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**AVAGO** TECHNOLOGIES | STORAGE BY **LSI**™

# Storage Solutions

**Product Guide**

# The amount and variety of data produced by content-rich Internet, cloud and enterprise applications poses unprecedented challenges for data centers of all sizes.

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New approaches and technologies are needed to manage this deluge of data: to store it, protect it, and maximize the value from it. These challenges present opportunities to help the world make the most from its data.

Avago Technologies is focused on helping customers in wireless communications, wired infrastructure, enterprise storage and industrial and other markets solve their challenges. Avago has the industry's broadest portfolio of storage solutions, backed by decades of experience and trusted by the world's leading server and storage suppliers. Avago provides the building blocks for storage solutions that help customers understand, prioritize, store and protect critical data.

Whether you need to protect data, power your storage solutions, or deliver the performance needed by critical applications, Avago's 12Gb/s SAS MegaRAID® controller cards and Host Bus Adapters (HBAs), Advanced Software Options, and Syncro® shared DAS solutions are the smart choice.

# HBAs

Equip storage solutions with the connectivity needed to meet any scaling needs from the smallest SMBs to the largest data centers. Avago HBAs can enable an easy, long-term storage growth strategy in practically any direct-attached storage scenario. Whether solutions use SAS or SATA, hard disk or flash, or even internal or external storage elements, our HBAs are designed to create the fabric tying any or all of those components together into a unified storage effort.

| Product Name | Part Number | Form Factor | Ports | Connectors | Bus Interface | No. of Devices Supported | RAID Levels |
|---|---|---|---|---|---|---|---|
| 12Gb/s SAS | | | | | | | |
| 9300-16e | LSI00342 (SGL) | Full-Height | 16 | 4 x SFF-8644 | PCIe 3.0 x8 | 2048 | JBOD |
| 9300-8e | LSI00343 (SGL) | LP MD2 | 8 | 2 x SFF-8644 | PCIe 3.0 x8 | 1024 | JBOD |
| 9300-16i | LSI00447 (SGL) | Full-Height | 16 | 4 x SFF-8643 | PCIe 3.0 x8 | 1024 | JBOD |
| 9300-8i | LSI00344 (SGL) | LP MD2 | 8 | 2 x SFF-8643 | PCIe 3.0 x8 | 1024 | JBOD |
| 9300-4i4e | LSI00348 (SGL) | LP MD2 | 8 | 1 x SFF-8643<br>1 x SFF-8644 | PCIe 3.0 x8 | 1024 | JBOD |
| 9300-4i | LSI00346 (SGL) | LP MD2 | 4 | 1 x SFF-8643 | PCIe 3.0 x8 | 1024 | JBOD |
| 6Gb/s SAS | | | | | | | |
| 9207-8e | LSI00300 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 3.0 x8 | 1024 | JBOD |
| 9207-8i | LSI00301 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 3.0 x8 | 256 | JBOD |
| 9207-4i4e | LSI00303 (SGL) | LP | 8 | 1 x SFF-8087<br>1 x SFF-8088 | PCIe 3.0 x8 | 256 | JBOD |
| 9206-16e | LSI00299 (SGL) | LP MD2 | 16 | 4 x SFF-8644 | PCIe 3.0 x8 | 1024 | JBOD |
| 9201-16e | LSI00276 (SGL) | Full Height | 16 | 4 x SFF-8088 | PCIe 2.0 x8 | 1024 | JBOD |
| 9200-8e | LSI00188 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 2.0 x8 | 512 | JBOD |
| 9212-4i4e | LSI00192 (SGL) | LP | 8 | 4 x SATA x 1<br>1 x SFF-8088 | PCIe 2.0 x8 | 256 | 0, 1, 1E, 10, JBOD |
| 9201-16i | LSI00244 (SGL) | Full Height | 16 | 4 x SFF-8087 | PCIe 2.0 x8 | 512 | JBOD |
| 9211-8i | LSI00194 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 2.0 x8 | 256 | 0, 1, 1E, 10, JBOD |
| 9211-4i | LSI00190 (SGL) | LP MD2 | 4 | 1 x SFF-8087 | PCIe 2.0 x8 | 256 | 0, 1, 1E, 10, JBOD |
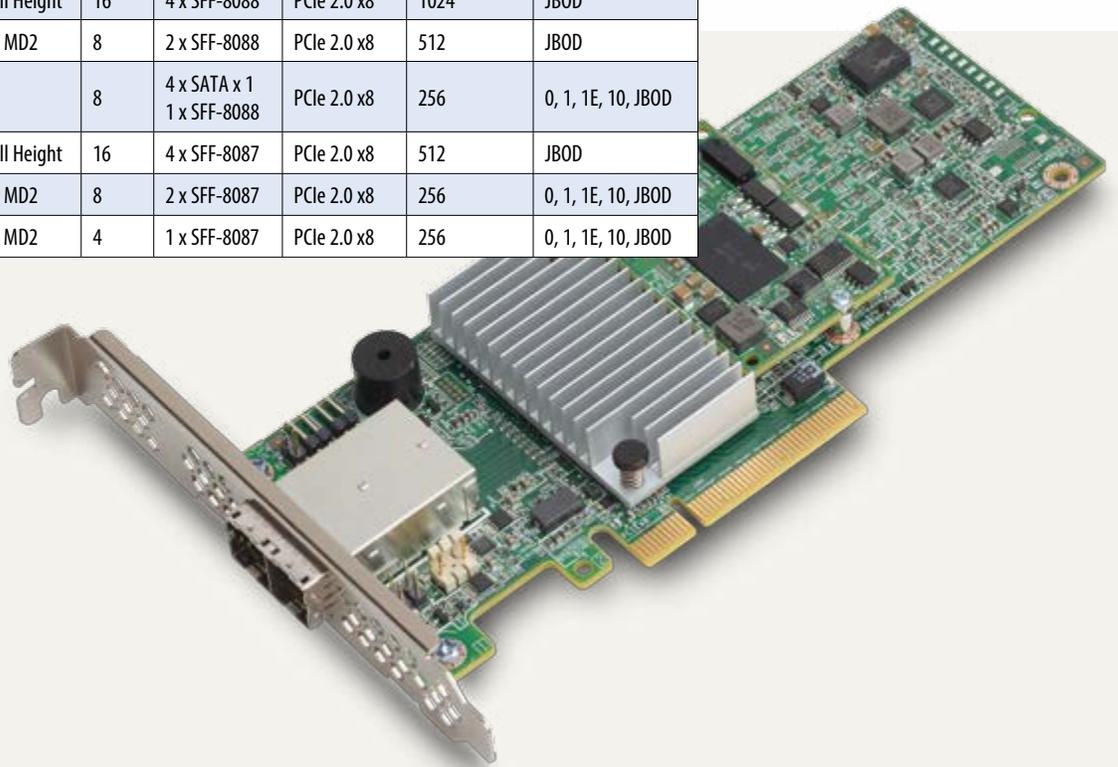
# MegaRAID Entry (iMR)

MegaRAID SAS entry controller cards provide trusted MegaRAID data protection and reliability for non-business critical applications. Offering the same management features and OS support as the mainstream MegaRAID lineup at an affordable price point, the entry controllers are great solutions for small and medium businesses (SMB) deploying entry-level server platforms and workstations.

| Product Name | Part Number | Form Factor | Ports | Connectors | Bus Interface | Processor | Cache Memory | Cache Protection |
|---|---|---|---|---|---|---|---|---|
| 12Gb/s SAS | | | | | | | | |
| 9341-4i | LSI00419 (SGL) | LP MD2 | 4 | 1 x SFF-8643 | PCIe 3.0 x8 | LSI SAS3008 | | |
| 9341-8i | LSI00407 (SGL) | LP MD2 | 8 | 2 x SFF-8643 | PCIe 3.0 x8 | LSI SAS3008 | | |
| 6Gb/s SAS | | | | | | | | |
| 9240-4i | LSI00199 (SGL) | LP MD2 | 4 | 1 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2008 | | |
| 9240-8i | LSI00200 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2008 | | |

# MegaRAID and 3ware RAID

Ensure critical data is protected and available with the most widely deployed RAID data protection architecture. Our broad range of MegaRAID and 3ware RAID controller cards are designed to address virtually all direct-attached storage environments where data protection, performance and expandability are crucial requirements – SATA or SAS, hard disk drives (HDDs) or solid state drives (SSDs), server-based storage or external direct-attached JBODs and storage enclosures.

| Product Name | Part Number | Form Factor | Ports | Connectors | Bus Interface | Processor | Cache Memory | Cache Protection |
|---|---|---|---|---|---|---|---|---|
| 12Gb/s SAS | | | | | | | | |
| 9361-4i | LSI00415 (SGL) | LP MD2 | 4 | 1 x SFF-8643 | PCIe 3.0 x8 | LSI SAS3108 | 1GB | LSICVM02 (optional) |
| 9361-8i | LSI00417 (SGL) | LP MD2 | 8 | 2 x SFF-8643 | PCIe 3.0 x8 | LSI SAS3108 | 1GB | LSICVM02 (optional) |
| 9380-4i4e | LSI00439 (SGL) | LP MD2 | 8 | 1 x SFF-8643 1 x SFF-8644 | PCIe 3.0 x8 | LSI SAS3108 | 1GB | LSICVM02 (optional) |
| 9380-8e | LSI00438 (SGL) | LP MD2 | 8 | 2 x SFF-8644 | PCIe 3.0 x8 | LSI SAS3108 | 1GB | LSICVM02 (optional) |
| 6Gb/s SAS | | | | | | | | |
| 9271-4i | LSI00328 (SGL) | LP MD2 | 4 | 1 x SFF-8087 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 LSICVM01 |
| 9271-8i | LSI00330 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 LSICVM01 |
| 9270-8i | LSI00326 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 |
| 9286-8e | LSI00332 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 |
| 9286CV-8e | LSI00333 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | CacheVault™ Included |
| 9266-4i | LSI00305 (SGL) | LP MD2 | 4 | 1 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 LSICVM01 |
| 9266-8i | LSI00295 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 LSICVM01 |
| 9285CV-8e | LSI00298 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 2.0 x8 | LSI SAS2208 | 1GB | CacheVault™ Included |
| 9260-4i | LSI00197 (SGL) | LP MD2 | 4 | 1 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
| 9260-8i | LSI00198 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
| 9261-8i | LSI00212 (SGL)) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
| 9260-16i | LSI00208 (SGL) | Full Height | 16 | 4 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
| 9280-8e | LSI00205 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
| 9280-16i4e | LSI00210 (SGL) | Full Height | 20 | 1 x SFF-8088 4 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
| 9280-24i4e | LSI00211 (SGL) | Full Height | 28 | 1 x SFF-8088 6 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 LSIiBBU08 |
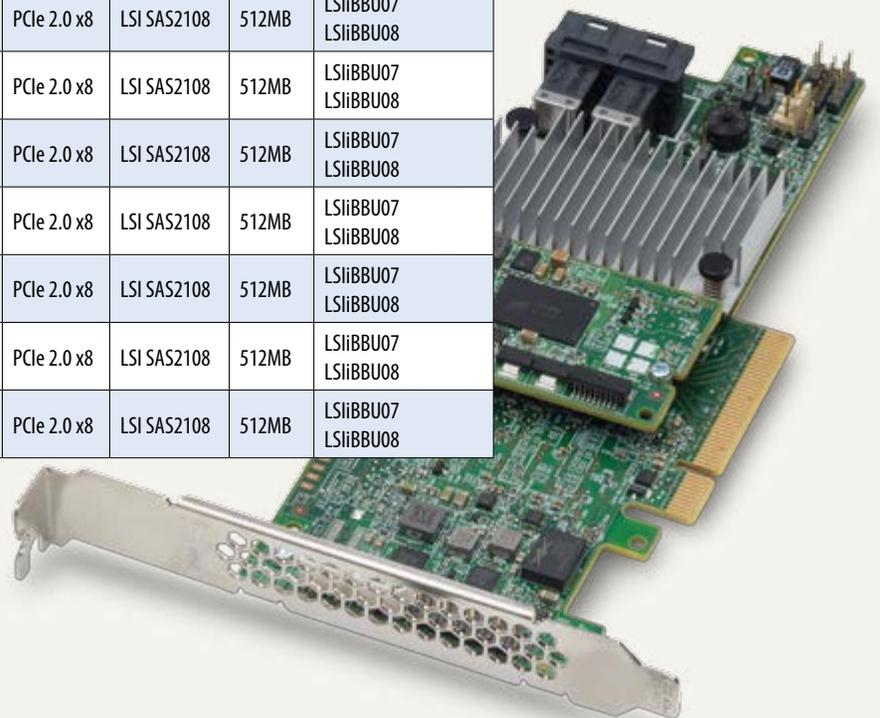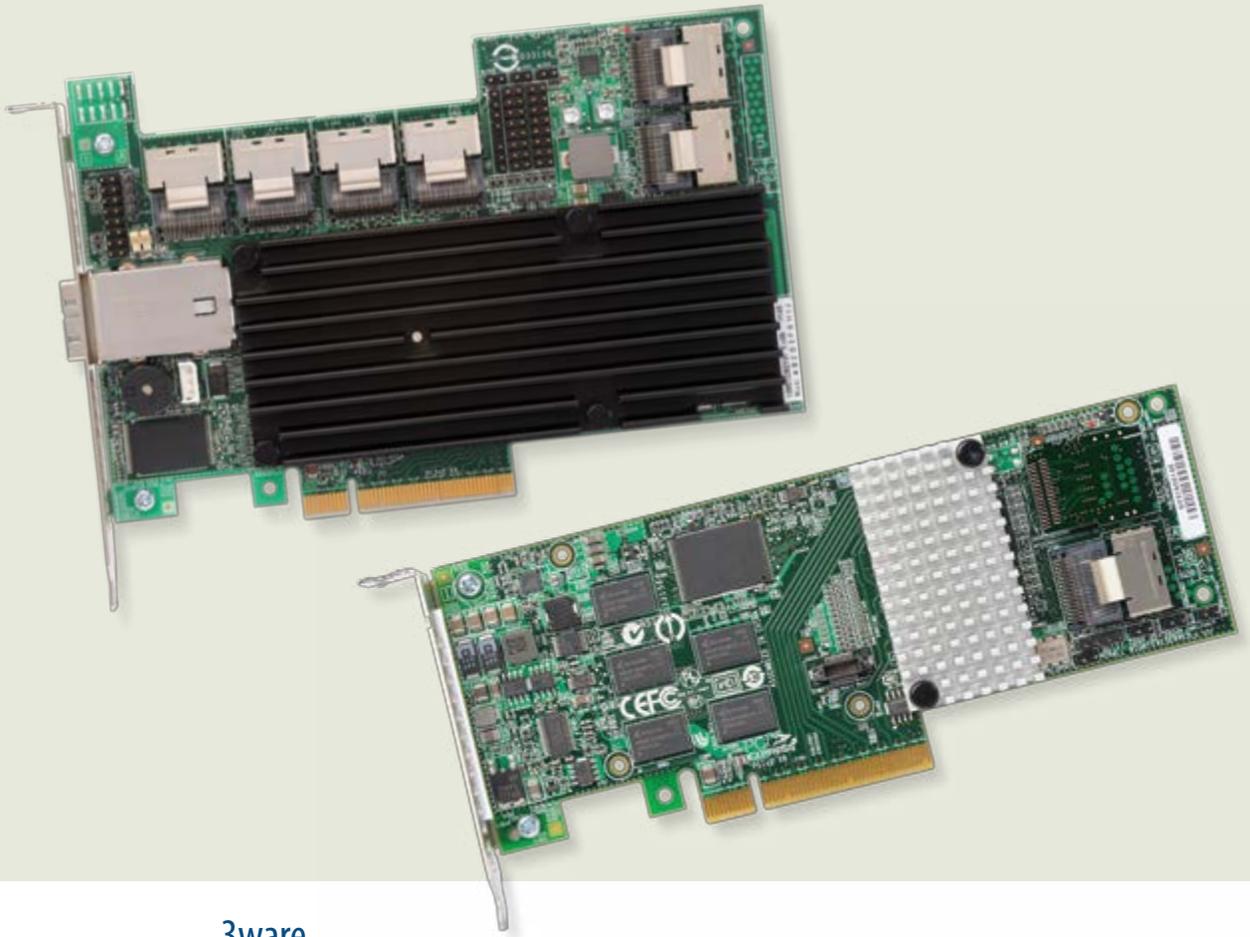
## 3ware

| Product Name | Part Number | Form Factor | Ports | Connectors | Bus Interface | Processor | Cache Memory | Cache Protection |
|---|---|---|---|---|---|---|---|---|
| 9750-24i4e | LSI00251 (SGL) | Full Height | 28 | 1 x SFF-8088 6 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 |
| 9750-16i4e | LSI00252 (SGL) | Full Height | 20 | 1 x SFF-8088 4 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 |
| 9750-8e | LSI00243 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 |
| 9750-4i4e | LSI00242 (SGL) | LP MD2 | 8 | 1 x SFF-8088 1 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 |
| 9750-8i | LSI00214 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 |
| 9750-4i | LSI00216 (SGL) | LP MD2 | 4 | 1 x SFF-8087 | PCIe 2.0 x8 | LSI SAS2108 | 512MB | LSIiBBU07 |

# SafeStore

Whether it is sensitive customer information, intellectual property or proprietary data that helps a company reach its strategic objectives, a company's data may be its most valuable asset. If this data is misplaced or stolen, organizations run the risk of lost revenue, legal implications and a tarnished reputation. With SafeStore software, businesses can be assured that the highest level of security is placed on their data, while preserving system performance and ease-of-use. Together with self-encrypting drives (SEDs), SafeStore software secures a drive's data from unauthorized access or modification resulting from theft, loss or repurposing of drives.

| | | |
|---|---|---|
| SafeStore™ Software | LSI00268 (SW License) | MR SAS 9260/9261/9265/9266/9270/9271/9280/9285/9286/9361/9380 series controllers |
| | LSI00245 (HW Key) | 9260 (-4i, -8i, -16i, CV-4i, CV-8i), 9280 (-8e, -4i4e, -16i4e, -24i4e) |
| | LSI00287 (HW Key) | 9265-8i, 9266 (-4i, -8i), 9270-8i, 9271 (-4i, -8i, -8iCC), 9285 (-8e, CV-8e), 9286 (-8e, CV-8e, CV-8eCC), 9361 (-4i, -8i), 9380 (-4i4e, -8e) |

# Cache Protection Options

RAID caching is a cost-effective way to improve I/O performance by writing data to a controllers' cache before it is written to disk. In write-back mode, data written to cache is vulnerable until it is made permanent on disk. To help avoid the possibility of data loss or corruption during a power or server failure, Avago offers the CacheVault flash cache protection module or the battery backup units for MegaRAID SAS controllers cards.

| Cache Protection Option | Part Number | Compatible Controller Cards |
|---|---|---|
| LSICVM02 | LSI00418 | 9361 and 9380 Series |
| LSICVM01 | LSI00297 | 9266 and 9271 Series |
| LSIiBBU09 | LSI00279 | 9265, 9266, 9270, 9271, 9285, and 9286 Series |
| LSIiBBU08 | LSI00264 | 9260, 9261 and 9280 Series |
| LSIiBBU07 | LSI00161 | 8880EM2, 9260, 9261, 9280 and 9750 Series |
| LSIiBBU06 | LSI00160 | 8704EM2, 8708EM2 |
| LSIiBBU05 | LSI00183 | 8704ELP, 8708ELP, 8888ELP |
| BBU-BRACKET-05 | LSI00291 | Remote Mounting Bracket for LSI BBUs and CacheVault Power Modules |
| Remote Cable/Interposer Kit | LSI00260 | Needed ONLY if require remote cable for LSIiBBU06/07 OR connecting LSIiBBU07/08 remotely to 9260-4i or 9260-8i |

# Syncro

As data volumes continue to grow, the need for a sharable, scalable storage solution that increases efficiency and uptime, while lowering costs and power usage, is now more important than ever.

Avago's Syncro solutions provide small to medium businesses (SMBs) needing a High Availability (HA) solution for their mission-critical applications, with an easier to deploy shared direct attached storage (DAS) solution. Syncro solutions are built on MegaRAID technology, designed to deliver uptime at the right price point.

| Product Name | Part Number | Form Factor | Ports | Connectors | Bus Interface | No. of Devices Supported | Cache Memory | Cache Protection |
|---|---|---|---|---|---|---|---|---|
| 12Gb/s SAS | | | | | | | | |
| Syncro 9361-8i | LSI00457 (KIT) | LP MD2 | 8 | 2 x SFF-8643 | PCIe 3.0 x8 | 96 | 2GB | CacheVault Included |
| Syncro 9380-8e | LSI00458 (KIT) | LP MD2 | 8 | 2 x SFF-8644 | PCIe 3.0 x8 | 96 | 2GB | CacheVault Included |
| 6Gb/s SAS | | | | | | | | |
| Syncro 9271-8i | LSI00392 (KIT) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 3.0 x8 | 96 | 1GB | CacheVault Included |
| Syncro 9286-8e | LSI00356 (KIT) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 3.0 x8 | 96 | 1GB | CacheVault Included |
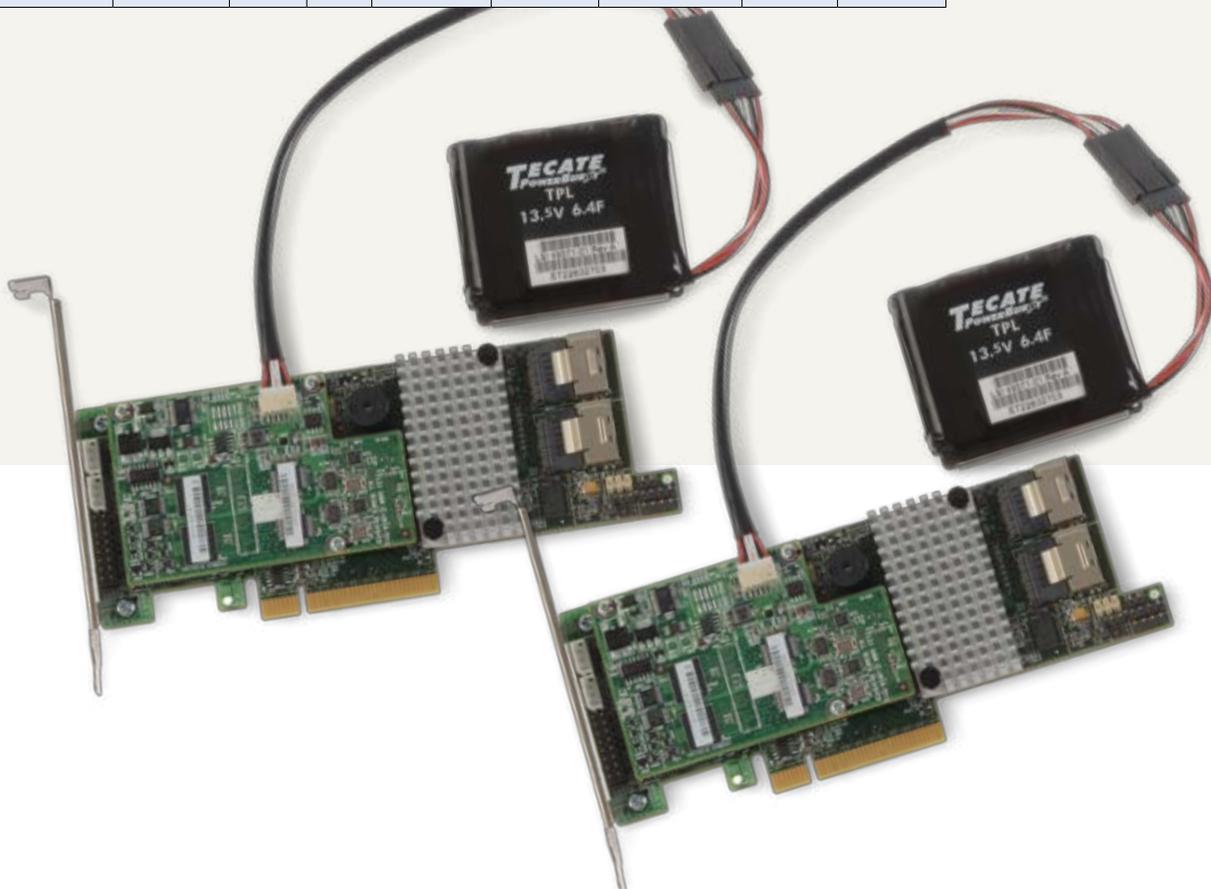
# CacheCade Pro 2.0

CacheCade Pro 2.0 software provides a combination of caching intelligence and trusted MegaRAID data protection to accelerate applications in direct-attached storage environments. When IT pushes hard disk drives (HDD) arrays to reach their I/O potential, data "hot spots" become inevitable. Utilizing a small solid state drive (SSD) investment as a front-side flash cache for the much larger disk array, CacheCade Pro 2.0 software dynamically keeps the "hottest" data in flash memory. This can dramatically improve read/write speeds and drop latency.

| | | |
|---|---|---|
| CacheCade® Pro 2.0 Software Pack | LSI00293 (SW License) | MR SAS 9260/9261/9265/9266/9270/9271/9280/9285/9286/9361/9380 series controllers |
| | LSI00292 (HW Key) | 9260 (-4i, -8i, -16i, CV-4i, CV-8i), 9280 (-8e, -4i4e, -16i4e, -24i4e) |
| | LSI00290 (HW Key) | 9265-8i, 9266 (-4i, -8i), 9270-8i, 9271 (-4i, -8i, -8iCC), 9285 (-8e, CV-8e), 9286 (-8e, CV-8e, CV-8eCC), 9361 (-4i, -8i), 9380 (-4i4e, -8e) |

## CacheCade Software-Enabled MegaRAID Boards

| Product Name | Part Number | Form Factor | Ports | Connectors | Bus Interface | Processor | Cache Memory | Cache Protection |
|---|---|---|---|---|---|---|---|---|
| 9271-8iCC | LSI00334 (SGL) | LP MD2 | 8 | 2 x SFF-8087 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | LSIiBBU09 LSICVM01 |
| 9286CV-8eCC | LSI00335 (SGL) | LP MD2 | 8 | 2 x SFF-8088 | PCIe 3.0 x8 | LSI SAS2208 | 1GB | CacheVault™ Included |
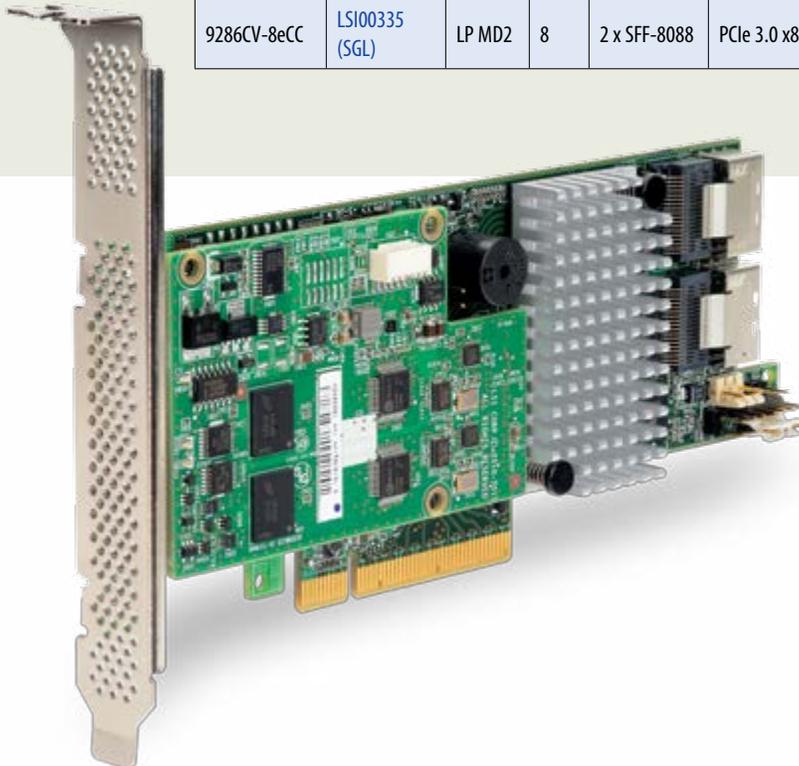
# Cables

| Cable Part Numbers | Length | Sideband Support | To Controller | To Drives/ Backplane | Compatible Controllers ( "i" = internal connectivity, "e" = external connectivity) |
|---|---|---|---|---|---|
| CBL-SFF8087-SATASB-06M | 0.6m | ✔ | SFF-8087 | Discrete | Internal connectivity:<br>MegaRAID 9280 (-4i4e, -16i4e, -24i4e)<br>MegaRAID 9271 (-4i, -8i, -8iCC)<br>MegaRAID 9270-8i<br>MegaRAID 9266 (-4i, -8i)<br>MegaRAID 9261-8i<br>MegaRAID 9260 (-4i, -8i, -16i)<br>MegaRAID 9240 (-4i, -8i)<br>SAS 9212-4i4e<br>SAS 9211 (-4i, -8i)<br>SAS 9207 (-4i4e, -8i)<br>SAS 9201-16i<br>3Ware 9750 (-4i, -8i, -4i4e, -16i4e, -24i4e)<br>Syncro CS 9271-8i (only SFF-8087 to SFF-8087Connection) |
| CBL-SFF8087-SATASB-10M | 1.0m | ✔ | | | |
| CBL-SFF8087OCF-05M | 0.5m | | SFF-8087 | Discrete | |
| CBL-SFF8087OCF-06M | 0.6m | | | | |
| CBL-SFF8087OCF-10M | 1.0m | | | | |
| CBL-SFF8087SB-08M | 0.8m | ✔ | SFF-8087 | SFF-8087 | |
| CBL-SFF8087SB-05M | 0.5m | ✔ | | | |
| CBL-SFF8087SB-06M | 0.6m | ✔ | | | |
| CBL-SFF8087-05M | 0.5m | | | | |
| CBL-SFF8087-06M | 0.6m | | | | |
| CBL-SFF8087-10M | 1.0m | | | | |
| CBL-SAS8087OCF-06M | 0.6m | | SFF-8087 | SFF-8482 | |
| CBL-RA8087SATASB-10M | 1.0m | ✔ | SFF-8087 (RA) | Discrete | Internal Connectivity:<br>3Ware 9750 (-16i4e, -24i4e)<br>MegaRAID 9280 (-16i4e, -24i4e) |
| CBL-RA8087SB-10M | 1.0m | ✔ | SFF-8087 (RA) | SFF-8087 | |
| CBL-RA8087-08M | 0.8m | | | | |
| CBL-RA8087-10M | 1.0m | | | | |
| CBL-SFF8088SAS-10M | 1.0m | | SFF-8088 | SFF-8088 | External connectivity:<br>MegaRAID 9286 (-8e, CV-8e, CV-8eCC)<br>MegaRAID 9285CV-8e<br>MegaRAID 9280 (-8e, -4i4e, -16i4e, -24i4e)<br>SAS 9212-4i4e<br>SAS 9207 (-4i4e, -8e), SAS 9206-16e<br>SAS 9201-16e, SAS 9200-8e<br>3Ware 9750 (-4i4e, -8e, -16i4e, -24i4e)<br>SAS6160 SAS Switch<br>Syncro CS 9286-8e |
| CBL-SFF8088SAS-20M | 2.0m | | | | |
| CBL-SFF8088ASAS-100M (Active) | 10m | | | | |
| CBL-SFF8088ASAS-200M (Active) | 20m | | | | |
| CBL-SFF8644-8088-10M | 1.0m | | SFF-8644 | SFF-8088 | External connectivity:<br>MegaRAID 9380 (-4i4e, -8e)<br>SAS 9300 (-4i4e, -8e, -16e)<br>SAS 9206-16e |
| CBL-SFF8644-8088-20M | 2.0m | | | | |
| CBL-SFF8644-8088-60M | 6.0m | | | | |
| CBL-SFF8644-10M | 1.0m | | SFF-8644 | SFF-8644 | |
| CBL-SFF8644-20M | 2.0m | | | | |
| CBL-SFF8644-60M | 6.0m | | | | |
| CBL-SFF8643-8087-06M | 0.6m | | SFF-8643 | SFF-8087 | Internal connectivity:<br>MegaRAID 9380-4i4e<br>MegaRAID 9361 (-4i, -8i)<br>MegaRAID 9341 (-4i, -8i)<br>SAS 9300 (-4i, -4i4e, -8i, -16i) |
| CBL-SFF8643-8087-08M | 0.8m | | | | |
| CBL-SFF8643-8087-10M | 1.0m | | | | |
| CBL-SFF8643-06M | 0.6m | | SFF-8643 | SFF-8643 | |
| CBL-SFF8643-08M | 0.8m | | | | |
| CBL-SFF8643-10M | 1.0m | | | | |
| CBL-SFF8643-SATASB-05M | 0.5m | ✔ | SFF-8643 | x4 SATA | |
| CBL-SFF8643-SATASB-06M | 0.6m | ✔ | | | |
| CBL-SFF8643-SATASB-10M | 1.0m | ✔ | | | |
| CBL-SFF8643-SAS8482SB-06M | 0.6m | ✔ | SFF-8643 | SFF-8482 | |
| CBL-RA8643-04M | 0.4m | | SFF-8643 (RA) | SFF-8643 | |

# Your Imagination. Our Innovation

Avago Technologies is a leading designer, developer and global supplier of a broad range of analog, digital, mixed signal and optoelectronics components and subsystems with a focus in III-V compound semiconductor design and processing. Backed by an extensive portfolio of intellectual property, Avago products serve four primary target markets: wireless communications, wired infrastructure, enterprise storage, and industrial and other. Avago has a global employee presence and rich heritage of technical innovation spanning over six decades.

Avago has strong market positions across a broad range of market segments with highly differentiated products that include:

- Film Bulk Acoustic Resonator (FBAR) Filters
- RF Front End Modules
- Parallel Optics Transceivers
- High Speed SerDes ASIC
- HDD Read Channel & Preamplifiers
- RAID and SAS I/O Controllers
- PCIe Switches
- Optocouplers
- Motion Encoders
- Industrial Fiber Solutions
- LED Display & Signage Solutions