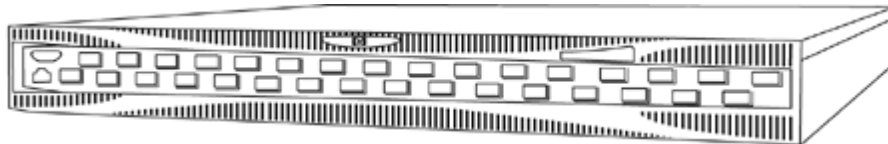


Overview



Introduction

The HP StorageWorks SAN Switch 2/32 provides the configuration flexibility, manageability, scalability, and performance needed by corporate storage network infrastructures.

Whether incorporated into an expansive core fabric or tactically placed at the edge, this switch delivers the performance of 2 Gb technologies and the ability to support very large fabric implementations.

The SAN Switch 2/32 offers storage networking features not found in any other switch, such as hardware Zoning. It also includes redundant power supplies, cooling and hot-plug optics; making it ideal for supporting medium to large corporate infrastructure implementations where redundant fabrics are part of the network design. Designed to the Fibre Channel standard, it is capable of operating independently or in core/edge fabrics.

The SAN Switch 2/32 Power Pack includes the SAN Switch 2/32 with additional software: Fabric Watch, ISL Trunking, Remote Switch, Extended Fabric, and Performance Monitor.

The SAN Switch 2/32 Power Pack provides the SAN administrator with the necessary tools to monitor the health and performance of the network, while also ensuring the highest levels of security, scalability and manageability. Available pre-configured on the switch or as an upgrade, Power Pack also provides the foundation for integration into HP OpenView Storage Area Manager (SAM), enabling infrastructure management through a single-pane-of-glass. The Power Pack tools can be ordered separately, as well.

Key Features and Benefits

- **Reduced Total Cost of Ownership (TCO) for SAN Infrastructure**
 - Enables storage consolidation, simplified management of data center SAN environment
- **Interoperability with the more than 1 MILLION port HP SAN Switch installed base**
- **Highest integration with HP Open View Storage Area Manager via:**
 - SAN Switch API
 - SAN Switch element managers
 - HP StorageWorks Fabric Manager
- **Highest integration with HP Open View Storage Area Manager via:**
 - SAN Switch API
 - SAN Switch element managers
 - HP StorageWorks Fabric Manager
- **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 and 2Gb SAN Switches

Models

HP StorageWorks SAN Switch 2/32 Models	StorageWorks SAN Switch 2/32	240603-B21
	StorageWorks SAN Switch 2/32 Power Pack	333764-B21
	Power Pack Software for SAN Switch 2/32	313448-B21

Product Highlights

SAN Switch 2/32

- Simplifies enterprise SAN deployment by combining higher edge switch port density with exceptional scalability, performance and reliability
- Delivers 32-ports in a 1.5U enclosure and up to 384-ports in a single 42U cabinet, facilitating manageable SAN fabrics composed of thousands of ports
- Meets enterprise level availability requirements with redundant, hot pluggable components, no-single-points-of-failure within the switch
- Provides 1 Gb and 2 Gb operation today
- Employs optional Inter-Switch Link (ISL) Trunking to provide a high-speed data path between switches

Configuration Support

<http://h18000.www1.hp.com/products/storageworks/san/documentation.html>

High-availability features

- Redundant hot swappable N 1 cooling Fans (three units standard)
- Redundant, hot swappable power supplies (two units standard)
- Field replaceable motherboard
- 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

Power and packaging

36U high StorageWorks Cabinets

42U high StorageWorks 9000 Cabinets

NOTE: Temporary power and packaging restrictions apply: 12, SAN switch 2/32 units per cabinet.

Software Components, Standard

Frame Filtering

An ASIC based capability in the 2 Gb/s 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.

Advanced Zoning

In the 2 Gb 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.

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

Software Components, Optional

SAN Switch 2/32 Power Pack Software Bundle The Power Pack Software Bundle for SAN Switch 2/32 includes the following:

- Fabric Watch
- Performance Monitor
- Extended Fabric
- Remote Switch
- 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.

Remote Switch

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

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 2 Gb switch needs its own license. The switch operating system views the trunk as a single, high bandwidth resource (up to 8 Gb) when routing connections between switches. Connections are load-balanced across the individual links, which comprise the logical trunk group. Each 16-port switch can have a total of four separate 4-port Trunk groups.

Fabric Manager, v4.1.1

Fabric Manager is a highly scalable, Java-based application that manages multiple switches and multiple fabrics (up to eight) in real time, helping SAN administrators with SAN configuration, monitoring, dynamic provisioning, and daily management. SAN administrators gain rapid access to critical SAN information across multiple personality fabrics, including both Fabric OS SANs and enhanced Secure Fabric OS SANs.

Product Highlights

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 - 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, please 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.

In addition, available service offerings include a full range of 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 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.

Service and Support, HP Care Pack, and Warranty Information

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.

NOTE: 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>.

Family Information

Features	SAN Switch 8-v	SAN Switch 2/16	SAN Switch 2/32	SAN Core 2/64
Targeted Environment	Workgroups, Departments	Departments, Data Centers	Departments, Data Centers	Data Centers
Port Bandwidth	200 MB/s	200 MB/s	200 MB/s	200 MB/s
Aggregate device bandwidth	800 MB/s	1600 MB/s	1600 MB/s	1600 MB/s
OS Support	Refer to SAN Design Guide pointer http://h18000.www1.hp.com/products/StorageWorks/san/documentation.html			
"QuickLoop" emulation	No	Yes (Included)	No	No
Storage system support	MA8000 EMA12000/16000 EVA, XP, VA	MA8000 EMA12000/16000 EVA, XP, VA	MA8000 EMA12000/16000 EVA, XP, VA	MA8000 EMA12000/16000 EVA, XP, VA
Ports	8 SFP	16 SFP	32 SFP	32 SFP Base 64 Total
Cascading support	Yes	Yes	Yes	Yes
Advanced Trunking	Optional	Optional	Included	Optional
Form factor	1U	1U	1.5U	14U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	Yes	Yes	Yes
Hot plug fans	No	Yes	Yes	Yes
Enterprise Backup Solution (EBS) support**	Yes	Yes	Yes	Yes
**NOTE: Requires correct Host Bus Adapter. Not all Operating Systems Supported.				

Configuration Information

Step 1 – Base Configuration and Power Pack

Select one:

Model	Model Description	Part Number
StorageWorks SAN switch 2/32	SAN Switch 2/32-32 port switch; rackmount kit; accessory kit (manuals on CD, enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, Advanced Fabric OS, Advanced Web Tools and Advanced Zoning. Includes serial cable.	240603-B21
StorageWorks SAN Switch 2/32 PowerPak	SAN Switch 2/32 32-port switch rackmount kit; accessory kit (manuals on CD, enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, Fabric Watch, ISL Trunking, Remote switch, Extended Fabric, Performance Monitor. Includes serial cable.	333764-B21

Step 2 – Additional Options

Optical Transceivers	Short Wave, 300 m, 2X, FC	A6515A
	Long Wave - 10 km	A6516A
	Long Wave - 35 km	300836-B21

2 Gb optical cables	LC-LC for between two 2 Gb devices	
	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 for between a 1 Gb and a 2 Gb device	
	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

Step 3 – Optional Software

Optional Software for SAN Switch 2/32	Fabric Manager, v4.x Base 10 domains	A7390A
	Fabric Manager, v4.x Enterprise 200 domains, 8 fabrics	A7389A
	Fabric Manager, v3 to v4.x upgrade	A7391A
	Fabric Manager v4 base to v4.x enterprise upgrade license	A7392A
	Power Pack Software Bundle	313448-B21
	NOTE: The Power Pack Software Bundle kit includes Fabric Watch, ISL Trunking, Remote Switch, Extended Fabric, and Advanced Performance Monitor.	
	Extended Fabric	313458-B21
	Remote Switch	313460-B21
	Fabric Watch	313454-B21
	Advanced Performance Monitor	313450-B21
	ISL Trunking	313452-B21
	Secure Fabric OS	332925-B21

Configuration Information

Fibre Channel standards and revisions	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			

Technical Specifications

Fibre Channel ports	32-ports, universal (E, F, and FL); up to eight 16-port Fibre Channel modules.	
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	
Performance	2.125 Gb per/sec line speed, full duplex	
Interoperability	SAN Switch 8, SAN Switch 16, SAN Switch 8-EL, SAN Switch 16-EL, Core Switch 2/64, SAN Switch 2/32	
Switch core	Non-blocking	
Fabric latency	<2 μ sec. with no contention, cut-through routing	
Hardware options	SFP media (Transceivers Optional, offered separately) Small form-factor pluggable (SFP); short wavelength (SWL) up to .18 mi (300m), long wavelength (LWL) up to 6.2 mi (10 km); distance depends on fiber-optic cable and port speed	
ISL Trunking	Up to four 2.125 Gb ports per ISL trunk; to 8.5 Gb per ISL Trunk	
Aggregate bandwidth	512 Gb end-to-end	
Switch latency	<2.1 μ sec any port to any port at 2 Gb, cut-through routing	
Maximum frame size	2112-byte payload	
Frame buffers	108 per 4-port group, dynamically allocated	
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); optional port type control	
Data traffic types	Fabric Switches supporting unicast, multicast (255 groups), and broadcast	
Media types	Hot pluggable, industry-standard small form factor pluggable (SFP), LC connector; Short-Wavelength Laser (SWL), up to 1,640 ft/500 m; Long-Wavelength Laser (LWL), up to 6.2 mi/10 km; distance depends on fiber optic cable and port speed (optional)	
Laser	Short-wave, 2Gb up to 975 ft/300 m; long-wave up to 6.2 mi/10 km	
Fabric services	Simple Name Server; Registered State Change Notification (RSCN); Alias Server (multicast); Advanced Zoning; WebTools; Fabric Watch; ISL Trunking (optional); Advanced Performance Monitoring	
Supported Software	Telnet, SNMP, WebTools, Zoning, Fabric Watch, Fabric Manager 3.0 and higher	
High Availability	Power supplies	Dual hot swappable
	Fans	Hot swappable
	Input power	Dual AC inputs
	Chassis power	Redundant AC-DC power supply modules
	Cooling	Three blower assembly modules (two operational required)
Management	Telnet; SNMP (FE MIB, FC Management MIB); WebTools; Fabric Watch; Fabric Access layer	
Management access	10/100 Ethernet (RJ-45), in-band over Fibre Channel (requires fabric); two serial ports (DB-9) per control processor module	
Diagnostics	POST and embedded online/offline diagnostics	
Mechanical Specifications	Mounting	Rack-mountable in a standard 19-in (48.26 cm) EIA rack; Telco-style mid-mounting available
	Ports per rack	42U rack
	Enclosure	Rear panel-to-door airflow
Dimensions	Width	16.87 in (42.855 cm)
	Height	2.58 in (6.55 cm) 1.5U
	Depth	23.06 in (58.564 cm)
	Weight	35.8 lb (16.24 kg) - with dual power supplies
Environment	Temperature	Operating 50° to 104° F (10° to 40° C) (operating) Non-Operating -13° to 158° F (-25° to 70° C)
	Humidity	Operating 20% to 85% non-condensing at 104° F (40° C)
	Altitude	0 to 3 km

Technical Specifications

	Shock	20 g, 6 ms, half sine	
	Vibration	Operating	0.5 g p-p, 5 to 500 Hz
		Non-operating	2.0 g, 5 to 500 Hz
Power	Supported power range	Nominal	100-240 VAC
		Maximum	5.0 amp maximum
	Frequency	47 to 63 Hz	

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