THE EDITOR'S VIEW

Media Processors May Have Short Reign

Host CPU Will Eventually Subsume Duties of Programmable Multimedia Chip

Declaring the demise of a product before it even ships may be premature, or at least a bit unfair, but perhaps I can beat the rush this way. Toshiba has just started shipping production versions of Chromatic's Mpact media processor, with systems slated to appear by the end of the year. Although Mpact is the first media processor to reach the market, it certainly won't be the last: a slew of companies, ranging from Samsung and Philips to Mitsubishi, have announced products or plans to enter this hot new market.

We expect these products to have significant market success. Consumers want more and more multimedia capabilities in their systems, and media processors replace a welter of hardwired single-function devices for 2D and 3D graphics, modem functions, video decoding, and audio decoding and mixing. Even business users are incorporating more multimedia tasks into their daily workload. A good media processor should offer lower cost and, as a programmable device, flexibility to accommodate new standards. MDR projects annual sales of media processors to reach tens of millions of units by the end of the decade.

In the long run, however, another trend will jeopardize the success, even the existence, of media processors in PCs. Host processors, which don't have enough power today to execute all desired multimedia algorithms, are continually becoming more powerful. At some point, the host CPU will be able to execute in software most of the tasks that tomorrow's media processors will handle.

Of course, the performance of the media processor will increase over time. But what exactly will that future media processor do? A fundamental aspect of multimedia is that it deals directly with human perceptions, not abstract data. Once a multimedia algorithm reaches the limit of most people's perception, there are few reasons to make that algorithm more complex.

A good example is audio. A high-end Pentium system can handle in software nearly any type of audio: 3D sound, Dolby AC-3, 32-channel mixing, upsampling, downsampling, etc. This ability limits the need for an external audio chip to do anything other than convert digital signals to analog output. GUI acceleration (2D graphics) has also reached the point where it is impossible for a person to distinguish between the performance of a midrange graphics chip and the fastest 2D accelerator.

There are two key exceptions to this trend. One is 3D graphics. The 3D performance of today's systems is far from ideal and could be improved by several orders of magnitude before reaching perceptual limits. Another exception is video-compression algorithms, which address bandwidth instead of perception. Even as infrastructures improve, bandwidth is unlikely to become free, so there will always be a tradeoff between paying for either decompression MIPS or bandwidth.

In areas where multimedia algorithms are reaching their limits, the host CPU will soon catch up. Intel believes a 233-MHz Klamath (P6) processor will execute full DVD decoding, including MPEG-2 video and Dolby AC-3 audio, completely in software, albeit using 100% of the CPU's performance. This chip will be available around 1Q97 and reach mainstream PC price points by the end of that year.

By 1999, P6 processors with twice the performance of a 233-MHz Klamath are likely to be in mainstream PCs, providing enough throughput for a combination of DVD decoding and other multimedia (or standard) tasks.

Merced, the chip formerly known as P7, is likely to provide an even bigger boost in multimedia performance. This chip should handle even muscular duties such as MPEG-2 or DVD encoding as well as decoding of future video standards such as MPEG-4. We expect to see Merced in high-end PCs by 1999 and in mainstream PCs by 2001.

Intel knows full well that multimedia tasks are a good way to soak up the extra processing power available from these future high-performance products. It is developing the tools and infrastructure needed to execute multimedia applications on the host CPU, and MMX may be just the first in a series of hardware enhancements aimed at boosting performance on these applications. High-performance multimedia will be a carrot to entice PC buyers to the next generation.

We expect Intel to try to shift all multimedia functions, with the possible exception of 3D graphics, to the host CPU within the next several years. This will create a tug-of-war as Intel and the media-processor vendors each try to pull these functions into their devices. I'll put my money on the 700-pound gorilla over the fractured media-processor forces.

Once high-end P6 and P7 chips reach the PC mainstream, the viability of media processors seems limited. The market for MPEG-1 decoders in PCs, for example, has been destroyed by the availability of software decoders that run on nearly any Pentium system. Thus, the media processor could become the math coprocessor of the 1990s: a valuable product that generates profits in the near term, but one that vendors can't count on to succeed in the next decade's PCs. M

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