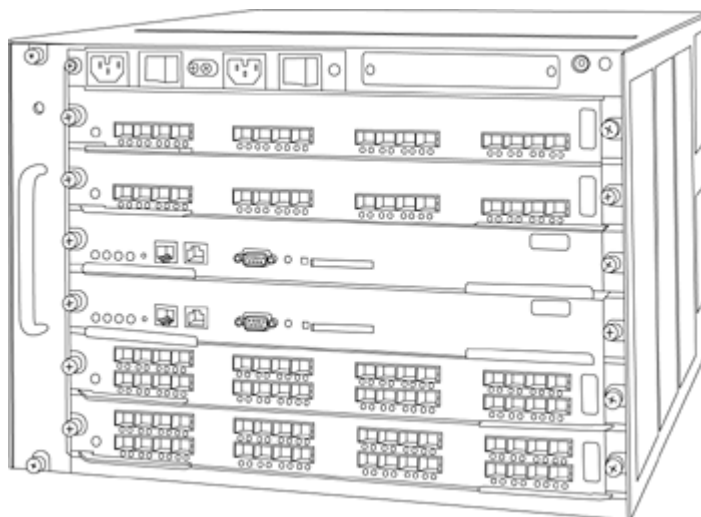# QuickSpecs

Overview

The Cisco MDS 9506 Multilayer Director w/Dual Supervisor 2 delivers multiple layers of intelligence, including multi-protocol support (Fibre Channel, iSCSI, FCIP), Virtual SANs (VSANs), embedded diagnostics and role-based security. With these innovations, companies can build highly scalable, available storage networks with comprehensive security and unified management.

The MDS 9506 with Supervisor 2 delivers industry-leading performance (1.44 Terabits internal system throughput) and increases total port density from 128-ports maximum to a new maximum of 192 when the new 48-port 4/2/1 Gb Fibre Channel modules are used. The MDS 9506 also features high availability, to lower TCO and enable integrated SAN infrastructures. HP delivers the Cisco MDS 9506 Multilayer Director with high availability features designed in. The base unit includes a 6 slot modular chassis with dual supervisor modules and dual power supplies to help ensure smooth, continuous operation and non-disruptive upgrade capability. Four remaining expansion slots can be filled by optional MDS 9000 Family Modules, which include12, 24 and 48-port, 4Gb Fibre channel and a 4-port 10Gb Fibre Channel Modules as well as 8-port 1Gb IP Storage Services Modules and a Multiprotocol Services Module (18+4, 18, 4Gb FC and 4, 1Gb IP ports) These modules provide integrated Fibre Channel, FCIP and iSCSI operation for SAN extension over IP networks for business continuance and disaster recovery solutions, the MPS 18/4 module along with the optional Cisco MDS 9500 Storage Media Encryption package can provide encryption for data at rest on storage tape media for added security to the SAN environment. iSCSI host access to Fibre Channel connected arrays and Enterprise-wide Data Archiving solutions. The MDS 9000 Storage Services Module enables fabric-based applications to access fabric-wide services for a wide range of solutions for business continuance, storage virtualization, data migration, network assisted backup solutions and information life cycle management. All modules are interchangeable across MDS 9500 Directors and 9200 series Fabric Switches, providing a smooth migration path, common sparing and investment protection.

Layered, intelligent features also include integration with HP OpenView, HP Storage Essentials and CiscoWorks RME, delivering ease of administration, improved customer productivity, and infrastructure management through a single pane-of-glass. This common software platform also ensures that the user's SAN environment will scale seamlessly as business grows and technology evolves.

Overview

Key Features

- **Reduced Total Cost of Ownership (TCO) for SAN Infrastructure**
  - Enables storage consolidation, simplified management of SAN environment
- **High Port Density**
  - 12- 192 Fibre Channel ports (auto-sensing 10/4/2/1 Gb) in single chassis
  - 1,152 ports in standard rack (42U)
- **Scalable**
  - Offers 12 to 192 Fibre Channel ports
  - Supports throughput up to 120 Gb in a single Port Channel ISL
- **Highly Available**
  - Redundant Supervisor 2s, power supplies and fans for high availability - Hot-swappable Supervisors, SFP optical interface modules, fan modules, and power modules. Hot software code loads are also used to maintain constant operation.
- **Interoperable**
  - Broad range of HP servers and operating systems
  - Disk and tape storage devices
  - Open platform for enabling network-based Intelligent Storage Applications
  - Common architectural platform across all Cisco MDS 9000 family products
  - MDS 9500 Directors and Cisco MDS 9200 Fabric Switch use interchangeable MDS 9000 Series modules
- **Integrated Management**
  - Embedded Fabric Manager
  - Integration with HP OpenView
  - Integration with HP Storage Essentials
  - Integration with CiscoWorks 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
  - Storage Media Encryption of Data at Rest on tape - FIPS 140-2, level 2 certifications.
- **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 and key management.

Product Highlights

Cisco MDS 9506 Multilayer Director	Supports from 12 to 192 auto-sensing 10/4/2 and 1-Gb Auto-Sensing Fibre Channel ports and from 2 to 26 1-Gb Ethernet ports (user configurable for iSCSI or FCIP) in a single chassis and up to 1,152 Fibre Channel ports in a single 42U rack.
Configuration support	http://h18000.www1.hp.com/products/storageworks/san/documentation.html
Security	Supports role-based access control, VSANs, hardware-enforced Zoning, FC-SP, ACLs, RADIUS authentication, SNMPv3, SSH, SFTP and IPsec. IEEE standard Advanced Encryption Standard (AES) 256-bit algorithms
Intelligent network services	• Virtual SANs (VSANs) • PortChannels • Quality of Service (QoS) • Security • Embedded Diagnostics
High Availability	• Hot code loads and non-disruptive software upgrades • Stateful process restart/failover • Full redundancy of all major components
High Performance	• 1.44 Terabit/sec internal system throughput • Ports up to 10 Gb Fibre Channel • Port Channels up to 120 Gb for ISLs
Multiprotocol/ Multitransport	• Enables a consistent feature set over a protocol agnostic switch fabric; • Seamlessly integrates Fibre Channel, iSCSI, and FCIP in one system. • Allows integration of future storage protocols with its flexible architecture.
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) multipathing provides the intelligence to load balance across up to 16 equal cost paths and, in the event of a switch failure, to dynamically reroute traffic.
Access Control Lists (ACLs)	Hardware-based intelligent frame processing.

QuickSpecs

Product Highlights

Traffic management
- Fibre Channel Congestion Control (FCC)
- Fabric-wide QoS

Management modes
- Cisco MDS 9000 Family Command Line Interface (CLI)
- Embedded Cisco Fabric Manager
- Optional Cisco Fabric Manager Server
- Integration with HP OpenView
- Integration with HP Storage Essentials
- Integration with Cisco Resource Manager Essentials (RME)

Interoperability
- Offers compatibility with a broad range of HP servers and operating systems, as well as disk and tape storage devices.
- Shares common switching modules across all Cisco MDS 9500 Series Director products as well as the MDS 9216 Multilayer Fabric Switch.

Product Family Models
- Cisco MDS 9513 Multilayer Director w/Dual Supervisor 2 - Intelligent, multi-protocol 13-slot Director with up to 528 Auto-Sensing 4/2/1 Gb Fibre Channel ports
- Cisco MDS 9509 Multilayer Director w/Dual Supervisor 2 - Intelligent, multi-protocol 9-slot Director with up to 336 Auto-Sensing 4/2/1 Gb Fibre Channel ports
- Cisco MDS 9222i Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with eighteen 4-Gb Fibre Channel ports, four 1Gb Ethernet ports, a four port FCIP software license and an open modular expansion slot with up to a forty-eight ports of 4-Gbps Fibre Channel or 10-Gb Fibre Channel ports for Inter-Switch Links
- Cisco MDS 9216A Multilayer Fabric Switch - Intelligent, multi-protocol modular Fabric Switch with up to 64 Auto-Sensing 4/2/1 Gb Fibre Channel ports (16, fixed 2/1 Gb Fibre Channel ports and up to 48 4/2/1 Gb Fibre Channel ports)
- Cisco MDS 9216i Multilayer Fabric Switch - Intelligent, multi-protocol modular Fabric Switch with up to 62 Auto-Sensing 4/2/1 Gb Fibre Channel ports and 2, 1 Gb Ethernet ports (14 fixed Fibre channel ports are Auto-Sensing 2/1 Gb Fibre Channel ports.and up to 48 4/2/1 Gb Fibre Channel ports)
- Cisco MDS 9124 Fabric Switch with up to 24 Auto-Sensing 4/2/1 Gb Fibre Channel ports
- Cisco MDS 9124 Fabric Switch for HP c-Class BladeSystems
- Embedded switch for HP c-Class BladeSystem with up to 24 Auto-Sensing 4/2/1 Gb Fibre Channel ports

QuickSpecs

Product Highlights

Software Components, Standard

SAN-OS	Cisco MDS 9000 SAN-OS delivers numerous advanced storage networking capabilities for the Cisco MDS 9000 Family of Multilayer Intelligent Directors and Fabric Switches.

Cisco Fabric Manager	Cisco Fabric Manager is a responsive, easy-to-use Java application that simplifies management across multiple switches and fabrics. Cisco Fabric 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 Fabric 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

Cisco Fabric Manager Server Package	The "Standard" Cisco Fabric Manager software that is included at no charge with the MDS family switches provides basic switch configuration and troubleshooting capabilities. The Cisco Fabric Manager Server (FMS) Package extends Cisco Fabric Manager by providing historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.
Cisco 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 Cisco MDS 9000 Enterprise Package.
Cisco MDS 9000 Family SME Package	Cisco MDS 9000 Family SME Package allows encryption of storage media (data at rest). Strong, standard IEEE AES-256 encryption for heterogeneous tape devices and VTLs as well as tape data compression are provided as a distributed fabric service.
Cisco MDS 9000 Family Mainframe Package	The Cisco MDS 9000 Family Mainframe Package is a comprehensive collection of features required for using the Cisco MDS 9500 Series switches in mainframe storage networks, including FICON protocol and CUP management, switch cascading, fabric binding, and intermixing.

Service and Support, Warranty Information

Warranty	(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (8x5, next business day response) and 1-year labor. **NOTE:** The hardware warranty covers firmware and embedded non-saleable software. For extended hardware installation and maintenance information, click the link below: http://h18005.www1.hp.com/services/carepaq/us/install/ http://h18005.www1.hp.com/services/carepaq/us/hardware/. **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.
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/.
Software Product Services	**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. **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.
Hardware Product Services	(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (8x5, next business day response) and 1-year labor. **NOTE:** The hardware warranty covers firmware and embedded non-saleable software. For extended hardware installation and maintenance information, click the link below: http://h18005.www1.hp.com/services/carepaq/us/install/ http://h18005.www1.hp.com/services/carepaq/us/hardware/.

Service and Support, 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:

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

Additional Services

Installation service; SAN Solution service; SAN-Environmental Support service; SAN Architecture service; Proactive 24

For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at:

http://www.hp.com/hps/support

Family Information

	Cisco MDS 9513 w/Dual Supervisor 2	Cisco MDS 9509 w/Dual Supervisor 2	Cisco MDS 9506 w/Dual Supervisor 2	Cisco MDS 9222i	Cisco MDS 9216i	Cisco MDS 9216A	Cisco MDS 9124	Cisco MDS 9124e Fabric Switch for HP c-Class Blade System
Introduction Date	May 2006	May 2006	May 2006	November 2007	May 2006	Dec 2005	March 2007	February 2007
Switch Type	Multilayer Director	Multilayer Director	Multilayer Director	Multilayer Fabric Switch	Multilayer Fabric Switch	Multilayer Fabric Switch	Fabric Switch	Embedded Fabric Switch
Maximum ports	528 Fibre Channel, 58 IP ports	336 Fibre Channel, 50 IP ports	192 Fibre Channel, 26 IP ports	18 fixed auto-sensing 4/2/1-Gbps Fibre Channel ports, 4 1-Gb Ethernet ports	64, up to 62 Fibre Channel, 10 IP ports	64 FC, up to 16 FC and 8 IP ports	Up to 24 Fibre Channel ports	16 Internal, 8 Fibre Channel ports
Number of slots per chassis	Thirteen	Nine	Six	Two	Two	Two	N/A, Fixed FRU	N/A, Fixed FRU
OS Support	NOTE: Please Refer to SAN Design Guide pointer: http://www.hp.com/go/SANdesign or http://www.hp.com/go/SANdesignguide.							

QuickSpecs

Configuration Information

Step 1 – Base Configuration

Select one:

Model Number	Model Description	Part Number
Cisco MDS 9506 Director, Base Unit w/Dual Supervisor 2	MDS 9506 NOTE: Base unit includes a 7U, 6 slot chassis, fans, dual supervisor 2 modules, dual AC power supplies, two 250 VAC 16 Amp power cords and two PDU power cords, firmware and documentation. Supervisor modules use 2 slots leaving slots for up to four optional expansion port modules. NOTE: Appropriate country power cords will be included for the 1900 watt AC power supply for the MDS 9506 Director based on ship to destination information. Optional twist lock power cords may be ordered separately.	AE388A

Step 2 – Options

Select each type of option with quantities specified:

Model Description	Quantity	Part Number
HP MDS 9000 Series 16-prt, 1/2 Gb FC Module, 16 short wave SFPs (A7428A) included	4 Max	A7464A
HP MDS 9000 Series 32-prt, 1/2 Gb FC Module, 32 short wave SFPs (A7428A) included	4 Max	A7465A
HP MDS 9000 2 Gb FC SFP SW XCVR (used on A7464A, A7465A, AE378A, A7559A and AE391A, 2 Gb FC Modules) *	Spares Only Included with 2 Gb FC Port Modules	A7428A
HP MDS 9000 2 Gb LW XCVR (used on A7464A, A7465A, AE378A, A7559A and AE391A, 2 Gb FC Modules) *		A7429A
HPMDS 9000 32-port Storage Services Module, includes 32 short wave SFPs (A7428A)	4 Max	AE378A
Cisco MDS 9500 Storage Services Module Application Enabler License To Use. (Required for Network Hosted Applications which use SAN Tap and ISAPI services on Storage Services Module)		T4317A
HP MDS 9000 12-port, 4 Gb FCmodule, (DOES NOT include SFPs)	4 Max	AE383A
HP MDS 9000 24-port, 4 Gb FC module, (DOES NOT include SFPs)	4 Max	AE384A
HP MDS 9000 48-port, 4 Gb FC module, (DOES NOT include SFPs)	4 Max	AE385A
HP MDS 9000 4Gb FC SFP, 4 pk, Shrt Range XCVR	SFPs not included with 4Gb 12, 24 and 48 port modules	AE379A
HP MDS 9000 4Gb FC SFP, Med Range XCVR		AE494A
HP MDS 9000 4Gb FC SFP, Lng Wave XCVR		AE380A
HP MDS 9000 4-port, 10 Gb F Module, (DOES NOT include SFPs)	3 Max	AE386A

Configuration Information

Cisco MDS 9000 10 Gb FC SFP, Short Wave Transceiver		AE381A
Cisco MDS 9000 10 Gb FC SFP, Long Wave Transceiver		AE456A
HP MDS 9000 Compact Flash Disk, 512MB		A7468A
HP MDS 9000 Port Analyzer Adapter		A7430A
Cisco MDS 9500 Dual Supervisor 2 Upgrade Kit	1 Max	AE387A
MDS 9000 10Gb Fibre Channel 2X Entended Range Transceiver		AG861A
MDS 9000 10Gb Fibre Channel 2X Copper Transceiver		AG870A
Cisco MDS 9000 10Gb Ethernet X2 Short Range Transceiver		AG871A
Cisco MDS 9000 Encryption Key Manager Smart Card Reader		AG872A
Cisco MDS 9000 Encryption Key Manager Smart Card		AG873A
Cisco MDS 9000 15 Meter Cable for 10Gb Copper Short Range X2 Transceivers		AG876A
Cisco MDS 9000 1 Meter Cable for 10Gb Copper Short Range X2 Transceivers		AG877A
HP StorageWorks CWDM 4-port Multiplexer A		AG878A
HP StorageWorks CWDM 4-port Multiplexer B		AG879A
HP StorageWorks CWDM 8-port Multiplexer		AG880A
HP StorageWorks CWDM Multiplexer Chassis		AG881A
HP 2m Single-Mode LC/LC Fibre Channel Cable Used for CWDM solution	1 Pack	AK345A
HP 5m Single-Mode LC/LC Fibre Channel Cable Used for CWDM solution	1 Pack	AK346A

Optional Software

HP MDS 9500 Fab MGR SV-1MDS 9500 swt LTU	1 per switch	A7514A
HP MDS 9500 Enterprise Package license, Required for Inter-VSAN routing, QoS management, IPsec security, LUN zoning and individual port security	1 per switch	A7517A
HP MDS 9500 Stor SrvcS Mod Enabler LTU(Required for Network and switch Hosted Applications which use SAN Tap and ISAPI services on Storage Services Module)		T4317A
Cisco MDS 9500 Mainframe FICON Software License To Use. XP Array configurations only & HP Services Installation and Startup Statement of Work is required	Required for each Switch used for FICON Plus prerequisite HP C&I Service HA546A1	T4408A
Cisco MDS 9500 Storage Media Encryption package for one MPS 18/4 Module LTU		T5415A

IP Services Solution

HP MDS 9500 8-pt 1GE IP STG Srvcs Module, requires A7487A,A7488A or AE382A SFPs	3 Max	A7470A
HP MDS 9500 8-prt FCIP Srvcs SW License LTU	1 per module	A7469A
MDS 9500 4-port IP Storage Services Module, requires A7487A, A7488A or AE382A SFPs		A7562A

Configuration Information

HP MDS 9500 4-prt FCIP SRVCS SW LTU, required for FCIP operation	1 per module	T3694A
MDS 9000 Multiprotocol Services Module w/0 1Gb Ethernet SFP (14+2, 14-ports FC and 2 ports 1 Gb Ethernet), (requires 2 A7487A, A7488A or AE382A SFPs)	14, A7428A SFPs included	AE391A
HP MDS 9500 2-prt FCIP Srvcs LTU, required for FCIP operation	1 per module	T3679A
HP MDS 9000 18+4 w/0 SFP Module (does not support AE382A Copper Transceiver)	4 Max	AG852A
HP MDS 9500 MPS 18/4 FCIP Module LTU, required for FCIP operation with AG852A		T5413A
1Gb-Ethernet/2FC SW SFPLG-LC	1 Min., 26 Max	A7487A
1Gb-Ethernet/2FCLW SFPLG-LC	1 Min., 26 Max	A7488A
1Gb Ethernet SFP, Copper Transceiver		AE382A
Course Wave Division Multiplexer solution		
HP 1470 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7475A
HP 1490 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7476A
HP 1510 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7477A
HP 1530 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7478A
HP 1550 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7479A
HP 1570 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7480A
HP 1590 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7481A
HP 1610 NM CWDM 2Gb FC SFP (works only with A7483A and A7484A multiplexers)		A7482A
HP LC/SC 1 Meter Fibre Cable (works only with A7483A and A7484A multiplexers)		A7485A
HP LC/SC 5 Meter Fibre Cable (works only with A7483A and A7484A multiplexers)		A7486A
MDS 9000 1470 NM CWDM 4Gb FC SFP Transceiver		AG853A
MDS 9000 1490 NM CWDM 4Gb FC SFP Transceiver		AG854A
MDS 9000 1510 NM CWDM 4Gb FC SFP Transceiver		AG855A
MDS 9000 1530 NM CWDM 4Gb FC SFP Transceiver		AG856A
MDS 9000 1550 NM CWDM 4Gb FC SFP Transceiver		AG857A
MDS 9000 1570 NM CWDM 4Gb FC SFP Transceiver		AG858A
MDS 9000 1590 NM CWDM 4Gb FC SFP Transceiver		AG859A
MDS 9000 1610 NM CWDM 4Gb FC SFP Transceiver		AG860A
Dense Wave Division Multiplexer solution		
MDS 9000 3661 NM DWDM 2Gb SFP Transceiver		AG862A
MDS 9000 3582 NM DWDM 2Gb SFP Transceiver		AG863A

Configuration Information

MDS 9000 3504 NM DWDM 2Gb SFP Transceiver	AG864A
MDS 9000 3425 NM DWDM 2Gb SFP Transceiver	AG865A
MDS 9000 3268 NM DWDM 2Gb SFP Transceiver	AG866A
MDS 9000 3190 NM DWDM 2Gb SFP Transceiver	AG867A
MDS 9000 3112 NM DWDM 2Gb SFP Transceiver	AG868A
MDS 9000 3033 NM DWDM 2Gb SFP Transceiver	AG869A
NOTE: MDS 9506 base unit includes a 7U, 6 slot chassis, fans, dual Supervisor 2 modules, dual 1900W AC power supplies, two 250 VAC, 20 Amp power cords and two PDU power cords.firmware and documentation	AE388A

Twist Lock power cord option	HP MDS 9506, 250 VAC 20A, Twist -l Pwr Cord	A7568A

NOTES:
* Fibre Channel ports on the MDS 9000 port modules may be configured to accept several different types of SFP optic transceivers. When ordering the MDS 9000 port cards A7464A, A7465A, AE378A, A7559A and AE391A, all available FC ports are shipped with the short wave SFP optic transceivers included. Other SFPs must be ordered separately. SFPs for all 1 Gb Etherent ports must also be ordered separately. Copper Ethernet transceivers are used for very short distances less than 100 meters and are used with standard Category 5 Ethernet wiring. HP MDS 9000 18+4 w/0 SFP Module does not support AE382A Copper Transceiver.

** MDS 9506 (p/n AE388A and A7471A) are shipped with dual 1900W AC power supplies, two 250 VAC, 20 Amp power cords and two PDU power cords. Optional U.S. twist lock power cords may be ordered separately.

Fibre Channel standards and revisions	Fibre Channel Protocols (FC-PH, Revision 4.3, FC-PH-2, Revision 7.4 FC-PH-3, Revision 9.4, FC-SW-2, Revision 5.3, FC-SB-2, Revision 2.1,	FC-GS-2, Revision 5.3, FC-GS-3, Revision 7.01, FC-FLA, Revision 2.7, FC-FG, Revision 3.5,	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-BB, Revision 4.7, FC-FS, Revision 1.7, FC-PI, Revision 13 , FC-MI, Revision 1.99, FC-Tape, Revision 1.17)

Technical Specifications

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 SAN-OS Release 3.0.(1) - Min. Revision
Performance	Transfer Rate	• 4 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	• 1/2/4/10 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
	Cable Lengths	2 meters, 5 meters, 15 meters, 30 meters, 50 meters

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)
	16-port 1/2Gb FC port card	1.75 x 15.5 x 16.5 in (4.45 x 39.37 x 41.91cm)	7.5 x 21.25 x 23 in (19.05 x 53.98 x 58.42 cm)
	32-port 1/2Gb FC port card	1.75 x 15.5 x 16.5 in (4.45 x 39.37 x 41.91cm)	7.5 x 21.25 x 23 in (19.05 x 53.98 x 58.42 cm)
	2 Gb FC-SW SFP, LC	0.25 x 0.5 x 2.5 in (0.6 x 1.27 x 6.35 cm)	n/a

Technical Specifications

	2 Gb FC-LW SFP, LC	0.25 x 0.5 x 2.5 in (0.6 x 1.27 x 6.35 cm)	n/a
	Sup Compact Flash Disk	1.375 x 1.625 x 0.125 in (3.49 x 4.13 x 0.32 cm)	n/a
	Port Analyzer Adapter	1.125 x 6 x 4.5 in (2.9 x 15.24 11.43 cm)	4 x 8 x 11 in (10.16 x 20.32 x 27.94 cm)
	1900W AC	7.125 x 7.75 x 14.625 in (18.1 x 19.7 x 37.15 cm)	n/a

Connectors/Cables	Connectors	• RJ-45 Interface Cable Connector • LC-type-fiber optic SFP
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 (0° to 40° 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 • Status
		                 • System
		                 • Active/Standby
		                 • Power Management
		                 • Ethernet (management)

	LED Indicators (On back)	Fan 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.
- W (Width) is the horizontal (left to right) dimension when looking at the front of the component, as it would be seen in the chassis. Exception is the compact flash where W is when looking at the identification label on the part.
- D (Depth) is the front to back dimension when looking at the front of the component, as it would be seen in the chassis. Exception is the compact flash where D is when looking at the identification label on the part.
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