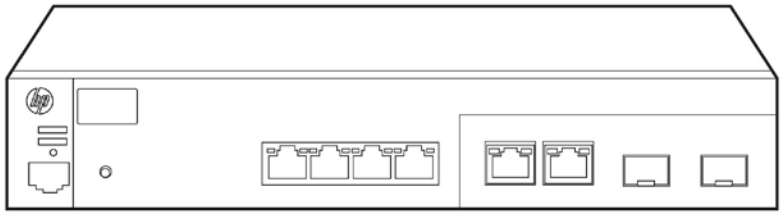
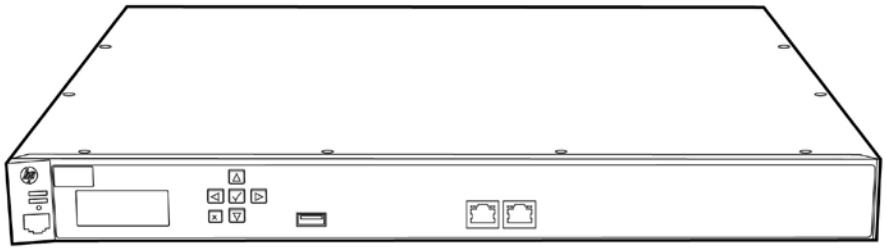
Overview

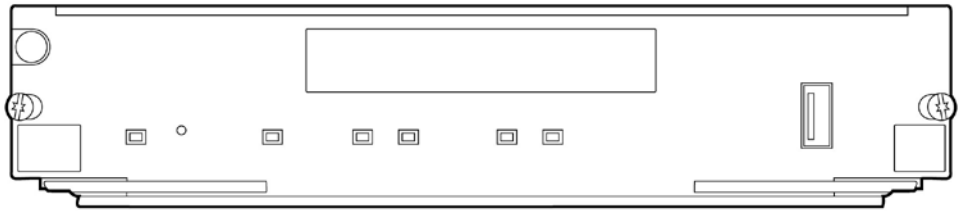
HPE MSM Controller Series



HP MSM720 Access Controller (WW)



HP MSM760 Premium Mobility Controller/HP MSM760 Access Controller



HP MSM765 zl Premium Mobility Controller

Overview

Models

HP MSM720 Access Controller (WW)	J9693A
HP MSM720 Premium Mobility Controller (WW)	J9694A
HP MSM760 Premium Mobility Controller	J9420A
HP MSM760 Access Controller	J9421A
HP MSM775 zl Premium Controller Module	J9840A

Key features

- Ease of use, scalability, and redundancy
- Enhanced architecture for flexible network design
- Supports IEEE 802.11a/b/g/n and . 11ac APs and access devices
- Comprehensive WLAN security
- Appliance and blade form factors

Product overview

Working in unison with HPE Access Points, the HPE MSM Controller Series delivers a high-performance networking solution. The enhanced controller architecture scales to new WLAN standards without requiring a controller replacement. The MSM controllers provide advanced Radio Resource Management (RRM), including client load balancing and interference mitigation. The MSM wireless controllers also support a fast-roaming capability.

Wireless security is comprehensive with integrated wireless IDS and support for internal and external Authentication, Authorization, and Accounting (AAA) servers; a built-in stateful firewall; per-user VLAN mapping; and authentication.

Features and benefits

Management

- **Wi-Fi Clear Connect**
  Provides a system-wide approach to delivering WLAN reliability by proactively determining and adjusting to changing RF conditions; optimizes WLAN performance by detecting interference from Wi-Fi and non-Wi-Fi sources—by using spectrum analysis capabilities built into the specific access points (refer to the HPE Access Point—Controller compatibility matrix), identifying rogue activity and making decisions at a system-wide level.
- **Advanced radio resource management**
  - **Automatic radio power adjustments**
    Include real-time power adjustments based on changing environmental conditions and signal coverage adjustment
  - **Automatic radio channel**
    Provides intelligent channel switching and real-time interference detection
  - **Intelligent client load balancing**
    Determines the number of clients across neighboring APs and adjusts client allocation to balance the load
  - **Airtime fairness**
    helps ensure equal RF transmission time for wireless clients
- **Spectrum analysis**
  - **Power/frequency spectrum analysis**
    Measures noise from IEEE 802.11 remote sources
  - **Signal detection/classification**
    Identifies source of RF interference; for example, Bluetooth, cordless phones, and microwave ovens
  - **Evaluation of channel quality**
    Helps detect severe channel degradation and improves the reporting of poor RF performance

Overview

- **Automated work flows**
  - **Initial controller settings**
    Defines basic operational settings for the controller; for example, network connections, security settings, and system time
  - **Wireless network for employees**
    Enables setup of a new wireless network for employees; for example, network and security settings, and basic voice and video settings
  - **Wireless network for guests**
    Provides wireless access for guest users; for example, network and security settings specific to guest access
- **Dashboard Monitoring and Analytics**
  - - Allow administrators to monitor and troubleshoot their HPE WLAN infrastructure at a glance
  - - Provide analytical visibility into multiple areas such as: Wireless Clients, Access Points and Alarms utilizing intuitive graphics and colors
  - - Display a quick operational health assessment of the Wi-Fi network and easy identification of potential issues
- **Gateway**
  Allows discovery of Bonjour services located in a different layer-3 network
- **HPE Zerocast**
  Eliminates Bonjour multicast traffic from the WLAN enabling scalable deployment of Apple devices with no performance impact on the Wi-Fi network
- **Access control**
  Enables filters to be applied inbound and outbound (on the AP) to SSIDs, groups of or specific APs. User based filtering can block Bonjour traffic until the user is authenticated
- **Remote configuration and management**
  Are available through a secure Web browser, command-line interface (console port or SSH), SOAP, or SNMP
- **Management interface control**
  Allows interfaces to be enabled or disabled depending on security preferences
- **Management VLAN**
  Segments traffic to and from management interfaces, including CLI, Web browser interface, and SNMP
- **RADIUS accounting support**
  separates RADIUS accounting server support per SSID; provides detailed session, usage, and billing information for each client activity
- **Logging**
  provides local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated
- **Controller networking**
  Includes IEEE 802.1D-compliant bridging and bridge MIB (RFC 4188), which is supported only on a primary bridge interface; stateful firewall; PPPoE client (RFC 2516); ICMP (RFC 792); IEEE 802.1Q VLAN tagging; NAT (RFC 1631); CIDR (RFC 1519); L2TP and PPTP servers for wireless clients; VPN client, which establishes PPTP or IPSec tunnels to other devices; and IGMP snooping (IGMP proxy v1 and v2), which is supported on the wireless interfaces of APs
- **DHCP support**
  Includes RFC 2131 and RFC 3046 (DHCP relay option 82) for server and built-in DHCP client for client
- **Band steering**
  Redirects 5 GHz-capable clients automatically to the less-congested 5 GHz spectrum
- **Controller management**
  Provides a secure Web browser (Secure Sockets Layer [SSL] and VPN), command-line interface, SOAP, SNMP v2c and v3, MIB-II with traps, RADIUS Authentication Client MIB (RFC 2618), and RIPv2 MIB extension (RFC 1724); implements scheduled configuration and firmware upgrades from a central server; offers per-user activity records by time used or data transferred; and supports remote syslog
- **HPE Intelligent Management Center (IMC) and Wireless Services Manager Software**
  Provide centralized management for discovery, logging, status, and configuration management
- **Unified network visibility**
  Provides visibility between a wired and wireless network, using the IEEE 802.1AB Link Layer Discovery Protocol (LLDP) and sFlow

Overview

- **Diagnostics**
  Records association, authentication, and DHCP events in client event log; includes a packet capture tool for Ethernet and IEEE 802.11 interfaces (PCAP format), a wireless client data rate matrix, and a client status page; complete session logging provides detailed information for problem identification and resolution
- **Group Bandwidth Management:**
  Ability to assign users to groups and control bandwidth by group

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
- **NAT/PAT**
  Leverages a choice of dynamic partial address translation (PAT) 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
- **Authenticated network access**
  Authenticates users with an internal or external RADIUS server or Microsoft® Active Directory before allowing full network connectivity

Quality of Service (QoS)

- **Rate limiting**
  Supports per-wireless client, ingress-enforced maximums and per-wireless client, per-queue guaranteed minimums
- **Centralized traffic**
  Layer 2 and Layer 3 QoS settings are maintained when using Mobility Traffic Manager or guest access

Mobility

- **HPE MSM solutions enhanced for businesses**
  Delivers services for a range of vertical markets, including healthcare, hospitality, education, manufacturing, transportation, and service providers
- **Powerful security capabilities**
  Enables robust identity- and role-based user account profiles to use internal or external AAA services
- **Solutions that cover the most important WLAN applications**
  Deliver rich application support, including guest access, location-based services, Voice over Wi-Fi (VoW), hotspot, surveillance, and secure point of sale
- **Capacity that scales from small office to large campus**
  Deploy wireless LANs (WLANs) efficiently with the MSM720 controller (which supports 10 to 40 APs) and the MSM760, MSM765 zl, and MSM775 zl controllers (which control 40 to 200 APs)
- **Premium Mobility scalability features**
  - **Virtual Controller**
    Managed by a single IP address the MSM76x and MSM775 zl each support a team of up to 800 APs and five controllers and the MSM720 a team of up to 40 APs across two controllers (a team requires the same controller type)
  - **N+1 redundancy**
    Teaming provides N+1 redundancy
  - **Seamless failover**
    APs can fail-over without rebooting, preserving mobility services when client traffic is bridged locally at the AP
  - **Up to 64 VSC profiles**
- **Mobility Traffic Manager**
  Provides flexible and multiple network distribution schemes address a range of business needs; policies for user network

Overview

and security profiles are consistently applied and enforced; wireless traffic can be directed anywhere in the network as required; enterprise businesses can easily migrate to the MSM mobility solution, preserving prior network designs

- **Controller client access control**
  provides SSL-protected universal access method, MAC address authentication, and IEEE 802.1x authentication; Web proxy server; support for centralized portal; AAA Security; WPA and WPA2 encryption; client-fixed IP address spoofing; per-site and per-user access lists; white list and black list support; bandwidth limiting per user, per VLAN, or per VSC; and concurrent users (up to 250 for the MSM720, up to 2,000 for the MSM760, MSM765 zl and MSM775 zl controller)
- **Simplified management with central control**
  Reduces the time and complexity of managing a wireless network; the solution controls up to hundreds of APs (depending on the controller) from a single management interface and helps ensure that a consistent set of services is delivered throughout the wireless network; and the controllers push authentication, encryption, QoS enforcement, and access policies to the APs, delivering intelligence to the edge of mobile networks
- **Services**
  Provides standard L2 roaming and VoWLAN support on all controllers, advanced fast roaming on mobility controllers, plug-and-play AP management, as well as public and guest Internet access
- **Advanced fast roaming (requires a mobility controller or upgrade)**
  Provides WPA2 opportunistic key caching through controller support as well as inter/intra-subnet roaming and seamless roaming (less than 50 ms roaming delay) support for VoW deployments

Security

- **Integrated IDS support (Premium Mobility version required)**
  - **Automated AP and client classification**
    reduces manual effort (administrator can override AP classification)
  - **Comprehensive detection capabilities**
    detects a wide range of attacks
  - **Flexible event reporting**
    enables configuration of which events will result in notifications
  - **Location tracking capabilities**
    helps identify the location of a rogue device
  - **Flexible deployment models**
    supports time slicing or dedicating a radio to detect full time
- **Secure shell**
  encrypts all transmitted data for secure remote CLI access over IP networks
- **Secure Sockets Layer (SSL)**
  encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- **IEEE 802.1X, Active Directory, and RADIUS network logins**
  Control wireless network access for authentication and accountability, using the IEEE 802.1X, Microsoft Active Directory, and RADIUS
- **RADIUS-based MAC authentication**
  authenticates a wireless client with a RADIUS server based on the MAC address of the client; this is useful for clients with minimal or no user interface
- **Web-based authentication**
  Provides a Web browser-based environment to authenticate clients that may not support the IEEE 802.1X supplicant
- **IEEE 802.1x supplicant on MSM APs**
  Helps prevent deployment of rogue networking equipment
- **Secure management access**
  Encrypts all access methods (CLI, GUI, or MIB) securely through SSH v2c, SSL, and/or SNMPv3

Policy management

- **Standards-based authentication support for Microsoft Active Directory and IEEE 802.1X**
  Integrates seamlessly into existing authentication services or uses the built-in database

Overview

- **Integration with HPE IMC Network Management software**
  Helps ensure consistent policy enforcement across wired and wireless networks

Connectivity

- **10GbE connections to the switch fabric**
  Leverages two 10GbE wire-speed internal connections to help ensure that the network connections from the application to the switch backplane do not limit application performance (MSM775 zl premium mobility controller only)
- **IPv6 wireless client traffic forwarding**
  Is supported for L2 and L3 mobility (MTM) and for client traffic directly bridged at the APs
- **IEEE 802.3ad link-aggregation control protocol (LACP) and Hewlett Packard Enterprise port trunking**
  Support up to six ports bonded via LACP; and facilitates manually configured trunks between an HPE switch and the controller (MSM720 controller only)

Comprehensive portfolio

- **Access point support**
  Refer to the HPE Access Point —Controller Compatibility Matrix (refer to **http://h20195.www2.hpe.com/V2/GetDocument.aspx?docname=4AA5-0345ENW&cc=us&lc=en**)
  Support for HPE 560 802.11ac access points

Performance

- **High-performance processor system**
  - **MSM720 controllers**
  - Freescale Dual Core 800 MHz P1020 Processor, 256 KB cache, and 1 GB DDR3 memory
  - **MSM760 controllers**
    Intel® Core™ 2 Duo Processor E6400, 2.13 GHz, and 2 MB cache
  - **MSM775 zl controller**
    Intel® Ivy Bridge Dual Core CPU Core i3-3120ME, 2.4 GHz, and 3 MB cache
- **Memory subsystems**
  - **MSM720 controllers**
    1 GB of DDR3 memory
  - **MSM760 controllers**
    2 GB of DDR2 memory
  - **MSM775 zl controllers**
    4 GB ECC DDR3-1333 SO-DIMM
- **Solid state drive (MSM775 zl model)**
  Enables rapid data reads/writes via the 32 GB SATA solid state drive (SSD), providing improved application performance

Additional information

- **Licensing model for guest user access (v5.7 and later)**
  The full number of supported guest access user sessions is enabled with the base-level controller models and is no longer tied to the AP upgrade license; for example, the base MSM720 (access and premium mobility) controllers will now support up to 250 concurrent users and the MSM760 base controllers will now support up to 2,000 concurrent users without requiring additional AP license upgrades
- **10-AP license upgrade option**
  This can be used on the MSM720, MSM76x, and MSM775 zl products on all supported firmware releases
- **Licensing model for the MSM317 access device (v5.7 and later)**
  No additional AP license is required for the MSM317; non-MSM317 devices are subject to AP licensing; maximum wireless

Overview

device limits per controller and team are unchanged, and all devices count toward these maximums; for example, an MSM760 could manage 200 MSM317 devices with no additional AP license, 40 APs and 160 MSM317 devices with no additional AP license; or 80 APs and 120 MSM317 devices with an additional 40-AP license

- **AP support**
  Refer to the HPE Access Point—Controller Compatibility Matrix at http://h20195.www2.hpe.com/V2/GetDocument.aspx?docname=4AA5-0345ENW&cc=us&lc=en

Warranty and support

- **Limited Lifetime Warranty 2.0—5y HDD**
  Limited Lifetime Warranty for the MSM720 and MSM775 zl controllers. See **http://www.hpe.com/networking/warrantysummary** for warranty and support information included with your product purchase.
- **1-year Warranty 2.0**
  1-year Warranty for the MSM760 controller. See **http://www.hpe.com/networking/warrantysummary** for warranty and support information included with your product purchase.

Configuration

Build To Order:

BTO is a standalone unit with no integration. BTO products ship standalone are not part of a CTO or Rack-Shippable solution.

HP MSM720 Access Controller (WW) • 4 RJ-45 autosensing 10/100/1000 port • 2 RJ-45 dual-personality 10/100/1000 ports/ SFP Ports	J9693A See Configuration **NOTE:** 1, 2
No Power Cord • No Localized Power Cord Selected	J9693A#AC3
HP MSM720 Premium Mobility Controller (WW) • 4 RJ-45 autosensing 10/100/1000 port • 2 RJ-45 dual-personality 10/100/1000 ports/ SFP Ports	J9694A See Configuration **NOTE:** 1, 2
HP MSM760 Premium Mobility Controller • 2 RJ-45 autosensing 10/100/1000 ports	J9420A See Configuration **NOTE:** 2
HP MSM760 Access Controller • 2 RJ-45 autosensing 10/100/1000 ports	J9421A See Configuration **NOTE:** 2
No Power Cord • No Localized Power Cord Selected	J9421A#AC3
HP MSM775 zl Premium Controller Module	J9840A

Configuration Rules:

Note 1 **The following Transceivers install into this Controller:**

HPE X111 100M SFP LC FX Transceiver	J9054C
HPE X121 1G SFP LC LH Transceiver	J4860C
HPE X121 1G SFP LC SX Transceiver	J4858C
HPE X121 1G SFP LC LX Transceiver	J4859C
HP X122 1G SFP LC BX-D Transceiver	J9142B
HP X122 1G SFP LC BX-U Transceiver	J9143B

Note 2 **Localization required. (See Localization Menu)**

Internal Power Supplies

None

Transceivers

Configuration

SFP Transceivers

HPE X111 100M SFP LC FX Transceiver	J9054C
HPE X121 1G SFP LC LH Transceiver	J4860C
HPE X121 1G SFP LC LX Transceiver	J4859C
HPE X121 1G SFP LC SX Transceiver	J4858C
HP X122 1G SFP LC BX-D Transceiver	J9142B
HP X122 1G SFP LC BX-U Transceiver	J9143B

Access Point Options

External Power Supplies

HP 1-port Power Injector	J9407B See Configuration **NOTE:**1

Configuration Rules:

Note 1 Localization required. (See Localization Menu)

Licenses

HP MSM Additional 10 Access Point E-LTU	J9697AAE See Configuration **NOTE:** 1
HP MSM720 Premium Electronic License to Use	J9698AAE See Configuration **NOTE:**2
HP MSM Additional 40 Access Point E-LTU	J9371AAE See Configuration **NOTE:**3
HP MSM760 Premium E-LTU	J9491AAE See Configuration **NOTE:**5

Configuration Rules

Note 1 This license is supported the following Controllers:

Configuration

	HP MSM720 Premium Mobility Controller (WW)	J9694A
	HP MSM760 Premium Mobility Controller	J9420A
	HP MSM775 zl Premium Controller Module	J9840A
	HP MSM720 Access Controller (WW)	J9693A
Note 2	This license is supported the following Controllers:	
	HP MSM720 Access Controller (WW)	J9693A
Note 3	This license is supported the following Controllers:	
	HP MSM760 Premium Mobility Controller	J9420A
	HP MSM775 zl Premium Controller Module	J9840A
	HP MSM760 Access Controller	J9421A
Note 5	This license is supported the following Controllers:	
	HP MSM760 Access Controller	J9421A

Technical Specifications

HP MSM720 Premium Mobility Controller (WW) (J9694A)

I/O ports and slots	4 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 2 RJ-45 dual-personality 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)	
Additional ports and slots	1 RJ-45 serial console port	
Physical characteristics	**Dimensions**	6.28(w) x 10(d) x 1.75(h) in (15.95 x 25.4 x 4.45 cm) (1U height)
	Weight	3.62 lb (1.64 kg)
Mounting	Supports the mounting options of the 2520-8 PoE switch, including EIA-standard 19 in. telco rack or equipment cabinet (rack-mounting kit included); horizontal surface or wall mounting	
Performance	**100 Mb Latency**	< 20.4 µs (LIFO 64-byte packets)
	1000 Mb Latency	< 6.3 µs (LIFO 64-byte packets)
	Throughput	up to 8.9 million pps
Environment	**Operating temperature**	41°F to 113°F (5°C to 45°C)
	Operating relative humidity	15% to 95% @ 104°F (40°C)
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C)
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	70 BTU/hr (73.85 kJ/hr)
	AC Voltage	100-240 VAC
	Current	.2/.1 A
	Maximum power rating	20 W
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1	
Emissions	FCC part 15 Class A; EN 55022 Class A; CISPR 22 Class A; ICES-003	
Features	Supported • IEEE 802.11 a/b/g/n and .11ac access points and devices • 10 to 40 access points and/or access devices (in increments of 10) • IEEE 802.3ad Link Aggregation Control Protocol (LACP) • 250 simultaneous guest access users Included services • Plug-and-play AP management and WLAN management • Guest access • Captive portal • PCI DSS compliance for wireless PoS traffic • Support for Real-Time Location Services (RTLS)	

Technical Specifications

- Advanced fast roaming with VoWLAN support
- Mobility Traffic Manager (MTM)
- Support for up to 64 VSC profiles
- Unified policy enforcement and network visibility
- Virtual controller (up to two MSM720 controllers and 40 APs with resiliency; 250 maximum concurrent users)

Notes	Latency values refer to client traffic bridged locally at the AP. Not all services are supported with the Virtual Controller feature. Please refer to the user documentation for more detail. For U.S. government manufactured sales requirements, order the TAA MSM720 controller models. For all other AMS and WW orders, use WW models.
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

HP MSM720 Access Controller (WW) (J9693A)

I/O ports and slots	4 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	
Additional ports and slots	1 RJ-45 serial console port	
Physical characteristics	**Dimensions**	6.28(w) x 10(d) x 1.75(h) in (15.95 x 25.4 x 4.45 cm) (1U height)
	Weight	3.62 lb (1.64 kg)
Mounting	Supports the mounting options of the 2520-8 PoE switch, including EIA-standard 19 in. telco rack or equipment cabinet (rack-mounting kit included); horizontal surface or wall mounting	
Performance	**100 Mb Latency**	< 20.4 µs (LIFO 64-byte packets)
	1000 Mb Latency	< 6.3 µs (LIFO 64-byte packets)
	Throughput	up to 8.9 million pps
Environment	**Operating temperature**	41°F to 113°F (5°C to 45°C)
	Operating relative humidity	15% to 95% @ 104°F (40°C)
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C)
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	70 BTU/hr (73.85 kJ/hr)
	AC Voltage	100-240 VAC
	Current	.2/.1 A
	Maximum power rating	20 W
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1	
Emissions	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1	
Features	Supported	

Technical Specifications

- IEEE 802.11 a/b/g/n and 802.11ac access points and devices
- 10 to 40 access points and/or access devices (in increments of 10)
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- 250 simultaneous guest access users

Included services

- Plug-and-play AP management and WLAN management
- Guest access
- Captive portal
- PCI DSS compliance for wireless PoS traffic
- Support for Real-Time Location Services (RTLS)
- Standard Layer 2 roaming with VoWLAN support
- Support for up to 16 VSC profiles
- Unified policy enforcement and network visibility

Notes	Latency values refer to client traffic bridged locally at the AP. For U.S. government manufactured sales requirements, order the TAA MSM720 controller models. For all other AMS and WW orders, use WW models.
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

HP MSM760 Premium Mobility Controller (J9420A)

I/O ports and slots	2 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	
Additional ports and slots	1 RJ-45 serial console port	
Physical characteristics	**Dimensions**	17.32(w) x 15.38(d) x 1.75(h) in (43.99 x 39.07 x 4.45 cm) (1U height)
	Weight	13.45 lb (6.1 kg)
Mounting	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
Environment	**Operating temperature**	41°F to 104°F (5°C to 40°C)
	Operating relative humidity	15% to 80%, noncondensing
	Nonoperating/Storage temperature	-40°F to 149°F (-40°C to 65°C)
	Nonoperating/Storage relative humidity	15% to 80%, noncondensing
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	434 BTU/hr (457.87 kJ/hr)
	AC Voltage	100-240 VAC
	Current	2/1 A
	Maximum power rating	127 W
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1	

Technical Specifications

Emissions FCC part 15 Class A; EN 55022 Class A; CISPR 22 Class A; ICES-003

Features Supported

- IEEE 802.11 a/b/g/n and .11ac access points and devices
- 40 to 200 access points and/or access devices (in increments of 10 or 40)
- MSM firmware releases prior to MSM v5.7: 1,000 simultaneous guest access users upgradable in increments of 250 per 40-AP license pack, up to a maximum of 2,000 guest access users Unlimited simultaneous users
- MSM v5.7 and later: 2,000 simultaneous guest access users with base product

Included services

- Plug-and-play AP management and WLAN management
- Guest access
- Captive portal
- PCI DSS compliance for wireless PoS traffic
- Support for Real-Time Location Services (RTLS)
- Advanced fast roaming with VoWLAN support
- Mobility Traffic Manager (MTM)
- Support for up to 64 VSC profiles
- Unified policy enforcement and network visibility
- Virtual controller (up to five MSM760 Premium Mobility controllers and 800 APs with resiliency)

Services Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

HP MSM760 Access Controller (J9421A)

I/O ports and slots	2 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	
Additional ports and slots	1 RJ-45 serial console port	
Physical characteristics	**Dimensions**	17.32(w) x 15.38(d) x 1.75(h) in (43.99 x 39.07 x 4.45 cm) (1U height)
	Weight	13.45 lb (6.1 kg)
Mounting and enclosure	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only	
Environment	**Operating temperature**	41°F to 104°F (5°C to 40°C)
	Operating relative humidity	15% to 80%, noncondensing
	Nonoperating/Storage temperature	-40°F to 149°F (-40°C to 65°C)
	Nonoperating/Storage relative humidity	15% to 80%, noncondensing
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	434 BTU/hr (457.87 kJ/hr)
	Voltage	100-240 VAC
	Current	2/1 A
	Maximum power rating	127 W

Technical Specifications

Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; IEC 60950-1; EN 60950-1
Emissions	FCC part 15 Class A; EN 55022 Class A; CISPR 22 Class A; ICES-003
Features	Supported • IEEE 802.11a/b/g/n and .11ac access points and devices • 40 to 200 access points and/or access devices (in increments of 10 or 40) • MSM firmware releases prior to MSM v5.7: 1,000 simultaneous guest access users upgradable in increments of 250 per 40-AP license pack, up to a maximum of 2,000 guest access users • MSM v5.7 and later: 2,000 simultaneous guest access users with base product • Maximum of 2,000 concurrent users are supported Included services • Plug-and-play AP management and WLAN management • Guest access • Captive portal • PCI DSS compliance for wireless PoS traffic • Support for Real-Time Location Services (RTLS) • Standard Layer 2 roaming with VoWLAN support • Support for up to 16 VSC profiles • Unified policy enforcement and network visibility
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

HP MSM775 zl Premium Controller Module (J9840A)

Physical characteristics	**Dimensions**	8.13(w) x 9.75(d) x 1.75(h) in (20.65 x 24.77 x 4.45 cm)
	Weight	2.65 lb (1.2 kg)
Mounting and enclosure	Can be installed in any of the following chassis: HP5406R zl2 (J9821A), HP5412R zl2 (J9822A), HP 5406 zl (J8697A), 5412 zl (J8698A), HP 8206 zl (J9640A),and 8212 zl (J8715A).	
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing
	Altitude	up to 10,000 ft (3 km)
	Notes	Non-operating/Storage Altitude up to 15,000 ft (4.6 km) The SSD has a maximum operational wet bulb temperature of 35°C (95°F) and a maximum non-operational wet bulb temperature of 40°C (104°F)
Electrical characteristics	**Maximum heat dissipation**	188 BTU/hr (198.34 kJ/hr)
	Maximum power rating	55 W
	Idle power	30 W
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1	
Emissions	FCC part 15 Class A; EN 55022 Class A; CISPR 22 Class A; ICES-003	

Technical Specifications

Features

Included services:

- Plug-and-play AP management and WLAN management
- Guest access (up to 2000 concurrent guest access user sessions are supported)
- Captive portal
- PCI DSS compliance for wireless PoS traffic
- Support for Real-Time Location Services (RTLS)
- Advanced fast roaming with VoWLAN support
- Mobility Traffic Manager (MTM)
- Support for up to 64 VSC profiles
- Unified policy enforcement and network visibility
- Virtual controller (up to five MSM775 zl controllers and 800 APs with resiliency)
- The MSM775 zl module has a 2000 concurrent user limit. When controllers are teamed the limit remains 2000 concurrent users regardless of the number of controllers in the team.

The MSM775 zl module provides a module reset switch on the front panel. Refer to the user documentation for more detail.

The MSM775 zl module has a USB port on the front panel. Use of this port is not supported.

Notes

- Not all services are supported with the Virtual Controller feature. Please refer to the user documentation for more detail.
- MSM775 zl modules can only be teamed with other MSM775 zl modules.
- Chassis Configuration Guidelines:
  - Up to six MSM775 modules can be installed in an HP 5406 zl, HP 5412 zl, HP 8206 zl or HP 8212 zl, chassis if no other service modules are installed.
  - Note that the maximum number of service modules in a chassis is 6. So if other service modules are installed in the same chassis, the total number of MSM775 zl modules than can be inserted in a chassis is reduced such that the total number of all service modules in a chassis does not exceed 6.
  - There are no restrictions on what slots the MSM775 zl modules are inserted into.
  - Maximum chassis operating temperature specifications of the HP 5400 zl chassis when the MSM775 zl module is installed is 45°C. Note that the maximum temperature of the chassis is determined by the module with the lowest operating temperature.
  - The maximum HP 8200 zl chassis operating temperature specification (45°C) does not change when a MSM775 zl module is installed.
  - Note that installation of the MSM775 does not increase or decrease documented chassis limits for other service modules.

Services

Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

Standards and protocols (applies to all products in series)

Device management

RFC 1155 Structure and Mgmt Information (SMIv1)
RFC 1157 SNMPv1/v2c
RFC 1305 NTPv3
RFC 1591 DNS (client)
RFC 1901 (Community based SNMPv2)
RFC 2030 SNTP
RFC 2578-2580 SMIv2
RFC 2580 (SMIv2 Conformance)
RFC 2616 HTTP
RFC 3410 (Management Framework)
RFC 3416 (SNMP Protocol Operations v2)

Technical Specifications

RFC 3417 (SNMP Transport Mappings)

General protocols
IEEE 802.11i Wireless Security
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1X PAE
IEEE 802.3ab 1000BASE-T Gigabit Ethernet over twisted pair (10/100/1000 models only)
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 1122 Host Requirements
RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
RFC 1305 NTPv3 (IPv4 only)
RFC 1519 CIDR
RFC 1542 BOOTP
RFC 2131 DHCP
RFC 3176 sFlow
RFC 4446 IANA Allocations for Pseudowire Edge to Edge Emulation (PWE3)

MIBs
RFC 1156 (TCP/IP MIB)
RFC 1157 A Simple Network Management Protocol (SNMP)
RFC 1212 Concise MIB Definitions
RFC 1213 MIB II
RFC 2578 Structure of Management Information Version 2 (SMIv2)
RFC 2863 The Interfaces Group MIB

Network management
IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
IEEE 802.1D (STP)
RFC 1155 Structure of Management Information
RFC 1157 SNMPv1
RFC 1212 Concise MIB definitions
RFC 1215 Convention for defining traps for use with the SNMP
RFC 1901 SNMPv2 Introduction
RFC 2578 SMIv2
RFC 2578 Structure of Management Information Version 2 (SMIv2)
RFC 2580 Conformance Statements for SMIv2
RFC 3164 BSD syslog Protocol
RFC 3410 Introduction to Version 3 of the Internet-standard Network Management Framework
RFC 3411 SNMP Management Frameworks
RFC 3412 SNMPv3 Message Processing
RFC 3413 Simple Network Management Protocol (SNMP) Applications
RFC 3414 SNMPv3 User-based Security Model (USM)
RFC 3415 SNMPv3 View-based Access Control Model VACM)
RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
RFC 3584 Coexistence between Version 1 and Version 2 of the Internet-standard Network
SNMPv1/v2c/v3

Security
RFC 1321 The MD5 Message-Digest Algorithm

Technical Specifications

RFC 1851 ESP Triple DES Transform
RFC 2104 Keyed-Hashing for Message Authentication
RFC 2246 Transport Layer Security (TLS)
RFC 2401 Security Architecture for the Internet Protocol
RFC 2408 Internet Security Association and Key Management Protocol (ISAKMP)
RFC 2409 The Internet Key Exchange (IKE)
RFC 2548 Microsoft Vendor-specific RADIUS Attributes
RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2865 RADIUS Authentication
RFC 2866 RADIUS Accounting
RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
RFC 3580 IEEE 802.1X RADIUS Guidelines
RFC 3686 Using AES Counter Mode with IPsec ESP
AES: CCM, CCMP
SSL and TLS: RC4 128-bit and RSA 1024- and 2048-bit
Web Authentication
WPA (Wi-Fi Protected Access)
WPA (Wi-Fi Protected Access)/WPA2

IPSec
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 2406 IP Encapsulating Security Payload
RFC 2407 - Domain of interpretation
RFC 2451 The ESP CBC-Mode Cipher Algorithms
RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPSec

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 2865 - Remote Authentication Dial In User Service (RADIUS)
RFC 3748 - Extensible Authentication Protocol (EAP)

PKI
RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile

Accessories

HP MSM Controller Series accessories

HP MSM720 Premium Mobility Controller (WW) (J9694A)	HP X122 1G SFP LC BX-D Transceiver	J9142B
	HP X122 1G SFP LC BX-U Transceiver	J9143B
	HP MSM Additional 10 Access Point E-LTU	J9697AAE
HP MSM720 Access Controller (WW) (J9693A)	HP X122 1G SFP LC BX-D Transceiver	J9142B
	HP X122 1G SFP LC BX-U Transceiver	J9143B
	HP MSM Additional 10 Access Point E-LTU	J9697AAE
	HP MSM720 Premium Electronic License to Use	J9698AAE
HP MSM760 Premium Mobility Controller (J9420A)	HP MSM Additional 40 Access Point E-LTU	J9371AAE
	HP MSM Additional 10 Access Point E-LTU	J9697AAE
HP MSM760 Access Controller (J9421A)	HP MSM Additional 10 Access Point E-LTU	J9697AAE
	HP MSM Additional 40 Access Point E-LTU	J9371AAE
	HP MSM760 Premium E-LTU	J9491AAE
HP MSM775 zl Premium Controller Module (J9840A)	HP MSM Additional 10 Access Point E-LTU	J9697AAE
	HP MSM Additional 40 Access Point E-LTU	J9371AAE

Accessory Product Details

HPE X121 1G SFP LC SX Transceiver (J4858C) A small form-factor pluggable (SFP) Gigabit SX transceiver that provides a full-duplex Gigabit solution up to 550 m on multimode fiber.	**Ports**	1 LC 1000BASE-SX port; Duplex: full only
	Physical characteristics	Dimensions: 2.24(d) x 0.54(w) x 0.48(h) in. (5.69 x 1.37 x 1.22 cm) Weight: 0.04 lb. (0.02 kg) Transceiver form factor: SFP
	Environment	Operating temperature: 32°F to 158°F (0°C to 70°C) Operating relative humidity: 5% to 85%, noncondensing Nonoperating/Storage temperature: -40°F to 203°F (-40°C to 85°C) Altitude: up to 10,000 ft. (3 km)
	Electrical characteristics	Power consumption typical: 0.4 W Power consumption maximum: 0.7 W
	Cabling	Type: • 62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively; Maximum distance: • 2-220 m (62.5 µm core diameter, 160 MHz*km bandwidth • 2-275 m (62.5 µm core diameter, 200 MHz*km bandwidth • 2-500 m (50 µm core diameter, 400 MHz*km bandwidth) • 2-550 m (50 µm core diameter, 500 MHz*km bandwidth) Cable length: 2-550m Fiber type: Multi Mode
	Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.
HPE X121 1G SFP LC LX Transceiver (J4859C) HP X121 1G SFP LC LX Transceiver: An SFP format gigabit transceiver with LC connectors using LX technology.	**Ports**	1 LC 1000BASE-LX port (IEEE 802.3z Type 1000BASE-LX); Duplex: full only
	Physical characteristics	Dimensions: 2.24(d) x 0.54(w) x 0.486(h) in. (5.69 x 1.37 x 1.23 cm) Weight:0.04 lb. (0.02 kg)
	Environment	Operating temperature: 32°F to 158°F (0°C to 70°C) Operating relative humidity: 0% to 85%, noncondensing Nonoperating/Storage temperature: -40°F to 212°F (-40°C to 100°C) Altitude: up to 10,000 ft. (3 km)
	Cabling	Type: • Either single mode or multimode; 62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively; Low metal content, single-mode fiber-optic, complying with ITU-T G.652 and ISO/IEC 793-2 Type B1; Maximum distance: • 2-550 m (multimode 62.5 µm core diameter, 500 MHz*km

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		bandwidth) • 2-550 m (multimode 50 µm core diameter, 400 MHz*km bandwidth) • 2-550 m (multimode 50 µm core diameter, 500 MHz*km bandwidth) • 2-10,000 m (single-mode fiber)
	Notes	A mode conditioning patch cord may be needed in some multimode fiber installations. Wavelength: 1310nm Power Consumption: < 500mW Typical
	Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.
HPE X121 1G SFP LC LH Transceiver (J4860C) A small form-factor pluggable (SFP) Gigabit LH transceiver that provides a full-duplex Gigabit solution up to 70 km on single-mode fiber.	**Ports**	1 LC 1000BASE-LH port (no IEEE standard exists for 1550 nm optics); Duplex: full only
	Physical characteristics	Dimensions: 2.17(d) x 0.60(w) x 0.46(h) in. (5.5 x 1.53 x 1.18 cm) Weight: 0.04 lb. (0.02 kg)
	Environment	Operating temperature: -40°F to 185°F (-40°C to 85°C) Operating relative humidity: 0% to 95% @ 77°F (25°C), noncondensing Nonoperating/Storage temperature: -40°F to 185°F (-40°C to 85°C) Altitude: up to 10,000 ft. (3 km)
	Cabling	Cable type: • Low metal content, single-mode fiber-optic, complying with ITU-T G.652 and ISO/IEC 793-2 Type B1; Maximum distance: • 10-70,000 m (single-mode fiber)
	Notes	Power consumption is 0.8 watts typical with 1 watt maximum at 100% utilization. For distances less than 20 km, a 10 dB attenuator must be used. For distances between 20 km and 40 km, a 5 dB attenuator must be used. Attenuators can be purchased from most cable vendors.
	Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.
HPE X111 100M SFP LC FX Transceiver (J9054C)	**Ports**	1 LC 100BASE-FX port (IEEE 802.3u Type 100BASE-FX); Duplex: half or full
	Physical characteristics	**Dimensions**: 2.7(d) x 0.54(w) x 0.48(h) in. (6.86 x 1.38 x 1.22 cm) **Weight**: 0.06 lb. (0.03 kg)
	Environment	**Operating temperature**: 32°F to 158°F (0°C to 70°C) **Operating relative humidity**: 5% to 95%

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		Nonoperating/Storage temperature	-40°F to 185°F (-40°C to 85°C)
		Nonoperating/Storage relative humidity	5% to 85%
		Altitude	up to 10,000 ft. (3 km)
	Cabling		Cable type: 62.5/125 ìm or 50/125 ìm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively; Maximum distance: • 2 km (full duplex) or 412 m (half duplex)
	Notes		Transmitter wavelength: 1310nm Power consumption is 1.1 watt maximum. For supported platforms and minimum software requirements to support this product, see the document titled "Support for the J9054C 100-FX SFP-LC Transceiver" on the "ProCurve Mini-GBICs and SFPs" Manuals Web page.
	Services		Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

HP X112 100M SFP LC BX-D Transceiver (J9099B) A small form-factor pluggable (SFP) 100-Megabit BX (bi-directional) "downstream" transceiver that provides 100 Mbps full-duplex connectivity up to 10 km on one strand of singlemode fiber. The J9099B connects to the J9100B "upstream" transceiver, or to any IEEE-standard 100BASE-BX10-U ("upstream") device.	**Ports**		1 LC 100BASE-BX10 port (IEEE 802.3ah Type 100BASE-BX10-D); Duplex: full only
	Physical characteristics	**Dimensions**	2.7(d) x 0.55(w) x 0.48(h) in. (6.86 x 1.39 x 1.22 cm)
		Weight	0.04 lb. (0.03 kg)
	Environment	**Operating temperature**	32ºF to 158ºF (0ºC to 70ºC)
		Operating relative humidity	0% to 95%, noncondensing
		Nonoperating/Storage temperature	-40ºF to 185ºF (-40ºC to 85ºC)
	Cabling		Type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 0.5-10,000 m (single-mode fiber)
	Notes		Transmit wavelength: 1550 nm. Receive wavelength: 1310 nm. Power consumption is 1.1 watt maximum. For supported platforms and minimum software requirements to support this product, see the document titled "Support for the HP BX Transceivers" on the "HP Mini-GBICs and SFPs" Manuals Web page. The J9099B connects to the J9100B "upstream" transceiver, or to any IEEE-standard 100BASE-BX10-U ("upstream") device. (A 100-BX-D transceiver can only connect to a 100-BX-U product. You cannot connect two 100-BX-D transceivers together.)
	Services		Refer to the Hewlett Packard Enterprise website at

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		http://www.hpe.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 Hewlett Packard Enterprise sales office.	
HP X112 100M SFP LC BX-U Transceiver (J9100B) A small form-factor pluggable (SFP) 100-Megabit BX (bi-directional) "upstream" transceiver that provides 100 Mbps full-duplex connectivity up to 10 km on one strand of singlemode fiber. The J9100B connects to the J9099B "downstream" transceiver, or to any IEEE-standard 100BASE-BX10-D ("downstream") device.	**Ports**	1 LC 100BASE-BX10 port (IEEE 802.3ah Type 100BASE-BX10-U); Duplex: full only	
	Physical characteristics	**Dimensions**	2.7(d) x 0.55(w) x 0.48(h) in. (6.86 x 1.39 x 1.22 cm)
		Weight	0.07 lb. (.03 kg)
	Environment	**Operating temperature**	32ºF to 158ºF (0ºC to 70ºC)
		Operating relative humidity	0% to 95%, noncondensing
		Nonoperating/Storage temperature	-40ºF to 185ºF (-40ºC to 85ºC)
	Cabling	Type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 0.5-10,000 m (single-mode fiber)	
	Notes	For supported platforms and minimum software requirements to support this product, see the document titled "Support for the HP BX Transceivers" on the "HP Mini-GBICs and SFPs" Manuals Web page. The J9100B connects to the J9099B "downstream" transceiver, or to any IEEE-standard 100BASE-BX10- D ("downstream") device. (A 100-BX-U transceiver can only connect to a 100-BX-D product. You cannot connect two 100-BX-U transceivers together.) Transmit wavelength: 1310 nm. Receive wavelength: 1550 nm. Power consumption is 1.1 watts maximum.	
	Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.	
HP X122 1G SFP LC BX-D Transceiver (J9142B) A small form-factor pluggable (SFP) Gigabit-BX (bi-directional) "downstream" transceiver that provides a full-duplex Gigabit solution up to 10 km on one strand of single-mode fiber. The J9142B connects to the J9143B "upstream"	**Ports**	1 LC 1000BASE-BX10 port (IEEE 802.3ah Type 1000BASE-BX10-D); Duplex: full only	
	Physical characteristics	**Dimensions**	2.19(d) x 0.54(w) x 0.46(h) in. (5.57 x 1.37 x 1.18 cm)
		Weight	0.04 lb. (0.02 kg)
	Environment	**Operating temperature**	32ºF to 158ºF (0ºC to 70ºC)
		Operating relative humidity	0% to 95%, non-condensing
		Non-operating/ Storage temperature	–40ºF to 185ºF –40ºC to 85ºC)
	Cabling	Type:	

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transceiver, or to any IEEE-standard 1000BASE-BX10-U ("upstream") device.			Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 0.5-10,000 m (single-mode fiber)
	Notes		Transmit wavelength: 1490 nm. Receive wavelength: 1310 nm. Power consumption is 1 watt maximum. For supported platforms and minimum software requirements to support this product, see the document titled "Support for the HP BX Transceivers" on the "HP Mini-GBICs and SFPs" Manuals Web page. The J9142B connects to the J9143B "upstream" transceiver, or to any IEEE-standard 1000BASE-BX10-U ("upstream") device. (A 1000-BX-D transceiver can only connect to a 1000-BX-U product. You cannot connect two 1000-BX-D transceivers together.)
	Services		Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.
HP X122 1G SFP LC BX-U Transceiver (J9143B) A small form-factor pluggable (SFP) Gigabit-BX (bi-directional) "upstream" transceiver that provides a full-duplex Gigabit solution up to 10 km on one strand of single-mode fiber. The J9143B connects to the J9142B "downstream" transceiver, or to any IEEE-standard 1000BASE-BX10-D ("downstream") device.	**Ports**		1 LC 1000BASE-BX10 port (IEEE 802.3ah Type 1000BASE-BX10-U); Duplex: full only
	Physical characteristics	**Dimensions**	2.19(d) x 0.54(w) x 0.46(h) in. (5.57 x 1.37 x 1.18 cm)
		Weight	0.04 lb. (0.02 kg)
	Environment	**Operating temperature**	32ºF to 158ºF (0ºC to 70ºC)
		Operating relative humidity	0% to 95%, non-condensing
		Non-operating/ Storage temperature	–40ºF to 185ºF –40ºC to 85ºC)
	Cabling		Type: Single-mode fiber optic, complying with ITU-T G.652; Maximum distance: • 0.5-10,000 m (single-mode fiber)
	Notes		Transmit wavelength: 1310 nm. Receive wavelength: 1490 nm. For supported platforms and minimum software requirements to support this product, see the document titled "Support for the HP BX Transceivers" on the "HP Mini-GBICs and SFPs" Manuals Web page. The J9143B connects to the J9142B "downstream" transceiver, or to any IEEE-standard 1000BASE-BX10-D ("downstream") device. (A 1000-BX-U transceiver can only connect to a 1000-BX-D product. You cannot connect two 1000-BX-U transceivers together.) Power consumption is 1 watt maximum.
	Services		Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard

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		Enterprise sales office.	
HP 1-port Power Injector (J9407B)	**Physical characteristics**	**Dimensions**	5.71(d) x 2.36(w) x 1.22(h) in. (14.5 x 6 x 3.1 cm)
		Weight	1 lb. (0.45 kg)
	Environment	**Operating temperature**	32°F to 104°F (0°C to 40°C)
		Operating relative humidity	5% to 93%, noncondensing
		Nonoperating/Storage temperature	-4°F to 158°F (-20°C to 70°C)
		Nonoperating/Storage relative humidity	5% to 95%, noncondensing
		Altitude	up to 10,000 ft. (3 km)
	Electrical characteristics	**Voltage**	100-240 VAC
		Current	0.3/0.2 A
		Frequency	50/60 Hz
		Notes	IEEE 802.3af compliant
	Safety	UL 60950; EN 60950	
	Emissions	EN 55024; EN 55022 (CISPR 22) Class B with FTP Cabling; FCC Part 15, Class B with FTP cabling	
	Notes	The 1-port power converter has 1 AC power cord input, 1 RJ-45 10/100/1000 Mbps port for data coming from the network infrastructure, and 1 RJ-45 for data plus IEEE 802.3af-compliant PoE for Gigabit Ethernet to power the access point.	
	Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.	
HPE X121 1G SFP RJ45 T Transceiver (J8177C) HP X121 1G SFP RJ45 T Transceiver: An SFP format gigabit transceiver with RJ45 connectors using 1000BaseT technology.	**Ports**	1 RJ-45 1000BASE-T port (IEEE 802.3ab Type 1000BASE-T); Duplex: full only	
	Physical characteristics	Dimensions: 2.71(d) x 0.54(w) x 0.55(h) in. (6.88 x 1.37 x 1.4 cm) Weight: 0.06 lb. (0.03 kg)	
	Environment	Operating temperature: 32°F to 158°F (0°C to 70°C); with 100 LFM airflow over the SFP module) Operating relative humidity: 0% to 95% @ 75°F (25°C), noncondensing Nonoperating/Storage temperature: -40°F to 185°F (-40°C to 85°C) Nonoperating/Storage relative humidity: 0% to 95% @ 77°F (25°C), noncondensing Altitude: up to 10,000 ft. (3000 km)	
	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: • 100 m	
	Notes	Power consumption is nominally 1 watt. For supported platforms and minimum software requirements to support this product, see the document titled "Support for the J8177C 1000Base-T	

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	Mini-GBIC" on the "ProCurve Mini-GBICs and SFPs" Manuals Web page. The J8177C Gigabit copper mini-GBIC is not supported on dual-personality ports. The J8177C is capable of 100 Mb operation. This is supported on only the HPE ProCurve Switch 8200zl, 5400zl, and 6200yl Series using software version K.12.21 or later. Use the "auto-100" port setting to enable 100 Mb operation. Important: The earlier J8177B does not support 100 Mb operation. When used in the ProCurve Switch gl 20-Port 10/100/1000 Module (J4908A), the J8177C mini-GBIC can be installed in either the upper or lower mini-GBIC port, but will block access to the other port.
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.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 Hewlett Packard Enterprise sales office.

Summary of Changes

Date	Version History	Action	Description of Change
01-Aug-2016	From Version 23 to 24	Changed	Adding #AC3 Option on Configuration section
22-Jan-2016	From Version 22 to 23	Changed	Edits made on Overview and Technical Specifications
01-Dec-2015	From Version 21 to 22	Changed	Overview and Technical Specifications updated
01-Dec-2014	From Version 20 to 21	Changed	Content QS edits, feature updates and warranty changes
		Removed	Removed MSM765zl, removed TAA sku options, added .11ac AP support, removed paper licenses, updated E-licenses, removed MSM710 mounting kit
23-May-2014	From Version 19 to 20	Changed	Content QS edits
20-Dec-2013	From Version 16 to 17	Changed	External Power Supplies were revised.
09-Dec-2013	From Version 15 to 16	Changed	Updates made to the Configuration section.
22-Apr-2013	From Version 14 to 15	Added	Overview: Added Images
25-Mar-2013	From Version 13 to 14	Added	Overview: Added Build to Order section to the Featrues and benefits section.
		Removed	Overview: Removed entire Models section.
22-Dec-2011	From Version 12 to 13	Changed	Updated the warranty statements in Features and Benefits.
16-Nov-2011	From Version 10 to 12	Changed	The QuickSpecs was rewritten, including changing the title.
18-Jul-2011	From Version 9 to 10	Changed	Accessories were revised.
08-Oct-2010	From Version 8 to 9	Changed	The QuickSpecs was rewritten, including changing the title.
02-Jun-2010	From Version 7 to 8	Changed	Updated the Introduction and Key Features.
25-Mar-2010	From Version 6 to 7	Changed	Updated the Introduction and Key Features.
10-Jan-2010	From Version 5 to 6	Changed	Updated the Introduction, Key Features, and Features and Benefits sections.
21-Oct-2009	From Version 3 to 4	Changed	Updated the Introduction and Key Features sections.
10-Aug-2009	From Version 2 to 3	Removed	Removed several models throughout the document.
01-Jun-2009	From Version 1 to 2	Added	Added several new modules throughout the document.

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