

QuickSpecs

HP SN8000C Directors (MDS 95xx), HP C-series Family

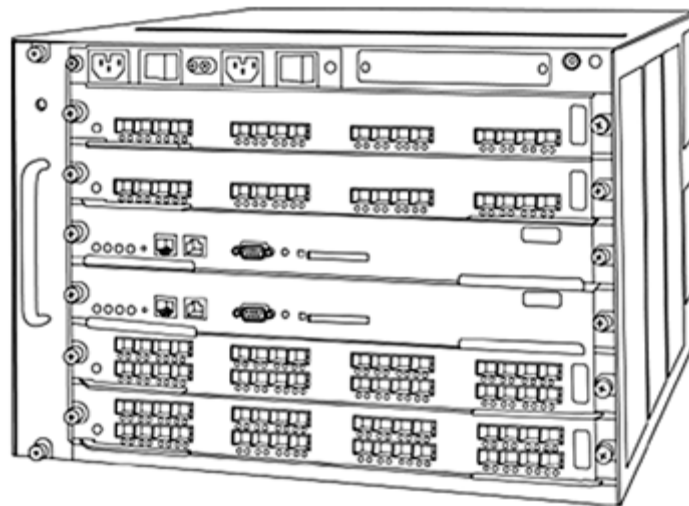
Overview

HP SN8000C Directors (MDS 95xx), HP C-series Family

The HP C-series SN8000C Directors deliver many unique innovations for constructing powerful, large scale storage networks. With these innovations, users can build highly scalable, always available, high performance storage network solutions with comprehensive security and unified management. The SN8000C Directors have multiple layers of intelligence, including multi-protocol support (Fibre Channel and FCoE), Virtual SANs (VSANs), embedded diagnostics and role-based security.

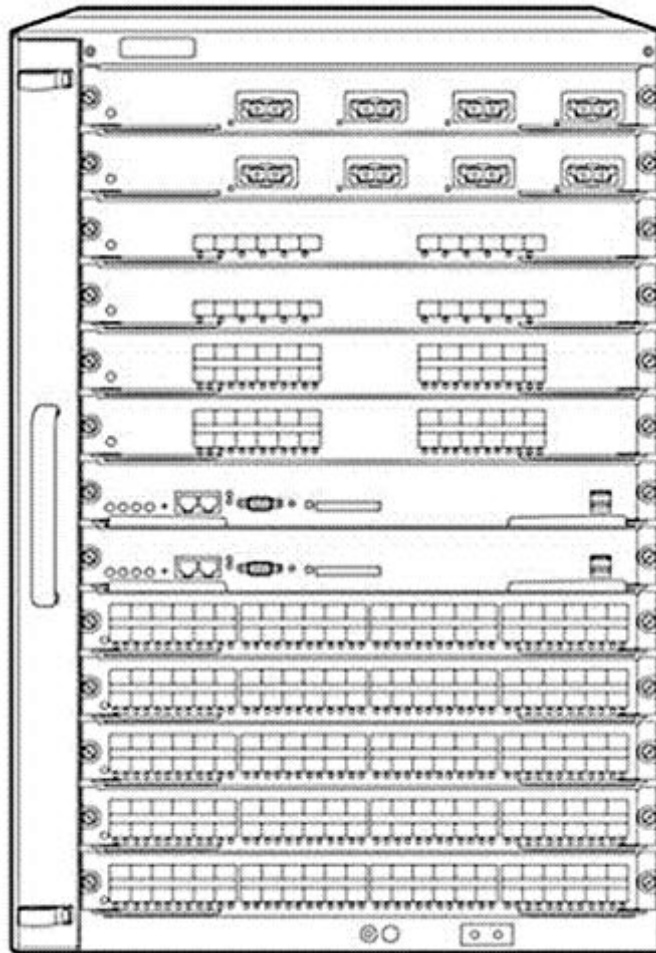
The SN8000C Directors deliver industry-leading scalability and performance (up to 8.4 Terabits per second internal system bandwidth), high port density (up to 528-ports in an SN8000C 13-Slot Director) and high availability to lower TCO and enable integrated SAN infrastructures. HPE delivers the SN8000C Directors with high availability features inherent in the design. The base units include a 6 or 13 slot modular chassis with dual supervisor 2A modules and power supplies to help ensure smooth, continuous operation and non-disruptive upgrade capability. The SN8000C 13-Slot Director also includes dual Fabric3 Modules making even the backplane fabric both redundant and hot-swappable, thereby taking fabric availability to a higher plane. The open expansion slots of the SN8000C Directors can be filled by optional MDS 9000 Family Modules, which include 32 and 48 port 8Gb Advanced Fibre Channel Modules. These MDS 9000 modules are interchangeable across SN8000C, providing a smooth migration path, common sparing and investment protection.

Layered, intelligent features also include integration with fabric-based applications to fabric-wide services for a wide range of solutions for business continuance, storage virtualization, network assisted backup and information life cycle management.



SN8000C 6-Slot Director w/Dual Supervisor 2A

Overview



SN8000C 13-Slot Director w/Dual Supervisor 2A

Key Features and Benefits

- **Reduced Total Cost of Ownership (TCO) for SAN Infrastructure**
 - Enables storage consolidation, simplified management of SAN environment
 - Integrates Fibre Channel, iSCSI, and FCIP in one system
- **High Port Density**
 - 12-528 Fibre Channel ports (auto-sensing 8/4/2 Gb) in single chassis
 - Up to 1,584 ports in standard rack (42U)
- **Scalable**
 - Supports throughput up to 160Gb in a single PortChannel 'ISL Trunk'
 - Offers 12 to 528 Fibre Channel ports in a single chassis
 - SN8000C 6-Slot Director supports up to 192 ports
 - SN8000C 13-Slot Director supports up to 528 ports
- **Highly Available**
 - Redundant power supplies, Supervisor 2A's, Fabric Modules and fans for high availability
 - Hot-swappable SFP optical interface modules, fan modules, and power modules. Hot software code loads are also used to maintain constant operation.
 - Supplies 1.44 up to 8.4 Terabits/sec total internal throughput with dual fabrics

Overview

- **Interoperable**
 - Broad range of Hewlett Packard Enterprise servers and operating systems
 - Disk and tape storage devices
 - Common architectural platform across all SN8000C and MDS9000 family products
 - SN8000C Directors and HP C-series MDS 9222i Fabric Switch use interchangeable MDS 9000 Series port modules
- **Integrated Management**
 - Embedded Device Manager
 - Cisco Data Center Network Manager
 - Integration with Cisco Works Resource Manager Essentials (RME)
- **Hardware Assisted Encryption Security**
 - On-board crypto processing engine supports secure IEEE standard Advanced Encryption Standard (AES) 256-bit algorithms, to encrypt data transported over IP networks or to be stored on tape.
 - IPsec for Data in Transit over IP networks
- **Comprehensive network security framework**
 - Supports RADIUS and TACACS+, Fibre Channel Security Protocol (FC-SP), Secure File Transfer Protocol (SFTP), Secure Shell (SSH) protocol, Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES), VSANs, hardware-enforced zoning, ACLs, and per-VSAN Role-Based Access Control (RBAC). Additionally Gigabit Ethernet ports support IPsec authentication, data integrity, and hardware-assisted data encryption.

Product Highlights

Network-based Intelligent Storage Applications

- Fabric-based Storage Virtualization
 - Network Assisted Back-up
 - Data replication
-

Security

- Supports role-based access control, VSANs, hardware-enforced Zoning, FC-SP, ACLs, RADIUS authentication, SNMPv3, SSH, SFTP, IPsec and encryption.
 - IEEE standard Advanced Encryption Standard (AES) 256-bit algorithms
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High Performance

- 1.44 or 8.4 Terabits/sec total internal system throughput
 - 10Gb Fibre Channel
 - Port Channels up to 160Gb for Inter-switch Links (ISLs)
 - Supports data compression
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Intelligent network services

- Virtualization
 - Data replication
 - Network-Assisted Back-up IP and FC network acceleration Virtual SANs (VSANs and Inter-VSAN routing)
 - PortChannels
 - Quality of Service (QoS)
 - Management Security
 - Embedded Diagnostics
-

High Availability

- Hot code loads and non-disruptive software upgrades
 - Stateful process restart/failover
 - Redundancy of all major components
 - Hot swappable components including switch fabric
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Multiprotocol/ Multi-transport

The multilayer architecture of the SN8000C Directors enable a consistent feature set over a protocol agnostic switch fabric; seamlessly integrates 8/4/2 and 10-Gb Fibre Channel, iSCSI, and FCIP in one system. Flexible architecture allows integration of future storage protocols.

Embedded Diagnostics

Provides industry-first intelligent diagnostics, including Fibre Channel ping and trace route, SPAN, protocol analysis and decoding, Zone and VSAN merge analysis, and integrated Call Home capability.

Port Channels

Allows users to aggregate up to 16 physical links into one logical bundle. The bundle can consist of any port in the chassis, ensuring that the bundle remains active in the event of a port, ASIC, or module failure. The bundle can sustain the failure of any physical link without causing a reset. Additionally, Fabric Shortest Path First (FSPF) multipath provides the intelligence to load balance across up to 16 FC equal cost paths and, in the event of a switch failure, to dynamically reroute traffic.

Product Highlights

Access Control

- Hardware-based intelligent frame processing
- VSAN-based access control
- Role based access control within VSANs
- Hardware-enforced zoning

Traffic management

- Fibre Channel Congestion Control (FCC)
- Fabric-wide QoS
- Egress-based CoS enables granular control of bandwidth allocation
- CoS-based buffer credit allocation
- Fibre Channel Write Acceleration

Management modes

- Cisco MDS 9000 Family Command Line Interface (CLI)
- Cisco Device Manager
- Cisco Data Center Network Manager
- Integration with Cisco Resource Manager Essentials (RME)
- Optional HP StoreFabric Data Center Network Manager Package

Interoperability

Offers compatibility with a broad range of Hewlett Packard Enterprise servers and operating systems, as well as disk and tape storage devices.

Product Family Models

- HP StoreFabric SN8500C 8-slot 16Gb FC Director
 - Intelligent, multi-protocol 8-slot Director with up to 384 16/8/4 Gb Fibre Channel ports in a single chassis. Also, the HP StoreFabric SN8500C 48-port 16Gb FC Module and the included Fabric 1 modules provide up to 384 ports of full 16Gbps line-rate performance across all ports or 384 10GbE FCoE ports in a single chassis or up to 1152 FCoE ports in a single rack with the use of the SN8500 FCoE module.
- HP StoreFabric SN8500C 4-slot 16Gb FC Director
 - Intelligent, multi-protocol 4-slot Director with up to 192 16/8/4 Gb Fibre Channel ports in a single chassis. Also, the HP StoreFabric SN8500C 48-port 16Gb FC Module and the included Fabric 1 modules provide up to 192 ports of full 16Gbps line-rate performance across all ports or 192 10GbE FCoE ports in a single chassis.
- HP SN8000C 13-Slot Supervisor 2A Fabric3 Director
 - Intelligent, multi-protocol 13-slot Director with up to 528 Auto-Sensing 8/4/2 Gb Fibre Channel ports in a single chassis. Also, the 32-port 8Gb Advanced Fibre Channel modules and the included Fabric 3 modules provide up to 352 ports of full 8Gbps line-rate performance across all ports.
- HP SN8000C 6-Slot Supervisor 2A Director
 - Intelligent, multi-protocol 6-slot Director with up to 192 Auto-Sensing 8/4/2 Gb Fibre Channel ports
- HP SN6500C 16Gb Multi-service Switch
 - Intelligent multi-protocol Fabric Switch with twenty active fixed 16Gb Fibre Channel ports, two fixed 10 Gigabit Ethernet FCIP ports, and eight fixed 10 Gigabit Ethernet FCoE ports. Provides up to forty active 16Gb Fibre Channel ports through a port upgrade license.
- HP SN6010C 16Gb Fabric Switch
 - With up to 48 Auto-Sensing 16/8/4Gb Fibre Channel ports
 - "Pay as you grow" scalability starting at 12 ports

Product Highlights

Software Components, Standard

NX-OS MDS 9000 NX-OS replaces SAN-OS and delivers numerous advanced storage networking capabilities for the Cisco MDS 9000 Family of Multilayer Intelligent Directors and Fabric Switches including 8Gb Fibre Channel support. The SN8000C Directors with Supervisor 2As now ship all with NX-OS 6.x or higher.

Cisco Data Center Network Manager

Cisco Data Center Network Manager is a responsive, easy-to-use Java application that simplifies management across multiple switches and fabrics. Cisco Data Center Network Manager enables administrators to perform vital tasks such as topology discovery, fabric configuration and verification, LUN security, monitoring, and fault resolution. All functions are available through a secure interface, which enables remote management from any location. Cisco Data Center Network Manager may be used independently or in conjunction with third-party management applications. Cisco provides an extensive API for integration with third-party and user developed management tools.

Software Components, Optional

HPE MDS 9500 Enterprise Package Cisco MDS switches have a set of advanced traffic engineering and advanced security features that are recommended for all Enterprise SANs. These features are bundled together in a management application called the HPE MDS 9500 Enterprise Package (for the SN8000C Directors).

HPE StoreFabric Data Center Network Manager Package

The "Standard" Cisco Data Center Network Manager software that is included at no charge with the SN8000C Directors provides basic switch configuration and troubleshooting capabilities. HP's C-series StoreFabric Data Center Network Manager (DCNM) for SN8000C Directors extends Cisco Data Center Network Manager by providing historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.

Cisco MDS 9500 Family Mainframe Package

The Cisco MDS 9500 Family Mainframe Package is a comprehensive collection of features required for using the SN8000C Directors in mainframe storage networks, including FICON protocol and CUP management, switch cascading, fabric binding, and intermixing. These features are available through the Cisco MDS 9500 Mainframe FICON Security License To Use (LTU).

HPE Support Services and Warranty Information

Warranty

(3-3-3) Hardware Warranty – Three-year warranty, 24x7, 4-hour remote 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 - Hewlett Packard Enterprise 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 HPE 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 HPE in the country in which you obtained the software.

NOTE: The hardware warranty covers firmware and embedded non-saleable software. For hardware installation information, click the link below:

<http://www.hp.com/services/deployment>

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

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

Protect your business beyond warranty with HPE Support Services

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new storage solution, giving you full entitlement for the support for need for your IT and business.

Connect your devices

Unlock all of the benefits of your technology investment by connecting your products to HP Enterprise. Achieve up to 77%¹ reduction in down time, near 100%² diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to HPE support.

1- IDC

2 - HP CSC reports 2014 - 2015

Optimized Care

HPE Proactive Care Advanced* - 24x7 coverage, three year Support Service

This services helps achieve a higher return on your product investment with personalized support from a local assigned Account Support Manager who will share best practice advice and personalized recommendations designed to help improve availability and performance to increase stability and reduce unplanned downtime. Leverage your system's ability to connect to HPE for pre-failure alerts, automatic call logging and parts dispatch. For business critical incidents, this service offers critical event management to reduce mean time to resolution. This recommendation provides 24x7 coverage with four-hour response for hardware and collaborative support that offers two-hour callback for supported software issues. Collaborative software management is included with independent software

HPE Support Services and Warranty Information

vendors unless you have your software support from HPE where we own all cases from start through to resolution.

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA5-3259ENW&cc=us&lc=en>

Standard Care

HPE Proactive Care* with 24x7 coverage, three year Support Service

HPE Proactive Care gives customers an enhanced call experience plus helps preventing problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice when your products are connected to HPE. This Service combines three years' proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

*HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverables.

Basic Care

HPE Foundation Care 24x7, three-year Support Service

HPE Foundation Care 24x7 gives you access to HPE 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. Simplify your support experience and make HPE your first call to help resolve hardware or software problems.

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

Related Services

HPE SAN Deployment Service

Hewlett Packard Enterprise delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-8527EN.pdf>

For more information

<http://www.hp.com/services/storage>

To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner.

HPE Support Services are sold by HPE and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Support Services at <http://www.hp.com/go/lookuptool>

Family Information

	HP StoreFabric SN8500C 4-slot 16Gb FC Director	HP StoreFabric SN8500C 8-slot 16Gb FC Director	HP SN8000C 6-Slot Director w/Dual Supervisor 2A	HP SN8000C 13-Slot Supervisor 2A Fabric3 Director	SN6010C 16Gb Fabric Switch	HP SN6500C 16Gb Multi-service Switch
Switch Type	Multilayer Director	Multilayer Director	Multilayer Director	Multilayer Director	Multilayer Fabric Switch	Multi-service Fabric Switch
Maximum ports	192 16 Gbps Fibre Channel ports, 192 FCoE ports	384 16 Gbps Fibre Channel ports, 384 FCoE ports	192 8 Gbps Fibre Channel ports, 16 IP ports	528 8 Gbps Fibre Channel, 44 IP ports	Up to 48 16 Gbps Fibre Channel ports	Up to 40 16 Gbps FC ports, 2 fixed 10GbE FCIP ports, 8 fixed 10GbE FCoE ports
Number of slots per chassis	Four	Eight	Six	Thirteen	One fixed	Two fixed

For additional switch support information, refer to the C-series FC Switch Connectivity Stream on the Single Point of Connectivity Knowledge (SPOCK) website at: <https://h20272.www2.hpe.com/spock/>. You must sign up for a Hewlett Packard Enterprise Passport to enable access. Once logged in, click Switches under Other Hardware in the last navigation panel of the window to access the Fibre Channel Switch Streams. Click on the C-Series FC Switch Connectivity Stream to open the document.

Configuration Information

Step 1 - Base Configurations

Select one:

Model	Part Number
HP StoreFabric SN8000C 13-slot Supervisor 2A Fabric 3 Director Switch NOTE: Base unit includes a 14U, thirteen slot chassis, fans, dual supervisor 2A modules, dual Fabric3 modules, dual 6000W AC power supplies, four 250 VAC, 20 Amp power cords and four PDU power cords, firmware accessory kit and documentation. Supports up to eleven optional expansion port modules	QW927C
HP StoreFabric SN8000C 6-slot Supervisor 2A Director Switch NOTE: Base unit includes a 7U, 6 slot chassis, fans, dual supervisor 2A modules, dual AC power supplies, two 250 VAC 16 Amp power cords and two PDU power cords, firmware, accessory kit and documentation. Supervisor modules use 2 slots leaving slots for up to four optional expansion port modules.	AE388E

*** Appropriate country power cords and PDU cords will be included for each AC power supply for the SN8000C Directors based on Ship To destination information.*

Step 2 - Options

Select each type of required options with quantities specified:

NOTE: For a complete list of supported switching modules in the SN8500C Director, please refer to the C-series FC Switch Connectivity Stream on the Single Point of Connectivity Knowledge (SPOCK) website at: <http://www.hp.com/storage/spock>

Model Description	Part Number
<u>8Gb Fibre Channel Options</u>	
NOTE: NX-OS requires SN8000C Supervisor 2 or 2A or later	
HP SN8000C 8Gb 32-Port Advanced Fibre Channel Module	QW924C
NOTE: SFPs required; supports 4, 8 and 10Gb SFPs, 32-Port and 48-Port Advanced Fibre Channel Modules require MDS 9513 Fabric 3 Modules	
HP SN8000C 8Gb 48-Port Advanced Fibre Channel Module	QW925C
NOTE: SFPs required; supports 4, 8 and 10Gb SFPs, 32-Port and 48-Port Advanced Fibre Channel Modules require MDS 9513 Fabric 3 Modules	
MDS 9000 8Gb FC SFP+ Short Range Transceiver	AJ906A
MDS 9000 8Gb FC SFP+ Long Range Transceiver	AJ907A
<u>4Gb Fibre Channel Options</u>	
HP MDS 9000 4Gb FC SFP, 4 pack, Short Range XCVR	AE379A
<u>10Gb Fibre Channel Options</u>	
HP SN8000C 8Gb 32-Port Advanced Fibre Channel Module	QW924C
NOTE: SFPs required; maximum of 24 10Gb FC SFPs allowed with each Advanced FC Module	
HP SN8000C 8Gb 48-Port Advanced Fibre Channel Module	QW925C
NOTE: SFPs required; maximum of 24 10Gb FC SFPs allowed with each Advanced FC Module	

Configuration Information

HP C-series 10Gb Fibre Channel Short Wave SFP+ Transceiver QW928A

NOTE: Maximum of 24 10Gb FC SW SFP+s allowed per Advanced FC Module

HP C-series 10Gb Fibre Channel Long Wave SFP+ Transceiver QW929A

NOTE: Maximum of 24 10Gb FC LW SFP+s allowed per Advanced FC Module

Optional Software Licenses

HP MDS 9500 MPS 18/4 FCIP Module LTU, required for FCIP operation with AG852B (MultiService Module) T5413A

HP StoreFabric SN8000C Enterprise Package License A7517A

NOTE: Set of advanced traffic-engineering and advanced security features; required for Inter-VSAN routing, QoS management, IPsec security, LUN zoning, encryption, and individual port security

HP StoreFabric SN8000C Data Center Network Manager LTU TC368A

NOTE: Manages multiple fabrics and monitors performance and traffic statistics

Cisco MDS 9500 Mainframe FICON Security License To Use (LTU) T4408A

NOTE: Required for each Switch used for FICON

Plus prerequisite HPE C&I Service HA546A1

NOTE: For XP Array configurations only, plus HPE Services Installation and Startup Statement of Work is required

Installation Services

For complete design and implementation of Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components, select **HPE Enhanced Implementation Service for SANs**

For basic hardware installation, select the service noted below. **NOTE: 1 per switch**

Product	Description	Installation	
AE388E	HP SN8000C 6-Slot SUP2A Director Switch	MDS 9506/9509/SN8500C Install	HA113A1#5D1
QW927C	HP SN8000C 13-Slot SUP2A Director Switch	MDS 9506/9509/SN8500C Install	HA113A1#5D1

Step 3 - Additional Options

Recommended Cables

PremierFlex OM4+ type cables

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

HPE OM3 LC-LC Optical Cables

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

Configuration Information

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

Technical Specifications

Fibre Channel standards and revisions

- Fibre Channel Protocols
- FC-PH, Revision 4.3 (ANSI/INCITS 230-1994)
- FC-PH, Amendment 1 (ANSI/INCITS 230-1994/AM1 1996)
- FC-PH, Amendment 2 (ANSI/INCITS 230-1994/AM2-1999)
- FC-PH-2, Revision 7.4 (ANSI/INCITS 297-1997) (ANSI/INCITS 269-1996)
- FCP-2, Revision 8 (ANSI/INCITS 350-2003)
- FC-SB-2, Revision 2.1 (ANSI/INCITS 349-2001)
- FC-SB-3, Revision 1.6 (ANSI/INCITS 374-2003)
- FC-PH-3, Revision 9.4 (ANSI/INCITS 303-1998)
- FC-PI, Revision 13 (ANSI/INCITS 352-2002)
- FC-FS, Revision 1.9 (ANSI/INCITS 373-2003)
- FC-AL, Revision 4.5 (ANSI/INCITS 272-1996)
- FC-AL-2, Revision 7.0 (ANSI/INCITS 332-1999)
- FC-AL-2, Amendment 1 (ANSI/INCITS 332-1999/AM1-2003)
- FC-SW-2, Revision 5.3 (ANSI/INCITS 355-2001)
- FC-SW-3, Rev. 6.6 (ANSI/INCITS 384-2004)
- FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001)
- FC-GS-4, Rev. 7.91 (ANSI/INCITS 387-2004)
- FC-BB-2, Rev. 6.0 (ANSI/INCITS 372-2003)
- FCP, Revision 12FC-VI, Revision 1.84 (ANSI/INCITS 357-2002)
- FC-FLA, Revision 2.7 (INCITS TR-20-1998)
- FC-PLDA, Revision 2.1 (INCITS TR-19-1998)
- FC-Tape, Revision 1.17 (INCITS TR-24-1999)
- FC-MI, Revision 1.92 (INCITS TR-30-2002)
- FC-SP, Revision 1.6
- FC-DA, Revision 3.1
- FC-SB-3, Amendment 1 (ANSI INCITS 374-2003/AM1-2007)
- FC-SB-4, Revision 3.0 (ANSI INCITS 466-2011)
- FC-BB-3, Revision 6.8 (ANSI INCITS 414-2006)
- FC-BB-4, Revision 2.7 (ANSI INCITS 419-2008)
- FC-BB-5, Revision 2.0 (ANSI INCITS 462-2010)
- IP over Fibre Channel (RFC 2625)
- Extensive IETF standards based TCP/IP, SNMPv3, and Remote Monitoring (RMON) MIBs
- Class of Service: Class 2, Class 3, Class F
- Fibre Channel standard port types: E, F, FL, B
- Fibre Channel enhanced port types: SD, ST, TE

Technical Specifications

SN8000C 6-Slot Director Weights, Dimensions, Environmental, Power and Packaging

Diagnostics

- Power-On Self Testing POST
- Error detection, fault isolation, parity checking, illegal address check
- Remote diagnostic through Call Home troubleshooting features
- Displayed LEDs
- Redundant Power Supply

Compatibility

Fibre Channel protocols

Fibre Channel Protocols (FC-PH, Revision 4.3, FC-PH-2, Revision 7.4 FC-PH-3, Revision 9.4, FC-GS-2, Revision 5.3, FC-GS-3, Revision 7.01, FC-FLA, Revision 2.7, FC-FG, Revision 3.5, FC-SW-2, Revision 5.3, FC-AL, Revision 4.5, FC-AL-2, Revision 7.0, FC-PLDA, Revision 2.1, FC-VI, Revision 1.61, FCP, Revision 12, FCP-2, Revision 7a, FC-SB-2, Revision 2.1, FC-BB, Revision 4.7, FC-FS, Revision 1.7, FC-PI, Revision 13, FC-MI, Revision 1.99, FC-Tape, Revision 1.17)

Classes of service

Class 2, Class 3, Class F

Port types

E, F, FL

Internet standards

RFC 791 IPv4, RFC 793, 1323 TCP, RFC 894 IP/Ethernet, RFC 1041 IP/802, RFC 792, 950, 1256 ICMP, RFC 1323 TCP performance enhancements, RFC 2338 VRRP

Ethernet standards

IEEE 802.3z Gigabit Ethernet, IEEE 802.1Q VLAN

IP over Fibre Channel

RFC 2625

O/S Support

MDS NX-OS Release 6.x - Min. Revision

Performance

Transfer Rate

- 2/4/8 Gb/FC port
- 10 Gb/FC port
- 10/100/1000 Mb Ethernet ports

Devices/Ports

- 192 FC ports, 26 IP ports
- 12, 10 Gb Fibre Channel Ports

Interface

- 2/4/8/10 Gb FC ports
- 10/100 Mb Ethernet port (management)
- RS-232 RJ-45 console port
- DB-9 COM port

Connectors/Cables

Connectors

- RJ-45 Interface Cable Connector
- LC-type-fiber optic SFP

Cables

- RJ-45 to RJ-45 rollover cable
- RJ-45 to DB-25 female DTE adapter (labeled "Terminal ")
- RJ-45 to DB-9 female DTE adapter (labeled "Terminal ")
- RJ-45 to DB-25 male DCE adapter (labeled "Modem")
- LC-type cable

Technical Specifications

Dimensions	Description	Out-of-box	Shipping
	Base unit w/o ports	12.25 x 17.37 x 21.75 in (31.1 x 44.1 x 55.25 cm)	32 x 32 x 23 in (81.28 x 81.28 x 58.42 cm)
	Sup Compact Flash Disk	1.375 x 1.625 x 0.125 in	n/a
	1900W AC	7.125 x 7.75 x 14.625 in (18.1 x 19.7 x 37.15 cm)	n/a
Environment	Non-operating temp	-40° to 158° F (-40° to 70° C), ambient non-operating and storage	
	Non-operating Humidity	5 to 95%, ambient (non-condensing) non-operating and storage	
	Operating temp	32° to 104° F (-40° to 70° C), ambient operating	
	Operating Humidity	10 to 90%, ambient (non-condensing) operating	
Electrical	Nominal Line Voltage	1900W AC: 100 to 120 VAC, 200 to 240 VAC	
	Range Line Voltage	1900W AC: 100 to 132 VAC, 200 to 240 VAC	
	Line Frequency	1900W AC: 50 to 60 Hz (nominal) (±3% for full range)	
	Typical Input Current	1900W AC: 16A max at 200 VAC at 1900W output, 12A max at 100 VAC	
	Power	1900W AC plug types: Argentina IRAM 2073 (12A), North America (1900W power supply) NEMA 5-15P (16A), Australia, New Zealand SAA/3 AS/NZZS 3112-1993 (15A), Europe VIIG CEE (7)VII (16A), Italy 1/3/16 CEI 23-16 (16A), United Kingdom BS89/13 BS 1363/A (13A; replaceable fuse)	
	LED Indicators (On front panel)	Supervisor	<ul style="list-style-type: none"> Status System Active/Standby Power Management Ethernet (management)
	LED Indicators (On back)	Fan	<ul style="list-style-type: none"> Fan status
		Power Supply	Input OK Output OK Output Fail

NOTES:

1. Dimension convention is as follows:

- H (Height) is the vertical dimension when looking at the front of the component, as it would be seen in the chassis. Exception is the compact flash where H is when looking at the identification label on the part.
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2. Packaging dimensions are reference as if you were looking at the front of the chassis in the packaging, if you could see through the packaging.

Technical Specifications

Diagnostics	<ul style="list-style-type: none"> • Power-On Self Testing POST • Error detection, fault isolation, parity checking, illegal address check • Remote diagnostic through Call Home troubleshooting features • Displayed LEDs • Redundant Power Supply 															
Compatibility	<p>Classes of service Class 2, Class 3, Class F</p> <p>Port types E, F, FL standard SD, TE, TL enhanced</p> <p>Internet standards</p> <ul style="list-style-type: none"> • RFC 791 IPv4, RFC 793, 1323 TCP, RFC 894 IP/Ethernet, RFC 1041 IP/802, RFC 792, 950, 1256 ICMP, RFC 1323 TCP performance enhancements, RFC 2338 VRRP • Extensive IETF-standards based TCP/IP, SNMPv3, and RMON MIBs <p>Ethernet standards IEEE 802.3z Gigabit Ethernet, IEEE 802.1Q VLAN</p> <p>IP over Fibre Channel RFC 2625</p> <p>O/S Support MDS NX-OS Release 6.x or higher</p>															
Performance	<p>Transfer Rate 2/4/8 & 10 Gb/FC port/1 Gb Ethernet Port</p> <p>Devices/Ports</p> <ul style="list-style-type: none"> • Up to 528 FC ports • 4/8/10 Gb Fibre Channel ports or 10/100/1000 Mb Ethernet ports <p>Interface</p> <ul style="list-style-type: none"> • 8/4/2 Gb FC ports • 1,000 Mb Ethernet ports • 10 Gb FC ports • 10/100 Mb Ethernet port (management) • RS-232 RJ-45 console port • DB-9 COM port 															
Connectors/Cables	<p>Connectors</p> <ul style="list-style-type: none"> • RJ-45 Interface Cable Connector • LC-type-fiber optic SFP <p>Cables</p> <ul style="list-style-type: none"> • RJ-45 to RJ-45 rollover cable • RJ-45 to DB-25 female DTE adapter (labeled "Terminal ") • RJ-45 to DB-9 female DTE adapter (labeled "Terminal ") • RJ-45 to DB-25 male DCE adapter (labeled "Modem") • LC-type cable 															
Dimensions	<table border="0"> <thead> <tr> <th style="text-align: left;">Description</th> <th style="text-align: left;">Out-of-box</th> <th style="text-align: left;">Shipping</th> </tr> </thead> <tbody> <tr> <td>Base unit w/o ports</td> <td>24.5 x 17.37 x 28 in (62.3 x 44.1 x 71.1 cm)</td> <td>42"L x 39"W x 39"H</td> </tr> <tr> <td>16-port 1/2Gb port card</td> <td>1.75 x 15.5 x 16.5 in (4.4 x 39.4 x 42 cm)</td> <td>7.5 x 21.25 x 23 in (19.1 x 54 x 58.4 cm)</td> </tr> <tr> <td>32-port 1/2Gb port card</td> <td>1.75 x 15.5 x 16.5 in (4.4 x 39.4 x 42 cm)</td> <td>7.5 x 21.25 x 23 in (19.1 x 54 x 58.4 cm)</td> </tr> <tr> <td>FC-SW SFP, LC</td> <td>0.25 x 0.5 x 2.5 in (0.6 x 1.3 x 6.4 cm)</td> <td>n/a</td> </tr> </tbody> </table>	Description	Out-of-box	Shipping	Base unit w/o ports	24.5 x 17.37 x 28 in (62.3 x 44.1 x 71.1 cm)	42"L x 39"W x 39"H	16-port 1/2Gb port card	1.75 x 15.5 x 16.5 in (4.4 x 39.4 x 42 cm)	7.5 x 21.25 x 23 in (19.1 x 54 x 58.4 cm)	32-port 1/2Gb port card	1.75 x 15.5 x 16.5 in (4.4 x 39.4 x 42 cm)	7.5 x 21.25 x 23 in (19.1 x 54 x 58.4 cm)	FC-SW SFP, LC	0.25 x 0.5 x 2.5 in (0.6 x 1.3 x 6.4 cm)	n/a
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FC-SW SFP, LC	0.25 x 0.5 x 2.5 in (0.6 x 1.3 x 6.4 cm)	n/a														

Technical Specifications

	FC-LW SFP, LC	0.25 x 0.5 x 2.5 in (0.6 x 1.3 x 6.4 cm)	n/a
	Sup Compact Flash Disk	1.375 x 1.625 x 0.125 in (3.5 x 4.1 x 0.3 cm)	n/a
	Port Analyzer Adapter	1.125 x 6 x 4.5 in (2.9 x 15.2 x 11.4 cm)	4 x 8 x 11 in (10.2 x 20.32 x 28 cm)
MDS 9513 Base Unit Weight		329 lbs (149.55 kg)	
Environment	Non-operating temp	-40° to 158° F (-40° to 70° C), ambient non-operating and storage	
	Non-operating Humidity	5 to 95%, ambient (non-condensing) non-operating and storage	
	Operating temp	32° to 104° F (-40° to 70° C), ambient operating	
	Operating Humidity	10 to 90%, ambient (non-condensing) operating	
Electrical	Nominal Line Voltage	6000W AC: 100 to 120 VAC, 200 to 240 VAC	
	Range Line Voltage	6000W AC: 100 to 132 VAC, 200 to 264 VAC	
	Line Frequency	6000W AC: 50 to 60 Hz (nominal) (±3% for full range)	
	Typical Input Current	6000W AC: 16A max at 200 VAC at 2500W output, 16A max at 100 VAC at 1300W output	
	Power	6000W AC plug types: International IEC 309 (20A), Europe CEE 7/7 (16A), North America (Non-locking) NEMA 6-20 plug (20A), North America (Locking) NEMA L6-20 plug (20A), Appliance coupler IEC 320 (16/20A)	
	LED Indicators (On front panel) (if applicable)	Generic	<ul style="list-style-type: none"> • System • Ethernet (management)
		Fan	<ul style="list-style-type: none"> • Fan status
		Switching Module	<ul style="list-style-type: none"> • Status • Speed • Link
	LED Indicators (On back)	Power Supply	<ul style="list-style-type: none"> • Input OK • Output OK • Output Fail

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Technical Specifications

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Summary of Changes

Date	Version History	Action	Description of Change
08-Apr-2016	From Version 13 to 14	Changed	Removed references to MDS 8Gb Fabric Switch for HP BladeSystem as products are, now, obsolete.
18-Sept-2015	From Version 12 to 13	Changed	Removed SN6000C switches as obsolete
03-Apr-2015	From Version 11 to 12	Changed	Removed 2 SFPs as obsolete (A7487A,AE380A) and references to MSM 18/4 FCIP Module, also obsolete.
20-Feb-2015	From Version 10 to 11	Changed	Removed MDS9222i as obsolete. Updated Spock info.
01-Dec-2014	From Version 9 to 10	Changed	Changes made throughout the entire QuickSpecs.
09-May-2014	From Version 7 to 9	Changed	Basic Care was revised.
01-Mar-2014	From Version 6 to 7	Changed	Changes made throughout the entire QuickSpecs.
14-May-2012	From Version 3 to 4	Changed	Changes made throughout the entire QuickSpecs.
09-Sep-2011	From Version 2 to 3	Changed	Step 2 was revised in Configuration Information and the title was changed.
08-Jun-2011	From Version 1 to 2	Removed	Removed StorageWorks throughout the document.



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