

# RAM-SAN™

The World's Fastest Storage™

## RamSan-400

- 3 Gigabytes per Second
- 400,000 IOPS
- 32 to 128 GB Storage
- 2-8 FC Links (4-Gb)
- 1-4 IB Links (4x)
- Hot-swap Modules

### Solid State Disk Storage

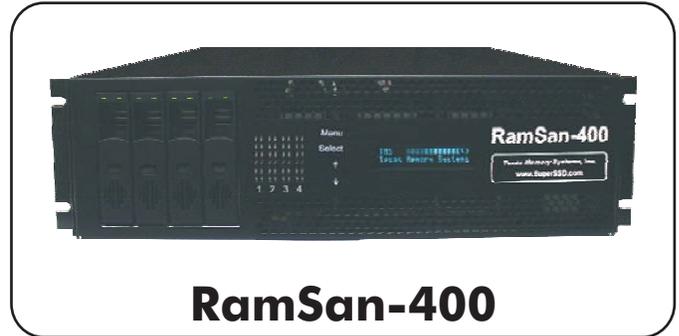
The RamSan-400 from Texas Memory Systems is the only storage product on the market capable of delivering on the promises of 4-Gb Fibre Channel and 4x InfiniBand. Its data storage is based on fast DDR RAM media instead of mechanical, rotating drives. Fully-loaded with eight Fibre Channel ports, this system can sustain over 400,000 random I/Os per second and 3 GB/sec of bandwidth. With a memory bus architecture similar to high performance servers, the RamSan-400 has the extra bandwidth needed for heavy operations. Its low latency has two advantages: it provides users (or servers) with 50x faster response times and allows 50x more users (or servers) to access the same volume. The RamSan-400 provides an incredible performance improvement over the best disks.

### Typical Storage Hierarchy

As computer performance increases faster than rotational disk performance, the traditional two-level storage hierarchy scheme needs a new performance level. The high-performance RamSan-400 fills this need by allowing users to implement a three tiered storage hierarchy. Even under heavy load conditions, the RamSan-400's I/O power and bandwidth make it possible for all of your computers to have immediate access to highly active data files simultaneously.

### Installation and Management

The RamSan-400 is as easy to install as a disk drive. In its simplest configuration, it provides a direct link to one server through a host bus adapter (HBA) or host channel adapter (HCA). In its expanded configuration, it can be linked through Fibre Channel or InfiniBand switches to hundreds of servers or workstations via SANs. Basic management operations, including manual shutdown and any alerts, are available from the front panel screen. Full monitoring and



RamSan-400

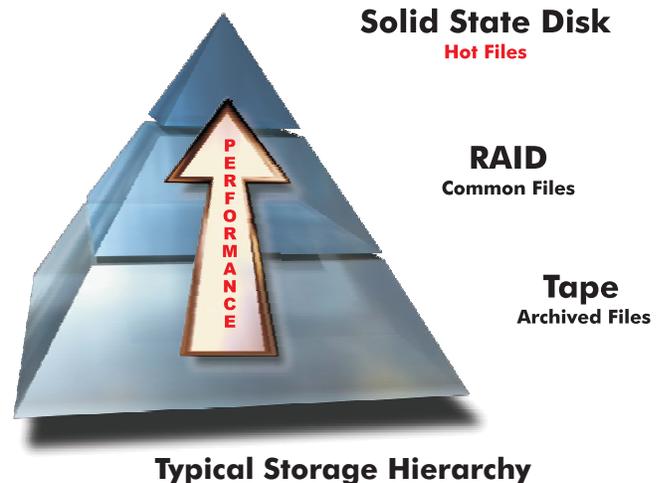
configuration capabilities are available over any browser via a protected Java applet. The RamSan-400 is fully SNMP compatible.

### Highly Reliable Storage

With any storage device, reliability is a primary concern. The RamSan-400 is designed to offer superior reliability to other solid state disks and RAID devices. Its standard features include: Chipkill™-protected RAM, hot-swap power supplies, failover ports, SNMP compatibility, three redundant internal batteries, and four redundant, hot-swappable backup disks.

### Non-Volatile Backup Methods

The RAM used to give the RamSan-400 record-breaking performance would generally lose its data if power was lost. To ensure non-volatility, the RamSan-400 includes batteries and two distinct backup methods which copy SSD data at 150 MB/sec to the redundant, internal RAID, giving the user the ultimate in versatility and reliability.



## FIBRE CHANNEL CONNECTION

- 4-Gbit Fibre Channel (2-Gbit capable) controllers available
- 2 ports standard; up to 8 ports available
- Supports point-to-point, arbitrated loop, and switched fabric topologies
- Interoperable with Fibre Channel Host Bus Adapters, switches, and operating systems

## INFINIBAND CONNECTION

- 4x InfiniBand (10-Gbit)
- 1 port standard; up to 4 ports available
- Supports SRP Upper Layer Protocol
- Interoperable with InfiniBand Host Channel Adapters, switches, and operating systems

## MANAGEMENT

- Browser-enabled system monitoring, management, and configuration
- SNMP supported
- Telnet management capability
- Front panel displays system status and provides basic management functionality

## LUN SUPPORT

- 1 to 64 LUNs with variable capacity per LUN
- Flexible assignment of LUNs to ports
- Hardware LUN masking

## DATA RETENTION

- Non-volatile solid state disk
- Redundant internal batteries power the system after power loss
- Automatically backs up data to disk if power is lost or manual shutdown

## Specifications

<b>I/Os per second</b>	400,000
<b>Capacity</b>	32-128 GB
<b>Bandwidth</b>	3 GB/sec
<b>Fibre Channels: 4-Gb, 2-Gb</b>	2 to 8 Ports
<b>InfiniBand: 4x</b>	1 to 4 Ports
<b>Latency</b>	<15 microseconds
<b>Disk Drives</b>	Redundant Hot-Swap
<b>Power Supplies</b>	Redundant Hot-Swap
<b>Batteries</b>	3 Redundant
<b>Size</b>	5.25" (3U) x 25"
<b>Power Consumption (peak)</b>	350 Watts
<b>Weight (maximum)</b>	80 lbs

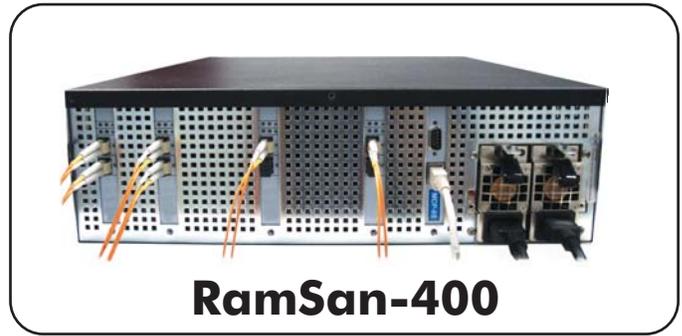
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**RamSan-400**

## RELIABILITY AND AVAILABILITY

- High availability architecture
- Chipkill™ technology protects data against memory errors up to and including loss of an entire memory chip
- Internal redundancies
  - Power supplies and fans
  - Backup battery power (n+1)
  - Backup hard disk drives (RAID3)
- Hot swappable components
  - Backup hard disk drives (front access)
  - Power supplies
- Active:Passive Fibre Channel failover (optional)

## BACKUP PROCEDURES

Supports two backup modes that are configurable per system or per LUN:

- Data Sync mode - synchronizes data to redundant internal disk drives before shutdown or with power loss.
- Active Backup™ mode (optional) - backs up data constantly to internal redundant disks without impacting system performance.

## ABOUT TEXAS MEMORY SYSTEMS

Since 1978, Texas Memory Systems (TMS) has specialized in high bandwidth, low latency, I/O-intensive storage systems. While the primary feature of our products has always been high performance, we achieve this performance without resorting to overly complex circuitry or unwieldy protocols. This emphasis on simplicity allows TMS to deliver outstanding performance using mature technologies and readily available off-the-shelf components.

TMS systems were originally designed to meet the needs of the U.S. defense industry. This market has always demanded the ultimate in performance and TMS has always delivered it. The RamSan-400 delivers a level of performance previously unavailable in a commercial storage product.