Overview

The HP StorageWorks 4/32B SAN Switch is the successor to the 4/32 SAN Switch, which shipped in January, 2005. The 4/32B SAN Switch offers an improved TCO because it consumes 20 percent less power, generates less heat, and requires less cooling then the 4/32 SAN Switch. The HP StorageWorks 4/32B SAN Switch delivers excellent overall value and investment protection as the foundation for a small SAN or as an edge switch in a larger core to edge enterprise SAN.
Whether incorporated into an expansive core fabric or tactically placed at the edge, this switch delivers the performance of 1,2, or 4 Gb technologies in a 1u footprint. The switch is available in three models:
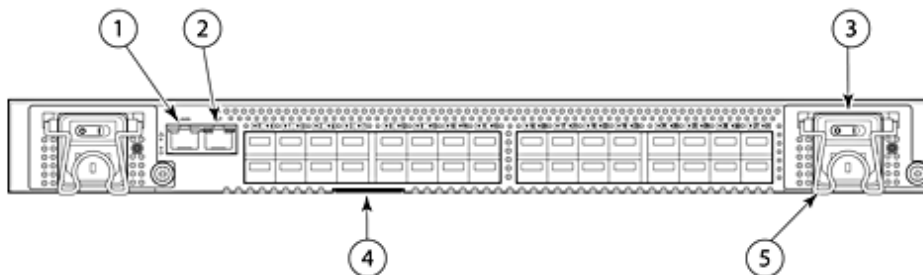
- HP StorageWorks 4/32B SAN Switch Power Pack with 32 active ports and value added software
- HP StorageWorks 4/32B Full SAN Switch with 32 active ports
- HP StorageWorks 4/32B SAN Switch with 16 active ports (Base)

An optional 8 port license scales the number of active ports to 24 or up to 32 ports.

Each switch variant has removable redundant power supplies/cooling units. These integrated POWER/FAN units reduce overall Field Replaceable Unit (FRU) count, lower power dissipation, and reduce cooling requirements. The switch is ideal for supporting medium to large corporate infrastructure implementations.

The 4/32B SAN Switch Power Pack includes the 4/32B SAN Switch (Full) with additional software: Fabric Watch, ISL Trunking, Extended Fabric, and Performance Monitor. Power Pack software provides SAN administrators with the necessary tools to monitor the health and performance of the network while insuring the highest levels of security, scalability, and manageability.

Small form factor pluggable optical transceivers (SFPs) must be ordered separately.

1. Console port	4. Switch ID pull out tab
2. Ethernet port	5. Power cord retainer
3. Power supply/fan assembly	

Overview

Key Features and Benefits

- Protects existing investments by providing 4 Gbit/sec technology with auto-sensing capabilities to recognize earlier 1 and 2 Gbit/sec devices
- Supports full 4 Gbit/sec operations at distances up to 100 kilometers (or 500 kilometers at 1 Gbit/sec) for cost-effective business continuance operations. Requires appropriate 4Gb SFPs.
- Increases network performance with enhanced Inter-Switch Link (ISL) Trunking, which enables a high-speed data path up to 32 Gbit/sec
- Utilizes Ports on Demand for fast, easy, and cost-effective scalability from 16 to 32 ports, in 8 port increments
- Meets high-availability requirements with redundant, hot-pluggable components, non-disruptive software upgrades, and hot code activation for a wide range of SAN configurations
- Integrated Power/Fan unit reduces overall Field Replaceable Unit (FRU) count, lowers power dissipatation, and reduces cooling requirements
- Leverages intelligent B-series SAN management and monitoring tools to increase operational efficiency and maximize SAN investments

Models

HP StorageWorks 4/32B SAN Switch Models	HP StorageWorks 4/32B SAN Switch Power Pack	AG758A
	HP StorageWorks 4/32B Full SAN Switch with 32 active ports	AG757A
	HP StorageWorks 4/32B SAN Switch with 16 active ports	AG756A

Product Highlights

4/32B SAN Switch	• Simplifies enterprise SAN deployment by combining higher edge switch port density with exceptional scalability, performance and reliability • Delivers 16, 24, or 32-ports in a 1U enclosure • Meets enterprise level availability requirements with redundant, hot pluggable components, no-single-points-of-failure within the switch • Provides 1 Gb, 2 Gb, and 4Gb/s* performance • Employs optional Inter-Switch Link (ISL) Trunking to provide a high-speed data path between switches which enables a high speed data path between 4Gb/s switches up to 32 Gbit/sec * Full 4Gb/s end to end storage performance requires 4 Gb/s HBAs, 4Gb/s controllers, and 4Gb/s switches. 4Gb/s ISL performance can be obtained between two 4Gb/s switches.

Configuration Support	http://h18000.www1.hp.com/products/storageworks/san/documentation.html

High-availability features	• Integrated redundant, hot swappable cooling fans and power supplies • Enhanced Fault Detection Logic • Parity protection on all data paths and system memory

Advanced Fabric Services	• Hardware and Software Enforced Zoning • Frame Filtering • Built-in Web browser management tools

Cabinet Support	• 22U, 36U, and 42U; 5000, 9000 and 10,000 series StorageWorks Cabinets are supported o 25U, 33U, and 41U HP system/e cabs

Software Components, Standard, Base Models

Frame Filtering	An ASIC based capability 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.

Advanced Zoning	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.

Web Tools	WebTools is an intuitive and easy-to-use graphical interface that enables organizations to monitor and manage SAN fabrics. Tasks can be performed through a Java-capable Web browser from a standard laptop, desktop PC or workstation from any location within the enterprise.

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.

Software Components, Optional

4/32B SAN Switch Power Pack Software Bundle

The Power Pack Software Bundle for 4/32B SAN Switch includes the following:

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

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.

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.

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.

Product Highlights

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.

Data Center Fabric Manager Enterprise

HP StorageWorks Data Center Fabric Manager Enterprise is a server based 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 also delivers unprecedented scalability with support for up to 24 SAN fabrics and 9,000 B-series switch ports.

HP will provide a free license upgrade to Data Center Fabric Manager Enterprise for existing HAFM/FM customers that have an active maintenance and support contract at the time Data Center Fabric Manager Enterprise is available. Data Center Fabric Manager does require at least one FOS based B-series SAN switch.

ISL Trunking

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

Secure Fabric OS

Secure Fabric OS™ is available only on the B-Series platform and is the only solution that provides protection for both management access and switch-to-switch authentication. This comprehensive security solution for SAN fabrics provides policy-based security protection for more predictable change management, assured configuration integrity and reduced risk of downtime. Secure Fabric OS protects the network by using the strongest, enterprise-class security methods available, including digital certificates and digital signatures, multiple levels of password protection, strong password encryption and Public Key Infrastructure (PKI)-based authentication, and 128-bit encryption of the switch's private key used for digital signatures. With its flexible design, Secure Fabric OS enables organizations to customize SAN security to meet specific policy requirements. In addition, Secure Fabric OS works in conjunction with Advanced Zoning to further secure access to the SAN, simplify storage management, and reduce provisioning time.

Service and Support, HP Care Pack, and Warranty Information

Warranty	(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (standard business hours, next business day response) and 1-year labor.

NOTE: The hardware warranty covers firmware and embedded non-saleable software. For extended hardware installation and maintenance information, click the link below:
http://www.hp.com/hps/carepack/services/.

NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details. Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

HP Service & Warranty Support

HP Service & Warranty Support Additional Warranty protection and/or HP Installation packages can be purchased.
NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details. HP provides a one-year, hardware limited warranty, fully supported by a worldwide network of resellers and service providers. The first year of Rights to New License Version and standard business day, standard business hours telephone support is included with the purchase of an HP Power Pack. In order to continue to receive telephone support and Rights to New License Version after the first year, the purchase of a software support contract or Care Pack is required.
In addition, available service offerings include a full range of HP Care Pack packaged hardware and software services:

- Installation
- Extended coverage hours and enhanced response times
- System management and performance services

For more information on warranty and support options, please visit our Web site at:
http://www.hp.com/hps/tech/storage/supp/.

Software Product Services

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.

NOTE: Certain restrictions and exclusions apply. Consult the Customer Support Center for details.

- Stand-alone Telephone Support
- Rights to new version
- Media and documentation updates

Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

Service and Support, HP Care Pack, and Warranty Information

Hardware Product Services

- Installation services
- On-site Maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage

HP Care Pack Services Warranty Upgrade Options

Service offerings include a full range of Customer HP Care Pack services for both hardware and software services:

- Response - Upgrade on-site response from next business day to same day 4-hours
- Coverage - Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration - Select duration of coverage for a period of 1, 3, or 5 years

Additional Warranty protection and/or HP Installation packages can be purchased.

NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details

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.

- 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 listed below:
http://www.hp.com/hps/carepack/services/

Additional Services

Installation service; SAN Solution service; SAN-Environmental Support service; SAN Architecture service; Proactive 24

For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at: http://www.hp.com/hps/support

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	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hp.com/go/sandesignguide					
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

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	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hp.com/go/sandesignguide				
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	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hp.com/go/sandesignguide			
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

Select one:

Model	Model Description	Part Number
4/32B SAN Switch Power Pack	4/32B SAN Switch with 32 active ports; rackmount kit; accessory kit (enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, Advanced Fabric OS, Advanced Web Tools, Advanced Zoning, Fabric Watch, Advanced Performance Monitor, Extended Fabric, ISL Trunking. Includes serial cable NOTE: Requires optical transceivers listed below	AG758A
4/32B Full SAN Switch	4/32B Full SAN Switch with 32 active port; rackmount kit; accessory kit (enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, Advanced Fabric OS, Advanced Web Tools and Advanced Zoning. Includes serial cable NOTE: Requires optical transceivers listed below	AG757A
4/32B SAN Switch Base	4/32B SAN Switch with 16 active ports; rackmount kit; accessory kit (enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, Advanced Fabric OS, Advanced Web Tools and Advanced Zoning. Includes serial cable NOTE: Requires optical transceivers listed below	AG756A
8 port upgrade license	8 port upgrade license for 4/32 SAN Switch (base model)	T3677A

Step 2 – Options

Select each type of required options with quantities specified:

	Model Description	Quantity	Part Number
4 Gb Transceivers	4Gb shortwave transceiver- Single Distance • 4Gb performance: 150 meters between devices • 2Gb performance: 300 meters between devices • 1Gb performance: 500 meters between devices	1	A7446B
	4Gb Long Wave transceiver - 10km	1	AE493A
2 Gb Transceivers	Short Wave, 300 m, 2X, FC	1	A6515A
	Long Wave - 10 km	1	A6516A
	Long Wave - 35 km	1	300836-B21
2 Gb optical cables	LC-LC for between two 2 Gb or 4Gb devices		
	2 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B21
	5 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B22
	15 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B23
	30 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B26
	50 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B27
	LC-SC for between a 1 Gb and a 2 Gb device		
	2 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B21
	5 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B22
	15 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B23
	30 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B26
	50 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B27

Configuration Information

Step 3 – Optional Software

Software for 4/32B SAN Switch	Data Center Fabric Manager Enterprise	T5542A
	Power Pack Software Bundle	313448-B21
	NOTE: The Power Pack Software Bundle kit includes Fabric Watch, ISL Trunking, Extended Fabric, and Advanced Performance Monitor.	
	Extended Fabric	313458-B21
	Fabric Watch	313454-B21
	Advanced Performance Monitor	313450-B21
	ISL Trunking	313452-B21
	Secure Fabric OS	332925-B21

Fibre Channel Standards And Revisions

For Fabric OS 5.2.0 and later, running on associated hardware, Brocade conforms to the Following Fibre Channel Standards:

- FC-AL-2 INCITS 332: 1999
- FC-GS-5 ANSI INCITS 427:2006 (Final stages of approval, includes the Following.)
  - FC-GS-4 ANSI INCITS 387: 2004
- FC-IFR revision 1
- FC-SW-4 INCITS 418:2006 (includes the following)
  - FC-SW-3 INCITS 384: 2004
- FC-VI INCITS 357: 2002
- FC-TAPE INCITS TR-24: 1999
- FC-DA INCITS TR-36: 2004 (includes the following)
  - FC-FLA INCITS TR-20: 1998
    FC-PLDA INCIT S TR-19: 1998
- FC-MI-2 ANSI/INCITS TR-39-2005
- FC-PI INCITS 352: 2002
- FC-PI-2 INCITS 404: 2005
- FC-FS-2 ANSI/INCITS 424:2006 (includes the following)
  - FC-FS INCITS 373: 2003
- FC-LS revision 1.51 (under development)
- FC-BB-3 INCITS 414: 2006 (includes the following)
  - FC-BB-2 INCITS 372: 2003
- FC-SB-3 INCITS 374: 2003 (replaces FC-SB ANSI X3.271: 1996; FC-SB-2 INCITS 374: 2001)

Technical Specifications

System Architecture	Fibre Channel ports	32 ports, universal (E, F, and FL)
	Scalability	Full fabric architecture: http://h18006.www1.hp.com/products/storageworks/ san/documentation.html
	Certified maximum	Refer to SAN Design Guide for current configuration information: http://h18006.www1.hp.com/products/storageworks/ san/documentation.html
	Interoperability	• SAN Switch 8 • SAN Switch 16 • SAN Switch 8-EL • 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
	Performance	1.063 Gbit/sec line speed (full duplex); 2.125 Gbit/sec line speed (full duplex); 4.25 Gbit/sec line speed (full duplex); auto-sensing of 1 Gbit/sec, 2 Gbit/sec, and 4 Gbit/sec port speeds; optionally programmable to fixed port speed; speed matching between 1, 2, and 4 Gbit/sec ports
	ISL Trunking	Up to eight 4.25 Gbit/sec ports per ISL trunk; up to 32 Gbit/sec per ISL trunk
	Aggregate bandwidth	256 Gbit/sec end to end
	Fabric latency	$<0.8\ \mu$sec with no contention, cut-through routing at 4 Gbit/sec
	Maximum frame size	2112-byte payload
	Classes of service	Class 2, Class 3, Class F (inter-switch frames)
	Port types	FL_Port, F_Port, and E_Port; self-discovery based on switch type (U_Port)
	Data traffic types	Fabric switches supporting unicast and broadcast
	Media types	Small Form-factor Pluggable (SFP) media; short-wave up to 500 meters (1640 feet); long-wave up to 10 kilometers (6.2 miles); extended long-wave up to 40km (24.8 mi). Distance depends on fiber optic cable and port speed.

Technical Specifications

	Fabric services	Simple Name Server; Registered State Change Notification (RSCN), Advanced Zoning; WEB TOOLS. Enhanced group Management, Optional fabric services include: Fabric Watch; Extended Fabrics; ISL Trunking; Advanced Performance Monitoring.
	Options	SFP media
Management	Management software supported	Telnet; RADIUS,SNMP (FE MIB, FC Management MIB); Advanced WEB TOOLS (optional); Enhanced group Management, ; Data Center Fabric Manager
	Management access	10/100 Ethernet port (RJ-45); Serial port (RS-232); in-band through Management Server
	Diagnostics	POST and embedded online/offline diagnostics
Mechanicals	Enclosure	Back-to-front airflow (non-Fibre Channel port side to Fibre Channel port side). Power from front. 1.0U, 19-inch EIA compliant
	Size	Width: 42.87 cm (16.88 in) Height: 4.35 cm (1.71 in) Depth: 26.4 cm (10.39 in)
	System Weight	4.2 kg (9.3 lb) with dual power supplies, no SFP
Environment	Temperature	Operating: 0° to 40° C (32° to 104° F) Non-operating: -25° to 70° C (-13° to 158° F)
	Humidity	Operating: 10 to 85 percent non-condensing at 40°C (104°F)
	Altitude	Operating: Up to 3000 meters (9842 feet) Storage: Up to 12 kilometers (39,370 feet)
	Shock	Operating: 20 g, 6 ms half-sine Non-operating: Half sine, 33G 11ms. 3/eg Axis
	Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
Airflow	High speed	20.8 CFM (cu. ft./min)
	Low speed (65%)	15.4 CFM
Power	Maximum output	70 Watts
	System power consumption	70 Watts max, 60 Watts typical
	Nominal input voltage	90- 264 VAC, Universal
	Input line frequency	47 - 63 Hz
	Minimum input voltage	90 VAC
	Maximum input voltage	264 VAC
	BTU rating (80% efficiency)	240 BTU/hr
	Inrush current	Maximum of 15 amps for period between 10-150 ms at 50° C (122° F)