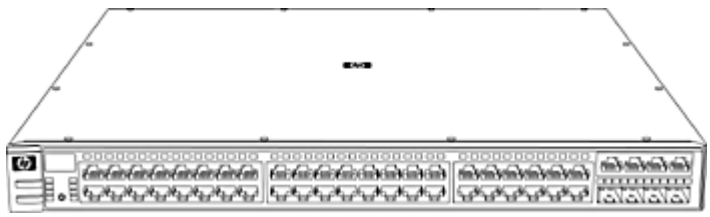
*Overview*

HP ProCurve Switch 3400cl-48G



## Introduction

The HP ProCurve Switch 3400cl series consists of exceptionally affordable 24- and 48-port 10/100/1000 intelligent edge stackables with optional 10-Gigabit uplinks* and stacking capability. Created in response to the growing need for network capacity in a world where high-demand applications are becoming common, these standards-based Layer 3 switches provide outstanding performance, traffic management, and access control capabilities. The result is an efficient, secure, high-throughput, multi-service network that is able to handle the demands of today's applications as well as those that will emerge in the future.

*Requires HP ProCurve Switch cl 10-GbE Media Flex Module (J8435A)

## Models

| | |
|---|---|
| HP ProCurve Switch 3400cl-48G | J4906A |

## Features and Benefits

### Connectivity

- **Dual-personality functionality**: four 10/100/1000 ports or mini-GBIC slots for optional fiber connectivity such as Gigabit-SX, -LX, or -LH
- **Auto-MDIX**: automatically adjusts for straight-through or crossover cables on all 10/100/1000 ports

### Performance

- **88 Gbps backplane with 64 million pps** (HP ProCurve 3400cl-24G) **and 136 Gbps backplane with 99.5 million pps** (HP ProCurve 3400cl-48G): up to ten times the bandwidth for low-latency throughput
- **Selectable queuing configurations**: increase performance by selecting the queuing configuration that best meets the requirements of network applications
- **Jumbo frames**: on Gigabit and 10-Gigabit ports, allow high-performance remote backup and disaster-recovery services (up to 4 ports per module on Gigabit modules)

### Resiliency and high availability

- **Router redundancy** (XRRP): allows groups of two routers to dynamically back each other up to create highly available routed environments
- **IEEE 802.3ad Link Aggregation Control Protocol** (LACP) **and ProCurve trunking**: support up to 25 trunks, each with up to 8 links (ports) per trunk
- **IEEE 802.1s Multiple Spanning Tree**: provides high link availability in multiple VLAN environments by allowing multiple spanning trees
- **IEEE 802.1w Rapid Convergence Spanning Tree Protocol**: increases network uptime through faster recovery from failed links

*Overview*

- **Optional redundant power supply**: provides uninterrupted power (provided by HP ProCurve 600 RPS/EPS)

Layer 2 switching

- **ProCurve switch meshing**: dynamically load-balances across multiple active redundant links to increase available aggregate bandwidth
- **VLAN support and tagging**: supports the IEEE 802.1Q (4,094 VLAN IDs) and 256 VLANs simultaneously
- **GARP VLAN Registration Protocol**: allows automatic learning and dynamic assignment of VLANs
- **IEEE 802.1v protocol VLANs**: isolate select non-IPv4 protocols automatically into their own VLANs

Layer 3 routing

- **Layer 3 IP routing**: provides routing of IP at media speed; supports static routes, RIP, RIPv2, and OSPF

Security

- **Access control lists** (ACLs): provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number
- **Dynamic ARP protection**: blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- **Port security**: allows access only to specified MAC addresses, which can be learned or specified by the administrator
- **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** (SSHv2): encrypts all transmitted data for secure, remote command-line interface (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**: industry-standard way of user authentication using an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server
- **MAC address lockout**: prevents configured particular MAC addresses from connecting to the network
- **Web-based authentication**: similar to IEEE 802.1X, provides a browser-based environment to authenticate clients that do not support the IEEE 802.1X supplicant
- **Secure FTP**: allows secure file transfer to/from the switch; protects against unwanted file downloads or unauthorized copying of switch configuration file
- **Secure management access**: all access methods--CLI, GUI, or MIB--are securely encrypted through SSHv2, SSL, and/or SNMPv3

Convergence

- **IP multicast routing** (PIM Dense): routes IP multicast traffic using the PIM Dense routing protocol
- **IP multicast snooping and data-driven IGMP**: automatically prevents flooding of IP multicast traffic

Quality of Service (QoS)

- **Rate limiting**: per-port ingress enforced maximums
- **Layer 4 prioritization**: enables prioritization based on TCP/UDP port numbers
- **Traffic prioritization** (IEEE 802.1p): allows real-time traffic classification into 8 priority levels mapped to 8 queues
- **Class of Service** (CoS): sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), L3 protocol, TCP/UDP port number, source port, and DiffServ

Manageability

- **sFlow** (RFC 3176): wire-speed traffic accounting and monitoring
- **RMON, XRMON, and SMON**: provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events

*Overview*

- Find-Fix-and-Inform: finds and fixes common network problems automatically, then informs administrator
- Dual flash images: provides independent primary and secondary operating system files for backup while upgrading
- Friendly port names: allow assignment of descriptive names to ports
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP): automated device discovery protocol for easy mapping by network management applications
- Stacking capability: single IP address management for a virtual stack of up to 16 switches, including the HP ProCurve Switch 2500 Series, 2510 Series, 2600 Series, 2800 Series, 2810 Series, 2900 Series, 3400cl Series, 3500yl Series, 4200vl Series, 6108, 6200yl-24G-mGBIC, and 6400cl Series

Industry-leading warranty

- Lifetime warranty: For as long as you own the product, with next-business-day advance replacement (available in most countries). The following hardware products and their related series modules have a one-year hardware warranty with extensions available: HP ProCurve Routing Switch 9300m Series, HP ProCurve Switch 8100fl Series, and HP ProCurve Network Access Controller 800. The following hardware mobility products have a one-year hardware warranty with extensions available: HP ProCurve M111 Client Bridge, HP ProCurve MSM3xx-R Access Points, HP ProCurve MSM7xx Mobility and Access Controllers, HP ProCurve RF Manager IDS/IPS Systems, HP ProCurve MSM Power Supplies, HP ProCurve 1-Port Power Injector, and HP ProCurve CNMS Appliances. Disk drives in the HP ProCurve ONE Services zl Modules have a five-year hardware warranty. Standalone software, upgrades, or licenses may have a different warranty duration. For details, refer to the ProCurve Software License, Warranty, and Support booklet at: http://www.procurve.com/warranty.

## Services

ProCurve Switch 3400cl-24G

| | |
|---|---|
| 3-year, 4-hour onsite, 13x5 coverage for hardware | U2855E |
| 3-year, 4-hour onsite, 24x7 coverage for hardware | U2856E |
| 3-year, 4-hour onsite, 24x7 coverage for hardware, 24 x 7 software phone support | U6304E |
| 3-year, 24x7 SW phone support, software updates | UE262E |
| Installation with minimum configuration, system-based pricing | U4826E |
| Installation with HP-provided configuration, system-based pricing | U4830E |

ProCurve Switch 3400cl-48G

| | |
|---|---|
| 3-year, 4-hour onsite, 13x5 coverage for hardware | H4496E |
| 3-year, 4-hour onsite, 24x7 coverage for hardware | H2893E |
| 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support | U6319E |
| 3-year, 24x7 SW phone support, software updates | UE264E |
| Installation with minimum configuration, system-based pricing | U4826E |
| Installation with HP-provided configuration, system-based pricing | U4830E |

Refer to the HP Web site at: www.procurve.com/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

*Technical Specifications*

| | | | |
|---|---|---|---|
| **HP ProCurve Switch 3400cl-48G** (J4906A) | **Ports** | 1 open module slot | |
| | | 44 auto-sensing 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 | |
| | | 1 RS-232C DB-9 console port | |
| | | 4 dual-personality ports; each port can be used as either an RJ-45 10/100/1000 port (IEEE 802.3 Type 10Base-T; IEEE 802.3u Type 100Base-TX; IEEE 802.3ab 1000Base-T Gigabit Ethernet) or an open mini-GBIC slot (for use with mini-GBIC transceivers) | |
| | **Maximum ports** | Supports a maximum of 48 Gigabit ports plus 2 10-GbE ports | |
| | **Dimensions** | 16.93 x 17.32 x 1.73 in. (43 x 44 x 4.4 cm) (1U height) | |
| | **Weight** | 10.84 lb. (4.92 kg) | |
| | **Memory and processor** | Processor type and speed | Motorola PowerPC MPC8245 @ 266 MHz |
| | | Packet buffer size | 4 MB (1 MB per 12 ports) |
| | | Flash capacity | 16 MB flash |
| | | SDRAM | 128 MB |
| | **Mounting** | Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); horizontal surface mounting only | |
| | **Performance** | Latency 1000 MB | <6 μs |
| | | 10 Gbps | <10 μs |
| | | Throughput | Up to 99.5 million pps |
| | | Routing/Switching capacity | 136 Gbps |
| | | Routing table size | 64,000 entries |
| | **Environment** | Operating temperature | 32° to 104°F (0° to 40°C) when used with any X2 10-GbE |
| | | Operating relative humidity | 15% to 95% @ 104°F (40°C), non-condensing |
| | | Non-operating/ Storage temperature | –40°F to 158°F (–40°C to 70°C) |
| | | Non-operating/ Storage relative humidity | 15% to 95% @ 149°F (65°C), non-condensing |
| | | Altitude | Up to 15,000 ft. (4.57 km) |
| | | Acoustic | Power: 53 dB; DIN 45635T.19 per ISO 7779 @ < 80°F (25°C) |
| | **Electrical characteristics** | The switch automatically adjusts to any voltage between 100–127 and 200–240 V and either 50 or 60 Hz | |
| | | Maximum heat dissipation | 482 BTU/hr (509 kJ/hr), including use of optional cl module with optics |
| | | Voltage | 100–127 / 200–240 VAC |
| | | Current | 3.0 / 1.5 A |
| | | Power consumption | 141 W |
| | | Frequency | 50/60 Hz |

| | | |
|---|---|---|
| | Notes | Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.<br>Maximum BTUs includes use of optional cl module with optics. |
| Safety | CSA 22.2 No. 60950; EN 60950/IEC 60950; UL 60950 | |
| Emissions | FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A | |
| Immunity | EN | EN55024, CISPR 24 |
| | ESD | IEC 61000-4-2, 4 kV CD, 8 kV AD |
| | Radiated | IEC 61000-4-3, 3V/m |
| | EFT/Burst | IEC 61000-4-4, 1.0 kV (power line), 0.5 kV (signal line) |
| | Surge | IEC 61000-4-5, 1 kV/2 kV AC |
| | Conducted | IEC 61000-4-6, 3V |
| | Power frequency magnetic field | IEC 61000-4-8, 1A/m, 50 or 60 Hz |
| | Voltage dips and interruptions | IEC 61000-4-11, >95% reduction, 0.5 period; 30% reduction, 25 periods |
| | Harmonics | EN 61000-3-2, IEC 61000-3-2:2001 |
| | Flicker | EN 61000-3-3, IEC 61000-3-3:2001 |
| Management | HP ProCurve Manager Plus; HP ProCurve Manager (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C) | |
| Notes | Other mini-GBICs supported: HP ProCurve Gigabit-SX-LC Mini-GBIC (J4858A/B) HP ProCurve Gigabit-LX-LC Mini-GBIC (J4859A/B) HP ProCurve Gigabit-LH-LC Mini-GBIC (J4860A/B) | |
| Standards and protocols | Device Management<br>HTML and telnet management | |
| | General Protocols<br>IEEE 802.1D MAC Bridges<br>IEEE 802.1p Priority<br>IEEE 802.1Q VLANs<br>IEEE 802.1s Multiple Spanning Trees<br>IEEE 802.1v VLAN classification by Protocol and Port<br>IEEE 802.1w Rapid Reconfiguration of Spanning Tree<br>IEEE 802.3ad Link Aggregation Control Protocol (LACP)<br>IEEE 802.3x Flow Control<br>RFC 768 UDP<br>RFC 783 TFTP Protocol (revision 2)<br>RFC 792 ICMP<br>RFC 793 TCP<br>RFC 826 ARP<br>RFC 854 TELNET | |

RFC 951 BOOTP
RFC 1058 RIPv1
RFC 1542 BOOTP Extensions
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2453 RIPv2
RFC 3046 DHCP Relay Agent Information Option

### IP Multicast
RFC 3376 IGMPv3

### MIBs
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 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 2863 The Interfaces Group MIB
RFC 2925 Ping MIB

### Network Management
IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
RFC 2819 Four groups of RMON:

- 1 (statistics), 2 (history), 3 (alarm) and 9 (events)

RFC 3164 BSD syslog Protocol
RFC 3176 sFlow
SNMPv1/v2c/v3
XRMON

### OSPF
RFC 2328 OSPFv2

### QoS/Cos
RFC 2474 DiffServ Precedence, including 8 queues/port
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2598 DiffServ Expedited Forwarding (EF)

### Security
IEEE 802.1X Port Based Network Access Control
RFC 1492 TACACS+
RFC 2138 RADIUS Authentication
RFC 2866 RADIUS Accounting

Secure Sockets Layer (SSL)
SSHv1/SSHv2 Secure Shell

## Accessories

| | |
|---|---|
| HP ProCurve Gigabit-SX-LC Mini-GBIC | J4858C |
| HP ProCurve Gigabit-LX-LC Mini-GBIC | J4859C |
| HP ProCurve Gigabit-LH-LC Mini-GBIC | J4860C |
| HP ProCurve 10-GbE X2-SC SR Optic | J8436A |
| HP ProCurve 10-GbE X2-SC LR Optic | J8437A |
| HP ProCurve 10-GbE X2-SC ER Optic | J8438A |
| HP ProCurve 10-GbE X2-CX4 Transceiver | J8440B |
| HP ProCurve 10-GbE CX4 Media Converter | J8439A |
| HP ProCurve 600 Redundant External Power Supply | J8168A |
| HP ProCurve Network Immunity Manager 1.0 50-device license | J9060A |
| HP ProCurve Network Immunity Manager 1.0 +100-device license | J9061A |
| HP ProCurve Network Immunity Manager 1.0 unlimited-device license | J9062A |
| HP ProCurve Manager 2.3 | - |
| cl Modules | |
| HP ProCurve Switch cl 10-GbE Media Flex Module | J8435A |
| HP ProCurve Switch cl 10-GbE CX4 Copper Module | J8434A |



To learn more about HP ProCurve Networking, please visit: ProCurve.com
Information is subject to change without notice.