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Down but Not Out

By [Nicole Ridgway](#) Published: September 22, 2006
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YOU'D THINK THE major players in the flash memory market would like to forget the 70% plunge in prices they've witnessed this year. Not necessarily. Though the shrinking price tag is pressuring the likes of Samsung, **Micron Technology** ([MU](#): 14.00, -0.18, -1.3%), Toshiba and **SanDisk** ([SNDK](#): 47.02, -0.19, -0.4%) now, greater affordability should ultimately unleash the true profit potential of flash as the memory finds its way into more products.

Introduced in 1989 by a researcher at Toshiba, NAND, the predominant type of flash memory in use today, has slowly revolutionized the way data is stored and accessed. While flash memory is finite — it can be erased and reprogrammed only a certain number of times — it's also what's called nonvolatile, meaning it hangs on to data even when the external power source is shut off. As such there's little of the slow "booting up" process that's required by the dynamic random access memory, or DRAM, used in personal computers. Flash memory is also fairly klutz-proof. That's one of the many reasons it's so well suited for portable devices like iPods, USB memory sticks and digital cameras.

To put the price decline for this technology into perspective, at the end of 2005 one gigabyte of flash memory cost \$45; earlier this year the price bottomed out at \$12 per gig. Seasonally strong demand fueled by back-to-school shopping and the upcoming holiday season has stabilized prices in the \$14 to \$15 range. NAND's steady price decline will likely resume after the holidays when the electronic gadgets that employ flash memory go on sale. So why in the world would investors want to put their money into a technology like flash that's getting cheaper by the day? The answer is simple: economies of scale.

Short term, yes, low prices make it harder for flash makers to turn a profit, forcing them to constantly find new manufacturing efficiencies or cram more data capacity onto a chip in order to improve margins. In the long term though, falling prices mean more affordable devices and greater opportunities.

"As the prices go down, more applications open up to NAND flash," says Jim Handy, a memory analyst at Phoenix-based chip consulting firm SemiCo Research. "In the past, we have seen NAND displace regular film in 35-millimeter cameras. We have seen MP3 files displace the CD and floppy disks get displaced by USB flash drives."

Independent electronics research firm iSuppli Corp. estimates that unit shipments of flash memory will grow by 192% this year and 174% in 2007. Meanwhile, average selling prices are projected to fall 60% and 58%, respectively. Nevertheless, there will still be a sizable reward for big players in the market like Samsung and Toshiba. Nam Hyung Kim, iSuppli's principal analyst specializing in memory, estimates that revenue will grow at a compound annual growth rate of 17%, hitting \$23.6 billion by 2010.

One of the most compelling near-term opportunities for flash memory will be in the PC industry. **Microsoft's** ([MSFT](#): 28.75, -0.06, -0.2%) Vista operating system, which is due out early next year, is going to offer features that allow for flash-based memory caches that will shorten the time it takes to boot up a computer or load applications. External flash memory can also be used as added system memory. Companies such as Samsung and **Seagate Technology** ([STX](#): 22.25, -0.01, -0.0%) are developing hybrid disk drives that incorporate a small amount of NAND flash that will help in the same manner, accelerating access to data, explains American Technology Research analyst Doug Freedman.

There are other sweet spots that lie ahead, especially in consumer electronics. For instance, mobile phones that play music will eat up more flash memory. We will also see more digital camcorders that use memory cards, much like digital cameras do, says SemiCo's Handy. Samsung developed such a camcorder several

years ago, but the price for the memory was equal to about \$400 per half hour of recording time. Now, it would cost closer to \$12 per half hour, says Handy.

While prices get more attractive for consumers, flash makers will have to endure ever decreasing prices for their wares until demand hits that critical mass. "We have a chicken and egg scenario and unfortunately they won't come at the same time," says American Technology's Freedman.

To help contain costs and gain a competitive advantage, the flash making world has become quite incestuous. In January, Boise, Idaho-based Micron Technology and **Intel** ([INTC](#): 20.65, -0.37, -1.8%) launched a flash manufacturing venture called IM Flash Technologies. Then, in June, Micron bought Lexar Media, a maker of NAND flash products like USB drives and memory cards, for \$850 million in stock. Meanwhile, SanDisk, which said in July that it'll buy Israeli flash-component maker **M-Systems** ([FLSH](#): 35.69, -0.12, -0.3%) for \$1.3 billion in stock, has a manufacturing joint venture with Toshiba. The venture, according to Freedman, is the lowest-cost producer of flash memory.

For long-term investors, placing bets on flash's future appeal could prove to pay off. Here in the U.S., Micron and SanDisk are the clearest investment opportunities. (Market leaders Samsung and Toshiba are based in Asia and a little harder to analyze given their vast operations in things like electronics and computers).

Micron is one of the largest memory-chip makers out there, with about 40% of its sales coming from DRAM that's used mostly in PCs. Adding flash memory to the mix helps diversify the company's revenue and places it in the heart of the growing flash market, notes Jefferies & Co. analyst John Lau in a Sept. 8 research report. Lau raised his rating on Micron's shares to Buy from Hold and increased his earnings estimates for the company's fiscal 2007 to 91 cents a share from 85 cents, citing "improving dynamics" and stronger pricing in both DRAM and NAND flash during the second half of 2006. The analyst expects the stock, which recently changed hands at \$17 and change, to climb to \$21.

A pure play in the flash space, SanDisk can't hedge its bets as well as Micron can. While sensitive to the whims of flash pricing, the company is securely positioned to benefit from both the MP3 player market and the market for removable flash storage on cellphones, says Freedman. One of SanDisk's strengths is that it not only makes the memory chips, but packages and sells them through retailers itself. This integrated strategy helps keep costs down. Oppenheimer analyst Vijay Rakesh says that firming flash prices and demand for removable storage could boost the company's margins further. Rakesh, who has a Buy rating on the stock, expects SanDisk to report gross margins for the September quarter close to 35%. Shares recently traded around \$56, well below the 52-week high of \$79.80.

Sure, the market for memory is a rocky one, and investors will have to endure more price pressure going forward. But in the end, that payoff could prove to be something highly memorable.