

Flash drives are making a big splash

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By Hiawatha Bray, Globe Staff | January 21, 2008

Those little flash memory cards you plug into your digital camera are starting to grow up.

Just ask the engineers at Apple Inc. The iconic computer maker's new MacBook Air laptop will be available in a \$3,100 version that uses a solid state flash memory drive, or SSD, instead of a mechanical hard drive.

And despite Apple's reputation for leading-edge technology, the company is following others who have deployed flash as a faster, more efficient alternative, less susceptible to shocks and vibrations.

For months, stodgy old Dell Inc. has been offering SSDs as a \$900 option in its laptops. Asustek Computer Inc., of Taiwan, already sells the Eee PC, a \$400 laptop with a measly 4 gigabytes of flash memory instead of a hard drive; at the recent Consumer Electronics Show in Las Vegas, Asus showed off an upcoming high-priced notebook with a 32-gig SSD drive.

Flash is also making a splash in the world of heavy-duty enterprise computing.

Last week, [EMC Corp.](#), of Hopkinton, the leader in "big iron" data storage systems, said it would begin offering flash drives as an option in its flagship Symmetrix line of storage arrays.

David Donatelli, president of EMC's storage division, said that because SSDs are all-electronic, they will give customers much faster access to critical data. "Over time, flash will take over more and more and more of the storage in our arrays," Donatelli said. "This is the beginning of one of the most fundamental shifts we've seen in a long time."

The hard-drive technology that has served us for half a century is in no danger of disappearing. Hard drives offer a combination of massive data capacity and low price that flash memory chips can't touch. According to the research firm IDC Corp., of Framingham, a gigabyte of hard-drive storage cost 45 cents last year; the same amount of flash storage cost \$18, or 40 times as much.

"On a per-gigabyte basis, flash is never going to compete with hard-disk drives," said an IDC analyst, Adrienne Downey.

Yet flash is narrowing the gap.

"A gigabyte of flash 10 years ago cost \$3,000. Right now you can go into [Best Buy](#) and get a gigabyte for about 12, 15 dollars," said Richard Heye, senior vice president of the SSD group at [SanDisk Corp.](#) of Milpitas, Calif., one of the leading makers of flash memory. IDC says that flash prices fell 60 percent last year, and will drop by 50 percent in 2008.

As prices fall, flash's advantages over hard drives become more attractive.

SSDs are well suited to laptops because they weigh less than hard drives, and are unfazed by physical shocks and vibrations that would destroy a hard drive. SSDs also use less power than hard drives, which means lower electric bills at big data centers and better battery life for laptops.

Flash is good for high-performance computing tasks because the cards can respond to data requests in a millisecond. Hard drives need several milliseconds to access information, because a mechanical arm must look up the data on the spinning disk. As a hard drive fills up, this search process takes longer and data through-put becomes slower, while a flash-based drive delivers fast performance even as it fills up.

EMC's Donatelli said that his customers run Symmetrix systems with the hard drives partially empty. This keeps the data moving faster, but wastes much of the array's storage capacity. Now users will be able to store their most time-sensitive data on flash drives and get good performance, while stuffing their mechanical drives with less-critical data. This will mean lower operating costs, despite the use of higher-priced flash drives, Donatelli said.

Flash's biggest drawback, apart from price, has been limited lifespan. The chips eventually lose the ability to store new data. A hobbyist's digital camera will probably never take enough pictures to wear out its flash chips. But computer drives must constantly store new data, hastening the day when the flash drive wears out.

Yet flash makers say they've licked this problem with software that spreads data across the millions of memory cells inside each flash chip. This ensures that the constant data rewrites are spread across many cells, thus extending the life of the entire drive.

SanDisk says its SSDs on average will run 2 million hours before failing, compared to about 300,000 hours for mechanical hard drives.

At today's prices, only the most affluent consumers will be buying full-featured laptops with SSDs. But Heye said corporate buyers will welcome the durability, higher performance, and longer battery life of flash-based laptops. IDC predicts that by 2011 flash drives will supplant hard drives in 20 percent of new laptops.

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Correction: Because of a reporting error, an analyst quoted in a story about flash memory in Monday's Business section was misidentified. Adrienne Downey works for Semico Research Corp. in Phoenix. ■

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