

## Variations on the theme

**In view of the release of Windows 95, Panicos Georgiades and Gabriel Jacobs make an educated guess at the forthcoming MPC Level III specification.**

In 1990, the Multimedia PC Marketing Council published the first MPC (Multimedia PC) specification, known as MPC Level I, which was to create a standard for a multimedia computing platform on the PC under Windows.

Its purpose was to help both consumers and developers: in theory, by purchasing a PC that bears the MPC logo, a consumer knows that a CD-ROM title bearing the same logo will play correctly. In the same way, manufacturers of peripherals and PCs know what is expected of their multimedia products for the PC platform.

Because MPC Level I was very basic, a new specification, MPC Level II (MPC2), was published by the Council in 1993. This was an enhanced standard, even though the original MPC specification continues in full effect.

In either case, the details of these specifications seemed to define a PC of

approximately the same power as that in general use at the time. In fact, we've always been of the opinion that neither



standard was realistic, although their existence seems to have been a success. They are not the only reason why the PC platform represents the largest multimedia market in the world, but they have certainly played an important role.

MPC (Level I) required a 16MHz 386SX with 2Mb of RAM, a 30Mb hard

disk, a single-speed CD-ROM drive, a 16-colour display, and an 8-bit sound card. MPC2 raised the requirement to a 25MHz 486 with 4Mb of RAM, a 150Mb hard disk, a double-speed CD-ROM drive, a 256-colour display and a 16-bit sound card.

A new MPC specification is imminent with the arrival of Windows 95: Microsoft has published a PC 95 Hardware Design Guide to help hardware manufacturers and vendors take advantage of the new capabilities of Windows 95. The Guide makes a number of important and interesting recommendations (mainly for playback machines). We have not only used these, but have done some crystal-ball gazing too to "guesstimate" what MPC3 might look like.

The first, and probably the most important consideration, is the balance of power: basically, balance beats horsepower. It's no use having a very powerful CPU if your hard disk is too small, and/or if the transfer rate between CD-ROM and PC is too slow, and/or if the bus on the graphics card isn't fast enough to get all the data to the screen in time.

During multimedia playback, a CD-ROM drive is needed for reading data and a hard disk for reading and writing data. The CPU is used for decompressing data (sound, vision), and the video (graphics card) and audio (sound card) subsystems for playing data. A super-fast Pentium PC will not relieve bottlenecks created by a slow CD-ROM drive or graphics card; and it won't increase the quality of an 8-bit sound card, or the quality of a good 16-bit sound card played through tinny speakers.

It is therefore important to break down and identify the different parts of a multimedia computer in order to specify exactly what level of power and specifications are needed for each type of operation.

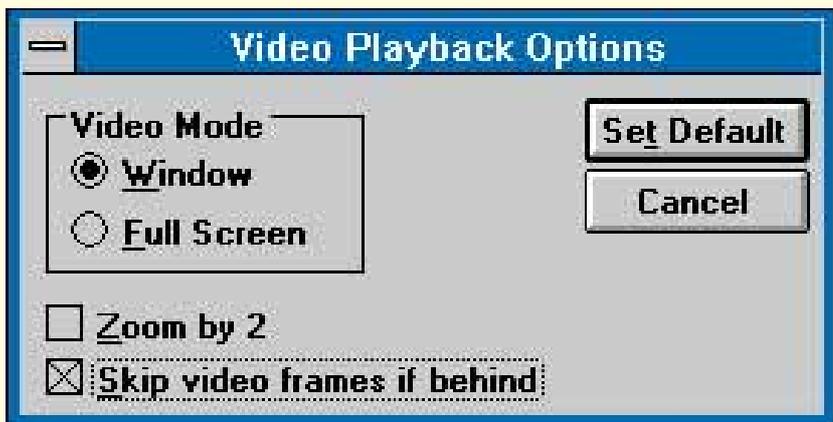
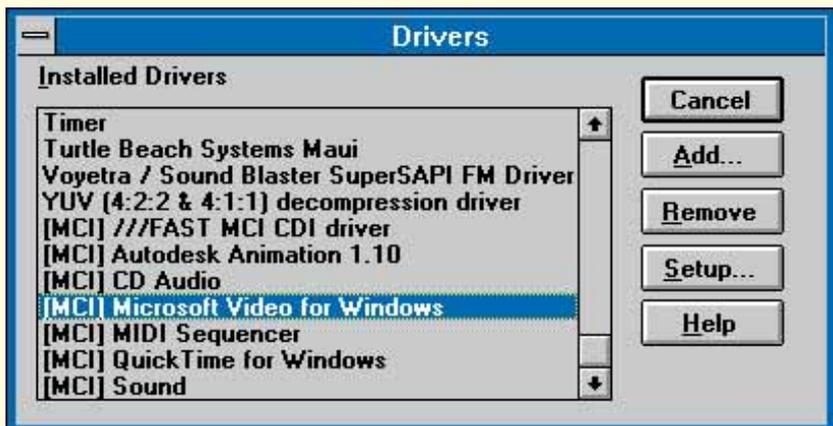
Turning initially to the local-bus motherboard and video card: all other things being equal, the performance of a computer with a local bus is about ten times better than one without. This is important for displaying digital video and most PCs sold today possess the feature. Microsoft recommends PCI over a VL bus. Will PCI feature as an MPC3 requirement? Probably not.

A graphics card these days should be capable of at least 800 x 600 resolution

### Summary of MPC Levels I and II, and our guess at Level III

	Level 1	Level 2	Level 3 (Windows 95)
RAM	2 MB	4 MB	8 MB
Processor	"386SX, 16 MHz"	"486SX, 25 MHz"	"486, 66 MHz"
Hard Drive	30 MB	160 MB	500 MB
CD-ROM Drive			
Sustained Transfer Rate	150 KB/sec.	300 KB/sec	450 KB/sec
Maximum Average Seek Time	1000 ms	400 ms	300 ms
Other		"CD-ROM XA ready, multi-session"	(no change)
Digital Audio	11-22 KHz/8-bit	11-44.1 KHz/16-bit	8-44.1 KHz/16-bit
MIDI Polyphony	8-note	8-note	24-note
Video Display	"640x480, 16 colours"	"640x480, 65,536 colours"	"800x600, 65,536 colours"
Ports	"MIDI I/O, joystick"	"MIDI I/O, joystick"	"MIDI I/O, joystick"

## Video



*If you're having problems running full-screen video, Windows control panel enables you to reduce the window size. If video still appears to go out of sync with audio, try tagging the "skip frames if behind" box*

with 16-bit colour (65,000 colours) and we strongly suspect that this will be part of MPC3. Multimedia applications use lots of colours to display photorealistic images. Although it's just about possible to display a single such image with 256 colours, you can't display two images using different 256-colour palettes if the display card can handle only 256 colours at a time. We recommend a 24-bit display card with at least 2Mb of video RAM.

Most CD-ROM drives sold today are double-speed (300Kb/sec transfer rate) as specified in MPC2, and titles written

assume double-speed data rate. At this speed, video clips at 320 x 240 resolution look okay because they play at an acceptable frame rate (number of frames per second) without so-called pixelation or blocking effects. The effect, a grainier image which, in the extreme, is made up of a series of blocks rather than dots, is caused by video compression so that the frame rate can be maintained.

If you can afford it, go for a triple-speed (450Kb/sec) drive, or higher, to ensure

that you get good double-speed performance — and check that it supports multi-session CDs. We would guess that triple-speed may be specified in MPC3.

Even though 8-bit sound cards are now uncommon, they are still sold in some shops; so insist on a 16-bit card. This will certainly be the MPC standard (in other words, no change from MPC2). Windows 95 multimedia applications will mainly be using compressed 16-bit digital audio.

As for other likely MPC3 sound specifications, it's difficult to guess what might become the likely requirements but we can be pretty certain about recommendations. If you're a developer, you should be looking at sound cards with digital inputs. And the trend is not always for higher specs: you could be getting more features if you look for a system that supports the lower 8kHz sampling rate (as well as the standard 11kHz, 22kHz, and 44kHz). The 8kHz rate is used by TrueSpeech compression in Windows 95 as well as for telephony applications.

Sound cards should also support general MIDI. This is a standard for assigning musical instruments so that a piece of music plays OK on different cards using different types of sound. Most cards sold nowadays support this standard, but you need to be careful of a number of factors:

- Multi-Timbral: the ability to play multiple musical instruments simultaneously. The minimum is 16 but we would recommend 24, or even 32 if you want true symphonic sound. We would hazard a guess that 24 will be the MPC3 standard.

- WaveTable synthesis as opposed to other types of synthesis (usually FM): WaveTable synthesis cards use actual recordings of instrument sounds and are about £30-£100 more expensive because they use extra ROM chips. They're a must if you wish to hear anything approximating music as opposed to computer-type squeaks.

- The card should have: a standard MIDI port which also supports joysticks (most cards do, but not all).

- The sound mixer on the card. This should mix input from four sources: WAV and MIDI from the card, CD-audio from the CD-ROM drive, and AUX In from an external input.

Microsoft specifies that input should have at least a 3-bit volume control (eight steps) with a logarithmic taper. They also specify that all sources are sourced with -10dB (Consumer Line Level 1mW into 600 ohms, 0dB) and without attenuation in order to ensure that the mixer won't clip (meaning that if a sound peaks, the audio

clicks instead of playing that sound). It also ensures that the mixer will output between 0dB and +3dB.

### Riotous assembly

Among the many CD-ROMs that pass our way, one has impressed us tremendously: Assembly 94 — a computer demo party. There are extraordinary things on this CD: things you've almost certainly never seen before; things you never thought your PC was capable of displaying.

If you're a computer demo programmer (many multimedia authors started that way), or if you're at the very cliff edge of animation, you'll probably know about it.

Assembly is a yearly party attended by the animation-Meisters of the world, at which they show off their programming and artistic skills. Established in 1992, Assembly 95 is expected to be held in Helsinki between 10th and 13th August.

Among other things, the party features competitions involving animation, raytracing, computer art, and computer music — all the ingredients needed to put together a computer demo. The competition entries must be original, hand-drawn, or computer-generated works (nothing scanned). They are exhibited on a large 8m x 6m screen with Dolby surround-sound. All the participants are allowed to vote for the winners.

The Assembly 94 CD is available for the PC and Amiga from Sound Solution (about £25). If you would like to see a selection of the wonders it contains, they're included on this month's cover CD-ROM.

### Cheaper CD-writer

Of course, whether or not you're into squeezing blood from a stone, as some of those demo authors seem to be (don't miss the 4Kb versions), the future for authoring has to be putting your work onto a CD-ROM without all the hassle and expense of using a professional firm to produce the discs for you. Last month we brought you news of the first CD-writer to break the £1,000 barrier, which seems to be starting a welcome trend.

It's been almost a year now since Yamaha released its CDR100, heralded as the world's only affordable 4-speed CD-writer — but there again, it depends on what you mean by "affordable". Two models make up Yamaha's Expert Series, the external CDE100 (at £2,199) and the internal CDR100 (at £1,899). Our current information is that by the time you read this, prices will have been heavily reduced and the internal machine will cost around

the £1,000 mark.

The units are SCSI-2, and there's multi-platform software support from distributors. Apart from Windows and Mac, there's software for Unix, Commodore Amiga, Windows NT and OS/2.

Although any blank media can be used, Yamaha only guarantees data integrity at 4-speed writing with either its own brand, or Kodak discs. Interestingly, the guarantee life of Yamaha's own blanks is 250 years, compared with only about 50 years offered by others. The choice therefore seems obvious; if you want to be sure that your great-great-grandchildren will appreciate your work, buy Yamaha.

The system can write the full variety of CD formats, including CD-DA, CD-ROM, CD-I, CD-ROM-XA, White Book MPEG, and Kodak PhotoCD.

### AVI playback fix

Here's a problem which one of our readers has asked us to tackle: when trying to play video files from a multimedia commercial title, or when using Media Player, you get a message that the AVI file is too big to be played in the selected VGA mode.

The error is caused by the fact that some video drivers can't run digital video (AVI files) using the MCI (Media Control Interface) Video for Windows driver set to Full Screen. To get around this problem you should set the playback video mode of the driver to Window rather than Full screen. You can do this from the Control Panel, as follows:

1. In the Drivers section of the Windows Control Panel, choose (MCI) Microsoft Video for Windows.
2. Click on the Setup button.
3. In the Video Mode selection box, choose the Window option.
4. Click on the Set Default button and then on the Close button to exit.

The problem is known to occur with about a dozen makes of card and it's more likely to happen with those having 512kb or 1Mb of video RAM.

### PCW Contacts

**Panicos Georghiadis 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)

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