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High Hopes for an Intel-STMicro Spin-Off



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Business Week Online
04/01/08 11:18 AM PT

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Before newly anointed Numonyx CEO Brian Harrison can get on with his plans to reshape the memory chip market, he'll have to make the most of what his company now sells: NOR flash chips. The NOR market is in a decline lately, but Numonyx has high hopes pinned on a new kind of chip: phase change memory.

Brian Harrison needs to succeed where his counterparts at [Intel](#) (Nasdaq: INTC) and STMicroelectronics failed. As CEO of new chip company [Numonyx](#), Harrison inherits two of those companies' worst-performing units -- and must make them pay off in a way they did not for their previous owners. Intel owns 45 percent of Numonyx, STMicro holds 49 percent, and private equity fund Francisco Partners owns 6 percent.

Harrison's plan is to build a market for a new kind of memory chip that he hopes will refashion the market for memory chips used in wireless phones and consumer electronics.

But first he must make the most of what Numonyx sells now -- a kind of memory chip known as "NOR flash," used widely in wireless phones, consumer electronics and automotive and industrial applications. [Intel](#) and STMicro announced plans to create the new company last year as a way of ridding themselves of their poorly performing NOR flash units. The new company supplants [Spansion](#), the former flash memory unit of [Advanced Micro Devices](#) (NYSE: AMD) (AMD), as the world's leading supplier of NOR flash chips.




Now is a good time to leave the NOR flash market. Worldwide NOR revenue declined by over 9 percent in 2007, and sales are expected to fall again by as much as 2 percent in 2008, according to market researcher iSuppli. NOR producers such as Intel, Spansion, STMicro and [Samsung](#) have been forced to cut prices in the face of competition from a chip known as "NAND flash," says iSuppli analyst Mark DeVoss.

Big Price Drop

Why the sudden threat? NAND products had simply reached a point where they could compete on price and capabilities, especially in high-volume products like wireless handsets. "[Manufacturers] were trying to sell a (US) \$6 NOR against the \$3 NAND, so they had to crash their prices to stay in the game," DeVoss says. Consequently, Spansion has reported losses its last three fiscal years. STMicro has lost money on flash for three years running as well.

NOR flash woes contributed to recent losses at Intel, too. Indeed, it was exposure to the memory-chip business that prompted Intel on March 3 to trim its gross margin forecasts for the current quarter. "NOR flash has never lived up to the hopes Intel had for it," says Doug Freedman, an analyst at American [Technology](#) Research.

So what does all this mean for Numonyx? Many hopes are resting on a new type of memory known as "phase change memory," or PCM, Harrison says. NOR and NAND are both considered "nonvolatile" memory, meaning they continue to store data after their power supply has been turned off. Where they differ is how they're used. NOR flash is best for storing software, such as the operating systems of wireless [phones](#). NAND is best for storing other types of data, like music on an MP3 player or photos taken with a digital camera.

Harrison says PCM could conceivably replace both. "It really combines the best attributes of NOR and NAND flash," he says. "Like NOR, it's perfectly suited for running code, but like NAND, you can save data to it quickly." Cell phone makers such as [Nokia](#) (NYSE: NOK) , [Research In Motion](#) (Nasdaq: RIMM)  or [Apple](#) (Nasdaq: AAPL)  could use PCM to combine all of the memory they need for their phones into a single chip, reducing manufacturing costs and freeing up space to add features.

Incredible Shrinking Chips

Numonyx also has a manufacturing advantage over Spansion and Samsung on its NOR chips. Its production technology can build chips with elements just 65 nanometers in size, while Spansion and Samsung are still at 90 nanometers. The smaller element size lets chipmakers cram more transistors onto ever-smaller chips. Numonyx says it will be able to shrink its NOR chips even more, to 45 nanometers next year and 32 nanometers down the road. It's unclear if NOR chips can get much smaller than that.



But by then, DeVoss says, PCM is likely to emerge as a cost-competitive answer to NOR. Harrison says the first PCM chips will appear on the market in late 2009 or 2010. PCM-based chips, he says, could supplant NOR flash within a few years in most cases and even replace much of the NAND flash now on the market.

Beyond that, Intel will be watching PCM closely, says analyst Bob Merritt of Semico Research. Much of the space on its PC microprocessors is taken up by SRAM, a type of high-speed short-term memory the chip uses as a sort of workbench for data it needs to keep close at hand.

Billion-Dollar Cost Savings?

The problem with SRAM on a microprocessor is that it requires a lot of power. Unlike flash or PCM memory, SRAM is volatile memory, meaning it loses data when it's turned off. So the data it holds is constantly being refreshed. Replace it with a high-speed nonvolatile memory like PCM and theoretically you can reduce the amount of power a microprocessor needs, Merritt says. Reduce the power the chip needs to run, and you reduce the power needed to cool it.

The implications of that are enormous when you consider the costs associated with keeping large data centers cool -- \$4.5 billion in 2006 and growing, according to the U.S. government.

Computer users could benefit, too. Storing the data a computer needs to boot up directly on the microprocessor might give PCs the ability to power up instantly, helping both Intel and [Microsoft](#) (Nasdaq: MSFT)  deliver on promises they've been making for years to cut boot-up times. By spinning off its hard-luck NOR unit now, Intel may yet see it pay off down the road. 

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