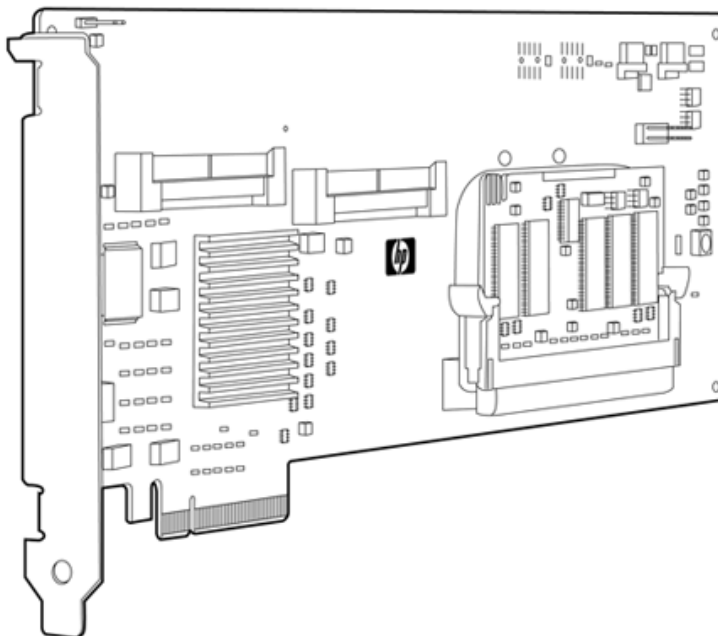# QuickSpecs

Overview

The HP Smart Array E200 is HP's first entry level PCI Express (PCIe) Serial Attached SCSI (SAS) RAID controller. The full size card has 8 ports and utilizes DDR1-266 memory. The E200 is ideal for RAID 0/1 and can be upgraded with the 128MB battery-backed write cache (BBWC) module for RAID 5.

Models

| HP Smart Array E200 Controller | HP Smart Array E200/64MB Controller | 409180-B21 |
| | HP Smart Array E200/128 BBWC Controller | 411508-B21 |

Upgrade Options

Cache Upgrade

NOTE: To upgrade the Smart Array E200/64 Controller to 128MB BBWC, please order PN 351580-B21. To upgrade the Smart Array E200i Controller to 128MB BBWC, please see the "Server Compatibility: Upgrade Options" section to determine which option is used for your server.

| 128MB Battery-Backed Write Cache | 351580-B21 |
| 128MB Battery-Backed Write Cache with Battery Housing | 346914-B21 |

Standard Features

The Smart Array Advantage	HP's innovative design and integration work within the Smart Array family of products creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HP Smart Array family brings an unparalleled return on investment through:
Data Compatibility	Data Compatibility with past and future generations of Serial Smart Array controllers allows for simple and easy upgrades any time needs for higher performance, capacity, and availability increase.
Consistent Configuration and Management Tools	All Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain HP server storage.
Universal Hard Drive	A universal hard drive is used across multiple HP ProLiant servers, disk enclosures and storage systems. With compatibility across many enterprise platforms, you are free to deploy and re-deploy these drives to quickly deliver increased storage capacity, migrate data between systems, and easily manage spare drives.
Pre-Failure Warranty	Pre-Failure Warranty means Systems Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HP Support Center or refer to your HP Server documentation.

Key Features

- Seamless upgrades from past generations and upgrades to next generation HP high performance and high capacity Serial Attached SCSI Smart Array controllers.
- 3G SAS technology delivers high performance and data bandwidth up to 300 MB\s per physical link and contains full compatibility with 1.5G SATA technology.
- x4 2.5G PCI Express host interface technology delivers high performance and data bandwidth up to 2 GB/s maximum bandwidth.
- Modular, easy-to-upgrade design lets you optimize performance by upgrading from 64MB cache to 128MB battery-backed write cache (BBWC).
- Addition of the battery backed cache upgrade enables BBWC, RAID 5, Capacity Expansion, RAID migration, and Stripe Size Migration.
- Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- Support for up to 2 TB in a single logical drive.
- Software consistency among all Smart Array family products: Array Configuration Utility (ACU), Option ROM Configuration for Arrays (ORCA), Systems Insight Manager, Array Diagnostic Utility (ADU) and SmartStart. Some of these features are not available with ProLiant 100 series platforms.
- The SA-E200 controller supports up to 8 drives. The SA-E200i supports 2-8 drives depending on the server implementation.

Standard Features

Online Management Features
- Online Capacity Expansion (with BBWC upgrade)
- Online RAID Level Migration (with BBWC upgrade)
- Online Stripe Size Migration (with BBWC upgrade)
- Mirror splitting and recombining
- Unlimited Global Online Spares Assignment
- User Selectable Expand and Rebuild Priority
- User Selectable RAID Level and Stripe Size
- User Selectable Read and Write Cache Sizes

Ports
- Eight (8) SAS physical links distributed across 2 internal x4 wide port connectors.

Performance

HP's High Performance Architecture sets new boundaries of industry performance expectations!

- 3G SAS (300MB/s bandwidth per physical link)
- x8 3G SAS physical links (compatible with 1.5G SATA)
- 64 MB or 128 MB DDR1-266 battery-backed cache provides up to 4.2 GB/s maximum bandwidth.
- x4 2.5G PCI Express host interface provides 2 GB/s maximum bandwidth.
- MIPS 32-bit Processor
- Read ahead caching
- Write-back caching (with battery-backed write cache upgrade

Capacity

Given the increasing need for high performance and rapid capacity expansion, the SA-E200 offers:

- Up to 4.5TB of total storage with 6 x 750GB SATA hard drives (3.5")
  NOTE: Support for a single logical drive is limited to 2TB.
- Up to 1.168TB of total storage with 8 x 146GB SFF SAS hard drives

Availability

Provides increased server uptime by providing advanced storage functionality:

- Online Capacity Expansion (with BBWC upgrade)
- Online RAID Level Migration (with BBWC upgrade)
- Online Stripe Size Migration (with BBWC upgrade)
- Global Online Spare
- Pre-Failure Warranty

Fault Prevention

The following features offer detection of possible failures before they occur, allowing preventive action to be taken:

- S.M.A.R.T.: Self Monitoring Analysis and Reporting Technology first developed at HP detects possible hard disk failure before it occurs, allowing replacement of the component before failure occurs.
- Drive Parameter Tracking monitors drive operational parameters, predicting failure and notifying the administrator.
- Dynamic Sector Repairing continually performs background surface scans on the hard disk drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.
- Smart Array Cache Tracking monitors integrity of controller cache, allowing pre-failure preventative maintenance.

Standard Features

Fault Tolerance
- Keeps data available and server running while a failed drive is being replaced; several fault tolerance configurations are supported including:
- RAID 5 (Distributed Data Guarding): This allocates one set of parity data across drives and allows simultaneous write operations. This level of fault tolerance can withstand a single drive failure without downtime or data loss.
  NOTE: RAID 5 is available with the 128MB BBWC option.
- RAID 1, 1+0 (Drive Mirroring): This allocates half of the drive array to data and the other half to mirrored data, providing two copies of every file. It is a high-performance RAID.

Fault Recovery

Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure

- On-Line Spares: There is no limit to the number of spare drives that can be installed prior to drive failure. If a failure occurs, recovery begins with an On-Line Spare and data is reconstructed automatically.
- DRAM ECC corrects against single bit data and address corruption.
- Battery-backed write cache upgrade provides for up to three days of battery power for data cache retention. The data backup duration could be extended anytime the server's auxiliary power is available during system power down.

Ease of Use

Consistency and Upgradeability make the Smart Array family unique in the industry:

- GUI based configuration, management and diagnostic software tools
- Common data format between generations of products
- Data migration between servers and external StorageWorks Modular Smart Array enclosures

Compatibility

Server Compatibility: HP SA-E200 Controller	For up to date compatibility, please see the following URL for complete Smart Array E200 Controller compatibility and support information: http://h18006.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html

Server Compatibility: Upgrade Options

128MB Battery-Backed Write Cache (PN 351580-B21) upgrade for the SA-E200i:

- HP ProLiant BL (BladeSystem)
    - ProLiant BL460c Server Blade
- HP ProLiant ML (expansion-optimized)
    - ProLiant ML350 G5

128MB Battery-Backed Write Cache with Battery Housing (PN 346914-B21) upgrade for the SA-E200i:

- HP ProLiant BL (BladeSystem)
    - ProLiant BL20p Server Blade G4
- HP ProLiant DL (rack-maximized)
    - ProLiant DL360 G5

Operating Systems

Microsoft® Windows™ 2000 (Server/Adv Server)
Microsoft Windows 2003 / R2 Standard Edition
Microsoft Windows 2003 / R2 Enterprise Edition
Microsoft Windows 2003 / R2 Standard x64 Edition
Microsoft Windows 2003 / R2 Enterprise x64 Edition
Microsoft Windows 2003 / R2 SBS
RedHat Enterprise Linux 3 (x86)
RedHat Enterprise Linux 3 (AMD64/EM64T)
RedHat Enterprise Linux 4 (x86)
RedHat Enterprise Linux 4 (AMD64/EM64T)
SUSE SLES 9 (x86)
SUSE SLES 9 (AMD64/EM64T)
Novell Netware 6.5 (Open Enterprise Server)
Novell Netware SBS
Solaris 9 for x86
Solaris 10 for x86
SCO UNIXWare 7.1.3
SCO UNIXWare 7.1.4
SCO Open Server 5.0.7
SCO Open Server 6.0
VMware ESX

Compatibility

Software Suite   All Smart Array products share a common set of configuration, management and diagnostic tools, including Array Configuration Utility (ACU), Array Diagnostic Utility (ADU), and Systems Insight Manager. This software consistency of tools reduces the cost of training for each successive generation of product and takes much of the guesswork out of troubleshooting field problems. These tools lower the total cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage.

Systems Insight Manager

- Powerful server and server options/storage manager tool
- Monitors over 1200 system wide parameters
- Configuration/Diagnostic Utilities
- SIM is only for the HP ProLiant 300, 500 and Blade series servers.

HP Array Configuration Utility (ACU)

- Powerful Web based configuration utility for all Smart Array controllers
- Provides a graphical view of HP drive array configurations
- Allows for management of multiple arrays over a secure internet connection from anywhere in the world
- Easy to use Wizards for configuration
- Runs offline for all supported Operating Systems on the ProLiant 300, 500 and Blade series and runs online for Windows and Linux. For online configuration of NetWare, use CPQONLIN.

HP Option ROM Configuration for Arrays (ORCA)

- A simple method for managing logical volumes during system power up by pressing F8 during POST
- Allows the ability to create arrays, logical volumes, and assign an online spare drive.
- Allows the ability to view and delete logical volumes
- Allows the ability to select the boot controller
- For advanced array configurations use ACU

HP Array Diagnostic Utility (ADU)

- In depth diagnostic and reporting utility for all Smart Array controllers
- Runs offline for all supported Operating Systems, and runs online for Windows and Linux in HP ProLiant 300, 500 and Blade series servers

Service and Support, HP Care Pack, and Warranty Information

Warranty	The warranty for this device is 3-years parts only.
	Pre-Failure Warranty: Drives attached to the Smart Array Controller and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. For complete details, consult the HP Support Center or refer to your HP Server Documentation.
Software Product Services	Standalone telephone support
	Rights to new license version
	Media and documentation updates
Hardware Product Services	Installation services
	On-site maintenance (includes warranty support)
	Response time upgrades during the warranty period
	Post-warranty coverage
	For additional hardware installation and maintenance information, please refer to the URL listed below: http://www.hp.com/hps/hardware/
Warranty Upgrade Options	Response - Upgrade on-site response from next business day to same day 4 hours
	Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days
	Duration - Select duration of coverage for a period of 1, 3, or 5 years
	Warranty upgrade options can come in the form of Care Packs, which are sold at the HP System level this product attaches too
HP Care Pack Information	HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage. Care Packs for this option is sold at the system level this option attaches too.
	HP Care Pack is not available for less than the product's warranty duration.
	HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
	HP Care Pack services are prepaid.
	For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL http://www.hp.com/hps/carepack/

Related Options

Hard Drives	Serial Attached SCSI (SAS) SFF Hot Plug	
	HP 36GB 3G SAS 10K SFF SP HDD	375859-B21
	HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
	HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
	SAS Hot Plug	
	HP 36GB 3G SAS 15K 3.5" SP HDD	375868-B21
	HP 72GB 3G SAS 15K 3.5" SP HDD	375870-B21
	HP 146GB 3G SAS 15K 3.5" SP HDD	375872-B21
	HP 300GB 3G SAS 15K 3.5" SP HDD	431944-B21
	Serial-ATA (SATA) SFF Hot Plug	
	HP 60GB 1.5G SATA 5.4K SFF HDD	379306-B21
	SATA Hot Plug	
	HP 80GB 1.5G SATA 7.2K 3.5" HDD	349237-B21
	HP 160GB 1.5G SATA 7.2K 3.5" HDD	349238-B21
	HP 250GB 1.5G SATA 7.2K 3.5" HDD	349239-B21
	HP 500GB 1.5G SATA 7.2K 3.5" HDD	395473-B21
	HP 750GB 1.5G SATA 7.2K 3.5" HDD	432341-B21
	SATA Non-Hot Plug	
	HP 250GB 1.5G SATA 7.2K NHP 3.5" HDD	411276-B21
	HP 160GB 1.5G SATA 7.2K NHP 3.5" HDD	411275-B21
	HP 80GB 1.5G SATA 7.2K NHP 3.5" HDD	383410-B21

NOTE: Go to the HP Hard Drive Compatibility table for complete drive compatibility information (http://www.hp.com/products/harddiskdrives). Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data.

Technical Specifications

Dimensions (not including bracket)	31.2 cm x 11.1 cm x 1.5 cm (12.3 in x 4.4 in x 0.6 in)
Disk Drive and Enclosure Interface	3G SAS (Serial Attached SCSI) 1.5G SATA (Serial ATA)
SAS Connectors	2 internal (SFF8484) x4 wide port connectors
Cache Memory Speed	DDR-1/266 MHz provides up to 4.2 GB/s maximum bandwidth.
Server Interface	x4 2.5G PCIe provides 2GB/s maximum bandwidth.
SAS Speed	x8 3G SAS provides 2.4GB/s maximum bandwidth.
Cache Memory	40-bit 64MB or 128MB cache: ECC protection, battery-backed, and transportable NOTE: The 64MB cache is not battery-backed or transportable.
Logical Volumes Supported	Up to 32 logical volumes
Maximum Volume Capacity	4.5TB (6 x 750GB) NOTE: Support for a single logical drive is limited to 2TB.
Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
RAID Support	RAID 5 (Distributed Data Guarding) NOTE: The 128MB BBWC upgrade is required to enable RAID 5 support. RAID 1, 1+0 (Striping & Mirroring) RAID 0 (Striping)
Upgradeable Firmware	Upgradeable Firmware