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VENDOR PROFILE

SVP.11: Texas Memory Systems Delivering on the SSD Promise

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IDC OPINION

The solid state drive (SSD) market is full of activity, with companies large and small announcing products that carry a promise of impressive performance gains, low power consumption, and cost-effective solutions when compared with the 50-year-old mechanical hard disk drive (HDD). Yet, for one company, Texas Memory Systems (TMS), with over 30 years of experience and 15 generations of SSD products, delivering on the promise of SSDs is nothing new. For some companies, they are just entering the SSD market by announcing their intentions or partners and realizing revenue is still a future event. TMS, on the other hand, is growing its RamSan SSD business with sales to end users through OEM, reseller, and direct channels and has positioned itself well within what IDC believes is a fast-growing market. TMS specializes in providing low-latency, high-bandwidth, I/O-intensive storage systems. TMS strengths include:

- **Solid engineering focus.** SSDs are advanced storage solutions that require both innovation and detailed knowledge to integrate solid state memory, memory management, controllers, and backplanes into a storage system without sacrificing performance. TMS does most of its engineering internally. Over 50% of its employees are engineers with an average of 5+ years of software experience and 10+ years of hardware experience at TMS designing SSD solutions for enterprise customers. This level of technical expertise is vital to deliver on the promise of SSDs, to iterate products rapidly in a competitive marketplace and, perhaps most important, to support enterprise customers.

- **Detailed understanding of the customer requirements.** Uniquely, TMS can leverage over 30 years of experience to help its customers integrate SSDs into their storage environments. The company routinely performs detailed analyses for its customers that provide valuable insights to application performance, storage workloads, and I/O bottlenecks. This is essential to proper utilization and optimization of SSD solutions.

IN THIS VENDOR PROFILE

This IDC Vendor Profile evaluates Texas Memory Systems, exploring TMS history, product positioning, and competitive posture. Relevant industry dynamics are discussed and highlighted. IDC also provides its opinion on and recommendations for Texas Memory Systems.

Filing Information: December 2008, IDC #215868

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This Vendor Profile is part of the Small Vendor Profile (SVP) Series, a special IDC initiative of IDC's storage hardware, storage software, semiconductor, and compliance infrastructure groups. The goal of the SVP Series is to profile smaller "have you ever heard of" companies that have unique but compelling positions within these IDC services. Every client of at least one IDC service within one of the IDC groups listed will receive each and every vendor profile, regardless of which analyst authors the profile. The SVP Series runs from October 2008 through September 2009.

SITUATION OVERVIEW

Company Overview

Texas Memory Systems, headquartered in Houston, Texas, is the leading global provider of solid state storage systems for accelerating mission-critical applications. Founded in 1978, Texas Memory Systems consults with its customers to define solutions that are fast, reliable, and economical. TMS products are available and supported worldwide.

TMS relies heavily on its deep engineering team to iterate innovative solutions rapidly. It leverages respected application acceleration consultants to analyze customer performance needs quickly and to develop solutions that leverage customers' existing architectures and aligning them with TMS RamSan SSD and partner products.

The RamSan product line stretches from small 16GB RAM-based products (RamSan-300) to the recently announced RamSan-5000 (a 20TB flash system). Together, these six separate products (discussed in the Product and Technology section) span a wide range of performance and cost metrics but are all designed with a similar end goal — accelerating customer applications.

The company's management team includes the following:

- **Holly Frost, CEO.** Frost founded Texas Memory Systems in 1978 and continues to play a leading role in the company's engineering and management.
- **Woody Hutsell, EVP.** Hutsell joined Texas Memory Systems in 2000 and has ushered TMS into the global enterprise SSD market. Hutsell is a frequent speaker at industry events on issues involving application acceleration and solid state disks.

The 80-employee company is privately owned with no long-term debt or venture capital funding. Its sales of SSDs are across a number of vertical end markets — federal: 32%, financial: 26%, telecom: 14%, ecommerce: 6%, and "other": 22%. The United States accounts for the majority of TMS' revenue, approximately 64%. While Europe (18%), Asia (8%), and "other" (10%) make up the balance of geographic revenue split for TMS.

Over the course of its 30-year history, TMS has garnered numerous awards. Some of the awards received in the last year include:

- Government Computer News, Best of FOSE 2008
- SQL Server Magazine, Gold Medal Winner, Editor's Best Awards 2008
- Windows IT Pro Magazine, Gold Medal Winner, Editor's Best Awards 2008
- Storage Performance Council (**www.storageperformance.org**) world record holder for SPC-1 tests in peak SPC-1 I/Os per second (IOPS), low cost per SPC-1 IOPS, and lowest average latency SPC-1 IOPS (audit identifier: A00063)
- SQL Server Magazine, Platinum Award Winner, Editor's Best Awards 2007

Company Strategy

TMS SSDs are marketed as "the world's fastest storage," and one look at its recent press announcements suggests that TMS takes its claim very seriously:

- **October 2008:** Texas Memory Systems delivers the first one million IOPS flash memory–based solid state system (RamSan-5000).
- **July 2008:** Texas Memory Systems introduces the world's fastest and highest-capacity RAM solid state disk (RamSan-440).
- **May 2008:** Renowned Oracle expert and author, Mike Ault, joins Texas Memory Systems to advise clients on implementing SSD for Oracle databases.
- **January 2008:** Texas Memory Systems RamSan-400 solid state disk produces a new world record SPC-1 performance and price-performance result. The SPC is an independent benchmarking organization.

TMS offers both RAM-based and SLC NAND flash-based SSDs through its RamSan product line. The RAM SSDs from TMS employ DDR RAM with backup storage media and batteries to ensure nonvolatility. These DRAM-based SSDs have long maintained a prominent position in enterprise storage applications where very high performance is required.

With its announcement in September 2007, TMS augmented its product line with the RamSan-500, which offers a thoughtfully architected blend of DRAM and NAND flash memory. The design utilizes fast DDR memory to create a large, performance-boosting cache for the high-capacity, lower-cost, flash-based storage. By combining the two technologies, DRAM and flash, TMS intends to exploit their respective strengths. DRAM is used to provide a performance-enhancing cache with fast write performance, while flash is used to provide fast reads, lower power consumption, and a lower price than pure DDR systems. The combined system offers the low price points that make flash SSDs attractive while still providing much higher performance than other solid state solutions.

Product and Technology

Currently, the TMS product portfolio includes:

- **RamSan-500.** The 12th generation of SSD from TMS and is a hybrid of DDR RAM (16–64GB) and flash memory (16Gb SLC NAND). The flash offers 1–2TB of usable storage arrayed in nine RAID-3-protected hot swappable modules. The RamSan-500 can handle over 100,000 random I/Os per second (cache miss) with 2,000MBps random sustained external throughput from flash. A single RamSan-500 unit only draws 300W of power when operating at full performance.

- **RamSan-5000.** An array of 10 or more RamSan-500 units can scale easily from 20TB to 100s of TB of capacity. The units can be arrayed for capacity, performance, and reliability. The system is noted for its ability to hit 1,000,000 IOPS with flash memory.

- **RamSan-440.** The 13th generation of SSD from TMS and is based on 1Gb DDR RAM storage technology. The system includes RAID-protected RAM memory boards and RAID-protected backup flash modules. It is available in capacity ranges from 128GB to 512GB RAM with 4Gb Fibre Channel interfaces. The RamSan-440 can handle over 600,000 random I/Os per second with 4,500MBps random sustained external throughput.

- **RamSan-400.** It uses 512Mb DDR RAM storage technology as well and is available in capacities from 32GB to 128GB with 4Gb Fibre Channel, 2Gb Fibre Channel, or 4x InfiniBand interfaces. The RamSan-400 can handle over 400,000 random I/Os per second at 3,000MBps random sustained external throughput.

- **RamSan-300.** It offers the lowest initial purchase price points of any TMS enterprise-class DRAM-based SSD. It can handle over 200,000 random I/Os per second with capacity ranges from 16GB to 32GB.

- **Write Accelerator.** It is specifically designed to increase Oracle database performance. It accelerates Oracle databases by allowing them to handle substantially greater transaction volumes and add more concurrent users. The Write Accelerator can deliver many times the performance of a standard cached RAID hard disk array and is more easily installed and managed by enterprises whose operations rely on Oracle-resident applications.

Key features of all TMS systems include the following:

- **Low access times.** TMS' RAM SSDs and caches have access times below 15 microseconds. In comparison, a mechanical HDD at approximately 5 milliseconds has 333 times higher access times.

- **High bandwidth.** RamSan units can support up to 4.5GBps of sustained random data throughput.

- **High I/Os per second.** RamSan units provide high random I/O performance because of their low access times and high bandwidth. TMS solutions range from 200,000 to over 1,000,000 IOPS.

- **High availability.** SSDs are inherently more reliable than HDD-based systems because they don't have moving parts in their data paths.

- **Nonvolatile.** All TMS enterprise SSDs are nonvolatile solutions. Flash memory is inherently nonvolatile, and TMS RAM SSDs have redundant internal batteries that maintain system power long enough to back up data to RAID-protected persistent internal storage.

FUTURE OUTLOOK

Increasingly, SSDs are becoming part of the storage industry. Datacenter storage requirements are increasing at rate between 50% and 60% per year based on IDC's forecast and show little evidence of slowing down. Yet, while capacity requirements are increasing at this rate, there is also a strong desire for increased performance, better utilization, faster access times, and lower power consumption solutions. As IDC has suggested in our research, these factors coupled with the decline in solid state memory costs are providing an increasing opportunity for SSD-based solutions.

Despite all the buzz around SSDs, solid state storage is not new when it comes to enterprise storage. DRAM-based storage solutions, like many of TMS's RamSan products, have been used for years to satisfy those applications demanding the highest performance in latency-sensitive environments. However, until recently, the use of solid state storage in the datacenter has been relatively expensive. The rapid erosion of NAND over the past few years is enabling more affordable solid state storage scenarios to emerge such as TMS's RamSan 500, which leverages NAND flash technology.

In general, IDC believes that although SSDs are a more expensive form of storage compared with HDD-based storage from a dollar-per-gigabyte perspective, they do provide a number of benefits over HDDs:

- Higher performance in terms of IOPS

- Lower power consumption, less heat generation, and lower cooling costs

- Low acoustical noise

- Form factor flexibility

As such, IDC expects SSDs will find an increasing role throughout the datacenter and experience solid growth for many years to come.

ESSENTIAL GUIDANCE

Advice for Texas Memory Systems

Storage requirements continue to advance. With the decline in solid state memory pricing (DRAM and NAND), solid state storage increasingly is becoming a viable solution for many markets and applications.

IDC believes TMS is committed to SSDs, flash based and DRAM. TMS has proven that it can deliver high-performance, reliable, effective solutions in this high growth area. However, the following are dynamics that we believe TMS should address or consider:

- One of the advantages that SSD technology provides is improved performance. However, IDC research has found that SSD technology is not necessarily plug and play. While TMS has designed a system that improves the performance of storage environment of specific customers and applications, as SSD-based systems become more broadly adopted, TMS will need to be mindful to test its systems against a much broader range of application and architecture scenarios to ensure the performance metrics are met and customers realize the full performance benefits of SSDs.

- Storage density and cost are two key decision criteria when choosing a storage solution. If the company desires to reach new, lower-end customers, then TMS should increase densities and continually look to deliver more at a lower dollar per gigabit.

- Competition in the SSD market is quickly increasing with over 75 companies actively involved in the market. TMS has to decide on a path for future success: Are they going to be a system provider that sells to end users (or through channel partners) or a technology partner/engineering company?

- SSD-based systems are being integrated for specific reasons, as opposed to generally. In other words, companies have specific applications for which they are considering SSDs. TMS has an opportunity to work closely with specific software and application vendors to fine-tune SSD-based solutions that it could bring to market.

- The industry is on the cusp of a tangible growth in cloud computing and storage. This segment of the industry has the potential to be very I/O intense, and companies providing cloud services should be on TMS' priority list of potential customers.

LEARN MORE

Related Research

- *Worldwide Solid State Drive 1H08 Update* (IDC #215294, November 2008)

- *Worldwide Disk Storage Systems 2007 Vendor Shares: Year in Review* (IDC #213916, October 2008)

- *Worldwide NAND Flash Demand and Supply 2Q08–4Q09 and 2008–2012 Update* (IDC #214200, September 2008)

- *Benchmarking Storage Options for PCs: The Results Are In — Exposing the Strengths and Weaknesses of HDDs, SSDs, and Hybrids* (IDC #213285, July 2008)

- *Worldwide Solid State Drive 2008–2012 Forecast and Analysis: Entering the No-Spin Zone* (IDC #212736, June 2008)
- *Texas Memory Systems' New RamSan-500* (IDC #208855, September 2007)

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