

### Overview

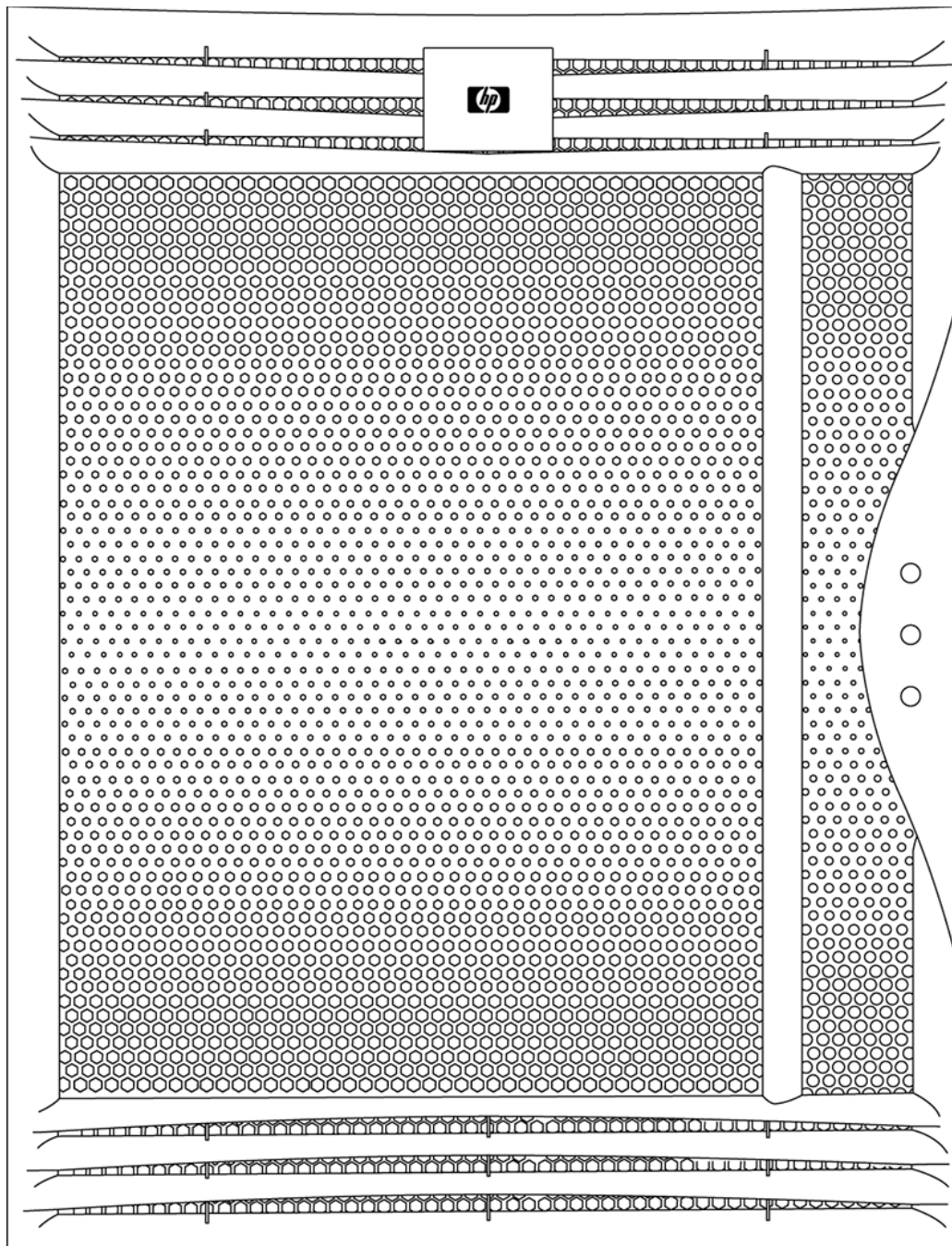
With the introduction of the SAN Director 2/128 and SAN Director 2/128 Power Pack, HP extends the StorageWorks B-Series product line and demonstrates a commitment to investment protection through complete compatibility with the installed base. The entire B-Series family of fabric switches and directors is 100 percent forward and backward compatible.

With 128 ports of concurrently active 2 Gbit/sec full duplex ports in a single domain, and accelerated redundant processors providing faster fabric services, the Director 2/128 delivers next-generation performance and scalability for large SANs with high availability requirements-with proven fabric intelligence.

The SAN Director 2/128 hardware and software architecture supports "five nines" availability (i.e., 99.999%) with such advantages as hot-swappable FRUs, redundant central processors with failover, and concurrent hardware and software upgrades.

Unique industry-leading capabilities position the Director Switch and the SAN Switch product family to be the standard solution for Corporate and Enterprise SANs. Administrators concerned with the threats of unauthorized SAN access and unauthorized SAN configuration changes can use the optional Secure Fabric OS™ tool, which has security capabilities built into the ASIC and software. Plus, they can use the optional Power Pack set of tools to monitor the network's health and performance. Available pre-configured on the switch or as an upgrade, Power Pack also provides the foundation for integration into HP OpenView Storage Area Manager (SAM), enabling infrastructure management through a single console. The Power Pack tools can be ordered separately, as well.

## Overview



## What's New

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

## Overview

### 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
- **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
  - Support for multi-protocol gateways - (Remote Switch)
- **HP Power Pack (Optional) - highest supported modular functionality**
  - Trunking - highest throughput between switches (8Gb/sec)
  - HW enforced WWN Zoning (Advanced Zoning)
  - Proactive threshold monitor (Fabric Watch)
  - Advanced Performance Monitor
  - Per Switch element manager (WebTools)
  - Support for extended distance (Extended Fabrics)
- **Fabric security (Secure Fabric OS) (Optional)**
  - Mission critical SAN Services SAN-ES
  - Assessment and installation services for security

### Models

|  |            |
|--|------------|
| StorageWorks SAN Director 2/128  | AA981A     |
| StorageWorks SAN Director 2/128 Power Pack   | AA982A     |
| StorageWorks SAN Director Blade  | AD504A     |
| <b>NOTE:</b> 0D1 will appear after this part number on your sales order if factory integration is indicated. |            |
| HP StorageWorks SAN Director 4/16 Blade  | A7990A     |
| <b>NOTE:</b> The 2/128 chassis supports 4/16 blades which can be mixed with the 2Gb ones                     |            |
| Power Pack Software Upgrade Bundle   | 330882-B21 |

### Product Highlights

#### SAN Director 2/128 and 2/128 Power Pack

- High availability redundant design, extensive diagnostics and system monitoring capabilities, integrated with Secure Fabric OS management tools, deliver unprecedented reliability, availability and serviceability (RAS).
- Delivers 128 ports of concurrently active 2 Gbit/sec full duplex ports in a single domain and accelerated redundant processors, enabling faster fabric services.
- Offers a highly available platform for mission-critical SAN-designed applications.
- Dual redundant control processors provide high availability and enable non-disruptive software upgrades.
- Supports emerging storage networking technologies with a unique multi-protocol architecture
- Provides 1 Gb and 2 Gb operation today, with seamless extension to 10 Gb in the future
- Employs optional Inter-Switch Link (ISL) Trunking to provide a high-speed data path between switches
- Integrates fully with HP OpenView storage management products
- Ships with two power supplies
- Ships with 32 ports; customers can purchase additional 16-port upgrade modules (maximum 128 ports)

#### 16 non-blocking ports

Please see the following web site for configuration support information:

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

#### High-availability features

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

#### Advanced Fabric Services

- ISL Trunking (optional)
- Hardware Enforced Zoning
- Frame Filtering
- Web Tools
- End-to-End Performance Analysis (optional)
- Remote Switch
- Fabric Manager (optional)

#### Power and cabinet support

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

**NOTE:** A maximum of two Core switches currently are supported to ship configured to order from the factory in a StorageWorks 42U, 9000 cabinet. The Standard internal PDUs provided with StorageWorks cabinets CANNOT be used for the SAN Director 2/128 when configured in a StorageWorks 42U, 9000 series cabinet. Two 30 AMP, 200-240V, L6-30p PDUs are required per cabinet. The part number for the required 30 AMP PDU is E7681A (E7681-63001).

## Product Highlights

### Software Components, Standard

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

---

**Frame Filtering** An ASIC based capability in the 2 Gb family of SAN switches that enables new applications and features. The switch has the ability to "view" the first 64-bytes of the Fibre Channel frame. At this time, Frame Filtering enables advanced capabilities such as Advanced Zoning and Advanced Performance Monitoring (optional).

---

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

---

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

---

### Software Components, Optional

**SAN Director 2/128 Power Pack Software Bundle** The SAN Director 2/128 Power Pack Software bundle includes:

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

---

**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.

---

**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.

---

**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.

---

## Product Highlights

### 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.

---

### Fabric Manager

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.

---

### 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, 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 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.

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                                 | 4/8 SAN Switch Base and 4/8 SAN Switch   | 4/16 SAN Switch and 4/16 SAN Switch Power Pack      | SAN Switch 4/32 and SAN Switch 4/32 Power Pack      | 4/64 SAN Switch and 4/64 SAN Switch Power Pack      | SAN Director 2/128 and Director 2/128 Power Pack    | 4/256 SAN Director and 4/256 Power Pack              |
| Targeted Environment                     | Workgroups, Departments  | Workgroups, Departments                             | Workgroups, Departments                             | Workgroups, Departments                             | Data Centers  | Data Centers   |
| Port Bandwidth                           | 4Gbit/sec  | 4Gbit/sec   | 4Gbit/sec   | 4Gbit/sec   | 2 Gbit/sec  | Up to 4Gbit/sec                                      |
| Aggregate device bandwidth               | 64 Gbit/sec end-to-end   | 128 Gbit/sec end-to-end                             | 128-256 Gbit/sec end-to-end                         | 256 Gbit/sec end-to-end                             | 512 Gbit/sec end-to-end                             | 2.176Tbit/sec  |
| OS Support                               | <p><b>NOTE:</b> Please Refer to SAN Design Guide pointer<br/> <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></p> |   |   |   |   |  |
| Storage system support                   | MA8000<br>EMA12000/<br>EMA16000 EVA,<br>XP, VA, MSA  | MA8000<br>EMA12000/<br>EMA16000 EVA,<br>XP, VA, MSA | MA8000<br>EMA12000/<br>EMA16000 EVA,<br>XP, VA, MSA | MA8000<br>EMA12000/<br>EMA16000 EVA,<br>XP, VA, MSA | MA8000<br>EMA12000/<br>EMA16000 EVA,<br>XP, VA, MSA | MA8000<br>EMA12000/<br>EMA16000<br>EVA , XP, VA, MSA |
| Ports                                    | 16 SFP   | 16 SFP  | 32 SFP  | 32 SFP Base<br>64 Total                             | 32 SFP Base<br>128 Total                            | 256 Total  |
| Cascading support                        | Yes  | Yes   | Yes   | Yes   | Yes   | Yes  |
| 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         |
| Form factor                              | 1U   | 1U  | 1U  | 2U  | 14U   | 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  |
| Enterprise Backup Solution (EBS) support | Yes  | Yes   | Yes   | Yes   | Yes   | Yes  |

## Family Information

| Features                                 | Brocade 4Gb SAN Switch for HP p-Class BladeSystem  | Brocade 4Gb SAN Switch for HP c-Class BladeSystem | MSA SAN Switch 2/8 (embedded switch) | HP 400 Multi-protocol Router           | B-Series Multi-protocol Router Blade   |
|--|--|---|--------------------------------------|--|--|
| Targeted Environment                     | Workgroups, Departments  | Workgroups, Departments                           | Workgroups, Departments              | Workgroups, Departments                | Data Centers                           |
| Port Bandwidth                           | 4 Gbit/sec   | 4 Gbit/sec  | 2 Gbit/sec                           | 4 Gbit/sec<br>Ethernet: 1 Gbit/sec     | 4 Gbit/sec<br>Ethernet: 1 Gbit/sec     |
| Aggregate device bandwidth               | 48 Gbit/sec end-to-end   | 192 Gbit/sec end-to-end                           | 32 Gbit/sec end-to-end               | 128 Gbit/sec                           | N/A                                    |
| OS Support                               | <b>NOTE:</b> Please Refer to SAN Design Guide pointer <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                   | MSA, EVA, XP   | MSA, EVA, XP                                      | MSA 1000                             | MSA, EVA, XP                           | MSA, EVA, XP                           |
| Ports                                    | 4 external / 8 internal  | 4 or 8 external / 8 or 16 internal                | 7 external / 1 internal              | 18 ports: 16 FC and 2 Gigabit Ethernet | 18 ports: 16 FC and 2 Gigabit Ethernet |
| Cascading support                        | Yes  | Yes   | Yes                                  | Yes                                    | Yes                                    |
| Advanced Trunking                        | Optional Upgrade   | Optional Upgrade                                  | Optional Upgrade                     | Optional Upgrade                       | Optional Upgrade to chassis            |
| Form factor                              | Embedded   | Embedded  | Embedded                             | 1U                                     | Blade in Director                      |
| Zoning Software                          | Yes (Included)   | Yes (Included)                                    | Yes (Included)                       | Yes (Included)                         | Yes (Included)                         |
| Hot plug, redundant power supplies       | Yes, in BladeSystem Enclosure  | Yes, in BladeSystem Enclosure                     | No                                   | No                                     | Yes, in director chassis               |
| Hot plug fans                            | Yes, in BladeSystem Enclosure  | Yes, in BladeSystem Enclosure                     | No                                   | No                                     | Yes, in director chassis               |
| Enterprise Backup Solution (EBS) support | Yes  | Yes   | Yes                                  | Yes                                    | Yes                                    |



## Configuration Information

|                     |   |  |            |
|---------------------|---|--|------------|
| 2 Gb optical cables | <i>LC-LC for between two 2 Gb devices</i>         |  |            |
|                     | 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 |
|                     | <i>LC-SC for between a 1 Gb and a 2 Gb device</i> |  |            |
|                     | 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 |

|  |                        |                        |                  |                          |                  |
|--|------------------------|------------------------|------------------|--------------------------|------------------|
| Fibre Channel Standards<br>And Revisions | FC-AL ANSI X3.272: '96 | FC-DA Rev 1.5          | FC-GS-2 Rev 5.3  | FC-MI-2 Rev. 2.1         | FC-SB-3 Rev 1.2  |
|  | FC-AL-2 NCITS 332: '99 | FC-FG ANSI X3.289 '96  | FC-GS-3 Rev 7.01 | FC-PI Rev. 1.3           | FC-SW-2 Rev 5.3  |
|  | FC-BB Rev. 4.7         | FC-FLA NCITS TR-20 '98 | FC-GS-4 Rev 7.6  | FC-PLDA NCITS TR-19: '98 | FC-SW-3 Rev 6.3  |
|  | FC-BB-2 Rev 5.3        | FC-FS Rev. 1.7         | FC-MI Rev 1.92   | FC-Tape                  | FC-SB-2 Rev. 2.1 |
|  | FCP-2 Rev 7            | IPFC                   |                  |                          | FC-VI Rev 1.61   |

## Technical Specifications

|                                  |  |  |
|----------------------------------|--|--|
| <b>Fibre Channel ports</b>       | 128 ports, universal (E, F, and FL); up to eight 16-port Fibre Channel modules   |  |
| <b>Control processor</b>         | Redundant (active/standby) control processor modules   |  |
| <b>Scalability</b>               | Full fabric architecture:<br><a href="http://h18006.www1.hp.com/products/storageworks/san/documentation.html">http://h18006.www1.hp.com/products/storageworks/san/documentation.html</a>   |  |
| <b>Performance</b>               | 1.063 Gb line speed, full duplex; 2.125 Gb line speed, full duplex; auto-sensing of 1 Gb and 2 Gb port speeds; optionally programmable to fixed port speed; speed matching between 1 Gb and 2 Gb ports   |  |
| <b>ISL Trunking</b>              | Up to four 2.125 Gb ports per ISL trunk; to 8.5 Gb per ISL Trunk   |  |
| <b>Aggregate bandwidth</b>       | 512 Gb end-to-end  |  |
| <b>Switch latency</b>            | <2.1 $\mu$ sec any port to any port at 2 Gb, cut-through routing   |  |
| <b>Maximum frame size</b>        | 2112-byte payload  |  |
| <b>Frame buffers</b>             | 108 per 4-port group, dynamically allocated  |  |
| <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); optional port type control  |  |
| <b>Data traffic types</b>        | Fabric Switches supporting unicast, multicast (255 groups), and broadcast  |  |
| <b>Media types</b>               | Hot pluggable, industry-standard small form factor pluggable (SFP), LC connector; Short-Wavelength Laser (SWL), up to 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) |  |
| <b>Fabric services</b>           | Simple Name Server; Registered State Change Notification (RSCN); Alias Server (multicast); Advanced Zoning; WebTools; Fabric Watch; ISL Trunking (optional); Advanced Performance Monitoring   |  |
| <b>High availability</b>         | <b>Control Processor</b>   | Redundant (active/standby) control processor modules; automatic failover; non-disruptive software upgrades; dual-flash memory on each control processor to store two software images |
|                                  | <b>Modules</b>   | Hot swappable  |
|                                  | <b>Backplane</b>   | Fully passive  |
|                                  | <b>Input power</b>   | Dual AC inputs   |
|                                  | <b>Chassis power</b>   | Dual AC-DC power supply modules  |
|                                  | <b>Cooling</b>   | Three blower assembly modules (two operational required)   |
| <b>Management</b>                | Telnet; SNMP (FE MIB, FC Management MIB); WebTools; Fabric Watch Optional; Fabric Access layer   |  |
| <b>Management access</b>         | 10/100 Ethernet (RJ-45), in-band over Fibre Channel (requires fabric); two serial ports (DB-9) per control processor module  |  |
| <b>Diagnostics</b>               | POST and embedded online/offline diagnostics   |  |
| <b>Mechanical specifications</b> | <b>Mounting</b>  | Rack-mountable in a standard 19-inch (48.26 cm) EIA rack; Telco-style mid-mounting available   |
|                                  | <b>Ports per rack</b>  | Up to 356-ports per 42U rack   |
|                                  | <b>Enclosure</b>   | Rear panel-to-door airflow   |
|                                  | <b>Width</b>   | 17.22 in (43.74 cm)  |
|                                  | <b>Height</b>  | 24.11 in (61.24 cm) 14U  |
|                                  | <b>Depth (without door)</b>  | 27.90 in (70.90 cm)  |
|                                  | <b>Depth (with door)</b>   | 29.20 in (74.20 cm)  |
|                                  | <b>Weight</b>  | 215 to 250 lb (98 to 113 kg)   |
| <b>Environment</b>               | <b>Temperature</b>   | <b>Operating</b> 50° to 104° F (10° to 40° C)  |
|                                  | <b>Humidity</b>  | <b>Operating</b> 20% to 85% non-condensing at 104° F (40° C)   |
|                                  | <b>Altitude</b>  | 0 to 3 km  |
|                                  | <b>Shock</b>   | 20 g, 6 ms, half sine  |
|                                  | <b>Vibration</b>   | <b>Operating</b> 0.5 g p-p, 5 to 500 Hz<br><b>Non-operating</b> 2.0 g, 5 to 500 Hz   |
|                                  | <b>Heat dissipation</b>  | 740 Watts (2525 BTU/hour) fully loaded   |

### Technical Specifications

|                           |  |                           |  |
|---------------------------|--|---------------------------|--|
| <b>Power</b>              | <b>Supported power range</b>   | <b>Nominal</b>            | 200-240 VAC, single phase              |
|                           |  | <b>Operational</b>        | 180-264 VAC, auto-sensing              |
|                           |  | <b>Maximum</b>            | 2300 Volt-amps                         |
|                           |  | <b>Maximum</b>            | 12 Amps                                |
|                           |  | <b>In-rush current</b>    | 40A maximum, < ¼ AC cycle, per AC unit |
| <b>Acoustics</b>          | <b>Frequency</b>   | 47 to 63 Hz               |  |
|                           | Declared Values per ISO 9296 and Iso 7779  | LwAd                      |  |
|                           |  | LpAm,dBA                  |  |
|                           |  | bystander positions       |  |
|                           |  | Idle/Operate Idle/Operate |  |
|                           |  | 7.6 59                    |  |
| <b>Certified maximum</b>  | Please Refer to SAN Design Guide at the following URL<br><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>• SAN Switch 8</li><li>• SAN Switch 16</li><li>• SAN Switch 8-EL</li><li>• SAN Switch 2/8V</li><li>• 4/8 SAN Switch</li><li>• SAN Switch 16-EL</li><li>• SAN Switch 2/16V</li><li>• SAN Switch 2/16N FF</li><li>• 4/16 SAN Switch</li><li>• Integrated /32</li><li>• SAN Switch 2/32</li><li>• SAN Switch 4/32</li><li>• 4/64 SAN Switch</li><li>• Core Switch 2/64</li><li>• SAN Director 2/128</li><li>• SAN Switch 2/16</li><li>• SAN Switch 1/16-EL</li><li>• MSA SAN switch 2/8</li><li>• Brocade 4Gb SAN Switch for p-class HP BladeSystem</li><li>• Brocade 4Gb SAN Switch for c-class HP BladeSystem</li><li>• 400 MP Router</li></ul> |                           |  |
| <b>Switch core</b>        | Non-blocking   |                           |  |
| <b>Fabric latency</b>     | <2 µ sec. with no contention, cut-through routing  |                           |  |
| <b>Hardware Options</b>   | 16 port FC Card, SFP media   |                           |  |
| <b>Supported software</b> | Telnet, SNMP, WebTools, Zoning, Fabric Watch Optional, Fabric Manager 4x Optional  |                           |  |

© Copyright 2006 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice.

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.