systems is getting easier, with clip releases or single thumbscrews, yet Viglen's box has six case screws. Once inside, you are presented with ample spare device bays, wires clipped into



submission and a motherboard free from obstructions.

### A good-quality 17in monitor

was supplied and the built-in speakers will save desktop space. Its crisp, bright display is not affected by cranking up the resolution, managing 1024 x 768 at 85Hz.



## PCW DETAILS

**Price** £1,173.83 (£999 ex VAT)

**Contact** Viglen 0181 758 7000  
[www.viglen.co.uk](http://www.viglen.co.uk)

**Good Points** Good display.  
Latest processor.

**Bad Points** Case intruders are discouraged.

**Conclusion** Perfectly balanced system configuration which retains the essential upgrade paths.

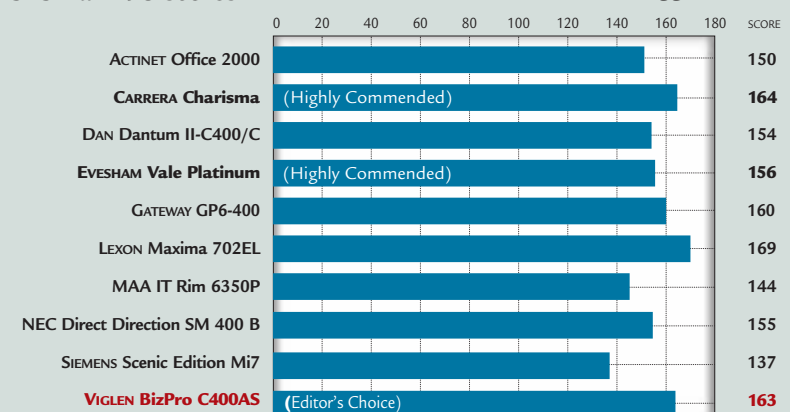
<b>Build Quality</b>	★★★★
<b>Performance</b>	★★★★
<b>Value for Money</b>	★★★★★
<b>Overall Rating</b>	★★★★★

# PCW Labs Report



## SYSMark 98 scores

Bigger is better

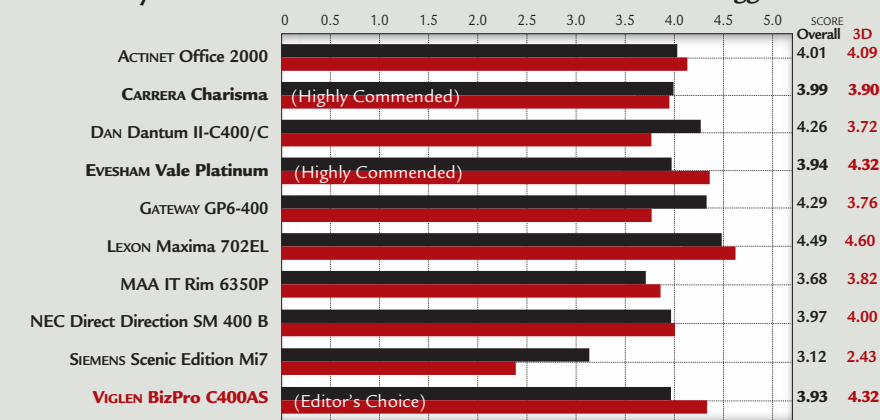


The PII, with its higher front-side bus speed of 100MHz, will beat the latest equally clocked 66MHz Celerons. Yet if you pitch a PII at 50MHz slower clock speed, performance is reduced: compare Viglen and Actinet. The three slowest PCs were those with 350MHz CPUs, showing how close the PII and the Celeron are in performance terms, with the latter having the advantage of Level 2 cache run at the core speed of the processor and the PII benefitting from a faster front-side bus. With the exception of Evesham, the next three slowest performers were those with only 64Mb of system memory. Its poor performance may be best explained through configuration problems or the use of old driver revisions (easily rectified).

Less indicative of system configuration requirements are the results of 3D graphics performance tests. The highest results were achieved by those PCs with the highest video memory resident on their graphics cards, but Evesham's system surprisingly failed to reflect this. The poorest performance was from the Siemens. This is not surprising, considering its choice of the Matrox Productiva G100, a 2D-only solution. Although graphics was not a focus in this group test, most vendors appreciated that 3D support was essential even for office environments and their choice of video cards must be applauded.

## Final Reality scores

Bigger is better



## How we did the tests



We ran two sets of tests on the PCs in this group test: **Final Reality** to test graphics capabilities, and **SYSMark 98** to test the speed of the machines when running 2D and 3D office applications.

➔ **The SYSMark test** measures the speed of the PC running 14 common office and content creation applications, and the time it takes to perform a variety of tasks in each application. Each test is run three times to ensure consistent results. The applications are divided into two categories:

➔ **Office productivity:** Corel CorelDraw 8, Microsoft Excel 97, Dragon Systems NaturallySpeaking 2.02, Netscape Communicator 4.05 Standard Edition, Caere OmniPage Pro 8.0, Corel Paradox 8, Microsoft PowerPoint 97 and Word 97.

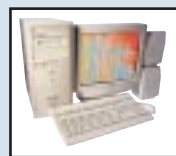
➔ **Content Creation:** MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia Extreme 3D 2, Adobe Photoshop 4.0.1, Adobe Premiere 4.2, and Xing Technology XingMPEG Encoder 2.1.

The number of tests run, and the type of applications used in this benchmark, ensure that all PCs are pushed to the limit, and that even those machines with very powerful processors are given a thorough workout. Performance depends on processor speed, RAM, graphics card and disk I/O. As the tests are based on widely available software packages, SYSMark scores accurately reflect how the machine will perform in a real-world situation.

➔ **Final Reality** is a suite of tests designed to gauge the processing power of the 3D accelerator on your graphics card, 2D image processing and AGP. It runs under Windows 95/98 and DirectX 5 and uses a 3D engine developed by Remedy. It supports Direct3D and looks at how the graphics accelerator handles the kind of data it would have to process when you are playing a game. The visual appearance factors are weighted in importance and combined with the overall processing speed to produce an overall mark.



# Table of features



VENDOR	ACTINET COMPUTERS	CARRERA	DAN TECHNOLOGY	EVESHAM	GATEWAY
MODEL NAME	OFFICE 2000	CHARISMA	DANTUMII-C400/C	EVESHAMVALE PLATINUM	GP6-400
Price (ex VAT)	£999	£999	£999	£999	£999
Price (inc VAT)	£1,173.83	£1,173.83	£1,173.83	£1,173.83	£1,173.83
Telephone	01952 270703	0181 307 2800	0181 830 1100	0800 4960800	0800 552000
URL	<a href="http://www.actinet.co.uk">www.actinet.co.uk</a>	<a href="http://www.carrera.co.uk">www.carrera.co.uk</a>	<a href="http://www.dan.co.uk">www.dan.co.uk</a>	<a href="http://www.evesham.com">www.evesham.com</a>	<a href="http://www.gateway.com/uk">www.gateway.com/uk</a>
<b>HARDWARE SPECS</b>					
Processor	Intel Pentium II 350MHz	Intel Pentium II 400MHz	Intel Celeron 400MHz Slot 1	Intel Celeron 400MHz Slot 1	Intel Pentium II 400MHz
RAM / type	128Mb / SDRAM PC100	128Mb / SDRAM PC100	64Mb / SDRAM PC100	128Mb / SDRAM PC100	64Mb / SDRAM PC100
RAM Slots taken / free	2 / 1	1 / 2	1 / 2	1 / 3	1 / 1
Hard disk	Quantum Fireball	Maxtor	IBM	Maxtor	Quantum Fireball
Size / interface	10.2Gb / EIDE	9.1Gb / EIDE	8.4Gb / EIDE	10Gb / EIDE	6.4Gb / EIDE
Storage drive	Iomega Internal Zip	Matshita LS-120 Ver4 06	Matshita LS-120 Ver4 07	Iomega Internal Zip	n/a
Storage drive media size	100Mb	120Mb	120Mb	100Mb	n/a
<b>MOTHERBOARD COMPONENTS</b>					
Motherboard manufacturer	ABIT	SuperMicro	ASUS	Chaintech	Gateway
Model / chipset	AB BH6 / Intel440BX	P6SBA / Intel 440BX	P2B / Intel440BX	6BTM / Intel440BX	E139761 / Intel440BX
L2 cache	512Kb	512Kb	128Kb on processor	128Kb on processor	512Kb
<b>EXPANSION AND I/O</b>					
Free 3.5/5.25in bays	1 / 1	2 / 2	2 / 2	1 / 2	3 / 2
Free PCI/ISA/shared slots	2 / 0 / 1	1 / 2 / 1	2 / 1 / 0	0 / 2 / 1	3 / 0 / 1
USB/Serial/Parallel/PS2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 1 / 1 / 2
<b>MULTIMEDIA</b>					
CD-ROM	Toshiba / XM-6402B	LG / CRD-8322B	Matshita / CR-588	Matshita / CR-589	Mitsumi / CRMC-FX322M2
CD-ROM speed/interface	36x / EIDE	32x / EIDE	32x / EIDE	32x / EIDE	32x / EIDE
Sound card manufacturer	Data Expert	Creative Labs	Creative Labs	Creative Labs	Creative Labs
Sound card model	Yamaha OPL3-SA <sub>x</sub>	SoundBlaster PCI64	SoundBlaster PCI64	SoundBlaster PCI64	ES1373
Speakers	Maxxtro SPK202	Turando 25W	Dan 150W PMPO	Zydec ZY-FI 2	n/a
Graphics card	Diamond Viper 550	ATI Xpert98	Matrox Millennium G200	STB Velocity 4400	Nvidia Riva128ZX
RAM / max RAM / type	16Mb / 16Mb / SDRAM	8Mb / 8Mb / SGRAM	8Mb / 16Mb / SGRAM	16Mb / 16Mb / SDRAM	8Mb / 8Mb / SGRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP (on-board)
Monitor	Hansol / 701A / 17in	LG / Studioworks 77i / 17in	CTX / VL700 / 17in	Taxan / Ergovision 730 / 17in	Gateway / VX700 / 17in
Max refresh 800 x 600	100Hz	85Hz	85Hz	100Hz	120Hz
Max refresh 1024 x 768	85Hz	75Hz	85Hz	85Hz	100Hz
Max refresh 1280 x 1024	60Hz	60Hz	60Hz	60Hz	75Hz
Max refresh 1600 x 1200	n/a	n/a	n/a	n/a	60Hz
<b>OTHER INFORMATION</b>					
Modem	Rockwell V.90 (PCI)	n/a	Rockwell V.90 (ISA)	Diamond SupraExpress 56i PCI	n/a
Modem speed	56Kbps	n/a	56Kbps	56Kbps	n/a
Misc hardware	D-Link DE-528CT	Intel 10/100Mbps	3COM 10/100Mbps	3COM 10/100Mbps	n/a
	10Mbps Ethernet Card	Ethernet Card	Ethernet Card	Ethernet Card	
Bundled software	MS Windows 98, MS Office 97 Professional	MS Windows 98	Windows 98, Works4.5a Lotus SmartSuite 97	Windows 98	Windows 98, Outlook 97,  Publisher 98, Word 97
Standard warranty	1st yr on site, 4yrs RTB	1st yr p+l, 2nd yr lab	12 months	2 yr osm	1st yr on site, 2 yrs RTB
Warranty options	3 yrs on site £149	on application	on site £35 / yr	3rd year £99	3yrs on site £149

# Table of features



VENDOR	LEXON TECHNOLOGY	MAA IT	NEC DIRECT	SIEMENS	VIGLEN
MODEL NAME	LEXON MAXIMA 702EL	RIM 6350P	DIRECTION SM 400 B	SCENIC EDITION Mi7	BizPro C400AS
Price (ex VAT)	£999	£999	£999	£999	£ 999
Price (inc VAT)	£1,173.83	£1,173.83	£1,173.83	£1,173.83	£ 1,173.83
Telephone	0181 667 1173	0870 6069696 / 0171 646 2000	0870 0106324	01252 555312	0181 758 7000
URL	<a href="http://www.lexonpc.com">www.lexonpc.com</a>	<a href="http://www.maa-it.co.uk">www.maa-it.co.uk</a>	<a href="http://www.necdirect-europe.com">www.necdirect-europe.com</a>	<a href="http://www.siemens.co.uk/cs">www.siemens.co.uk/cs</a>	<a href="http://www.viglen.co.uk">www.viglen.co.uk</a>
<b>HARDWARE SPECS</b>					
Processor	Intel Pentium II 400MHz	Intel Pentium II 350MHz	Intel Pentium II 400MHz	Intel Pentium II 350MHz	Intel Celeron 400MHz Slot 1
RAM / type	128Mb / SDRAM PC100	128Mb / SDRAM PC100	64Mb / SDRAM PC100	64Mb / SDRAM PC100	128Mb / SDRAM PC100
RAM Slots taken / free	1 / 2	1 / 3	1 / 2	1 / 1	1 / 2
Hard disk	Seagate Medalist Pro	Fujitsu	Maxtor	Maxtor	IBM
Size / interface	9.1Gb / EIDE	10.2Gb / EIDE	8.4Gb / EIDE	3.2Gb / EIDE	8.4Gb / EIDE
Storage drive	Iomega Internal Zip	Iomega Internal Zip	n/a	Iomega internal Zip	Matshita LS-120 Ver4 07
Storage drive media size	100Mb	100Mb	n/a	100Mb	120Mb
<b>MOTHERBOARD COMPONENTS</b>					
Motherboard manufacturer	ASUS	Gigabyte Technology	Intel	Siemens	Viglen
Model / chipset	P2B (Rev. 1.02) / Intel 440BX	GA-6BXE / Intel 440BX	SE440BX / Intel440BX	F10 GS / Intel440BX	VIG69M / Intel440BX
L2 cache	512K	512K	512K	512K	128K on processor
<b>EXPANSION AND I/O</b>					
Free 3.5/5.25in bays	0 / 2	2 / 2	1 / 2	0 / 0	2 / 2
Free PCI/ISA/shared slots	0 / 2 / 1	3 / 1 / 1	1 / 1 / 1	2 / 0 / 0	1 / 2 / 0
USB/Serial/Parallel/PS2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 1 / 1 / 2	2 / 2 / 1 / 2
<b>MULTIMEDIA</b>					
CD-ROM	Creative Labs / CD3630E	Pioneer / DR704s	Hitachi DVD / GD-2500	Mitsumi / FX322M	Panasonic / CR-588
CD-ROM speed/interface	36x / EIDE	32x / EIDE	24X (4X DVD) / EIDE	32X / EIDE	32X / EIDE
Sound card manufacturer	Creative Labs	Creative Labs	Creative Labs	Terratec	Yamaha
Sound card model	SoundBlaster PCI64	SoundBlaster PCI64	SoundBlaster PCI64	Promedia AD1816	Labway XG
Speakers	Creative Labs CSW20	Typhoon	Labtec LS2420	n/a	n/a
Graphics card	Diamond Viper 550	Diamond Stealth G460	ATI Xpert98 (w/TV-out)	Matrox Productiva G100	STB Velocity 4400 (w/TV-out)
RAM / max RAM / type	16Mb / 16Mb / SDRAM	8Mb / 8Mb / SGRAM	8Mb / 8Mb / SGRAM	4Mb / 4Mb / SGRAM	16Mb / 16Mb / SDRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Monitor	Mag/XJ707T T'tron/17in	M'bishi/DiamondScan 70/17in	NEC/Multisync70/17in	Siemens/MCM152V/15in	Envy/17CS/17in
Max refresh 800 x 600	100Hz	100Hz	100Hz	85Hz	100Hz
Max refresh 1024 x 768	85Hz	85Hz	85Hz	60Hz	85Hz
Max refresh 1280 x 1024	60Hz	60Hz	60Hz	n/a	60Hz
Max refresh 1600 x 1200	n/a	n/a	n/a	n/a	n/a
<b>OTHER INFORMATION</b>					
Modem	Lexon 56Kflex Internal	n/a	Diamond SupraExpress	n/a	CIS PCI (Rockwell V.90)
Modem speed	56Kbps	n/a	56Kbps	n/a	56Kbps
Misc hardware	3COM 10/100Mbps	n/a	n/a	n/a	Viglen Ethergreen 3200P
	Ethernet Card				10/100Mbps Ethernet Card
Bundled software	Windows 98, SuperVoice, Lotus SmartSuite 97	Windows 98, Lotus SmartSuite 97	Windows 98, CorelDraw7, IBM Via Voice, Works 4.5a, McAfee VirusScan, Word 97	Windows 98, Dr Solomon Anti-Virus Toolkit, MS Office 97 Professional	Windows 98, MS Office SBE
Standard warranty	1st yr on-site, 2nd yr RTB (p+l)	5 years RTB	3 yrs, 1 yr on site	1 yr on site, 3 yrs RTB	1 year collect and return
Warranty options	on site - 2 yrs £55, 3 yrs £90	On site £49/yr, 3 yrs os £129	1, 2 or 3 yrs on site	3 yrs on site £150	Options inc 4-hr response osm



# Editor's Choice



suitably spent elsewhere. Supplying a full memory quota of 128Mb and a bay-saving LS-120 goes some way to prove Viglen's understanding of its market. Construction is admirable, and efforts have been made towards providing the upgrade paths which would be necessary to prolong the life of this machine.

## ◀ Evesham Micros' **EveshamVale Platinum** is **Highly Commended**.

It was a tough contender for our Editor's Choice, just lacking in that final panache required to raise its head above the

◀ **THE VIGLEN  
BizPRO, PERFECTLY  
BALANCED AND  
UPGRADEABLE**

Viglen. On paper, it comprised an almost perfect selection of components with generous storage and an excellent choice of

**W**e wanted small business machines at a modest price of £999 (ex VAT), which would be easy to upgrade. The detailed specifications were left to the manufacturers, so our vendors were free to put together some highly individual systems. Overall the machines' specifications were fairly modest, with vendors perhaps erring on the side of caution in view of recent component-price fluctuations. Nevertheless, all the machines supplied would last for some time in a

▼ **OPEN UPGRADE  
OPTIONS WITH THE  
EVESHAMVALE  
PLATINUM**

small business. When most office workers are struggling with 32Mb of system memory, our harsh criticism of those vendors supplying new systems with 64Mb may seem churlish. Considering that memory is the cheapest component, increasing this provides the most substantial performance improvements and so the expected long life of these machines warranted no less than 128Mb to be supplied. Similarly, the choice of storage capacity was generous, with most vendors supplying hard disks larger than 8Gb, as well as removable storage media, providing all end-users with at least one means of backup. With the exception of Siemens, all vendors

supplied 17in displays: when most spreadsheets dictate resolutions of 1024 x 768, this is the minimum acceptable size for monitors. Most video cards supplied were good enough to power excellent displays.

◀ **Viglen's BizPro C400AS** is our **Editor's Choice**. It manages to supply everything a small business could ask for, plus a little bit more. It may have been pipped at the post in performance terms, but the money saved by supplying a Celeron-powered machine was

monitor. Performance was marred by an unknown factor which could only be explained through configuration problems or even driver revisions. But as tune-ups are easily dealt with, the award reflects the overall package.

## **The Carrera Charisma** is also **Highly Commended**. If



▲ **THE CARRERA  
CHARISMA  
MUSCLE MACHINE**

Carrera's personality is represented in this package,

picking a fight is not recommended: this PC is one of the more powerful contenders, with massive storage capabilities housed in a bulky case. Where other vendors' intentions to offer upgrade paths were admirable, you'd have to act almost immediately. Carrera offers a quality construction that allows you to leave your upgrading options open. □

