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## Overview

### HP StorageWorks 4/64 SAN Switch & 4/64 SAN Switch Power Pack /B-Series Family

The HP StorageWorks 4/64 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. With its high port count and Ports on Demand flexibility to establish a footprint and grow port capacity as needed, the HP StorageWorks 4/64 SAN Switch is an ideal solution for fan-out from a director core, or as the core switch in a fabric.

The 4/64 SAN Switch is a 4Gb Fire Channel Switch and delivers 64 ports in a 2U footprint. The switch is available in three models:

- ε HP StorageWorks 4/64 SAN Switch Power Pack with 32 active ports and value added software
- ε HP StorageWorks 4/64 SAN Switch with 64 active ports (Full)
- ε HP StorageWorks 4/64 SAN Switch with 32 active ports (Base)

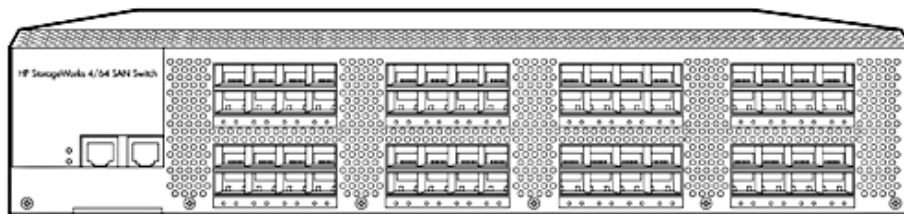
An optional 16 port license scales the number of active ports to 48 or up to 64 ports.

Each switch variant has removable redundant power supplies and removable redundant cooling units. The switch is ideal for supporting medium to large corporate infrastructure implementations.

The 4/64 SAN Switch Power Pack includes the 4/64 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.

The HP StorageWorks 4/64 provides a high-value option for port aggregation, the simplification of management and high scalability on demand in a high-performance 32- to 64-port SAN switch for environments that have high port count needs but do not require the capabilities of a director-class fabric core. Because the 4/64 SAN Switch is easily upgradeable across a range of 32 to 64 ports and can be deployed as either a standalone, core, or edge switch, it extends HP's Adaptive Enterprise approach.

Small form factor optical pluggables (SFPs) must be ordered separately



### Key Features and Benefits

- ε Delivers 64 ports in a 2U package, reduces the number of domains, but provides more usable ports (vs. two 32-port switches linked via Inter-Switch Links (ISLs) and lower power consumption compared to two 32-port switches
- ε Protects existing investments by providing 4 Gbit/sec technology with auto-sensing capabilities to recognize 1, 2, and 4 Gbit/sec devices
- ε 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.
- ε Increases network performance with enhanced Inter-Switch Link (ISL) Trunking, which enables a high-speed data path up to 32 Gbit/sec
- ε Utilizes Ports on Demand for fast, easy, and cost-effective scalability from 32 to 64 ports
- ε Meets high-availability requirements with redundant, hot-pluggable components, non-disruptive software upgrades, and hot code activation for a wide range of SAN configurations

Leverages intelligent B-series SAN management and monitoring tools to increase operational efficiency and maximize SAN investments.

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## Product Highlights

- 4/64 SAN Switch**
- z Simplifies enterprise SAN deployment by combining higher port count density with exceptional scalability, performance and reliability
  - z Delivers 32, 48, or 64-ports in a 2U enclosure
  - z Meets enterprise level availability requirements with redundant, hot pluggable components, no-single-points-of-failure within the switch
  - z Provides 1 Gb, 2 Gb, and 4Gb/s\* performance
  - z 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**
- z Redundant, hot swappable cooling fans
  - z Redundant, hot swappable power supplies
  - z Enhanced Fault Detection Logic
  - z Parity protection on all data paths and system memory

- Advanced Fabric Services**
- z Hardware and Software Enforced Zoning
  - z Frame Filtering
  - z Built-in Web browser management tools
  - z Enhanced Group Management (EGM)
  - z Data Center Fabric Manager (optional)

- Cabinet Support**
- z HP StorageWorks (22U, 36U and 42U)9000 and 10000 G1 Series, (25U, 33U and 41U) HP System/e, and the new 42U HP 10000 G2 Series
- NOTE:** To order factory integration, add 0D1 after the part number on your sales order.

## 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.

**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

**4/64 SAN Switch Power Pack Software Bundle** The Power Pack Software Bundle for 4/64 SAN Switch includes the following:

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

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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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**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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**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.

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**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 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.

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

### Warranty

(1-1-1) Hardware Warranty - One-year on-site warranty, 8x5, next business day 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 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

- ⌘ Stand-alone telephone support
- ⌘ Rights to new license version
- ⌘ Media and documentation updates

### Hardware Product Services

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

### HP Care Pack Services Warranty Upgrade

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

**Options**

- ⌚ 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://h18005.www1.hp.com/services/carepaq/index.html>

**Additional Services**

Implementation service, SAN Architecture service. For more information on service options, please visit our Web site at: <http://www.hp.com/go/san>.

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**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+
<b>Targeted Environment</b>	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers	Data Centers
<b>Port Bandwidth</b>	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec
<b>Aggregate device bandwidth</b>	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
<b>OS Support</b>	<b>NOTE:</b> Please Refer to SAN Design Guide <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>					
<b>Storage system support</b>	<b>XP, EVA, MSA</b>					
<b>Ports</b>	8 Enabled 24 Max	16 Enabled 24 Max	24 Enabled 40 Max	48 Enabled 80 Max	Up to 192	Up to 384
<b>SFP</b>	B-series	B-series	B-series	B-series	B-series	B-series
<b>Advanced Trunking</b>	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
<b>Adaptive Networking</b>	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
<b>Form factor</b>	1U	1U	1U	2U	7U	14U
<b>Zoning Software</b>	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
<b>Hot plug, redundant power supplies</b>	No	No	Yes	Yes	Yes	Yes
<b>Hot plug fans</b>	No	No	Yes	Yes	Yes	Yes

Features	4/8 SAN Switch Base and 4/8 SAN	4/16 SAN Switch and 4/16 SAN	4/32B SAN Switch and 4/32B SAN	4/64 SAN Switch and 4/64 SAN	4/256 SAN Director and 4/256
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	Switch	Switch Power Pack	Switch Power Pack	Switch Power Pack	SAN Director Power Pack
<b>Targeted Environment</b>	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers
<b>Port Bandwidth</b>	4Gbit/sec	4Gbit/sec	4Gbit/sec	4Gbit/sec	4Gbit/sec
<b>Aggregate device bandwidth</b>	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
<b>OS Support</b>	<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>				
<b>Storage system support</b>	<b>XP, EVA, MSA</b>				
<b>Ports</b>	8 Enabled 16 Max	16 Enabled	16 Min 32 Max	32 Min 64 Max	Up to 384
<b>SFP</b>	HP	HP	HP	HP	HP
<b>Advanced Trunking</b>	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
<b>Form factor</b>	1U	1U	1U	2U	14U
<b>Zoning Software</b>	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
<b>Hot plug, redundant power supplies</b>	No	No	Yes	Yes	Yes
<b>Hot plug fans</b>	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
<b>Targeted Environment</b>	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers
<b>Port Bandwidth</b>	8Gbit/sec	4Gbit/sec	4 Gbit/sec Ethernet: 1 Gbit/sec	4 Gbit/sec Ethernet: 1 Gbit/sec
<b>Aggregate device bandwidth</b>	320 Gbit/sec end-to-end	192 Gbit/sec end-to-end	128 Gbit/sec end to end	N/A
<b>OS Support</b>	<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>			
<b>Storage system support</b>	<b>XP, EVA, MSA</b>			
<b>Ports</b>	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
<b>SFP</b>	B-series	HP	HP	HP
<b>Advanced Trunking</b>	Optional Upgrade	Optional Upgrade	Optional Upgrade	Optional Upgrade to chassis
<b>Adaptive Networking</b>	Included with Power Pack+ or Optional Upgrade	No	No	Optional Upgrade to DC SAN Director Backbone Chassis
<b>Form factor</b>	Embedded	Embedded	1U	Blade in SAN Director
<b>Zoning Software</b>	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
<b>Hot plug, redundant power supplies</b>	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes	Yes, in SAN Director chassis
<b>Hot plug fans</b>	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes	Yes, in SAN Director chassis

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## Configuration Information

### Step 1 – Base Configuration

Select one:



Model	Model Description	Part Number
<b>4/64 SAN Switch Power Pack</b>	4/64 SAN Switch with 32 active ports; rackmount kit; accessory kit (enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, serial cable, Advanced Fabric OS, Advanced Web Tools, Advanced Zoning, Fabric Watch, Advanced Performance Monitor, Extended Fabric, ISL Trunking. <b>NOTE: Requires optical transceivers listed below</b>	AE496A
<b>4/64 SAN Switch Full</b>	4/64 SAN Switch with 64 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 <b>NOTE: Requires optical transceivers listed below</b>	AG457A
<b>4/64 SAN Switch Base</b>	4/64 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 and Advanced Zoning. Includes serial cable <b>NOTE: Requires optical transceivers listed below</b>	AE495A
<b>16 port upgrade license</b>	16 port upgrade license for 4/64 SAN Switch (base model) and 4/64 SAN Switch Power Pack model	T4411A

## Step 2 – Options

Select each type of required options with quantities specified:

	Model Description	Quantity	Part Number
<b>4 Gb Transceivers</b>	4Gb shortwave transceiver- Single Distance	1	A7446B
	<ul style="list-style-type: none"> <li>ε 4Gb performance: 150 meters between devices</li> <li>ε 2Gb performance: 300 meters between devices</li> <li>ε 1Gb performance: 500 meters between devices</li> </ul>		
<b>2 Gb Transceivers</b>	4Gb Long Wave transceiver - 10km	1	AE493A
	Short Wave, 300 m, 2X, FC	1	A6515A
	Long Wave - 10 km	1	A6516A
	Long Wave - 35 km	1	300836-B21
<b>2 Gb optical cables</b>	<b>LC-LC for between two 2 Gb or 4Gb devices</b>		
	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
	<b>LC-SC for between a 1 Gb and a 2 Gb device</b>		
	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

## Step 3 – Optional Software

<b>Software for 4/64 SAN Switch</b>	Data Center Fabric Manager Enterprise	T5542A
	Power Pack Software Bundle	T4412A
	<b>NOTE: The Power Pack Software Bundle kit includes Fabric Watch, ISL Trunking, Extended Fabric, and Advanced Performance Monitor.</b>	
	Extended Fabric	313458-B21
	Fabric Watch	313454-B21
	Advanced Performance Monitor	313450-B21
	ISL Trunking	313452-B21
	Secure Fabric OS	332925-B21

<b>Fibre Channel Standards And Revisions</b>	FC-FG Rev 3.5	FC-AL Rev. 4.5	FC-FLA Rev 2.7	FC-PLDA Rev 2.1	FC-VI Rev 1.5
	FC-PH-2 Rev 7.4	FC-GS-2 Rev 5.3	FC-PH-3 Rev 9.4	FC-SW Rev 3.3	IPFC RFC 2625
	FC-AL-2 Rev. 7.0	FC-PH Rev 4.3			

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## Technical Specifications

<b>System Architecture</b>	<b>Fibre Channel ports</b>	64 ports, universal (E, F, and FL)
	<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>Certified maximum</b>	Refer to SAN Design Guide for current configuration information: <a href="http://h18006.www1.hp.com/products/storageworks/san/documentation.html">http://h18006.www1.hp.com/products/storageworks/san/documentation.html</a>
	<b>Interoperability</b>	<ul style="list-style-type: none"> <li>z SAN Switch 8</li> <li>z SAN Switch 16</li> <li>z SAN Switch 8-EL</li> <li>z SAN Switch 16-EL</li> <li>z SAN Switch 2/8v</li> <li>z SAN Switch 2/16v</li> <li>z SAN Switch 2/16N</li> <li>z SAN Switch 2/16</li> <li>z SAN Switch 2/16-EL,</li> <li>z Core Switch 2/64</li> <li>z SAN Switch 2/32</li> <li>z SAN Director 2/128</li> <li>z 4/256 SAN Director</li> <li>z 4/64 SAN Switch</li> <li>z 4/32 SAN Switch</li> <li>z 4/32B SAN Switch</li> <li>z 4/8 SAN Switch</li> <li>z 4/16 SAN Switch</li> <li>z 8/8 SAN Switch</li> <li>z 8/40 SAN Switch,</li> <li>z 8/80 SAN Switch</li> <li>z DC04 SAN Director</li> <li>z DC SAN Backbone Director</li> <li>z Brocade 4Gb SAN Switch for HP p-Class BladeSystem</li> <li>z Brocade 4Gb SAN Switch for HP c-Class BladeSystem</li> <li>z MSA SAN Switch 2/8</li> <li>z HP 400 MP-Router</li> </ul>
	<b>Performance</b>	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
	<b>ISL Trunking</b>	Up to eight 4.25 Gbit/sec ports per ISL trunk; up to 32 Gbit/sec per ISL trunk
	<b>Aggregate bandwidth</b>	512 Gbit/sec end to end
	<b>Fabric latency</b>	<2.4 µsec with no contention, cut-through routing at 4 Gbit/sec
	<b>Maximum frame size</b>	2112-byte payload
	<b>Classes of service</b>	Class 2, Class 3, Class F (inter-switch frames)
	<b>Port types</b>	FL_Port, F_Port, and E_Port; self-discovery based on switch type (U_Port)
	<b>Data traffic types</b>	Fabric switches supporting unicast and broadcast
	<b>Media types</b>	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 100 km (62.1 mi). Distance depends on fiber optic cable and port speed.
	<b>Fabric services</b>	Simple Name Server; Registered State Change Notification (RSCN). Optional fabric services include: Advanced Zoning; Fabric Watch; Extended Fabrics; ISL Trunking; Advanced Performance Monitoring; WEB TOOLS, Enhanced group Management,
	<b>Options</b>	SFP media



<b>Management</b>	<b>Management software supported</b> <b>Management access</b>	Telnet; SNMP (FE MIB, FC Management MIB); Advanced WEB TOOLS; Enhanced group Management, Data Center Fabric Manager 10/100 Ethernet port (RJ-45); Serial port (RS-232); in-band through Management Server
<b>Mechanicals</b>	<b>Diagnostics</b> <b>Enclosure</b>  <b>Size</b>	POST and embedded online/offline diagnostics Non-port side to port side (port side exhaust); back-to-front airflow; power from rear; 2.0U, 19-in.-EIA compliant Width: 42.87 cm (16.88 in) Height: 8.60 cm (3.39 in) Depth: 61.0 cm (24.02 in)
<b>Environment</b>	<b>System Weight</b> <b>Temperature</b>  <b>Humidity</b> <b>Altitude</b>  <b>Shock</b>  <b>Vibration</b>	13.7 kg (30.2 lb) - with dual power supply, no SFP Operating: 0°C to 40°C (32°F to 104°F) Non-operating: -25°C to 70°C (-13°F to 158°F) Operating: 20 to 85 percent non-condensing at 40°C (104°F) Operating: Up to 3000 meters (9842 feet) Storage: Up to 12 kilometers (39,370 feet) Operating: 20 g, 6 ms half-sine Non-operating: 15 g, 12-18 ms trapezoid 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
<b>Airflow</b>	<b>High speed</b> <b>Low speed (65%)</b>	40 CFM (cu. ft./min) 27.5 CFM
<b>Power</b>	<b>Maximum output</b> <b>System power consumption</b> <b>Nominal input voltage</b> <b>Input line frequency</b> <b>Minimum input voltage</b> <b>Maximum input voltage</b> <b>BTU rating (80% efficiency)</b> <b>Inrush current</b>	300 Watts 175 Watts max 90- 264 VAC, Universal 47 - 63 Hz 90 VAC 264 VAC 756 BTU/hr Maximum of 15 amps for period between 10-150 ms at 50° Celsius (122° Fahrenheit)

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