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By Pam Baker
February 16, 2005 7:07PM

"To completely and radically change chip architecture massive, industry-wide retooling, so the question is 'Rather than start from scratch, what can be enhanced a silicon chip to increase performance and time to market?'"
Manny Vara, manufacturing side spokesperson for Intel

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The stakes are high, the chips expensive, and each hand dealt has a different wild card. This is the game giant chipmaker Intel is out to win.

In a world of anything goes, smaller is bigger, and first is all that matters. Intel is certainly working hard not to just keep their edge, but to design the edge in the future. Group analyst Andy Efstathiou told NewsFactor.

A Small, Small World

To get bigger in the chip industry, a company must deliver small on a grand scale. A key is to manufacture chips too small for an electron microscope in the lab and then produce them in the trillions for mass consumption. Once that is done, they return to the lab and make trillions of something smaller still.

And while the chipmaker is making teeny, tiny chips smaller to the nano device, Intel also is busy striking partnerships with suppliers and creating entirely new gizmos and gabbing devices -- all of which must work faster, better, and ahead of the generation before.

"Intel research is very broad-based and extremely intense in every arena," says Efstathiou.

Indeed, each area of research is a small world of its own. "There are hundreds of thousands, of scientists cooking up a lot of innovation, much of which will hit the marketplace as soon as next year," Barbara Grimes, mobile computing

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for Intel Corp., told NewsFactor.

Coming down the Intel pipeline is an interesting array of developments. Here's what is in store for the next one to ten years...

Hot and Not

"We are at the physical limits of power utilization and cooling abilities. In order to increase computing capabilities, either the data center itself needs to be re-architected or product enhancers like Intel will have to be," says Efstathiou.

Intel's much-touted dual core processors are already in production to address power and energy problems while doubling performance. They are expected to be available by next year in virtually all products, including desktop, mobile and server processors. "That's the next big trend," Grimes says.

Sum More Than Parts

In the way of laptops, the code-name "Sonoma" platform will be good for the first half of 2006, at least, followed by the code-name "Napa" platform, complete with dual-core processors, in early 2006.

The overall focus of Intel is shifting from individual components to platform architecture, Grimes says, and new products will follow the Centrino model -- meaning all new components will be designed to work together in the platform to maximize performance and to provide more sophisticated capabilities and features.

"We are looking at introducing virtualization and security technologies with enhanced capabilities to platforms," says Grimes.

Beyond Beyond

That is not all Intel is up to. "They are moving more software functionality to the chip level or embedding it in the silicon itself," says Efstathiou.

Meanwhile, Intel Israel has spent the last two to three years developing an optical chipset based on silicon wafers capable of converting electronic signals to optical signals within the chip. Essentially, the new development will replace standard electrical connections used for communications between computer components to increase those communications literally to the speed of light.

"To completely and radically change chip architecture requires a massive, multi-year retooling, so the question becomes, 'Rather than start from scratch, what can be enhanced or added to a silicon chip to increase performance and time to market?'", says Manny Vara, manufacturing side spokesperson for Intel told NewsFactor.

Power Play

But, for now, the biggest news for consumers and enterprises could be the array of power cells designed to make short-life batteries a thing of the past.

"We are investing in numerous new power sources, because no one is betting on the next power breakthrough," says Grimes.

Among the Intel invested power choices coming down the pipeline:

- A denser lithium battery for notebook PCs and PDAS made by Japan-- which is projected to double the life of current lithium batteries;
- Fuel cells based on PolyFuel's membranes using a simple chemical process combines methanol and oxygen to produce electricity. Projected to provide 10 times the energy of rechargeable batteries, the thing looks like a cartridge that easily pops into a laptop 🔋 or cell phone 🔋 and is silent when depleted.
- Zinc Matrix Power's polymer-based rechargeable alkaline battery, which is similar to the common flashlight battery, is about the size -- but double -- of current laptop batteries.

Zinc Matrix is expected to be commercially available in 2006; the others within two to three years.

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