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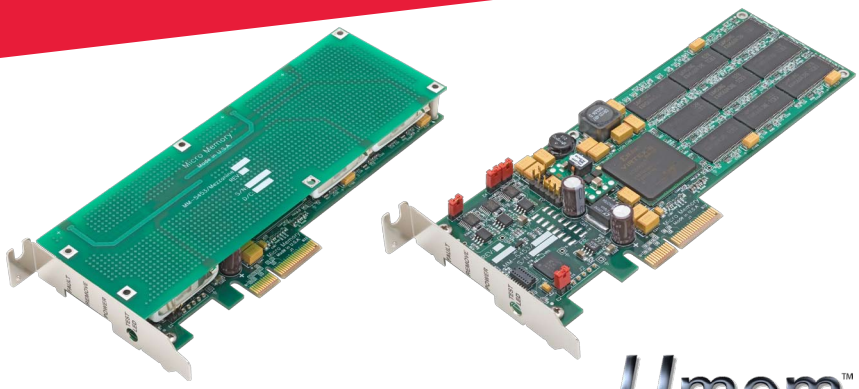
Find the *Curtiss-Wright / VMETRO / Micro Memory MM-5453J* at our website: ***Click HERE***



Data Sheet

MM-5453CN

2GB PCI Express® x4 Low Profile NVRAM Card



µmem™ NVRAM cards

Applications

- Network attached storage
- SAN management and virtualization appliances
- Disk-based backup
- Continuous data protection

Features

- Capacity: 512MB, 1GB & 2GB
- PCI Express x4 interface
- Application optimized Mailbox DMA for chaining linked-lists
- Specialized, low latency DDR memory controller
- Error detection and correction
- Supports interrupts
- Field replaceable battery mezzanine
- Low-profile, half-length PCI card form factor
- Device drivers are available for several operating systems

Benefits

- Low latency, random access persistent storage
- High throughput
- File system journaling and logging
- Software RAID
- Intelligent write-caching

Overview

The Umem MM-5453CN is a battery-backed, PCI Express (PCIe) x4 NVRAM card designed to improve response time and data availability in enterprise-class server and storage appliances.

Based on a PCIe x4 interface, the MM-5453CN can be accessed by the host as a peripheral device over a serial interconnect as part of a PCIe switch fabric subsystem. PCIe fabrics enable concurrent host access of multiple peripherals, and as a serial interconnect, signal integrity is improved over higher clock frequencies when compared to more traditional parallel buses such as PCI-X. At the device driver level, PCIe is backwards compatible to PCI. The MM-5453CN contains the same register set and DMA functionality as its PCI Umem predecessors, preserving customer's software investments and providing a seamless transition to high-speed serial technology.

Ultimate Random Access Performance, Only Possible With RAM

With up to 2GB of DDR memory, the MM-5453CN is optimized for both continuous random access and high throughput operations, only possible with solid state RAM. While the penalties of random access operations are well understood with hard disk drive technology, they also exist with other solid state drives (SSD), such as those based on FLASH memory technology.

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FLASH SSDs are not the answer

While FLASH is non-volatile, it has significant latency as pages or blocks are "FLASHed" to memory. Techniques involving striping large numbers of FLASH devices by structuring arrays as both wide and deep are utilized to improve this limitation. While this technique does benefit throughput, it does little to improve real IOPS. This is especially true for bursts larger than the memory's FLASH page size, which is commonly misrepresented in marketing material for FLASH SSDs.

Because of FLASH memory's limited lifetime write/erase cycles, SSDs utilize wear leveling algorithms to increase the number of accesses over time. This introduces overhead as a virtual file system acts as an intermediary between the I/O operations and memory accesses. These performance limitations are compounded because NAND FLASH inherently has bad blocks, which grow over time. Bad block mapping algorithms are thus implemented which often involve reading pages before writing, further increasing response time for random and even sequential operations.

Data Retention Technology

For these performance reasons, Umem cards utilize DRAM instead of FLASH memory. Umem NVRAM cards are thus only limited by the peripheral interconnect, PCIe, rather than the memory media. However, DDR, unlike FLASH, is volatile and has challenging attributes with regards to holding data without continuously applying power.

This volatile DDR memory is transformed into persistent storage on Umem cards through the use of proprietary data retention technology that has been continuously refined for over twenty-five years, so that memory reliably maintains data through a myriad of different abrupt power failures and system panics.

Form Factor

Up to three re-chargeable lithium-ion batteries are located on a FRU mezzanine that is mounted to the MM-5453CN. The integrated configuration has been designed to stay within the PCI single card slot envelope. The MM-5453CN's compact form factor is compliant with the PCI-SIG specification for low profile, mid-length options and ideal for use in tightly integrated appliances.

Umem Controller

The MM-5453CN's performance characteristics are the result of a specialized, low latency DDR memory controller and application optimized DMA engine that includes chaining of linked lists, scatter-gather capabilities and semaphore updates to minimize system overhead.

The Key to Cutting-Edge File Systems

Under the direct control of the system host, Umem NVRAM cards can be utilized to maximize and differentiate file system performance. Umem technology enables specialized file system operations, advanced features, data protection, and availability functionality to be implemented that would otherwise incur prohibitive performance penalties.

Leading edge proprietary file systems found in enterprise-class appliances are often built on the assumption of utilizing battery-backed NVRAM. This provides the ability to ensure certain operations, such as those involving checkpoints and inode updates, can be logged to high-speed, random access stable storage in an ordered fashion without incurring the penalties otherwise associated with other forms of stable storage. This greatly enhances both the performance and availability of these solutions.

In addition to enabling specialized file system implementations, Umem NVRAM cards can enable application specific write-caching under the intelligent control of the host, possibly in conjunction with software RAID and file system journaling not possible with the NVRAM found in a conventional RAID controller.

Umem NVRAM Cards for NFS

Especially applicable to file servers and storage appliances that adhere to the NFS protocol, Umem cards enable these products to improve performance for I/O intensive applications and still comply with the industry standard benchmark for NFS, SPEC SFS.

SPEC SFS requires following the NFS protocol, which ensures reliability by making many operations synchronous. These operations typically involve directory and inode updates, journal logs and metadata, data base snapshots, cluster check points, time stamps and changes to actual file data.



While making operations synchronous and requiring they be committed to stable storage is an excellent method towards guaranteeing reliability, there is an associated performance penalty when hard disk drives or FLASH SSDs are selected as the stable storage device.

Umem PCI NVRAM cards minimize this penalty and response time by replacing disk accesses with memory accesses. But unlike system memory, the Umem cards uniquely provide on-board battery back-up that enables data retention and prevents re-initialization of memory upon power up or system reset. This ensures compliance with the NFS protocol and SPEC SFS requirements for stable storage, and more generally ensures high availability for enterprise-class appliances.

Warranty

This product has a one year warranty.

Contact Information

To find your appropriate sales representative, please visit:

Website: www.cwcembedded.com/sales

Email: sales@cwcembedded.com

For technical support, please visit:

Website: www.cwcembedded.com/support1

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