

ProCurve Switch 6400cl Series

The ProCurve Switch 6400cl series consists of 6-port 10-GbE stackables with optional 10-GbE add-on modules. Loaded with full Layer 3 features, the 6400cl series switches offer low-cost 10-GbE for high-performance aggregation of clusters of Gigabit switches. Ideal for consolidating multiple wiring closets, the 6400cl series offers the highest bandwidth on the market today for Gigabit. The ProCurve Switch 6400cl series also provides fiber flexibility to connect remote campuses up to 40 km away.



ProCurve Switch 6400cl
(J8433A)



ProCurve Switch 6410cl
(J8474A)

ProCurve Switch 6400cl Series

Features and benefits

Performance

- **160 Gbps backplane with 119 mpps:** unprecedented 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 4 trunks, each with up to 4 links (ports) per trunk; trunking across modules is supported
- **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
- **Optional redundant power supply:** provides uninterrupted power (provided by 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 (4,096 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, RIP2, 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
- **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
- **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 and RADIUS network login:** control port-based access for authentication and accountability
- **Web-based authentication:** similar to IEEE 802.1X, provides a browser-based environment to authenticate clients that do not support the

ProCurve Switch 6400cl Series

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 access to manage the 6400cl series:** all access methods--CLI, GUI, or MIB--are securely encrypted through SSHv2, SSL, and/or SNMPv3

Convergence

- **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 4 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 and XRMON:** provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- **Stacking capability:** single IP address management for a virtual stack of up to 16 switches, including the 3400cl series

Industry-leading warranty

- **Lifetime warranty:** for as long as you own the product, with next-business-day advance replacement (available in most countries)

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Services

ProCurve Switch 6400cl

- 3-year, 4-hour onsite, 13x5 coverage for hardware (UA438E)
- 3-year, 4-hour onsite, 24x7 coverage for hardware (UA439E)
- 3-year, 24x7 SW phone support, software updates (UF791E)
- Installation with minimum configuration, system-based pricing (U4826E)
- Installation with HP-provided configuration, system-based pricing (U4830E)
- Installation with HP-provided configuration, system-based pricing (UA440E)

ProCurve Switch 6410cl

- 3-year, 4-hour onsite, 13x5 coverage for hardware (UA438E)
- 3-year, 4-hour onsite, 24x7 coverage for hardware (UA439E)
- 3-year, 24x7 SW phone support, software updates (UF791E)
- Installation with minimum configuration, system-based pricing (U4826E)
- Installation with HP-provided configuration, system-based pricing (U4830E)
- Installation with HP-provided configuration, system-based pricing (UA440E)

ProCurve Switch 6400cl Series



ProCurve Switch 6400cl (J8433A)

ProCurve Switch 6410cl (J8474A)

Specifications

Ports

6 CX4 10-GbE ports(IEEE 802.3ak Type 10Gbase-CX4); Duplex: full only
 1 RS-232C DB-9 console port
 Supports a maximum of 8 10-GbE ports

1 RS-232C DB-9 console port
 Supports a maximum of 8 10-GbE ports
 6 10-GbE ports; Duplex: full only

Cabling

CX4 ports
 Maximum distance:
 • 0.5 m to 15 m using CX4 cable
 • Up to 300 m using J8439A media converter using MMF

X2 transceiver slots
 ProCurve 10-GbE X2-SC LR Optic
 Maximum distance:
 • 9/125 μ m single-mode cable = 2-10 km
 ProCurve 10-GbE X2-SC SR Optic
 Maximum distance:
 • 62.5 μ m multimode cable @ 160 MHz/km = 2-26 meters
 • 62.5 μ m multimode cable @ 200 MHz/km = 2-33 meters
 • 50 μ m multimode cable @ 400 MHz/km = 2-66 meters
 • 50 μ m multimode cable @ 500 MHz/km = 2-82 meters
 • 50 μ m multimode cable @ 2000 MHz/km = 2-300 meters
 ProCurve 10-GbE X2-SC ER Optic
 Maximum distance:
 • 30 km (40 km using engineered link)
 • Available Summer 2006
 ProCurve 10-GbE X2-CX4 Transceiver
 Maximum distance:
 • 0.5 m to 15 m using CX4 cable
 • Up to 300 m using J8439A media converter using MMF

Physical characteristics

Dimensions 16.9(d) x 17.4(w) x 1.7(h) in. (42.93 x 44.2 x 4.32 cm) (1U height)
 Weight 12.35 lb. (5.60 kg)

Dimensions 16.9(d) x 17.4(w) x 1.7(h) in. (42.93 x 44.2 x 4.32 cm) (1U height)
 Weight 13.45 lb. (6.1 kg)

Memory and processor

Processor Motorola PowerPC MPC8245 @ 266 MHz, 16 MB flash, 128 MB SDRAM, 128 MB flash ROM; packet buffer size: 4 MB

Processor Motorola PowerPC MPC8245 @ 266 MHz, 16 MB flash, 128 MB SDRAM, 128 MB flash ROM; packet buffer size: 4 MB

Mounting

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

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

Performance

Latency < 11.7 μ s (LIFO 64-byte packets)
 Throughput up to 119 million pps (64-byte packets)
 Routing/Switching capacity 160 Gbps
 Routing table size 16000 entries

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 Throughput up to 119 million pps (64-byte packets)
 Routing/Switching capacity 160 Gbps
 Routing table size 16000 entries

ProCurve Switch 6400cl Series

Environment

Operating temperature	32°F to 131°F (0°C to 55°C); 104°F (40°C) when used with SR/LR/ER optics	32°F to 131°F (0°C to 55°C); 104°F (40°C) when used with SR/LR/ER optics
Operating relative humidity	15% to 95% @ 104°F (40°C)	15% to 95% @ 104°F (40°C)
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)
Altitude	up to 15091 ft. (4.6 km)	up to 15091 ft. (4.6 km)
Acoustic	Power: 55 dB; DIN 45635T.19 per ISO 7779 @ <77°F (25°C)	Power: 55 dB; DIN 45635T.19 per ISO 7779 @ <77°F (25°C)

Electrical characteristics

Maximum heat dissipation	383 BTU/hr(404.07 kJ/hr), including use of optional cl modules with optics	383 BTU/hr(404.07 kJ/hr), including use of optional cl modules with optics
Voltage	100-127 / 200-240 VAC	100-127 / 200-240 VAC
Current	3 / 1.5 A	3 / 1.5 A
Power consumption	112 W	112 W
Frequency	50 / 60 Hz	50 / 60 Hz

Safety

CSA 22.2 No. 60950; EN 60950/IEC 60950; UL 60950	CSA 22.2 No. 60950; EN 60950/IEC 60950; UL 60950
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Emissions

FCC Class A; VCCI Class A; EN55022/CISPR-22 Class A	FCC Class A; VCCI Class A; EN55022/CISPR-22 Class A
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Immunity

EN	EN55024, CISPR 24	EN55024, CISPR 24
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; 3V/m	IEC 61000-4-3; 3V/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; 3V	IEC 61000-4-6; 3V
Power frequency magnetic field	IEC 61000-4-8; 1A/m, 50 or 60 Hz	IEC 61000-4-8; 1A/m, 50 or 60 Hz
Voltage	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	EN61000-3-2, IEC61000-3-2	EN61000-3-2, IEC61000-3-2
Flicker	EN61000-3-3, IEC61000-3-3	EN61000-3-3, IEC61000-3-3

Management

ProCurve Manager Plus; ProCurve Manager (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)	ProCurve Manager Plus; ProCurve Manager (included); command-line interface; Web browser; configuration menu; out-of-band management (serial RS-232C)
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ProCurve Switch 6400cl Series

Standards and Protocols

Device Management

HTML and telnet management

General Protocols

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 802.3ae 10-Gigabit 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 951 BOOTP
RFC 1058 RIP v1
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 OSPF v2 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 2863 The Interfaces Group MIB

Network Management

IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
RFC 1724 RIPv2 MIB
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 2598 DiffServ Expedited Forwarding (EF)

Security

IEEE 802.1X Port Based Network Access Control
RFC 1492 TACACS+
RFC 2138 RADIUS Authentication Secure Sockets Layer (SSL)
SSHv1/SSHv2 Secure Shell
RFC 2866 RADIUS Accounting

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Accessories



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

10-Gigabit module with 2 X2 transceiver slots

Ports

2 open transceiver slots

Physical characteristics

Dimensions: 6.81(d) x 4.5(w) x 1.6(h) in. (17.3 x 11.43 x 4.06 cm)
Weight: 0.64 lb. (0.29 kg)

Environment

Operating temperature: 32°F to 131°F (0°C to 55°C)
Operating relative humidity: 15% to 95%,

non-condensing

Non-operating/Storage temperature: -40°F to 158°F (-40°C to 70°C)
Non-operating/Storage relative humidity: 15% to 95%, non-condensing

Notes

Operating temperature is 32°F to 104°F (0°C to 40°C) if any X2 10-GbE optic or transceiver is inserted in any X2 slot.



ProCurve Switch cl 10-GbE CX4 Copper Module (J8434A)

2-port 10-Gigabit module with fixed CX4 connectors and 0.5 m cable

Ports

2 10-GbE ports (IEEE 802.3ak Type 10Gbase-CX4)
Duplex: full only

Physical characteristics

Dimensions: 6.81(d) x 4.5(w) x 1.5(h) in. (17.3 x 11.43 x 3.81 cm)
Weight: 0.67 lb. (0.3 kg)

Environment

Operating temperature: 32°F to 131°F (0°C to 55°C)
Operating relative humidity: 15% to 95%, non-condensing
Non-operating/Storage temperature: -40°F to 158°F (-40°C to 70°C)
Non-operating/Storage relative humidity:

15% to 95%, non-condensing

Cabling

Maximum distance:
• 15 m using CX4 cable • 300 m using optical media converters and multimode fiber cable

Notes

Use CX4 10-GbE cable (0.5-15 m) or ProCurve 10-GbE CX4 Media Converter (J8439A).

Includes a single 0.5 m CX4 cable.



NEW ProCurve Switch 10-GbE X2-CX4 Transceiver (J8440B)

10-Gigabit X2 transceiver that supports a CX4 connector with distance of 15 m

Physical characteristics

Dimensions: 3.54(d) x 1.42(w) x 0.53(h) in. (8.99 x 3.61 x 1.35 cm)
Weight: 0.18 lb. (0.08 kg)

Environment

Operating temperature: 32°F to 131°F (0°C to 55°C)
Operating relative humidity: 15% to 95%, non-condensing

Cabling

Maximum distance:
• 15 m using CX4 cables • 300 m using optical media converters and multimode fiber cable

Notes

Use CX4 10-GbE cable (0.5-15 m) or ProCurve 10-GbE CX4 Media Converter (J8439A).

ProCurve 10-GbE CX4 Media Converter (J8439A)

Optical media converter for CX4 (10G copper) mmf cable up to 300 m

Physical characteristics

Dimensions: 0(d) x 0(w) x 0(h) in. (x x cm)

Cabling

Maximum distance:

• 62.5 μm multimode cable @ 150 MHz/km = 1-50 meters • 50 μm multimode cable @ 500 MHz/km = 1-100 meters • 50 μm multimode cable @ 2000 MHz/km = 1-300 meters

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NEW ProCurve 10-GbE X2-SC ER Optic (J8438A)
Supports the 10G ER standard. Supports single-mode fiber up to 40 km.*

Ports

1 SC 10-GbE port(IEEE 802.3ae Type 10Gbase-ER)
Duplex: full only

Physical characteristics

Dimensions: 3.48(d) x 1.42(w) x 0.43(h) in. (8.84 x 3.61 x 1.09 cm)
Weight: 0.15 lb. (0.07 kg)

Environment

Operating temperature: 32°F to 104°F (0°C to 40°C)
Operating relative humidity: 15% to 95%, non-condensing

Cabling

Type:

- Low metal content, single-mode fiber-optic, complying with ITU-T G.652 and ISO/IEC 793-2 Type B1

Maximum distance:

- 30 km*

Notes

Conditioning patch cord cables are not supported.

* Maximum distance 40 km using engineered link.



NEW ProCurve 10-GbE X2-SC LR Optic (J8437A)
10-Gigabit X2 transceiver that supports LR distance of 10 km on single mode fiber

Ports

1 SC 10-GbE port(IEEE 802.3ae Type 10Gbase-LR)
Duplex: full only

Physical characteristics

Dimensions: 3.48(d) x 1.42(w) x 0.43(h) in. (8.84 x 3.61 x 1.09 cm)
Weight: 0.16 lb. (0.07 kg)

Environment

Operating temperature: 32°F to 104°F (0°C to 40°C)
Operating relative humidity: 15% to 95%, non-condensing

Cabling

Type:

- Low metal content, single-mode fiber-optic, complying with ITU-T G.652 and ISO/IEC 793-2 Type B1

Maximum distance:

- 9/125 μ m single-mode cable = 2 m-10 km

Notes

Conditioning patch cord cables are not supported.



NEW ProCurve 10-GbE X2-SC SR Optic (J8436A)
Transceiver that supports 10G SR fiber standard; supports standard 50 μ and 62.5 μ mmf up to 300 m

Ports

1 SC 10-GbE port(IEEE 802.3ae Type 10Gbase-SR)
Duplex: full only

Physical characteristics

Dimensions: 3.48(d) x 1.42(w) x 0.43(h) in. (8.84 x 3.61 x 1.09 cm)
Weight: 0.64 lb. (0.29 kg)

Environment

Operating temperature: 32°F to 104°F (0°C to 40°C)
Operating relative humidity: 15% to 95%, non-condensing

Cabling

Maximum distance:

- 62.5 μ m multimode cable @ 160 MHz/km = 2-26 meters
- 62.5 μ m multimode cable @ 200 MHz/km = 2-33 meters
- 50 μ m multimode cable @ 400 MHz/km = 2-66 meters
- 50 μ m multimode cable @ 500 MHz/km = 2-82 meters
- 50 μ m multimode cable @ 2000 MHz/km = 2-300 meters

Notes

62.5 μ m (core/cladding) diameter or 50 μ m, 850 nm, low metal content, multimode fiber-optic, complying with the ITU-T G.652 and ISO/IEC 793-2 Type B1 standards

ProCurve 600 Redundant External Power Supply (J8168A)

The ProCurve 600 Redundant and External Power Supply (RPS/EPS) has 6 RPS ports and 2 EPS ports and supplies backup and Power over Ethernet power.

Ports

6 redundant power supply ports
Restrictions: Each port can provide redundant +12 V power to a connected switch; only one port can provide power at a given time

2 external power supply ports
Restrictions: Provides +50 VDC external PoE to up to two switch devices; provides max. of 408 W full power to one device, and half power (204 W each) if connected to two devices

Physical characteristics

Dimensions: 12.83(d) x 17.44(w) x 1.73(h) in. (32.59 x 44.3 x 4.39 cm) (1U height)
Weight: 11.78 lb. (5.34 kg), Fully loaded

Mounting

1U rack-mountable and wall-mountable enclosure using standard mounting hardware

Environment

Operating temperature: 32°F to 131°F (0°C to 55°C)
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 15091 ft. (4.6 km)
Acoustic: Noise emission LwA=59.2 dB at virtual workspace, according to DIN 45635 T.19

Electrical characteristics

Description: The unit automatically adjusts to any voltage between 100-240 V and either 50 or 60 Hz
Voltage: 100-240 VAC
Current: 9 / 5 A

Power consumption: 800 W
RPS power: 180 W
PoE power: 408 W
Frequency: 50 / 60 Hz

Safety

CSA 22.2 No. 60950
EN 60950/IEC 60950
UL 60950

Emissions

FCC Class A
VCCI Class A
EN55022/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; 3 V/m
EFT/Burst: IEC 61000-4-4; 1.0 kV (power line), .05 kV (signal line)
Surge: IEC 61000-4-5; 1 kV/2 kV AC
Conducted: IEC 61000-4-6; 3 V
Power frequency magnetic field: IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage: IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics: EN61000-3-2, IEC61000-3-2
Flicker: EN61000-3-3, IEC61000-3-3

Management

Provides information via port interfaces of attached devices

Notes

Supported devices
• ProCurve Switch 2600-PWR series, ProCurve Switch 2800 series, ProCurve Switch 5300xl series, ProCurve Switch 3400cl series, ProCurve Switch 6400cl series, ProCurve Secure Router 7000dl series

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