

## Matrix Acquisition Will Add Another Dimension to SanDisk

Joseph Unsworth

SanDisk has a strong presence in the consumer portable-storage market. Matrix Semiconductor's 3-D memory technology will also enable SanDisk to target content providers with a secure write-once product.

## NEWS ANALYSIS

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### Event

On 20 October 2005, SanDisk announced an agreement to acquire Matrix, which develops and supplies 3-D integrated-circuit technology with one-time programmable capability. SanDisk expects to close the deal by the end of 2005.

### Analysis

The Matrix acquisition will add complementary elements to SanDisk's digital-media business, including the ability to construct 3-D memory integrated circuits and a portfolio of more than 100 patents. Matrix's proprietary technology significantly reduces memory costs by allowing higher-density chips to be built vertically. This makes its memory products cheaper than competing memory technologies, such as Mask ROM and NAND flash. The technology also enables faster time to market, because devices can be preprogrammed by Matrix or an original equipment manufacturer (OEM). However, it also has a significant drawback: The technology is write-once, which reduces its flexibility and limits it to the prerecorded-content and consumable-media markets.

Pre-loaded-content memory is used to store content such as games, maps and video. (Early customers for Matrix memory include Mattel and Sharp Electronics; Kodak, Sony, Nintendo and others have provided funding for Matrix.) SanDisk has a vast retail network, and the ability to ship large amounts of pre-loaded content represents a significant opportunity for the company. The need for secure protection is a critical issue for any media content storage device. SanDisk recently introduced its own TrustedFlash content protection solution, but a proven content protection scheme will be essential in attracting premium content support.

The market for consumable media (for example, disposable flash cards that are used in place of analog film) likely does not offer the same promise. Consumers will be willing to purchase media that can be used just once only if it is significantly cheaper than programmable NAND flash cards. SanDisk will need to enlist the help of OEMs to address this market, because the Matrix technology requires software drivers or controller logic to communicate with the host device.

The Matrix 3-D technology will complement, but not compete with, SanDisk's existing flash card and USB flash drive portfolio. If SanDisk can maintain the cost advantages inherent in 3-D memory, and exploit its strong retail presence to enable sales of prerecorded content, it should gain business benefits from this acquisition. Gartner does not, however, expect SanDisk to offer a hybrid 3-D/NAND flash technology in the near future.

**Recommendation for OEMs:** For now, use 3-D memory technology for pre-loaded-content applications — but only if a trusted digital-rights scheme is in place.

**Analytical Source:** Joe Unsworth, Gartner Research

### Recommended Reading and Related Research

- "Matrix to Offer Cheap, Permanent Bits With 3-D Memory" — Matrix's 3-D semiconductor technology dramatically lowers costs and could open new markets. **By Richard Gordon**
- "Cool Vendors in Semiconductors, 2005" — New memory devices are among several innovations that promise to revolutionize semiconductor technology. **By Jim Tully and others**

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