Models

HP A9512 Switch Chassis	JC125B
HP A9508-V Switch Chassis	JC474B
HP A9505 Switch Chassis	JC124B

Key features

- Data center, large campus, enterprise LANs, MANs
- Modular routing switch, IPv6, MPLS
- Future-proof architecture
- Added functionality with service modules
- Robust network and service virtualization

Product overview

The HP A9500 Switch Series are modular switches that form a next-generation data center/large campus core switching platform. With unprecedented levels of networking performance, industry-leading availability, and flexible and efficient deployment options, these switches enable new services while driving down the cost of network operations. The A9500 series switches can provide more than 1.4 TB of high-performance switching capacity, aggregate up to 192 10-GbE or 576 GbE ports, and offer a future-proof architecture that enables customers to support emerging enterprise core or data center requirements.

Features and benefits

Quality of Service (QoS)

- IEEE 802.1p prioritization: delivers data to devices based on the priority and type of traffic
- Class of Service (CoS): sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ
- Virtual Output Queuing (VOQ) architecture: reduces complexity and increases efficiency and cost-effectiveness by eliminating head-of-line blocking issues within the queuing system
- Bandwidth shaping:
  - Port-based rate limiting: provides per-port ingress/egress enforced maximum bandwidth
  - Classifier-based rate limiting: uses access control list (ACL) to enforce maximum bandwidth for ingress/egress traffic on each port
- Traffic policing: supports Committed Access Rate (CAR) and line rate
- Congestion avoidance: Weighted Random Early Detection(WRED)/Random Early Detection (RED)
- Powerful QoS feature: supports the following congestion actions: strict priority queuing (SP), weighted round robin (WRR), and SP+WRR

Firewall

- Stateful firewall: enforces firewall policies to control traffic and filter access to network services; maintains session information for every connection passing through it, enabling the firewall to control packets based on existing sessions
- Zone-based access policies: logically groups virtual LANs (VLANs) into zones that share common security policies; allows both unicast and multicast policy settings by zones instead of by individual VLANs
- Application-level gateway (ALG): deep packet inspection in the firewall discovers the IP address and service port information embedded in the application data; the firewall then dynamically opens appropriate connections for specific applications

Overview

- NAT/PAT: choice of dynamic or static network address translation (NAT) preserves a network's IP address pool or conceals the private address of network resources, such as Web servers, which are made accessible to users of a guest or public wireless LAN

Virtual private network (VPN)

- IPSec: provides secure tunneling over an untrusted network such as the Internet or a wireless network; offers data confidentiality, authenticity, and integrity between two endpoints of the network
- Layer 2 Tunneling Protocol (L2TP): an industry standard-based traffic encapsulation mechanism supported by many common operating systems such as Windows® XP and Windows Vista®; will tunnel the Point-to-Point Protocol (PPP) traffic over the IP and non-IP networks; may use the IP/UDP transport mechanism in IP networks
- Generic Routing Encapsulation (GRE): can be used to transport Layer 2 connectivity over a Layer 3 path in a secured way; enables the segregation of traffic from site to site
- Manual or automatic Internet Key Exchange (IKE): provides both manual or automatic key exchange required for the algorithms used in encryption or authentication; auto-IKE allows automated management of the public key exchange, providing the highest levels of encryption

Management

- Management interface control: provides management access through modem port, terminal interface, as well as in-band and out-of-band Ethernet ports; provides access through terminal interface, telnet, or Secure Shell (SSH)
- Industry-standard CLI with a hierarchical structure: reduces training time and expenses, and increases productivity in multivendor installations
- Management security: multiple privilege levels with password protection restrict access to critical configuration commands; ACLs provide telnet and SNMP access; local and remote syslog capabilities allow logging of all access
- SNMPv1, v2, and v3: provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption
- sFlow (RFC 3176): provides scalable ASIC-based wire-speed network monitoring and accounting with no impact on network performance; this allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring purposes
- Remote monitoring (RMON): uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
- FTP, TFTP, and SFTP support: FTP allows bidirectional transfers over a TCP/IP network and is used for configuration updates; Trivial FTP is a simpler method using User Datagram Protocol (UDP)
- Debug and sampler utility: supports ping and traceroute for both IPv4 and IPv6
- Network Quality Analyzer (NQA): analyzes network performance and service quality by sending test packets, and provides network performance and service quality parameters such as jitter, TCP, or FTP connection delays and file transfer rates; allows network manager to determine overall network performance and to diagnose and locate network congestion points or failures
- Network Time Protocol (NTP): synchronizes timekeeping among distributed time servers and clients; keeps consistent timekeeping among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time
- Info center: provides a central information center for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP): automated device discovery protocol provides easy mapping by network management applications
- Multiple configuration files: can be stored to the flash image
- Dual flash images: provide independent primary and secondary operating system files for backup while upgrading
- USB support:
  - File copy: allows users to copy switch files to and from a USB flash drive

Overview

Connectivity

- High-density port connectivity: provides up to 12 interface module slots, up to 192 10-GbE ports, or 576 GbE ports (fiber or copper) per system
- Flexible port selection: provides a combination of fiber and copper interface modules, 100/1000BASE-X auto-speed selection, and 10/100/1000BASE-T auto-speed detection plus auto duplex and MDI/MDI-X
- Jumbo frames: are supported on 10 GbE and GbE ports; up to 9,000 sizes allow high-performance backups and disaster recovery systems
- Loopback: supports internal loopback testing for maintenance purposes and an increase in availability; loopback detection protects against incorrect cabling or network configurations and can be enabled on a per-port or per-VLAN basis for added flexibility
- Packet storm protection: protects against broadcast, multicast, or unicast storms with user-defined thresholds
- Ethernet OAM: provides a Layer 2 link performance and fault detection monitoring tool, which reduces failover and network convergence times
- Flow control: using standard IEEE 802.3x, it provides back pressure to reduce congestion in heavy traffic situations
- Monitor link: collects statistics on performance and errors on physical links, increasing system availability

Performance

- Scalable system design: backplane is designed for bandwidth increases; provides investment protection to support future technologies and higher speed connectivity
- Flexible chassis selection: provides a choice of three chassis, ranging from a 12-slot or 8-slot vertical for data center applications and a 5-slot; allows you to tailor your needs to meet your budget
- High-speed fully distributed architecture: provides switching capacity up to 1440 Gbps; supports a bandwidth of 857 Mpps and up to 192 10-GbE ports or 576 GbE fiber or copper ports; all switching and routing is performed in the I/O modules; meets today's and future demand for an enterprise's bandwidth-intensive applications

Resiliency and high availability

- Redundant/Load-sharing fabrics, management, fan assemblies, and power supplies: increase total performance and power available while providing hitless, stateful failover
- Hot-swappable modules: help ensure the replacement of hardware interface modules without impacting the traffic flow through the system
- Redundant power supplies: services module has the same level of power supply redundancy as the switch in which it is installed
- Passive design system: backplane has no active components for increased system reliability
- Separate data and control paths: increases security and performance
- Hitless patch upgrades: allow patches and new service features to be installed without restarting the equipment, increasing network uptime and facilitating maintenance
- IEEE 802.3ad Link Aggregation Control Protocol (LACP): supports up to 240 trunks, each with 12 links per trunk; supports static or dynamic groups and user-selectable hashing algorithm
- Virtual Router Redundancy Protocol (VRRP): allows a group of routers to dynamically back each other up to create highly available routed environments
- Intelligent Resilient Framework (IRF): creates virtual resilient switching fabrics, where two or more switches perform as a single Layer 2 switch and Layer 3 router; switches do not have to be co-located and can be part of a disaster recovery system; servers or switches can be attached using standard LACP for automatic load-balancing and high availability; simplifies network operation by eliminating the complexity of Spanning Tree, Equal-Cost Multipath (ECMP), or VRRP
- Smart link: allows 50 ms failover between links
- Graceful restart: features are fully supported, including graceful restart for OSPF, IS-IS, BGP, LDP, and RSVP; network remains stable during the active-standby switchover; after the switchover, the device quickly learns the network routes by

communicating with adjacent routers; forwarding remains uninterrupted during the switchover to realize nonstop forwarding (NSF)

- IP/LDP FRR: nodes are configured with backup ports, routes, and LSPs; local implementation requires no cooperation of adjacent devices, simplifying the deployment; solves the traditional convergence faults in IP forwarding and MPLS forwarding, protecting the links, nodes, and paths without establishing respective backup LSPs for them; realizes restoration within 50 ms, with the restoration time independent of the number of routes and fast link switchovers without route convergence
- Ring Resiliency Protection Protocol (RRPP): provides standard sub-200 ms recovery for ring Ethernet-based topology

Layer 2 switching

- VLANs: support up to 4096 port or IEEE 802.1Q-based VLANs
- Spanning Tree: fully supports standard IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol
- Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping: effectively control and manage the flooding of multicast packets in a Layer 2 network
- Port isolation: increases security by isolating ports within a VLAN while still allowing them to communicate with other VLANs
- GARP VLAN Registration Protocol: allows automatic learning and dynamic assignment of VLANs
- Bridge Protocol Data Unit (BPDU) tunneling: transmits Spanning Tree Protocol BPDUs transparently, allowing correct tree calculations across service providers, WANs, or MANs
- Port mirroring: duplicates port traffic (ingress and egress) to a local or remote monitoring port; supports 64 mirroring groups, with an unlimited number of ports per group
- Device Link Detection Protocol (DLDP): monitors link connectivity and shuts down ports at both ends if uni-directional traffic is detected, preventing loops in STP-based networks
- IEEE 802.1ad QinQ and Selective QinQ: increase the scalability of an Ethernet network by providing a hierarchical structure; connect multiple LANs on a high-speed campus or metro network

Layer 3 services

- Address Resolution Protocol (ARP): determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network
- User Datagram Protocol (UDP) helper: redirects UDP broadcasts to specific IP subnets to prevent server spoofing
- Dynamic Host Configuration Protocol (DHCP): simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets

Layer 3 routing

- Static IPv4 routing: provides simple, manually configured IPv4 routing
- Routing Information Protocol: uses a distance vector algorithm with UDP packets for route determination; supports RIPv1 and RIPv2 routing; includes loop protection
- OSPF: Interior Gateway Protocol (IGP) using link-state protocol for faster convergence; supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- Border Gateway Protocol 4 (BGP-4): Exterior Gateway Protocol (EGP) with path vector protocol uses TCP for enhanced reliability for the route discovery process, reduces bandwidth consumption by advertising only incremental updates, and supports extensive policies for increased flexibility, as well as scales to very large networks
- Intermediate system to intermediate system (IS-IS): Interior Gateway Protocol (IGP) using path-vector protocol, which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
- Policy-based routing: makes routing decisions based on policies set by the network administrator
- IP performance enhancement: is a set of tools that enhances the performance of IPv4 networks; includes directed broadcasts, customization of TCP parameters, support of ICMP error packets, and extensive display capabilities

Overview

- Unicast Reverse Path Forwarding (uRPF): is defined by RFC 3704 and limits erroneous or malicious traffic
- Static IPv6 routing: provides simple, manually configured IPv6 routing
- Dual IP stack: maintains separate stacks for IPv4 and IPv6 to ease transition from an IPv4-only network to an IPv6-only network design
- Routing Information Protocol next generation (RIPng): extends RIPv2 to support IPv6 addressing
- OSPFv3: OSPF support for IPv6
- IS-IS for IPv6: extends IS-IS to support IPv6 addressing
- BGP+: extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing
- IPv6 tunneling: is an important element for the transition from IPv4 to IPv6; allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6to4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels
- Multiprotocol Label Switching (MPLS): uses BGP to advertise routes across Label Switched Paths (LSPs), but uses simple labels to forward packets from any Layer 2 or Layer 3 protocol, thus reducing complexity and increasing performance; supports graceful restart for reduced failure impact; supports LSP tunneling and multilevel stacks
- Multiprotocol Label Switching (MPLS) Layer 3 VPN: allows Layer 3 VPNs across a provider network; uses MP-BGP to establish private routes for increased security; supports RFC 2547bis multiple autonomous system VPNs for added flexibility
- Multiprotocol Label Switching (MPLS) Layer 2 VPN: establishes simple Layer 2 point-to-point VPNs across a provider network using only MPLS LDPs; requires no routing and therefore decreases complexity, increases performance, and allows VPNs of non-routable protocols; uses no routing information for increased security; supports Martini draft technologies
- Virtual Private LAN Service (VPLS): establishes point-to-multipoint Layer 2 VPNs across a provider network
- Multiprotocol Label Switching Traffic Engineering (MPLS TE): Traffic Engineering (TE) is used to enhance traffic over large MPLS networks based on type of traffic and available resources; TE dynamically tunes traffic management attributes and enables true load balancing; MPLS TE supports route backup using Fast Reroute (FRR)
- Service loopback: allows any module to take advantage of higher-featured modules, including OAA modules, by redirecting traffic; reduces investment and enables higher bandwidth and load sharing; supports IPv6, IPv6 multicast, tunneling, and MPLS
- Bidirectional Forwarding Detection (BFD): enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF
- Multicast VPN: supports Multicast Domain (MD) multicast VPN, which can be distributed on separate service cards, providing high performance and flexible configuration

Security

- DHCP protection: blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- DHCP snooping: helps ensure that DHCP clients receive IP addresses from authorized DHCP servers and maintain a list of DHCP entries for trusted ports; prevents reception of fake IP addresses and reduces ARP attacks, improving security
- RADIUS: eases switch security access administration by using a password authentication server
- TACACS+: is an authentication tool using TCP with encryption of the full authentication request that provides additional security
- Switch management logon security: can require either RADIUS or TACACS+ authentication for secure switch CLI logon
- Media access control (MAC) authentication: provides simple authentication based on a user's MAC address; supports local or RADIUS-based authentication
- Secure Shell (SSHv2): uses external servers to securely log in to a remote device; with authentication and encryption, it protects against IP spoofing and plain-text password interception; increases the security of Secure FTP (SFTP) transfers
- Attack protection: protects from attacks that use a large number of ARP requests by using a host-specific, user-selectable threshold; provides Address Scanning Attack Prevention, MAC Address Flooding Attack Prevention, and STP Attack Prevention
- Access control list (ACL): supports powerful ACLs for both IPv4 and IPv6; filters traffic to prevent illegal users from accessing the network, or controls network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on Layer 2 header or Layer 3 protocol header; rules can be set to operate on specific dates or times
- IP Source Guard: filters packets on a per-port basis, which prevents illegal packets from being forwarded

Overview

- Network address translation (NAT): provides a method for translating private IP addresses to public IP addresses, reducing the number of IP addresses used, and isolates the enterprise addressing environment
- Multiple user authentication methods:
  - IEEE 802.1X: is an industry-standard method of user authentication using an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server
  - Web-based authentication: similar to IEEE 802.1X, it provides a browser-based environment to authenticate clients that do not support the IEEE 802.1X supplicant
  - MAC-based authentication: client is authenticated with the RADIUS server based on the client's MAC address
- Endpoint Admission Defense (EAD): provides security policies to users accessing a network
- Port isolation: secures and adds privacy, and prevents malicious attackers from obtaining user information

Convergence

- Multicast Source Discovery Protocol (MSDP): is used for inter-domain multicast applications, allowing multiple PIM-SM domains to interoperate
- Internet Group Management Protocol (IGMP): is used by IP hosts to establish and maintain multicast groups; supports v1, v2, and v3; utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks
- Protocol Independent Multicast (PIM): is used for IPv4 and IPv6 multicast applications; supports PIM Dense Mode (PIM-DM), Sparse Mode (PIM-SM), and Source-Specific Mode (PIM-SSM)
- Multicast Border Gateway Protocol (MBGP): allows multicast traffic to be forwarded across BGP networks and kept separate from unicast traffic
- Multicast Listener Discovery (MLD) protocol: is used by IP hosts to establish and maintain multicast groups; supports v1 and v2 and utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv6 multicast networks
- Multicast VLAN: allows multiple VLANs to receive the same IPv4 or IPv6 multicast traffic, reducing network bandwidth demand by eliminating multiple streams to each VLAN

Integration

- Open Application Architecture (OAA): provides high-performance application-specific modules fully integrated with the switching architecture; uses the chassis high-speed backplane to access network-related data; increases performance, reduces costs, and simplifies network management
- VPN firewall module: provides enhanced stateful packet inspection and filtering; supports flexible security zones and virtual firewall containment; provides advanced VPN services with 3DES and AES encryption at high performance and low latency, Web content filtering, and application prioritization and enhancement
- Load-balancing module: local and global server load-balancing module improves traffic distribution using powerful scheduling algorithms, including Layer 4 to 7 services; monitors the health status of servers and firewalls
- NetStream module: provides traffic analysis and statistics capture to allow network administrators to rapidly identify network anomalies and security threats, as well as capacity planning information; supports NetFlow v5 and v9
- Wireless controller module: supports up to 640 access points (APs) per module; supports IEEE 802.11s/b/g/n APs; provides full user access management and QoS policies on a per-user basis; supports enterprise-class encryption; supports RF monitoring and control, MAP control, rogue AP detection, and location policy enforcement

Additional information

- Green initiative support: provides support for RoHS and WEEE regulations
- Low power consumption: is rated to have one of the lowest power usages in the industry by Miercom independent tests
- Unified, modular Comware operating system with modular architecture:
  - all switching, routing, and security platforms leverage a common, unified modular operating system—Comware; provides an easy-to-enhance-and-extend feature set without wholesale changes
- OPEX savings: a common operating system simplifies and streamlines deployment, management, and training, thereby cutting costs as well as reducing the chance for human error associated with having to manage multiple operating systems

across different platforms and network layers

Warranty and support

- 1-year warranty: with advance replacement and 10-calendar-day delivery (available in most countries)
- Electronic and telephone support: limited electronic and telephone support is available from HP; refer to: www.hp.com/networking/warranty for details on the support provided and the period during which support is available
- Software releases: refer to: www.hp.com/networking/warranty for details on the software releases provided and the period during which software releases are available for your product(s)

HP A9512 Switch Chassis (JC125B)		
Included accessories	2 HP A9512/A9505/A8812/A8805 Spare Fan Assembly (JC109A)	
Ports	2 switch fabric slots	
	12 I/O module slots	
	Supports a maximum of 192 10-GbE ports or 576 autosensing 10/100/1000 ports or 576 SFP ports, with optional module	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	includes: 2 x JC109A 2 fan tray slots	
Physical characteristics	**Dimensions**	17.72(d) x 17.4(w) x 29.65(h) in. (45.0 x 44.2 x 75.3 cm) (17U height)
	Weight	132.28 lb. (60 kg), Fully loaded chassis, two fabrics, two power supplies, and a full complement of typical I/O modules
	Full configuration weight	242.5 lb. (110 kg)
Memory and processor	**Fabric**	PowerPC @ 1000 MHz, 128 MB flash, 1 GB RAM, 256 MB compact flash
	I/O Module	PowerPC @ 667 MHz, 512 MB RAM
Mounting	Mounts in an EIA standard 19-in. rack or other equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 6.0 μs (FIFO 64-byte packets)
	10 Gbps Latency	< 6.0 μs (FIFO 64-byte packets)
	Throughput	857 million pps
	Routing/Switching capacity	1440 Gbps
	Routing table size	256000 entries
Reliability	**MTBF (years)**	41
	Availability	99.999%
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	5% to 95%, noncondensing
Electrical characteristics	**Voltage**	100-120/200-240 VAC
	DC Voltage	-48 V/-60 V
	Current	16/92 A
	Power output	3500 W
	Frequency	50/60 Hz
	Notes	Based on a 3500 W DC power supply
Safety	UL 60950-1; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; EN 60950-1/A11	

Technical Specifications

Emissions	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR22 Class A; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A	
Immunity	Generic	ETSI EN 300 386 V1.3.3
	EN	EN 61000-4-2:1995+A1:1998+A2:2001
	ESD	EN 61000-4-2
	Radiated	EN 61000-4-3
	EFT/Burst	EN 61000-4-4
	Surge	EN 61000-4-5
	Conducted	EN 61000-4-6
	Power frequency magnetic field	IEC 61000-4-8
	Voltage dips and interruptions	EN 61000-4-11
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	IMC - Intelligent Management Center; command-line interface; out-of-band management (serial RS-232C); SNMP Manager; Telnet; terminal interface (serial RS-232C); modem interface; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB	
Notes	IPSec/IKE functionality are provided by HP A9500 VPN/Firewall Module (JD245A).	
Services	3-year, parts only, global next-day advance exchange (HP763E) 3-year, 4-hour onsite, 13x5 coverage for hardware (HP764E) 3-year, 4-hour onsite, 24x7 coverage for hardware (HP767E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (HP770E) 3-year, 24x7 SW phone support, software updates (HP773E) 1-year, post-warranty, 4-hour onsite, 13x5 coverage for hardware (HR499E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware (HR500E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (HR501E) Installation with minimum configuration, system-based pricing (UX033E) 4-year, 4-hour onsite, 13x5 coverage for hardware (HP765E) 4-year, 4-hour onsite, 24x7 coverage for hardware (HP768E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (HP771E) 4-year, 24x7 SW phone support, software updates (HP774E) 5-year, 4-hour onsite, 13x5 coverage for hardware (HP766E) 5-year, 4-hour onsite, 24x7 coverage for hardware (HP769E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (HP772E) 5-year, 24x7 SW phone support, software updates (HP775E) 3 Yr 6 hr Call-to-Repair Onsite (HP776E) 4 Yr 6 hr Call-to-Repair Onsite (HP777E) 5 Yr 6 hr Call-to-Repair Onsite (HP778E) 1-year, 6 hour Call-To-Repair Onsite for hardware (HR503E) 1-year, 24x7 software phone support, software updates (HR502E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your	

local HP sales office.

HP A9508-V Switch Chassis (JC474B)		
Included accessories	1 HP A9508-V/A8808-V Spare Fan Assembly (JC475A)	
Ports	2 switch fabric slots 8 I/O module slots Supports a maximum of 128 10-GbE ports or 384 autosensing 10/100/1000 ports or 384 SFP ports, with optional module	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	includes: 1 x JC475A 1 fan tray slot	
Physical characteristics	**Dimensions**	17.72(d) x 17.17(w) x 38.39(h) in. (45.0 x 43.6 x 97.5 cm) (22U height)
	Weight	127.87 lb. (58 kg), Fully loaded chassis, two fabrics, two power supplies, and a full complement of typical I/O modules
	Full configuration weight	220.46 lb. (100 kg)
Memory and processor	**Fabric**	PowerPC @ 1000 MHz, 128 MB flash, 1 GB RAM, 256 MB compact flash
	I/O Module	PowerPC @ 667 MHz, 512 MB RAM
Mounting	Mounts in an EIA standard 19-in. rack or other equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 6.0 μs (FIFO 64-byte packets)
	10 Gbps Latency	< 6.0 μs (FIFO 64-byte packets)
	Throughput	571 million pps
	Routing/Switching capacity	960 Gbps
	Routing table size	256000 entries
Reliability	**MTBF (years)**	56
	Availability	99.999%
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	5% to 95%, noncondensing
Electrical characteristics	**Voltage**	100-120/200-240 VAC
	DC Voltage	-48 V/-60 V
	Current	16/92 A
	Power output	3500 W
	Frequency	50/60 Hz
	Notes	Based on a 3500 W DC power supply
Safety	UL 60950-1; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; EN 60950-1/A11	

Emissions	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR22 Class A; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A	
Immunity	Generic	ETSI EN 300 386 V1.3.3
	EN	EN 61000-4-2:1995+A1:1998+A2:2001
	ESD	EN 61000-4-2
	Radiated	EN 61000-4-3
	EFT/Burst	EN 61000-4-4
	Surge	EN 61000-4-5
	Conducted	EN 61000-4-6
	Power frequency magnetic field	IEC 61000-4-8
	Voltage dips and interruptions	EN 61000-4-11
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	IMC - Intelligent Management Center; command-line interface; out-of-band management (serial RS-232C); SNMP Manager; Telnet; terminal interface (serial RS-232C); modem interface; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB	
Notes	IPSec/IKE functionality are provided by HP A9500 VPN/Firewall Module (JD245A).	
Services	3-year, parts only, global next-day advance exchange (UX016E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UX017E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UX020E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UX023E) 3-year, 24x7 SW phone support, software updates (UX026E) 1-year, post-warranty, 4-hour onsite, 13x5 coverage for hardware (HR504E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware (HR505E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (HR506E) Installation with minimum configuration, system-based pricing (UX033E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UX018E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UX021E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UX024E) 4-year, 24x7 SW phone support, software updates (UX027E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UX019E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UX022E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UX025E) 5-year, 24x7 SW phone support, software updates (UX028E) 3 Yr 6 hr Call-to-Repair Onsite (UX029E) 4 Yr 6 hr Call-to-Repair Onsite (UX030E) 5 Yr 6 hr Call-to-Repair Onsite (UX031E) 1-year, 6 hour Call-To-Repair Onsite for hardware (HR508E) 1-year, 24x7 software phone support, software updates (HR507E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your	

local HP sales office.

HP A9505 Switch Chassis (JC124B)		
Included accessories	1 HP A9512/A9505/A8812/A8805 Spare Fan Assembly (JC109A)	
Ports	2 switch fabric slots 5 I/O module slots Supports a maximum of 80 10-GbE ports or 240 autosensing 10/100/1000 ports or 240 SFP ports, with optional module	
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	
Fan tray	includes: 1 x JC109A 1 fan tray slot	
Physical characteristics	**Dimensions**	17.72(d) x 17.4(w) x 19.13(h) in. (45.0 x 44.2 x 48.6 cm) (11U height)
	Weight	88.18 lb. (40 kg), Fully loaded chassis, two fabrics, two power supplies, and a full complement of typical I/O modules
	Full configuration weight	154.32 lb. (70 kg)
Memory and processor	**Fabric**	PowerPC @ 1000 MHz, 128 MB flash, 1 GB RAM, 256 MB compact flash
	I/O Module	PowerPC @ 667 MHz, 512 MB RAM
Mounting	Mounts in an EIA standard 19-in. rack or other equipment cabinet (hardware included); horizontal surface mounting only	
Performance	**1000 Mb Latency**	< 6.0 μs (FIFO 64-byte packets)
	10 Gbps Latency	< 6.0 μs (FIFO 64-byte packets)
	Throughput	357 million pps
	Routing/Switching capacity	600 Gbps
	Routing table size	256000 entries
Reliability	**MTBF (years)**	70
	Availability	99.999%
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 95%, noncondensing
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	5% to 95%, noncondensing
Electrical characteristics	**Voltage**	100-120/200-240 VAC
	DC Voltage	-48 V/-60 V
	Current	16/92 A
	Power output	3500 W
	Frequency	50/60 Hz
	Notes	Based on a 3500 W DC power supply
Safety	UL 60950-1; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; EN 60950-1/A11	

Emissions	VCCI Class A; EN 55022 Class A; ICES-003 Class A; ANSI C63.4 2003; AS/NZS CISPR22 Class A; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A	
Immunity	Generic	ETSI EN 300 386 V1.3.3
	EN	EN 61000-4-2:1995+A1:1998+A2:2001
	ESD	EN 61000-4-2
	Radiated	EN 61000-4-3
	EFT/Burst	EN 61000-4-4
	Surge	EN 61000-4-5
	Conducted	EN 61000-4-6
	Power frequency magnetic field	IEC 61000-4-8
	Voltage dips and interruptions	EN 61000-4-11
	Harmonics	EN 61000-3-2, IEC 61000-3-2
	Flicker	EN 61000-3-3, IEC 61000-3-3
Management	IMC - Intelligent Management Center; command-line interface; out-of-band management (serial RS-232C); SNMP Manager; Telnet; terminal interface (serial RS-232C); modem interface; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB	
Notes	IPSec/IKE functionality are provided by HP A9500 VPN/Firewall Module (JD245A).	
Services	3-year, parts only, global next-day advance exchange (UX016E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UX017E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UX020E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UX023E) 3-year, 24x7 SW phone support, software updates (UX026E) 1-year, post-warranty, 4-hour onsite, 13x5 coverage for hardware (HR504E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware (HR505E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (HR506E) Installation with minimum configuration, system-based pricing (UX033E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UX018E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UX021E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UX024E) 4-year, 24x7 SW phone support, software updates (UX027E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UX019E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UX022E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UX025E) 5-year, 24x7 SW phone support, software updates (UX028E) 3 Yr 6 hr Call-to-Repair Onsite (UX029E) 4 Yr 6 hr Call-to-Repair Onsite (UX030E) 5 Yr 6 hr Call-to-Repair Onsite (UX031E) 1-year, 6 hour Call-To-Repair Onsite for hardware (HR508E) 1-year, 24x7 software phone support, software updates (HR507E) Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your	

local HP sales office.

Standards and protocols (applies to all products in series)

BGP

RFC 1771 BGPv4
RFC 1772 Application of the BGP
RFC 1965 BGP4 confederations
RFC 1997 BGP Communities Attribute
RFC 1998 PPP Gandalf FZA Compression Protocol
RFC 2385 BGP Session Protection via TCP MD5
RFC 2439 BGP Route Flap Damping
RFC 2547 BGP/MPLS VPNs
RFC 2796 BGP Route Reflection
RFC 2858 BGP-4 Multi-Protocol Extensions
RFC 2918 Route Refresh Capability
RFC 3065 Autonomous System Confederations for BGP
RFC 3107 Support BGP carry Label for MPLS
RFC 3392 Capabilities Advertisement with BGP-4
RFC 4271 A Border Gateway Protocol 4 (BGP-4)
RFC 4272 BGP Security Vulnerabilities Analysis
RFC 4273 Definitions of Managed Objects for BGP-4
RFC 4274 BGP-4 Protocol Analysis
RFC 4275 BGP-4 MIB Implementation Survey
RFC 4276 BGP-4 Implementation Report
RFC 4277 Experience with the BGP-4 Protocol
RFC 4360 BGP Extended Communities Attribute
RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
RFC 4724 Graceful Restart Mechanism for BGP
RFC 4760 Multiprotocol Extensions for BGP-4

Denial of service protection

RFC 2267 Network Ingress Filtering
Automatic filtering of well-known denial-of-service packets
CPU DoS Protection
Rate Limiting by ACLs

Device management

RFC 1157 SNMPv1/v2c
RFC 1305 NTPv3
RFC 1902 (SNMPv2)
RFC 2271 FrameWork
RFC 2579 (SMIv2 Text Conventions)
RFC 2580 (SMIv2 Conformance)
RFC 2819 (RMON groups Alarm, Event, History and Statistics only)
Multiple Configuration Files
Multiple Software Images
SSHv1/SSHv2 Secure Shell

MIBs

RFC 1156 (TCP/IP MIB)
RFC 1157 A Simple Network Management Protocol (SNMP)
RFC 1213 MIB II
RFC 1215 A Convention for Defining Traps for use with the SNMP
RFC 1229 Interface MIB Extensions
RFC 1271 Remote Network Monitoring Management Information Base
RFC 1493 Bridge MIB
RFC 1643 Ethernet MIB
RFC 1657 BGP-4 MIB
RFC 1724 RIPv2 MIB
RFC 1757 Remote Network Monitoring MIB
RFC 1850 OSPFv2 MIB
RFC 2012 SNMPv2 MIB for TCP
RFC 2013 SNMPv2 MIB for UDP
RFC 2021 RMONv2 MIB
RFC 2096 IP Forwarding Table MIB
RFC 2127 ISDN Management Information Base using SMIv2
RFC 2233 Interfaces MIB
RFC 2268 Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)
RFC 2452 IPV6-TCP-MIB
RFC 2454 IPV6-UDP-MIB
RFC 2465 IPv6 MIB
RFC 2466 ICMPv6 MIB
RFC 2571 SNMP Framework MIB
RFC 2572 SNMP-MPD MIB
RFC 2573 SNMP-Target MIB
RFC 2578 Structure of Management Information Version 2 (SMIv2)
RFC 2579 Textual Conventions for SMIv2
RFC 2580 Conformance Statements for SMIv2
RFC 2613 SMON MIB
RFC 2618 RADIUS Client MIB
RFC 2620 RADIUS Accounting MIB
RFC 2665 Ethernet-Like-MIB
RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
RFC 2787 VRRP MIB
RFC 2819 RMON MIB
RFC 2856 Textual Conventions for Additional High Capacity Data Types
RFC 2863 The Interfaces Group MIB
RFC 2925 Ping MIB
RFC 2932IP (Multicast Routing MIB)
RFC 2933 IGMP MIB

TACACS/TACACS+

General protocols
IEEE 802.1ad Q-in-Q
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
IEEE 802.1X PAE
IEEE 802.3ab 1000BASE-T
IEEE 802.3ac (VLAN Tagging Extension)
IEEE 802.3ad Link Aggregation Control Protocol (LACP)
IEEE 802.3ae 10-Gigabit Ethernet
IEEE 802.3ah Ethernet in First Mile over Point to Point Fiber - EFMF
IEEE 802.3u 100BASE-X
IEEE 802.3x Flow Control
IEEE 802.3z 1000BASE-X
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 894 IP over Ethernet
RFC 903 RARP
RFC 906 TFTP Bootstrap
RFC 925 Multi-LAN Address Resolution
RFC 950 Internet Standard Subnetting Procedure
RFC 951 BOOTP
RFC 959 File Transfer Protocol (FTP)
RFC 1027 Proxy ARP
RFC 1042 IP Datagrams
RFC 1058 RIPv1
RFC 1142 OSI IS-IS Intra-domain Routing Protocol
RFC 1195 OSI ISIS for IP and Dual Environments
RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
RFC 1256 ICMP Router Discovery Protocol (IRDP)
RFC 1293 Inverse Address Resolution Protocol
RFC 1305 NTPv3
RFC 1350 TFTP Protocol (revision 2)
RFC 1519 CIDR
RFC 1531 Dynamic Host Configuration Protocol
RFC 1533 DHCP Options and BOOTP Vendor Extensions
RFC 1541 DHCP
RFC 2934 Protocol Independent Multicast MIB for IPv4
RFC 3273 HC-RMON MIB
RFC 3414 SNMP-User based-SM MIB
RFC 3415 SNMP-View based-ACM MIB
RFC 3417 Simple Network Management Protocol (SNMP) over IEEE 802 Networks
RFC 3418 MIB for SNMPv3
RFC 3593 Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals
RFC 3595 Textual Conventions for IPv6 Flow Label
RFC 3621 Power Ethernet MIB
RFC 3811 Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management
RFC 3812 Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB)
RFC 3813 MPLS LSR MIB
RFC 3814 MPLS FTN MIB
RFC 3815 MPLS LDP MIB
RFC 3826 AES for SNMP's USM MIB
RFC 4113 UDP MIB
RFC 4444 Management Information Base for Intermediate System to Intermediate System (IS-IS)

MPLS
RFC 2205 Resource ReSerVation Protocol (RSVP) - Version 1 Functional Specification
RFC 2209 Resource ReSerVation Protocol (RSVP)
RFC 2702 Requirements for Traffic Engineering Over MPLS
RFC 2858 Multiprotocol Extensions for BGP-4
RFC 3031 Multiprotocol Label Switching Architecture
RFC 3032 MPLS Label Stack Encoding
RFC 3107 Carrying Label Information in BGP-4
RFC 3479 Fault Tolerance for the Label Distribution Protocol (LDP)
RFC 3487 Graceful Restart Mechanism for LDP
RFC 4090 Fast Reroute Extensions to RSVP-TE for LSP Tunnels
RFC 4364 BGP/MPLS IP Virtual Private Networks (VPNs)
RFC 4379 Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures
RFC 4447 Pseudowire Setup and Maintenance Using LDP
RFC 4448 Encapsulation Methods for Transport of

RFC 1591 DNS (client only)
RFC 1631 NAT
RFC 1701 Generic Routing Encapsulation
RFC 1721 RIP-2 Analysis
RFC 1723 RIP v2
RFC 1812 IPv4 Routing
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2138 Remote Authentication Dial In User Service (RADIUS)
RFC 2338 VRRP
RFC 2453 RIPv2
RFC 2644 Directed Broadcast Control
RFC 2763 Dynamic Name-to-System ID mapping support
RFC 2784 Generic Routing Encapsulation (GRE)
RFC 2865 Remote Authentication Dial In User Service (RADIUS)
RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS
RFC 2973 IS-IS Mesh Groups
RFC 3022 Traditional IP Network Address Translator (Traditional NAT)
RFC 3277 IS-IS Transient Blackhole Avoidance
RFC 3567 Intermediate System to Intermediate System (IS-IS) Cryptographic Authentication
RFC 3619 Ethernet Automatic Protection Switching (EAPS)
RFC 3719 Recommendations for Interoperable Networks using Intermediate System to Intermediate System (IS-IS)
RFC 3784 ISIS TE support
RFC 3786 Extending the Number of IS-IS LSP Fragments Beyond the 256 Limit
RFC 3787 Recommendations for Interoperable IP Networks using Intermediate System to Intermediate System (IS-IS)
RFC 3847 Restart signaling for IS-IS
RFC 4251 The Secure Shell (SSH) Protocol Architecture
RFC 5130 A Policy Control Mechanism in IS-IS Using Administrative Tags

IP multicast

RFC 2236 IGMPv2
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 3376 IGMPv3
RFC 3446 Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast
Ethernet over MPLS Networks
RFC 4664 Framework for Layer 2 Virtual Private Networks
RFC 4665 Service Requirements for Layer 2 Provider Provisioned Virtual Private Networks
RFC 4761 Virtual Private LAN Service (VPLS) Using BGP for Auto-Discovery and Signaling
RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling
RFC 5036 LDP Specification

Network management

IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
RFC 1155 Structure of Management Information
RFC 1157 SNMPv1
RFC 1448 Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)
RFC 2211 Controlled-Load Network
RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
RFC 3164 BSD syslog Protocol
RFC 3176 sFlow
RFC 3411 SNMP Management Frameworks
RFC 3414 SNMPv3 User-based Security Model (USM)
RFC 3415 SNMPv3 View-based Access Control Model VACM)

OSPF

RFC 1245 OSPF protocol analysis
RFC 1246 Experience with OSPF
RFC 1765 OSPF Database Overflow
RFC 1850 OSPFv2 Management Information Base (MIB), traps
RFC 2328 OSPFv2
RFC 2370 OSPF Opaque LSA Option
RFC 3101 OSPF NSSA
RFC 3137 OSPF Stub Router Advertisement
RFC 3623 Graceful OSPF Restart
RFC 3630 Traffic Engineering Extensions to OSPF Version 2
RFC 4061 Benchmarking Basic OSPF Single Router Control Plane Convergence
RFC 4062 OSPF Benchmarking Terminology and Concepts
RFC 4063 Considerations When Using Basic OSPF Convergence Benchmarks
RFC 4222 Prioritized Treatment of Specific OSPF Version 2 Packets and Congestion Avoidance
RFC 4577 OSPF as the Provider/Customer Edge

(PIM) and Multicast Source Discovery Protocol (MSDP)
RFC 3618 Multicast Source Discovery Protocol (MSDP)
RFC 3973 PIM Dense Mode
RFC 4601 Draft 10 PIM Sparse Mode
RFC 4604 Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast
RFC 4605 IGMP/MLD Proxying
RFC 4607 Source-Specific Multicast for IP
RFC 4610 Anycast-RP Using Protocol Independent Multicast (PIM)
RFC 5059 Bootstrap Router (BSR) Mechanism for Protocol Independent Multicast (PIM)
draft-rosen-vpn-mcast-08

IPv6

RFC 1886 DNS Extension for IPv6
RFC 1887 IPv6 Unicast Address Allocation Architecture
RFC 1981 IPv6 Path MTU Discovery
RFC 2080 RIPng for IPv6
RFC 2081 RIPng Protocol Applicability Statement
RFC 2292 Advanced Sockets API for IPv6
RFC 2373 IPv6 Addressing Architecture
RFC 2375 IPv6 Multicast Address Assignments
RFC 2460 IPv6 Specification
RFC 2461 IPv6 Neighbor Discovery
RFC 2462 IPv6 Stateless Address Auto-configuration
RFC 2463 ICMPv6
RFC 2464 Transmission of IPv6 over Ethernet Networks
RFC 2473 Generic Packet Tunneling in IPv6
RFC 2526 Reserved IPv6 Subnet Anycast Addresses
RFC 2529 Transmission of IPv6 Packets over IPv4
RFC 2545 Use of MP-BGP-4 for IPv6
RFC 2553 Basic Socket Interface Extensions for IPv6
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
RFC 2740 OSPFv3 for IPv6
RFC 2767 Dual stacks IPv46 & IPv6
RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
RFC 3307 IPv6 Multicast Address Allocation
Protocol for BGP/MPLS IP Virtual Private Networks (VPNs)
RFC 4811 OSPF Out-of-Band LSDB Resynchronization
RFC 4812 OSPF Restart Signaling
RFC 4813 OSPF Link-Local Signaling
RFC 4940 IANA Considerations for OSPF

QoS/CoS

IEEE 802.1P (CoS)
RFC 1349 Type of Service in the Internet Protocol Suite
RFC 2211 Specification of the Controlled-Load Network Element Service
RFC 2212 Guaranteed Quality of Service
RFC 2474 DSCP DiffServ
RFC 2475 DiffServ Architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2598 DiffServ Expedited Forwarding (EF)
RFC 2697 A Single Rate Three Color Marker
RFC 2698 A Two Rate Three Color Marker

Security

IEEE 802.1X Port Based Network Access Control
RFC 1321 The MD5 Message-Digest Algorithm
RFC 1334 PPP Authentication Protocols (PAP)
RFC 1492 An Access Control Protocol, Sometimes Called TACACS
RFC 1492 TACACS+
RFC 1994 PPP Challenge Handshake Authentication
Protocol (CHAP)
RFC 2082 RIP-2 MD5 Authentication
RFC 2104 Keyed-Hashing for Message Authentication
RFC 2138 RADIUS Authentication
RFC 2408 Internet Security Association and Key Management Protocol (ISAKMP)
RFC 2409 The Internet Key Exchange (IKE)
RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2865 RADIUS Authentication
RFC 2866 RADIUS Accounting
RFC 2867 RADIUS Accounting Modifications for Tunnel Protocol Support
RFC 2868 RADIUS Attributes for Tunnel Protocol Support
RFC 2869 RADIUS Extensions
Access Control Lists (ACLs)
Guest VLAN for 802.1x
MAC Authentication

RFC 3315 DHCPv6 (client and relay)
RFC 3484 Default Address Selection for IPv6
RFC 3513 IPv6 Addressing Architecture
RFC 3587 IPv6 Global Unicast Address Format
RFC 3736 Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6
RFC 3810 MLDv2 for IPv6
RFC 4007 IPv6 Scoped Address Architecture
RFC 4214 Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)
RFC 4291 IP Version 6 Addressing Architecture
RFC 4293 MIB for IP
RFC 4862 IPv6 Stateless Address Auto-configuration
RFC 4940 IANA Considerations for OSPF
RFC 5178 OSPFv3 Graceful Restart
Secure Sockets Layer (SSL)
SSHv1/SSHv2 Secure Shell

VPN
RFC 2403 - HMAC-MD5-96
RFC 2404 - HMAC-SHA1-96
RFC 2405 - DES-CBC Cipher algorithm
RFC 2407 - Domain of interpretation
RFC 2547 BGP/MPLS VPNs

IPsec
RFC 1828 IP Authentication using Keyed MD5
RFC 1829 The ESP DES-CBC Transform
RFC 2085 HMAC-MD5 IP Authentication with Replay Prevention
RFC 2401 IP Security Architecture
RFC 2402 IP Authentication Header
RFC 2406 IP Encapsulating Security Payload
RFC 2410 - The NULL Encryption Algorithm and its use with IPsec
RFC 2411 IP Security Document Roadmap
RFC 2451 The ESP CBC-Mode Cipher Algorithms
RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec

HP A9500 Switch Series accessories	**Modules**	
	HP A9500 48-port GbE SFP LEB Module	JC113A
	HP A9500 48-port Gig-T LEB Module	JC107A
	HP A9500 48-port Gig-T REB Module	JC116A
	HP A9500 16-port GbE SFP/8-port GbE Combo LEB Module	JC123A
	HP A9500 16-port Gig-T/8-port GbE Combo LEB Module	JC122A
	HP A9500 16-port 10-GbE SFP+ REB Module	JC108A
	HP A9500 4-port 10-GbE XFP LEB Module	JC114A
	HP A9500 2-port 10-GbE XFP LEB Module	JC112A
	HP A9500 48-port GbE SFP LEC Module	JC471A
	HP A9500 48-port Gig-T LEC Module	JC115A
	HP A9500 16-port GbE SFP/8-port GbE Combo LEC Module	JC117A
	HP A9500 16-port Gig-T/8-port GbE Combo LEC Module	JC119A
	HP A9500 4-port 10-GbE XFP LEC Module	JC118A
	HP A9500 2-port 10-GbE XFP LEC Module	JC470A
	Transceivers	
	HP X110 100M SFP LC FX Transceiver	JF833A
	HP X120 100M/1G SFP LC LX Transceiver	JF832A
	HP X125 1G SFP RJ45 T Transceiver	JD089B
	HP X120 1G SFP LC SX Transceiver	JD118B
	HP X120 1G SFP LC LX Transceiver	JD119B
	HP X124 1G SFP LC LH40 1310nm Transceiver	JD061A
	HP X120 1G SFP LC LH40 1550nm Transceiver	JD062A
	HP X125 1G SFP LC LH70 Transceiver	JD063B
	HP X120 1G SFP LC LH100 Transceiver	JD103A
	HP X120 1G SFP LC BX 10-U Transceiver	JD098B
	HP X120 1G SFP LC BX 10-D Transceiver	JD099B
	HP X130 10G XFP LC SR Transceiver	JD117B
	HP X130 10G XFP LC LR Transceiver	JD108B
	HP X135 10G XFP LC ER Transceiver	JD121A
	HP X130 10G XFP LC ZR Transceiver	JD107A
	HP X130 SFP+ LC SR Transceiver	JD092B
	HP X130 SFP+ LC LRM Transceiver	JD093B
	HP X130 SFP+ LC LR Transceiver	JD094B
	HP X170 1G SFP LC LH70 1470 Transceiver	JD113A
	HP X170 1G SFP LC LH70 1490 Transceiver	JD114A
	HP X170 1G SFP LC LH70 1510 Transceiver	JD115A
	HP X170 1G SFP LC LH70 1530 Transceiver	JD116A
	HP X170 1G SFP LC LH70 1550 Transceiver	JD109A
	HP X170 1G SFP LC LH70 1570 Transceiver	JD110A
	HP X170 1G SFP LC LH70 1590 Transceiver	JD111A
	HP X170 1G SFP LC LH70 1610 Transceiver	JD112A
	HP X240 SFP+ SFP+ 3 m Direct Attach Cable	JD097B
	HP X240 SFP+ SFP+ 5 m Direct Attach Copper Cable	JG081B

Cables	
HP 50 m Multimode OM3 LC/LC Optical Cable	AJ839A
HP 30 m Multimode OM3 LC/LC Optical Cable	AJ838A
HP 15 m Multimode OM3 LC/LC Optical Cable	AJ837A
HP 5 m Multimode OM3 LC/LC Optical Cable	AJ836A
HP 2 m Multimode OM3 LC/LC Optical Cable	AJ835A
HP 1 m Multimode OM3 LC/LC Optical Cable	AJ834A
HP 0.5 m Multimode OM3 LC/LC Optical Cable	AJ833A
NEW HP 0.5 m PremierFlex OM3+ LC/LC Optical Cable	BK837A
NEW HP 1 m PremierFlex OM3+ LC/LC Optical Cable	BK838A
NEW HP 2 m PremierFlex OM3+ LC/LC Optical Cable	BK839A
NEW HP 5 m PremierFlex OM3+ LC/LC Optical Cable	BK840A
NEW HP 15 m PremierFlex OM3+ LC/LC Optical Cable	BK841A
NEW HP 30 m PremierFlex OM3+ LC/LC Optical Cable	BK842A
NEW HP 50 m PremierFlex OM3+ LC/LC Optical Cable	BK843A
Power Supply	
HP A9500/A8800 AC Power Frame	JC111A
HP A9500/A8800 3500W DC Power Supply	JC473A
HP A9500/A8800 1800W AC Power Supply	JC110B
HP A9500/A8800 2000W DC Power Supply	JC029B
License	
HP A-WX Blade 128 AP License Upgrade	JD464B
WLAN	
HP A9500 Access Controller Module	JD442A
Appliance	
HP A9500 VPN Firewall Module	JD245A
HP A9500 Load Balancing Module	JD247A
HP A9500 NetStream Monitoring Module	JD246A
Memory	
HP A-Series 1GB SDRAM	JC071A
HP A9512 Switch Chassis (JC125B)	
HP A9500 720Gbps Fabric/Main Processing Unit	JC120A
HP A9512/A9505/A8812/A8805 Spare Fan Assembly	JC109A
HP A9508-V Switch Chassis (JC474B)	
HP A9500 720Gbps Fabric/Main Processing Unit	JC120A
HP A9508-V/A8808-V Spare Fan Assembly	JC475A
HP A9505 Switch Chassis (JC124B)	
HP A9505 360Gbps Fabric/Main Processing Unit	JC121A
HP A9512/A9505/A8812/A8805 Spare Fan Assembly	JC109A

NOTE: Details are not available for all accessories. The following specifications were available at the time of publication.

HP 9500 48-port GbE SFP Module (JC113A)	**Ports**	48 SFP 100/1000 Mbps ports	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.47 lb. (3.39 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 48-port Gig-T Module (JC107A)	**Ports**	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.1 lb. (3.22 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 48-port Gig-T 2.4:1 Module (JC116A)	**Ports**	48 RJ-45 autosensing 10/100/1000 PoE ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3af PoE); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.32 lb. (3.32 kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP 9500 24-port GbE SFP Module (JC123A)	**Ports**	16 SFP 100/1000 Mbps ports 8 dual-personality ports; 1000M Combo ports (SFP or RJ-45)	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.77 lb. (3.07 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 24-port Gig-T Module (JC122A)	**Ports**	16 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 8 dual-personality ports; 1000M Combo ports (SFP or RJ-45)	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.66 lb. (3.02 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 16-port 10GbE SFP+ Module (JC108A)	**Ports**	16 SFP+ 10-GbE ports; Duplex: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.32 lb. (3.32 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 4-port 10GbE XFP Module (JC114A)	**Ports**	4 XFP 10-GbE ports; Duplex: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.79 lb. (3.08 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP 9500 2-port 10GbE XFP Module (JC112A)	**Ports**	2 XFP 10-GbE ports; Duplex: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.48 lb. (2.94 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 48-port 1000BASE-X SFP Advanced Module (JC471A)	**Ports**	48 SFP 100/1000 Mbps ports	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.67 lb. (3.48 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 48-port Gig-T Advanced Module (JC115A)	**Ports**	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.94 lb. (3.15 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 24-port GbE SFP Advanced Module (JC117A)	**Ports**	16 SFP 100/1000 Mbps ports 8 dual-personality ports; 1000M Combo ports (SFP or RJ-45)	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.99 lb. (3.17 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP 9500 24-port Gig-T Advanced Module (JC119A)	Ports	16 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 8 dual-personality ports; 1000M Combo ports (SFP or RJ-45)	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.83 lb. (3.10 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 4-port 10GbE XFP Advanced Module (JC118A)	Ports	4 XFP 10-GbE ports; Duplex: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.99 lb. (3.17 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 2-port 10GBASE-X XFP Advanced Module (JC470A)	Ports	2 XFP 10-GbE ports; Duplex: full only	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	6.66 lb. (3.02 kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP X125 1G SFP RJ45 T Transceiver (JD089B) A small form factor pluggable (SFP) Gigabit 1000Base-T transceiver that provides a full duplex Gigabit solution up to 100m on a Cat-5+ cable.	**Ports**		1 RJ-45 1000BASE-T port (IEEE 802.3ab Type 1000BASE-T)
	Connectivity	**Connector type**	RJ-45
	Physical characteristics	**Dimensions**	2.71(d) x 0.54(w) x 0.55(h) in. (6.88 x 1.37 x 1.4 cm)
		Full configuration weight	0.07 lb. (0.03 kg)
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling		Cable type: 1000BASE-T: Category 5 (5E or better recommended), 100 Ù differential 4-pair unshielded twisted pair (UTP) or shielded twisted pair (STP) balanced, complying with IEEE 802.3ab 1000BASE-T; Maximum distance: • 100m
	Services		Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP X120 1G SFP LC SX Transceiver (JD118B) A small form-factor pluggable (SFP) Gigabit SX transceiver that provides a full-duplex Gigabit solution up to 550m on a Multimode fiber.	**Ports**		1 LC 1000BASE-SX port
	Connectivity	**Connector type**	LC
		Wavelength	850 nm
	Physical characteristics	**Dimensions**	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling		Maximum distance: • FDDI Grade distance = 220m • OM1 = 275m • OM2 = 500m • OM3 = Not Specified by standard
		Cable length	up to 550m
		Fiber type	Multi Mode
	Services		Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP X120 1G SFP LC LX Transceiver (JD119B) A small form-factor pluggable (SFP) Gigabig LX transceiver that provides a full duplex Gigabit solution up to 550m on MMF or 10Km on SMF	**Ports**	1 SFP 1000BASE-LX port (IEEE 802.3z Type 1000BASE-LX)	
	Connectivity	**Connector type**	LC
		Wavelength	1300 nm
	Physical characteristics	**Dimensions**	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Cable type: Either single mode or multimode; Maximum distance: • 550m for Multimode • 10km for Singlemode	
		Fiber type	Both
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP X124 1G SFP LC LH40 1310nm Transceiver (JD061A) A small form-factor pluggable SFP Gigabit LH40 transceiver that provides a full duplex Gigabit solution up to 40km on a single-mode fiber.	**Ports**	1 LC 1000Base-LH port (no IEEE standard exists for 1550 nm optics)	
	Connectivity	Connector type	LC
		Wavelength	1310 nm
	Physical characteristics	Dimensions	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	Power consumption typical	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Cable type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 40km distance	
		Fiber type	Single Mode
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP X120 1G SFP LC LH40 1550nm Transceiver (JD062A) A small form-factor pluggable (SFP) Gigabit LH40 transceiver that provides a full-duplex Gigabit solution up to 40 km on a single mode fiber.	**Ports**	1 LC 1000BASE-LH port (no IEEE standard exists for 1550 nm optics)	
	Connectivity	Connector type	LC
		Wavelength	1550 nm
	Physical characteristics	Dimensions	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	Power consumption typical	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Cable type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 40km distance	
		Fiber type	Single Mode
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP X125 1G SFP LC LH70 Transceiver (JD063B) A small form-factor pluggable (SFP) Gigabit LH70 transceiver that provides a full-duplex Gigabit solution up to 70km on a single-mode fiber.	**Ports**	1 LC 1000BASE-LH port (no IEEE standard exists for 1550 nm optics)	
	Connectivity	**Connector type**	LC
		Wavelength	1550 nm
	Physical characteristics	**Dimensions**	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Cable type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 70km	
		Fiber type	Single Mode
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP X120 1G SFP LC LH100 Transceiver (JD103A) A small form factor pluggable (SFP) Gigabit LH100 transceiver that provides a full-duplex Gigabit solution up to 100km on a single mode fiber.	**Ports**	1 LC 1000BASE-LH port (no IEEE standard exists for 1550 nm optics)	
	Connectivity	**Connector type**	LC
		Wavelength	1550 nm
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Cable type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • Up to 100km	
		Fiber type	Single Mode
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

HP X120 1G SFP LC BX 10-U Transceiver (JD098B) A small form-factor pluggable (SFP) Gigabit LX-BX10-U transceiver that provides a full duplex Gigabit solution up to 10km on a single mode cable.	**Ports**	1 LC 1000BASE-BX10 port (IEEE 802.3ah Type 1000BASE-BX10-U); Duplex: full only	
	Connectivity	**Connector type**	LC
	Physical characteristics	**Dimensions**	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Maximum distance: • 10km	
		Fiber type	Single Mode
	Notes	TX 1310nm RX 1490nm	
	Services	Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Accessory Product Details

HP X120 1G SFP LC BX 10-D Transceiver (JD099B) A small form-factor pluggable (SFP) Gigabit LX-BX10-D transceiver that provides a full duplex Gigabit solution up to 10km on a single mode cable.	**Ports**	1 LC 1000BASE-BX10 port (IEEE 802.3ah Type 1000BASE-BX10-D); Duplex: full only	
	Connectivity	**Connector type**	LC
	Physical characteristics	**Dimensions**	2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
		Full configuration weight	0.04 lb. (0.02 kg)
	Electrical characteristics	**Power consumption typical**	0.8 W
		Power consumption maximum	1.0 W
	Cabling	Maximum distance: • Up to 10km	
		Fiber type	Single Mode
	Notes	TX 1490nm RX 1310nm	
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

HP 50 m Multimode OM3 LC/LC Optical Cable (AJ839A)	**Cabling**	**Cable type**: 50/125 μm (core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m; **Maximum distance**: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.

		• Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
HP 30 m Multimode OM3 LC/LC Optical Cable (AJ838A)	Cabling	Cable type: 50/125 μm (core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m; Maximum distance: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters. • Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 15 m Multimode OM3 LC/LC Optical Cable (AJ837A)	Cabling	Cable type: 50/125 μm (core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m; Maximum distance: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters. • Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 5 m Multimode OM3 Cabling LC/LC Optical Cable (AJ836A)		Cable type: 50/125 μm core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m; Maximum distance: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: This specification defines the detail requirements for a tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters. • Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 2 m Multimode OM3 Cabling LC/LC Optical Cable (AJ835A)		Cable type: 50/125 μm (core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m; Maximum distance: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters. • Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 1 m Multimode OM3 Cabling LC/LC Optical Cable (AJ834A)		Cable type: 50/125 μm (core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m Maximum distance: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters. • Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 0.5 m Multimode OM3 LC/LC Optical Cable (AJ833A)	Cabling	Cable type: 50/125 μm (core/cladding) diameter, mulitimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m Maximum distance: 10Gbps Transfer Rate (Ethernet): 300m
	Notes	Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end. • Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um • Optical glass: Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm. • Optical glass: Bandwidth: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links. • CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber and designed to work in both the 850 and 1300 nm wavelength windows. • BULK CABLE & CABLE ASSEMBLY CONFIGURATION: • Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic. • Jacket Color: Aqua for OM3 multimode per TIA 598 • Boot Color: White • Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters. • Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46. • Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 0.5 m PremierFlex OM3+ LC/LC Optical Cable (BK837A)	Notes	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core diameter: 50um ± 3um; Cladding diameter: 125um ± 2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade - Low Smoke Zero Halogen (LSZH) thermoplastic. • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL OFN FT4, ROHS. Cable also has a longitudal white stripe that runs the entire length of the cable. • Insertion Loss: less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
HP 1 m PremierFlex OM3+ LC/LC Optical Cable (BK838A)	Notes	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core Diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable. • Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 2 m PremierFlex OM3+ LC/LC Optical Cable (BK839A)	Notes	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable. • Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
HP 5 m PremierFlex OM3+ LC/LC Optical Cable (BK840A)	Notes	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable. • Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 15 m PremierFlex OM3+ LC/LC Optical Cable (BK841A)	Notes	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable. • Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
HP 30 m PremierFlex OM3+ LC/LC Optical Cable (BK842A)	Notes	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable. • Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

Accessory Product Details

HP 50 m PremierFlex OM3+ LC/LC Optical Cable (BK843A)	**Notes**	Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end. • Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um • Bandwidth: 3000 MHz-km @ 850nm (Laser) • Jacket Color: Blue • Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic • Boot Color: White • Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable. • Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m • Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

HP A9500 Access Controller Module for 128-640 Access Points (JD442A)	**Ports**	1 RJ-45 serial console port 1 RJ-45 out-of-band management port 2 USB 1.0 12 Mbps ports	
	Physical characteristics	**Dimensions**	14.45(d) x 13.39(w) x 1.6(h) in. (36.7 x 34 x 4.06 cm) (1U height)
		Weight	7.89 lb. (3.58 kg)
	Memory and processor	**Processor**	Eight core @ 950 MHz, 256 MB compact flash, 1 GB DDR2 DIMM
	Performance	**Switch fabric speed**	20 Gbps
		MAC address table size	24,000 entries
	Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
		Operating relative humidity	5% to 95%, non-condensing
		Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
		Non-operating/Storage relative humidity	5% to 95%, non-condensing
	Electrical characteristics	**Maximum heat dissipation**	358 BTU/hr (377.69 kJ/hr)
		Maximum power rating	105 W
	Safety	UL 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; GOST; C-Tick; NOM; IEC 60950-1(with CB report)	

Emissions	EN 55022; VCCI; ICES-003; AS/NZS CISPR 22; EN 300 386; FCC Part 15; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC	
Immunity	EN	EN 61000-4-2:1995+A1:1998+A2:2001; EN 61000-4-3:2006; EN 61000-4-4:2004; EN 61000-4-5:2006; EN 61000-4-6: 1996 +A1:2001:A2:2007; EN 61000-4-8:2001; EN 61000-4-11:2004; EN 55024:1998+ A1:2001 + A2:2003
Management	IMC - Intelligent Management Center; command-line interface; Web browser; configuration menu; SNMP Manager; Telnet; HTTPS; RMON1; FTP; in-line and out-of-band; IEEE 802.3 Ethernet MIB; Ethernet Interface MIB	
Features	A9500 ACM License system • The A9500 ACM is an access controller module for the HP A9500 series Ethernet switches. It supports 128 APs by default. After license upgrade, the access controller module can support up to 640 APs.	
Notes	Max. number of users: 20K. Max. number of users that are supported by local authentication: 1K. Max. number of SSIDs that can be configured: 512. Max. number of users that are supported by local portal authentication: 4K. Number of ACLs: 32K.	
Services	Refer to the HP website at: www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

Standards and protocols

General protocols

RFC 768 UDP
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 855 Telnet Option Specification
RFC 858 Telnet Suppress Go Ahead Option
RFC 894 IP over Ethernet
RFC 950 Internet Standard Subnetting Procedure
RFC 959 File Transfer Protocol (FTP)
RFC 1122 Host Requirements
RFC 1141 Incremental updating of the Internet checksum
RFC 1144 Compressing TCP/IP headers for low-speed serial links
RFC 1256 ICMP Router Discovery

MIBs

RFC 1229 Interface MIB Extensions
RFC 1643 Ethernet MIB
RFC 1757 Remote Network Monitoring MIB
RFC 2011 SNMPv2 MIB for IP
RFC 2012 SNMPv2 MIB for TCP
RFC 2013 SNMPv2 MIB for UDP
RFC 2571 SNMP Framework MIB
RFC 2572 SNMP-MPD MIB
RFC 2613 SMON MIB
RFC 2863 The Interfaces Group MIB
RFC 2932IP (Multicast Routing MIB)
RFC 2933 IGMP MIB

Mobility

IEEE 802.11a High Speed Physical Layer in the 5 GHz Band
IEEE 802.11b Higher-Speed Physical Layer Extension in the 2.4 GHz Band

Protocol (IRDP)
RFC 1321 The MD5 Message-Digest Algorithm
RFC 1334 PPP Authentication Protocols (PAP)
RFC 1350 TFTP Protocol (revision 2)
RFC 1812 IPv4 Routing
RFC 1944 Benchmarking Methodology for Network Interconnect Devices
RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
RFC 2104 HMAC: Keyed-Hashing for Message Authentication
RFC 2246 The TLS Protocol Version 1.0
RFC 2284 EAP over LAN
RFC 2644 Directed Broadcast Control
RFC 2864 The Inverted Stack Table Extension to the Interfaces Group MIB
RFC 2866 RADIUS Accounting
RFC 2869 RADIUS Extensions
RFC 3268 Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)
RFC 3619 Ethernet Automatic Protection Switching (EAPS)
draft-ietf-capwap-protocol-specification-00.txt:CAPWAP Protocol Specification
draft-ohara-capwap-lwapp-03.txt:Light Weight Access Point Protocol

IP multicast
RFC 1112 IGMP
RFC 2236 IGMPv2
RFC 2934 Protocol Independent Multicast MIB for IPv4

IPv6
RFC 1350 TFTP
RFC 1881 IPv6 Address Allocation
IEEE 802.11d Global Harmonization
IEEE 802.11g Further Higher Data Rate Extension in the 2.4 GHz Band
IEEE 802.11i Medium Access Control (MAC) Security Enhancements
IEEE 802.11n WLAN Enhancements for Higher Throughput

Network management
RFC 1155 Structure of Management Information
RFC 1905 SNMPv2 Protocol Operations
RFC 2573 SNMPv3 Applications
RFC 2574 SNMPv3 User-based Security Model (USM)
RFC 2575 VACM for SNMP
SNMPv1/v2c

QoS/CoS
RFC 2474 DS Field in the IPv4 and IPv6 Headers
RFC 2475 DiffServ Architecture
RFC 3168 The Addition of Explicit Congestion Notification (ECN) to IP

Security
IEEE 802.1X Port Based Network Access Control
RFC 3394 Advanced Encryption Standard (AES) Key Wrap Algorithm
RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
Access Control Lists (ACLs)
Guest VLAN for 802.1x
MAC Authentication
Secure Sockets Layer (SSL)
SSHv1.5 Secure Shell
SSHv2 Secure Shell
Web Authentication
WPA (Wi-Fi Protected Access)/WPA2

IKEv1
RFC 3748 - Extensible Authentication

		Management RFC 1887 IPv6 Unicast Address Allocation Architecture RFC 1981 IPv6 Path MTU Discovery RFC 2292 Advanced Sockets API for IPv6 RFC 2373 IPv6 Addressing Architecture RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2461 IPv6 Neighbor Discovery RFC 2462 IPv6 Stateless Address Auto-configuration RFC 2463 ICMPv6 RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2526 Reserved IPv6 Subnet Anycast Addresses RFC 2563 ICMPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6	Protocol (EAP)

HP 9500 VPN Firewall Module (JD245A)	Ports	2 RJ-45 auto-negotiating 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T) 2 dual-personality ports; auto-sensing 10/100/1000Base-T or SFP 1 RJ-45 serial console port 1 Compact Flash port	
	Physical characteristics	Dimensions	14.92(d) x 15.71(w) x 1.58(h) in. (37.9 x 39.9 x 4.01 cm)
		Weight	7.72 lb. (3.5 kg)

Accessory Product Details

Environment	Operating temperature	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	10% to 95%, noncondensing
Management	IMC - Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; HTTPS; RMON1; FTP	
Features	PerfoPerformance - 8Gbps Firewall Throughput - 2M Concurrent connection - 60K New connection per second - Max 20480 security policies - 2Gbps 3DES/AES VPN Throughput - 5000 IPSec tunnel - 4K VLAN Firewall operation mode - Routing mode - Transparent mode - Hybrid mode AAA service - Local Authentication - Standard Radius - HWTACACS+ - RADIUS domain Authentication ASPF - General TCP / UDP application - FTP/SMTP/HTTP/RTSP/H323 Protocol State Detection - SIP/MGCP/QQ/MSN Protocol State Detection - Java/ActiveX Blocking and Detection - Port mapping - Support for the fragmented packets Virtualization - 256 Virtual Firewall - 4 default Security Zone - Max 256 Security Zone NAT - NAPT - PAT - NAT Server - Port mapping - Bidirectional NAT - Static NAT Network Security - Add blacklist by hand or automatically - IP+MAC Binding - ARP Reverse Query - ARP Cheat Check - Management ports closed by default DDOS - DNS Query Flood - SYN Flood	

- Auto start TCP Proxy when Detect SYN Flood
- ICMP Flood
- UDP Flood
- IP Spoofing
- SQL injection filter

L2TP VPN
- LNS,LAC
- L2TP Multi-instance

GRE
- GRE tunneling protocol

IPSec
- AH/ESP
- ESP
- Transport/tunnel
- NAT traversal
- Strategy template

IKE
- DH
- Pre-share Key authentication-method
- Support aggressive mode and main exchange mode
- IKE DPD, PKI / CA

Network Feature
- 802.1q VLAN
- 4K sub-interface
- Static and dynamic ARP
- Multicast, PIM
- IGMP v1/v2/v3

Routing
- RIP
- OSPF
- BGP
- Static Route
- policy Route

High Availability
- Active/Active mode
- Active/Passive mode
- Session Synchronization for Firewall

System management
- Web Management support IE/Firefox
- Command line interface (Console/Telnet/SSH)
- Classification Manager
- Unified management through iMC
- SNMP v2c/v3

Administration
- Software Upgrades
- Configuration Backup and Restore

Logging/Monitoring
- Syslog
- Mini RMON
- NTP

	- NAT/ASPF/firewall log stream(Binary log) IPv6 Routing & Multicast - RIPng - OSPFv3 - BGP4+ - Static Route - Policy Route - PIM-SM/DM IPv6 Security - NAT-PT - Manual tunnel - IPV6 OVER ipv4 GRE tunnel - 6to4 tunnel (RFC3056) - ISATAP Tunnel - IPv6 Packet Filter - Radius - NAT64
Services	3-year, parts only, global next-day advance exchange (UZ896E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UZ897E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UZ900E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UZ904E) 3-year, 24x7 SW phone support, software updates (UZ907E) 1-year, post-warranty, 4-hour onsite, 13x5 coverage for hardware (HR735E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware (HR736E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (HR737E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UZ898E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UZ901E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UZ941E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UZ905E) 4-year, 24x7 SW phone support, software updates (UZ908E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UZ899E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UZ902E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UZ906E) 5-year, 24x7 SW phone support, software updates (UZ909E) 3 Yr 6 hr Call-to-Repair Onsite (UZ910E) 4 Yr 6 hr Call-to-Repair Onsite (UZ911E) 5 Yr 6 hr Call-to-Repair Onsite (UZ912E) 1-year, 6 hour Call-To-Repair Onsite for hardware (HR739E) 1-year, 24x7 software phone support, software updates (HR738E) Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
Standards and protocols	IPv6

RFC 1981 IPv6 Path MTU Discovery
RFC 2460 IPv6 Specification
RFC 2465 Management Information Base for IP
Version 6: Textual Conventions and General
Group(partially support, only "IPv6 Interface Statistics table")
RFC 3484 Default Address Selection for IPv6
RFC 3513 IPv6 Addressing Architecture
RFC 3587 IPv6 Global Unicast Address Format
RFC 4007 IPv6 Scoped Address Architecture
RFC 4862 IPv6 Stateless Address Auto-configuration

Security
RFC 1321 The MD5 Message-Digest Algorithm
RFC 1334 PPP Authentication Protocols (PAP)
RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
RFC 2104 Keyed-Hashing for Message Authentication
RFC 2138 RADIUS Authentication
RFC 2618 RADIUS Authentication Client MIB
RFC 2620 RADIUS Accounting Client MIB
RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2865 RADIUS (client only)
RFC 2865 RADIUS Authentication
RFC 2867 RADIUS Accounting Modifications for Tunnel Protocol Support
RFC 2868 RADIUS Attributes for Tunnel Protocol Support
RFC 2869 RADIUS Extensions draft-grant-tacacs-02 (TACACS)

VPN
RFC 1701 Generic Routing Encapsulation (GRE)
RFC 1702 Generic Routing Encapsulation over IPv4 networks.
RFC 1828 IP Authentication using Keyed MD5
RFC 1829 The ESP DES-CBC Transform
RFC 1853 IP in IP Tunneling
RFC 2085 HMAC-MD5 IP Authentication with Replay Prevention
RFC 2401 Security Architecture for the Internet Protocol
RFC 2402 IP Authentication Header
RFC 2403 - HMAC-MD5-96
RFC 2403 The Use of HMAC-MD5-96 within ESP and AH
RFC 2404 The Use of HMAC-SHA-1-96 within ESP and AH
RFC 2405 The ESP DES-CBC Cipher Algorithm With Explicit IV
RFC 2406 IP Encapsulating Security Payload (ESP)
RFC 2410 The NULL Encryption Algorithm and Its Use With IPsec
RFC 2411 IP Security Document Roadmap
RFC 2451 The ESP CBC-Mode Cipher Algorithms
RFC 2473 Generic Packet Tunneling in IPv6 Specification
RFC 2529 Transmission of IPv6 over IPv4 Domains without Explicit Tunnels
RFC 2661 Layer Two Tunneling Protocol "L2TP"
RFC 2784 Generic Routing Encapsulation (GRE)
RFC 2868 RADIUS Attributes for Tunnel Protocol Support
RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec

RFC 4214 Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)

IKEv1
RFC 2407 The Internet IP Security Domain of Interpretation for ISAKMP
RFC 2408 Internet Security Association and Key Management Protocol (ISAKMP).
RFC 2409 The Internet Key Exchange (IKE)
RFC 2412 The OAKLEY Key Determination Protocol
RFC 3526 More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE)
RFC 3706 A Traffic-Based Method of Detecting Dead Internet Key Exchange (IKE) Peers

PKI
RFC 2511 Internet X.509 Certificate Request Message Format
RFC 3279 Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
draft-nourse-scep-06:
PKCS#1
PKCS#10
PKCS#12
PKCS#7

HP 9500 Load Balancing Module (JD247A)	Ports	2 RJ-45 auto-negotiating 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T) 2 dual-personality ports; auto-sensing 10/100/1000Base-T or SFP 1 RJ-45 serial console port 1 Compact Flash port	
	Physical characteristics	Dimensions	14.92(d) x 15.71(w) x 1.57(h) in. (37.9 x 39.9 x 4 cm)
		Weight	7.94 lb. (3.6 kg)
	Memory and processor	2 GB DDR2 SDRAM Mb, 4 MB flash	
	Environment	Operating temperature	32°F to 113°F (0°C to 45°C)
		Operating relative humidity	10% to 90%, noncondensing
	Features	Performance - 2Gbps throughput - Concurrent connections: 2M - L4 Connection Per Second: 50K - L7 Connection Per Second: 30K - Max number of virtual servers: 1K - Max number of real server groups: 1K	

- Max number of real servers: 16K
- Max number of real servers in one real server group: 1K

Load balancing scheduling algorithm
- Round robin
- Weighted round robin
- Least connections
- Weighted least connections
- Random
- Weighted random
- Source IP address hashing
- Destination IP address hashing
- Source IP-port hashing
- UDP Packet Load Hash
- Best-case Response Time
- L7 Content

Health Monitor Algorithm
- ICMP
- TCP
- FTP
- HTTP
- SSL
- DNS
- Radius
- SMTP
- POP3
- RTSP
- IMAP4
- SNMP
- SIP

User Session Persistence for L4 Load Balance
- Source IP based
- Cookie based
- HTTP Header based
- Source/Destination IP/ Port/ Port+IP based

User session persistence for L7 Load Balance
- HTTP Header based
- HTTP Cookie
- SIP based
- Radius attributes based
- DHCP based

Real Service Group Method for L7 Load Balance
- HTTP Request URL-File
- HTTP Request URL-Function
- HTTP Host
- HTTP User-Agent
- HTTP Accept-Language
- HTTP Accept-Encoding
- HTTP Request-Method
- HTTP header
- RTSP URL

- DHCP Relay Agent IP
IPv6 load balancing algorithm
- Round Robin
- Weighted Round Robin
- Least Connection
- Weighted Least Connection
- Random
- Weighted Random
- Source IP/IP-Port Hash
- Destination IP Hash
IPv6 Health monitoring Algorithm
- ICMP
- HTTP
User-Session Persistence for IPv6
- Source IP based
Operation Mode
- NAT Mode
- DR Mode
- Firewall Load Balance
Security Features
- ACL
- NAPT
- PAT
- NAT Server
- Port mapping
- DNS Query Flood
- SYN Flood
- ICMP Flood
- UDP Flood
- IP Spoofing
- Hotfix
- standard Radius
HA
- VRRP
- Dual Hot Standby
- Configuration Sync
System Management
- Web UI
- Command line
- Management at different grades
- SSH1.5
- SSH2.0
- FTP/TFTP/Telnet
- SNMPv1/v2c/v3
- Mini RMON
- NTP
Log
- Syslog
- NAT/ASPF/Firewall Flow Log

Services	3-year, parts only, global next-day advance exchange (UZ950E)

		3-year, 4-hour onsite, 13x5 coverage for hardware (UZ951E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UZ954E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UZ958E) 3-year, 24x7 SW phone support, software updates (UZ961E) 1-year, post-warranty, 4-hour onsite, 13x5 coverage for hardware (HR750E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware (HR751E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (HR752E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UZ952E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UZ955E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UZ959E) 4-year, 24x7 SW phone support, software updates (UZ962E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UZ953E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UZ956E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UZ960E) 5-year, 24x7 SW phone support, software updates (UZ963E) 3 Yr 6 hr Call-to-Repair Onsite (UZ964E) 4 Yr 6 hr Call-to-Repair Onsite (UZ965E) 5 Yr 6 hr Call-to-Repair Onsite (UZ966E) 1-year, 6 hour Call-To-Repair Onsite for hardware (HR754E) 1-year, 24x7 software phone support, software updates (HR753E) Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
HP 9500 NetStream Monitoring Module (JD246A)	Ports	2 RJ-45 auto-negotiating 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T) 2 RJ-45 dual-personality ports; auto-sensing 10/100/1000Base-T or SFP 1 RJ-45 serial console port 1 Compact Flash port	
	Physical characteristics	Dimensions	14.92(d) x 15.71(w) x 1.57(h) in. (37.9 x 39.9 x 4 cm)
		Weight	7.28 lb. (3.3 kg)
	Memory and processor	2 GB DDR2 SDRAM, 4 MB flash	
	Performance	Throughput	4 Gbps
		Concurrent sessions	2.4M
	Environment	Operating temperature	32°F to 104°F (0°C to 40°C)
		Operating relative humidity	10% to 90%, noncondensing
	Management	IMC - Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; HTTPS; FTP	
	Features	PerConfiguration of NetStream on an interface	

	Setting of the interface sampling mode - Rule-based mode - Random mode Configuration of packet filtering on an interface Configuration of aggregate IP traffic accounting - protocol-port aggregation Setting of buffer size for NetStream data Setting of the output address for NetStream data Setting of the output version Setting of the output rate Setting of the packet refresh rate for templates of NetStream data of version 9 Setting of the time refresh rate for templates of NetStream data of version 9 Aging of NetStream data - Active aging time - Inactive aging time - Forced aging Format of output NetStream data - Version 5 - Version 8 - Version 9 Management mode - CLI (Telnet or SSH) - Support of standard SNMPv3; SNMPv2c and SNMPv1 compatible
Services	3-year, parts only, global next-day advance exchange (UZ932E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UZ933E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UZ936E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UZ940E) 3-year, 24x7 SW phone support, software updates (UZ943E) 1-year, post-warranty, 4-hour onsite, 13x5 coverage for hardware (HR745E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware (HR746E) 1-year, post-warranty, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (HR747E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UZ934E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UZ937E) 4-year, 24x7 SW phone support, software updates (UZ944E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UZ935E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UZ938E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UZ942E) 5-year, 24x7 SW phone support, software updates (UZ945E) 3 Yr 6 hr Call-to-Repair Onsite (UZ946E) 4 Yr 6 hr Call-to-Repair Onsite (UZ947E) 5 Yr 6 hr Call-to-Repair Onsite (UZ948E) 1-year, 6 hour Call-To-Repair Onsite for hardware (HR749E) 1-year, 24x7 software phone support, software updates (HR748E) Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about

		services and response times in your area, please contact your local HP sales office.	
HP 9500 720Gbps Fabric Module (JC120A)	**Ports**	1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 RJ-45 autosensing 10/100 port (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full 1 RJ-45 Serial port 1 Compact Flash port 1 USB 2.0	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.83 lb. (3.55 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	
HP 9500 360Gbps Fabric Module (JC121A)	**Ports**	1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 RJ-45 autosensing 10/100 port (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full 1 RJ-45 Serial port 1 Compact Flash port 1 USB 2.0	
	Physical characteristics	Dimensions	14.96(d) x 15.75(w) x 1.57(h) in. (38 x 40 x 4 cm)
		Weight	7.25 lb. (3.29 kg)
	Services	Refer to the HP website at www.hp.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.	

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