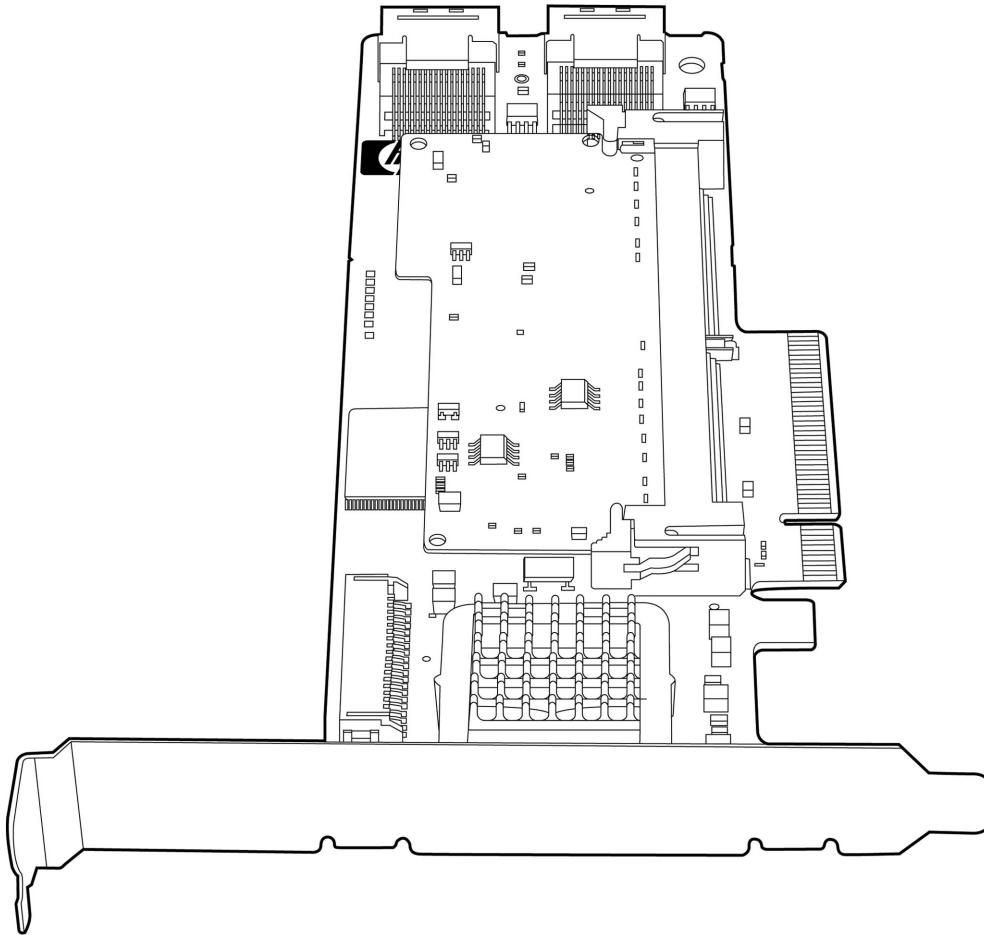


### Overview

The HP Smart Array P410 is an 8 Port Serial Attached SCSI (SAS) RAID controller. The P410 is designed for RAID applications and can be upgraded with the 512MB battery-backed write cache (BBWC) or 512MB / 1GB flash-backed write cache (FBWC) and the Smart Array Advanced Pack.



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### What's New

- Updating supported hard drives.
-

### Overview

#### Models

##### **HP Smart Array P410 Controller**

HP Smart Array P410/256 2-ports Int PCIe x8 SAS Controller	462862-B21
HP Smart Array P410/512 BBWC 2-ports Int PCIe x8 SAS Controller	462864-B21
HP Smart Array P410/512 FBWC 2-ports Int PCIe x8 SAS Controller	578230-B21
HP Smart Array P410/1G FBWC 2-ports Int PCIe x8 SAS Controller	572532-B21

### Standard Features

#### The Smart Array Advantage

HP's innovative design and integration work of 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** among all models of Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase. Even successive generations of Smart Array controllers understand the data format of other Smart Array Controllers.

**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 the HP server storage.

**Universal Hard Drive** form factor is for use across multiple HP 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** means HP 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

- The SA-P410 Controller supports up to 24 drives depending on the server implementation. Additional drives can be supported with cache and connection to the HP SAS Expander Card.
- Seamless upgrades from past generations and upgrades to next generation HP high performance and high capacity Serial Attached SCSI Smart Array controllers.
- 6Gb/s SAS technology delivers high performance and data bandwidth and contains full compatibility with 3Gb/s SATA technology.
- x8 PCI Express gen 2 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 40-bit 256MB cache to 72-bit 512MB battery-backed write cache (BBWC) or 72-bit 512MB/1G Flash Backed Write Cache (FBWC).
- Addition of the battery or flash backed cache upgrade enables array expansion, logical drive extension, RAID migration, and stripe size migration.
- Additionally, Smart Array Advanced Pack License key enables RAID 6 (ADG), 6+0, Advanced Capacity Expansion, Mirror Splitting and Recombining in Offline Mode, Drive Erase, Performance Optimization-Degraded Reads and Read Coalescing (VOD).
- Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- 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.
- Low-profile PCI Express form factor - ships with a full size bracket for deployment in either a low-profile or full sized slot.

### Standard Features

#### Management Features

- Online array expansion (with BBWC/FBWC upgrade)
  - Online Advanced Capacity Expansion (with BBWC/FBWC and Smart Array Advanced Pack upgrade)
  - Online logical drive extension (with BBWC/FBWC upgrade)
  - Online RAID level migration (with BBWC/FBWC upgrade)
  - Online strip size migration (with BBWC/FBWC upgrade)
  - Offline Mirror splitting and recombining (with BBWC/FBWC and Smart Array Advanced Pack upgrade)
  - Unlimited global online spare 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!

- 6Gb/s SAS [(600MB/s bandwidth per physical link)]
  - x8 6Gb/s SAS physical links (compatible with 3Gb/s SATA )
  - 256 MB 40-bit wide DDR2-800MHz cache upgradeable to 512 MB 72-bit wide DDR2-800MHz battery-backed write cache or 512 MB / 1 G 72-bitwide DDR2 flash backed write cache provides up to 4.2 GB/s maximum bandwidth
  - x8 PCI Express gen 2 host interface provides maximum bandwidth
  - Gen 2.0
  - Read ahead caching
  - Write-back caching (with BBWC/FBWC)
- 

**Native Command Queuing** Native Command Queuing (NCQ) is a technology designed to increase performance of SATA hard disk drives by allowing the individual hard disk to internally optimize the order in which received read and write commands are executed. This can reduce the amount of unnecessary going back-and-forth on the drive's heads, resulting in increased performance for workloads where multiple simultaneous read/write requests are outstanding, most often occurring in server or storage-type applications. Without NCQ the drive has to process and complete one command at a time. For NCQ to be enabled, it must be supported and turned on in the controller and in the hard drive itself.

**NOTE:** Please see the [SATA Hard Drive QuickSpecs](http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html) for specific SATA hard drive capacities that support NCQ:  
[http://h18000.www1.hp.com/products/quickspecs/11940\\_div/11940\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html)

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#### Capacity

Given the increasing need for rapid capacity expansion, the SA-P410 Controller can support up to 25 HDDs.

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### Standard Features

#### Availability

Provides increased server uptime by providing advanced storage functionality:

- Online RAID level migration (between any RAID level/with BBWC/FBWC)
- Online stripe size migration
- Online array expansion
- Online logical drive extension
- Online drive firmware upgrade
- Unlimited global online spare
- Pre-Failure Warranty

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#### 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 hard drive before a real 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.

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#### Fault Tolerance

Keeps data available and server running while a failed drive is being replaced; several fault tolerance configurations are supported including:

- **RAID 6 with ADG** (Advanced Data Guarding): This is the highest level of fault tolerance. It allocates two sets of parity data across drives and allows simultaneous write operations. This level of fault tolerance can withstand two simultaneous drive failures without downtime or data loss.
- **RAID 6+0**: Supported with min of 8 drives, but would have 4 available. Target benefit is to split RAID across the external boxes  
**NOTE: RAID 6, 6+0 can be enabled with either**
  - Minimum of 256 MB cache with Battery and Smart Array Advanced Pack License key option upgrades
  - Minimum of 512 MB BBWC/FBWC and Smart Array Advanced Pack License key option upgrades
- **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.
  - RAID5 is available on the SA P410/P410i with a minimum of 256MB cache and battery
- **RAID 5+0**: This is a RAID 0 array striped across 5 elements. Combines the straight block-level striping of RAID 0 with the distributed parity of RAID 5.
- **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.

### Standard Features

#### Fault Recovery

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

- Recovery ROM: This feature protects the user from a firmware image corruption by storing a redundant copy of the firmware image. If the active firmware image becomes corrupt, the controller will use the redundant firmware image and continue operating.
  - 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 detects and corrects data bit errors.
  - Battery-backed write cache upgrade provides for up to two 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.
  - Flash Backed Write Cache upgrade provides indefinite data retention.
- 

#### 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 Modular Smart Array enclosures
- 

#### 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.

#### 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

### Compatibility

#### Server Compatibility

For up to date compatibility, please see the following URL for complete Smart Array 1 Controller compatibility and support information:

<http://h18006.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html>

#### Operating Systems

Microsoft Windows 2003 x64 Edition  
Microsoft Windows 2003 x84 Edition  
Microsoft Windows 2008 Server x64  
Microsoft Windows 2008 Server x84  
Novell Open Enterprise Server, NetWare 6.5  
Red Hat Enterprise Linux 4 & 5 (x64 & x84)  
SUSE Linux Enterprise Server 9 (x64 & x84)  
SUSE Linux Enterprise Server 10 (x64 & x84)  
SUSE Linux Enterprise Server 11 (x64 & x84)  
VMWare

**NOTE:** For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix: <http://h18004.www1.hp.com/products/servers/linux/hplinuxcert.html>

#### Software Suite

All Smart Array products share a common set of configuration, management and diagnostic tools, including Array Configuration Utility, 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

##### 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 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 drives during system power up by pressing F8 during POST
- Allows the ability to create arrays, logical drives, and assign an online spare drive
- Allows the ability to view and delete logical drives
- 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

### Service and Support

#### Service and Support

#### **HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI**

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

#### **Protect your business beyond warranty**

When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

#### **HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively**

HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care—from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs—from purchase to equipment retirement.

Learn more: [www.hp.com/services/servers](http://www.hp.com/services/servers) and [www.hp.com/services/storage](http://www.hp.com/services/storage)

**NOTE:** Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at <http://www.hp.com/go/lookuptool>



### Service and Support

#### Recommended HP Care Pack Services for optimal satisfaction with your HP product

##### Recommended Services **Hardware Options Support**

HP Care Packs provide support for all HP-branded hardware options qualified for inclusion in your server or storage solution. Any additional HP-qualified options installed within the server are covered at the same service level and for the same period as the server and no additional cost.

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

##### **3-Year HP Hardware Support Onsite Service, 4-hour response, 24x7**

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE>

##### **HP Installation and Startup of HP ProLiant Servers**

Provides for the installation of your new HP ProLiant server and operating system to assist you in bringing your new HP ProLiant server and operating system into operation in a timely and professional manner.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Delivery of the service at a mutually scheduled time convenient to your organization
- Availability of an HP service specialist to answer basic questions during the onsite delivery of this service
- Custom installation as detailed in "Delivery specifications" or in a Statement of Work (SOW)
- Verification prior to installation that all service prerequisites are met

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982?7572ENN>

### Service and Support

#### Optional HP Care Pack Services that will enhance your HP product experience

##### Optional Services

##### **3-Year HP Hardware Support Onsite Call-to-Repair (CTR) Service, 6- or 24-hour**

As an alternative to our recommended support level, for customers who need committed call-to-repair for server hardware.

Provides your IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 or 24 hours of the initial service request to the HP Global Solution Center.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf>

##### **3-Year HP Support Plus 24**

As an alternative to our recommended support level, for customers who need access to responsive 24x7 hardware and software support plus software updates on HP and selected third party products:

For a higher return on your server and storage technology, our 3-year combined reactive support service delivers integrated onsite hardware/software support services available 24x7x365, including access to HP technical resources, 4-hour response onsite hardware support and software updates.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE>

##### **HP Proactive Select Service**

Customer needs on demand access to consulting, technical proactive services and education courses

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN>

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##### eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

##### **Support Portal**

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

##### **Features include:**

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: <http://www.hp.com/support>

### Service and Support

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

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### Customer Technical Training

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

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### HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

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### Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: [www.hp.com/services/proliant](http://www.hp.com/services/proliant) or [www.hp.com/services/bladeSystem](http://www.hp.com/services/bladeSystem) or <http://www.hp.com/services/storage>

### Related Options

#### Upgrade Options

<b>HP Optional Upgrades</b>	HP 512MB P-Series Battery Backed Write Cache Upgrade	462967-B21
	HP 650 mAh P-Series Battery	462969-B21
	<b>NOTE:</b> To enable BBWC on the 256MB cache.	
	HP 512MB Flash Backed Write Cache	534916-B21
	HP 1GB Flash Backed Cache	534562-B21
	HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	516471-B21
	<b>NOTE:</b> This part number can be used to purchase a single license or to order multiple licenses with a single activation key. Customers will receive a license entitlement certificate via e-mail. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HP Software Technical Support Services.	
	<b>NOTE:</b> A license key and a minimum of 256MB cache with battery kit or FBWC are required to enable features. For more information go to: <a href="http://www.hp.com/go/saap">http://www.hp.com/go/saap</a>	

**NOTE:** This is a list of supported options. Some may be discontinued.

#### HP Hard Drives

##### HP SAS Hot Plug Drives

**NOTE:** These drives are not supported by Gen8 servers.

##### SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

HP 1.2TB 6G SAS 10K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	693648-B21
HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	619291-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3 yr Warranty Hard Drive	627117-B21
HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
HP 72GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512545-B21

##### SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516828-B21
HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21

##### SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	605835-B21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507610-B21

##### SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives

HP 3TB 6G SAS 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	625031-B21
HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507616-B21
HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507614-B21

##### HP SAS Non-Hot Plug Drives

**NOTE:** These drives are not supported by Gen8 servers.

### Related Options

#### SAS Non-Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive	590698-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive	537809-B21
HP 72GB 6G SAS 15K rpm SFF (2.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive	537805-B21

#### SAS Non-Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives

HP 600GB 6G SAS 15K rpm LFF (3.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive	516830-B21
HP 450GB 6G SAS 15K rpm LFF (3.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive	516826-B21
HP 300GB 6G SAS 15K rpm LFF (3.5-inch) Non-hot Plug Dual Port Enterprise 3yr Warranty Hard Drive	516824-B21

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:

[http://h18000.www1.hp.com/products/quickspecs/12244\\_div/12244\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html) (Worldwide)

#### HP SATA Hot Plug Hard Drives

**NOTE:** These drives are not supported by Gen8 servers.

#### SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives

HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	571230-B21
HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	458945-B21

#### SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 3G SATA 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive	625609-B21
HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21

#### SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives

HP 4TB 3G SATA 7.2k rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	694374-B21
HP 3TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	628059-B21
HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	507632-B21
HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	454146-B21
HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458928-B21

#### HP SATA Non-Hot Plug Hard Drives

**NOTE:** These drives are not supported by Gen8 servers.

#### SATA Non-Hot Plug SFF (2.5-inch) Entry (ETY) Drives

HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Non-hot plug Entry 1yr Warranty Hard Drive	628033-B21
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#### SATA Non-Hot Plug LFF (3.5-inch) Entry (ETY) Drives

HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1yr Warranty Hard Drive	571232-B21
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#### SATA Non-Hot Plug SFF (2.5-inch) Midline (MDL) Drives

HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507753-B21
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#### SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives

### Related Options

HP 3TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot plug Midline 1yr Warranty Hard Drive	628063-B21
HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507774-B21
HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	507772-B21
HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1yr Warranty Hard Drive	458941-B21

**NOTE:** SATA hard drives have a 1-year warranty. Please see the QuickSpecs for Technical Specifications and additional information:  
[http://h18000.www1.hp.com/products/quickspecs/13021\\_div/13021\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html)  
 (Worldwide)

#### HP Solid State Drive

**NOTE:** These drives are not supported by Gen8 servers.

#### 6G SAS ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

HP 800GB 6G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Warranty Solid State Drive	690823-B21
HP 400GB 6G SAS Mainstream Endurance SFF 2.5-in ENT Mainstream 3yr Warranty Solid State Drive	690821-B21
HP 200GB 6G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Warranty Solid State Drive	690819-B21

#### 6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

HP 400GB 6G SATA Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	730063-B21
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#### 3G SATA MLC Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

HP 400GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636597-B21
HP 200GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636595-B21
HP 100GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636593-B21

#### 3G SATA MLC Non-hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

HP 400GB 3G SATA MLC SFF (2.5-inch) Non-hot plug Enterprise Mainstream 3yr Wty Solid State Drive	636605-B21
HP 200GB 3G SATA MLC SFF (2.5-inch) Non-hot plug Enterprise Mainstream 3yr Wty Solid State Drive	636601-B21
HP 100GB 3G SATA MLC SFF (2.5-inch) Non-hot plug Enterprise Mainstream 3yr Wty Solid State Drive	636599-B21

#### 3G SATA MLC Hot Plug LFF (3.-5inch) Enterprise Mainstream Solid State Drives

HP 400GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636611-B21
HP 200GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636609-B21
HP 100GB 3G SATA MLC LFF (3.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	636607-B21

#### 6G SAS SLC Hot Plug Enterprise Performance Solid State Drives

### Related Options

HP 400GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive	632494-B21
HP 200GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive	632492-B21
<b>6G SAS ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives</b>	
HP 800GB 6G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Warranty Solid State Drive	690823-B21
HP 400GB 6G SAS Mainstream Endurance SFF 2.5-in ENT Mainstream 3yr Warranty Solid State Drive	690821-B21
HP 200GB 6G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Warranty Solid State Drive	690819-B21
<b>6G SAS MLC Hot Plug Enterprise Mainstream Solid State Drives</b>	
HP 800GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	632506-B21
HP 400GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	632504-B21
HP 200GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive	632502-B21

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:

[http://h18000.www1.hp.com/products/quickspecs/14038\\_div/14038\\_div.html](http://h18000.www1.hp.com/products/quickspecs/14038_div/14038_div.html) (Worldwide)

**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.

**NOTE:** There is a known compatibility issue with some early 3.5" SATA HDD that will make them unable to be used with the SA-P400 controller. Customers should verify that they are not using hard drive part number 332649-002/003 (spare 353042-001), 332650-002/003 (spare 353043-001), or 356536-002/003 (spare 353044-001).

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

**NOTE:** Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

### HP Tape Backup

**NOTE:** For the complete range of tape drives, autoloaders, libraries and media see: <http://www.hp.com/go/tape>.

**NOTE:** For tape drives mounted in an internal peripheral bay an internal SAS cable is used to connect the tape drive to the P410 controller. For external (desktop) tape drives, tape drives in Rack-Mount Kits, tape autoloaders and tape libraries a split SAS cable is used with the external cable routed from the P410 controller through an unoccupied server PCI expansion slot to the tape drive.

### SAS Tape Drives

HP DAT 160 SAS Internal Tape Drive	Q1587A
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### Related Options

HP DAT 160 SAS External Tape Drive	Q1588A
HP DAT 320 SAS Internal Tape Drive	AJ830A
HP DAT 320 SAS External Tape Drive	AJ828A
HP Ultrium 448 SAS Internal Drive	DW085A
HP Ultrium 448 SAS External Drive	DW086A
HP Ultrium 920 SAS Internal Tape Drive	EH847A
HP Ultrium 920 SAS External Tape Drive	EH848A
HP LTO-4 Ultrium 1760 SAS Internal WW Tape Drive	EH919A
HP LTO-4 Ultrium 1760 SAS External Tape Drive	EH920A
HP LTO-4 Ultrium 1760 SAS (1) in 1U Rack-mount Kit	EH946A
HP LTO-4 Ultrium 1840 SAS Internal Tape Drive	EH860A
HP LTO-4 Ultrium 1840 SAS External WW Drive	EH861A
<b>SAS Rack-mount Tape Drive Enclosures</b>	
HP 1U SAS Rack-mount Kit	AE459A
<b>NOTE:</b> The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS and LTO-4 Ultrium 1760 SAS tape drives.	
HP 3U SAS Rack-mount Kit	AG576A
<b>NOTE:</b> The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple SAS tape drives including DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS, LTO-4 Ultrium 1760 SAS and LTO-4 Ultrium 1840 SAS tape drives.	
<b>SAS Tape Autoloaders</b>	
HP 1/8 G2 LTO-4 Ultrium 1760 SAS Tape Autoloader	AK377A
HP 1/8 G2 Ultrium 920 SAS Autoloader	AH558A
<b>SAS Tape Libraries</b>	
HP MSL2024 1 LTO-4 Ultrium 1760 SAS Tape Library	AK378A
HP MSL2024 Ultrium 920 SAS Tape Library	AH559A
HP MSL4048 2 LTO-4 Ultrium 1760 SAS Tape Library	AK380A
HP StorageWorks MSL4048 Ultrium 920 SAS Tape Library	AH560A
HP MSL8096 2 LTO-4 Ultrium 1760 SAS Tape Library	AK382A
HP StorageWorks MSL8096 2 Ultrium 920 SAS Tape Library	AH561A
<b>SAS Cables for Tape Drives</b>	
HP Mini-SAS Cable for LTO Internal Tape Drive	AP746A
<b>NOTE:</b> Use this cable to connect HP Ultrium 448, 920, 960, 1760 and 1840 SAS internal tape drives to Mini-SAS (SFF8087) ports. This replaces the existing cable connecting the HBA/controller to the disk backplane. This replacement cable has three channels for disks and 1 channel for the tape drive (SFF8482 port).	
HP SAS MIN-MIN 3X1X-5M Cable Assembly Kit	AG452A
<b>NOTE:</b> This split cable connects internally to SAS Hard Drive Cage (3 channels) and externally to the tape drive (1 channel) with other connector attaching to the controller. The external cable, for the drive, requires a PCI slot to exit the server.	



### Related Options

#### HP Cable Options

#### Mini SAS Cables

HP Mini SAS to Mini SAS 28in Cable Assembly	496013-B21
HP Mini SAS to Mini SAS 33in Cable Assembly	496014-B21
HP Mini SAS to 8484 18in/24in Cable Assembly	496015-B21
HP Mini SAS to 8484 32in/35in Cable Assembly	496016-B21

#### Additional Cables

HP 15 Position 24in SFP Battery Cable Assembly	496029-B21
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### Technical Specifications

<b>Dimensions</b> (not including bracket)	Low Profile PCIe Form Factor 7.5 in x 9.5 in x 2.25 in (19.05 cm x 24.13 cm x 5.72 cm)
<b>Disk Drive and Enclosure Interface - Transfer rate</b>	6Gb/s SAS (Serial Attached SCSI) 3Gb/s SATA (Serial ATA)
<b>SAS Connectors</b>	2 internal (Mini-SAS) x8 wide port connectors
<b>Cache Memory Speed</b>	DDR2-800MHz with 40 or 72-bit wide bus provides up to 4.2 GB/s maximum bandwidth.
<b>Server Interface</b>	x8 5G PCIe 2.0 provides 4GB/s maximum bandwidth
<b>SAS Speed</b>	x8 6Gb/s SAS provides 4.8GB/s maximum bandwidth
<b>Cache Memory</b>	40-bit 256MB ECC protected cache (72-bit 512MB BBWC or 72-bit 512MB and 1G FBWC module upgrades available); transportable with battery-backed or flash upgrade
<b>Logical Drives Supported</b>	Zero Memory, Up to 2 logical volumes 256MB cache and greater, Up to 64 logical volumes
<b>Host Memory Addressing</b>	64-bit, supporting greater than 4GB server memory space
<b>RAID Support</b>	RAID 6, 6+0 (Advanced Data Guarding) <b>NOTE:</b> RAID 6, 6+0 can be enabled with either <ul style="list-style-type: none"><li>• Minimum of 256 MB cache, Battery kit and Smart Array Advanced Pack License key option upgrades</li><li>• Minimum of 512 MB BBWC/FBWC and Smart Array Advanced Pack License key option upgrades</li></ul> RAID 5, 5+0 (Distributed Data Guarding) <b>NOTE:</b> A minimum of 256 MB cache and battery are required to enable RAID 5, 5+0 support of the Smart Array P410i RAID 1+0 (Striping & Mirroring) RAID 0 (Striping)
<b>Upgradeable Firmware</b>	Upgradeable Firmware with recovery ROM feature

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<b>Environment-friendly Products and Approach</b>	<b>End-of-life Management and Recycling</b>	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.  The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
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### Technical Specifications

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.