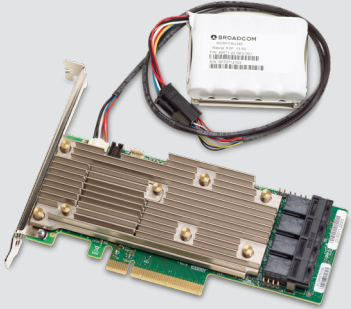


## Product Brief



### Key Features

- Cached Data Protection for MegaRAID 93xx and 94xx series adapters
- NAND flash protects the integrity of cached data in the event of system hangs, crashes, kernel panics, or power failures
- Automatically transfers cached data to flash storage when a power failure occurs
- Eliminates the need for Lithium-ION batteries and associated hardware maintenance cost, resulting in a greener, lower total cost cache protection solution
- Does not require special IATA shipping compliance
- Suitable for file, web, database, and e-mail servers; storage appliances, high-performance computing, digital content, medical imaging, and similar applications.

# CacheVault™ Technology

**CVM02, CVPM02, and CVPM05 Optional Accessory Modules Enable Flash Cache Protection for 12Gb/s SAS/SATA/NVMe PCIe RAID Controllers**

## MegaRAID® and CacheVault™ Technologies Deliver Lower Total Cost and Longer Life Cache Protection

Data center managers and architects are expected to do more than ever, including protecting rapidly expanding volumes of data, meeting performance requirements of mission-critical applications, and implementing a variety of green, low-cost initiatives.

RAID caching is a cost-effective way to improve I/O performance by writing data to a controller's cache before it is written to disk. However, in the event of a power or server failure, the writes in cache may be lost.

CacheVault technology prevents data loss by powering critical components of the card long enough to automatically transfer the cached data to NAND flash. Once power returns, the data is restored to the cache and normal operation resumes.

Combining the Broadcom MegaRAID 94xx Tri-Mode and 93xx MegaRAID controllers with CacheVault technology provides the industry's most reliable RAID solution. By using a super capacitor instead of Lithium-ION batteries, CacheVault technology virtually eliminates hardware maintenance costs associated with batteries, lowers total cost of ownership over the life of the controller card, and provides more environmentally friendly cache protection, all while maintaining optimal RAID performance.

### Write-Back Cache Protection

The CacheVault CVPM02 and CVPM05 energy backup modules protect the write-back cache function that hardware RAID controller users require. RAID caching is a cost-effective way to improve I/O performance by writing data to a controller's cache before it is written to disk. Write-back cache improves application performance by storing write data to high performance cache memory during periods of heavy use. Where there is a break in user requests, the data is written from the cache memory to the array.

During normal write-back operation, data is written to cache (DRAM), the I/O is acknowledged as "complete" to the application that issued the write, and later the write is flushed to disk. If power is lost while write-back cache is enabled, the writes in DRAM may be lost. Since the controller has already acknowledge the I/O as complete, the application is unaware of the data loss.

## Benefits of CacheVault Technology vs. BBUs

Older generations of RAID controllers used lithium-ion-based battery backup units to keep the data resonant in the cache memory until power could be restored. Data was only available for up to 72 hours. Over the life of a controller, the battery will need to be replaced numerous times, as it is only good for about 1 ½ years, which increases cost of ownership. Unlike super-capacitors, batteries cannot sit on the shelf for a long period of time without requiring re-charging, making inventory management costly. Further, shipping and disposing lithium-ion batteries require special considerations and fees.

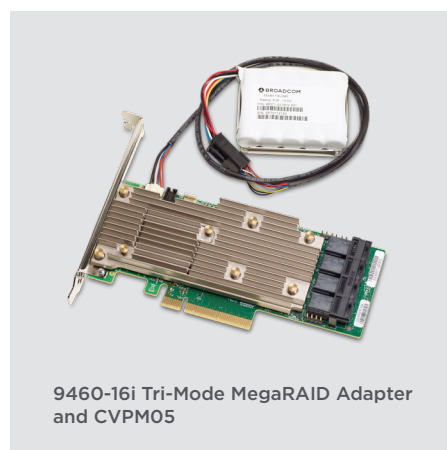
## Simple Installation

The MegaRAID 93xx 12Gb/s SAS/SATA adapters enable CacheVault protection with the CVFM02 kit. This kit includes both the super-capacitor and a separate flash module that attaches to the base adapter.

The MegaRAID 94xx Tri-Mode series adapters have the flash embedded on the adapter board. CacheVault technology is added by attaching the CVPM05 module. A separate flash module is not necessary when using the MegaRAID 94xx Tri-Mode adapter series.

Both kits include cables and optional mounting clips that can be used to mount the super-capacitor based on the system architect's preference. A remote mount board that can be used to mount the super-capacitor in an empty PCI Express slot is also available separately.

	CacheVault Technology	Standard Battery Backup (BBU)
Maintenance schedule	None	Battery should be replaced every 1 to 2 years, battery monitoring required
Maintenance impact	None	Server must be opened (removed from rack) and taken offline while the battery is being replaced
Data recoverable for	3+ years	Up to 72 hours, less if battery degraded
Time to cache protection	Immediate Capacitor charges in seconds while the system boots	Several Hours Batteries require 4.5 to 9 hours charging time and 24 to 48 hours for initial capacity test
Inventory requirements	None	Must carefully manage inventory due to limited shelf life requiring re-charging
Disposal issues	None	Need to safely dispose of hazardous battery material
Shipping requirements	Standard	Special IATA regulations must be met for air shipments

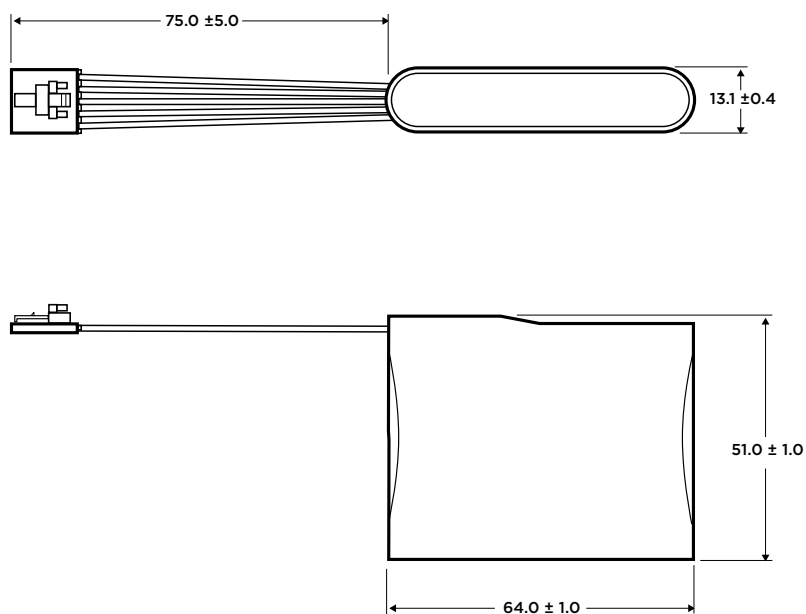


	CVM02	CVPM02	CVPM05
MPN	05-25444-00	05-50038-00	05-50039-00
Super-Capacitor Model	FBU02	FBU02	FBU345
MegaRAID controllers supported	9361-8i 9361-4i 9380-8e 9380-4i4e	9361-24i 9361-16i 9380-8i8e	9460-16i 9460-8i 9480-8i8e 9365-28i*
Kit Contents	Flash module Super-capacitor Mounting clip/screws 240 mm cable 620 mm cable	Super-capacitor Mounting clip/screws 240 mm cable 620 mm cable	Super-capacitor Mounting clip/screws 620 mm cable
Compatible with previous generations of MegaRAID adapters	No	Yes Super-capacitor supports SAS2208, 3108, 3116, or 3124 based adapters	No
Operating Temperature	0°C to 55°C	0°C to 55°C	0°C to 55°C
Storage Temperature	-40°C to 70°C	-40°C to 70°C	-40°C to 70°C
Shrink Wrap Color	Black	Black	White

\* The 9365-28i is a SAS3508-based adapter, but is not a Tri-Mode capable. It requires use of CVPM05 instead of CVPM02.

## Cache Vault Power Module Dimensions

The CVPM dimensions are shown in the following figure.



Units = mm

Figure represents CVPM02. CVPM05 uses Molex 43025-0800 connector, but dimension of 75.0 mm from capacitor to connector edge remains the same.

## Optional Remote Mount Board

Available separately is an optional remote mounting board for customers to remotely mount their CacheVault super-capacitor in an open PCIe slot. The remote mounting boards allows one or two super-capacitors to be attached and plugs into an empty PCIe slot. This product can be ordered using part number L5-25376-00.