

Visit the **Distribution Insider** to download the e-book

Sponsored by 

BRIEFINGCENTER

EE Times:
Ramtron, TI to spin FRAM for masses

[Mark LaPedus](#)
[EE Times](#)
 (03/12/2007 9:00 AM EDT)

[San Jose, Calif.](#) -- Ramtron International Corp. is hoping that the two-pronged offensive it is launching in ferroelectric random-access [memory](#) technology will help its FRAM gain traction in more mainstream applications.

After years of development--and promises--Ramtron (Colorado Springs, Colo.) will roll out what the company claims is the world's first 4-Mbit FRAM. At the same time, the company has expanded its ties with Texas Instruments Inc. As part of that agreement, TI (Dallas) will manufacture Ramtron's 4-Mbit FRAM line on a foundry basis using its 130-nanometer process.

Ramtron and TI have been working together since 2001, when the companies entered a FRAM licensing and development agreement. Until now, the partners have provided few details about their development plans.

The product launch and joint-development announcement not only propel FRAM into new markets, such as portable systems, but also prove that the technology is somewhat scalable, according to the companies. "This manufacturing agreement [with TI] marks a major leap forward in the commercialization of higher-density FRAM products," said Ramtron chief executive officer William Staunton III. Although FRAMs have shown promise, scaling and manufacturing issues have limited the memory devices' adoption to smaller densities and 0.35-micron technology.

Analysts believe the 4-Mbit FRAM is a little late to the game, however. "It's a milestone, but it's later than what they originally expected," said Robert Lineback, an analyst with IC Insights Inc. "The proof in the pudding is if we will eventually see FRAM embedded in a TI DSP."

TI dropped hints that it may market the FRAM for embedded applications in the future.

FRAM offers features consistent with [RAM](#) but is nonvolatile like [ROM](#) technology. FRAM bridges the gap between the two categories and creates what Ramtron calls a nonvolatile RAM.

FRAM memories are compatible with standard CMOS manufacturing processes. The ferroelectric thin film is placed over [CMOS](#) base layers and sandwiched between electrodes, enabling fast write-cycle times at low power. A ferroelectric [capacitor](#) is formed using iridium electrodes and a thin lead zirconate titanate ferroelectric layer.

Ramtron's announcement represents a somewhat new direction for the company. Previously, its FRAM parts were exclusively manufactured on a foundry basis by Fujitsu Ltd. (Tokyo). Fujitsu will continue to manufacture 1-Mbit-and-below FRAMs for Ramtron.

Ramtron's agreement with TI allows it to produce its FRAM memory products, including its 4-Mbit device, on TI's 130-nm CMOS process. That process appears to be scalable and does not require an inordinate number of new steps. Only two additional mask steps have been used to embed the nonvolatile FRAM module within the standard CMOS 130-nm logic process, said Ted Moise, director of FRAM development at TI.

Ramtron remains a small player in a potentially huge market, however. The company reported revenue of \$9.5 million for the fourth quarter of 2006, up 6 percent from the \$8.9 million posted in the year-ago period. Ramtron's fourth-quarter loss from continuing operations was \$180,000, compared with a fourth-quarter loss in that category of \$131,000 a year earlier.

Revenue increased 18 percent to \$40.5 million in 2006. Full-year 2006 income from continuing operations was \$457,000, compared with a loss from continuing operations of \$2.6 million for the previous year.

The company is projecting FRAM revenue growth of between 27 percent and 32 percent for 2007.

FRAM uses less power than MRAM, said Ramtron.

But "MRAM has been making progress," said IC Insights' Lineback.

For the most part, FRAM is best-suited as a replacement for E²PROMs and battery-backed SRAMs, said Mike Alwais, senior vice president of strategy marketing for Ramtron.

Engineering samples of Ramtron's FM22L16 are available now. Limited volumes are planned for the third quarter, with full-volume production slated for the fourth quarter for parts packaged in a 44-pin TSOP-II. Pricing starts at \$19 in quantities of 10,000.

Related Products

- [REVIEW: Power-managed chips to implement simultaneous DSP, control, and applications processing](#)
- [IP embeds Bluetooth 2.0+EDR in consumer, auto ICs](#)
- [Reference platform addresses telematics applications](#)
- [LED chips create bright colors for computer games, mini projectors](#)
- [Wide-bandwidth, CMOS-input op-amps light on battery consumption](#)

Marketplace (Sponsored Links)

[Via Doubling to Improve Yield](#)
 In nanometer designs, the number of single vias and overlapping via transitions can contribute sign...

[Buy a Link Now](#)

Technical Papers

- >> [Free Keithley White Paper on Test Sequencing](#)
 - >> [Tektronix Jitter 360° Series by Ransom Stephens](#)
 - >> [SystemVerilog User Group - Free Membership](#)
- [All White Papers >](#)

EE Times TechCareers Search Jobs

Enter Keyword(s):
 Function:
 State:

[Post Your Resume](#)

[Employers Area](#)

Most Recent Posts

- [Mechanical Engineer](#)
 Electric Machinery
 Minneapolis, MN US
 3/4/2007 12:51 AM
- [Sr Systems Engineer II - E/A18 Radar Systems](#)
 Raytheon
 SAN DIEGO, CA US
 3/11/2007 8:47 AM

[More career-related news, resources and job postings for technology professionals](#)

Site Features

- Calendar Events
- Conference Coverage
- Forums
- Career Center
- Multimedia
- Print Edition
- Column Archive
- Special Reports
- Subscriptions
- Print | Digital

Ads by Goooooogle

Nortel WIMAX
 Deploy mobile WIMAX at various frequencies. Read paper.
[www.nortel.com](#)

Wireless I/O Radio
 902- 928 MHz Spread Spectrum Analog & Digital Signals. Low Power
[www.freewave.com](#)

Motorola Canopy
[Buy Now](#)
 ALTIUS Communications is your complete source for Canopy!
[altiuscomm.com](#)

BridgeWave GigE Wireless
 Go Gigabit with BridgeWave 60GHz RF QuickQuote returned in hours
[www.GigabitRF.com](#)

Advertise on this site


FEATURED TOPIC

Sponsored by 
BRIEFINGCENTER

ADDITIONAL TOPICS

- ▶ [Verify Your IC Designs with a Plan-to-Closure Flow. Download the ebook.](#)
- ▶ [Tackle barriers to electronics supply chain management](#)
- ▶ [Visit the Verification Insider from plan to closure at block, chip, and system levels](#)
- ▶ [Turn small-volume into big business. Download the e-book.](#)
- ▶ [Slim down inventory. Read about small-volume fulfillment](#)