

### Overview

The HP StorageWorks 4/256 SAN Director is an advanced B-series director-class switch, which provides high reliability, performance and scalability for Storage Area Networks (SANs) in mission critical enterprise environments.

The 4/256 SAN Director provides a 4Gb/s backplane with industry-leading 10Gb, 8Gb, and 4Gb/s Fibre Channel port speeds. It delivers leading performance and scalability with up to 384 ports in a single domain. The high-performance architecture provides auto-speed negotiation to support legacy 1, 2, and 4 Gb/s server and storage devices for maximum flexibility. An 8Gb Fibre Channel blade also provides the ability to aggregate up to eight 8 Gb/s ports to create an Inter-Switch Link (ISL) trunk (optional software) for up to an unprecedented 64 Gb/s of bandwidth. For organizations with dark fiber, a 10Gb blade enables them to fully utilize 10Gbit/sec links via dark fiber. In most cases today, a leased 10Gbit/sec link is underutilized because organizations can transmit only 4 Gbit/sec Fibre Channel traffic over a 10 Gbit/sec connection.

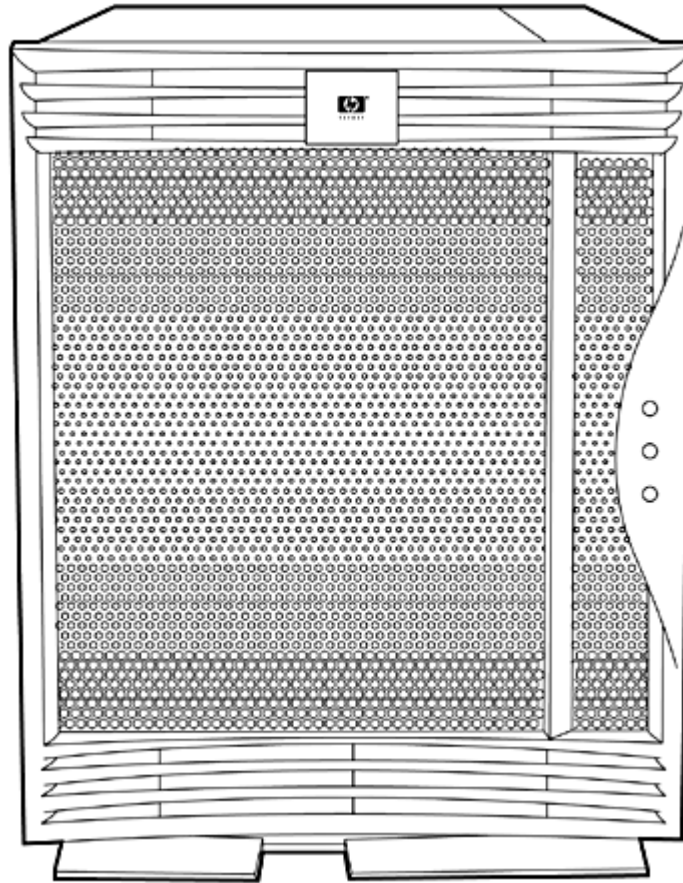
With Extended Fabric software (optional) distance support for extended applications has been increased to support distances up to 500 kilometers depending on speed. The director also extends the distance for data transferred through ISL Trunking which enables new levels of performance between data centers.

The 4/256 SAN Director is designed for continuous operation and supports "five-nines" (i.e., 99.999%) availability. The director is engineered with built-in redundancy; FRUs capable of hot-swap install/de-install, and non-disruptive hardware and software upgrades concurrent with operation.

The unique industry-leading capabilities position the Director Switch and the B-series product family to be the standard solution for Corporate and Enterprise SANs. Administrators concerned with the threats of unauthorized SAN access and unauthorized SAN configuration changes can use security capabilities built into the ASIC and software. Plus, they can use the optional Power Pack set of tools to monitor the network's health and performance. Available pre-configured on the switch or as an upgrade, Power Pack also provides the foundation for integration into HP storage management tools, enabling infrastructure management through a single-pane-of-glass. The Power Pack tools can be ordered separately, as well.



### Overview



### What's New

Supports the HP Factory Express racking capability through the use of a factory integration option.

### Key Features and Benefits

- **Outstanding scalability and performance**
  - Delivers up to 384 4 Gb/s ports or 128 8 Gb/s ports in a single domain and a 14U enclosure
  - Greater trunking bandwidth and distance support
  - Optimized fabric performance and load balancing by automatically routing of data to most efficient path
- **State of the art reliability**
  - Meets ultra-high availability requirements with redundant, hot-pluggable components, no single point of failure, and non-disruptive software upgrades
- **Reduced total Cost of Ownership (TCO) for SAN Infrastructure**
  - Enables storage consolidation, simplified management of data center SAN environment
  - Low Cost Server connectivity via iSCSI minimizes cost of connecting second tier assets
- **Broadest range of compatibility with SAN products**
  - Multi-vendor server and storage environment
  - Widest range of HP SAN solutions
  - Backward compatible with previously installed 1Gb, 2Gb, and 4Gb SAN Switches
  - Interoperability with the more than 3.0 MILLION port HP SAN Switch installed base



### Overview

- Interop mode support with M-series M-EOS and B-Series FOS based SAN fabrics
- **Flexible SAN Services**
  - 4Gb Fibre Channel routing services
  - FCIP Services for SAN Extension featuring:
    - Hardware assisted traffic forwarding for greater performance
    - Hardware-based Encryption for greater security (optional)
- **HP Power Pack (Optional) - highest supported modular functionality**
  - Trunking - highest throughput between switches (32Gb/sec)
  - Proactive threshold monitor (Fabric Watch)
  - Advanced Performance Monitor
  - Support for extended distance (Extended Fabrics)
- **Broadest Range of HP Packaged SAN Services**
  - Mission critical SAN Services SAN-ES
  - Assessment and installation services for security



### Product Highlights

#### 4/256 SAN Director and 4/256 Power Pack

- 384-port single-domain 4 Gb/s director that enables high-port-count SANs with fewer domains
- Flexibility to build a high-port-count or highest-performing director with 4Gb 48, 32 and 16-port blades and 8Gb 16 port blades
- Full performance at 4 Gb/s across 128 ports using 16-port 4 Gb/s blades, providing excellent performance
- Full performance at 2 Gb/s across 256 ports using 32-port 4 Gb/s blades, providing leading performance and port density
- 3 to 1 maximum oversubscription ratio with 48-port 4 Gb/s blades for outstanding fan-out scalability
- Local switching capability on every port for each port blade providing full 4 Gb or 8Gb bandwidth
- Enhanced control processors with approximately twice the processing power and an optimized memory bus for more powerful fabric services processing
- Automatic port speed negotiation at 1, 2, 4, and 8 Gb/s to help ensure seamless integration and interoperability with existing networked storage environments
- "Five-nines" availability and reliability
- Built-in redundancy with no single point of failure for AC power input, power supplies, and cooling blowers, as well as control processors with stateful failover
- Concurrent hardware and software upgradeability with hot code loading and activation
- Hot-swappable Field-Replaceable Units (FRUs)
- Employs (optional) Inter-Switch Link (ISL) Trunking to provide high-speed data path between switches
- Integrates fully with HP OpenView storage management products
- Ships with two power supplies and control processors
- Ships with zero ports; flexibility to configure the Director with either 16-port, 32-port or 48-port, Multi-Protocol blade and/or iSCSI 4Gb/s blades
- Outstanding flexibility with 4Gb routing services, FCIP SAN extension services, and iSCSI support
- Designed for E\_Port interoperability with B-Series or M-Series fabrics

#### SAN scalability

Scales up to 384 ports in a single switch domain, participating in large core-to-edge fabrics. Please see the following web site for SAN configuration support information:  
<http://www.hp.com/go/SANDesignGuide>

#### High-availability features

- Redundant, hot-swappable components
- Redundant power and cooling subsystems
- Enhanced data integrity on all data paths
- Fabric Shortest Path First (FSPF) rerouting around failed links
- Integration with SNMP managers
- Automatic Control Processor fail over
- Non-disruptive "hot" software code loads and activation
- Easy configuration, save and restore
- Remote Monitoring of entire data center via Instant Support Enterprise Edition (ISEE)



### Product Highlights

- Advanced Fabric Services**
- ISL Trunking (optional)
  - Hardware Enforced Zoning
  - Frame Filtering
  - Web Tools
  - Enhanced Group Management (EGM)
  - End-to-End Performance Analysis (optional)
  - Extended Fabrics (optional)
  - Fabric Watch (optional)
  - Data Center Fabric Manager (optional)

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### Cabinet Support

22U, 36U, and 42U; 5000, 9,000 and 10,000 series StorageWorks Cabinets are supported  
25U, 33U, and 41U HP system/e cabs

**NOTE:** A maximum of two Director switches currently are supported to ship configured to order from the factory in a StorageWorks 42U, 10000 (10KG2) cabinet. The Standard internal PDUs provided with StorageWorks cabinets CANNOT be used for the SAN Director when configured in a StorageWorks 42U, 10000 series cabinet. Two 30 AMP, 200-240V, L6-30p PDUs are required per cabinet. The part number for the required 30 AMP PDU is E7681A (E7681-63001).

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### Software Components, Standard

#### Remote Switch

The Remote Switch fabric functions with the aid of a bridging device, or network bridge. The network bridge supports Fibre Channel physical interfaces, as well as secondary non-Fibre Channel FCIP physical interfaces.

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#### Frame Filtering

An ASIC based capability in the 4 Gb family of SAN switches that enables new applications and features. The switch has the ability to "view" the first 64-bytes of the Fibre Channel frame. At this time, Frame Filtering enables advanced capabilities such as Advanced Zoning and Advanced Performance Monitoring (optional).

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#### Advanced Zoning

In the 2Gb generation of switches, WWN Zoning and Access Control are enforced by hardware that provides the same simple administration previously enforced only with software. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.

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#### WebTools

WebTools is an intuitive and easy-to-use graphical interface that enables organizations to monitor and manage HP SAN switch fabrics. SAN administrators can perform management tasks by using a Java-capable Web browser from standard laptops, desktop PCs, or workstations from any location within the enterprise.

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### Product Highlights

#### EGM

Enhanced Group Management (EGM) is a FOS license that is included with all B-Series switches and enables multi-switch operations. It helps automate operations across multiple switches to save time and streamline repetitive operations, which are typically prone to error. EGM drives consistency across fabrics, while minimizing the risk associated with potential downtime due to configuration mismatches. EGM provides streamlined troubleshooting for more effective fabric monitoring and diagnosis.

Both Data Center Fabric Manager Professional and Enterprise enable EGM functionality. Customers have EGM functionality enabled within the hardware product and need only to make the decision around which management application is right for them - Data Center Fabric Manager Professional or Enterprise.

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### Software Components, Optional

**SAN Director Power Pack Software Bundle** The SAN Director Power Pack Software bundle includes:

- Extended Fabric
- ISL Trunking
- Advanced Performance Monitoring
- Fabric Watch

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#### Extended Fabric

Extends all of the scalability, reliability, and performance benefits of Fibre Channel Storage Area Networks (SANs) beyond the native 10 km distance specified by the Fibre Channel standard.

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#### Data Center Fabric Manager Professional

HP StorageWorks Data Center Fabric Manager Professional is a server based management application available at no-charge and comes with B-series SAN Switches and includes the following features:

- Allows management of a single Fabric OS (FOS) fabric (up to a 1,000 B-Series switch ports) at a time
- Performs group switch management beyond the scope of Web Tools
- Does not offer management of the DC SAN Backbone Director

It is targeted for SMB customers that use FOS based SAN fabrics and require a management solution for smaller SANs based on a single fabric.

SMB customers that initially start off with Data Center Fabric Manager Professional and have a small SAN environment may over time feel the need for an enterprise-class product (Data Center Fabric Manager Enterprise) as their environments start to grow in size and complexity, and as they start to uptake more enterprise-class functionality (such as Fibre Channel Routing, FCIP, etc.). A non-disruptive upgrade path is available from Data Center Fabric Manager Professional to Data Center Fabric Manager Enterprise.



### Product Highlights

#### Data Center Fabric Manager Enterprise

HP StorageWorks Data Center Fabric Manager Enterprise is the enterprise-class product that supports FOS products as well as FOS and M-EOS products together. It provides complete DC SAN Backbone Director management including enterprise-class features/environments such as FICON, Fibre Channel Routing, FCIP, adaptive networking, etc.

It delivers unprecedented scalability (up to 24 fabrics and 9,000 switch ports) compared to the existing products.

It offers brand-new features including Adaptive Networking features for quality of service, ingress rate limiting and traffic isolation zones.

Data Center Fabric Manager Enterprise requires at least one FOS based B-series SAN switch in the SAN. While DCFM provides increased functionality, not all features available in FM or HAFM are available in DCFM, and some functions may operate differently. Please refer to the Migration and Transition guide for additional information.

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#### ISL Trunking

For high performance enhanced Trunking, this optional license logically groups up to eight E-ports to provide a high bandwidth trunk between two switches. Each 4 Gb switch needs its own license. The switch operating system views the trunk as a single, high bandwidth resource (up to 32 Gb) when routing connections between switches. Connections are load-balanced across the individual links, which comprise the logical trunk group.

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#### Advanced Performance Monitor

This enabling technology helps administrators monitor and watch specific fabric metrics -- from a SID (Source ID) to a DID (Destination ID) -- so they can fine-tune and scale the fabric more efficiently. Plus, Advanced Performance Monitoring includes the ability for early warning detection of hot spots within the fabric, a powerful tool for maintaining overall balanced performance.

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#### Fabric Watch

Fabric Watch enables each switch to monitor the SAN for potential faults and automatically alert network managers to problems before they become failures. Fabric Watch tracks a variety of SAN fabric elements, events, and counters. Monitoring fabric-wide events, ports, SFPs, and environmental parameters permits early fault detection and isolation as well as performance measurement. Each switch in the SAN needs its own Fabric Watch license.

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#### HP StorageWorks 4/256 SAN Director FICON CUP Active License

Ficon Director Switching provides Fibre Channel and FICON intermix, FICON Control Unit Port (CUP), and FICON cascading for more than one 4/256 SAN Director in XP Storage Array environments. The license feature provides Control Unit Port (CUP) in-and management function designed to allow mainframe applications to perform configuration, monitoring, management and statistics collection. These applications include System Automation for OS/390 (SA/390), Dynamic Channel Management Facility (DCM) and Resource Management Facility (RMF). Hardware-enforced FICON and FCP port zoning enhances separation with intermix operation.

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### Product Highlights

#### HP StorageWorks MP Blade Performance Extension LTU

Optional software license to activate the high performance extension services. The HP MPR Blade provides two types of SAN Services:

Optional software license to activate the FCIP SAN services. The HP MPR Blade provides two types of SAN Services:

FC-FC Subnet Routing Service for SAN island consolidation: Logically connect devices in multiple SAN fabrics to share storage resources-from any fabric regardless of distance-with the administration and fault isolation benefits of separately managed fabrics

FCIP Tunneling Service for SAN extension over distance: Seamlessly and reliably extend HP B-Series SANs across MAN and WAN IP networks with high performance FCIP services, fully integrated with HP CA solutions for EVA and XP. Configurable hardware-based encryption is also available in for the FCIP service with FOS v5.2 or later.





### Service and Support, HP Care Pack, and Warranty Information

#### Warranty

2-2-2) Hardware Warranty - Hardware Warranty - Two-year on-site warranty, 24x7, 4-hour remote response, installation not included.

**NOTE:** The hardware warranty covers firmware and embedded non-saleable software.

Saleable software carries its own warranty, see below.

Software Warranty - HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.

**EXCLUSIVE REMEDY:** The entire liability of HP and its suppliers and your exclusive remedy for software that does not conform to this Limited Warranty shall be the repair or replacement of the defective media. This warranty and remedy are subject to your returning the defective media during the warranty period to HP in the country in which you obtained the software.

#### HP Care Pack Services. Scalable, Flexible, Dependable. Like your storage.

Your storage is evolving. Get scalable support that evolves with it. HP Care Pack Services is an easy-to-buy, easy-to-use portfolio of packaged services covering your lifecycle needs. You can rely on our highly skilled, HP certified professionals to offer a breadth of expertise across leading storage technologies, and work side by side with you for optimal results. Push services beyond expectations and choose support that meets the changing needs of your business with the same reliability, scalability and flexibility you demand of your storage.

#### Protect your business beyond the warranty

Standard warranty protects against product defects and some causes of downtime. HP Care Pack Services helps you proactively guard against unplanned downtime which can reduce your productivity and profitability. By using a standard approach to warranty uplifts, such as HP Care Pack Services, customers can be more sure of consistency of operations for both mission-critical and standard business computing.

#### Extending warranties with HP Care Pack Services

The key to normalizing the warranty of combined solutions-is making service uplift simple: HP Care Pack Services. This portfolio of predefined packages, extending across the entire IT lifecycle, offering consulting, education, technical support, optimization, risk assessment, and more. It's entirely flexible allowing customers to extend the cover to the precise level of support required. Customer's standard hardware warranty, for example, can be upgraded to next-business-day response, to same-day coverage, or even to a committed six-hour call-to-repair service available 24 hours every day of the week.

Provide consistent, predictable levels of support across your entire department or business

Give you direct access to proven technical and problem-solving expertise

Offer a choice of response-time and repair-time commitments

Are available whenever and wherever you do business

For many products, post-warranty HP Care Pack Services are available when your original warranty has expired. Choose the support levels that meet your business requirements, from basic to mission-critical. <http://www.hp.com/hps/storage>

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

**Recommended Services** HP Care Pack Services recommended for optimal satisfaction of all deployments of your product.

**3-Year HP Support Plus 24** 24x7x365 hardware and software services - plus cost-saving software updates and more

HP Support Plus 24 helps you increase performance and availability with comprehensive, consistent hardware and software services. Working with your IT team, HP Services engineers deliver onsite hardware support and



### Service and Support, HP Care Pack, and Warranty Information

over-the-phone software support around-the-clock 365 days per year. Service coverage encompasses HP products and selected multivendor hardware and software.

In addition, this convenient HP Care Pack packaged service makes software updates available to you at substantial savings.

Choose Support Plus 24 when you need to:

Improve uptime with responsive hardware and software services available anytime

Cost-effectively obtain expert 24x7 multivendor hardware and software support

Enjoy consistent service coverage across geographically dispersed sites

Update HP and selected third-party software at a predictable cost

Take advantage of subscription savings on software updates

**HP SAN Solution Service** Get your SAN implementation right - right from the start.

Storage has become essential to the growth and agility of your business. That's why choosing an HP SAN as your data management solution is a smart business decision. But your SAN can deliver the results you need only if it is implemented correctly and integrated with your business.

SAN installation, startup, and integration call for specialized expertise in planning and design, hardware configuration, network software installation, and operability verification. Your SAN needs to be configured for high performance and availability. And it needs to be integrated with your applications, management environment, and business processes.

Product Number	Product Name	Service Name	Care Pack Services Product # and Band
A7988B	HP StorageWorks 4/256 SAN Director	3-Year HP Support Plus 24	HA111A3-80D
A7989B	HP StorageWorks 4/256 SAN Director Power Pack	3-Year HP Support Plus 24	HA111A3-80E
A7990B	HP 4/256 SAN Director 16-port 4Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-4CD
A7991B	HP 4/256 SAN Director 32-port 4Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-80F
AG561B	HP 4/256 SAN Director 48-port 4Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-87H
AK858B	HP SAN Director 16-port 8Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9CF
AK859B	HP SAN Director 32-port 8Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9CG
AK860B	HP SAN Director 48-port 8Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9K3
AG461B	HP SAN Director Multi-Protocol Router Blade	3-Year HP Proactive 24 for SANs	HA111A3-8S1
AG671B	HP 4/256 SAN Director iSCSI Blade	3-Year HP Proactive 24 for SANs	HA111A3-7JX



### Service and Support, HP Care Pack, and Warranty Information

#### Related Services

Services that will enhance the user experience in many product deployments.

**3-Year HP Critical Service for SANs** 3-Year HP Critical Service for SANs offers a comprehensive, robust suite of proactive and reactive services expressly designed to help you resolve complex interoperability issues and maximize uptime and data availability in your SAN environment

**HP Assessment Service for SANs** HP Assessment Service for SANs offers customized technical and operational guidance to customers with a deployed storage area network (SAN) infrastructure, and provides recommendations to help improve availability levels and ongoing management of your SAN environment.

Product Number	Product Name	Service Name	Care Pack Services Product # and Band
A7988B	HP StorageWorks 4/256 SAN Director	3-Year HP Critical Service for SANs	HA111A3-80D
A7989B	HP StorageWorks 4/256 SAN Director Power Pack	3-Year HP Critical Service for SANs	HA112A3-80E
A7990B	HP 4/256 SAN Director 16-port 4Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-4CD
A7991B	HP 4/256 SAN Director 32-port 4Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-80F
AG561B	HP 4/256 SAN Director 48-port 4Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-87H
AK858B	HP SAN Director 16-port 8Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9CF
AK859B	HP SAN Director 32-port 8Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9CG
AK860B	HP SAN Director 48-port 8Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9K3
AG461B	HP SAN Director Multi-Protocol Router Blade	3-Year HP Critical Service for SANs	HA112A3-8S1
AG671B	HP 4/256 SAN Director iSCSI Blade	3-Year HP Critical Service for SANs	HA112A3-7JX



### Service and Support, HP Care Pack, and Warranty Information

#### 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>

#### Remote Support Technology (RST)-HP Remote Support Pack

Taking a more proactive approach to IT support, the HP Remote Support pack plug-in module easily integrates with HP Systems Insight Manager to provide a powerful, unified "single pane of glass" solution for onsite and remote management.

HP Remote Support Pack enhances HP Systems Insight Manager with intelligent event diagnosis plus the automatic submission of hardware event notifications securely to HP support, including acknowledgment and status returns. It adds remote configuration collections to allow the delivery of assessment and proactive services for your SAN storage and HP-UX environments.

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#### Customer Technical Training

Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. [www.hp.com/learn/storage](http://www.hp.com/learn/storage)

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#### HP Services Awards

HP 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. For a list of all our awards, please visit:

<http://h20219.www2.hp.com/services/cache/433028-0-0-225-121.html>.

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#### Additional Services

For more information about HP Care Pack Services for Storage, please visit:

<http://www.hp.com/hps/storage>

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" <http://www.hp.com>



### Family Information

Features	8/8 SAN Switch Base and 8/8 SAN Switch	8/24 SAN Switch Base	8/40 SAN Switch and 8/40 SAN Switch Power Pack+	8/80 SAN Switch and 8/80 SAN Switch Power Pack+	DC04 SAN Director and DC04 SAN Director Power Pack+	DC SAN Backbone Director Power Pack+
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers	Data Centers
Port Bandwidth	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec
Aggregate device bandwidth	128 - 384 Gbit/sec end-to-end	256 - 384 Gbit/sec end-to-end	384 - 640 Gbit/sec end-to-end	768 - 1280 Gbit/sec end-to-end	3 Tbit/sec end-to-end	6.5 Tbit/sec end-to-end
OS Support	<b>NOTE: Please Refer to SAN Design Guide</b> <a href="http://www.hp.com/go/sandesign">http://www.hp.com/go/sandesign</a> or <a href="http://www.hp.com/go/sandesignguide">http://www.hp.com/go/sandesignguide</a>					
Storage system support	XP, EVA, MSA					
Ports	8 Enabled 24 Max	16 Enabled 24 Max	24 Enabled 40 Max	48 Enabled 80 Max	Up to 192	Up to 384
SFP	B-series	B-series	B-series	B-series	B-series	B-series
Advanced Trunking	Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Form factor	1U	1U	1U	2U	7U	14U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No	Yes	Yes	Yes	Yes
Hot plug fans	No	No	Yes	Yes	Yes	Yes



# QuickSpecs

## HP StorageWorks 4/256 SAN Director and 4/256 Power Pack B-Series Family

### Family Information

Features	4/8 SAN Switch Base and 4/8 SAN Switch	4/16 SAN Switch and 4/16 SAN Switch Power Pack	4/32B SAN Switch and 4/32B SAN Switch Power Pack	4/64 SAN Switch and 4/64 SAN Switch Power Pack	4/256 SAN Director and 4/256 SAN Director Power Pack
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers
Port Bandwidth	4Gbit/sec	4Gbit/sec	4Gbit/sec	4Gbit/sec	4Gbit/sec
Aggregate device bandwidth	64 Gbit/sec end-to-end	128 Gbit/sec end-to-end	128-256 Gbit/sec end-to-end	512 Gbit/sec end-to-end	3.2 Tbit/sec end-to-end
OS Support	<b>NOTE: Please Refer to SAN Design Guide</b> <a href="http://www.hp.com/go/sandesign">http://www.hp.com/go/sandesign</a> or <a href="http://www.hp.com/go/sandesignguide">http://www.hp.com/go/sandesignguide</a>				
Storage system support	XP, EVA, MSA				
Ports	8 Enabled 16 Max	16 Enabled	16 Min 32 Max	32 Min 64 Max	Up to 384
SFP	HP	HP	HP	HP	HP
Advanced Trunking	Optional Upgrade	Included with Power Pack or Optional Upgrade	Included with Power Pack or Optional Upgrade	Included with Power Pack or Optional Upgrade	Included with Power Pack or Optional Upgrade
Form factor	1U	1U	1U	2U	14U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No	Yes	Yes	Yes
Hot plug fans	No	No	Yes	Yes	Yes

Features	Embedded SAN Switch for EVA4400	Brocade 4Gb SAN Switch for HP c-Class BladeSystem	HP 400 Multi-protocol Router	B-Series Multi-protocol Router Blade
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers
Port Bandwidth	8Gbit/sec	4Gbit/sec	4 Gbit/sec Ethernet: 1 Gbit/sec	4 Gbit/sec Ethernet: 1 Gbit/sec
Aggregate device bandwidth	320 Gbit/sec end-to-end	192 Gbit/sec end-to-end	128 Gbit/sec end to end	N/A
OS Support	<b>NOTE: Please Refer to SAN Design Guide</b> <a href="http://www.hp.com/go/sandesign">http://www.hp.com/go/sandesign</a> or <a href="http://www.hp.com/go/sandesignguide">http://www.hp.com/go/sandesignguide</a>			
Storage system support	XP, EVA, MSA			
Ports	20 external per EVA Controller Pair	4 or 8 external / 8 or 16 internal	18 ports: 16 FC and 2 Gigabit Ethernet	18 ports: 16 FC and 2 Gigabit Ethernet
SFP	B-series	HP	HP	HP
Advanced Trunking	Optional Upgrade	Optional Upgrade	Optional Upgrade	Optional Upgrade to chassis
Adaptive Networking	Included with Power Pack+ or Optional Upgrade	No	No	Optional Upgrade to DC SAN Director Backbone Chassis
Form factor	Embedded	Embedded	1U	Blade in SAN Director
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)



## Family Information

Hot plug, redundant power supplies	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes	Yes, in SAN Director chassis
Hot plug fans	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes	Yes, in SAN Director chassis



### Configuration Information

#### Step 1 – Base Configuration and Power Pack

Select one:

Model	Model Description	Part Number
StorageWorks 4/256 SAN Director	256-port capable Fibre Channel Director with 2 control processors, 2 power supplies, rack rails, Zoning, Web tools. Does not include Port blades or SFPs	A7988B
StorageWorks 4/256 SAN Director Power Pack	256-port capable Fibre Channel Director with 2 control processors, 2 power supplies, rack rails, Zoning, Web tools, Advanced Performance Monitor, Fabric Watch, ISL Trunking, Extended Fabrics. Does not include Port blades or SFPs	A7989B

#### Step 2 – Additional Port Configurations

	Model Description	Quantity	Part Number
4/16 port blade	16-port 4Gb/s Director Blade <b>NOTE:</b> Requires optical transceivers for each port as listed below.	Add the appropriate quantity of 16-port blades to meet requirements	A7990B
4/32 port blade	32-port 4Gb/s Director Blade <b>NOTE:</b> Requires optical transceivers for each port as listed below.	Add the appropriate quantity of 32-port blades to meet requirements	A7991B
4/48 port blade	48-port 4 Gb/s Director <b>NOTE:</b> Requires optical transceivers for each port as listed below <b>NOTE:</b> If the 4/256 SAN Director was manufactured prior to 9/30/06, customers installing the 4/48 blade for added port connectivity beyond 256 ports will need to order the new high density cable management comb to accommodate the increase number of fiber optic cables	Add the appropriate quantity of 48-port blades to meet requirements	AG561B
8/16 port blade	16-port 8Gb/s Director Blade <b>NOTE:</b> Requires B-series optical transceivers (AJ716A, and AJ715A) for each port as listed below.	Add the appropriate quantity of 16-port blades to meet requirements	AK858B
8/32 port blade	32-port 8Gb/s Director Blade <b>NOTE:</b> Requires B-series optical transceivers (AJ716A, and AJ715A) for each port as listed below.	Add the appropriate quantity of 32-port blades to meet requirements	AK859B
8/48 port blade	48-port 8Gb/s Director Blade <b>NOTE:</b> Requires B-series optical transceivers (AJ716A, and AJ715A) for each port as listed below. Requires additional power supplies (AG460A)	Add the appropriate quantity of 48-port blades to meet requirements	AK860B
10/6 port blade	6-port 10Gb/s Director Blade <b>NOTE:</b> Requires optical XFP transceivers for each port as listed below. Requires additional power supply (AG460A) if the 4/256 SAN Director is fully populated with the 10/6 blade.	Add the appropriate quantity of 6-port blades to meet requirements	AK861B
HP StorageWorks B-Series iSCSI Blade	16 ports (8 Fibre Channel and 8 Gigabit Ethernet) per blade enables bridging of iSCSI hosts to Fibre Channel Fabrics <b>NOTE:</b> Requires additional power supplies (AG460A) and optical transceivers listed below.	A maximum of 4 iSCSI blades supported per Director chassis	AG671B





### Configuration Information

<p>HP StorageWorks Multi-protocol Router Blade for B-Series</p>	<p>18 ports (16 Fibre Channel and 2 Gigabit Ethernet) multi-protocol router providing 2 types of SAN services: FC subnet routing, and FCIP tunneling. Includes rack mount kit, advanced zoning and web tools.</p> <p><b>NOTE:</b> Requires additional power supplies (AG460A) and optical transceivers listed below.</p>	<p>A maximum of two B-Series MP Router Blades supported per Director chassis</p>	<p>AG461B</p>
<p>High Density Cable Management Comb</p>	<p>HP StorageWorks B-Director Cable Mgmt Comb</p>	<p>One per chassis</p>	<p>AG562A</p>
<p>Add Software:</p>			
<p>Power Pack Software Bundle for SAN Director</p>	<p>Fabric Watch, ISL Trunking, Extended Fabric, Advanced Performance Monitoring</p>		<p>330882-B21</p>
<p>Optional Software:</p>	<p>HP StorageWorks MP Blade Perf Extens LTU:</p> <p>Optional software license to activate the high performance extension services for either IP or FC connectivity in the MP Blade. IP and FC extension services are mutually exclusive. It includes the Encryption Services License.</p>		<p>T4427A</p>
	<p>HP StorageWorks B-Series Fabric Watch Dir Swt LTU ALL</p>		<p>334218-B21</p>
	<p>HP StorageWorks B-Series ISL Trunking Dir Swt LTU ALL</p>		<p>325887-B21</p>
	<p>HP StorageWorks B-Series Advanced Performance Monitor Dir Swt LTU ALL</p>		<p>334219-B21</p>
	<p>HP StorageWorks B-Series Extended Fabric Dir Swt LTU ALL</p>		<p>325886-B21</p>
	<p>HP StorageWorks 4/256 Director FICON Cup Active License*</p>		<p>T4401A*</p>
	<p>*Check for availability in region; only supported in XP Storage array environments</p>		
	<p>Data Center Fabric Manager Enterprise</p>		<p>T5542A</p>

### Step 3 – Additional Options

<p>Additional Power Supply</p>	<p>HP StorageWorks Power Supply for Director Chassis - Quantity 2</p> <p><b>NOTE:</b> 4 power supplies are required when using the B-Series iSCSI Blade, Multi-protocol Router Blades, FC10-6, or FC8-48 Blade.</p>		<p>AG460A</p>
<p>Optical Transceivers</p>	<p>8Gb Short Wave B-Series FC SFP+ 1 Pack</p> <p><b>NOTE:</b> Only the "B-Series" branded SFPs are supported with the 8/16 Fibre Channel Blade (AK858A), 8/32 Fibre Channel Blade (AK859A), and the 8/48 Fibre Channel Blade (AK860A)</p>		<p>AJ716A</p>
	<p>8Gb Long Wave B-series 10km FC SFP+ 1 Pack</p> <p><b>NOTE:</b> Only the "B-Series" branded SFPs are supported with the 8/16 Fibre Channel Blade (AK858A), 8/32 Fibre Channel Blade (AK859A), and the 8/48 Fibre Channel Blade (AK860A)</p>		<p>AJ717A</p>
	<p>4Gb/s Short Wave FC SFP 1 Pack</p>		<p>A7446B</p>
	<p>4Gb Short Wave B-Series FC SFP 1 Pack</p> <p><b>NOTE:</b> Only the "B-Series" branded are supported with the 8/16 Fibre Channel Blade (AK858A), 8/32 Fibre Channel Blade (AK859A), and the 8/48 Fibre Channel Blade (AK860A)</p>		<p>AJ715A</p>
	<p>4Gb Long Wave FC SFP 1 Pack - 10km</p>		<p>AE493A</p>
	<p>HP 4Gb Long Wave B-Series FC SFP 1 Pack - 10km</p> <p><b>NOTE:</b> Only the "B-Series" branded are supported with the 8/16 Fibre Channel Blade (AK858A), 8/32 Fibre Channel Blade (AK859A), and the 8/48 Fibre Channel Blade (AK860A)</p>		<p>AK870A</p>
	<p>2Gb/s Long Wave FC SFP 1 Pack - 10 km</p>		<p>A6516A</p>
	<p>2Gb/s Long Wave FC SFP 1 Pack - 35 km</p>		<p>300836-B21</p>



## Configuration Information

HP BLc 10Gb SR XFP Opt Kit	443756-B21
<b>NOTE:</b> Required when using a 10/6 Fibre Channel Blade (AK861A)	
HP BLc 10Gb LR XFP Opt Kit	443757-B21
<b>NOTE:</b> Required when using a 10/6 Fibre Channel Blade (AK861A)	

### Optical cables

#### PremierFlex OM3+ type cables

0.5m PremierFlex LC/LC Multi-Mode Optical Cable	BK837A
1m PremierFlex LC/LC Multi-Mode Optical Cable	BK838A
2m PremierFlex LC/LC Multi-Mode Optical Cable	BK839A
5m PremierFlex LC/LC Multi-Mode Optical Cable	BK840A
15m PremierFlex LC/LC Multi-Mode Optical Cable	BK841A
30m PremierFlex LC/LC Multi-Mode Optical Cable	BK842A
50m PremierFlex LC/LC Multi-Mode Optical Cable	BK843A

#### LC-LC type cables

2 m LC-LC Multi-Mode Fibre Channel Cable	221692-B21
5 m LC-LC Multi-Mode Fibre Channel Cable	221692-B22
15 m LC-LC Multi-Mode Fibre Channel Cable	221692-B23
30 m LC-LC Multi-Mode Fibre Channel Cable	221692-B26
50 m LC-LC Multi-Mode Fibre Channel Cable	221692-B27

#### LC-SC type cables

2 m LC-SC Multi-Mode Fibre Channel Cable	221691-B21
5 m LC-SC Multi-Mode Fibre Channel Cable	221691-B22
15 m LC-SC Multi-Mode Fibre Channel Cable	221691-B23
30 m LC-SC Multi-Mode Fibre Channel Cable	221691-B26
50 m LC-SC Multi-Mode Fibre Channel Cable	221691-B27

<b>Fibre Channel Standards And Revisions</b>	Up to 384 ports, universal (E, F, and FL); up to eight Fibre Channel modules, either 16 port, 32 port or 48 port
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### Technical Specifications

<b>Fibre Channel ports</b>	Up to 384 ports, universal (E, F, and FL); up to eight Fibre Channel modules, either 16 port, 32 port, or 48 port												
<b>Control processor</b>	Redundant (active/standby) control processor modules												
<b>Scalability</b>	Full fabric architecture: <a href="http://h18006.www1.hp.com/products/storageworks/san/documentation.html">http://h18006.www1.hp.com/products/storageworks/san/documentation.html</a>												
<b>Performance</b>	1.063 Gb line speed, full duplex; 2.125 Gb line speed, full duplex ; 4.25 Gb line speed, full duplex; auto-sensing of 1 Gb, 2 Gb, 4Gb, and 8Gb port speeds; optionally programmable to fixed port speed; speed matching between 1 Gb, 2 Gb, 4Gb, and 8Gb ports												
<b>ISL Trunking</b>	Up to eight 8 Gbit/sec ports per ISL trunk; up to 64 Gbit/sec per ISL trunk. Up to two 8-port trunk groups supported on 16-port blades, four 8-port trunk groups supported on 32-port blades, and eight 8-port trunk groups supported on 48-port blades. ISL Trunking at 2 Gbit/sec for compatibility with B-Series legacy switches and directors.												
<b>Aggregate bandwidth</b>	3.264 Tbit/sec												
<b>Switch latency</b>	<2.1 $\mu$ sec any port to any port at 2 Gbit/sec, cut-through routing; <3.6 $\mu$ sec any port to any port at 4 Gbit/sec, cut-through routing												
<b>Maximum frame size</b>	2112-byte payload												
<b>Frame buffers</b>	1024 per blade dynamically allocated up to 255 per port												
<b>Classes of service</b>	Class 2, Class 3, Class F (inter-switch frames)												
<b>Port types</b>	FL_Port (all except on 48-port blades), F_Port, E_Port, self-discovery based on switch type (U_Port); port type control for EX_Port, VE_Port and Vex_Port; Gigabit Ethernet for VE_Port and Vex_Port												
<b>Data traffic types</b>	Fabric Switches supporting unicast, multicast (255 groups), and broadcast												
<b>Media types</b>	Hot-pluggable, industry-standard Small Form-factor Pluggable (SFP), LC connector; Short-Wavelength Laser (SWL) up to 500 meters (1,640 feet); Long-Wavelength Laser (LWL) up to 10 km (6.2 mi); Extended Long- Wavelength Laser (ELWL) up to 100 km (62.1 mi); distance depends on fiber optic cable and port speed Note: For 4 Gbit/sec operations, only SWL is supported.												
<b>Fabric services</b>	Simple Name Server; Registered State Change Notification (RSCN); Alias Server (multicast); Advanced Zoning; WebTools; Enhanced group Management, Fabric Watch; ISL Trunking (optional); Advanced Performance Monitoring; FICON Control Unit Port (CUP) on 4/16 and 4/32 SAN Director blades												
<b>High availability</b>	<table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"><b>Control Processor</b></td> <td>Redundant (active/standby) control processor modules; automatic failover; non-disruptive software upgrades; dual-flash memory on each control processor to store two software images</td> </tr> <tr> <td style="vertical-align: top;"><b>Modules</b></td> <td>Hot swappable</td> </tr> <tr> <td style="vertical-align: top;"><b>Backplane</b></td> <td>Fully passive</td> </tr> <tr> <td style="vertical-align: top;"><b>Input power</b></td> <td>Dual AC inputs</td> </tr> <tr> <td style="vertical-align: top;"><b>Chassis power</b></td> <td>Dual AC-DC power supply modules</td> </tr> <tr> <td style="vertical-align: top;"><b>Cooling</b></td> <td>Three blower assembly modules (two operational required)</td> </tr> </table>	<b>Control Processor</b>	Redundant (active/standby) control processor modules; automatic failover; non-disruptive software upgrades; dual-flash memory on each control processor to store two software images	<b>Modules</b>	Hot swappable	<b>Backplane</b>	Fully passive	<b>Input power</b>	Dual AC inputs	<b>Chassis power</b>	Dual AC-DC power supply modules	<b>Cooling</b>	Three blower assembly modules (two operational required)
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<b>Modules</b>	Hot swappable												
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<b>Input power</b>	Dual AC inputs												
<b>Chassis power</b>	Dual AC-DC power supply modules												
<b>Cooling</b>	Three blower assembly modules (two operational required)												
<b>Management</b>	Telnet; RADIUS, SNMP (FE MIB, FC Management MIB); WebTools; Enhanced group Management, Fabric Watch Optional; Fabric Access layer Data Center Fabric Manager												
<b>Management access</b>	10/100 Ethernet (RJ-45), in-band over Fibre Channel (requires fabric); two serial ports (DB-9) per control processor module												
<b>Diagnostics</b>	POST and embedded online/offline diagnostics												
<b>Mechanical specifications</b>	<table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"><b>Mounting</b></td> <td>Rack-mountable in a standard 19-inch (48.26 cm) EIA rack; Telco-style mid-mounting available</td> </tr> <tr> <td style="vertical-align: top;"><b>Ports per rack</b></td> <td>Up to 768-ports per 42U rack</td> </tr> <tr> <td style="vertical-align: top;"><b>Enclosure</b></td> <td>Rear panel-to-door airflow</td> </tr> <tr> <td style="vertical-align: top;"><b>Width</b></td> <td>17.22 in (43.74 cm)</td> </tr> <tr> <td style="vertical-align: top;"><b>Height</b></td> <td>24.11 in (61.24 cm) 14U</td> </tr> </table>	<b>Mounting</b>	Rack-mountable in a standard 19-inch (48.26 cm) EIA rack; Telco-style mid-mounting available	<b>Ports per rack</b>	Up to 768-ports per 42U rack	<b>Enclosure</b>	Rear panel-to-door airflow	<b>Width</b>	17.22 in (43.74 cm)	<b>Height</b>	24.11 in (61.24 cm) 14U		
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<b>Height</b>	24.11 in (61.24 cm) 14U												



### Technical Specifications

	<b>Depth</b> (without door)	27.90 in (70.90 cm)
	<b>Depth</b> (with door)	29.20 in (74.20 cm)
	<b>Weight</b>	95 kg (210 lb) for 128-port configuration (eight FC4-16 blades, without media) 98 kg (216 lb) for 256-port configuration (eight FC4-32 blades, without media) 98 kg (216 lb) for 384-port configuration (eight FC4-48 blades, without media)
<b>Environment</b>	<b>Temperature</b>	<b>Operating</b> 32° to 104° F (0° to 40° C) <b>Non-operating</b> -25° to 70° C (-13° to 158° F)
	<b>Humidity</b>	<b>Operating</b> 5% to 85% non-condensing at 104° F (40° C) <b>Non-operating and storage</b> (non-condensing) 0% to 93%
	<b>Altitude</b>	Up to 3000 meters(9800 feet)
	<b>Shock</b>	20 g, 11 ms, half sine
	<b>Vibration</b>	<b>Operating</b> Operating: 20G, 11 ms, half sine 1G p-p, 5-500Hz, 1 octave min Non-operating: 33G, 11 ms, half sine 2.4G p-p, 5-500Hz, 1 octave min <b>Non-operating</b> Operating: 5G p-p, 0 to 3kHz at 1.0 octave min Non-operating: 10G p-p, 0 to 5 kHz at 1.0 octave min
	<b>Heat dissipation</b>	1160 W or 3949 BTU (eight 48-port blades and two CP4 blades) 915 W or 3115 BTU (eight 32-port blades and two CP4 blades) 710 W or 2425 BTU (eight 16-port blades and two CP4 blades)
<b>Power</b>	<b>Supported power range</b>	<b>Nominal</b> 200-240 VAC, 12A single phase <b>Operational</b> 180-264 VAC, auto-sensing <b>In-rush current</b> 40A maximum, peak <b>Input frequency range</b> 47-63 Hz
		<b>NOTES:</b> A fully loaded switch requires a maximum of 750 Volt-Amps. A fully populated 4/256 SAN Director with no MP router I blades, 10/6 blades, iSCSI blades, or FC8-48 blades can function by the power supplied with two power supplies in redundant power mode.  A 4/256 SAN Director populated with either the B-Series MP Router blade (,the B-Series iSCSI Blade, the 10/6 blade ,or the FC8-48 blade requires four functional power supplies.
	<b>Power Supplies</b>	Two power supplies Output voltages (each): 48V at 20 amps; 12V at included with each director 4 amps  Maximum output power: 1000 watts AC inrush current 40A maximum, peak
	<b>Power Cables</b>	Power Cables included Two, IEC 60320/C19 to IEC 60320/C20 to connect from the director to the rack PDU Two, IEC 320, EN60320 C19-Angled, 16A/250VAC to L6-20 to connect from director to wall outlet
	<b>Certified maximum</b>	Please Refer to SAN Design Guide at the following URL <a href="http://www.hp.com/go/SANDesignGuide">http://www.hp.com/go/SANDesignGuide</a>
<b>Interoperability</b>	<ul style="list-style-type: none"><li>● SAN Switch 8</li><li>● SAN Switch 16</li><li>● SAN Switch 8-EL</li></ul>	



### Technical Specifications

- SAN Switch 2/8V
- 4/8 SAN Switch
- SAN Switch 16-EL
- SAN Switch 2/16V
- SAN Switch 2/16N FF
- 4/16 SAN Switch
- Integrated /32
- SAN Switch 2/32
- 4/32 SAN Switch
- 4/64 SAN Switch
- Core Switch 4/64
- SAN Director 2/128
- DC04 SAN Director
- DC SAN Backbone Director
- SAN Switch 2/16
- SAN Switch 1/16-EL
- MSA SAN Switch 2/8
- SAN Switch 8/8
- SAN Switch 8/24
- SAN Switch 8/40
- SAN Switch 8/80
- Brocade 4Gb SAN Switch for p-class HP BladeSystem
- Brocade 4Gb SAN Switch for c-class HP BladeSystem
- 400 MP Router
- B-Series MP Router Blade

<b>Switch core</b>	Non-blocking
<b>Fabric latency</b>	< 2 $\mu$ sec. with no contention, cut-through routing
<b>Hardware Options</b>	16, 32 and 48 port FC Card, iSCSI blade, MP-Router blades ; SFP media
<b>Supported software</b>	Telnet, SNMP, WebTools, Zoning, Fabric Watch Optional, Fabric Manager Optional

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