# Texas Memory Systems

The World's Fastest Storage®

# RamSan-810


- **10 TB usable eMLC Flash**
- **320,000 IOPS**
- **4 GBps bandwidth**
- **1U rackmount system**
- **10 year usable life**
- **Fibre Channel or InfiniBand interfaces**
- **Series-7 Flash Controller™**

## Overview

The **RamSan-810** is the first Texas Memory Systems enterprise multi-level cell (**eMLC**) Flash storage system.

**eMLC Flash** combines the **high speed** and **reliability** of single-level cell (SLC) Flash with the **low cost** of MLC Flash. It is appropriate for use with read-intensive enterprise workloads. The new eMLC RamSan-810 boasts the following key features:

- **2 to 10 TB** of usable storage space
- Enterprise grade **32nm eMLC Flash** media
- **1U** form factor with support for two **dual-port 8 Gb/s Fibre Channel** controllers or **dual-port 40 Gb/s QDR InfiniBand** controllers
- Proprietary **Series-7 Flash Controller™** featuring **hardware Flash management** and **patented reliability features**

## Key Applications

The RamSan-810 can speed up high-performance, **read-heavy** enterprise **storage area network (SAN)** applications like:

- **Data warehouses and online analytical processing (OLAP) databases**
- **Content delivery networks**
- **Sequential data collection**

## Performance

The RamSan-810 provides **maximum performance**:

| Metric | Read | Write |
|---|---|---|
| **IOPS** | 320 K | 320 K |
| **Bandwidth** | 4 GB/s | 4 GB/s |

## Reliability

The RamSan-810 has the reliability features required in true **enterprise storage**, including:

- Standard **chip-level RAID** and patented **Variable Stripe RAID™ (VSR™)** protection against plane and chip failures
- **Enhanced Error Correcting Code (ECC)** protection against page failures
- Available **integrated spare Flash card** limiting maintenance downtime
- **Redundant power supplies** with active failover protection against single-source power issues


**Learn more at http://RamSan.com/Products/RamSan-810.**

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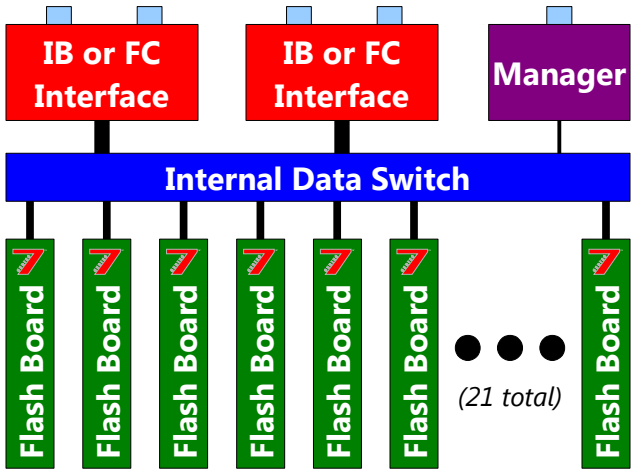
## Architecture

The RamSan-810 continues the TMS tradition of high bandwidth, low latency systems with most control logic implemented in hardware. It is built with **21 Flash boards** powered by the proprietary Texas Memory Systems **Series-7 Flash Controller™**. The boards are connected through a high-speed **internal data switch**, along with **two dual-port Fibre Channel or InfiniBand interfaces** and a **management controller** offering an Ethernet interface.




## Series-7 Flash Controller™

Exclusively available from Texas Memory Systems, the **Series-7 Flash Controller™** is the seventh generation of RamSan Flash controllers. Its main features over other architectures include:

- **Better performance.** The highly parallel architecture of the Series-7 Flash Controller takes full advantage of the performance of each Flash chip by minimizing individual FPGA load. This parallel architecture is a core component of the RamSan design and is why the RamSan is the uncontested performance leader.
- **More reliability features.** Patented Variable Stripe RAID™ (VSR™) technology, available exclusively in new Texas Memory Systems products, efficiently bypasses failed Flash planes and chips. Enhanced error correcting code (ECC) techniques help mitigate block failures.
- **Improved latency for small requests.** The Series-7 Flash Controller has new optimizations for small (512-byte) requests that significantly decrease latency.

## Variable Stripe RAID™ (VSR™)

The exclusive patented Variable Stripe RAID™ feature offered by the Series-7 Flash Controller reduces business interruptions and improves mean time between failures (MTBF) by providing a higher level of **protection** against common Flash plane failures and less common Flash device failures. VSR complements standard error-correction techniques to enable continued system operation in the event of Flash failures. It improves on traditional RAID by providing **greater stripe size granularity** and **variable stripe sizes**, allowing the controller to **skip bad areas** rather than failing or replacing them with a full spare chip. VSR accomplishes this by allowing XOR RAID stripes to be dynamically resized for distribution across fewer Flash devices. When a Flash device failure is detected, data is migrated to new stripes that do not include the failed chip or plane.

## Ultimate Write Performance and Reliability

The RamSan-810 includes **30% overprovisioning** (19% overprovisioned space and 11% RAID overhead—13 TB raw vs. 10 TB usable) on each card to deliver industry leading performance and reliability to its users. Overprovisioning is the practice of including additional space that is not presented to the user to increase write performance.

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