

## Time to plump for Pentium

**With more manufacturers developing products specifically for use with Pentium processors, Panicos Georghiades and Gabriel Jacobs reckon it could finally be time for multimedia fans to invest in an Intel. There's also a new CD-ROM for Macromedia Director, and more on MPC standards.**

**A**lthough high-end 486-based PCs can run multimedia quite acceptably if fitted with 8Mb RAM or more, it seems that if you want a multimedia playback PC with a future, you should seriously consider a Pentium processor.

This may sound like the kind of sales hype you normally have to be wary of. After all, there's always something faster than what you've got, either here and now or just round the corner. It's obviously in the interest of manufacturers to try to convince us that we can't expect good results for multimedia without the extra speed of the Pentium chip — the higher we set our sights, the more money we spend.

But you may have to consider a Pentium for reasons which go beyond its raw processing speed. Over the last year, despite Pentium's bad press over floating point calculations, a number of multimedia-related manufacturers and developers have been introducing products which specifically make use of Pentium features to achieve improved performance.

For instance, one of the leading multimedia companies, Macromedia, has recently released a minor upgrade to Director 4.0 for Windows. This new version (4.0.4) is optimised for the fast performance and graphics capabilities of the Pentium. On a Pentium, the new version can display twice as many frames per second as the older version. Other improvements include DIB support, embedded QuickTime compressed PICT files, and mixing sounds that use different resolutions and sampling rates. The upgrade is



*Test your PC's performance with the MPC Wizard. Individual components and complete systems can be checked*

available at £25 to all registered users from Macromedia (01344 76111).

Having other firms make use of the Pentium's native operations is what Intel is aiming for, as is evident from the number of tools it provides free to developers. At the end of April this year it unveiled version 2.0 of its 3DR technology, first

released a year earlier but now optimised for the Pentium. Version 2.0 offers features not available in current 3D-graphics Windows software, and will help multimedia, virtual reality, CAD and games applications by providing better image quality and transparent scalability. Software libraries include a general lighting model, matrix operations and camera model, texture processing and user interface kits, a comprehensive geometric mathematical library, and support for Visual Basic.

Another Intel technology, NSP (Native Signal Processing), developed in conjunction with other manufacturers, enables realtime multimedia tasks such as audio signal processing or video file capture and compression to be done on the Pentium. A second developers' kit, Native Audio, was released last May as part of NSP. This enables functions which otherwise require specialised dedicated co-processor hardware, such as WaveTable MIDI

synthesis, 3D audio and special effects, to be delivered using software only and the Pentium. Some of the most important benefits of this will be digital mixing of multiple audio tracks, simultaneous record and playback, and advanced compression algorithms including MPEG sound.

Intel isn't the only company providing software-only solutions with the Pentium. Xing Technologies, pioneers in MPEG compression/decompression software, have recently been working in conjunction with several graphics card manufacturers

## Media Book CD

If you're developing multimedia using Macromedia Director (Mac or PC), you'll be interested to know of a new CD-ROM containing information and development tools provided by professional dedicated users.

There are over 100 royalty-free XObjects, as well as re-usable Lingo code. With this, not only can you save development time but you can also learn more about Director's not-so-friendly Lingo programming language.

The CD contains a Lingo directory with all known and some officially undocumented Lingo keywords including syntax, results, functionality and cross-platform considerations. Each keyword is accompanied by interactive examples, illustrations, and some by QuickTime movies.

The Lingo library contains more than 200 ready-to-use Lingo handlers and functions for string, data and file manipulation that you can copy and use in your applications. A general reference library contains 100 articles on topics such as using the FileIO XObject and optimising load times when reading from a CD-ROM.

There's also a collection of Mac and Windows XObjects, including some for printing, file management, memory management, and system analysis. Most of these are royalty-free.

On top of all that there's the Toolbox, a suite of development aids including score, cast, sprite and movie-in-a-window management tools, and Lingo analysis, debugging and formatting tools. Finally there's a resource directory of where you can get even more tools and further information.

The CD-ROM is rather slow, but we were very impressed with many of the techniques.

Media Book CD is manufactured by Grey Matter Designs and sold by Computers Unlimited (0181 200 8282).

to deliver software-only MPEG video playback on Pentium machines.

XingMPEG Player is bundled with a graphics card from Miro: the MiroVideo 12 PD. This ordinary S-VGA card for PCI and VLBus slots costs only £99 and can scale AVI files to full screen. But if you have a Pentium 90 or higher you can also playback full-screen MPEG video. At £99 it's over £100 cheaper than the cheapest dedicated MPEG playback card on the market.

On the other hand, £100 is nowadays more or less the difference between a 486 and a Pentium. So you may find that by paying the extra and investing in a Pentium instead, you'll save money on dedicated multimedia peripherals such as video playback cards and audio cards with DSP.

And, of course, you get all the other speed advantages of that faster processor we're told we can't be without.

### Testing for performance

Last month we described the specifications of the MPC standards. But manufacturers' quoted specifications can be presented in ways that suit them rather than us, and can often be found inadequate in real-life situations.

Therefore, whether you're a professional multimedia developer, or just your common or garden user, you really need ways of testing individual multimedia component peripherals as well as complete systems. It could be for the purpose of buying a system, or developing an application, or simply because you need to

change a configuration in order to maximise performance when running a particular application. For example, you may want to alter the screen resolution and colour-depth so that a particular multimedia application's video clips run better.

To find out how a system will behave you have to carry out the right kind of tests. If you dabble in programming, you could devise your own tests, but it usually takes far less time to use existing ones.

There's a plethora of benchtest programs around, some of them bundled with various pieces of hardware such as SCSI adaptors, co-processor chips and graphics cards. But most of these tests are inadequate for testing multimedia, since in their efforts to be accurate and independent, they tend to test in the kind of ideal conditions few of us meet in the real world.

There are, however, a few programs specifically written to test multimedia machines or functions. One we use often, and which has proved accurate and reliable, is MPC Wizard. Unlike most other Wizards it doesn't come from Microsoft, but from Softkey, and it tells you all manner of revealing little things.

Using it is simple. You run it, and it informs you how well your computer performs several multimedia-related tasks. The tests are divided into four sections: CD-ROM Drive, Graphics, Sound, and Video.

Many of you will no doubt remember those test programs you could buy a few years back which told you how well your



PC was doing compared to an IBM AT. You got an overall figure which made you feel good because it was rather hard for any PC clone not to outperform the IBM AT.

Well, you're unlikely to get the same feeling automatically with the Wizard tests, since it shows you not how your machine stacks up against the competition, but against several of the MPC Council's requirements and recommendations.

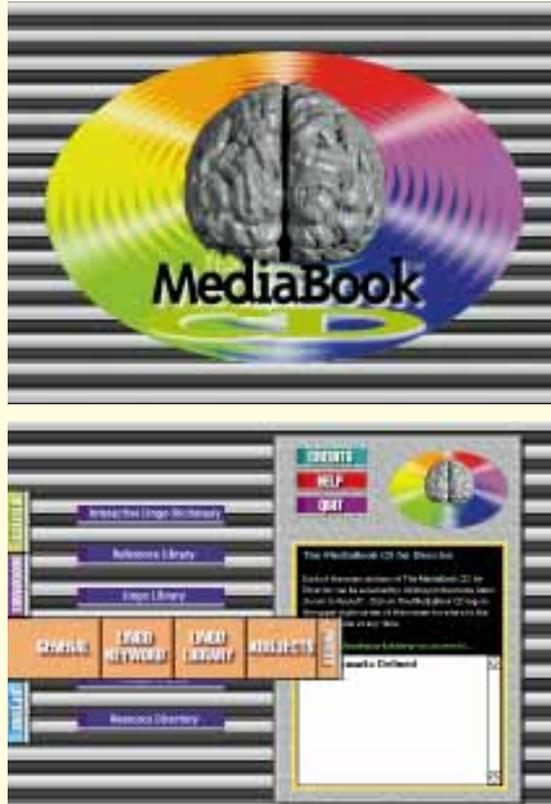
For example, the CD-ROM tests check out the MSCDEX version you're using, the access time of the drive, and its real (as opposed to its theoretical) transfer rates on your system. It may come as a surprise to some readers that this latter figure will depend on how much of the CPU (Central Processing Unit — the main chip) is used during the transfer process. CPU time is critical in assessing performance of multimedia elements, as we shall see.

The written specification of your double-speed CD-ROM drive will be around 300Kb/sec, but you'll find that if your PC devotes all its processing power to read from the drive, this value will be higher, whereas if it devotes a low percentage of CPU time to the operation, the transfer rate will fall well below the theoretical value. In fact, if your processor is too busy doing other things, the transfer rate from your double-speed CD-ROM drive can fall below single-speed values.

This kind of thing is important. The MPC Level 1 minimum specification for CD-ROM transfer rates is 150Kb/sec for a sustained period of time, during which it should command about 40 percent of your CPU's time. If the rate drops significantly below 150Kb/sec, the result will be that video, animation and sound will break up if they're played directly from the CD. Poor lip synchronisation in video clips of talking heads is a typical example of too low a transfer rate, though there may be other causes.

MPC Level 2 specs require the CD-ROM drive be able to read data at a sustained rate of 300Kb/sec at a recommended CPU usage time of 60 percent maximum, so that the CPU can get on with other things and give an impression of real multitasking. MPC Wizard tests transfer rates at 40, 60 and 100 percent of CPU usage.

Another set of tests that may reveal interesting results is for the graphics adaptor. You might well imagine that if you bought a machine with a 32-bit SVGA local bus graphics adaptor, it would satisfy MPC requirements. Well, maybe yes,



*Media Book provides over 100 royalty-free XObjects and re-usable Lingo code. A must for the budding Macromedia Director developer*

maybe no. It depends on the resolution and colour depth you're using — and again, on how much of your CPU's power is devoted to graphics.

In addition, even though your system may be capable of displaying more than 16 colours, the Windows display driver software you're using may not be taking advantage of this capability.

MPC Wizard tests the colour depth and resolution that your currently installed driver is capable of, and also carries out bitmap display speed tests.

Now back to those talking heads, since the problem of synchronised audio and motion video is obviously also related to graphics capabilities, and in particular the pixel-write speed of the adaptor.

This is something which is often virtually ignored, with spatial resolution (the number of pixels displayed) and colour resolution (the number of bits per pixel) taking pride of place. In fact, pixel-write speed can be just as important as the other two parameters, since if the pixels can't be drawn rapidly enough, even the fastest transfer rate from a CD-ROM won't be of much use.

MPC Level 1 specifications recommend that the graphics adaptor should be

able to draw 1-, 4-, and 8-bit-per-pixel DIBs (Device Independent Bitmaps) on the screen, at a rate of at least 358,400 pixels per second while using 100 percent of the CPU time, and 143,360 pixels per second at 40 percent of CPU time.

Most graphics subsystems can handle that kind of speed, but MPC Level 2 specifications are far harder to meet. Here, we're talking of a minimum of about 1.2 million pixels per second using 40 percent of the CPU time, which is the kind of value necessary to ensure that video at 15 frames/sec in 256 colours and 320 x 240 resolution plays back as it should (the calculation is  $15 \times 320 \times 240 = 1,152,000$ ).

The Wizard test loads 18 1-bit, 4-bit or 8-bit images into memory, then measures how fast it can draw those images at either 40 or 100 percent of the CPU time.

The program also carries out tests for CD Audio, Wave Audio, MIDI and loudspeakers. In the case of audio, the recommendation is that it shouldn't involve more than 15 percent of CPU time.

The test for Video for Windows, which will be important to many people, counts the actual number of frames displayed for two frame sizes and three compression formats (Video 1, Intel Indeo, and Cinepak). The program will also perform a test on MPEG hardware if you have it fitted.

In addition, MPC Wizard lists all the MPC specifications, and has a selection of drivers for various multimedia peripherals.

We don't suppose many readers will have access to a large range of machines to test them all out and compare them, but it might not be such a bad thing to wander into computer shops with Wizard in your hand, to see if the claims made by manufacturers are real.

Or maybe not. Salespeople might get quite upset at that, especially if you don't buy anything after tying up their demo machines for hours. Anyway, shops take note: have your own copy of Wizard (at £19), or a similar program, ready running on your best machine.

## PCW Contacts

**Panicos Georghiades and Gabriel Jacobs** will be glad to answer your questions. Either write to PCW, or email [g.c.jacobs@swan.ac.uk](mailto:g.c.jacobs@swan.ac.uk)

Softkey 0181 789 2000  
Xing Technologies 00 1 805 473 0145  
Miro 01494 510250

