Christmas crackers

Why seek out three kings of Orient when you can take wise advice from us? Ajith Ram tests 12 PC systems for games, office or home, some at prices that won't sleigh you.

Christmas is that time of year when many people consider treating themselves and their family to a new PC. There's a wealth of choice and specifications around, so we have divided our group test into three categories to help you find exactly what you want.

☞ **The first category** includes four games systems. As this is a season when there's more time available in which to play games, and the largest number of games titles are released, it makes sense to test a few machines which could fit the bill as a "perfect" games machine. Our specification included a powerful graphics card, large monitor, good sound card, speakers and games bundle, for a cost of around £1,500 (inc VAT).

☞ **Our second category** is made up of mid-range systems that will run office applications, an accounts package and multimedia programs and which can be used to surf the net. In other words, the family PCs. For around £1,000 (inc VAT) we asked that these systems be equipped with a good graphics card, sound card, speakers and a decent monitor.

☞ **Our third category** consists of the budget-priced PCs. Typically costing around £700 (inc VAT) these economically priced systems are good for those on the lookout for a second home PC and are a good choice for college students on a tight budget. We weren't looking for flashy extras, just good, solid components at a fair price.

Contents

Illustration by Mark Hudson

Armari **NBX-350 95**   • Games system

This machine has the same powerful graphics card as the Carrera system [*below*]. Housing the Riva TNT chipset, the Diamond Viper V550 supports Microsoft's DirectX 6 API and is the fastest 3D accelerator on the market [*PCW November '98, p198*]. With 16Mb RAM, the Viper card can handle resolutions up to 1920x1600 and is supported by a 350MHz PII processor. The Armari system has a Creative Labs DVD-ROM, but the MPEG-2 decoding is handled by the processor and Zoran's

software DVD player. Since the Riva TNT chipset does not support motion compensation, the software playback may result in dropped frames. Audio is provided by Diamond Multimedia's Sonic Impact S90. Based on Aureal Semiconductor's Vortex chipset, the S90 is a true gamer's card. Supporting Aureal's proprietary A3D API and Microsoft's DirectSound, it is one of the few sound cards able to reproduce true surround-sound using just two speakers. The A3D API is supported in popular games.

The NBX-350 is housed in one of the largest tower cases we have seen, making its interior seem tidy and spacious. The Asus motherboard has two PCI slots free. There are also two 3.5in and 5.25in bays free, making the system easy to upgrade. The 9.1Gb hard disk is big enough to cope with demanding desktop storage requirements.

The Armari's performance in our SYSmark test was above average. Its Final Reality test results were equally good, due to its powerful graphics card.

The 17in Iiyama S7029T monitor supports resolutions up to 1600x1200 but here it has a lower refresh rate than the ADI 5GT monitor. It provides sharp images and crisp colours and the controls are easy to manipulate.

PCW DETAILS

Price £1,498 (£1,275 ex VAT)
Contact Armari 0181 810 7441
www.armari.com
Good Points *Powerful graphics card. DVD-ROM.*
Bad Points *Average speakers. No hardware MPEG-2 decoder.*
Conclusion *A good gaming system that is easily upgradeable.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★

Carrera **Power Pro 2-450**   • Games system

Built around Intel's 450MHz processor, the Power Pro is the fastest system in this group test with a SYSmark test score of 181. The heart of a games PC is the graphics card. The Power Pro delivers its knockout punch through the Diamond Viper V550, *Editor's Choice* in our November '98 graphics card group test. Built around nVidia's new Riva TNT chipset and boasting a fill rate of 180 million pixels/sec, the V550 is faster even than a dedicated 3D accelerator like the Voodoo2. The Riva TNT (TwiN Texel), as its name

implies, is able to read two pixels in a single clock cycle. This gives it an advantage in games, now coming on to the market, which utilise multi-texturing. The high fill rate also gives the V550 the ability to deliver smooth frame rates. A graphics card with such brute power requires a CPU which can keep pace with it. The 450MHz Pentium II is the fastest on the market and is an excellent companion to the Diamond card. Gamers who want even more processing power might consider overclocking the CPU, although this is a risky operation. The Carrera system also has the most powerful sound card on the market. Equipped with a RISC processor as powerful as a Pentium 133, the SoundBlaster Live! is a gamer's dream. The Power Pro comes with four surround speakers and a subwoofer, and Carrera has included a driving wheel with force feedback.

The 17in LG77T monitor is able to support a refresh rate of 75Hz at 1280x1024. Built using shadow

mask technology, the LG monitor has a 0.28mm dot pitch. Although the screen was consistently bright and the images sharp at all resolutions, some of the colours in the blue region of the visible spectrum were washed out. The pushbutton controls are easy to access and manipulate.

HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

PCW DETAILS

Price £1,550 (£1,319 ex VAT)
Contact Carrera 0171 830 0486
www.carrera.co.uk
Good Points *Excellent graphics and sound.*
Bad Points *None.*
Conclusion *A true gaming system.*

Build Quality	★★★★
Performance	★★★★★
Value for Money	★★★
Overall Rating	★★★★

Gateway **G6-350**

● **Games system**

The first gaming system Gateway sent us had a faulty motherboard. The replacement came with an Intel Tolstoy BX motherboard with a 350MHz PII processor. To provide 3D acceleration for games, an STB Blackmagic Voodoo2 card was included. Although it's a good 3D accelerator with support for single-pass multitexturing, it's not quite as powerful as the Viper V550.

Also, the Voodoo2 chipset does not support advanced features like specular lighting and bump mapping. A SoundBlaster 64 provides audio via a pair of Altec Lansing speakers. Although it's a PCI sound card, the SB 64 is not as impressive as the SB Live!. Its positional 3D sound output from the two speakers is a feeble attempt at true surround sound.

The Gateway system has a DVD-ROM but no MPEG-2 decoder card. Even with the power of the 350MHz CPU, software DVD playback results in dropped frames. One reason for this is that the main STB Velocity display card does not support motion compensation. The PC has a large 10.2Gb hard drive, big enough to keep the most avid application-hoarder happy for a while, and an Iomega Zip drive. The G6-350 was the only system that came in a desktop case. Smaller than the tower models, the interior was slightly cramped. With two free PCI slots and a single ISA slot, the Gateway system is not as easily upgradeable as others in the group.

The 17in Gateway monitor is not as good as the LG77T nor the ADI 5GT. Its refresh rate of 1024x768 is an acceptable 85Hz but this falls to a poor 60Hz at 1280x1024. Its colour fidelity and image sharpness are on a par with others, though.

PCW DETAILS

Price £1,397 (£1,189 ex VAT)
Contact Gateway 0800 552000
www.gateway.com/uk
Good Points Powerful. Dedicated 3D graphics card. DVD-ROM.
Bad Points Average sound card. No hardware MPEG-2 decoder.
Conclusion Some good components, but not the most powerful gaming PC.

Build Quality	★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Mesh **Elite Terminator 350**

● **Games system**

Unlike Armari, Carrera and Gateway, Mesh supplied a PC with an AMD processor. Running at 350MHz, the K6-2 is an excellent choice for a gaming system. This is because its 27 3D Now! instructions speed up floating-point calculations, giving it an edge over a Pentium II of the same speed. The Hercules Terminator Beast graphics card, although fearsome in name, is not as powerful as the Diamond

Viper V550, but in games which do not use multitexturing it is still faster than a dedicated 3D accelerator like the Voodoo2. The Savage 3D chipset on which it is built is also the only one that supports texture compression, part of Microsoft's new DirectX 6 API.

The Teac PowerMax multimedia system is another impressive part of the Mesh PC. Consisting of five speakers and a dedicated subwoofer, the PowerMax is capable of reproducing true Dolby Pro Logic surround sound. Unfortunately, it lacks support for superior Dolby AC-3, so users will not be able to hear DVD movie soundtracks in their full glory. The AWE 64 Gold, although one of the best ISA sound cards ever produced, is not as powerful as its successor, the SoundBlaster Live!. It also lacks support for surround sound.

The Mesh system is well built. All the wires and IDE cables are kept well out of the way and the components are easily accessible.

It has three PCI slots and one free ISA slot.

The 17in ADI 5GT monitor is built using Sony's Trinitron technology. With a 0.26mm dot pitch, this monitor supported the highest refresh rates in this group test. Its picture quality and colour fidelity are among the best.

PCW DETAILS

Price £1,500 (£1,275 ex VAT)
Contact Mesh 0181 208 4700
www.meshplc.co.uk
Good Points Powerful graphics card. DVD-ROM with MPEG-2 decoder. Excellent speakers.
Bad Points Average sound card.
Conclusion A powerful gaming system that deserves consideration.

|	
Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Atlantic **Pro 98**

● Mid-range system

The Atlantic Pro 98, like the Tiny Family Bonus system [*p148*], houses the 333MHz Celeron processor with 128Kb of L2 cache and comes with a BX motherboard. With its capacity to handle bus speeds of up to 100MHz, this motherboard can hold processors faster than 500MHz. Atlantic has included 64Mb of PC 100 SDRAM. This memory runs at a maximum speed of 100MHz although it will clock down to 66MHz when used with the Celeron. Upgrading the processor at a later date will be easy, as the motherboard and RAM are ready to run faster and so give a big performance boost. The 6.4Gb hard drive in the Pro 98 is larger than the one in Tiny's system and is adequate for a family PC. There are three PCI slots free.

The ATi Xpert 98 graphics card is based on the 64-bit Rage Pro Turbo chipset. Even though the card in the Atlantic system has only 4Mb of memory, it is upgradeable to 8Mb for a little more money. The Xpert 98, in addition to being a good 2D/3D card, also supports motion compensation for DVD playback. Although Pro 98 does not have a DVD-ROM, users who intend to upgrade can mobilise the help of the graphics card for software playback, provided the processor is powerful enough to support it. The Terratec Xlerate is a PCI sound card which supports Aureal's A3D API. This enables it to reproduce surround sound through just two speakers. Due to its support for 64 voices, the Xlerate can also function as a MIDI card.
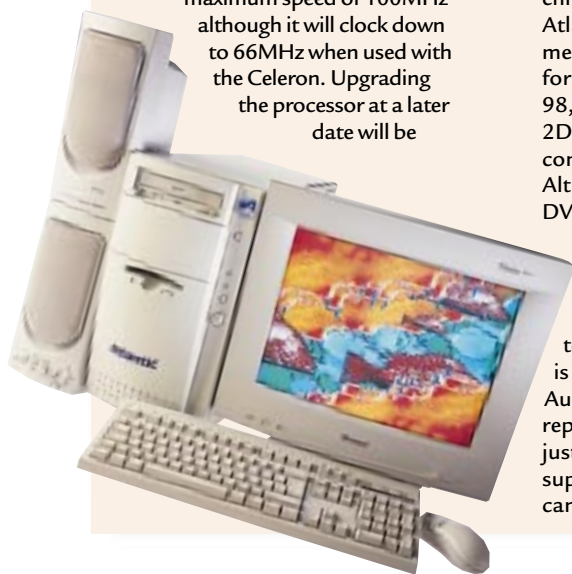
The 17in Hansol 700 monitor supports resolutions up to 1280x1024 but its refresh rate at that resolution is a flickery 60Hz. At lower resolutions the refresh rate rises to 85Hz. Its screen is not as bright and clear as the ADI and Iiyama monitors in this group test.

PCW DETAILS

Price *£997 (£899 ex VAT)*
Contact *Atlantic 0990 134725*
www.atlanticsystems.com
Good Points *Easily upgradeable. Well constructed.*
Bad Points *Average monitor.*
Conclusion *An easily upgradeable system with some good components.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Dan **Xplora II Plus**

● Mid-range system

When Intel released the original Celeron processor, it was heavily criticised for its lack of L2 cache and consequent poor performance in office applications. However, its successor, the 333MHz processor with 128Kb L2 cache, is proving popular with system vendors. The Dan Xplora, like four other systems in this group test, comes with this CPU. It has a motherboard based on the BX chipset, as do the systems from Tiny [*p148*] and Atlantic [*above*].

Currently running at 66MHz, the speed of the frontside bus can be increased to 100MHz if a faster processor, such as a Pentium II 350, is inserted. Its ability to accommodate CPUs beyond 500MHz makes it the ideal platform for upgrading.

This Dan system is well built, with ample ventilation. Its two free DIMM slots, four PCI slots and two 5.25in bays make it easy to upgrade. The ATI All-in-Wonder Pro graphics card is built on the Rage Pro Turbo chipset. What differentiates this from the Xpert 98 is a high-quality TV tuner: in addition to being able to see a TV display on the monitor, users can capture the images as AVI or BMP files. However, the TV tuner does need a boosted signal to work properly. The AWE 64 Value is an ISA sound card using the EMU1000 processor. Although it is able to support 64 voices simultaneously, its fidelity is not as high as the PCI Xlerate sound card. Also, it cannot reproduce surround sound through two speakers. The Dan Hi-Fi speakers are very good quality.

The 15in CTX monitor handles refresh rates up to 85Hz at 1024x768 but this falls to a flickery 60Hz at its highest resolution of 1280x1024. Overall, this CTX monitor is not quite as good as the ADI Microscan 4P.

PCW DETAILS

Price *£1,018 (£866 ex VAT)*
Contact *Dan 0181 830 1100*
www.dan.co.uk
Good Points *Well constructed. Good graphics card.*
Bad Points *Average sound card.*
Conclusion *An easily upgradeable system, slightly let down by an average monitor.*

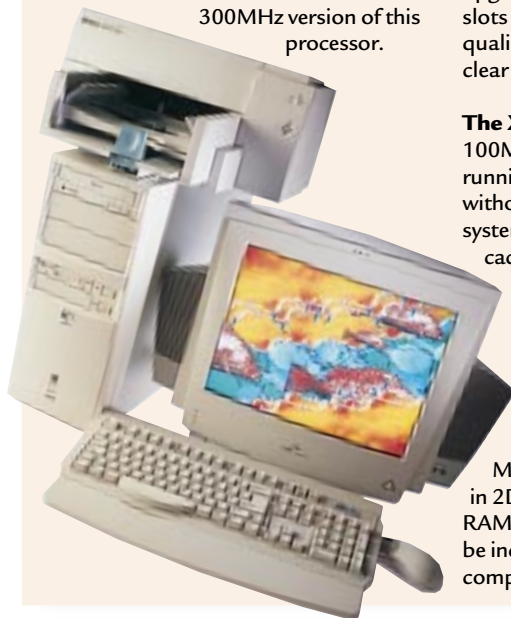|	
Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Mertec **XM300-K2**

Mid-range system

Although Intel has an overall market share of 85 percent, the budget PC market rests firmly in the hands of AMD. Its new K6-2 processor, with 27 hard-coded MMX-style instructions that speed up floating-point calculations, has been well received by system vendors. Mertec's XM300 uses the 300MHz version of this processor.

The AMD processor comes on a Super Socket 7 motherboard. Like the BX motherboard used for Intel's processors, the Super 7 is capable of running at 100MHz and can support K6-2 processors faster than 500MHz. The Mertec system can be easily upgraded by virtue of its two free DIMM slots and three PCI slots. The build quality is excellent, with cables kept clear of any critical components.

The XM300 has 64Mb of RAM, of the 100MHz variety, which is enough for running Windows 98 applications without any major hiccups. The Mertec system additionally comes with 1Mb of cache on the motherboard. Although this is supposed to boost performance, it was not reflected in the system's SYSmark test score. The Millennium G200 graphics card is one of the most powerful around. Based on the Matrox 128-bit G200 chipset, the 8Mb Millennium is an excellent performer in 2D and 3D applications. It has a high RAMDAC of 250Hz and its memory can be increased to 16Mb. It also has motion compensation for DVD playback.

The 17in ADI 5P monitor is not as good as the costlier ADI 5GT. With a 0.28mm dot pitch, this shadow mask monitor supports a resolution of 1280x1024 at a flickery 60Hz. Its refresh rate increases to 85Hz at lower resolutions.

PCW DETAILS

Price *£999 (£850 ex VAT)*
Contact *Mertec 01792 473700,*
www.mertec.co.uk
Good Points *Well constructed. Good graphics and sound.*
**Bad Points** *Average performance.*
Conclusion *An easily upgradeable system.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★

Tiny **Family Bonus**

Mid-range system

The Family Bonus system has Intel's latest 333MHz processor from the low-cost Celeron series. Unlike the original Celeron, which had no cache, the new processor has 128Kb of L2 cache running at the same clock speed as the processor. This makes it a good choice for running routine office applications like Word and Excel. Even though the Celeron has its own EX motherboard, Tiny has chosen a superior BX model, making the system easily upgradeable. The Microstar motherboard can handle frontside bus speeds of 66MHz and
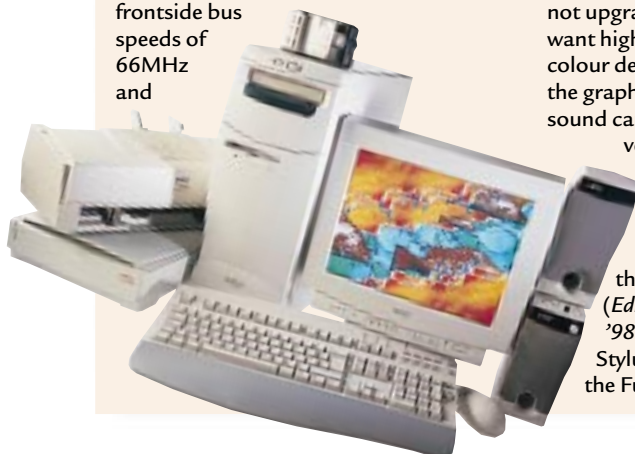
100MHz, which means the buyer can upgrade to a faster PII processor. But to get a real performance kick, the RAM will also have to be upgraded, to PC100 SDRAM. The motherboard has three PCI and two ISA slots free.

The ATI 3D Charger graphics card uses an older Rage II chipset and has 4Mb of SDRAM. It's not as powerful as ATI's own next-generation cards, based on the Rage Pro chipset, but the 3D Charger is good enough for regular work. The 4Mb of memory is not upgradeable, though. Users who want high resolutions at better colour depths will have to replace the graphics card. The Yamaha sound card pushes sound out of two very stylish speakers and its fidelity is above average. Living up to its name, the Family Bonus comes with three PC peripherals: the Umax Astra 610P scanner (*Editor's Choice in our September '98 group test*), the Epson Stylus Color 300 printer and the Fuji DX-5 digital camera with

4Mb of Flash memory. The Tiny system is certainly value for money.

The 15in Tiny monitor does not support resolutions beyond 1024x768, and at that resolution its refresh rate falls to 65Hz. The images have good clarity, though, and the controls are easy to access.

PCW DETAILS

Price *£1,056 (£899 ex VAT)*
Contact *Tiny 0800 821333*
www.tiny.com
Good Points *Easily upgradeable. Free scanner, printer and digital camera.*
Bad Points *Average monitor.*
Conclusion *A well built system that is excellent value for money.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★★
Overall Rating	★★★★

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

Dabs Direct **Atlantis Home Value** `Budget system`

As the Dabs Direct system emerged from its box, we heard a metallic clang inside the ATX case. Opening up the system, there were unidentifiable bits of metal at the bottom of the case which could have damaged the components.

The Atlantis Home Value is not such good value for money as the others in this group, the main reason being the 266MHz Celeron processor (the original model Intel launched in early 1998).

With no L2 cache and a slower clock speed than the 300MHz version, this CPU performs poorly in business applications (see its low SYSmark score, *p162*). Dabs has chosen an Abit 440LX motherboard for the Celeron. These motherboards have a reputation for being stable platforms for over-clocking, and due to the absence of L2 cache, the original Celeron is quite tolerant to this. The Atlantis system has only a tiny 2.1Gb hard drive and this limited storage could easily become filled.

The construction of the Dabs system is not as tidy as the Elonex PC [*below*]. The wires and IDE cables are a tangled web, preventing easy access to the components, but at least it is well ventilated. And, in addition to the free DIMM slot, there are three 5.25in bays free.

The graphics card is based on the S3 Virge chipset. Although a good performer in 2D applications, it is far less powerful than the ATI Rage Pro and Riva 128 processors. This chipset also has some well-known compatibility problems with a few popular PC components.

The 14in Belinea monitor has a poor refresh rate of 60Hz at 1024x768. Even at lower resolutions, the refresh rate does not rise beyond 75Hz. Image sharpness also suffers at its highest resolution.

PCW DETAILS

Price *£699 (£595 ex VAT)*
Contact *Dabs Direct*
0800 558866 **www.dabs.com**
Good Points *Free bays for expansion. Easy to over-clock.*
Bad Points *Poor construction. Mediocre performance. Old components.*
Conclusion *A budget system worth consideration if no other can be found.*

Build Quality	★★★
Performance	★★
Value for Money	★★
Overall Rating	★★

Elonex **MLX-6333/1** `Budget system`

The original Celeron processor failed to make an impression but its successor, with 128Kb cache, has fared better. The Elonex system comes with the 300MHz version of this processor. With its L2 cache running at the same core speed as the processor, the new Celeron is only slightly slower in office applications than a PII of the same speed. Its floating-point engine is identical to that of a PII and, with the higher cache speed, it is a slightly better choice than PIIs clocked at the same speed for running games and multimedia applications. The Celeron comes on an EX motherboard. The EX chipset was specially designed as a low-cost solution to hold the Celeron and has a frontside bus speed of 66MHz. Although adequate for running the Celeron, the PC is not as easily upgradeable as those with BX motherboards. The system is very well built and is easily upgradeable as there are three free slots.

The Diamond Viper V330 graphics card is based on the 128-bit Riva 128ZX chipset. It has 8Mb of SDRAM and is a good performer in 2D and 3D applications. The V330 supports DirectX and OpenGL APIs. Unlike the other systems in this group, the MLX has an on-board sound card. And, the Yamaha YMF 715 chipset fully supports the DirectSound API, so with high-quality audio output it's a good component to be included with this budget PC.

The 14in Elonex monitor is the best small monitor in this group test. It has excellent colour fidelity and image sharpness, and sustains a high refresh rate of 120Hz at 1024x768.

PCW DETAILS

Price *£699 (£595 ex VAT)*
Contact *Elonex 0181 452 4444*
www.elonex.co.uk
Good Points *High-quality construction. Excellent monitor.*
Bad Points *Motherboard cannot take Pentium II processors.*
Conclusion *A well-built budget PC with all important components.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

Linear **Vantage XL**

Budget system

Proving the value of Intel's low-cost processor yet again, Linear's Vantage XL system comes with the 300MHz version of the new Celeron. With 128Kb cache on the processor itself, it is an excellent choice for a budget PC. With performance on office applications only slightly less than a Pentium II of the same speed, the new CPU is good value for money. The Vantage system's 64Mb RAM comes in two modules, which is unfortunate as there are no DIMM slots free for upgrading. The ATX tower case is rather small, making the interior feel crowded. The XL has a 32X CD ROM drive and a 4.3Gb hard drive. The latter is good enough for a low-priced system and is capable of coping with most routine storage needs.

The PCI version of the ATI All-in-Wonder Pro is included in Linear's system. Although the card has 8Mb of RAM, performance trails behind its AGP counterpart. This is partly reflected in the Linear system's low SYSmark and Final Reality scores. The All-in-Wonder Pro uses the 64-bit Rage Pro chipset. With the help of the powerful floating-point unit in the Celeron, the card provides good 3D acceleration. It has a built-in TV tuner and the ability to capture video in AVI format.

The Creative Labs Vibra 16S sound card is not the most vibrant on the market. Being an ISA model, it is capable of handling only 16 voices simultaneously and is therefore not as good as the next-generation AWE 32 and AWE 64 models.

The 15in Relisys monitor has a 0.28mm dot pitch and supports resolutions as high as 1024x768 at a respectable 75Hz. Its controls are easy to access and image quality is excellent.
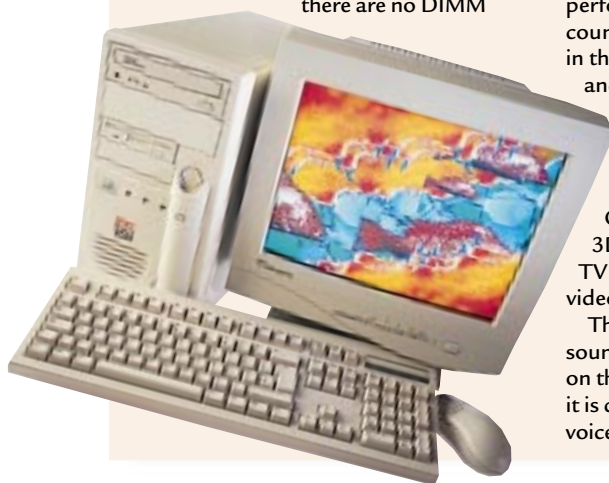
PCW DETAILS

Price £699 (£595 ex VAT)
Contact Linear Direct 0181 408 9888 (no URL)
Good Points Excellent monitor.
Bad Points Crowded interior. Mediocre performance. No free DIMM slots.
Conclusion A budget system with no special components.

Build Quality	★★★
Performance	★★
Value for Money	★★★
Overall Rating	★★★

Roldec **Puma**

Budget system

Advanced Micro Devices (AMD) processors appear in over 50 percent of budget PCs, so it is not surprising to a find a powerful AMD processor at the heart of such a system as this. The Roldec Puma sports the 333MHz version of AMD's new K6-2 processor. The K6-2 has 27 3D Now! instructions on it which help to speed up floating-point calculations. If properly supported by the application, the K6-2 can be more powerful than a Pentium II of the same speed, which makes the Puma a good system for running office applications as well as multimedia programs.

The Diamond Viper V330 graphics card, with 4Mb of memory, uses the Riva 128 chipset. It is one of the few cards with optimised drivers to take advantage of the new 3D Now! instructions. Hence, it is a good companion to the AMD processor. New AMD and Cyrix CPUs run on Super Socket 7 motherboards. The Microstar motherboard in the Puma system has a frontside bus speed of 100MHz so Roldec had fitted 100MHz SDRAM, and it is able to handle processors faster than 500MHz. The Roldec Puma has a 4.5Gb hard drive and a claimed 40X CD-ROM. However, our tests show that the actual average speed of the Asus CD-ROM is only around 24X. The Sonic Impact S90 sound card is the latest from Diamond Multimedia. Using Aureal's Vortex chipset, the S90 is able to reproduce surround sound from two speakers.

The 15in ADI monitor, although smaller than the 5P and 5GT, has the same 0.28mm dot pitch and high image quality. It has a maximum resolution of 1024x768 at a respectable refresh rate of 75Hz.

PCW DETAILS

Price £699 (£595 ex VAT)
Contact Roldec Systems 01902 456464
www.roldec.com
Good Points Powerful processor. Good graphics card and sound card.
Bad Points None.
Conclusion A budget system that is good value for money.

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

Table of features

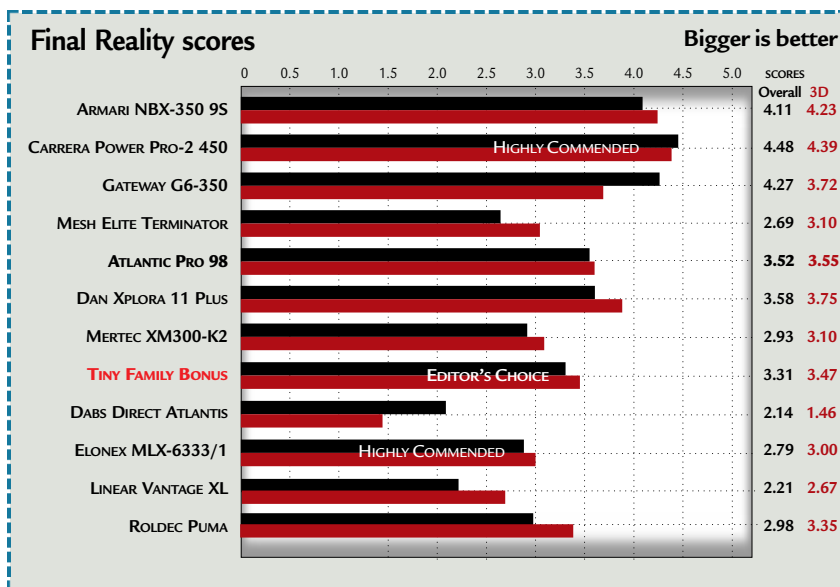| MANUFACTURER	ARMARI	CARRERA	GATEWAY	MESH COMPUTERS	ATLANTIC	DAN TECHNOLOGY
MODEL NAME	NBX-350 9S	POWER PRO 2-450	G6-350	ELITE TERMINATOR 350	PRO 98	DAN XPLORA II PLUS
Price (ex VAT)	£1,275	£1,319	£1,189	£1,275	£899	£866
Price (inc VAT)	£1,498	£1,550	£1,397	£1,500	£997	£1,018
Telephone	0181 810 7441	0171 830 0486	0800 552000	0181 208 4700	0990 134725	0181 830 1100
Web address	www.armari.com	www.carrera.co.uk	www.gateway.com/uk	www.meshplc.co.uk	www.atlanticsystems.com	www.dan.co.uk
Processor	Intel Pentium II 350	Intel Pentium II 450	Intel Pentium II 350	AMD K6-2 350	Intel Celeron A 333	Intel Celeron A 333
RAM supplied	128Mb	64Mb	64Mb	128Mb	64Mb	64Mb
RAM type	PC 100 SDRAM	PC 100 SDRAM	PC 100 SDRAM	PC 100 SDRAM	PC100 SDRAM	66MHz SDRAM
DIMMs occ/free	1/2	1/2	1/2	2/1	1/2	1/2
HD size	9.1Gb	10.1Gb	10.2Gb	10Gb	6.4Gb	4.3Gb
HD access time	9.5ms	9ms	10ms	9ms	9ms	12ms
HD interface	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA
Motherboard	Asus P2B	Super Micro P6 SBA	Intel Tolstoy	EPOX Socket 7	Intel SE440BX NA	Asustek P2B
Chipset	Intel 440BX	Intel 440BX	Intel 440BX	ETEQ 82c 66 38	Intel 440BX	Intel 440BX
L2 cache/max	512Kb/512Kb	512Kb/1Mb	512Kb/512Kb	1Mb/1Mb	512Kb/512kb	128Kb/128Kb
Free 3.5/5.25in bays	2/2	1/2	2/1	2/1	1/2	1/2
PCI/ISA/shared slots	4/2/1	4/3/1	3/1/1	4/2/1	3/1/2	4/3/1
USB/ser/par/PS/2	2/2/1/2	2/1/1/2	2/1/1/2	2/2/1/2	2/2/1/2	2/2/1/2
CD-ROM manuf.	Creative Labs	LG Electronics	Toshiba	Creative Labs	Samsung	Teac
CD-ROM model	PC-DVD-ROM 2240E	DRD-820B DVD-ROM	DVD-ROM	PC-DVD	CD ROM	CD532E
CD-ROM speed	2X DVD/20X CD	2X DVD/20X CD	2X DVD/24X CD	2X DVD/20X CD	32X	32X
CD-ROM interface	EIDE	EIDE	EIDE	EIDE	Ultra DMA	EIDE
Sound card manuf.	Diamond	Creative Labs	Creative Labs	Creative Labs	Terratec	Creative
Sound card model	Sonic Impact S90	SoundBlaster Live!	SoundBlaster 64	AWE64 Gold	Xlerate PCI A3D	AWE 64 Value
Speakers	Yamaha YST-MS25	Cambridge PC Works	Altec Lansing GCS100	Teac Powermax 1000	Atlantic 160W (PMPO)	Dan Hi-Fi Speakers
Graphics card manuf.	Diamond	Diamond	STB	Hercules	ATI	ATI
Graphics card model	Viper V550	Viper V550	Velocity	Terminator	Xpert98	All-in-Wonder Pro
Graphics interface	AGP	AGP	AGP	AGP	AGP	AGP
Graphics RAM/Max	16Mb/16Mb	16Mb/16Mb	8Mb/8Mb	8Mb/8Mb	4Mb/8Mb	4Mb/8Mb
Monitor	Iiyama S7029T	LG 77T	Gateway rebadge	ADI 5GT	Hansol 700	CTX FST
Monitor size (ins)	17in	17in	17in	17in	17in	15in
Refresh - 800 x 600	120Hz	120Hz	85Hz	120Hz	85Hz	85Hz
Refresh - 1024x768	90Hz	85Hz	85Hz	120Hz	85Hz	85Hz
Refresh - 1280x1024	80Hz	75Hz	60Hz	90Hz	60Hz	60Hz
Refresh - 1600x1200	70Hz	Not supported	Not supported	75Hz	Not supported	Not supported
Modem manuf.	Diamond	Diamond	GUC	Generic 56K	Generic 56K	Pace
Modem model	Supra Express 56K	Supra Express 56K	✗	✗	✗	56K
Modem standard	K56flex	K56flex	V.90	V.90	V.90	K56flex
Other hardware	-	Steering wheel	STB Blackmagic Voodoo2, joystick	Microsoft Sidewinder	Noise cancelled headset microphone	Microphone
Other software	-	-	Gateway games bundle, MS Home Essentials	Games bundle	Lotus SmartSuite, Corel Draw 7, IBM ViaVoice, IBM Antivirus	Quicken 6.0 SE, MS Works, Encarta 98
Standard warranty	1 yr on-site	1 yr RTB	1 yr on-site	1 yr RTB, parts & labour	1 yr collect & rtn with parts & labour	1 yr on-site
Warranty options	Two more years at 8% of PC's cost	1 yr on-site for £39	3 yrs on-site	-	Up to 5 yrs collect & rtn with parts & labour	3 yrs on-site
Technical support	0181 810 7441	0171 830 0486	0800 802000	0181 208 4700	0990 134725	0181 830 1100

Table of features

Manufacturer	Mertec Computers	Tiny Computers	Dabs Direct	Elonex	Linear Direct	Roldec Systems
Model Name	XM300-K2	Family Bonus	Atlantis Home Value	MLX-6333/I	Linear Vantage XL	Puma
Price (ex VAT)	£850	£899	£595	£595	£595	£595
Price (inc VAT)	£999	£1,056	£699	£699	£699	£699
Telephone	01792 473700	0800 821333	0800 558866	0181 452 4444	0181 408 9888	01902 456464
Web address	www.mertec.co.uk	www.tiny.com	www.dabs.com	www.elonex.co.uk	None	www.roldec.com
Processor	AMD K6-2 300	Intel Celeron A 333	Intel Celeron 266	Intel Celeron A 300	Intel Celeron A 300	AMD K6-2 333
RAM supplied	64Mb	32Mb	32Mb	64Mb	64Mb	64Mb
RAM type	PC100 SDRAM	66MHz SDRAM	66MHz SDRAM	66MHz SDRAM	66MHz SDRAM	PC 100 SDRAM
DIMMs occ/free	1/2	1/2	1/1	1/2	2/0	1/2
HD size	6.4Gb	4.3Gb	2.1Gb	6.4Gb	4.3Gb	4.5Gb
HD access time	9ms	10ms	11ms	9ms	10ms	9ms
HD interface	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA	Ultra DMA
Motherboard	Soyo SY-SEMA	Microstar MS 6119	Abit AH6	Microstar MS 612B	KTX M59TC	Microstar
Chipset	ETEQ 82c 66 38	Intel 440BX	Intel 440LX	Intel 440EX	ALI M1531 B1	ETEQ 82c 66 38
L2 cache/max	1Mb/1Mb	128Kb/128Kb	None	128Kb/128Kb	512Kb/512Kb	512Kb/512Kb
Free 3.5/5.25in bays	1/2	1/1	1/3	1/1	1/1	2/1
PCI/ISA/shared slots	5/2/1	4/3/1	3/2/0	2/1/1	4/3/0	4/3/1
USB/ser/par/PS/2	2/2/1/1	2/2/1/2	2/2/1/2	2/2/1/1	0/2/1/1	2/2/1/2
CD-ROM manuf.	LG Electronics	Panasonic	Mitsumi	Vuego	Cyberdrive	Asus
CD-ROM model	CRD-832OB	CR-588-B	FX3200	CD 632A	Cyberdrive 32	CD-S400
CD-ROM speed	32X	32X	32X	32X	32X	40X
CD-ROM interface	EIDE	Ultra DMA	EIDE	EIDE	EIDE	EIDE
Sound card manuf.	Creative Labs	Yamaha	Pine	Yamaha	Creative Labs	Diamond
Sound card model	SoundBlaster 128 PCI	XE-32	Schubert 3D Max	YMF 715	Vibra 16S	Sonic Impact S90
Speakers	ADI 5P2000	Tiny CPR 50	Logic 3 Maxim 60W	Creative CSW20	Creative Labs	Arowana
Graphics card manuf.	Matrox	ATi	S3	Diamond	ATi	Diamond
Graphics card model	Millennium G200	3D Charger AGP	Virge GX2	Viper V330	All-in-Wonder Pro	Viper V330
Graphics interface	AGP	AGP	AGP	AGP	PCI	AGP
Graphics RAM/Max	8Mb/16Mb	4Mb/4Mb	4Mb/4Mb	8Mb/8Mb	8Mb/8Mb	4Mb/4Mb
Monitor	ADI 5P	Tiny rebadge	Belinea 10-40-10	Elonex rebadge	Relisys RE5188	ADI 4P
Monitor size (in)	17in	15in	14in	14in	15in	15in
Refresh - 800x600	85Hz	75Hz	75Hz	120Hz	85Hz	85Hz
Refresh - 1024x768	75Hz	65Hz	60Hz	120Hz	75Hz	75Hz
Refresh - 1280x1024	60Hz	Not supported	Not supported	100Hz	Not supported	Not supported
Refresh - 1600x1200	Not supported	Not supported	Not supported	85Hz	Not supported	Not supported
Modem manuf.	Generic 56K	E-tech	Dabs	E-tech	LT	Generic 56K
Modem model		56K Fax Modem	56K voice	56K Fax Modem	PCI 56K	56K Fax Modem
Modem standard	V.90	K56flex	V.90	K56flex	V.90	V.90
Other hardware	HP DeskJet 670C	Umax 610P	Logic 3 joystick	-	-	-
		Fuji digital camera,				
		Epson Stylus 300				
Other software	Encarta 98, Scenes, 3D	-	-	MS Works	Lotus SmartSuite	Lotus SmartSuite,
	Movie Maker, MS Golf,					Screamer2,
	MS Works 4, Corel					PC Check
	Draw 4, Cinemania 97					
Standard warranty	5 yr RTB, 2 yrs parts	1 yr RTB	1 yr on-site,	1 yr RTB	1 yr RTB	5 yrs RTB,
	& labour, 3 yrs labour		4 yrs labour			2 yrs pts & lab
Warranty options	1 yr on site	5 yrs on-site, from £79	3 yrs on site	5 yrs RTB	2 more yrs labour only	2 yrs parts only
Technical support	01792 473700	0800 821333	0800 558866	0181 452 6666	0181 408 9888	01902 456464

PCW Labs Report

SYSmark 98 scores

Bigger is better

	SCORE
ARMARI NBX-350 9S	152
CARRERA POWER PRO-2 450 — HIGHLY COMMENDED	181
GATEWAY G6-350	141
MESH ELITE TERMINATOR	128
ATLANTIC PRO 98	128
DAN XPLORA 11 PLUS	124
MERTEC XM300-K2	109
TINY FAMILY BONUS — EDITOR'S CHOICE	122
DABS DIRECT ATLANTIS	74
ELONEX MLX-6333/1 — HIGHLY COMMENDED	119
LINEAR VANTAGE XL	81
ROLDEC PUMA	111
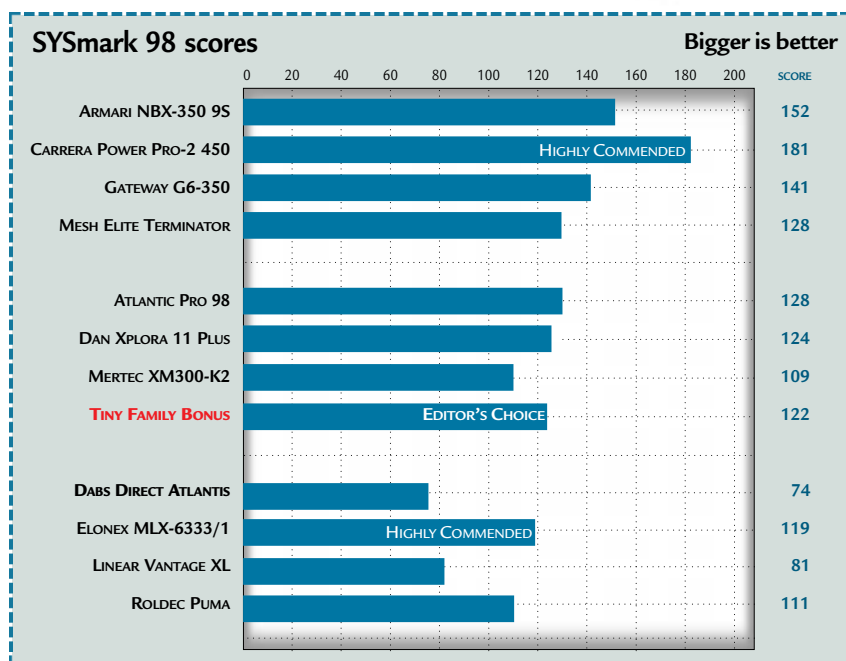
These results show, more than anything else, the need for a good processor when running 2D office applications. This is most clearly seen in the Armari and Carrera machines. Both have the same graphics card (a Diamond Viper V550 with 16Mb of graphics RAM) but the Armari had a slower processor (PII 350) and more system RAM (128Mb), while the Carrera had a PII 450 and just 64Mb of RAM. However, the processing power of the Carrera won through, suggesting that you do not need 128Mb of RAM to run Word and should instead go for the fastest processor you can. We were also disappointed to see the AMD processors doing so badly in comparison to both the PIIs and the Celerons.

In these tests, a good processor seems to have been secondary to the graphics card and RAM. The Armari and Carrera were very close both in 3D and overall scores. Not surprisingly, they both have the same graphics card with the same amount of graphics RAM. We can see the clear advantage of having 16Mb of graphics RAM compared to the 8Mb included in most of these systems. However, the extra RAM in the Armari seems to have made more of an impression in this test than in the 2D tests, almost catching the Carrera with its faster processor.

Final Reality scores

Bigger is better

	Overall	3D
ARMARI NBX-350 9S	4.11	4.23
CARRERA POWER PRO-2 450 — HIGHLY COMMENDED	4.48	4.39
GATEWAY G6-350	4.27	3.72
MESH ELITE TERMINATOR	2.69	3.10
ATLANTIC PRO 98	3.52	3.55
DAN XPLORA 11 PLUS	3.58	3.75
MERTEC XM300-K2	2.93	3.10
TINY FAMILY BONUS — EDITOR'S CHOICE	3.31	3.47
DABS DIRECT ATLANTIS	2.14	1.46
ELONEX MLX-6333/1 — HIGHLY COMMENDED	2.79	3.00
LINEAR VANTAGE XL	2.21	2.67
ROLDEC PUMA	2.98	3.35

■ Overall score ■ 3D score

How we did the tests

We ran two sets of tests on the machines: **Final Reality** to test graphics capabilities, and **SYSmark 98** to test the speed of the machines when running 2D office applications. The SYSmark test measures the speed of the PC running eight common office 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. Performance depends on processor speed, RAM, graphics card and disk I/O. As the tests are based on business 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.

Editor's Choice

A Christmas stocking-full of PCs for all budgets.

Apart from a couple of exceptions, there are some factors common to all the systems in this group test. The quality of construction of these PCs is excellent. They have high-quality components and most are easily upgradeable. For instance, we were pleasantly surprised to find powerful 333MHz processors inside PCs costing less than £700. And, the vendors have included large hard drives, powerful graphics cards and good sound cards. Many of these systems would keep you happy for a long time to come.

☞ **In the games system category,** the **Carrera Power Pro 2-450** stands out. In addition to being a speed monster, the quality of its internal components far outstrips others. The SoundBlaster Live! audio card is a good example. With its four-speaker surround-sound output it is a perfect gamer's card, and its impressive MIDI synthesis and so turns the Carrera PC into a miniature home studio. Similarly, the fast 450MHz Pentium II processor is a good companion to the powerful Diamond Viper V550 graphics card. Carrera has also thoughtfully included a steering wheel with force feedback to cap a well-equipped gaming system.

The quality of construction of these PCs is excellent

☞ **In the £1,000 price bracket,** the **Tiny Family Bonus** system caught our eye. Tiny claims to be the UK's largest PC retailer and this system is representative of the company's dedication to the mainstream consumer market. While not lacking in quality components, as shown by the inclusion of the 333MHz processor and upgradeable motherboard, the Tiny PC has no less than three useful peripherals bundled free with it. The Umax 610P scanner is one of the best in its price range and came top in our scanners group test in the September '98 issue. The Epson Stylus Color 300 printer, although not that fast, produces decent-quality colour images and text. The Fuji DX-5 digital camera has a decent image resolution of 640x480 and comes with a 4Mb flash memory cartridge.

☞ **The sub £700 budget PC** segment is one of the fastest-growing sections of the PC market. The Elonex MLX-6333/1, despite its rock-bottom price, does not skimp on any necessary component. With its 300MHz processor and a large 6.4Gb hard drive, this system's performance is actually better than that of many others costing far more.

Christmas is a time when buyers look for bargains. In the realm of PC sales, there is no better bargain than the **Tiny Family Bonus** system. Its build quality is as good as the best in this group test, and with three high-quality bundled peripherals, the Family Bonus system is excellent value for money. These factors, along with the Tiny's high upgradeability, make it a fitting choice for our **Editor's Choice** award. The Tiny PC, more than any other system, would be the ideal Christmas gift.

The Carrera and Elonex systems also deserve an honourable mention. While the former is a speed demon and a gamer's dream, the latter delivers high performance at an enticing price. For these reasons, the **Carrera Power Pro-2 450** and the **Elonex MLX-6333/1** are worthy winners of our Highly Commended awards.

▲ **TOP TINY FAMILY BONUS**
MIDDLE CARRERA POWER PRO 2-450
BOTTOM ELONEX MLX-6333/1