



# HP 5400 zl Switch Series



## Key features

- Advanced access layer, distribution, and core
- Integrated L2 to L4 intelligent edge feature set
- Enterprise-class performance and security
- HP AllianceOne integrated
- Scalable 10/100/1000 and 10GbE connectivity

## Product overview

The HP 5400 zl Switch Series consists of advanced intelligent switches in the HP modular chassis product line, which includes 6-slot and 12-slot chassis and associated zl modules and bundles. The foundation for the switch series is a purpose-built, programmable ProVision ASIC that allows the most demanding networking features, such as Quality of Service (QoS) and security, to be implemented in a scalable yet granular fashion. With 10/100, Gigabit Ethernet, and 10 Gigabit Ethernet interfaces; choice of PoE+ and non-PoE; integrated Layer 3 features; and HP AllianceOne solutions, the 5400 zl switch series offers excellent investment protection, flexibility, and scalability, as well as ease of deployment, operation, and maintenance.

## Features and benefits

### Software-defined networking

- **NEW OpenFlow**  
is a key technology that enables software-defined networking by allowing the separation of data (packet forwarding) and control (routing decision) paths

### Quality of Service (QoS)

- **Advanced classifier-based QoS**  
classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- **Layer 4 prioritization**  
enables prioritization based on TCP/UDP port numbers
- **Traffic prioritization**  
allows real-time traffic classification into eight priority levels mapped to eight queues
- **Bandwidth shaping**
  - **Port-based rate limiting**  
provides per-port ingress-/egress-enforced increased bandwidth
  - **Classifier-based rate limiting**  
uses an access control list (ACL) to enforce increased bandwidth for ingress traffic on each port
  - **Reduced bandwidth**  
provides per-port, per-queue egress-based reduced bandwidth
- **Class of Service (CoS)**  
sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ

### Management

- **Remote intelligent mirroring**  
mirrors selected ingress/egress traffic based on ACL, port, MAC address, or VLAN to a local or remote HP 8200 zl, 6600, 6200 yl, 5400 zl, or 3500 Switch located anywhere on the network
- **RMON, XRMON, and sFlow v5**  
provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- **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
- **Uni-Directional Link Detection (UDLD)**  
monitors a cable between two switches and shuts down the ports on both ends if the cable is broken, turning the bidirectional link into a unidirectional one; this prevents network problems such as loops
- **Management simplicity**  
provides common software features and CLI implementation across all HP ProVision-based switches (including the zl and yl switches)

- **Command authorization**  
leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity
- **Friendly port names**  
allows assignment of descriptive names to ports
- **Dual flash images**  
provides independent primary and secondary operating system files for backup while upgrading
- **Multiple configuration files**  
stores easily to the flash image
- **NEW Comware CLI**
  - **Comware-compatible CLI**  
bridges the experience of HP Comware CLI users who are using the HP ProVision software CLI
  - **Display and fundamental Comware CLI commands**  
are embedded in the switch CLI as native commands; display output is formatted as on Comware-based switches, and fundamental commands provide a Comware-familiar initial switch setup
  - **Configuration Comware CLI commands**  
when Comware commands are entered, CLI help is elicited to formulate the correct ProVision software CLI command

### Connectivity

- **IEEE 802.3az Energy Efficient Ethernet**  
lowers power consumption in periods of low link usage (supported on v2 zl 10/100/1000 and 10/100 modules)
- **IEEE 802.3af Power over Ethernet (PoE)**  
provides up to 15.4 W per port to IEEE 802.3af-compliant PoE-powered devices such as IP phones, wireless access points, and security cameras
- **IEEE 802.3at Power over Ethernet Plus**  
provides up to 30 W per port to IEEE 802.3 for PoE- and PoE+-powered devices, such as video IP phones, IEEE 802.11n wireless access points, and advanced pan/zoom/tilt security cameras
- **Prestandard PoE support**  
detects and provides power to prestandard PoE devices; see the list of supported devices in the product FAQ at [www.hp.com/networking](http://www.hp.com/networking)
- **High-density port connectivity**  
provides up to 12 interface module slots and up to 288 wire-speed 10/100/1000 PoE-enabled ports or 96 10-GbE ports per system
- **Jumbo frames**  
on Gigabit Ethernet and 10-Gigabit Ethernet ports, jumbo frames allow high-performance remote backup and disaster-recovery services
- **Auto-MDIX**  
provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports

- **IPv6**

- **IPv6 host**  
enables switches to be managed in an IPv6 network
- **Dual stack (IPv4 and IPv6)**  
transitions from IPv4 to IPv6, supporting connectivity for both protocols
- **MLD snooping**  
forwards IPv6 multicast traffic to the appropriate interface
- **IPv6 ACL/QoS**  
supports ACL and QoS for IPv6 network traffic
- **IPv6 routing**  
supports static and OSPFv3 routing protocols
- **6in4 tunneling**  
supports encapsulation of IPv6 traffic in IPv4 packets

## Performance

- **High-speed, high-capacity architecture**  
1 Tbps crossbar switching fabric provides intra-module and inter-module switching with 585.6 million pps throughput on the purpose-built ProVision ASICs
- **Selectable queue configurations**  
allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications

## Resiliency and high availability

- **Virtual Router Redundancy Protocol**  
allows groups of two routers to dynamically back each other up to create highly available routed environments
- **IEEE 802.1s Multiple Spanning Tree Protocol**  
provides high link availability in multiple VLAN environments by allowing multiple spanning trees; encompasses IEEE 802.1D Spanning Tree Protocol and IEEE 802.1w Rapid Spanning Tree Protocol
- **IEEE 802.3ad Link Aggregation Control Protocol (LACP) and HP port trunking**  
support up to 144 trunks, each with up to eight links (ports) per trunk
- **Distributed trunking**  
enables loop-free and redundant network topology without using Spanning Tree Protocol; allows a server or switch to connect to two switches using one logical trunk for redundancy and load sharing
- **Optional redundant power supply (HP 5400 series)**  
provides uninterrupted power and allows hot-swapping of the redundant power supplies when installed
- **Hot-swappable modules (5400 zl series)**  
permits modules, mini-GBICs, and power supplies in a redundant power supply configuration to be added or swapped without interrupting the network
- **Sparing simplicity**  
HP zl-common accessories (interface modules and power supplies)

- **Uplink Failure Detection**

provides active-standby network path redundancy for servers that are configured for active-standby NIC teaming

## Layer 2 switching

- **VLAN support and tagging**  
supports the IEEE 802.1Q standard and 2,048 VLANs simultaneously
- **IEEE 802.1v protocol VLANs**  
isolate select non-IPv4 protocols automatically into their own VLANs
- **GARP VLAN Registration Protocol**  
allows automatic learning and dynamic assignment of VLANs
- **IEEE 802.1ad Q-in-Q**  
increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network
- **MAC-based VLAN**  
provides granular control and security; uses RADIUS to map a MAC address/user to specific VLANs (requires v2 modules)
- **Rapid Per-VLAN Spanning Tree (RPVST+)**  
allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+
- **HP switch meshing**  
dynamically load balances across multiple active redundant links to increase available aggregate bandwidth; allows concurrent Layer 3 routing with v2 modules

## Layer 3 services

- **User Datagram Protocol (UDP) helper function**  
allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP
- **Loopback interface address**  
defines an address in Routing Information Protocol (RIP) and Open Standard Path First (OSPF), improving diagnostic capability
- **Route maps**  
provide more control during route redistribution; allow filtering and altering of route metrics

## Layer 3 routing

- **Static IP routing**  
provides manually configured routing for both IPv4 and IPv6 networks
- **Routing Information Protocol (RIP)**  
provides RIPv1 and RIPv2 routing
- **OSPF**  
provides OSPFv2 for IPv4 routing and OSPFv3 for IPv6 routing
- **Policy-based routing**  
uses a classifier to select traffic that can be forwarded based on policy set by the network administrator (requires v2 modules)

- **Border Gateway Protocol (BGP)**  
provides IPv4 Border Gateway Protocol routing, which is scalable, robust, and flexible

## Security

- **Access control lists (ACLs)**  
provide filtering based on the IP field, source/destination IP address/subnet, and source/destination TCP/UDP port number on a per-VLAN or per-port basis
- **Multiple user authentication methods**
  - **IEEE 802.1X users per port**  
provides authentication of multiple IEEE 802.1X users per port
  - **Web-based authentication**  
authenticates from a Web browser for clients that do not support IEEE 802.1X supplicant
  - **MAC-based authentication**  
client is authenticated with the RADIUS server based on the client's MAC address
  - **Concurrent IEEE 802.1X, Web, and MAC authentication schemes per port**  
switch port accepts up to 32 sessions of IEEE 802.1X, Web, and MAC authentications
- **Virus throttling**  
detects traffic patterns typical of worm-type viruses and either throttles or entirely prevents the virus from spreading across the routed VLANs or bridged interfaces without requiring external appliances
- **DHCP protection**  
blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- **Secure management access**  
delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2, SSL, and/or SNMPv3
- **USB Secure Autorun (requires HP PCM+)**  
deploys, diagnoses, and updates a switch using a USB flash drive; works with a secure credential to prevent tampering
- **Switch CPU protection**  
provides automatic protection against malicious network traffic trying to shut down the switch
- **ICMP throttling**  
defeats ICMP denial-of-service attacks by enabling any switch port to automatically throttle ICMP traffic
- **Identity-driven ACL**  
enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- **STP BPDU port protection**  
blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- **Dynamic IP lockdown**  
works with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing
- **Dynamic ARP protection**  
blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- **STP root guard**  
protects the root bridge from malicious attacks or configuration mistakes
- **Detection of malicious attacks**  
monitors 10 types of network traffic and sends a warning when an anomaly that potentially can be caused by malicious attacks is detected
- **Port security**  
allows access only to specified MAC addresses, which can be learned or specified by the administrator
- **MAC address lockout**  
prevents particular configured MAC addresses from connecting to the network
- **Source-port filtering**  
allows only specified ports to communicate with each other
- **RADIUS/TACACS+**  
eases switch management security administration by using a password authentication server
- **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
- **Secure FTP**  
allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- **Management Interface Wizard**  
helps secure management interfaces such as SNMP, telnet, SSH, SSL, Web, and USB at the desired level
- **Switch management logon security**  
helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- **Security banner**  
displays a customized security policy when users log in to the switch

## Convergence

- **IP multicast routing**  
includes PIM Sparse and Dense modes to route IP multicast traffic
- **IP multicast snooping (data-driven IGMP)**  
prevents flooding of IP multicast traffic

- **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
- **PoE allocations**  
supports multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user-specified) to allocate PoE power for more efficient energy savings
- **Auto VLAN configuration for voice**
  - **RADIUS VLAN**  
uses a standard RADIUS attribute and LLDP-MED to automatically configure a VLAN for IP phones
  - **CDPv2**  
uses CDPv2 to configure legacy IP phones
  - **RADIUS VLAN**  
uses a standard RADIUS attribute and LLDP-MED to automatically configure a VLAN for IP phones
  - **CDPv2**  
uses CDPv2 to configure legacy IP phones

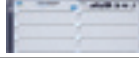
## Warranty and support

- **Lifetime warranty**  
advance hardware replacement for as long as you own the product with next-business-day delivery (available in most countries)†
- **Electronic and telephone support**  
limited electronic and business-hours telephone support is available from HP for the entire warranty period; to reach our support centers, refer to **[www.hp.com/networking/contact-support](http://www.hp.com/networking/contact-support)**; for details on the duration of support provided with your product purchase, refer to **[www.hp.com/networking/warrantysummary](http://www.hp.com/networking/warrantysummary)**
- **Software releases**  
to find software for your product, refer to **[www.hp.com/networking/support](http://www.hp.com/networking/support)**; for details on the software releases available with your product purchase, refer to **[www.hp.com/networking/warrantysummary](http://www.hp.com/networking/warrantysummary)**

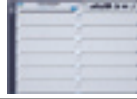
†HP warranty includes repair or replacement of hardware for as long as you own the product, with next business day advance replacement (available in most countries). The disk drive included with HP AllianceOne Advanced Services and Services z1 Modules, HP Threat Management Services z1 Module, HP AllianceOne Extended z1 Module with Riverbed Steelhead, HP MSM765z1 Mobility Controller and HP Survivable Branch Communication z1 Module powered by Microsoft Lync has a five-year hardware warranty. For details, refer to the Software license and hardware warranty statements at **[www.hp.com/networking/warranty](http://www.hp.com/networking/warranty)**.

# HP 5400 zL Switch Series

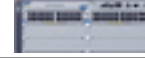
## Specifications



HP 5406 zL Switch with Premium Software (J9642A)



HP 5412 zL Switch with Premium Software (J9643A)



HP 5406-44G-PoE+-2XG v2 zL Switch with Premium Software (J9533A)

### Included accessories

1 HP 20-port Gig-T PoE+ / 2-port 10GbE SFP+ v2 zL Module (J9536A)  
1 HP 1500W PoE+ zL Power Supply (J9306A)  
1 HP 24-port Gig-T PoE+ v2 zL Module (J9534A)

### Ports

6 open module slots  
  
Supports a maximum of 48 10GbE ports or 144 autosensing 10/100/1000 ports or 144 mini-GBICs, or a combination

12 open module slots  
  
Supports a maximum of 96 10GbE ports or 288 autosensing 10/100/1000 ports or 288 mini-GBICs, or a combination

44 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only

2 open 10GbE SFP+ transceiver slots

4 open module slots

Supports a maximum of 34 10GbE ports or 140 autosensing 10/100/1000 ports or 98 mini-GBICs, or a combination

### Power supplies

2 power supply slots  
1 minimum power supply required (ordered separately)

4 power supply slots  
2 minimum power supplies required (ordered separately)

2 power supply slots  
1 minimum power supply required  
includes: 1 x J9306A (HP 1500W PoE+ zL Power Supply)

### Physical characteristics

Weight 17.5(w) x 17.75(d) x 6.9(h) in (44.45 x 45.09 x 17.53 cm) (4U height)  
23.55 lb (10.68 kg)

17.5(w) x 17.75(d) x 12.1(h) in (44.45 x 45.09 x 30.73 cm) (7U height)  
34.94 lb (15.85 kg)

17.5(w) x 17.75(d) x 6.9(h) in (44.45 x 45.09 x 17.53 cm) (4U height)  
46.08 lb (20.9 kg)

### Memory and processor

Gigabit module ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM  
  
10G module ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM  
  
Management module Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM

ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM  
  
ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM  
  
Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM

ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM  
  
ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM  
  
Freescale PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM

### Mounting

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only

### Performance

1000 Mb Latency < 3.7 µs (FIFO 64-byte packets)  
10 Gb/s Latency < 2.1 µs (FIFO 64-byte packets)  
Throughput up to 282.1 Mpps  
Routing/Switching capacity 379.2 Gb/s  
Switch fabric speed 379.2 Gb/s  
Routing table size 10000 entries (IPv4), 5000 entries (IPv6)  
MAC address table size 64000 entries

< 3.7 µs (FIFO 64-byte packets)  
< 2.1 µs (FIFO 64-byte packets)  
up to 564.2 Mpps  
758.4 Gb/s  
758.4 Gb/s  
10000 entries (IPv4), 5000 entries (IPv6)  
64000 entries

< 3.7 µs (FIFO 64-byte packets)  
< 2.1 µs (FIFO 64-byte packets)  
up to 282.1 Mpps  
379.2 Gb/s  
379.2 Gb/s  
10000 entries (IPv4), 5000 entries (IPv6)  
64000 entries

### Environment

Operating temperature 32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed  
Operating relative humidity 15% to 95% @ 131°F (55°C), noncondensing  
Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C)  
Nonoperating/Storage relative humidity 15% to 95% @ 149°F (65°C), noncondensing  
Altitude up to 10,000 ft (3 km)  
Acoustic Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296

32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed  
15% to 95% @ 131°F (55°C), noncondensing  
-40°F to 158°F (-40°C to 70°C)  
15% to 95% @ 149°F (65°C), noncondensing  
up to 10,000 ft (3 km)  
Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296

32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed  
15% to 95% @ 131°F (55°C), noncondensing  
-40°F to 158°F (-40°C to 70°C)  
15% to 95% @ 149°F (65°C), noncondensing  
up to 10,000 ft (3 km)  
Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296

### Electrical characteristics

Frequency 50/60 Hz  
  
Achieved Miercom Certified Green Award  
  
Description Chassis ships without power supplies. Two power supply slots are available; three different power supplies are available. See power supply products for additional specifications.  
  
Maximum heat dissipation 2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)  
  
Voltage 100-127/200-240 VAC  
  
Idle power

50/60 Hz  
  
Chassis ships without power supplies. Four power supply slots are available; three different power supplies are available. See power supply products for additional specifications.  
  
4900 BTU/hr (5169 kJ/hr), (max. non-PoE); 7400 BTU/hr (7,807 kJ/hr) (max. using PoE)  
  
100-127/200-240 VAC

50/60 Hz  
  
One J9306A product is installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.  
  
2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)  
  
110-127/200-240 VAC  
  
215 W

# HP 5400 zl Switch Series

## Specifications (continued)

	HP 5406 zl Switch with Premium Software (J9642A)	HP 5412 zl Switch with Premium Software (J9643A)	HP 5406-44G-PoE+-2XG v2 zl Switch with Premium Software (J9533A)
Notes	Power supplies must be ordered separately. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Power supplies must be ordered separately. Two power supplies are required to power the J8698A chassis. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
<b>Safety</b>	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
<b>Emissions</b>	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A
<b>Immunity</b>			
EN	EN 55024, CISPR 24	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD	IEC 61000-4-2; 4 kV CD, 8 kV AD	IEC 61000-4-2; 4 kV CD, 8 kV AD
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics	EN 61000-3-2, IEC 61000-3-2	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	EN 61000-3-3, IEC 61000-3-3
<b>Management</b>	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
<b>Notes</b>	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).
<b>Services</b>	3-year, 4-hour onsite, 13x5 coverage for hardware (UY909E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UY910E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY911E) 3-year, 24x7 SW phone support, software updates (UY912E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UW452E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UW453E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW454E) 4-year, 24x7 SW phone support, software updates (UW455E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UW473E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UW474E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW475E) 5-year, 24x7 SW phone support, software updates (UY938E) 3 Yr 6 hr Call-to-Repair Onsite (UY913E) 4 Yr 6 hr Call-to-Repair Onsite (UW456E) 5 Yr 6 hr Call-to-Repair Onsite (UY939E) 1-year, 4-hour onsite, 13x5 coverage for hardware (HR599E) 1-year, 4-hour onsite, 24x7 coverage for hardware (HR600E)	3-year, 4-hour onsite, 13x5 coverage for hardware (UY914E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UY915E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY916E) 3-year, 24x7 SW phone support, software updates (UW440E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UW457E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UW458E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW459E) 4-year, 24x7 SW phone support, software updates (UW460E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UY940E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UY917E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY918E) 5-year, 24x7 SW phone support, software updates (UY919E) 3 Yr 6 hr Call-to-Repair Onsite (UW441E) 4 Yr 6 hr Call-to-Repair Onsite (UW461E) 5 Yr 6 hr Call-to-Repair Onsite (UY920E) 1-year, 4-hour onsite, 13x5 coverage for hardware (HR604E) 1-year, 4-hour onsite, 24x7 coverage for hardware (HR605E)	3-year, 4-hour onsite, 13x5 coverage for hardware (UY909E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UY910E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY911E) 3-year, 24x7 SW phone support, software updates (UY912E) Installation with minimum configuration, system-based pricing (U4828E) Installation with HP-provided configuration, system-based pricing (U4832E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UW452E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UW453E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW454E) 4-year, 24x7 SW phone support, software updates (UW455E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UW473E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UW474E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW475E) 5-year, 24x7 SW phone support, software updates (UY938E) 3 Yr 6 hr Call-to-Repair Onsite (UY913E) 4 Yr 6 hr Call-to-Repair Onsite (UW456E) 5 Yr 6 hr Call-to-Repair Onsite (UY939E) 1-year, 4-hour onsite, 13x5 coverage for hardware (HR599E) 1-year, 4-hour onsite, 24x7 coverage for hardware (HR600E)

# HP 5400 zl Switch Series

## Specifications (continued)

HP 5406 zl Switch with Premium Software (J9642A)	HP 5412 zl Switch with Premium Software (J9643A)	HP 5406-44G-PoE+-2XG v2 zl Switch with Premium Software (J9533A)
<p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR603E)</p> <p>1-year, 24x7 software phone support, software updates (HR602E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR601E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS738E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS739E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS740E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS741E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS742E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS743E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS744E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS745E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>	<p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR608E)</p> <p>1-year, 24x7 software phone support, software updates (HR607E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR606E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS746E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS747E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS748E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS749E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS750E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS751E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS752E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS753E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>	<p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR603E)</p> <p>1-year, 24x7 software phone support, software updates (HR602E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR601E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS738E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS739E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS740E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS741E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS742E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS743E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS744E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS745E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>



# HP 5400 zl Switch Series

## Specifications (continued)



	HP 5412-92G-PoE+-2XG v2 zl Switch with Premium Software (J9532A)	HP 5406-44G-PoE+-4G-SFP v2 zl Switch with Premium Software (J9539A)
<b>Included accessories</b>	3 HP 24-port Gig-T PoE+ v2 zl Module (J9534A) 1 HP 20-port Gig-T PoE+ / 2-port 10GbE SFP+ v2 zl Module (J9536A) 2 HP 1500W PoE+ zl Power Supply (J9306A)	1 HP 24-port Gig-T PoE+ v2 zl Module (J9534A) 1 HP 20-port Gig-T PoE+ / 4-port SFP v2 zl Module (J9535A) 1 HP 1500W PoE+ zl Power Supply (J9306A)
<b>Ports</b>	92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only  2 open 10GbE SFP+ transceiver slots  8 open module slots  Supports a maximum of 66 10GbE ports or 284 autosensing 10/100/1000 ports or 194 mini-GBICs, or a combination	44 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); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only  4 open mini-GBIC slots  4 open module slots  Supports a maximum of 32 10GbE ports or 140 autosensing 10/100/1000 ports or 100 mini-GBICs, or a combination
<b>Power supplies</b>	4 power supply slots 2 minimum power supplies required includes: 2 x J9306A (HP 1500W PoE+ zl Power Supply)	2 power supply slots 1 minimum power supply required includes: 1 x J9306A (HP 1500W PoE+ zl Power Supply)
<b>Physical characteristics</b>		
Weight	17.5(w) x 17.75(d) x 12.1(h) in (44.45 x 45.09 x 30.73 cm) (7U height) 75.36 lb (34.18 kg)	17.5(w) x 17.75(d) x 6.9(h) in (44.45 x 45.09 x 17.53 cm) (4U height) 45.58 lb (20.68 kg)
<b>Memory and processor</b>		
Gigabit module	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM
10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
Management module	Freescall PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM	Freescall PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
<b>Mounting</b>	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only
<b>Performance</b>		
1000 Mb Latency	< 3.7 µs (FIFO 64-byte packets)	< 3.7 µs (FIFO 64-byte packets)
10 Gb/s Latency	< 2.1 µs (FIFO 64-byte packets)	< 2.1 µs (FIFO 64-byte packets)
Throughput	up to 564.2 Mpps	up to 282.1 Mpps
Routing/Switching capacity	758.4 Gb/s	379.2 Gb/s
Switch fabric speed	758.4 Gb/s	379.2 Gb/s
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries
<b>Environment</b>		
Operating temperature	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
Operating relative humidity	15% to 95% @ 131°F (55°C), noncondensing	15% to 95% @ 131°F (55°C), 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	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
<b>Electrical characteristics</b>		
Frequency	50/60 Hz	50/60 Hz
Description	Two J9306A products are installed. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	One J9306A product is installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
Voltage	110-127/200-240 VAC	110-127/200-240 VAC
Idle power	312 W	215 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
<b>Safety</b>	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
<b>Emissions</b>	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A
<b>Immunity</b>		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24

# HP 5400 zl Switch Series

## Specifications (continued)

	HP 5412-92G-PoE+-2XG v2 zl Switch with Premium Software (J9532A)	HP 5406-44G-PoE+-4G-SFP v2 zl Switch with Premium Software (J9539A)
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD	IEC 61000-4-2; 4 kV CD, 8 kV AD
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
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
<b>Management</b>	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
<b>Notes</b>	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).
<b>Services</b>	<p>3-year, 4-hour onsite, 13x5 coverage for hardware (UY914E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware (UY915E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY916E)</p> <p>3-year, 24x7 SW phone support, software updates (UW440E)</p> <p>Installation with minimum configuration, system-based pricing (U4828E)</p> <p>Installation with HP-provided configuration, system-based pricing (U4832E)</p> <p>4-year, 4-hour onsite, 13x5 coverage for hardware (UW457E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware (UW458E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW459E)</p> <p>4-year, 24x7 SW phone support, software updates (UW460E)</p> <p>5-year, 4-hour onsite, 13x5 coverage for hardware (UY940E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware (UY917E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY918E)</p> <p>5-year, 24x7 SW phone support, software updates (UY919E)</p> <p>3 Yr 6 hr Call-to-Repair Onsite (UW441E)</p> <p>4 Yr 6 hr Call-to-Repair Onsite (UW461E)</p> <p>5 Yr 6 hr Call-to-Repair Onsite (UY920E)</p> <p>1-year, 4-hour onsite, 13x5 coverage for hardware (HR604E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware (HR605E)</p> <p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR608E)</p> <p>1-year, 24x7 software phone support, software updates (HR607E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR606E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS746E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS747E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS748E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS749E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS750E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS751E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS752E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS753E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>	<p>3-year, 4-hour onsite, 13x5 coverage for hardware (UY909E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware (UY910E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY911E)</p> <p>3-year, 24x7 SW phone support, software updates (UY912E)</p> <p>Installation with minimum configuration, system-based pricing (U4828E)</p> <p>Installation with HP-provided configuration, system-based pricing (U4832E)</p> <p>4-year, 4-hour onsite, 13x5 coverage for hardware (UW452E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware (UW453E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW454E)</p> <p>4-year, 24x7 SW phone support, software updates (UW455E)</p> <p>5-year, 4-hour onsite, 13x5 coverage for hardware (UW473E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware (UW474E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW475E)</p> <p>5-year, 24x7 SW phone support, software updates (UY938E)</p> <p>3 Yr 6 hr Call-to-Repair Onsite (UY913E)</p> <p>4 Yr 6 hr Call-to-Repair Onsite (UW456E)</p> <p>5 Yr 6 hr Call-to-Repair Onsite (UY939E)</p> <p>1-year, 4-hour onsite, 13x5 coverage for hardware (HR599E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware (HR600E)</p> <p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR603E)</p> <p>1-year, 24x7 software phone support, software updates (HR602E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR601E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS738E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS739E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS740E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS741E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS742E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS743E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS744E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS745E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>

# HP 5400 zL Switch Series

## Specifications (continued)



	HP 5412-92G-PoE+-4G v2 zL Switch with Premium Software (J9540A)	HP 5406 8p 10GBASE-T 8p 10GbE SFP+ v2 zL Switch with Premium Software (J9866A)
<b>Included accessories</b>	3 HP 24-port Gig-T PoE+ v2 zL Module (J9534A) 1 HP 20-port Gig-T PoE+ / 4-port SFP v2 zL Module (J9535A) 2 HP 1500W PoE+ zL Power Supply (J9306A)	1 HP 8-port 10GbE SFP+ v2 zL Module (J9538A) 1 HP 1500W PoE+ zL Power Supply (J9306A) 1 HP 8-port 10GBASE-T v2 zL Module (J9546A)
<b>Ports</b>	92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only  4 open mini-GBIC slots  8 open module slots  Supports a maximum of 64 10GbE ports or 284 autosensing 10/100/1000 ports or 196 mini-GBICs, or a combination	8 RJ-45 10GbE ports (IEEE 802.3an-2006 Type 10GBASE-T)  8 open 10GbE SFP+ transceiver slots  4 open module slots  Supports a maximum of 32 10GbE ports or 96 autosensing 10/100/1000 ports or 96 mini-GBICs, or a combination
<b>Power supplies</b>	4 power supply slots 2 minimum power supplies required includes: 2 x J9306A (HP 1500W PoE+ zL Power Supply)	2 power supply slots 1 minimum power supply required includes: 1 x J9306A (HP 1500W PoE+ zL Power Supply)
<b>Physical characteristics</b>		
Weight	17.5(w) x 17.75(d) x 12.1(h) in (44.45 x 45.09 x 30.73 cm) (7U height) 74.86 lb (33.96 kg)	17.5(w) x 17.75(d) x 6.9(h) in (44.45 x 45.09 x 17.53 cm) (4U height) 46.08 lb (20.9 kg)
<b>Memory and processor</b>		
Gigabit module	ARM9 @ 200 MHz; packet buffer size: 144 Mb QDR SDRAM	
10G module	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM	ARM9 @ 200 MHz; packet buffer size: 36 Mb QDR SDRAM
Management module	Freescall PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM	Freescall PowerPC 8540 @ 666 MHz, 4 MB flash, 128 MB compact flash, 256 MB DDR SDRAM
<b>Mounting</b>	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); horizontal surface mounting only
<b>Performance</b>		
1000 Mb Latency	< 3.7 µs (FIFO 64-byte packets)	< 3.7 µs (FIFO 64-byte packets)
10 Gb/s Latency	< 2.1 µs (FIFO 64-byte packets)	< 2.1 µs (FIFO 64-byte packets)
Throughput	up to 564.2 Mpps	up to 282.1 Mpps
Routing/Switching capacity	758.4 Gb/s	379.2 Gb/s
Switch fabric speed	758.4 Gb/s	379.2 Gb/s
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries
<b>Environment</b>		
Operating temperature	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed	32°F to 131°F (0°C to 55°C); 0°C to 40°C with J8706A or J8707A modules installed
Operating relative humidity	15% to 95% @ 131°F (55°C), noncondensing	15% to 95% @ 131°F (55°C), 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	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 64 dB, Pressure: 57.5 dB ISO 7779, ISO 9296	Power: 57 dB, Pressure: 40.2 dB ISO 7779, ISO 9296
<b>Electrical characteristics</b>		
Frequency	50/60 Hz	50/60 Hz
Description	Two J9306A products are installed. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	One J9306A product is installed. One open power supply slot is available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
Voltage	110-127/200-240 VAC	110-127/200-240 VAC
Idle power	312 W	215 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
<b>Safety</b>	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
<b>Emissions</b>	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A
<b>Immunity</b>		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24

# HP 5400 zl Switch Series

## Specifications (continued)

	HP 5412-92G-PoE+-4G v2 zl Switch with Premium Software (J9540A)	HP 5406 8p 10GBASE-T 8p 10GbE SFP+ v2 zl Switch with Premium Software (J9866A)
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD	IEC 61000-4-2; 4 kV CD, 8 kV AD
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
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
<b>Management</b>	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	HP PCM+; HP PCM (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
<b>Notes</b>	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; for example, J9142B, J8177C).
<b>Services</b>	<p>3-year, 4-hour onsite, 13x5 coverage for hardware (UY914E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware (UY915E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY916E)</p> <p>3-year, 24x7 SW phone support, software updates (UW440E)</p> <p>Installation with minimum configuration, system-based pricing (U4828E)</p> <p>Installation with HP-provided configuration, system-based pricing (U4832E)</p> <p>4-year, 4-hour onsite, 13x5 coverage for hardware (UW457E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware (UW458E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW459E)</p> <p>4-year, 24x7 SW phone support, software updates (UW460E)</p> <p>5-year, 4-hour onsite, 13x5 coverage for hardware (UY940E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware (UY917E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY918E)</p> <p>5-year, 24x7 SW phone support, software updates (UY919E)</p> <p>3 Yr 6 hr Call-to-Repair Onsite (UW441E)</p> <p>4 Yr 6 hr Call-to-Repair Onsite (UW461E)</p> <p>5 Yr 6 hr Call-to-Repair Onsite (UY920E)</p> <p>1-year, 4-hour onsite, 13x5 coverage for hardware (HR604E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware (HR605E)</p> <p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR608E)</p> <p>1-year, 24x7 software phone support, software updates (HR607E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR606E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS746E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS747E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS748E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS749E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS750E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS751E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS752E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS753E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>	<p>3-year, 4-hour onsite, 13x5 coverage for hardware (UY909E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware (UY910E)</p> <p>3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 SW phone support and SW updates (UY911E)</p> <p>3-year, 24x7 SW phone support, software updates (UY912E)</p> <p>Installation with minimum configuration, system-based pricing (U4828E)</p> <p>Installation with HP-provided configuration, system-based pricing (U4832E)</p> <p>4-year, 4-hour onsite, 13x5 coverage for hardware (UW452E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware (UW453E)</p> <p>4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW454E)</p> <p>4-year, 24x7 SW phone support, software updates (UW455E)</p> <p>5-year, 4-hour onsite, 13x5 coverage for hardware (UW473E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware (UW474E)</p> <p>5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UW475E)</p> <p>5-year, 24x7 SW phone support, software updates (UY938E)</p> <p>3 Yr 6 hr Call-to-Repair Onsite (UY913E)</p> <p>4 Yr 6 hr Call-to-Repair Onsite (UW456E)</p> <p>5 Yr 6 hr Call-to-Repair Onsite (UY939E)</p> <p>1-year, 4-hour onsite, 13x5 coverage for hardware (HR599E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware (HR600E)</p> <p>1-year, 6 hour Call-To-Repair Onsite for hardware (HR603E)</p> <p>1-year, 24x7 software phone support, software updates (HR602E)</p> <p>1-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support and software updates (HR601E)</p> <p>1-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS738E)</p> <p>1-year, 24x7 software phone support, software updates + 4 hour hardware exchange (HS739E)</p> <p>3-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS740E)</p> <p>3-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS741E)</p> <p>4-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS742E)</p> <p>4-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS743E)</p> <p>5-year, 24x7 software phone support, software updates + Next Business Day Hardware Exchange (HS744E)</p> <p>5-year, 24x7 software phone support, software updates + 4 hour Hardware Exchange (HS745E)</p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> 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.</p>

**Standards and Protocols**

(applies to all products in series)

<b>BGP</b>	RFC 1997 BGP Communities Attribute	RFC 2918 Route Refresh Capability RFC 4271 A Border Gateway Protocol 4 (BGP-4)	RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP) RFC 5492 Capabilities Advertisement with BGP-4
<b>Device management</b>		RFC 1591 DNS (client)	HTML and telnet management
<b>General protocols</b>	IEEE 802.1ad Q-in-Q IEEE 802.1AX-2008 Link Aggregation IEEE 802.1D MAC Bridges IEEE 802.1p Priority IEEE 802.1Q VLANs IEEE 802.1s Multiple Spanning Trees IEEE 802.1v VLAN classification by Protocol and Port IEEE 802.1w Rapid Reconfiguration of Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.3af Power over Ethernet	IEEE 802.3x Flow Control RFC 768 UDP RFC 783 TFTP Protocol (revision 2) RFC 792 ICMP RFC 793 TCP RFC 826 ARP RFC 854 TELNET RFC 868 Time Protocol RFC 951 BOOTP RFC 1058 RIPv1 RFC 1350 TFTP Protocol (revision 2)	RFC 1519 CIDR RFC 1542 BOOTP Extensions RFC 2030 Simple Network Time Protocol (SNTP) v4 RFC 2131 DHCP RFC 2453 RIPv2 RFC 2548 (MS-RAS-Vendor only) RFC 3046 DHCP Relay Agent Information Option RFC 3576 Ext to RADIUS (CoA only) RFC 3768 VRRP RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
<b>IP multicast</b>		RFC 3376 IGMPv3 (host joins only)	RFC 3973 PIM Dense Mode
<b>IPv6</b>	RFC 1981 IPv6 Path MTU Discovery RFC 2375 IPv6 Multicast Address Assignments RFC 2460 IPv6 Specification RFC 2464 Transmission of IPv6 over Ethernet Networks RFC 2710 Multicast Listener Discovery (MLD) for IPv6 RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only) RFC 3019 MLDv1 MIB RFC 3315 DHCPv6 (client and relay) RFC 3484 Default Address Selection for IPv6 RFC 3587 IPv6 Global Unicast Address Format	RFC 3596 DNS Extension for IPv6 RFC 3810 MLDv2 for IPv6 RFC 4022 MIB for TCP RFC 4087 IP Tunnel MIB RFC 4113 MIB for UDP RFC 4213 Basic Transition Mechanisms for IPv6 Hosts and Routers RFC 4251 SSHv6 Architecture RFC 4252 SSHv6 Authentication RFC 4253 SSHv6 Transport Layer RFC 4254 SSHv6 Connection RFC 4291 IP Version 6 Addressing Architecture	RFC 4293 MIB for IP RFC 4294 IPv6 Node Requirements RFC 4419 Key Exchange for SSH RFC 4443 ICMPv6 RFC 4541 IGMP & MLD Snooping Switch RFC 4861 IPv6 Neighbor Discovery RFC 4862 IPv6 Stateless Address Auto-configuration RFC 5095 Deprecation of Type 0 Routing Headers in IPv6 RFC 5340 OSPFv3 for IPv6 RFC 5453 Reserved IPv6 Interface Identifiers RFC 5519 Multicast Group Membership Discovery MIB (MLDv2 only)
<b>MIBs</b>	IEEE 802.1ap (MSTP and STP MIB's only) RFC 1213 MIB II RFC 1493 Bridge MIB RFC 1724 RIPv2 MIB RFC 1850 OSPFv2 MIB	RFC 2021 RMONv2 MIB RFC 2096 IP Forwarding Table MIB RFC 2613 SMON MIB 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 2737 Entity MIB (Version 2) RFC 2787 VRRP MIB RFC 2863 The Interfaces Group MIB RFC 2925 Ping MIB
<b>Network management</b>	IEEE 802.1AB Link Layer Discovery Protocol (LLDP)	RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events) RFC 3176 sFlow	ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED) SNMPv1/v2c/v3 XRMON
<b>OSPF</b>		RFC 2328 OSPFv2	RFC 3101 OSPF NSSA
<b>QoS/CoS</b>		RFC 2474 DiffServ Precedence, including 8 queues/port	RFC 2597 DiffServ Assured Forwarding (AF)
<b>Security</b>	IEEE 802.1X Port Based Network Access Control RFC 1492 TACACS+	RFC 2865 RADIUS (client only) RFC 2866 RADIUS Accounting	RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP) Secure Sockets Layer (SSL) SSHv2 Secure Shell

## HP 5400 zl Switch Series accessories

### Modules

HP 8-port 10GBASE-T v2 zl Module (J9546A)  
HP 4-port 10GbE CX4 zl Module (J8708A)  
HP 4-port 10GbE X2 zl Module (J8707A)  
HP 4-port 10GbE SFP+ zl Module (J9309A)  
HP 8-port 10GbE SFP+ v2 zl Module (J9538A)  
HP 20-port Gig-T PoE+ / 2-port 10GbE SFP+ v2 zl Module (J9536A)  
HP 20-port Gig-T PoE+ / 4-port SFP v2 zl Module (J9535A)  
HP 24-port SFP v2 zl Module (J9537A)  
HP 12-port Gig-T PoE+ / 12-port SFP v2 zl Module (J9637A)  
HP 24-port 10/100/1000 PoE zl Module (J8702A)  
HP 20-port 10/100/1000 PoE+ / 4-port Mini-GBIC zl Module (J9308A)  
HP 20-port Gig-T / 4-port Mini-GBIC zl Module (J8705A)  
HP 24-port Mini-GBIC zl Module (J8706A)  
HP 24-port 10/100/1000 PoE+ zl Module (J9307A)  
HP 24-port Gig-T PoE+ v2 zl Module (J9534A)  
HP 24-port 10/100 PoE+ zl Module (J9478A)  
HP 24-port 10/100 PoE+ v2 zl Module (J9547A)  
HP 24-port Gig-T v2 zl Module (J9550A)  
HP 20-port Gig-T / 4-port SFP v2 zl Module (J9549A)  
HP 20-port Gig-T / 2-port 10GbE SFP+ v2 zl Module (J9548A)  
HP Survivable Branch Communication zl Module powered by Microsoft® Lync (J9485A)  
HP Services zl Module for Avaya Aura Session Border Controller powered by Acme Packet (J9486A)  
HP Advanced Services zl Module with Citrix XenServer platform (J9747A)  
HP Advanced Services zl Module with VMware vSphere Platform (J9748A)

### Transceivers

HP X131 10G X2 SC ER Transceiver (J8438A)  
HP X131 10G X2 SC SR Transceiver (J8436A)  
HP X131 10G X2 CX4 Transceiver (J8440C)  
HP X111 100M SFP LC FX Transceiver (J9054C)  
HP X131 10G X2 SC LR Transceiver (J8437A)  
HP X131 10G X2 SC LRM Transceiver (J9144A)  
HP X112 100M SFP LC BX-D Transceiver (J9099B)  
HP X112 100M SFP LC BX-U Transceiver (J9100B)  
HP X132 10G SFP+ LC SR Transceiver (J9150A)  
HP X132 10G SFP+ LC LR Transceiver (J9151A)  
HP X132 10G SFP+ LC LRM Transceiver (J9152A)  
HP X121 1G SFP LC LH Transceiver (J4860C)  
HP X121 1G SFP LC SX Transceiver (J4858C)  
HP X121 1G SFP LC LX Transceiver (J4859C)  
HP X121 1G SFP RJ45 T Transceiver (J8177C)  
HP X122 1G SFP LC BX-D Transceiver (J9142B)  
HP X122 1G SFP LC BX-U Transceiver (J9143B)  
HP X132 10G SFP+ LC ER Transceiver (J9153A)

### Cables

HP X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B)

HP X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B)  
HP X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable (J9285B)  
HP X244 10G XFP to SFP+ 1m Direct Attach Copper Cable (J9300A)  
HP X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9301A)  
HP X244 10G XFP to SFP+ 5m Direct Attach Copper Cable (J9302A)  
HP 0.5 m Multimode OM3 LC/LC Optical Cable (AJ833A)  
HP 1 m Multimode OM3 LC/LC Optical Cable (AJ834A)  
HP 2 m Multimode OM3 LC/LC Optical Cable (AJ835A)  
HP 5 m Multimode OM3 LC/LC Optical Cable (AJ836A)  
HP 15 m Multimode OM3 LC/LC Optical Cable (AJ837A)  
HP 30 m Multimode OM3 LC/LC Optical Cable (AJ838A)  
HP 50 m Multimode OM3 LC/LC Optical Cable (AJ839A)  
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A)  
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A)  
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A)  
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)  
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)  
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)  
HP X242 10G SFP+ to SFP+ 10m Direct Attach Copper Cable (J9286B)  
HP X242 10G SFP+ to SFP+ 15m Direct Attach Copper Cable (J9287B)

### Power Supply

HP 1500W PoE+ zl Power Supply (J9306A)  
HP 1500W zl Power Supply (J8713A)  
HP 875W zl Power Supply (J8712A)

### EPS/RPS

HP zl Power Supply Shelf (J8714A)

### License

HP MSM760/765 Additional 40 Access Point License (J9371A)  
HP 5400 zl Premium License (J8994A)  
HP MSM760/765 additional 40 Access Point E-LTU (J9371AAE)



Products within this series have achieved sufficient scores in each of the rated criteria to achieve the Miercom Certified Green distinction Award. See the Specifications section of this series for more information.

---

**To learn more, visit [hp.com/networking](http://hp.com/networking)**

© Copyright 2009-2013 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft is a U.S. registered trademark of Microsoft Corporation.

4AA2-6511ENW, Created May 2009; Updated September 2013, Rev. 12

