



Intel, Micron Start to Flash Dance  
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Micron and Intel said Monday that they would form a new company dedicated to manufacturing NAND flash memory, of which a "significant portion" will be shipped to Apple Computer. The venture, which will be 51 percent owned by Micron Technology Inc., will be named IM Flash Technologies LLC. Micron will list IM Flash as a consolidated subsidiary, according to Micron spokesman Dan Francisco.

Each company will initially contribute about \$1.2 billion in cash and other assets to the venture, while adding at least \$1.4 billion plus additional investments over the course of the next three years. The management team for the new company will be led by Intel's Dave Baglee, who previously served as manager of Intel Corp.'s Fab 11 in New Mexico, and Micron's Rod Morgan, who most recently served as manager of Micron's fabrication facility in Manassas, Va.

While Intel has traditionally designed and manufactured NOR flash for code storage in cell phones, PCs and other devices, the data storage that NAND flash enables has allowed that portion of the market to skyrocket. Revenue in the global NAND flash memory market rose to \$2.97 billion in the third quarter, up 30.2 percent from \$2.28 billion in the second quarter, iSuppli said in a recent report. In August the firm predicted that overall NAND flash demand would skyrocket 65 percent to \$10.9 billion in 2007.

In all, the NAND market has been driven by legions of small-form-factor flash cards used by digital cameras, in addition to newer products like the flash-based Apple Shuffle and now the Apple Nano. On Monday, Apple Computer said that it had signed deals with Hynix, Intel, Micron, Samsung Electronics and Toshiba to secure a steady supply of NAND flash memory through 2010, prepaying a total of \$1.25 billion. According to Intel and Micron, prepayments to IM Flash were worth \$250 million to each company.

Although giants in the microprocessor and DRAM industries, Intel and Micron are both bit players in the NAND flash market. Intel's product portfolio lacks NAND capability, even though the company's StrataFlash flash product line added NAND-like features in an effort to steal market share from its rivals. Micron is the sixth-largest NAND supplier, with only 3.4 percent of the market during the third quarter, far behind Samsung and Toshiba, which hold about 50 percent and 22.8 percent of the market, respectively, iSuppli said.

"The increasing importance of NAND flash technology was the key motivator of the two companies joining together," Intel spokesman Tom Beermann said Monday. "We see flash memory as a growth area, and certainly complementary to NOR flash."

Intel has been singing the praises of NAND flash since 2003, when the company first claimed its NOR-based StrataFlash Wireless Memory System could be used for both NOR code storage as well as NAND-like data storage. A year later, Microsoft began talking about placing flash memory inside of hard drives.

"I think that was some pretty good marketing," iSuppli analyst Mark DeVoss said Monday of the StrataFlash announcement. "Remember, that was the time Toshiba and Samsung started rattling their sabers and saying that NAND could replace NOR in cell phones."

At its Intel Developer Forum in Feb. 2004, Intel executives committed themselves to regaining their footing in the flash market, using the StrataFlash as leverage against Samsung as other rivals. According to DeVoss, however, Intel didn't include a comprehensive plan to address data storage.

"This [IF Flash] is a pretty key announcement," DeVoss said. "I think that Intel has recognized that in order to be a full-service flash supplier, they have to have NAND."

Although Micron produces both NAND and NOR flash, the company entered the NAND flash market in July 2004 with the declared intention of breaking into the top three. Hynix Semiconductor currently ranks third in worldwide NAND sales, with about nine more points of market share than Micron. NAND sales have nevertheless helped Micron weather the boom-and-bust cycles of the DRAM market; in September, Micron reported that NAND flash represented 15 percent of its net sales of \$1.26 billion, a five-fold increase in NAND sales from the prior quarter.

The JV will begin production in early 2006 from three sites, all owned by Micron: Boise, Idaho; Manassas, Virginia; and Lehi, Utah. Initial production will begin in Boise, followed by 300-mm wafer starts in Manassas and Lehigh in early 2007, Francisco said. By placing the IM Flash joint venture under Micron, the JV can use Micron's cross-licensing agreements with Samsung to shield it from any IP complaints, iSuppli's DeVoss added.

And combining Micron's manufacturing with Intel's know-how could make a difference, according to Jim Handy, a non-volatile memory analyst with Semico Research. "In 2004, Micron at an analyst meeting in London announced their intention to get into NAND memory in a very big way," he said. "A year later, in 2005, they were nearly invisible in the market."

"But the example I like to draw is Hynix, which tried for eight years to bring out their own flash -- they just couldn't make it yield," Handy added. "But they went to ST Micro[electronics] and got some trade secrets that had been eluding them. Within nine months they were at very high-yield production of NAND. It didn't take them very long to acquire that know-how and get into high-volume production."

Neither Intel's Beermann nor Micron's Francisco would comment on the expected output of IM Flash. "We certainly intend on being competitive," Francisco said.

According to Francisco, however, the new venture won't cannibalize Micron's existing NAND sales. "This will really help Micron serve our customers in mobile handsets and other mobile products, as well as helping to accelerate our progress in the NAND market," he said. "We also see this as an opportunity to partner with the world's largest semiconductor company. Intel recognizes our capabilities as a technology leader and product innovator."

IM Flash's roadmap calls for NAND flash production to continue on 90-nm processes, then move to 72-nm and then 58-nm technologies at an undisclosed future time.

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