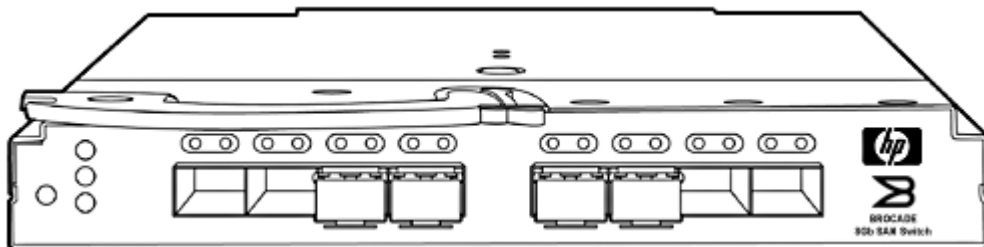


### Overview

The Brocade 8Gb SAN Switch for HP BladeSystem c-Class delivers an easy to manage embedded Fibre Channel switch with 8 Gbps performance. The Brocade 8Gb SAN Switch hot-plugs into the back of the HP BladeSystem c-Class Enclosure. The integrated design frees up rack space, enables shared power and cooling, and reduces cabling and small form-factor pluggables. Enhanced trunking support with external switches provides higher bandwidth to enable demanding applications such as server virtualization. New features in the Power Pack+ option enable you to manage data flow to maintain optimized application performance. The 12 or 24 auto-sensing ports support lower bandwidth components for investment protection and an upgrade license enables you to 'pay as you grow'. The Brocade 8Gb SAN Switch saves space and cost, significantly simplifies the SAN environment, enables easier deployment and management, and delivers the performance required for emerging higher throughput applications.



**Brocade 8Gb SAN Switch**

#### **Integrated SAN connectivity**

- Enables data center consolidation with HP BladeSystem c-Class through a state-of-the-art zero-footprint design while lowering cost through shared power and cooling, fewer cables and SFPs, and a reduction in space.

#### **8 Gbps storage networking**

- Enables support of virtualized environments and other emerging technologies through high-speed technology that doubles the performance of the storage network. Both internal and external facing ports auto-sense lower bandwidth components for flexibility and investment protection (2, 4, or 8 Gb).

#### **Non-blocking architecture**

- Includes connection speed support for all ports to provide a high-performance system with aggregate bandwidth of up to 384 Gbps (24 ports x 8 Gbps x 2 for full duplex).

#### **ISL Trunking performance enhancements**

- Now providing support for up to a single trunk made up of all eight SAN ports for a total of up to 64 Gbps balanced throughput. Trunking of the SAN-facing ports with external Brocade or HP B-series switches provides a high-bandwidth solution while lowering costs through fewer SFPs and cables. F-Port Trunking supported in Access Gateway mode.

#### **Adaptive Networking Services**

- Enables organizations to better manage data flows and meet service level agreements while maintaining optimized application performance in virtual environments with new Adaptive Networking services, including Adaptive Fabric Quality of Service, Traffic Isolation, and Ingress Rate Limiting.

#### **Access Gateway mode**

- Employs N\_Port ID Virtualization (NPIV), an ANSI T11 standard, to enable interoperability with other SAN fabrics and eliminate domain considerations while improving SAN scalability.

### Overview

#### **Broad range of management tools and SMI-s conformance**

- Integrates with HP Onboard Administrator for BladeSystem, HP Systems Insight Manager, and HP Storage Essentials and leverages HP B-series management and monitoring tools. An SMI-s API enables the use of industry standard interfaces to integrate management with other applications.

#### **Available in three models with a scalable licensing option**

- Available in 12-port, 24-port and 24-port Power Pack+ Full Fabric models. Choose the features and management options that make sense for your needs. In addition, enables 'pay as you grow' scalability for easy, scalable growth in dynamic business environments with a non-disruptive 12-port upgrade for the 12-port model.
- 

### What's New

- **New RoHS compliant HP SAN switches**

**NOTE:** Restriction of Hazardous Substances Directive or RoHS is a directive adopted by the European Union that restricts the use of certain hazardous materials in the manufacture of various types of electronic and electrical equipment. The RoHS compliant products with new part numbers listed in this document are functionally equivalent to the corresponding products with old part numbers and are fully interchangeable.

### Product Highlights

#### Advanced Fabric Services

- Hardware Enforced Zoning (included)\*
- Dynamic Path Selection (included)\*
- WebTools (included)
- Enhanced Group Management (EGM)
- Power Pack+ fabric services software bundle (optional)
  - Adaptive Networking\*
  - ISL Trunking
  - Fabric Watch\*
  - Extended Fabrics\*
  - Server Application Optimization (SAO)\*\*
  - Advanced Performance Monitoring\*
- Secure Fabric OS (included in base FOS)\*
- SAN Network Advisor (optional)

\* Not supported in Brocade Access Gateway mode.

\*\* Brocade 804 8Gb FC HBA for HP c-Class BladeSystem required.

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#### Manageability

- WebTools (included)
  - Enhanced Group Management (EGM)
  - Advanced Performance Monitoring (optional Power Pack+ upgrade)
  - HP OnBoard Administrator (included with HP BladeSystem)
  - HP Systems Insight Manager (included with HP BladeSystem)
  - HP Storage Essentials (optional)
  - API
  - SNMP
  - SMI
- 

#### Interoperability

Brocade Access Gateway enables Brocade embedded SAN switches to interoperate with other SAN fabrics running supported firmware. While in Brocade Access Gateway mode, the device must also be connected to an NPIV-enabled edge switch or director. Supported edge environments are listed in the Brocade Fabric OS® release notes.

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### Software Components, Standard

#### Access Gateway\*

Brocade Access Gateway Mode enables seamless connectivity for Brocade embedded SAN switches to other supported SAN fabrics, enhances scalability, and simplifies manageability. Utilizing N\_Port ID Virtualization (NPIV) standards, Brocade Access Gateway eliminates switch/domain considerations.

\* Brocade Access Gateway mode does not support many switch-related features, including most features in the Power Pack+ bundle. Please refer to the Fabric OS Release Notes and Access Gateway Administrator's Guide for details.

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#### Frame Filtering

A special B-Series 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 (optional).

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### Product Highlights

#### Advanced Zoning

Zoning (Port and Worldwide Name), as well as Access Control, are enforced by hardware within the ASIC that provides the same simple administration previously enforced only with software. Hardware enforcement enables the highest level of zoning enforcement without any impact to performance. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.

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#### WebTools - included in Brocade Fabric OS

Enables organizations to monitor and manage single Fibre Channel switches and monitor small 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.

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#### 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.

SAN Network Advisor Professional, Professional Plus and Enterprise enable EGM functionality. Customers have EGM functionality enabled within the hardware product and need only to make the decision around which SAN Network Advisor application is right for them.

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#### Dynamic Path Selection

Improves performance by dynamically routing data traffic across multiple links and trunk groups.

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#### Secure Fabric OS - included in Brocade Fabric OS

Secure Fabric OS features have been fully integrated into the base Fabric OS since v5.3.0. These comprehensive security features for SAN fabrics provide policy-based security protection for more predictable change management, assured configuration integrity and reduced risk of downtime. Security methods supported include 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. These features enable organizations to customize SAN security to meet specific policy requirements and work in conjunction with Advanced Zoning to further secure access to the SAN, simplify storage management, and reduce provisioning time.

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### Software Components, Optional

#### Power Pack+ Software Bundle

The Power Pack+ Software Bundle includes:

- Adaptive Networking\*
- ISL Trunking
- Advanced Performance Monitoring\*
- Server Application Optimization (SAO)\*\*
- Extended Fabrics\*
- Fabric Watch\*

\* Not supported in Access Gateway mode

\*\* Brocade 804 8Gb FC HBA for HP c-Class BladeSystem required.

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### Product Highlights

#### **Adaptive Networking Services**

This suite of tools optimizes fabric behavior and ensures ample bandwidth for mission-critical applications. The tools currently include Quality of Service (QoS), Ingress Rate Limiting, Traffic Isolation, and Top Talkers. By assigning zones a high, medium, or low priority, QoS allocates bandwidth in the event of congestion to expedite high-priority traffic and keep all traffic flowing. Ingress Rate Limiting restricts data flow from less-critical hosts at preset bandwidths. Traffic Isolation assigns high-bandwidth data flows to specific ISLs. And Top Talkers measures the top bandwidth-consuming traffic in real time for a specific physical or virtual device, or end to end across the fabric.

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#### **ISL Trunking**

For high performance and seamless failover, this optional license logically groups up to eight E-ports (switch mode) or F-ports (Access Gateway mode) to provide a high bandwidth trunk between two Brocade or HP B-Series switches. Each switch needs its own license. The fabric operating system views the trunk as a single, high bandwidth ISL resource (up to 64 Gbps when routing connections between 8 Gbps capable switches). Connections are load-balanced across the individual links, which comprise the logical trunk group.

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#### **Fabric Watch**

Fabric Watch enables each switch to monitor the health of 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 Monitoring**

This enabling technology helps administrators monitor application data traffic 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 maximizing SAN performance.

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#### **Extended Fabrics**

Extends the native Fibre-Channel traffic up to 590 km. Extended Fabrics increases 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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#### **Server Application Optimization**

Server Application Optimization (SAO) license improves overall application performance for physical servers and virtual machines. SAO, when deployed with Brocade Fibre Channel HBAs, extends Brocade Adaptive Networking from the Brocade SAN fabric to the server infrastructure. This delivers application-level, fine-grain Quality of Service (QoS) management to the HBAs and related server applications.

Solution Requirements:

- SAO license must be installed on the edge (server connected) switch
  - Adaptive Networking (AN) license must be installed on the edge (server connected) switch
  - SAO requires Brocade <> HBA installed in the server
-

### Product Highlights

#### **SAN Network Advisor Professional**

HP SAN Network Advisor Professional is a management application available at no-charge and comes with B-series SAN Switches and:

- Allows management of a single Fabric OS (FOS) fabric (up to a 1,000 switch ports) at a time
- Performs group switch management beyond the scope of Web Tools
- Does not offer management of the SN8000B 8-Slot or DC SAN Backbone Directors

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 SAN Network Advisor Professional and have a small SAN environment may over time feel the need for an enterprise-class product (SAN Network Advisor 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 SAN Network Advisor Professional to SAN Network Advisor Enterprise.

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#### **SAN Network Advisor Enterprise and Professional+**

HP SAN Network Advisor Enterprise and Professional+ are the enterprise-class products that support FOS products as well as FOS and M-EOS products together. SAN Network Advisor Enterprise provides complete SN8000B 8-Slot Director and DC SAN Backbone Director management including enterprise-class features/environments such as FICON, Fibre Channel Routing, FCIP, adaptive networking, etc while HP SAN Network Advisor Professional+ provides the same feature set except for support for the SN8000B 8-Slot Director, DC SAN Backbone Director, and FICON.

HP SAN Network Advisor Enterprise delivers unprecedented scalability, up to 24 fabrics and 9,000 switch ports, while HP SAN Network Advisor Professional+ scales to 4 SAN Fabrics and 2560 switch ports. To accommodate growth, there is an upgrade available to SAN Network Advisor Enterprise from SAN Network Advisor Professional Plus.

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

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### BladeSystem compatibility

The Brocade 8Gb SAN Switch for HP BladeSystem c-Class must be deployed within the HP BladeSystem c-Class infrastructure and is compatible only with HP BladeSystem c-Class Enclosures.

#### **HP ProLiant Servers**

ProLiant BLc server blades (All ProLiant BLc server blades with support for Fibre Channel Mezzanine cards)

#### **HP Integrity Servers**

Integrity BLc server blades

#### **HP FC HBA Mezzanines**

All HP Fibre Channel Mezzanine cards for Bladesystem c-Class are supported

- Please refer to HP FC HBA Mezzanine Product QuickSpecs for server support details. 8Gb FC HBA Mezzanie support with the Brocade 8Gb SAN Switch requires HP FOS v6.2.0d or later. Brocade 804 8Gb FC HBA requires FOS v6.3.1c or 6.4.0b or later.

#### **HP BladeSystem c-Class Enclosures**

HP BladeSystem c7000 and c3000 Enclosures

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### Product Highlights

#### Switch interoperability

##### HP B-Series Switches, Directors, and Routers

##### Gen 5 Fibre Channel 16 Gb Switches and Directors

##### 8 Gb Switches and Directors

##### 4 Gb Switches and Directors

##### Virtual Connect

##### Multi-Protocol Routers and Gateways

- SN8000B Director Switch (Enterprise)
- SN6500B Fibre Channel Switch (High-end)
- SN6000B Fibre Channel Switch (Midmarket)
- SN3000B Fibre Channel Switch (Entry)
- Embedded switch for HP 4400 Enterprise Virtual Array
- 8/8 SAN Switch
- 8/24 SAN Switch
- 8/40 SAN Switch
- Encryption SAN Switch
- DC04 SAN Director
- 8/80 SAN Switch
- DC SAN Backbone Director
- Brocade 4Gb SAN Switch for HP c-Class BladeSystem
- 4/8 SAN Switch
- 4/16 SAN Switch
- 4/32 SAN Switch
- 4/32B SAN Switch
- 4/64 SAN Switch
- 4/256 SAN Director
- HP Virtual Connect 4Gb Fibre Channel Module for HP c-Class BladeSystem
- HP Virtual Connect 8Gb 24-port Fibre Channel Module
- HP Virtual Connect 8Gb 20-port Fibre Channel Module
- MPX200 Multiprotocol Router (iSCSI, FCIP, FC, FCoE) and Data Migration\*
- Multi-protocol Extension Blade
- 10/24 Blade for DC SAN Directors
- 1606 Extension SAN Switch
- 2408 FCoE Converged Network Switch
- Multi-Protocol Router Blade

\* Supported in the same fabric with Brocade 8Gb SAN Switch for HP BladeSystem c-Class, but not directly connected.

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

#### Warranty

(1-1-1) Hardware Warranty - One-year on-site warranty, normal business hours, 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.

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#### Services Included with Product Purchase

The Power Pack+ Software Bundle includes one year of HP standard business hours, standard business days Software Support (includes software technical support and software product and documentation updates).

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#### 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 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/>.

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#### Software Product Services

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



### 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

The embedded SAN switches for HP BladeSystem c-Class are not covered under the BladeSystem Enclosure Care Packs; the SAN switches carry separate Care Packs. SAN Switch Care Pack service level support should always be uplifted to match existing storage or server service levels.

**NOTE:** The HP Care Pack service part numbers below covers the Brocade 8/12c SAN Switch & Brocade 8/24c SAN Switch

#### Hardware Services On-site Service

HP 3 Years Next business day c-Class SAN Switch Hardware Support	UE436E
HP 3 Years 4 hour 13x5 c-Class SAN Switch Hardware Support	UE437E
HP 3 Years 4 Hour 24 hours	UE438E
HP 3 Years 6 Hour 24x7 Call-To-Repair c-Class SAN Switch Hardware Support	UE439E
HP 4 Years Next business day c-Class SAN Switch Hardware Support	UE440E
HP 4 Years 4 hour 13x5 c-Class SAN Switch Hardware Support	UE441E
HP 4 Years 4 Hour 24 hours	UE442E
HP 4 Years 6 Hour 24x7 Call-To-Repair c-Class SAN Switch Hardware Support	UE443E
HP 5 Years Next business day c-Class SAN Switch Hardware Support	UE444E
HP 5 Years 4 hour 13x5 c-Class SAN Switch Hardware Support	UE445E
HP 5 Years 4 Hour 24 hours	UE446E
HP 5 Years 6 Hour 24x7 Call-To-Repair c-Class SAN Switch Hardware Support	UE447E
HP Installation Storage Switches Service	U5988E

**NOTE:** The HP Care Pack service part numbers below covers the Brocade 8/24c SAN Switch Power Pack+

#### Hardware Services On-site Service

##### Support Plus

Onsite HW support, 8am-9pm, M-F, 4hr response and SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, 3 Years, Electronic	UL246E
Onsite HW support, 8am-9pm, M-F, 4hr response and SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, 4 Years , Electronic	UL248E
Onsite HW support, 8am-9pm, M-F, 4hr response and SW Tech support offsite, onsite at HP's discretion, 8am-9pm, M-F 2hr response time excl. HP holidays, 5 Years , Electronic	UL250E
<b>Support Plus 24 - Recommended</b>	
Onsite HW support 24x7, 4hr response and SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, 3 Years, Electronic	UL247E
Onsite HW support 24x7, 4hr response and SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, 4 Years, Electronic	UL249E
Onsite HW support 24x7, 4hr response and SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays, 5 Years, Electronic	UL251E

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

#### 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. **Support Plus 24 is the recommended service for this product.**

- 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

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#### 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://h20219.www2.hp.com/services/cache/10950-0-0-225-121.html>

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#### 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>.

### Configuration Information

#### Step 1 – Base Configurations

Select one:

Model Name	Model Description	Part Number
<b>HP B-Series 8/12c SAN Switch BladeSystem c-Class</b>	(1) 8 Gb SAN Switch; 12 ports enabled for any combination (internal and external); two (2) short wave 8 Gb SFP+s; full fabric connectivity; documentation	AJ820B*
<b>HP B-Series 8/24c SAN Switch BladeSystem c-Class</b>	(1) 8 Gb SAN Switch; 24 ports enabled (16 internal, 8 external); four (4) short wave 8 Gb SFP+s; full fabric connectivity; documentation	AJ821B*
<b>HP B-Series 8/24c SAN Switch Pwr Pk+ BladeSystem c-Class</b>	(1) 8 Gb SAN Switch; 24 ports enabled (16 internal, 8 external); four (4) short wave 8 Gb SFP+s; full fabric connectivity; documentation and includes Power Pack+ Bundle and management tools (see software components, optional)	AJ822B*

\* The new part numbers for these models indicate RoHS compliance. Equivalent models with old part numbers may still be ordered until they are made obsolete. #0D1 may appear after this part number on your sales order when factory integration is indicated.

#### Step 2 – Additional Options

Select each type of required options with quantities specified:

##### Hardware:

Model Name	Model Description	Part Number
<b>8 Gb Optical Transceivers (SFP+s)</b>	Short Wave: HP 8Gb SW B-series FC SFP+	*AJ716A
	HP 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceiver	AJ716B
	HP 8Gb Long Wave B-series 10km Fibre Channel 1 Pack SFP+ Transceiver	AJ717A
	HP B-series 8Gb Extended Long Wave 25km Fibre Channel SFP+ Transceiver 1 Pack	AW538A
<b>4 Gb Optical Transceivers (SFPs)</b>	HP 4Gb Short Wave B-series Fibre Channel 1 Pack SFP Transceiver	AJ715A
	HP 4Gb Long Wave B-series 30km Fibre Channel SFP Transceiver 1 Pack	AN211A
<b>Optical cables</b>	<b>PremierFlex OM4 type cables</b>	
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A
	<b>LC-LC for between 4/8 Gb and 4/8 Gb Fibre Channel devices</b>	
	HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HP LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
	HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

\* AJ716A is End of Life (EOL), and is replaced by AJ716B because of RoHS compliance; however, the SKU is still orderable until supplies are diminished.

### Configuration Information

#### Software:

**Power Pack+ Software Bundle** For upgrading Full Fabric 8 Gb switches to Power Pack+. Includes bundled license for: T5521A

- Adaptive Networking
- ISL Trunking
- Advanced Performance Monitoring
- Fabric Watch
- Server Application Optimization\*
- Extended Fabrics

\* [Brocade 804 8Gb FC HBA for HP c-Class BladeSystem](#) required for support.

**Optional Software** Brocade 8 and 16 Gb SAN Switch for HP BladeSystem c-Class 12-port Upgrade LTU T5517A

HP B-series 8-24-port SAN Switch Adaptive Networking RTU T5524A

HP B-series 8-24 Port SAN Switch Server Application Optimization LTU TA756A

\*Fabric Watch \*T5521A

HP B-series 8-24 Port SAN Switch ISL Trunking LTU T5527A

\*Advanced Performance Monitoring \*T5521A

\*Extended Fabrics \*T5521A

HP B-series SAN Network Advisor Enterprise LTU TC352A

HP B-series SAN Network Advisor Professional Plus LTU TC353A

HP B-series SAN Network Advisor Professional Plus Upgrade LTU TC354A

\* In order to obtain Fabric Watch or Advanced Performance Monitoring or Extended Fabrics Software a purchase of the T5521A Power Pack+ Software Bundle is required.

### Family Comparison

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+	SN3000B 16Gb FC Switch and SN3000B 16Gb FC Power Pack+	SN6000B 16Gb FC Switch and SN6000B 16Gb FC Power Pack+
<b>Targeted Environment</b>	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments
<b>Fibre Channel Port Bandwidth</b>	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	16Gbit/sec	16Gbit/sec
<b>Aggregate device bandwidth</b>	128 - 384 Gbit/sec full duplex	256 - 384 Gbit/sec full duplex	384 - 640 Gbit/sec full duplex	768 - 1280 Gbit/sec full duplex	384 - 768 Gbit/sec full duplex	768 - 1536 Gbit/sec full duplex
<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/sandesinguide">http://www.hp.com/go/sandesinguide</a>					
<b>Storage system support</b>	<b>MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA</b>					
<b>FC Ports</b>	8 Enabled 24 Max	16 Enabled 24 Max	24 Enabled 40 Max	48 Enabled 80 Max	12 or 24 Enabled 24 Max	24 or 48 Enabled 48 Max
<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+ 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+ Upgrade	Included with Power Pack+ or Optional Upgrade
<b>Form factor</b>	1U	1U	1U	2U	1U	1U
<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	Optional	Yes
<b>Hot plug fans</b>	No	No	Yes	Yes	Yes (integrated with power supply)	Yes (integrated with power supply)

### Family Comparison

Features	2408 FCoE CN Switch and 2408 FCoE CN Switch Power Pack+	1606 Extension SAN Switch	Encryption SAN Switch
Targeted Environment	Workgroups, Departments	Data Centers	Data Centers
Fibre Channel Port Bandwidth	8Gbit/sec	8Gbit/sec	8Gbit/sec
Ethernet	10Gbit/sec Converged Enhanced Ethernet	1Gbit/sec Ethernet	N/A
Aggregate device bandwidth			512 Gbit/sec full duplex
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	<b>MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA</b>		
FC Ports	8 Enabled 8 Max	4 or 16 Enabled 16 Max	32 Enabled 32 Max
Ethernet Ports	24 Enabled 24 Max	2 or 6 Enabled 6 Max	N/A
SFP	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Optional Upgrade
Adaptive Networking	No	Included with Power Pack+ or Optional Upgrade	Optional Upgrade
Form factor	1U	1U	2U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes	Yes	Yes
Hot plug fans	Yes	Yes	

Features	SN8000B 8-Slot SAN Director Power Pack+	SN8000B 4-Slot SAN Director and 4-Slot SAN Director Power Pack+	DC SAN Backbone Director Power Pack+	DC04 SAN Director and DC04 SAN Director Power Pack+
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers	Traditional Data Centers	Traditional Data Centers
Port Bandwidth	Up to 16Gbit/sec	Up to 16Gbit/sec	8Gbit/sec	8Gbit/sec
Aggregate device bandwidth	16.4 Tbit/sec full duplex	8.2 Tbit/sec full duplex	4.1 Tbit/sec full duplex	2 Tbit/sec full duplex
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	<b>MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA</b>			
Ports	Up to 512 SFP	Up to 256 SFP	Up to 512	Up to 256
SFP	B-series	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack	Included with Power Pack or Optional Upgrade	Included with Power Pack+	Included with Power Pack+ or Optional

### Family Comparison

<b>Adaptive Networking</b>	Included with Power Pack	Included with Power Pack or Optional Upgrade	Included with Power Pack+	Included with Power Pack+ or Optional
<b>Form factor</b>	14U	9U	14U	9U
<b>Zoning Software</b>	Yes (included)	Yes (included)	Yes (Included)	Yes (Included)
<b>Hot plug, redundant power supplies</b>	Yes	Yes	Yes	Yes
<b>Hot plug fans</b>	Yes	Yes	Yes	Yes

Features	Embedded SAN Switch for EVA4400	Brocade 8Gb SAN Switch for HP c-Class BladeSystem	B-Series Multi-protocol Router Blade	B-Series Multi-protocol Extension Blade
<b>Targeted Environment</b>	Workgroups, Departments	Workgroups, Departments	Data Centers	Data Centers
<b>Port Bandwidth</b>	8Gbit/sec	8Gbit/sec	4 Gbit/sec FC Ethernet: 1 Gbit/sec	8 Gbit/sec FC Ethernet: 1 or 10 Gbit/sec
<b>Aggregate device bandwidth</b>	320 Gbit/sec full duplex	384 Gbit/sec full duplex	N/A	N/A
<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>MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/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	16 8Gb FC and 10 1GbE or 2 10GbE
<b>SFP</b>	B-series	B-series	HP	B-series
<b>Advanced Trunking</b>	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Optional Upgrade to chassis	Optional Upgrade to chassis
<b>Adaptive Networking</b>	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Optional Upgrade to chassis	Optional Upgrade to chassis
<b>Form factor</b>	Embedded	Embedded	Blade in 4/256, DC SAN Back, or DC04 SAN Dir	Blade in SN8000B and DC SAN Directors
<b>Zoning Software</b>	Embedded	Yes (Included)	Yes (Included)	Yes (Included)
<b>Hot plug, redundant power supplies</b>	Yes (Included)	Yes, in BladeSystem Enclosure	Yes, in director chassis	Yes, in director chassis
<b>Hot plug fans</b>	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes, in director chassis	Yes, in director chassis

### Technical Specifications

<b>Fibre Channel ports</b>	Brocade 8/12c SAN Switch model: 12 - 8 Gb ports in any internal/external port combination (ships with two 8 Gb short wave SFP+s) Brocade 8/24c SAN Switch models: 16 internal 8 Gb ports and 8 external 8 Gb auto-sensing ports (ships with four 8 Gb short wave SFP+s) <a href="http://h18006.www1.hp.com/products/storageworks/san/documentation.html">http://h18006.www1.hp.com/products/storageworks/san/documentation.html</a>	
<b>Device support and Scalability guidelines</b>		
<b>Performance</b>	8 Gb/sec line speed, full duplex	
<b>Certified maximum</b>	Certified maximum information available at: <a href="http://h18006.www1.hp.com/products/storageworks/san/documentation.html">http://h18006.www1.hp.com/products/storageworks/san/documentation.html</a>	
<b>Switch core</b>	Non-blocking	
<b>Fabric latency</b>	700 nSec. Latency increases as input port speed is lower than the output port speed.	
<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>	Hot-pluggable, B-Series Branded Small Form Factor Pluggable (SFP), LC connector; Short-Wave Laser (SWL), Long-Wave Laser (LWL); Extended Long-Wave Laser (ELWL); distance depends on fiber-optic cable and port speed. Supports SFP (4/2/1 Gbit/sec) and/or SFP+ (8/4/2 Gbit/sec) optical transceivers.	
<b>Laser</b>	Short-wave, long-wave, and extended long wave laser transceivers (SFP's) are supported	
<b>Fabric services</b>	Simple Name Server, Registered State Change Notification (RSCN). Includes Advanced WebTools Enhanced group Management and Advanced Zoning. Optional fabric services include: Adaptive Networking, Fabric Watch, ISL Trunking, Advanced Performance Monitoring, and Extended Fabrics.	
<b>Options</b>	SFP media, port upgradeable licensing, advanced management software licensing	
<b>Supported software</b>	Telnet, SNMP (FE MIB, FC Management MIB), HP Systems Insight Manager, HP Storage Essentials, HP Onboard Administrator for BladeSystem, Advanced WebTools, Enhanced Group Management, , Advanced Zoning, SAN Network Advisor, Fabric Watch, and Advanced Performance Monitoring	
<b>Management access</b>	WebTools, SMI-s provider, SNMP, Telnet, and Secure Telnet	
<b>Diagnostics</b>	POST and embedded online/offline diagnostics	
<b>Dimensions</b>	Depth	11.00 in. (with handle protrusion)
	Height	1.13 in.
	Width	7.63 in.
	Weight	Approx. 2.91 lb - without media
<b>Environment</b>	<b>System Inlet Temperature</b> Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305m (1.8°F per every 1000ft) above sea level to a maximum of 3050m (10,000ft), no direct sustained sunlight. Maximum rate of change is 10°C/Hr (18°F/Hr ). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/Hr (36°F/Hr).



### Technical Specifications

	<b>Relative Humidity</b>	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	<b>Altitude</b>	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
		Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
<b>Vibration</b>	Operating	1 G, 10-500 Hz, 60 minutes per axis	
	Non-operating	2 G, 10-500 Hz, 30 minutes	
<b>Shock</b>	Operating	Half-sine-wave shock, 40 G, 2 ms duration, in each direction of three mutually perpendicular axes.	
	Non-operating	Half-sine-wave shock, 140 G, 2 ms duration, in each direction of three mutually perpendicular axes; and square-wave shock up to 80 G, 180 inches/s velocity change, in each direction of three mutually perpendicular axes.	
<b>EMI</b>	CFR 47 Subpart B of Part 15 of the FCC Rules, Class A level CISPR22 Class A EN55022 Class A VCCI Class A ITE AS/NZS 3548 Class A CNS 13438 Class A EMC Directive (89/336/EEC) for CE Marking in European Union		
<b>Safety</b>	Underwriters Laboratories, UL60950 Canadian Standards Association, CSA60950 TUV Rheinland of North America, EN60950 Nemko, EN60950 Low Voltage Directive (73/23/EEC) for CE Marking in European Union		
<b>Fibre Channel Standards And Revisions</b>	<ul style="list-style-type: none"> <li>● FC-AL-2 INCITS 332: 1999</li> <li>● FC-GS-5 ANSI INCITS 427: (includes the following.)             <ul style="list-style-type: none"> <li>○ FC-GS-4 ANSI INCITS 387: 2004</li> </ul> </li> <li>● FC-IFR INCITS 1745-D, revision 1.03 (under development)</li> <li>● FC-SW-4 INCITS 418:2006 (includes the following)             <ul style="list-style-type: none"> <li>○ FC-SW-3 INCITS 384: 2004</li> </ul> </li> <li>● FC-VI INCITS 357: 2002</li> <li>● FC-TAPE INCITS TR-24: 1999</li> <li>● FC-DA INCITS TR-36: 2004 (includes the following)             <ul style="list-style-type: none"> <li>○ FC-FLA INCITS TR-20: 1998</li> <li>○ FC-PLDA INCIT S TR-19: 1998</li> </ul> </li> <li>● FC-MI-2 ANSI/INCITS TR-39-2005</li> <li>● FC-PI INCITS 352: 2002</li> <li>● FC-PI-2 INCITS 404: 2005</li> <li>● FC-PI-4 INCITS 1647-D, revision 7.1 (under development)</li> <li>● FC-FS-2 ANSI/INCITS 424:2006 (includes the following)             <ul style="list-style-type: none"> <li>○ FC-FS INCITS 373: 2003</li> </ul> </li> <li>● FC-LS INCITS 433: 2007</li> <li>● FC-BB-3 INCITS 414: 2006 (includes the following)             <ul style="list-style-type: none"> <li>○ FC-BB-2 INCITS 372: 2003</li> </ul> </li> <li>● FC-SB-3 INCITS 374: 2003 (replaces FC-SB ANSI X3.271: 1996; FC-SB-2 INCITS 374: 2001)</li> </ul>		

### Technical Specifications

- RFC 2625 IP and ARP Over FC
  - RFC 2837 Fabric Element MIB
  - MIB-FA INCITS TR-32: 2003
  - FCP-2 INCITS 350: 2003 (replaces FCP ANSI X3.269: 1996)
  - SNIA Storage Management Initiative Specification (SMI-S) Version 1.2 (includes the following)
    - SNIA Storage Management Initiative Specification (SMI-S) Version 1.03 ISO standard IS24775-2006. Replaces (ANSI INCITS 388: 2004)
    - SNIA Storage Management Initiative Specification (SMI-S) Version 1.1.0
    - SNIA Storage Management Initiative Specification (SMI-S) Version 1.2.0
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