MMX factor

The Pentium chip with added multimedia extensions (MMX) has arrived, and so have the first PCs based on the new technology. We line up eight machines to see what MMX can do

All PCs need a processor. It's the most important part of the computer and the one that does most of the hard work – if you like, a processor is a computer's 'brain'. In the PC marketplace there are a number of companies that make these processors, but the unquestioned leader is Intel.

Truly an industry veteran, Intel has been making computer chips for a quarter of a century and it was responsible for the processor used in the very first PC, made by the once-dominant IBM. Since then, Intel has gone on to produce the world's best-known and most prevalent processor: the Pentium.

Just a few weeks ago the top chip manufacturer unveiled a new version of its Pentium processor, the Pentium MMX. The 'MMX' part is a rather imaginative abbreviation of 'multimedia extensions', and it promises to bring improved graphics, sound and video, as well as faster processing, to users of desktop PCs. These advances are made possible by the addition of some multimedia-specific commands, and there's a fuller description of exactly what these can do later in this feature.

Already PC manufacturers are embracing this latest jump in technology, and we've gathered together the first batch of MMX-based PCs to appear and subjected them to our stringent Labs tests.

Carrera Power Media P200MMX

Carrera is a relatively new PC manufacturer based in West London. Since it started trading in 1993 the company has grown quickly and, as well as its mail-order operation, it runs a retail shop in London's Tottenham Court Road.

Generally speaking, PCs come in two types of cases: 'desktop' (flat and wide), or 'tower' (tall and thin). Of course, there are some stylised

exceptions, but the Power Media P200MMX isn't one of them. Standing at around 18in high, its plain case is a 'midi-tower', meaning it is too short to be classed as a tower yet at the same time too tall to be a 'mini-tower'. At the front of the machine, aside from the expected 3.5in floppy disk drive, there's an eight-speed (often abbreviated as '8x') CD-ROM drive. The days since the first CD-ROM drives – single-speed or 1x – appeared are long gone, and today you'd be unwise to buy a system fitted with less than a 6x CD-ROM drive.

Inside the Power Media things are clean enough with all cables being tied and secured. However, there is a slight problem: a couple of these cables are tightly stretched across the two spare PCI slots. Many modern expansion cards (TV tuners, teletext adaptors and so on) need to be slotted into PCI sockets, so if you wanted to add such a card you'd need to reorganise the cabling a bit.

Apart from the insignificant-looking Pentium MMX 200MHz processor, the Power Media has a good number of other features worth mentioning. There's an AWE32 sound card from Creative Labs, and a modem that runs at

33.6Kbits/s (kilobits per second). This is the latest data transfer speed standard for modems which, in a nutshell, means it can retrieve information quickly and speed up Internet 'surfing'. You may have read about modems that run faster than this (56Kbit/s) but these are based on proprietary systems and therefore, at least at the moment, are not 'industry standard'.

Carrera has fitted 16Mb of RAM (memory) to the Power Media, which is a respectable amount. However, all other manufacturers in this test supplied machines with 32Mb of memory and this has been reflected in the Power Media's performance figure. **In the performance stakes Carrera's first MMX system has suffered against the competition because it only has 16Mb of RAM. It's a fine PC, but its test results demonstrate how important that additional 16Mb of RAM can be.**

○ £1,996.33 (inc VAT)
○ Carrera: 0171 830 0486

Power Media P200MMX

Build quality	★ ★ ★ ☆ ★
Performance	★ ★ ★ ☆ ★
Features	★ ★ ★ ★ ☆
Value for money	★ ★ ★ ☆ ★
Overall	★ ★ ★ ☆ ★

Dan Ultimate 200/X

Dan Ultimate 200/X

Over the past year or so, North London-based Dan Technology's PCs have made regular appearances in the pages of *What PC?*. The company's machines have performed consistently well in our tests, and more often than not they've represented very good value for money as well. With this in mind,

we had high expectations of Dan's first PC fitted with an MMX processor. The machine that we received, an Ultimate 200/X, certainly had a price to match its name.

The Ultimate 200/X is housed in a midi-tower case and looks quite unremarkable but for one eye-catching feature: an Iomega Zip drive that occupies one of the 5.25in drive bays. But why is this so appealing, and what exactly is a Zip drive? Zip drives (designed by US company Iomega) can store up to 100Mb of information on cheap, removable disks – it's a bit like having an unlimited number of small hard disks at your disposal.

Naturally, a computer is not complete without a monitor and Dan has made a good choice in the 17in iiyama model that it is shipping with the Ultimate 200/X. Admittedly, larger monitors such as this do eat up desk space, but the advantage is that you can comfortably use higher resolutions. A typical 15in monitor is really only usable at up to 800x600 (that is, 800 dots, or 'pixels', across the screen and 600 down). At all resolutions right up to 1,280x1,024 pixels the iiyama 17in holds an impressive picture,

and the ample brightness and contrast ranges mean it can be adjusted to suit all tastes.

As you might have guessed from its name the Ultimate 200/X is powered by a 200MHz MMX processor, and this, in combination with the 32Mb of RAM and the 2Mb Matrox Mystique graphics card, helped the machine to be one of the best performers in the test.

Bundled with the Ultimate 200/X is a futuristic car-racing game called Pod – the first game written especially for MMX processors. There are also a number of 'MMX enhanced' titles from the current doyen of the multimedia world, Dorling Kindersley.

Dan has managed, yet again, to produce a machine that has an impressive specification and performs brilliantly. £2,381 is a lot to spend on a PC, but you get a lot for your money.

○ £2,381.73 (inc VAT)
○ Dan: 0181 830 1100

Dan Ultimate 200/X

Build quality	★ ★ ★ ★ ★
Performance	★ ★ ★ ★ ★
Features	★ ★ ★ ★ ★
Value for money	★ ★ ★ ★ ☆
Overall	★ ★ ★ ★ ★ ▶

What is MMX?

So you've heard that Pentium MMX is going to be big. You may even have been told that you'd be mad to consider buying anything else. But what exactly is MMX and how does it work?

In a nutshell, Pentium MMX is a new improved version of the Pentium processor with extra features to improve the performance of multimedia applications, games and high-speed communications. The engineers at Intel examined the most time-consuming and compute-intensive operations that crop up during these tasks, worked out which were the most common, and then built 57 new functions or 'instructions' into the chip's design to speed them up.

When used by software especially written for Pentium MMX, these extra commands can improve the playback of video, making full-screen video at almost VHS quality a reality; they can speed up the generation and manipulation of 2D and 3D graphics, and enhance audio output. Compared to a standard Pentium of the same speed, a Pentium MMX processor can improve multimedia performance by up to 60 percent.

In addition to the extra instructions, Intel has also reduced the chip's power consumption, improved the way in which instructions are processed, and doubled the size of the chip's on-board cache to 32Kb, which will speed up just about everything the PC does. In fact, a 166MHz Pentium MMX is faster than a 200MHz standard Pentium.

At present, Pentium MMX processors are available at 166MHz and 200MHz for PCs, and 150MHz for use in notebooks. More speeds are on the way.

Intel says MMX capabilities will be found in all its future microprocessors, and as the number of applications that use them increases, standard Pentiums are sure to be phased out over the coming year. However, with so many Pentium systems in use it is likely that programmers will support both chips for some time to come.

The company has also designed a series of new OverDrive processors, which can be plugged into many existing Pentium systems, providing an easy upgrade. These will be available in speeds up to 166MHz during the first half of 1997, and up 200MHz in the second half.

Dell Dimension XPS M166
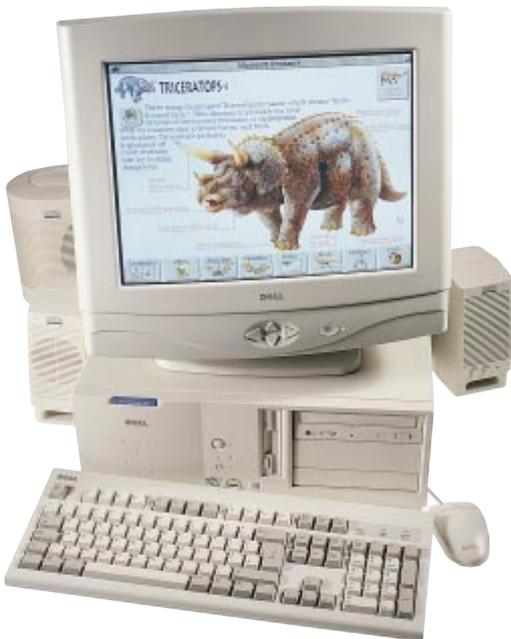
Among the masses of PC manufacturers Dell is undoubtedly one of the heavyweights. Michael Dell founded his eponymous company in the US in 1984, and just three years later began selling custom-built PCs across Europe as well. The Dell Dimension range has been around for a while now, and this XPS M166 fitted with a Pentium MMX running at 166MHz is the latest addition. Our review model was in the final stages of production, so specifications may change slightly on its commercial release.

After you've had a good look inside a few PCs, the sight of the motherboard (the part of the computer all the various bits and pieces attach to) is unlikely to bring any surprises. The same is true of the XPS M166's motherboard, but it is slightly unusual in having only DIMM (Dual In-line Memory Module) sockets instead of SIMM (Single In-line Memory Module) sockets. Naturally, to the user it doesn't matter whether the memory chips are in the form of DIMMs or SIMMs, but 64-bit processors like the Pentium can benefit speed-wise from the extra contacts that DIMMs have, and for this reason they will become more common as time moves on.

Although lacking any real extras, the XPS M166 does have a solid basic specification. Like Dan's Ultimate 200/X the CD-ROM drive is a 12-speed one, and the solitary DIMM provides a healthy 32Mb of memory. Better still is the 3Gb (gigabyte) hard disk drive, which should be more than enough for most people's needs. Indeed, you may not need such a large amount of storage at the moment but be wary of buying any machine fitted with a hard drive below 1Gb in size.

Sound comes courtesy of a compact pair of Altec Lansing speakers, and these are driven by a Creative Labs Sound Blaster AWE32 sound card, the card against which other sound cards are judged.

The keyboard is perfectly responsive, but is let down by its bottom row of keys which, for some unknown reason, are convex curved and angled slightly away. **Not a particularly exciting machine but the Dimension XPS M166 is superbly built; and it does bear the name of one of the most respected companies in the industry.**

○ £1,996.33 (inc VAT)
○ Dell: 01344 720000

Dell Dimension XPS M166

Build quality	★ ★ ★ ★ ★
Performance	★ ★ ★ ★ ☆
Features	★ ★ ★ ☆ ☆
Value for money	★ ★ ★ ★ ☆
Overall	★ ★ ★ ★ ☆ ▶

Dotlink Terminator 200MMX

Dotlink runs its mail-order business from its head-quarters in Wembley. The company has been around for several years and produces PCs to suit most people's needs.

Dotlink's Terminator 200MMX takes its name from its two most prominent features: a Hercules Terminator 3D graphics card and, of course, a Pentium MMX running at 200MHz. By this point, you'll need no introduction to the latter of these two features, but you may not have heard of the former.

Hercules is a US company that's been producing graphics cards since the birth of the PC, and the 4Mb Terminator 3D is its very latest card. It's admirable that Dotlink has seen fit to install a recent graphics card rather than opt for an older, cheaper alternative.

Somewhat unusually, the Terminator 200MMX's motherboard sports a total of six SIMM sockets. Only two of these are occupied – both by 16Mb SIMMs, giving a total memory of 32Mb – meaning there are four sockets available for expansion.

In comparison to the competition, some parts of Dotlink's machine look a little lacklustre. Surrounded by mostly 12-speed CD-ROM drives, the Terminator 200MMX's eight-speed CD-ROM drive seems slow, and most other manufacturers have also managed to include a modem as standard.

However, on the flip side the 15in ViewSonic is very usable at its optimum 800x600 resolution and

Dotlink's fitting of an Eagle Exabyte tape drive Nest is a good idea. Eagle produces removable tape drives that can be simply slotted into any PC with a Nest, and the tapes can be used to back up to 4.4Gb of data.

The mouse is the ubiquitous model from the even more ubiquitous Microsoft, and is as welcome as ever. The big and clunky keyboard cannot be greeted with quite the same enthusiasm, but it does the job. And the same is also true of the JUSTer speakers: they're suitably hefty and look the part, but their output tends to break up at higher volume or bass levels.

The Terminator 200MMX is a something of a mixed bag – or box – good in some areas, but lacking in others. It performs, and is priced, well and it certainly deserves to be viewed as above average.
○ £1,687.30 (inc VAT)
○ Dotlink: 0181 902 5802

Dotlink Terminator 200MMX
|	
Build quality	★ ★ ★ ★ ☆
Performance	★ ★ ★ ★ ★
Features	★ ★ ★ ☆ ☆
Value for money	★ ★ ★ ★ ★
Overall	★ ★ ★ ★ ☆

Evesham Platinum HX

It won't surprise you to hear that Evesham Micros is based in the town of Evesham, but you may not know that the company began life by selling Sinclair Spectrum computers from a tiny shop. Now it's one of the largest mail-order PC suppliers in the UK, and it also operates retail shops in Evesham, Cambridge, Birmingham and Milton Keynes.

The Platinum HX is Evesham's first PC to feature a Pentium MMX processor at its heart, and it's the cheaper (and slower) of the two models currently available: a 166MHz. Wisely, Evesham has complemented this with 32Mb of RAM but the cache is only 256Kb. A cache is made of a very fast type of memory, and it helps a computer to run faster by providing the processor with near-instant access to recently used commands.

Undoubtedly the most striking feature of this system is the gargantuan 17in monitor, made by GoldStar. A pair of side-mounted speakers contribute to its ample bulk, but their quality output makes them welcome extras.

On the subject of monitors, it's worth bearing in mind that the '15in' or '17in' tag most manufacturers give to their models does not refer directly to the size of the screen. A 17in monitor, for example, does indeed have a 17in tube but the actual viewable area – your screen – is likely to be much less, usually below 16in (measured across the diagonal).

Inside its midi-tower case the Platinum HX is exceptionally tidy, with every single cable bound along

its entire length. There's a 2.5Gb hard disk nestled neatly underneath the spare 5.25in and 3.5in drive bays. Predictably enough, a disk drive and a 12-speed CD-ROM drive occupy the other two bays.

An increasing number of companies, Evesham included, seem to be bundling the Microsoft Mouse with their PCs. This is no bad thing as its ergonomic ambidextrous design makes it a firm favourite with many users. The large, plastic keyboard is not as appealing, but the heavy action and long travel of the keys will make it instantly familiar to those used to tapping away on traditional typewriters.

Considering that the Platinum HX only has a 166MHz MMX processor it is a bit too expensive. On the plus side, though, Evesham is the only supplier in this test that offers on-site maintenance as standard.
○ £1,999 (inc VAT)
○ Evesham: 01386 765500

Evesham Platinum HX
Build quality	★ ★ ★ ★ ★
Performance	★ ★ ★ ★ ☆
Features	★ ★ ★ ★ ☆
Value for money	★ ★ ★ ★ ☆
Overall	★ ★ ★ ★ ☆

MMX software

It's all very well Intel boasting about how much better multimedia and games software will be on a Pentium MMX, but what's the reality? How much MMX software is actually out there and, more importantly, is it worth splashing out on an MMX machine to use it?

Currently, MMX-specific software is thin on the ground but this is hardly surprising as it is just a few weeks since the new processors made their first appearance. Writing any kind of software takes months, and more advanced games and multimedia projects can take a year or more to complete.

However, Intel naturally wanted to ensure there was some software available when the first MMX PCs went on sale. For this reason, some software companies were privy to the details of MMX technology before it was launched. This meant a trickle of titles appeared at the same time as the MMX processor was launched – and naturally some of these are better than others.

Of the ones we've seen, futuristic car-racing game Pod is the most visually impressive. The 3D graphics move fluidly and we cannot think of any PC game that comes close to its detail level. In the past, 'polygon dropout' (where 'distant' objects appear and disappear with wild abandon) has been rife, but in Pod this simply doesn't happen. At any one time you can see a huge length of the track, and even the furthest trackside objects are visible. Unfortunately, under its surface gloss Pod is ultimately quite a boring game but it gives a good idea of the graphical delights set to follow.

Dorling Kindersley's The Human Body is typical of the sort of multimedia titles that will benefit most from MMX technology. The program is a combination of sounds, videos and 3D graphics, and it has been 'enhanced' to take advantage of MMX functions. The Human Body is not as immediately eye-catching as Pod, and its 3D sections are not particularly fast either, but overall it seems more polished than its non-MMX counterpart.
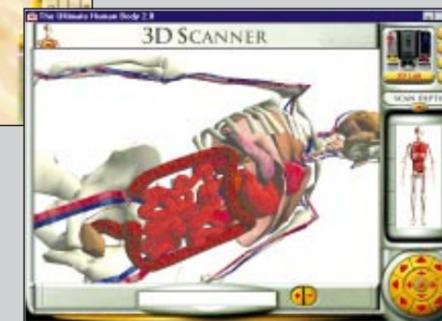
For the artists out there, Adobe has an MMX-enhanced version of its image-editing program, Photoshop. In tests we found that performance was improved anywhere between 10 and 45 percent depending on the operation.

Mesh Elite 200MMX Fireblade Connect
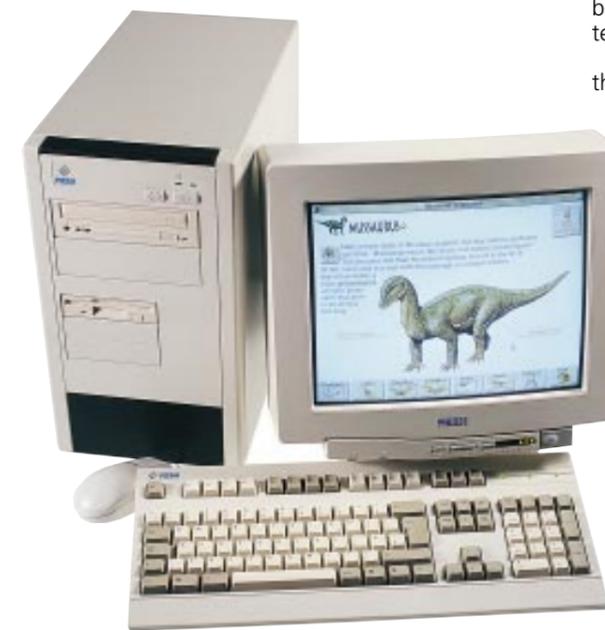
In most other industries, being a decade-old company is little to boast about. However, the computer industry is unlike most others and to that end UK PC manufacturer Mesh is currently busily, and proudly, celebrating its tenth birthday.

Like most of Mesh's machines, the Elite 200MMX has a strange-looking case. In this instance, it's an over-wide mini-tower with Mesh's trademark piece of black-coloured wire mesh its base. Sliding this off reveals the usual array of cables and cards rising from expansion slots on the motherboard. There are three PCI slots free, and one full-length ISA slot. ISA, which stands for Industry Standard Architecture, is an ageing expansion card standard, but it's useful to have a spare ISA slot or two because ISA cards are still fairly common.

The 'Connect' part of the Elite 200MMX's full name relates to the 33.6Kbits/s (Kilobits per second) modem that comes fitted with the PC. Recently, there seems to have been a shift among manufacturers to make machines supplied with modems the rule, rather than the exception. This is definitely good news for consumers because most people will, sooner or later, want to get hooked up to the Internet.

A Mesh-badged 15in monitor, made by ADI, supplies the pictures – and very impressive pictures they are too. Although it doesn't look particularly special – the controls are a combination of capsule-shaped buttons and old-fashioned dial controls – the screen gives very sharp images, even at a resolution of 1,024x768.

There's little doubt that the 'best' input devices (such as keyboards and mice) are very much down to personal taste. For example, the Microsoft Mouse that comes with the Mesh machine is certainly a favourite among the *What PC?* team, but the included keyboard tells a different story. It's responsive enough, but the microswitch keys means it's very noisy in use – if you value peace and quiet, it could become quite infuriating.

The Elite 200MMX is not the best machine we've seen from Mesh, but it is very competitively priced.
○ £1,643.83 (inc VAT)
○ Mesh: 0181 452 1111

Mesh Elite 200MMX
Build quality	★ ★ ★ ★ ☆
Performance	★ ★ ★ ★ ☆
Features	★ ★ ★ ★ ☆
Value for money	★ ★ ★ ★ ★
Overall	★ ★ ★ ★ ☆

MJN P166 Multimedia

MJN is just one arm of a large PC manufacturing company based in Lancashire. The MJN-branded machines are pitched very much at first-time buyers and the education market – for this reason, MJN PCs tend to be cheaper than many similarly specified PCs. But you do have to be content with buying via mail order.

We found we had to be a little over-careful when setting up our P166 Multimedia review model. As soon as we placed the machine on our Labs bench both the plastic plates blanking the spare 5.25in drive bays fell out. We soon clipped them back in place, but they remained decidedly loose.

While it might appear we're being pedantic by picking up on a seemingly minor failing such as this, we feel it does merit highlighting. You wouldn't expect to find parts falling off any other type of consumer product – nor would you accept it – so why should PC manufacturers' wares be exempt from such criticism?

It's a shame that MJN skimped on the case because the machine is well put together inside. The various cables are a little messy, but they don't get in the way of any of the spare expansion slots – three PCI and two ISA. The occupied slots are hosts to a 33.6Kbits/s modem, and a Creative Labs Sound Blaster AWE32 sound card as well as a 2Mb ATI 3D Xpression graphics card.

To call the keyboard low profile would be an understatement. The keys barely rise above the slim moulding, and they are quite flat as well. However, even though it feels a little unusual at first, this is a very comfortable keyboard to use. The mouse (made by Logitech) is good too, being both ergonomically and stylishly designed.

Unfortunately, the same compliments cannot be paid to the 15in ProScan monitor. Regardless of how much we twiddled its dials and pushed its buttons we could not get the displayed image in focus. In fairness, we eventually achieved a picture which was usable, but it remained well below the standard we would expect.

MJN's P166 Multimedia offers reasonable performance and specification at a highly reasonable price. The poor monitor, however, reduces its appeal.
- £1,526.33 (inc VAT)
- MJN: 01282 777555

MJN P166 Multimedia

Build quality	★★★ ☆ ☆
Performance	★★★★ ☆
Features	★★★★ ☆
Value for money	★★★★★
Overall	★★★★ ☆

Viglen Awesome 200M Genie ATX

If you've ever wondered what happened to Amstrad's involvement with the PC industry, you need look no further than Viglen. The Middlesex-based company was bought by Amstrad a couple of years ago, but fortunately – and

definitely wisely – Viglen was allowed to continue as an independent PC manufacturer.

It's a rare occasion during the course of group test to come across a machine that has a feature unique among the group, yet the Awesome 200M boasts not just one, but two. The first, an IrDA (Infrared Device Association) infra-red port, is now commonplace on modern notebook computers, but still somewhat of a rarity on desktop PCs. Having an infra-red port means your PC can communicate cordlessly with other IrDA-compliant devices, such as printers, keyboards and mice.

The second unique feature, a PhotoDrive photograph scanner, is not in itself an oddity but it's not often such gadgets come supplied as part of a PC's standard specification. Looking suspiciously like a tray-less CD-ROM drive, the PhotoDrive in fact draws photographs (or photograph-sized documents) into its 5in-wide entry slot. Once it has swallowed your photograph, the PhotoDrive automatically scans it and displays the result as a digital image on the screen. You can choose a scan resolution of up to 400dpi (dots per inch), and at this top resolution the scan quality really is most impressive.

It's likely that the latter of these two features made a none-too-insignificant contribution to the Awesome 200M's hefty price. However, considering the 32Mb of RAM, 3Gb hard disk drive, 12-speed CD-ROM drive and the 33.6Kbit/s modem that you also get, the value for money certainly seems to be spot on.

It doesn't end there. There's an impressive 17in Envy monitor which is complemented by a 4Mb 3D Xpression graphics card, made by ATI. Completing the system is the 16-bit ESS AudioDrive sound card which pumps its Sound Blaster-compatible audio through an excellent set of Yamaha speakers. In combination with a thumping 25W sub-woofer, these 10in speakers offer a superb reproduction.

Awesome by name, and mostly by nature. If you've got plenty of spare change down the side of your sofa, gather it up and buy this machine.
- £2,351.38 (inc VAT)
- Viglen: 0181 758 7000

Awesome 200M Genie ATX

Build quality	★★★★★
Performance	★★★★ ☆
Features	★★★★★
Value for money	★★★★ ☆
Overall	★★★★★

VNU LABS EUROPEAN

Speed tests

- Dan P200 MMX
- Dotlink P200 MMX
- Viglen P200 MMX
- Mesh P200 MMX
- Dell P166 MMX
- MJN P166 MMX
- Evesham P166 MMX
- Carrera P200 MMX

NOTE: All machines tested with 32Mb of RAM as supplied except the Carrera which included 16Mb of RAM

Compaq

The performance of machines in this chart is measured relative to a **Compaq DX4/100** with 16Mb of RAM

NOTES: NSTL benchmarks from which this chart was generated were performed in the *What PC?* VNU Labs. In all tests, a longer bar indicates better system performance.

Alternative MMXs

Contender ATX Performance 166M

Although Viglen's main submission for this group test was right at the top of the price tree, the company also produces MMX machines aimed at those on a tighter budget. A typical example is the Contender ATX Performance 166M, which uses the cheaper 166MHz MMX processor, and is fitted with 16Mb of RAM. On top of this you get a 2Gb hard disk drive, an eight-speed CD-ROM drive, a 16-bit sound card and a 28.8Kbit/s modem.
- £1,499 (inc VAT)
- Viglen: 0181 758 7000

Gateway P5-200 Multimedia

Gateway's first MMX system arrived just a little too late to be included as part of the main group test. As well as a 200MHz MMX processor, the P5-200 Multimedia has 33Mb of RAM (memory), a 12-speed CD-ROM drive, a 33.6Kbit/s modem and a massive 3.8Gb hard disk. The monitor is a

17in model from CrystalScan, and this is driven by a 4Mb graphics card. Topping this off is a healthy software bundle which includs Microsoft's Office Professional 95.
- £2,113.83 (inc VAT)
- Gateway: 0800 302000

Silica Hurricane 166MMX

If you dig through the piles of jeans and T-shirts currently stacked in your local Debenhams store, you might well find a Silica concession. Within that concession you will find Silica's latest PC: a 166MHz MMX machine with a 2.1Gb hard disk and 32Mb of memory. Unfortunately, at this price it only comes with a 14in monitor but the one-year on-site maintenance Silica gives is a definite plus point.
- £1,699.00 (inc VAT)
- Silica: 01483 718100
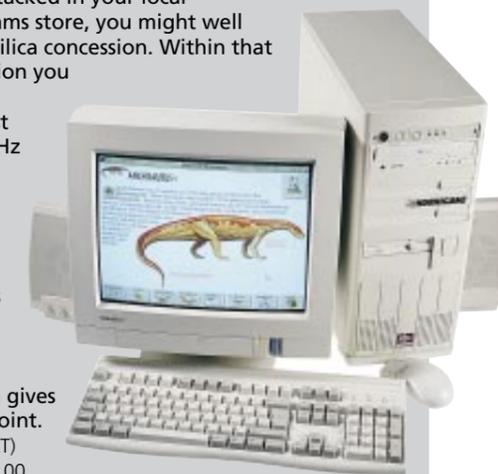
Pentium MMX PCs compared

	Carrera	Dan	Dell	Dotlink	Evesham	Mesh	MJN	Viglen
Model	Power Media P200MMX	Ultimate 200/X	Dimension XPS M166	Terminator 200MMX	Vale Platinum HX	Elite 200MX Fireblade Connect	P166 Multimedia	Awesome 200M Genie ATX
Price (inc VAT)	£ 1,996.33	£ 2,381.73	£ 1,996.33	£ 1,687.30	£ 1,999	£ 1,643.83	£ 1,526.33	£ 2,351.38
Processor	Pentium MMX 200MHz	Pentium MMX 200MHz	Pentium MMX 166MHz	Pentium MMX 200MHz	Pentium MMX 166MHz	Pentium MMX 200MHz	Pentium MMX 166MHz	Pentium MMX 200MHz
Memory	16Mb	32Mb	32Mb	32Mb	32Mb	32Mb	32Mb	32Mb
Cache	512Kb	512Kb	512Kb	512Kb	256Kb	512Kb	512Kb	256Kb
Hard disk	2Gb	2.5Gb	3Gb	2.5Gb	2.5Gb	2Gb	2.5Gb	3Gb
Case	Midi-tower	Midi-tower	Desktop	Mini-tower	Midi-tower	Mini-tower	Mini-tower	Midi-tower
Sound hardware	Creative Labs Sound Blaster AWE32	Creative Labs Sound Blaster AWE32	Creative Labs Sound Blaster AWE32	Creative Labs Sound Blaster AWE32	Yamaha Sound System (emulates AWE32)	Creative Labs Sound Blaster AWE32	Creative Labs Sound Blaster AWE32	16-bit ESS AudioDrive
Speakers included	●	●	●	●	● (on monitor)	●	○	●
Graphics	Matrox Mystique (2Mb)	Matrox Mystique (2Mb)	Matrox Millennium (4Mb)	Hercules Terminator 3D (4Mb)	Matrox Millennium (4Mb)	ATI 3D Xpression (2Mb)	ATI Video Xpression (2Mb)	ATI 3D Xpression (4Mb)
CD-ROM drive speed	8x	12x	12x	8x	12x	12x	8x	12x
Monitor	Goldstar 15in	Iiyama 17in	Dell 17in	ViewSonic 15in	Goldstar 17in	ADI 15in	ProScan 15in	Envy 17in
Modem (kbits/s)	33.6 (voice)	33.6	n/a	n/a	33.6	33.6 (voice)	33.6	33.6 (voice)
Other	n/a	Iomega Zip drive	n/a	Eagle Exabyte tape drive Nest	Iomega Zip drive	n/a	n/a	PhotoDrive (photograph-size image scanner, IrDA infra-red port)
Warranty	1-year parts, 3-year labour RTB	1-year RTB	1-year RTB	2-year RTB (1st year parts and labour; 2nd year labour only)	1-year on-site	1-year RTB, 'collect and return'	1-year RTB	1-year RTB, 'collect and return'

● = Yes   ○ = No
RTB = return to base

BEST BUY — WHAT PC?

The MMX PC market is still in its early days, but we were more than happy with the majority of the machines we received. However, in this test Dan's Ultimate 200/X had the edge in terms of performance and specifications and it justly takes the Best Buy award.

RECOMMENDED — WHAT PC?

Two machines are worthy of our recommendation. Viglen's Awesome 200M has plenty of features and is a very desirable machine – if you can afford it. At the opposite end of the price scale is Mesh's Elite 200MMX Fireblade Connect which, despite its (comparatively) mediocre performance, has plenty of features and would make a great MMX entry-level buy.

Scott Colvey