

# HP 10500 Switch Series



## Key features

- Advanced, next-generation Clos architecture
- More than 11 terabits-per-second switching capacity
- Feature-rich switch with IPv6 and MPLS functionality
- HP IRF technology virtualizes up to 4 chassis
- Ultra-high 1/10/40/100GbE density, including wire-speed on all ports

## Product overview

HP 10500 Switch Series sets a new benchmark for performance, reliability, and scalability with next-generation Clos architecture. Designed for enterprise campus core networks, the 10500 Switch Series enables a cloud-connected and rich-media-capable infrastructure. The switch series provides industry-leading 10GbE/40GbE/100GbE port density, 3-microsecond latency, and very low energy consumption.

With HP Intelligent Resilient Framework (IRF) technology, the scalability and resiliency of the 10500 Switch Series can be extended and virtualized across up to 4 chassis with a single management interface—enabling flatter, more agile networks. This switch series, along with the entire HP FlexNetwork architecture, can be seamlessly managed through the HP Intelligent Management Center (IMC), which provides a single-pane-of-glass management view of the infrastructure.

## Features and benefits

### Product architecture

- Advanced HP Comware modular operating system

Enables high stability, independent monitoring and restart of individual software modules, and enhanced software process serviceability functions; allows individual software modules to be upgraded for higher availability; and supports enhanced serviceability functions

- In-service software upgrade

Provides an upgrade of the entire chassis or an individual task or process, with zero-packet loss

- Distributed architecture with separation of data and control planes

Delivers enhanced fault tolerance and facilitates nearly continuous operation and zero-service disruption during planned or unplanned control-plane events

- Multitenant Device Context

Virtualizes a physical switch into multiple logical devices, with each logical switch having its own processes, configuration, and administration

### Performance

- High-speed fully distributed architecture

Provides up to 11.52 Tb/s switching capacity with released line cards and up to 13.72 Tb/s switching fabric capacity with Type D fabric; modules provide nonblocking wirespeed 10GbE/40GbE/100GbE performance; with 4 fabrics, the switch delivers up to 8.571 billion pps throughput; all switching and routing is performed in the I/O modules; meets the demand of bandwidth-intensive applications today and in the future

- Scalable system design

Provides investment protection to support future technologies and higher-speed connectivity, as the switch is designed for increased backplane bandwidth

- Flexible chassis selection

Enables you to tailor product selections to your budget with a choice of 4 chassis: the 10504 switch (4 open module slots), 10508 switch (8 open module slots), 10508-V switch (8 vertical open module slots), and 10512 switch (12 open module slots)

### Connectivity

- High-density port connectivity

Offers up to 12 interface module slots; provides up to 96 40GbE ports, 576 10GbE ports, and 576 gigabit fiber/electrical ports per system

- Jumbo frames

Allows high-performance backups and disaster-recovery systems; and provides a maximum frame size of 9k bytes

- 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

- Ethernet operations, administration, and maintenance (OAM)

Detects data link layer problems that occurred in the “last mile” using the IEEE 802.3ah OAM standard; monitors the status of the link between 2 devices

- 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

- Monitor link  
Collects statistics on performance and errors on physical links, increasing system availability (Comware v5 only)
- Packet storm protection  
Protects against unknown broadcast, unknown multicast, or unicast storms with user-defined thresholds
- Flow control  
Provides back pressure using standard IEEE 802.3x, reducing congestion in heavy traffic situations

### **Software-defined Networking (SDN)**

- OpenFlow 1.3  
Enables SDN to provide an end-to-end solution to automate the network, allowing for rapid application deployments (Comware v7 only)

### **Quality of Service (QoS)**

- Powerful QoS feature  
Supports the following congestion actions: strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), and WRED

### **Resiliency and high availability**

- Redundant and load-sharing fabrics, management, fan assemblies, and power supplies  
Increases total performance and power availability while providing hitless, stateful failover
- All hot-swappable modules  
Allows replacement of modules without any impact on other modules
- Separate data and control paths  
Separates control from services and keeps service processing isolated; increases security and performance
- Passive design system  
Delivers increased system reliability as the backplane has no active components
- Intelligent Resilient Framework (IRF)  
Creates virtual resilient switching fabrics, where 2 or more switches perform as a single L2 switch and L3 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; can help eliminate the need for complex protocols such as Spanning Tree Protocol (STP), Equal-Cost Multipath (ECMP), or Virtual Router Redundancy Protocol (VRRP), thereby simplifying network operation
- IRF capability  
Provides single IP address management for a resilient virtual switching fabric of up to 4 switches
- Ring resiliency protection protocol  
Provides standard sub-100 ms recovery for a ring Ethernet-based topology (Comware v5 only)
- VRRP  
Allows groups of 2 routers to dynamically back each other up to create highly available routed environments
- Device Link Detection Protocol (DLDP)  
Monitors link connectivity and shuts down ports at both ends if unidirectional traffic is detected, preventing loops in STP-based networks
- Hitless patch upgrades  
Allows patches and new service features to be installed without restarting the equipment, increasing network uptime, and facilitating maintenance

- IEEE 802.3ad LACP

Supports up to 128 trunks, each with 8 links per trunk; and provides support for static or dynamic groups and a user-selectable hashing algorithm

- Graceful restart

Supports graceful restart for OSPF, IS-IS, BGP, LDP, and RSVP; the 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 achieve nonstop forwarding (NSF)

- Ultra-fast protocol convergence (sub-second) with standards-based failure detection—bidirectional forwarding detection

Enables link connectivity monitoring and reduces network convergence time for the routing information protocol (RIP), OSPF, BGP, IS-IS, VRRP, MPLS, and IRF

- Smart link

Allows 100 ms failover between links (Comware v5 only)

- Multiple internal power supplies

Provides high reliability; the 10504 switch provides 3+1 redundancy; the 10508, 10508-V, and 10512 switches provide 5+1 redundancy

### **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 network endpoints

- Generic Routing Encapsulation (GRE)

Transports 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

Enables or disables each of the following interfaces depending on security preferences: console port, telnet port, or reset button

- Industry-standard CLI with a hierarchical structure

Reduces training time and expenses, and increases productivity in multivendor installations

- Management security

Restricts access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide telnet and SNMP access; local and remote syslog capabilities allow logging of all access

- SNMPv1, v2, and v3

Provides 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 wirespeed 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; and supports events, alarms, history, and statistics groups as well as a private alarm extension group
- FTP, TFTP, and SFTP support  
Offers different mechanisms for configuration updates; FTP allows bidirectional transfers over a TCP/IP network; trivial FTP (TFTP) is a simpler method using User Datagram Protocol (UDP); Secure File Transfer Protocol (SFTP) runs over an SSH tunnel to provide additional security
- Debug and sampler utility  
Supports ping and traceroute for both IPv4 and IPv6
- Network Time Protocol (NTP)  
Synchronizes timekeeping among distributed time servers and clients; keeps timekeeping consistent among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time
- 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 a network manager to determine overall network performance and to diagnose and locate network congestion points or failures
- Information center  
Provides a central repository 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)  
Advertises and receives management information from adjacent devices on a network, facilitating easy mapping by network management applications
- Dual flash images  
Provides independent primary and secondary operating system files for backup while upgrading
- Multiple configuration files  
Stores easily to the flash image

## **Layer 2 switching**

- VLAN  
Supports up to 4,096 port-based or IEEE 802.1Q-based VLANs; and supports MAC-based VLANs, protocol-based VLANs, and IP-subnet-based VLANs for added flexibility (Comware v7 only supports port-based VLANs)
- Bridge Protocol Data Unit (BPDU) tunneling  
Transmits STP BPDUs transparently, allowing correct tree calculations across service providers, WANs, or MANs
- GARP VLAN Registration Protocol  
Allows automatic learning and dynamic assignment of VLANs (Comware v5 only)
- Port mirroring  
Duplicates port traffic (ingress and egress) to a local or remote monitoring port; supports 4 mirroring groups, with an unlimited number of ports per group
- STP  
Supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping  
Controls and manages the flooding of multicast packets in a Layer 2 network

- IEEE 802.1ad QinQ and selective QinQ  
Increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network
- Per-VLAN spanning tree plus  
Allows each VLAN to build a separate spanning tree to improve link bandwidth usage in network environments with multiple VLANs (Comware v5 only)
- Isolation at data link layer with private VLANs  
Provides, through a two-tier VLAN structure, an additional layer of protection, simplifying network configuration while saving VLAN resources

### 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
- 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
- Domain Name System (DNS)  
Provides a distributed database that translates domain names and IP addresses, which simplifies network design; supports client and server

### Layer 3 routing

- Static IPv4 routing  
Provides simple manually configured IPv4 routing
- Routing Information Protocol (RIP)  
Uses a distance vector algorithm with UDP packets for route determination; supports RIPv1 and RIPv2 routing; includes loop protection
- Open shortest path first (OSPF)  
Delivers faster convergence; uses this link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- Intermediate system to intermediate system (IS-IS)  
Uses a path vector IGP, 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)
- Border Gateway Protocol 4 (BGP-4)  
Delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large networks
- Policy-based routing  
Makes routing decisions based on policies set by the network administrator
- IP performance optimization  
Provides a set of tools to improve the performance of IPv4 networks; includes directed broadcasts, customization of TCP parameters, support of ICMP error packets, and extensive display capabilities
- Unicast Reverse Path Forwarding (uRPF)  
Limits erroneous or malicious traffic in accordance with RFC 3074

- Static IPv6 routing  
Provides simple manually configured IPv6 routing
- Dual IP stack  
Maintains separate stacks for IPv4 and IPv6 to ease the 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  
Provides 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
- 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, which reduces complexity and increases 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 Label Distribution Protocol (LDP); requires no routing and, therefore, decreases complexity, increases performance, and allows VPNs of non-routable protocols; uses no routing information for increased security; supports Circuit Cross Connect (CCC), Static Virtual Circuits (SVCs), Martini draft, and Kompella-draft technologies
- Virtual Private LAN Service (VPLS)  
Establishes point-to-multipoint Layer 2 VPNs across a provider network
- Super VLAN  
Saves IP address space using the RFC 3069 standard (also called VLAN Aggregation)
- Equal-Cost Multipath (ECMP)  
Enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- IPv6 tunneling  
Provides 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 6-to-4 intra-site-automatic-tunnel-addressing-protocol (ISATAP) tunnels, and IPv6 VPN provider-edge router tunnel

## **Security**

- Access control list (ACL)  
Supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header; rules can be set to operate on specific dates or times

- Remote Authentication Dial-In User Service (RADIUS)  
Eases switch security access administration by using a password authentication server
- Terminal Access Controller Access-Control System (TACACS+)  
Delivers an authentication tool using TCP with encryption of the full authentication request, providing additional security
- Switch management logon security  
Helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ 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
- DHCP snooping  
Enables 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
- IP Source Guard  
Filters packets on a per-port basis, which prevents illegal packets from being forwarded
- ARP attack protection  
Protects from attacks using a large number of ARP requests with a host-specific, user-selectable threshold
- Port security  
Allows access only to specified MAC addresses, which can be learned or specified by the administrator
- IEEE 802.1X support  
Provides port-based user authentication with support for Extensible Authentication Protocol (EAP) MD5, TLS, TTLS, and PEAP with choice of AES, TKIP, and static or dynamic WEP encryption for protecting wireless traffic between authenticated clients and the access point
- Media access control (MAC) authentication  
Provides simple authentication based on a user's MAC address; supports local or RADIUS-based authentication
- Multiple user authentication methods
  - IEEE 802.1X  
Uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards
  - Web-based authentication  
Provides a browser-based environment, similar to IEEE 802.1X, to authenticate clients that do not support the IEEE 802.1X supplicant
  - MAC-based authentication  
Authenticates the client with the RADIUS server based on the client's MAC address
- DHCP protection  
Blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Endpoint Admission Defense (EAD)  
Provides security policies to users accessing a network



## Convergence

- LLDP-MED (Media Endpoint Discovery)

Defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones

- Protocol Independent Multicast (PIM)

Defines modes of IPv4 and IPv6 multicasting to allow one-to-many and many-to-many transmission of information; supports PIM Dense Mode (DM), Sparse Mode (SM), and Source-Specific Multicast (SSM)

- Multicast Source Discovery Protocol (MSDP)

Allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications (Comware v5 only)

- Internet Group Management Protocol (IGMP)

Utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3

- 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

Establishes, maintains, and manages IPv6 multicast groups and networks; supports v1 and v2 and utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM)

- Multicast VLAN

Allows multiple VLANs to receive the same IPv4 or IPv6 multicast traffic, lessening network bandwidth demand by reducing eliminate multiple streams to each VLAN

- Voice VLAN

Assigns VLAN and priority for IP phones automatically, simplifying network configuration and maintenance (Comware v5 only)

## 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; delivers advanced VPN services with 3DES and AES encryption at high performance and low latency; and offers Web content filtering and application prioritization and optimization

- Local and global server load-balancing module

Improves traffic distribution using powerful scheduling algorithms, including L4 to L7 services; and monitors the health status of servers and firewalls (JD252A Comware v5 only)

- NetStream module

Provides traffic analysis and statistics capture to allow network administrators to rapidly identify network anomalies and security threats as well as obtain capacity planning information; and supports NetFlow v5 and v9 (JD254A Comware v5 only)

- Unified wired-WLAN module

Supports up to 1,024 access points per module; can be used with select HP access points (refer to the HP 10500/7500 20G Unified Wired-WLAN Module data sheet for more details); provides N+1, N+N, and 1+1 redundancy with sub-second failovers; offers IPv4/IPv6 and end-to-end QoS; and includes flexible forwarding modes as well as Wi-Fi clear connect radio-frequency optimization and integrated IDS

- VPN 20Gbps 10500 Firewall Module

Provides enhanced stateful packet inspection and filtering; supports flexible security zones and virtual firewall containment; delivers advanced VPN services with 3DES and AES encryption at high performance and low latency; offers Web content filtering and application prioritization and optimization

**Additional information**

- Green initiative support

Provides support for RoHS and WEEE regulations

- OPEX savings

Simplifies and streamlines deployment, management, and training through the use of a common operating system, thereby cutting costs as well as reducing the risk of human errors associated with having to manage multiple operating systems across different platforms and network layers

- Unified HP Comware operating system with modular architecture

Provides an easy-to-enhance-and-extend feature set, which doesn't require whole-scale changes; all switching, routing, and security platforms leverage the Comware OS, a common unified modular operating system

**Warranty and support**

- 1-year Warranty 2.0

Advance hardware replacement with 10-calendar-day delivery (available in most countries)

- Electronic and telephone support (for Warranty 2.0)

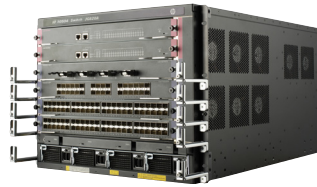
Limited electronic and 24x7 telephone support is available from HP for the entire warranty period; to reach our support centers, refer to [hp.com/networking/contact-support](http://hp.com/networking/contact-support); for details on the duration of support provided with your product purchase, refer to [hp.com/networking/warrantysummary](http://hp.com/networking/warrantysummary)

- Software releases

To find software for your product, refer to [hp.com/networking/support](http://hp.com/networking/support); for details on the software releases available with your product purchase, refer to [hp.com/networking/warrantysummary](http://hp.com/networking/warrantysummary)

## HP 10500 Switch Series

### Specifications



	HP 10504 Switch Chassis (JC613A)	HP 10508 Switch Chassis (JC612A)
<b>I/O ports and slots</b>	4 I/O module slots Supports a maximum of 192 10GbE ports or 96 1/10GBASE-T ports or 192 Gigabit Ethernet ports or 32 40GbE ports, or a combination	8 I/O module slots Supports a maximum of 384 10GbE ports or 192 1/10GBASE-T ports or 384 Gigabit Ethernet ports or 64 40GbE ports, or a combination
<b>Additional ports and slots</b>	2 MPU (for management modules) slots 4 switch fabric slots	2 MPU (for management modules) slots 4 switch fabric slots
<b>Power supplies</b>	4 power supply slots 1 minimum power supply required (ordered separately)	6 power supply slots 1 minimum power supply required (ordered separately)
<b>Fan tray</b>	includes: 1 x JC632A 1 fan tray slot	includes: 1 x JC633A 1 fan tray slot
<b>Physical characteristics</b>		
Dimensions	17.32(w) x 25.98(d) x 13.9(h) in (43.99 x 65.99 x 35.31 cm) (8U height)	17.32(w) x 25.98(d) x 24.41(h) in (43.99 x 65.99 x 62 cm) (14U height)
Weight	85.32 lb (38.7 kg) chassis	125 lb (56.7 kg) chassis
Full configuration weight	183.14 lb (83.07 kg)	285.34 lb (129.43 kg)
<b>Memory and processor</b>		
Management module	Dual Core MIPS @ 1.2 GHz, 512 MB flash, 8 GB DDR2 SDRAM	Dual Core MIPS @ 1.2 GHz, 512 MB flash, 8 GB DDR2 SDRAM
<b>Mounting and enclosure</b>		
	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only
<b>Performance</b>		
Throughput	Up to 2.9BPPS Type D Fabric / 1.9BPPS Type B Fabric	Up to 5.7BPPS Type D Fabric / 1.9BPPS Type B Fabric
Switching capacity	Up to 4.8Tbps Type D Fabric / 3.5Tbps Type B Fabric	Up to 9.3Tbps Type D Fabric / 4.2Tbps Type B Fabric
Routing table size	Up to 256K IPv4 / 8K IPv6 with the EB LPU	Up to 256K IPv4 / 8K IPv6 with the EB LPU
MAC address table	Up to 512K with the EB LPU	Up to 512K with the EB LPU
<b>Reliability</b>		
Availability	99.999%	99.999%

**Environment**

Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	10% to 95%, noncondensing	10% to 95%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Altitude	up to 13,123 ft (4 km)	up to 13,123 ft (4 km)
Acoustic	Low-speed fan: 62.3 dB, High-speed fan: 75.5 dB	Low-speed fan: 63 dB, High-speed fan: 75.8 dB

**Electrical characteristics**

Frequency	50/60 Hz	50/60 Hz
AC voltage	100 - 120/200 - 240 VAC	100 - 120/200 - 240 VAC
DC voltage	-48 to -60 VDC	-48 to -60 VDC
Current	16/60 A	16/60 A
Power output	2500 W	2500 W

**Notes**

Based on common power supply 2,500 W (AC)

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**Safety**

CAN/CSA 22.2 No. 60950-1; FCC Part 15, Subpart B; FDA 21 CFR Subchapter J; ROHS Compliance; IEC 60950-1 :Second Edition ; EN 60950-1:2006 + A11:2009; AS/NZS 60950-1; IEC 60825-1; UL 60950-1, 2nd Edition; EN60825-2:2004+A1:2007

CAN/CSA 22.2 No. 60950-1; FCC Part 15, Subpart B; FDA 21 CFR Subchapter J; ROHS Compliance; IEC 60950-1 :Second Edition ; EN 60950-1:2006 + A11:2009; AS/NZS 60950-1; IEC 60825-1; UL 60950-1, 2nd Edition; EN60825-2:2004+A1:2007

**Emissions**

VCCI Class A; EN 55022 Class A; CISPR 22 Class A; IEC/EN 61000-3-2; IEC/EN 61000-3-3; ICES-003 Class A; AS/NZS CISPR 22 Class A; FCC (CFR 47, Part 15) Class A; GB9254

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**Immunity**

Generic	Directive 2004/108/EC	Directive 2004/108/EC
EN	EN 55024:1998+ A1:2001 + A2:2003; ETSI EN 300 386 V1.3.3	EN 55024:1998+ A1:2001 + A2:2003; ETSI EN 300 386 V1.3.3
ESD	EN 61000-4-2	EN 61000-4-2
Radiated	EN 61000-4-3	EN 61000-4-3
EFT/Burst	EN 61000-4-4	EN 61000-4-4
Surge	EN 61000-4-5	EN 61000-4-5
Conducted	EN 61000-4-6	EN 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	EN 61000-4-11	EN 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	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

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**

These modules—JC614A, JD252A, and JD254A—are only available using Comware v5 for the 10500. Please see an HP representative or technical notes for details.

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**Services**

Refer to the HP website at [hp.com/networking/services](http://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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## HP 10500 Switch Series

### Specifications (continued)



	HP 10508-V Switch Chassis (JC611A)	HP 10512 Switch Chassis (JC748A)
<b>I/O ports and slots</b>	8 I/O module slots Supports a maximum of 384 10GbE ports or 192 1/10GBASE-T ports or 384 Gigabit Ethernet ports or 64 40GbE ports, or a combination	12 I/O module slots Supports a maximum of 576 10GbE ports or 288 1/10GBASE-T ports or 576 Gigabit Ethernet ports or 96 40GbE ports, or a combination
<b>Additional ports and slots</b>	2 MPU (for management modules) slots 4 switch fabric slots	2 MPU (for management modules) slots 4 switch fabric slots
<b>Power supplies</b>	6 power supply slots 1 minimum power supply required (ordered separately)	6 power supply slots 1 minimum power supply required (ordered separately)
<b>Fan tray</b>	includes: 1 x JC634A 1 fan tray slot	includes: 1 x JC758A, JC773A 2 fan tray slots
<b>Physical characteristics</b>		
Dimensions	17.32(w) x 25.98(d) x 34.88(h) in (43.99 x 65.99 x 88.6 cm) (20U height)	17.32(w) x 25.98(d) x 31.38(h) in (44.0 x 66.0 x 79.7 cm) (18U height)
Weight	169.53 lb (76.9 kg) chassis	166.23 lb (75.4 kg) chassis
Full configuration weight	331.31 lb (150.28 kg)	380.95 lb (172.8 kg)
<b>Memory and processor</b>		
Management module	Dual Core MIPS @ 1.2 GHz, 512 MB flash, 8 GB DDR2 SDRAM	Dual Core MIPS @ 1.2 GHz, 512 MB flash, 8 GB DDR2 SDRAM
<b>Mounting and enclosure</b>		
	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA standard 19-inch rack or other equipment cabinet (hardware included); horizontal surface mounting only
<b>Performance</b>		
Throughput	Up to 5.7BPPS Type D Fabric / 1.9BPPS Type B Fabric	Up to 8.6BPPS Type D Fabric / 2.9BPPS Type B Fabric
Switching capacity	Up to 9.3Tbps Type D Fabric / 4.2Tbps Type B Fabric	Up to 13.8Tbps Type D Fabric / 6.0Tbps Type B Fabric
Routing table size	Up to 256K IPv4 / 8K IPv6 with the EB LPU	Up to 256K IPv4 / 8K IPv6 with the EB LPU
MAC address table	Up to 512K with the EB LPU	Up to 512K with the EB LPU
<b>Reliability</b>		
Availability	99.999%	99.999%

**Environment**

Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	10% to 95%, noncondensing	10% to 95%, noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	5% to 95%, noncondensing	5% to 95%, noncondensing
Altitude	up to 13,123 ft (4 km)	up to 13,123 ft (4 km)
Acoustic	Low-speed fan: 61.6 dB, High-speed fan: 72.6 dB	Low-speed fan: 66 dB, High-speed fan: 79 dB

**Electrical characteristics**

Frequency	50/60 Hz	50/60 Hz
AC voltage	100 - 120/200 - 240 VAC	100 - 120/200 - 240 VAC
DC voltage	-48 to -60 VDC	-48 to -60 VDC
Current	16/60 A	16/60 A
Power output	2500 W	2500 W

**Notes**

Based on common power supply 2,500 W (AC)

Based on common power supply 2,500 W (AC)

**Safety**

CAN/CSA 22.2 No. 60950-1; FCC Part 15, Subpart B; FDA 21 CFR Subchapter J; ROHS Compliance; IEC 60950-1 :Second Edition ; EN 60950-1:2006 + A11:2009; AS/NZS 60950-1; IEC 60825-1; UL 60950-1, 2nd Edition; EN60825-2:2004+A1:2007

CAN/CSA 22.2 No. 60950-1; FCC Part 15, Subpart B; FDA 21 CFR Subchapter J; ROHS Compliance; IEC 60950-1 :Second Edition ; EN 60950-1:2006 + A11:2009; AS/NZS 60950-1; IEC 60825-1; UL 60950-1, 2nd Edition; EN60825-2:2004+A1:2007

**Emissions**

VCCI Class A; EN 55022 Class A; CISPR 22 Class A; IEC/EN 61000-3-2; IEC/EN 61000-3-3; ICES-003 Class A; AS/NZS CISPR 22 Class A; FCC (CFR 47, Part 15) Class A; GB9254

VCCI Class A; EN 55022 Class A; CISPR 22 Class A; IEC/EN 61000-3-2; IEC/EN 61000-3-3; ICES-003 Class A; AS/NZS CISPR 22 Class A; FCC (CFR 47, Part 15) Class A; GB9254

**Immunity**

Generic	Directive 2004/108/EC	Directive 2004/108/EC
EN	EN 55024:1998+ A1:2001 + A2:2003; ETSI EN 300 386 V1.3.3	EN 55024:1998+ A1:2001 + A2:2003; ETSI EN 300 386 V1.3.3
ESD	EN 61000-4-2	EN 61000-4-2
Radiated	EN 61000-4-3	EN 61000-4-3
EFT/Burst	EN 61000-4-4	EN 61000-4-4
Surge	EN 61000-4-5	EN 61000-4-5
Conducted	EN 61000-4-6	EN 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and interruptions	EN 61000-4-11	EN 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	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

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**

These modules—JC614A, JD252A, and JD254A—are only available using Comware v5 for the 10500. Please see an HP representative or technical notes for details.

These modules—JC614A, JD252A, and JD254A—are only available using Comware v5 for the 10500. Please see an HP representative or technical notes for details.

**Services**

Refer to the HP website at [hp.com/networking/services](http://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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**Standards and Protocols**

(applies to all products in series)

<b>BGP</b>	RFC 1771 BGPv4 RFC 1772 Application of the BGP RFC 1997 BGP Communities Attribute RFC 1998 An Application of the BGP Community Attribute in Multi-home Routing RFC 2385 BGP Session Protection via TCP MD5 RFC 2439 BGP Route Flap Damping 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 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 5291 Outbound Route Filtering Capability for BGP-4 RFC 5292 Address-Prefix-Based Outbound Route Filter for BGP-4
<b>Denial of service protection</b>	RFC 2267 Network Ingress Filtering	Automatic filtering of well-known denial-of-service packets	CPU DoS Protection Rate Limiting by ACLs
<b>Device management</b>	RFC 1157 SNMPv1/v2c RFC 1305 NTPv3 RFC 1902 (SNMPv2) RFC 2579 (SMIPv2 Text Conventions)	RFC 2580 (SMIPv2 Conformance) RFC 2819 (RMON groups Alarm, Event, History and Statistics only) HTTP, SSHv1, and Telnet Multiple Configuration Files	Multiple Software Images SSHv1/SSHv2 Secure Shell TACACS/TACACS+ Web UI
<b>General protocols</b>	IEEE 802.1ad Q-in-Q IEEE 802.1ag Service Layer OAM 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 802.3ba 40 and 100 Gigabit Ethernet Architecture 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 959 File Transfer Protocol (FTP) RFC 1027 Proxy ARP RFC 1035 Domain Implementation and Specification 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 1393 Traceroute Using an IP Option RFC 1519 CIDR RFC 1531 Dynamic Host Configuration Protocol RFC 1533 DHCP Options and BOOTP Vendor Extensions RFC 1591 DNS (client only) RFC 1624 Incremental Internet Checksum 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 2082 RIP-2 MD5 Authentication RFC 2091 Trigger RIP RFC 2131 DHCP RFC 2138 Remote Authentication Dial In User Service (RADIUS) RFC 2236 IGMP Snooping 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 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 4486 Subcodes for BGP Cease Notification Message RFC 4884 Extended ICMP to Support Multi-Part Messages RFC 4941 Privacy Extensions for Stateless Address Autoconfiguration in IPv6 RFC 5130 A Policy Control Mechanism in IS-IS Using Administrative Tags

<b>IP multicast</b>	<p>RFC 2236 IGMPv2  RFC 2283 Multiprotocol Extensions for BGP-4  RFC 2362 PIM Sparse Mode  RFC 3376 IGMPv3  RFC 3446 Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)</p>	<p>RFC 3618 Multicast Source Discovery Protocol (MSDP)  RFC 3973 PIM Dense Mode  RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches  RFC 4601 PIM Sparse Mode</p>	<p>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 5059 Bootstrap Router (BSR) Mechanism for Protocol Independent Multicast (PIM)</p>
<b>IPv6</b>	<p>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</p>	<p>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 IPv4 &amp; IPv6  RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers</p>	<p>RFC 3056 Connection of IPv6 Domains via IPv4 Clouds  RFC 3307 IPv6 Multicast Address Allocation  RFC 3315 DHCPv6 (client and relay)  RFC 3484 Default Address Selection for IPv6  RFC 3513 IPv6 Addressing Architecture  RFC 3736 Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6  RFC 3810 MLDv2 for IPv6  RFC 4214 Intra-Site Automatic Tunnel Addressing Protocol (ISATAP)  RFC 4861 IPv6 Neighbor Discovery  RFC 4862 IPv6 Stateless Address Auto-configuration</p>
<b>MIBs</b>	<p>RFC 1156 (TCP/IP MIB)  RFC 1157 A Simple Network Management Protocol (SNMP)  RFC 1215 A Convention for Defining Traps for use with the SNMP  RFC 1229 Interface MIB Extensions  RFC 1493 Bridge MIB  RFC 1573 SNMP MIB II  RFC 1643 Ethernet MIB  RFC 1657 BGP-4 MIB  RFC 1724 RIPv2 MIB  RFC 1907 SNMPv2 MIB  RFC 2011 SNMPv2 MIB for IP  RFC 2012 SNMPv2 MIB for TCP  RFC 2013 SNMPv2 MIB for UDP  RFC 2096 IP Forwarding Table MIB  RFC 2233 Interface MIB  RFC 2452 IPV6-TCP-MIB  RFC 2454 IPV6-UDP-MIB</p>	<p>RFC 2465 IPv6 MIB  RFC 2466 ICMPv6 MIB  RFC 2571 SNMP Framework MIB  RFC 2572 SNMP-MPD MIB  RFC 2573 SNMP-Notification MIB  RFC 2573 SNMP-Target MIB  RFC 2578 Structure of Management Information Version 2 (SMIv2)  RFC 2580 Conformance Statements for SMIv2  RFC 2618 RADIUS Client MIB  RFC 2620 RADIUS Accounting MIB  RFC 2665 Ethernet-Like-MIB  RFC 2668 802.3 MAU MIB  RFC 2674 802.1p and IEEE 802.1Q Bridge MIB  RFC 2787 VRRP MIB  RFC 2819 RMON MIB  RFC 2925 Ping MIB</p>	<p>RFC 2932IP (Multicast Routing MIB)  RFC 2933 IGMP MIB  RFC 2934 Protocol Independent Multicast MIB for IPv4  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 3595 Textual Conventions for IPv6 Flow Label  RFC 3621 Power Ethernet 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 4133 Entity MIB (Version 3)  RFC 4444 Management Information Base for Intermediate System to Intermediate System (IS-IS)</p>
<b>MPLS</b>	<p>RFC 2205 Resource ReSerVation Protocol (RSVP)  RFC 2209 Resource ReSerVation Protocol (RSVP)  RFC 2702 Requirements for Traffic Engineering Over MPLS  RFC 2858 Multiprotocol Extensions for BGP-4  RFC 2961 RSVP Refresh Overhead Reduction Extensions  RFC 3031 Multiprotocol Label Switching Architecture  RFC 3032 MPLS Label Stack Encoding  RFC 3107 Carrying Label Information in BGP-4  RFC 3212 Constraint-Based LSP Setup using LDP</p>	<p>RFC 3479 Fault Tolerance for the Label Distribution Protocol (LDP)  RFC 3487 Graceful Restart Mechanism for LDP  RFC 3564 Requirements for Support of Differentiated Service-aware MPLS Traffic Engineering  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</p>	<p>RFC 4448 Encapsulation Methods for Transport of 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</p>



<b>Network management</b>	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 3176 sFlow RFC 3411 SNMP Management Frameworks	RFC 3412 SNMPv3 Message Processing RFC 3414 SNMPv3 User-based Security Model (USM) RFC 3415 SNMPv3 View-based Access Control Model (VACM) ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
<b>OSPF</b>	RFC 1245 OSPF protocol analysis RFC 1246 Experience with OSPF RFC 1765 OSPF Database Overflow RFC 1850 OSPFv2 Management Information Base (MIB), traps RFC 2154 OSPF w/Digital Signatures (Password, MD-5) 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 OSPFv2 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 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
<b>QoS/CoS</b>	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)
<b>Security</b>	IEEE 802.1X Port Based Network Access Control RFC 1321 The MD5 Message-Digest Algorithm RFC 1334 PPP Authentication Protocols (PAP) 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 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 2868 RADIUS Attributes for Tunnel Protocol Support RFC 2869 RADIUS Extensions Access Control Lists (ACLs) Guest VLAN for 802.1x MAC Authentication Port Security SSHv1/SSHv2 Secure Shell
<b>VPN</b>	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 RFC 2917 A Core MPLS IP VPN Architecture	RFC 3947 - Negotiation of NAT-Traversal in the IKE RFC 4302 - IP Authentication Header (AH) RFC 4303 - IP Encapsulating Security Payload (ESP)
<b>IPSec</b>	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

## HP 10500 Switch Series accessories

### Modules

HP 10500 Type A Main Processing Unit with Comware v7 Operating System (JG496A)  
 HP 10500 Main Processing Unit (JC614A)  
 HP 10500 48-port 10GbE SFP+ SF Module (JC756A)  
 HP 10500 32-port 10GbE SFP+ SF Module (JC755A)  
 HP 10500 24-port 1/10GBASE-T SF Module (JG394A)  
 HP 10500 8-port 40GbE QSFP+ SF Module (JG392A)  
 HP 10500 4-port 40GbE QSFP+ SF Module (JC757A)  
 HP 10500 4-port 40GbE CFP SF Module (JG396A)  
 HP 10500 8-port 10GbE SFP+ SE Module (JC631A)  
 HP 10500 4-port 10GbE XFP SE Module (JC620A)  
 HP 10500 16-port GbE SFP/8-port GbE Combo/2-port 10GbE XFP SE Module (JC617A)  
 HP 10500 16-port GbE SFP/8-port GbE Combo SE Module (JC763A)  
 HP 10500 48-port Gig-T SE Module (JC618A)  
 HP 10500 48-port GbE SFP SE Module (JC619A)  
 HP 10500 16-port 10GbE SFP+ SC Module (JC628A)  
 HP 10500 8-port 10GbE SFP+ EA Module (JC630A)  
 HP 10500 4-port 10GbE XFP EA Module (JC624A)  
 HP 10500 16-port GbE SFP/8-port GbE Combo/2-port 10GbE XFP EA Module (JC621A)  
 HP 10500 48-port GbE SFP EA Module (JC622A)  
 HP 10500 48-port Gig-T EA Module (JC623A)  
 HP 10500 8-port 10GbE SFP+ EB Module (JC629A)  
 HP 10500 4-port 10GbE XFP EB Module (JC627A)  
 HP 10500 48-port GbE SFP EB Module (JC625A)  
 HP 10500 16-port GbE SFP/8-port GbE Combo/2-port 10GbE XFP EB Module (JC626A)  
 HP 10500 2-Port 100GbE CFP SE Module (JG916A)

### Transceivers

HP X110 100M SFP LC FX Transceiver (JD102B)  
 HP X110 100M SFP LC LX Transceiver (JD120B)  
 HP X110 100M SFP LC LH40 Transceiver (JD090A)  
 HP X110 100M SFP LC LH80 Transceiver (JD091A)  
 HP X115 100M SFP LC BX 10-D Transceiver (JD101A)  
 HP X115 100M SFP LC BX 10-U Transceiver (JD100A)  
 HP X120 1G SFP RJ45 T Transceiver (JD089B)  
 HP X120 1G SFP LC SX Transceiver (JD118B)  
 HP X120 1G SFP LC LX Transceiver (JD119B)  
 HP X125 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-D Transceiver (JD099B)  
 HP X120 1G SFP LC BX 10-U Transceiver (JD098B)  
 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)

**Transceivers**

HP X130 10G SFP+ LC SR Transceiver (JD092B)  
 HP X130 10G SFP+ LC LRM Transceiver (JD093B)  
 HP X130 10G SFP+ LC LR Transceiver (JD094B)  
 HP X130 10G SFP+ LC ER 40km Transceiver (JG234A)  
 HP X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable (JD095C)  
 HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable (JD096C)  
 HP X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (JD097C)  
 HP X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable (JG081C)  
 HP X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable (JC784C)  
 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 X180 10G XFP LC LH 80km 1538.98nm DWDM Transceiver (JG226A)  
 HP X180 10G XFP LC LH 80km 1539.77nm DWDM Transceiver (JG227A)  
 HP X180 10G XFP LC LH 80km 1540.56nm DWDM Transceiver (JG228A)  
 HP X180 10G XFP LC LH 80km 1542.14nm DWDM Transceiver (JG229A)  
 HP X180 10G XFP LC LH 80km 1542.94nm DWDM Transceiver (JG230A)  
 HP X180 10G XFP LC LH 80km 1558.98nm DWDM Transceiver (JG231A)  
 HP X180 10G XFP LC LH 80km 1559.79nm DWDM Transceiver (JG232A)  
 HP X180 10G XFP LC LH 80km 1560.61nm DWDM Transceiver (JG233A)  
 HP X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver (JG661A)  
 HP X140 40G QSFP+ MPO SR4 Transceiver (JG325A)  
 HP X240 40G QSFP+ to QSFP+ 1m Direct Attach Copper Cable (JG326A)  
 HP X240 40G QSFP+ to QSFP+ 3m Direct Attach Copper Cable (JG327A)  
 HP X240 40G QSFP+ to QSFP+ 5m Direct Attach Copper Cable (JG328A)  
 HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable (JG329A)  
 HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable (JG330A)  
 HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable (JG331A)  
 HP X140 40G CFP LC LR4 10km SM Transceiver (JC857A)  
 HP X140 40G QSFP+ MPO SR4 Transceiver (JG325B)  
 HP X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver (JG709A)  
 HP X130 10G SFP+ LC LH 80km Transceiver (JG915A)

**Security Modules**

HP 7500 Load Balancing Module (JD252A)

**Power Supply**

HP 10500 2500W AC Power Supply (JC610A)  
 HP 10500 2400W DC Power Supply (JC747A)

**Mounting Kit**

HP X421 Chassis Universal 4-post Rack Mounting Kit (JC665A)

**License**

HP 10500/7500 SSL VPN 1000-user License (JD257A)  
 HP Unified Wired-WLAN 128 AP E-LTU (JG649AAE)

**Power cords**

HP 10500 -48V 3m DC Power Supply Cable (JG390A)  
 HP 10500 -48V 15m DC Power Supply Cable (JG391A)

**Appliance**

HP 10500/7500 SSL VPN Module with 500-user License (JD253A)  
 HP 10500/7500 NetStream Monitoring Module (JD254A)  
 HP 10500/11900/7500 20Gbps VPN Firewall Module (JG372A)

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**HP 10504 Switch Chassis(JC613A)**      HP 10504 400Gbps Type A Fabric Module (JC615A)  
HP 10504 880Gbps Type B Fabric Module (JC751A)  
HP 10504 1.2Tbps Type D Fabric Module (JC752A)  
HP 10504 Spare Fan Assembly (JC632A)

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**HP 10508 Switch Chassis (JC612A)**      HP 10508/10508-V 720Gbps Type A Fabric Module (JC616A)  
HP 10508/10508-V 1.04Tbps Type B Fabric Module (JC753A)  
HP 10508/10508-V 2.32Tbps Type D Fabric Module (JC754A)  
HP 10508 Spare Fan Assembly (JC633A)

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**HP 10508-V Switch Chassis (JC611A)**      HP 10508/10508-V 720Gbps Type A Fabric Module (JC616A)  
HP 10508/10508-V 1.04Tbps Type B Fabric Module (JC753A)  
HP 10508/10508-V 2.32Tbps Type D Fabric Module (JC754A)  
HP 10508-V Spare Fan Assembly (JC634A)

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**HP 10512 Switch Chassis (JC748A)**      HP 10512 1.52Tbps Type B Fabric Module (JC749A)  
HP 10512 3.44Tbps Type D Fabric Module (JC750A)  
HP 10512 Spare Top Fan Tray Assembly (JC758A)  
HP 10512 Spare Bottom Fan Tray Assembly (JC773A)

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