Overview

HP 5900 Switch Series

Product overview

The HP 5900 Switch Series is a family of high-density, ultra-low-latency, top-of-rack (ToR) switches that is part of the HP FlexNetwork architecture’s HP FlexFabric solution.

Ideally suited for deployment at the server access layer of large enterprise data centers, the HP 5900 Switch Series is also powerful enough for deployment at the data center core layer of medium-sized enterprises. With the increase in virtualized applications and server-to-server traffic, customers now require ToR switch innovations that will meet their needs for higher-performance server connectivity, convergence of Ethernet and storage traffic, the capability to handle virtual environments, and ultra low latency all in a single device.

Key features

- Cut-through with ultra low latency and wire speed
- HP Intelligent Resilient Framework (IRF) for virtualization and two-tier architecture
- High 1/10GbE ToR port density with 40 GbE uplinks
- IPv6 support in ToR with full L2/L3 features
- Convergence ready with DCB, FCoE, and TRILL

Features and benefits

Quality of Service (QoS)

- Powerful QoS features:
  - **Flexible classification** creates traffic classes based on access control lists (ACLs), IEEE 802.1p precedence, IP, and DSCP or Type of Service (ToS) precedence; supports filter, redirect, mirror, remark, and logging
  - **Feature support** provides support for Strict Priority Queuing (SP), Weighted Fair Queuing (WFQ), Weighted Deficit Round Robin (WDRR), SP+WDRR together, configurable buffers, Explicit Congestion Notification (ECN), and Weighted Random Early Detection (WRED)

Data center optimized
QuickSpecs

Overview

- **Flexible high port density**
  the HP 5900 Switch Series enables scaling of the server edge with 1 GbE and 10GbE ToR deployments to new heights with high-density 48-port solutions delivered in a 1RU design; the high server port density is backed by 40 GbE QSFP+ uplinks to deliver the availability of needed bandwidth for demanding applications; each 40 GbE QSFP+ port can also be configured as four 10GbE ports by using a 40-GbE-to-10GbE splitter cable

- **High-performance switching**
  cut-through and nonblocking architecture delivers low latency (~1 microsecond for 10GbE) for very demanding enterprise applications; the switch delivers high-performance switching capacity and wire-speed packet forwarding

- **Higher scalability**
  HP Intelligent Resilient Framework (IRF) technology simplifies the architecture of server access networks; up to nine HP 5900 switches can be combined to deliver unmatched scalability of virtualized access layer switches and flatter two-tier networks using IRF, which reduces cost and complexity

- **Advanced modular operating system**
  Comware v7 software's modular design and multiple processes bring native high stability, independent process monitoring, and restart; the OS also allows individual software modules to be upgraded for higher availability and supports enhanced serviceability functions like hitless software upgrades with single-chassis ISSU

- **TRILL and EVB/VEPA**
  TRansparent Interconnection of Lots of Links (TRILL) is supported to increase the scale of enterprise data centers; Edge Virtual Bridging with Virtual Ethernet Port Aggregator (EVB/VEPA) provides connectivity into the virtual environment for a data center-ready environment

- **Reversible airflow**
  enhanced for data center hot-cold aisle deployment with reversible airflow—for either front-to-back or back-to-front airflow

- **Redundant fans and power supplies**
  1+1 internal redundant and hot-pluggable power supplies and dual fan trays enhance reliability and availability

- **Lower OPEX and greener data center**
  provide reversible airflow and advanced chassis power management

- **Data Center Bridging (DCB) protocols**
  provides support for IEEE 802.1Qbb Priority Flow Control (PFC), Data Center Bridging Exchange (DCBX), and IEEE 802.1Qaz Enhanced Transmission Selection (ETS) for converged applications

- **FCoE support**
  provides support for Fibre Channel over Ethernet (FCoE), including expansion, fabric, trunk VF and N ports, and aggregation of E-port and N-port virtualization; fabric services such as name server, registered state change notification, and login services; per-VSAN fabric services, FSPF, soft and hard zoning, Fibre Channel traceroute, ping, debugging, and FIP snooping

- **Jumbo frames**
  with frame sizes of up to 10,000 bytes on Gigabit Ethernet and 10-Gigabit ports, allows high-performance remote backup and disaster-recovery services to be enabled

Manageability

- **Full-featured console**
  provides complete control of the switch with a familiar CLI

- **Troubleshooting**
  - Ingress and egress port monitoring
    enable network problem solving
  - Traceroute and ping
    enable testing of network connectivity

- **Multiple configuration files**
  allow multiple configuration files to be stored to a flash image

- **sFlow (RFC 3176)**
  provides wire-speed traffic accounting and monitoring

- **SNMP v1, v2c and v3**
Overview

facilitate centralized discovery, monitoring, and secure management of networking devices

- **Out-of-band interface**
  isolates management traffic from user data plane traffic for complete isolation and total reachability, no matter what happens in the data plane

- **Remote configuration and management**
  is available through a secure command-line interface (CLI) over Telnet and SSH; Role-Based Access Control (RBAC) provides multiple levels of access; Configuration Rollback and multiple configurations on the flash provide ease of operation; remote visibility is provided with sFlow and SNMP v1/v2/v3, and is fully supported in HP Intelligent Management Center (IMC)

- **ISSU and hot patching**
  provides hitless software upgrades with single-unit In Services Software Upgrade (ISSU) and hitless patching of the modular operating system

- **Autoconfiguration**
  provides automatic configuration via DHCP autoconfiguration

- **Network Time Protocol (NTP) and Secure Network Time Protocol (SNTP)**
  synchronize timekeeping among distributed time servers and clients; keep consistent timekeeping among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time

Resiliency and high availability

- **HP Intelligent Resilient Framework (IRF) technology**
  enables an HP FlexFabric to deliver resilient, scalable, and secured data center networks for physical and virtualized environments; groups up to nine HP 5900 switches in an IRF configuration, allowing them to be configured and managed as a single switch with a single IP address; simplifies ToR deployment and management, reducing data center deployment and operating expenses

- **IEEE 802.1w Rapid Convergence Spanning Tree Protocol**
  increases network uptime through faster recovery from failed links

- **IEEE 802.1s Multiple Spanning Tree**
  provides high link availability in multiple VLAN environments by allowing multiple spanning trees

- **Virtual Router Redundancy Protocol (VRRP)**
  allows groups of two routers to dynamically back each other up to create highly available routed environments

- **Hitless patch upgrades**
  allows patches and new service features to be installed without restarting the equipment, increasing network uptime and facilitating maintenance

- **Ultrafast protocol convergence (< 50 ms) with standard-based failure detection—Bidirectional Forwarding Detection (BFD)**
  enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF

- **Device Link Detection Protocol (DLDP)**
  monitors link connectivity and shuts down ports at both ends if unidirectional traffic is detected, preventing loops in STP-based networks

- **Graceful restart**
  allows routers to indicate to others their capability to maintain a routing table during a temporary shutdown and significantly reduces convergence times upon recovery; supports OSPF, BGP, and IS-IS

Layer 2 switching

- **MAC-based VLAN**
  provides granular control and security; uses RADIUS to map a MAC address/user to specific VLANs

- **Address Resolution Protocol (ARP)**
  supports static, dynamic, and reverse ARP and ARP proxy

- **Flow Control**
  IEEE 802.3x Flow Control provides intelligent congestion management via PAUSE frames
QuickSpecs

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- **Ethernet Link Aggregation**
  provides IEEE 802.3ad Link Aggregation of up to 128 groups of 16 ports; support for LACP, LACP Local Forwarding First, and LACP Short-time provides a fast, resilient environment that is ideal for the data center
  - **Spanning Tree Protocol (STP)**
    STP (IEEE 802.1D), Rapid STP (RSTP, IEEE 802.1w), and Multiple STP (MSTP, IEEE 802.1s)
  - **VLAN support**
    provides support for 4,096 VLANs based on port, MAC address, IPv4 subnet, protocol, and guest VLAN; supports VLAN mapping
  - **IGMP support**
    provides support for IGMP Snooping, Fast-Leave, and Group-Policy; IPv6 IGMP Snooping provides Layer 2 optimization of multicast traffic
  - **DHCP support at Layer 2**
    provides full DHCP Snooping support for DHCP Snooping Option 82, DHCP Relay Option 82, DHCP Snooping Trust, and DHCP Snooping Item Backup

Layer 3 services

- **Address Resolution Protocol (ARP)**
  determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network
- **Dynamic Host Configuration Protocol (DHCP)**
  simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets
- **Operations, administration and maintenance (OAM) support**
  provides support for Connectivity Fault Management (IEEE 802.1AG) and Ethernet in the First Mile (IEEE 802.3AH); provides additional monitoring that can be used for fast fault detection and recovery

Layer 3 routing

- **Virtual Router Redundancy Protocol (VRRP) and VRRP Extended**
  allow quick failover of router ports
- **Policy-based routing**
  makes routing decisions based on policies set by the network administrator
- **Equal-Cost Multipath (ECMP)**
  enables multiple equal-cost links in a routing environment to increase link redundancy and scale bandwidth
- **Layer 3 IPv4 routing**
  provides routing of IPv4 at media speed; supports static routes, RIP and RIPv2, OSPF, BGP, and IS-IS
- **Open shortest path first (OSPF)**
  delivers faster convergence; uses this link-state routing InteriorGateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- **Border Gateway Protocol 4 (BGP-4)**
  delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large networks
- **Intermediate system to intermediate system (IS-IS)**
  uses a path vector Interior Gateway Protocol (IGP), which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
- **Static IPv6 routing**
  provides simple manually configured IPv6 routing
- **Dual IP stack**
  maintains separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design
- **Routing Information Protocol next generation (RIPng)**
Overview

- extends RIPv2 to support IPv6 addressing
- **OSPFv3** provides OSPF support for IPv6
- **BGP+** extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing
- **IS-IS for IPv6** extends IS-IS to support IPv6 addressing
- **IPv6 tunneling** allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6to4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels; is an important element for the transition from IPv4 to IPv6
- **Policy routing** allows custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies
- **Bidirectional Forwarding Detection (BFD)** enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF
- **Multicast Routing PIM Dense and Sparse modes** provides robust support of multicast protocols
- **Layer 3 IPv6 routing** provides routing of IPv6 at media speed; supports static routing, RIPvng, OSPFv3, BGP4+ for IPv6, and IS-ISv6

Additional information

- **Green IT and power**
  - improves energy efficiency through the use of the latest advances in silicon development; shuts off unused ports and utilizes variable-speed fans, reducing energy costs
- **Low power consumption**
  - is rated to have one of the lowest power usages in the industry by Miercom independent tests

Management

- **USB support**
  - **File copy**
    - allows users to copy switch files to and from a USB flash drive

- **Multiple configuration files**
  - can be stored to the flash image

- **SNMPv1, v2c, and v3**
  - facilitate centralized discovery, monitoring, and secure management of networking devices

- **Network Time Protocol (NTP)**
  - synchronizes timekeeping among distributed time servers and clients; keeps timekeeping consistent among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time

- **Out-of-band interface**
  - isolates management traffic from user data plane traffic for complete isolation and total reachability, no matter what happens in the data plane

- **Port mirroring**
  - enables traffic on a port to be simultaneously sent to a network analyzer for monitoring

- **Remote configuration and management**
  - is available through a command-line interface (CLI)

- **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

- **sFlow (RFC 3176)**
QuickSpecs

HP 5900 Switch Series

Overview

provides scalable ASIC-based wirespeed network monitoring and accounting with no impact on network performance; this allows network operators to gather a variety of sophisticated network statistics and information for capacity planning and real-time network monitoring purposes

- **Command authorization**
  leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity

- **Dual flash images**
  provide independent primary and secondary operating system files for backup while upgrading

- **Command-line interface (CLI)**
  provides a secure, easy-to-use CLI for configuring the module via SSH or a switch console; provides direct real-time session visibility

- **Logging**
  provides local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated

- **Management interface control**
  provides management access through a modem port and terminal interface, as well as in-band and out-of-band Ethernet ports; provides access through terminal interface, telnet, or secure shell (SSH)

- **Industry-standard CLI with a hierarchical structure**
  reduces training time and expenses, and increases productivity in multivendor installations

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

- **Information center**
  provides a central repository for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules

- **Network management**
  HP Intelligent Management Center (IMC) centrally configures, updates, monitors, and troubleshoots

- **Remote intelligent mirroring**
  mirrors ingress/egress ACL-selected traffic from a switch port or VLAN to a local or remote switch port anywhere on the network

Security

- **Access control lists (ACLs)**
  provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number

- **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

- **IEEE 802.1X and RADIUS network logins**
  control port-based access for authentication and accountability

- **Port security**
  allows access only to specified MAC addresses, which can be learned or specified by the administrator

Convergence

- **LLDP-MED (Media Endpoint Discovery)**
  is a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones

Warranty and support

- **1-year warranty**
QuickSpecs

HP 5900 Switch Series

Overview

- advance hardware replacement with 10-calendar-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)
## Build To Order:

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

### HP FlexFabric 5900CP-48XG-4QSFP+ Switch

- **48** fixed 1000/10000 SFP+ / FC SFP+ ports \( \min=0 \), \( \max=48 \)
- **4** QSFP+ 40-GbE ports \( \min=0 \), \( \max=4 \)
- Must select min **1** Power Supply
- Must select min **2** Fan Tray
- **1U** - Height

### HP 5900AF-48XG-4QSFP+ Switch

- **48** fixed 1000/10000 SFP+ ports \( \min=0 \), \( \max=48 \)
- **4** QSFP+ 40-GbE ports \( \min=0 \), \( \max=4 \)
- Must select min **1** Power Supply
- Must select min **2** Fan Tray
- **1U** - Height

### HP 5900AF-48XG-4QSFP F-B Bundle

HP 5900AF-48XG-4QSFP F-B 4xUnit Bundle

- **4** - JC772A HP 5900AF-48XG-4QSFP+ Switch
- **8** - JC680A HP 58x0AF 650W AC Power Supply
- **8** - JC683A HP 58x0AF Frt(ports)-Bck(pwr) Fan Tray
- **6** - JD097C HP X240 10G SFP+ SFP+ 3m DAC Cable
- **2** - JG081C HP X240 10G SFP+ SFP+ 5m DAC Cable
- **64** - JD092B HP X130 10G SFP+ LC SR Transceiver

### Each Switch:

- **48** fixed 1000/10000 SFP+ ports \( \System Std=20 \), \( \max=48 \) \( \User min=0 \), \( \max=28 \)
- **4** QSFP+ 40-GbE ports \( \System Std=4 \), \( \max=4 \) \( \User min=-4 \), \( \max=0 \)
- **2** Power Supplies Standard \( \min=2 \), \( \max=2 \)
- **2** Front to Back Fan Trays Standard \( \min=2 \), \( \max=2 \)
- **1U** - Height

### PDU Cable NA/MEX/TW/JP (8 Cables)

- **C15** PDU Jumper Cord (NA/MEX/TW/JP) (8 Cables)

### PDU Cable ROW (8 Cables)

- **C15** PDU Jumper Cord (ROW) (8 Cables)

### HP 5900AF-48XG-4QSFP B-F Bundle

HP 5900AF-48XG-4QSFP B-F 4xUnit Bundle

- **4** - JC772A HP 5900AF-48XG-4QSFP+ Switch
QuickSpecs

HP 5900 Switch Series

Configuration

- 8 - JC680A HP 58x0AF 650W AC Power Supply
- 8 - JC682A HP 58x0AF Bck(pwr)-Frt(ports) Fan Tray
- 6 - JD097C HP X240 10G SFP+ SFP+ 3m DAC Cable
- 2 - JG081C HP X240 10G SFP+ SFP+ 5m DAC Cable
- 64 - JD092B HP X130 10G SFP+ LC SR Transceiver

Each Switch:

- 48 fixed 1000/10000 SFP+ ports (System Std=20 \ max=48 User min=0 \ max=28)
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)
- 2 Power Supplies Standard (min=2 \ max=2)
- 2 Back to Front Fan Trays Standard (min=2 \ max=2)
- 1U - Height

PDU Cable NA/MEX/TW/JP (8 Cables) JG847A#B2B

- C15 PDU Jumper Cord (NA/MEX/TW/JP) (8 Cables)

PDU Cable ROW (8 Cables) JG847A#B2C

- C15 PDU Jumper Cord (ROW) (8 Cables)

HP 5900AF-48XGT-4QSFP+ Switch JG336A

- 48 RJ-45 1/10GbE ports 4 QSFP+ 40-GbE ports (min=0 \ max=4)
- Must select min 1 Power Supply
- Must select min 2 Fan Tray
- 1U - Height

See Configuration Note: 2

HP 5900AF-48XGT-4QSFP F-B Bundle JG850A

HP 5900AF-48XGT-4QSFP F-B 4xUnit Bundle JG850A

- 4 - JG336A HP 5900AF-48XGT-4QSFP+ Switch
- 8 - JC680A HP 58x0AF 650W AC Power Supply
- 8 - JG552A HP X712 Frt(ports)-Bck(pwr) HV Fan Tray

Each Switch:

- 48 RJ-45 10GbE ports
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)
- 2 Power Supplies Standard (min=2 \ max=2)
- 2 Front to Back Fan Trays Standard (min=2 \ max=2)
- 1U - Height

PDU Cable NA/MEX/TW/JP (8 Cables) JG850A#B2B

- C15 PDU Jumper Cord (NA/MEX/TW/JP) (8 Cables)
QuickSpecs

HP 5900 Switch Series

Configuration

PDU Cable ROW (8 Cables)  
- C15 PDU Jumper Cord (ROW) (8 Cables)

HP 5900AF-48XGT-4QSFP B-F Bundle  
HP 5900AF-48XGT-4QSFP F-B 4xUnit Bundle  
- 4 - JG336A HP 5900AF-48XGT-4QSFP+ Switch  
- 8 - JC680A HP 58x0AF 650W AC Power Supply  
- 8 - JC553A HP X712 Bck(pwr)-Frt(ports) HV Fan Tray

Each Switch:
- 48 RJ-45 10GbE ports  
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)  
- 2 Power Supplies Standard (min=2 \ max=2)  
- 2 Back to Front Fan Trays Standard (min=2 \ max=2)  
- 1U - Height

PDU Cable NA/MEX/TW/JP (8 Cables)  
- C15 PDU Jumper Cord (NA/MEX/TW/JP) (8 Cables)

PDU Cable ROW (8 Cables)  
- C15 PDU Jumper Cord (ROW) (8 Cables)

HP 5900AF-48G-4XG-2QSFP+ Switch  
- 48 autosensing 10/100/1000 ports (RJ45)  
- 4 fixed 1000/10000 SFP+ ports (min=0 \ max=4)  
- 2 QSFP+ 40-GbE ports (min=0 \ max=2)  
- Must select min 1 Power Supply  
- Must select min 2 Fan Tray  
- 1U - Height

HP 5900AF-48G-4XG-2QSFP F-B Bundle  
HP 5900AF-48G-4XG-2QSFP F-B 4xUnit Bundle  
- 4 - JG510A HP 5900AF-48G-4XG-2QSFP+ Switch  
- 8 - JC680A HP 58x0AF 650W AC Power Supply  
- 8 - JC683A HP 58x0AF Frt(ports)-Bck(pwr) Fan Tray  
- 32 - JD092B HP X130 10G SFP+ LC SR Transceiver (16 Transceivers for the 4 Switches and 16 additional)

Each Switch:
- 48 autosensing 10/100/1000 ports (RJ45)  
- 4 fixed 1000/10000 SFP+ ports (System Std=4 \ max=4 User min=0 \ max=0)
QuickSpecs

HP 5900 Switch Series

Configuration

- 2 QSFP+ 40-GbE ports (min=0 \ max=2)
- 2 Power Supplies Standard (min=2 \ max=2)
- 2 Front to Back Fan Trays Standard (min=2 \ max=2)
- 1U - Height

PDU Cable NA/MEX/TW/JP (8 Cables) JG848A#B2B
- C15 PDU Jumper Cord (NA/MEX/TW/JP) (8 Cables)

PDU Cable ROW (8 Cables) JG848A#B2C
- C15 PDU Jumper Cord (ROW) (8 Cables)

HP 5900AF-48G-4XG-2QSFP B-F Bundle JG849A
HP 5900AF-48G-4XG-2QSFP B-F 4xUnt Bundle

- 4 - JG510A HP 5900AF-48G-4XG-2QSFP+ Switch
- 8 - JC680A HP 58x0AF 650W AC Power Supply
- 8 - JC682A HP 58x0AF Bck(pwr)-Frt(ports) Fan Tray
- 32 - JD092B HP X130 10G SFP+ LC SR Transceiver
  (16 Transceivers for the 4 Switches and 16 additional)

Each Switch:

- 48 autosensing 10/100/1000 ports (RJ45)
- 4 fixed 1000/10000 SFP+ ports(System Std=4 \ max=4 User min=0 \ max=0)
- 2 QSFP+ 40-GbE ports (min=0 \ max=2)
- 2 Power Supplies Standard (min=2 \ max=2)
- 2 Back to Front Fan Trays Standard (min=2 \ max=2)
- 1U - Height

PDU Cable NA/MEX/TW/JP (8 Cables) JG849A#B2B
- C15 PDU Jumper Cord (NA/MEX/TW/JP) (8 Cables)

PDU Cable ROW (8 Cables) JG849A#B2C
- C15 PDU Jumper Cord (ROW) (8 Cables)

Note 1 The following Transceivers install into this switch:
HP X130 SFP+ LC SR Transceiver JD092B
HP X130 SFP+ LC LRM Transceiver JD093B
HP X130 SFP+ LC LR Transceiver JD094B
HP X130 10G SFP+ LC ER 40km Transceiver JG234A
HP X240 10G SFP+ SFP+ 0.65m DAC Cable JD095C
HP X240 10G SFP+ SFP+ 1.2m DAC Cable JD096C
HP X240 10G SFP+ SFP+ 3m DAC Cable JD097C
HP X240 10G SFP+ SFP+ 5m DAC Cable JG081C
### Configuration

| HP X240 10G SFP+ 7m DAC Cable | JC784C |
| HP X125 1G SFP LC LH40 1310nm Transceiver | JD061A |
| HP X120 1G SFP LC LH40 1550nm Transceiver | JD062A |
| HP X125 1G SFP LC LH70 Transceiver | JD063B |
| HP X120 1G SFP RJ45 T Transceiver | JD089B |
| HP X120 1G SFP LC BX 10-U Transceiver | JD098B |
| HP X120 1G SFP LC BX 10-D Transceiver | JD099B |
| HP X125 1G SFP LC SX Transceiver | JD118B |
| HP X120 1G SFP LC LX Transceiver | JD119B |

**Note 2**  The following 40G Transceivers install into this switch:

| HP X140 40G QSFP+ LC LR4 SM XCVR | JG661A |
| HP X140 40G QSFP+ MPO SR4 XCVR | JG325B |
| HP X140 40G QSFP+ CSR4 300m XCVR | JG709A |
| HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| HP X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |
| HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |
| HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable | JG331A |

**Note 3**  The following FC Transceivers install into this switch:

| HP 16Gb FC/10GbE 100m SFP+ XCVR | H6Z42A |
| HP 8Gb Short Wave FC SFP+ 1 Pack | AJ718A |
| HP 8Gb LW 10km FC SFP+ 1 Pk Transceiver | AW584A |

**Note 6**  Localization (Wall Power Cord) required on orders without #B2B, #B2C (PDU Power Cord). (See Localization Menu)

### Box Level Integration CTO Models

#### CTO Solution Sku

**HP 59xx CTO Switch Solution**

- SSP trigger sku

#### CTO Switch Chassis

<table>
<thead>
<tr>
<th>HP FlexFabric 5900CP-48XG-4QSFP+ Switch</th>
<th>JG838A</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 fixed 1000/10000 SFP+ / FC SFP+ ports (min=0 \ max=48)</td>
<td>See Configuration Note: 1,2,3,10</td>
</tr>
<tr>
<td>4 QSFP+ 40-GbE ports (min=0 \ max=4)</td>
<td></td>
</tr>
<tr>
<td>Must select min 1 Power Supply</td>
<td></td>
</tr>
<tr>
<td>Must select min 2 Fan Tray</td>
<td></td>
</tr>
<tr>
<td>1U - Height</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HP 5900AF-48XG-4QSFP+ Switch</th>
<th>JC772A</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 fixed 1000/10000 SFP+ ports (min=0 \ max=48)</td>
<td>See Configuration Note: 1,2,10</td>
</tr>
<tr>
<td>4 QSFP+ 40-GbE ports (min=0 \ max=4)</td>
<td></td>
</tr>
<tr>
<td>Must select min 1 Power Supply</td>
<td></td>
</tr>
<tr>
<td>Must select min 2 Fan Tray</td>
<td></td>
</tr>
</tbody>
</table>
QuickSpecs

HP 5900 Switch Series

Configuration

- 1U - Height

HP 5900AF-48XGT-4QSFP+ Switch  JG336A
- 48 RJ-45 1/10GbE ports
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)
- min=0 \ max=4 QSFP+ Transceivers
- Must select min 1 Power Supply
- Must select min 2 Fan Tray
- 1U - Height

HP 5900AF-48G-4XG-2QSFP+ Switch  JG510A
- 48 autosensing 10/100/1000 ports (RJ45)
- 4 fixed 1000/10000 SFP+ ports (min=0 \ max=4)
- 2 QSFP+ 40-GbE ports (min=0 \ max=2)
- Must select min 1 Power Supply
- Must select min 2 Fan Tray
- 1U - Height

Note 1
The following Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable
HP X130 SFP+ LC SR Transceiver  JD092B
HP X130 SFP+ LC LRM Transceiver  JD093B
HP X130 SFP+ LC LR Transceiver  JD094B
HP X130 10G SFP+ LC ER 40km Transceiver  JG234A

Note 2
The following 40G Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable
HP X140 40G QSFP+ LC LR4 5M XCVR  JG661A
HP X140 40G QSFP+ MPO SR4 4XCVR  JG325B
HP X140 40G QSFP+ CSR4 300m XCVR  JG709A
HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable  JG326A
HP X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable  JG327A
HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable  JG328A
HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable  JG329A
HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable  JG330A
HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable  JG331A

Note 3
The following FC Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable
HP 16Gb FC/10GbE 100m SFP+ XCVR  H6Z42A
HP 8Gb Short Wave FC SFP+ 1 Pack  AJ718A
HP 8Gb LW 10km FC SFP+ 1 Pk Transceiver  AW584A

Note 10
If the Switch Chassis is to be Box Level Factory Integrated (CTO), Then the #0D1 is required on the Switch Chassis and integrated to the JG505A - HP 59xx CTO Switch Solution. (Min 1/Max 1 Switch per SSP)
# QuickSpecs

## HP 5900 Switch Series

### Configuration

## Rack Level Integration CTO Models

**HP FlexFabric 5900CP-48XG-4QSFP+ Switch**  
JG838A  
See Configuration  
Note: 1,2,3,5,11

- 48 fixed 1000/10000 SFP+ / FC SFP+ ports (min=0 \ max=48)  
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)
- Must select min 1 Power Supply  
- Must select min 2 Fan Tray  
- 1U - Height

**HP 5900AF-48XG-4QSFP+ Switch**  
JC772A  
See Configuration  
Note: 1,2,5,11

- 48 fixed 1000/10000 SFP+ ports (min=0 \ max=48)  
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)  
- Must select min 1 Power Supply  
- Must select min 2 Fan Tray  
- 1U - Height

**HP 5900AF-48XGT-4QSFP+ Switch**  
JG336A  
See Configuration  
Note: 2, 5,11

- 48 RJ-45 1/10GbE ports  
- 4 QSFP+ 40-GbE ports (min=0 \ max=4)  
- min=0 \ max=4 QSFP+ Transceivers  
- Must select min 1 Power Supply  
- Must select min 2 Fan Tray  
- 1U - Height

**HP 5900AF-48G-4XG-2QSFP+ Switch**  
JG510A  
See Configuration  
Note: 1,2,11

- 48 autosensing 10/100/1000 ports (RJ45)  
- 4 fixed 1000/10000 SFP+ ports (min=0 \ max=4)  
- 2 QSFP+ 40-GbE ports (min=0 \ max=2)  
- Must select min 1 Power Supply  
- Must select min 2 Fan Tray  
- 1U - Height

### Note 1

The following Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable

- HP X130 SFP+ LC SR Transceiver JD092B
- HP X130 SFP+ LC LRM Transceiver JD093B
- HP X130 SFP+ LC LR Transceiver JD094B
- HP X130 10G SFP+ LC ER 40km Transceiver JG234A
- HP X240 10G SFP+ SFP+ 0.65m DAC Cable JD095C
- HP X240 10G SFP+ SFP+ 1.2m DAC Cable JD096C
- HP X240 10G SFP+ SFP+ 3m DAC Cable JD097C
- HP X240 10G SFP+ SFP+ 5m DAC Cable JG081C
- HP X240 10G SFP+ SFP+ 7m DAC Cable JC784C
- HP X125 1G SFP LC LH40 1310nm Transceiver JD061A
- HP X120 1G SFP LC LH40 1550nm Transceiver JD062A
- HP X125 1G SFP LC LH70 Transceiver JD063B
- HP X120 1G SFP RJ45 T Transceiver JD089B
- HP X120 1G SFP LC BX 10-U Transceiver JD098B
- HP X120 1G SFP LC BX 10-D Transceiver JD099B
- HP X125 1G SFP LC SX Transceiver JD118B
QuickSpecs

HP 5900 Switch Series

Configuration

HP X120 1G SFP LC LX Transceiver  
JD119B

Note 2
The following 40G Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable
HP X140 40G QSFP+ LC LR4 SM XCVR  
JG661A
HP X140 40G QSFP+ MPO SR4 XCVR  
JG325B
HP X140 40G QSFP+ CS40 300m XCVR  
JG709A
HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable  
JG326A
HP X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable  
JG327A
HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable  
JG328A
HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable  
JG329A
HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable  
JG330A
HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable  
JG331A

Note 3
The following FC Transceivers install into this switch: (Use #0D1 or #B01 quoted to switch if switch is CTO) - if applicable
HP 16Gb FC/10GbE 100m SFP+ XCVR  
H6Z42A
HP 8Gb Short Wave FC SFP+ 1 Pack  
AJ718A
HP 8Gb LW 10km FC SFP+ 1 Pk Transceiver  
AW584A

Note 5
Switch Height is 2U if a Back to Front Fan Tray (JC682A/JG553A) is ordered #0D1 with this switch. REMARK: This only applies for CTO Rack Level Integration.

Note 11
If HP CTO Switch Chassis is selected for Rack Level Integration, Then the Switch needs to integrate (with #0D1) to the Rack.

Internal Power Supplies

(JG838A, JC772A, JG336A and JG510A) System (std 0 // max 2) User Selection (min 1 // max 2) per switch
(JG846A, JG847A, JG850A, JG851A, JG848A and JG849A) System (std 2 // max 2) User Selection (min 0 // max 0) per switch

HP 58x0AF 650W AC Power Supply  
JC680A
• includes 1 x c13, 300w

PDU Cable NA/MEX/TW/JP  
JC680A#B2B
• C15 PDU Jumper Cord (NA/MEX/TW/JP)

PDU Cable ROW  
JC680A#B2C
• C15 PDU Jumper Cord (ROW)

HP 58x0AF 650W DC Power Supply  
JC681A
See Configuration Note: 1

Configuration Rules

Note 1
If 2 power supplies are selected they must be the same Sku number.
### Note 2
REMARK: When Switches/Routers are Factory Racked, Then #B2B, or #B2C should be the Defaulted Power Cable option on the Switches/Routers.

### Remarks:
Drop down under power supply should offer the following options and results:
- **Switch/Router/Power Supply to PDU Power Cord - #B2B in North America, Mexico, Taiwan, and Japan or #B2C ROW.** (Watson Default B2B or B2C for Rack Level CTO)
- **Switch/Router/Power Supply to Wall Power Cord - Localized Option** (Watson Default for BTO and Box Level CTO)

### Localization

<table>
<thead>
<tr>
<th>Power Supply Region</th>
<th>Power Supply Model</th>
<th>Power Cord Details</th>
<th>Part Store #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, CEI 23-50, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0825</td>
</tr>
<tr>
<td>U.S. - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, NEMA 5-15P, C13 STRAIGHT, 125 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0822</td>
</tr>
<tr>
<td>Australia - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, AS/NZS 3112, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0828</td>
</tr>
<tr>
<td>Brazil - Portuguese localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, NBR 14136 Fig13, C13 STRAIGHT, 250 V, 2.5 A, 2.5 meters, 8.21 feet</td>
<td>8121-1069</td>
</tr>
<tr>
<td>Korea - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, CEE 7-VII, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0823</td>
</tr>
<tr>
<td>United Kingdom - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, BS 1363/A, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0824</td>
</tr>
<tr>
<td>Switzerland - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, SEV 6534-2 Type 12, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0827</td>
</tr>
<tr>
<td>Denmark - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, DK 2-5A, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0826</td>
</tr>
<tr>
<td>Japan - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, JIS C 8303, C13 STRAIGHT, 125 V, 12 A, 2.3 meters, 7.55 feet</td>
<td>8120-4753</td>
</tr>
<tr>
<td>India - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, IS 1293, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0928</td>
</tr>
<tr>
<td>South Africa - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, SABS 164, C13 STRAIGHT, 250 V, 10 A, 3 meters, 9.85 feet</td>
<td>8121-0919</td>
</tr>
<tr>
<td>Israel - English localization</td>
<td>HP A58x0AF 650W AC Power Supply</td>
<td>1, SI 32 90-DEG, C13 STRAIGHT, 250 V, 10 A, 2.5 meters, 8.21 feet</td>
<td>8121-1035</td>
</tr>
</tbody>
</table>
Enter the following menu selections as integrated to the CTO Model X server above if order is factory built.

| Transceivers | SFP Transceivers | HP X125 1G SFP LC LH40 1310nm Transceiver | JD061A |
| Transceivers | HP X120 1G SFP LC LH40 1550nm Transceiver | JD062A |
| Transceivers | HP X125 1G SFP LC LH70 Transceiver | JD063B |
| Transceivers | HP X120 1G SFP RJ45 T Transceiver | JD089B |
| Transceivers | HP X120 1G SFP LC BX 10-U Transceiver | JD098B |
| Transceivers | HP X120 1G SFP LC BX 10-D Transceiver | JD099B |
| Transceivers | HP X120 1G SFP LC SX Transceiver | JD118B |
| Transceivers | HP X120 1G SFP LC LX Transceiver | JD119B |
| Transceivers | HP X130 10G SFP+ LC SR Transceiver | JD092B |
| Transceivers | HP X130 10G SFP+ LC LRM Transceiver | JD093B |
| Transceivers | HP X130 10G SFP+ LC LR Transceiver | JD094B |
| Transceivers | HP X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable | JD095C |
| Transceivers | HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable | JD096C |
| Transceivers | HP X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable | JD097C |
| Transceivers | HP X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable | JG081C |
| Transceivers | HP X240 10G SFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| Transceivers | HP X240 10G SFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| Transceivers | HP StoreFabric 16Gb FC/10GbE 100m SR SFP+ Transceiver | H6Z42A |
| Transceivers | HP 8Gb Short Wave Fibre Channel SFP+ 1 Pack | AJ718A |
| Transceivers | HP 8Gb Long Wave 10km Fibre Channel SFP+ 1 Pack Transceiver | AW584A |
| Transceivers | HP X140 40G QSFP+ LC LR4 5m 1310nm Transceiver | JG661A |
| Transceivers | HP X140 40G QSFP+ MPO SR4 Transceiver | JG325B |
| Transceivers | HP X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver | JG709A |
| Transceivers | HP X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable | JG326A |
| Transceivers | HP X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable | JG327A |
| Transceivers | HP X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable | JG328A |
| Transceivers | HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable | JG329A |
| Transceivers | HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable | JG330A |
| Transceivers | HP X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable | JG331A |
QuickSpecs

HP 5900 Switch Series

Configuration


Switch Options  Fan Trays

(JG838A, JC772A, JG336A and JG510A) System (std 0 // max 2) User Selection (min 2 // max 2) per switch (JG846A, JG847A, JG850A, JG851A, JG848A and JG849A) System (std 2 // max 2) User Selection (min 0 // max 0) per switch

HP A58x0AF Back (power side) to Front (port side) Airflow Fan Tray

HP A58x0AF Front (port side) to Back (power side) Airflow Fan Tray

HP X711 Front (port side) to Back (power side) Airflow High Volume Fan Tray

HP X712 Back (power side) to Front (port side) Airflow High Volume Fan Tray

Configuration Rules

Note 1  Fan Trays cannot be mixed in the same switch enclosure

Note 3  Only supported on the JG838A, JC772A, JG510A, and JG554A

Note 4  Only supported on the JG336A, JC772A, JG510A, JG554A

Remarks: Watson Blue Text:
If there is any empty space below the switch in a rack when using Back to Front Fan Trays, JC682A, the rack will receive an Air Plenum kit that takes up 1U of additional space in the rack. The Air Plenum kit is not required on fully configured racks. This only applies for CTO Rack Level Integration. The Air Plenum Kit is a non-saleable SKU, and is brought in automatically for CTO Factory Rack Level Integration.
HP 5900AF-48XG-4QSFP+ Switch (JC772A)

I/O ports and slots
- 48 fixed 1000/10000 SFP+ ports
- 4 QSFP+ 40-GbE ports

Additional ports and slots
- 1 RJ-45 serial console port
- 1 RJ-45 out-of-band management port
- 1 USB 2.0

Power supplies
- 2 power supply slots
- 1 minimum power supply required (ordered separately)

Fan tray
- 2 fan tray slots

The customer must order fan trays, as fan trays are not included with the switch. This system requires two same-direction airflow fan trays to function properly. The system should not be operated with only one fan tray for more than 24 hours. The system should not be operated without a fan tray for more than two minutes. The system should not be operated outside of the temperature range of 32°F (0°C) to 113°F (45°C). Failure to comply with these operating requirements may void the product warranty.

Physical characteristics
- Dimensions: 17.32(w) x 25.98(d) x 1.72(h) in (43.99 x 65.99 x 4.37 cm)
- Weight: 28.66 lb (13 kg) shipping weight

Memory and processor
- 512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB

Performance
- 10 Gbps Latency: < 1.5 μs (64-byte packets)
- Throughput: 952 million pps
- Routing/Switching capacity: 1280 Gb/s
- Routing table size: 16000 entries (IPv4), 8000 entries (IPv6)
- MAC address table size: 128000 entries

Environment
- Operating temperature: 32°F to 113°F (0°C to 45°C)
- Operating relative humidity: 10% to 90%, noncondensing

Acoustic
- Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB

Electrical characteristics
- Frequency: 50/60 Hz
- Maximum heat dissipation: 887 BTU/hr (935.79 kJ/hr)
- AC voltage: 100–240 VAC
- Maximum power rating: 260 W
- Idle power: 200 W

Safety
- UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; ULAR; GOST; EN 60950-1/A11; FDA 21 CFR Subchapter J; NOM; ROHS Compliance

Emissions

Immunity
- Generic: ETSI EN 300 386 V1.3.3
- ESD: EN 61000-4-2; IEC 61000-4-2
- Radiated: EN 61000-4-3; IEC 61000-4-3
- EFT/Burst: EN 61000-4-4; IEC 61000-4-4
- Surge: EN 61000-4-5; IEC 61000-4-5
- Conducted: EN 61000-4-6; IEC 61000-4-6
QuickSpecs

HP 5900 Switch Series

Technical Specifications

- **Power frequency magnetic field**: IEC 61000-4-8; EN 61000-4-8
- **Voltage dips and interruptions**: EN 61000-4-11; IEC 61000-4-11
- **Harmonics**: EN 61000-3-2, IEC 61000-3-2
- **Flicker**: EN 61000-3-3, IEC 61000-3-3

**Management**
- IMC - Intelligent Management Center; command-line interface; out-of-band management; SNMP Manager; Telnet; FTP

**Notes**
The customer must order a power supply, as the device does not come with one. At least one JC680A or JC681A is required.

**Services**
Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

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**HP 5900AF-48G-4XG-2QSFP+ Switch** (JG510A)

**I/O ports and slots**
- 48 autosensing 10/100/1000 ports; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)
- 4 fixed 1000/10000 SFP+ ports
- 2 QSFP+ 40-GbE ports

**Additional ports and slots**
- 1 RJ-45 serial console port
- 1 RJ-45 out-of-band management port
- 1 USB 2.0

**Power supplies**
- 2 power supply slots
- 1 minimum power supply required (ordered separately)

**Fan tray**
- 2 fan tray slots
  The customer must order fan trays, as fan trays are not included with the switch. This system requires two same-direction airflow fan trays to function properly. The system should not be operated with only one fan tray for more than 24 hours. The system should not be operated without a fan tray for more than two minutes. The system should not be operated outside of the temperature range of 32°F (0°C) to 113°F (45°C). Failure to comply with these operating requirements may void the product warranty.

**Physical characteristics**

- **Dimensions**: 17.32(w) x 18.11(d) x 1.72(h) in (43.99 x 46.0 x 4.37 cm) (1U height)
- **Weight**: 28.66 lb (13 kg) shipping weight

**Memory and processor**
- 512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB

**Performance**

- **10 Gbps Latency**: < 1.5 μs (64-byte packets)
- **Throughput**: 250 million pps (64-byte packets)
- **Routing/Switching capacity**: 336 Gb/s
- **Routing table size**: 16000 entries (IPv4), 8000 entries (IPv6)
- **MAC address table size**: 128000 entries

**Environment**

- **Operating temperature**: 32°F to 113°F (0°C to 45°C)
- **Operating relative humidity**: 10% to 90%, noncondensing
- **Acoustic**: Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB

**Electrical characteristics**

- **Frequency**: 50/60 Hz
- **Maximum heat dissipation**: 887 BTU/hr (935.79 kJ/hr)
- **AC Voltage**: 100-240 VAC
### Technical Specifications

<table>
<thead>
<tr>
<th><strong>Maximum power rating</strong></th>
<th>260 W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Idle power</strong></td>
<td>200 W</td>
</tr>
</tbody>
</table>

**Safety**
- UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; ULAR; GOST; EN 60950-1/A11; FDA 21 CFR Subchapter J; NOM; ROHS Compliance

**Emissions**

**Immunity**
- Generic ETSI EN 300 386 V1.3.3
- ESD EN 61000-4-2; IEC 61000-4-2
- Radiated EN 61000-4-3; IEC 61000-4-3
- EFT/Burst EN 61000-4-4; IEC 61000-4-4
- Surge EN 61000-4-5; IEC 61000-4-5
- Conducted EN 61000-4-6; IEC 61000-4-6
- Power frequency magnetic field IEC 61000-4-8; EN 61000-4-8
- Voltage dips and interruptions EN 61000-4-11; IEC 61000-4-11
- Harmonics EN 61000-3-2, IEC 61000-3-2
- Flicker EN 61000-3-3, IEC 61000-3-3

**Management**
- IMC – Intelligent Management Center; command-line interface; out-of-band management; SNMP Manager; Telnet; FTP

**Notes**
The customer must order a power supply, as the device does not come with one. At least one JC680A or JC681A is required.

**Services**
Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

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**HP 5900AF-48XGT-4QSFP+ Switch** (JG336A)

**I/O ports and slots**
- 48 RJ-45 1/10GbE ports (IEEE 802.3an-2006 Type 10GBASE-T and IEEE 802.3ab-2008 Type 1000BASE-T)
- 4 QSFP+ 40-GbE ports

**Additional ports and slots**
- 1 RJ-45 serial console port
- 1 RJ-45 out-of-band management port
- 1 USB 2.0

**Power supplies**
- 2 power supply slots
- 1 minimum power supply required (ordered separately)

**Fan tray**
- 2 fan tray slots
- The customer must order fan trays, as fan trays are not included with the switch. This system requires two same-direction airflow fan trays to function properly. The system should not be operated with only one fan tray for more than 24 hours. The system should not be operated without a fan tray for more than two minutes. The system should not be operated outside of the temperature range of 32°F (0°C) to 113°F (45°C). Failure to comply with these operating requirements may void the product warranty.

**Physical characteristics**
- **Dimensions** 17.32(w) x 25.98(d) x 1.72(h) in (43.99 x 65.99 x 4.37 cm)
- **Weight** 28.66 lb (13 kg), Fully loaded

**Memory and processor**
- 512 MB flash, 2 GB SDRAM; packet buffer size: 9 MB

**Performance**
- **10 Gbps Latency** < 1.5 μs (64-byte packets)
**QuickSpecs**

**HP 5900 Switch Series**

**Technical Specifications**

**Throughput**
- 952 million pps

**Routing/Switching capacity**
- 1280 Gb/s

**Routing table size**
- 16000 entries (IPv4), 8000 entries (IPv6)

**MAC address table size**
- 128000 entries

**Environment**
- **Operating temperature**: 32°F to 113°F (0°C to 45°C)
- **Operating relative humidity**: 10% to 90%, noncondensing

**Acoustic**
- Low-speed fan: 65.7 dB, High-speed fan: 70.6 dB

**Electrical characteristics**
- **Frequency**: 50/60 Hz
- **Maximum heat dissipation**: 887 BTU/hr (935.79 kJ/hr)
- **AC Voltage**: 100-240 VAC
- **Maximum power rating**: 260 W
- **Idle power**: 200 W

**Safety**
- UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1; Anatel; ULAR; GOST; EN 60950-1/A11; FDA 21 CFR Subchapter J; NOM; ROHS Compliance

**Emissions**

**Immunity**
- **Generic**: ETSI EN 300 386 V1.3.3
- **ESD**: EN 61000-4-2; IEC 61000-4-2
- **Radiated**: EN 61000-4-3; IEC 61000-4-3
- **EFT/Burst**: EN 61000-4-4; IEC 61000-4-4
- **Surge**: EN 61000-4-5; IEC 61000-4-5
- **Conducted**: EN 61000-4-6; IEC 61000-4-6
- **Power frequency magnetic field**: IEC 61000-4-8; EN 61000-4-8
- **Voltage dips and interruptions**: EN 61000-4-11; IEC 61000-4-11
- **Harmonics**: EN 61000-3-2, IEC 61000-3-2
- **Flicker**: EN 61000-3-3, IEC 61000-3-3

**Management**
- IMC - Intelligent Management Center; command-line interface; out-of-band management; SNMP Manager; Telnet; FTP

**Notes**
- The customer must order a power supply, as the device does not come with one. At least one JC680A or JC681A is required.

**Services**
- Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

**Standards and protocols**

**BGP**
- RFC 1163 Border Gateway Protocol (BGP)
- RFC 1771 BGPv4
- RFC 1997 BGP Communities Attribute
- RFC 2918 Route Refresh Capability
- RFC 3392 Capabilities Advertisement with BGP-4

**IPv6**
- RFC 2080 RIPng for IPv6
- RFC 2460 IPv6 Specification
- RFC 2461 IPv6 Neighbor Discovery
- RFC 2462 IPv6 Stateless Address Auto-configuration
QuickSpecs

HP 5900 Switch Series

Technical Specifications

RFC 4271 A Border Gateway Protocol 4 (BGP-4)
RFC 4360 BGP Extended Communities Attribute
RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
RFC 4760 Multiprotocol Extensions for BGP-4

Device management
RFC 1157 SNMPv1/v2c
RFC 1305 NTPv3
RFC 1591 DNS (client)
RFC 1902 (SNMPv2)
RFC 1908 (SNMP v1/2 Coexistence)
RFC 2573 (SNMPv3 Applications)
RFC 2576 (Coexistence between SNMP V1, V2, V3)
Multiple Configuration Files
Multiple Software Images
SSHv1/SSHv2 Secure Shell
TACACS/TACACS+

General protocols
IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
IEEE 802.3ad Link Aggregation Control Protocol (LACP)
IEEE 802.3ae 10-Gigabit Ethernet
IEEE 802.3ag Ethernet OAM
IEEE 802.3ah Ethernet in First Mile over Point to Point Fiber - EFMF
IEEE 802.3x Flow Control
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 854 TELNET
RFC 856 TELNET
RFC 868 Time Protocol
RFC 896 Congestion Control in IP/TCP
Internetworks
RFC 950 Internet Standard Subnetting Procedure
RFC 1027 Proxy ARP
RFC 1058 RIPv1
RFC 1091 Telnet Terminal-Type Option
RFC 1141 Incremental updating of the Internet checksum
RFC 1142 OSI IS-IS Intra-domain Routing Protocol
RFC 1191 Path MTU discovery
RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
RFC 1253 (OSPF v2)

OSPF
RFC 1587 OSPF NSSA
RFC 2328 OSPFv2
RFC 3101 OSPF NSSA
RFC 3137 OSPF Stub Router Advertisement
RFC 3623 Graceful OSPF Restart
RFC 4577 OSPF as the Provider/Customer Edge Protocol for BGP/MPLS IP Virtual Private Networks (VPNs)
RFC 4811 OSPF Out-of-Band LSDB Resynchronization
RFC 4812 OSPF Restart Signaling
RFC 4813 OSPF Link-Local Signaling

QoS/CoS
IEEE 802.1P (CoS)
RFC 2475 DiffServ Architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 3247 Supplemental Information for the New Definition of the EF PHB (Expedited Forwarding Per-Hop Behavior)
QuickSpecs

HP 5900 Switch Series

Technical Specifications

RFC 1531 Dynamic Host Configuration Protocol
RFC 1533 DHCP Options and BOOTP Vendor Extensions
RFC 1534 DHCP/BOOTP Interoperation
RFC 1541 DHCP
RFC 1591 DNS (client only)
RFC 1624 Incremental Internet Checksum
RFC 1723 RIP v2
RFC 1812 IPv4 Routing
RFC 2030 Simple Network Time Protocol (SNTP) v4
RFC 2131 DHCP
RFC 2236 IGMP Snooping
RFC 2338 VRRP
RFC 2453 RIPv2
RFC 2581 TCP Congestion Control
RFC 2644 Directed Broadcast Control
RFC 2767 Dual Stacks IPv4 & IPv6
RFC 3046 DHCP Relay Agent Information Option
RFC 3768 Virtual Router Redundancy Protocol (VRRP)
RFC 4250 The Secure Shell (SSH) Protocol
RFC 4251 The Secure Shell (SSH) Protocol Architecture
RFC 4252 The Secure Shell (SSH) Authentication Protocol
RFC 4253 The Secure Shell (SSH) Transport Layer Protocol
RFC 4254 The Secure Shell (SSH) Connection Protocol
RFC 4364 BGP/MPLS IP Virtual Private Networks (VPNs)
RFC 4419 Diffie-Hellman Group Exchange for the Secure Shell (SSH) Transport Layer Protocol
RFC 4594 Configuration Guidelines for DiffServ Service Classes
RFC 4941 Privacy Extensions for Stateless Address Autoconfiguration in IPv6

RFC 3260 New Terminology and Clarifications for DiffServ

Security
Access Control Lists (ACLs)
SSHv2 Secure Shell
### HP X120 1G SFP LC LH40 1550nm Transceiver (JD062A)

A small form-factor pluggable (SFP) Gigabit LH40 transceiver that provides a full-duplex Gigabit solution up to 40 km on a single mode fiber.

<table>
<thead>
<tr>
<th><strong>Ports</strong></th>
<th>1 LC 1000BASE-LH port (no IEEE standard exists for 1550 nm optics)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectivity</strong></td>
<td><strong>Connector type</strong> LC</td>
</tr>
<tr>
<td></td>
<td><strong>Wavelength</strong> 1550 nm</td>
</tr>
<tr>
<td><strong>Physical characteristics</strong></td>
<td><strong>Dimensions</strong> 2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)</td>
</tr>
<tr>
<td><strong>Electrical characteristics</strong></td>
<td><strong>Full configuration weight</strong> 0.04 lb. (0.02 kg)</td>
</tr>
<tr>
<td></td>
<td><strong>Power consumption typical</strong> 0.8 W</td>
</tr>
<tr>
<td></td>
<td><strong>Power consumption maximum</strong> 1.0 W</td>
</tr>
</tbody>
</table>

**Cabling**

- **Cable type:** Single-mode fiber optic, complying with ITU-T G.652;
- **Maximum distance:** 40 km

**Services**

Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

### HP X125 1G SFP LC LH70 Transceiver (JD063B)

A small form-factor pluggable (SFP) Gigabit LH70 transceiver that provides a full-duplex Gigabit solution up to 70 km on a single-mode fiber.

<table>
<thead>
<tr>
<th><strong>Ports</strong></th>
<th>1 LC 1000BASE-LH port (no IEEE standard exists for 1550 nm optics)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectivity</strong></td>
<td><strong>Connector type</strong> LC</td>
</tr>
<tr>
<td></td>
<td><strong>Wavelength</strong> 1550 nm</td>
</tr>
<tr>
<td><strong>Physical characteristics</strong></td>
<td><strong>Dimensions</strong> 2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)</td>
</tr>
<tr>
<td><strong>Electrical characteristics</strong></td>
<td><strong>Full configuration weight</strong> 0.04 lb. (0.02 kg)</td>
</tr>
<tr>
<td></td>
<td><strong>Power consumption typical</strong> 0.8 W</td>
</tr>
<tr>
<td></td>
<td><strong>Power consumption maximum</strong> 1.0 W</td>
</tr>
</tbody>
</table>

**Cabling**

- **Cable type:** Single-mode fiber optic, complying with ITU-T G.652;
- **Maximum distance:** 70 km

**Services**

Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

### HP X120 1G SFP LC SX Transceiver (JD118B)

<table>
<thead>
<tr>
<th><strong>Ports</strong></th>
<th>1 LC 1000BASE-SX port</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connectivity</strong></td>
<td><strong>Connector type</strong> LC</td>
</tr>
<tr>
<td></td>
<td><strong>Wavelength</strong> 850 nm</td>
</tr>
</tbody>
</table>

**Services**

Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
QuickSpecs

Accessory Product Details

A small form-factor pluggable (SFP) Gigabit SX transceiver that provides a full-duplex Gigabit solution up to 550m on a Multimode fiber.

<table>
<thead>
<tr>
<th>Physical characteristics</th>
<th>Dimensions</th>
<th>2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full configuration weight</td>
<td></td>
<td>0.04 lb. (0.02 kg)</td>
</tr>
</tbody>
</table>

**Electrical characteristics**

- **Power consumption typical**: 0.8 W
- **Power consumption maximum**: 1.0 W

**Cabling**

- **Maximum distance**:
  - FDDI Grade distance = 220m
  - OM1 = 275m
  - OM2 = 500m
  - OM3 = Not Specified by standard
- **Cable length** up to 550m
- **Fiber type**: Multi Mode

**Services**

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

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**HP X120 1G SFP LC LX Transceiver (JD119B)**

A small form-factor pluggable (SFP) Gigabit LX transceiver that provides a full duplex Gigabit solution up to 550m on MMF or 10Km on SMF

**Ports**

- **1 SFP 1000BASE-LX port (IEEE 802.3z Type 1000BASE-LX)**

**Connectivity**

- **Connector type**: LC
- **Wavelength**: 1300 nm

**Physical characteristics**

- **Dimensions**: 2.17(d) x 0.6(w) x 0.46(h) in. (5.51 x 1.52 x 1.17 cm)
- **Full configuration weight**: 0.04 lb. (0.02 kg)

**Electrical characteristics**

- **Power consumption typical**: 0.8 W
- **Power consumption maximum**: 1.0 W

**Cabling**

- **Cable type**: Either single mode or multimode;
- **Maximum distance**:
  - 550m for Multimode
  - 10km for Singlemode
- **Fiber type**: Both

**Services**

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

---

**HP X125 1G SFP RJ45 T Transceiver (JD089B)**

A small form-factor pluggable (SFP) Gigabit 1000Base-T transceiver

**Ports**

- **1 RJ-45 1000BASE-T port (IEEE 802.3ab Type 1000BASE-T)**

**Connectivity**

- **Connector type**: RJ-45

**Physical characteristics**

- **Dimensions**: 2.71(d) x 0.54(w) x 0.55(h) in. (6.88 x 1.37 x 1.4 cm)
- **Full configuration weight**: 0.07 lb. (0.03 kg)

**Electrical characteristics**

- **Power consumption typical**: 0.8 W
- **Power consumption maximum**: 1.0 W

**Cabling**

- **Cable type**: 1000BASE-T: Category 5 (5E or better recommended), 100 Ù differential 4-pair unshielded
### Accessory Product Details

<table>
<thead>
<tr>
<th>Services</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A transceiver that provides a full duplex Gigabit solution up to 100m on a Cat-5+ cable.</td>
</tr>
<tr>
<td></td>
<td>A twisted pair (UTP) or shielded twisted pair (STP) balanced, complying with IEEE 802.3ab 1000BASE-T;</td>
</tr>
<tr>
<td></td>
<td><strong>Maximum distance:</strong></td>
</tr>
<tr>
<td></td>
<td>• 100m</td>
</tr>
</tbody>
</table>

Refer to the HP website at: [www.hp.com/networking/services](http://www.hp.com/networking/services) for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.
## Summary of Changes

<table>
<thead>
<tr>
<th>Date</th>
<th>Version History</th>
<th>Action</th>
<th>Description of Change:</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-June-2014</td>
<td>From Version 22 to 23</td>
<td>Changed</td>
<td>Overview section revised.</td>
</tr>
<tr>
<td>31-Mar-2014</td>
<td>From Version 21 to 22</td>
<td>Changed</td>
<td>Transceivers were revised.</td>
</tr>
<tr>
<td>19-Mar-2014</td>
<td>From Version 20 to 21</td>
<td>Changed</td>
<td>Product descriptions, Transceivers, and notes were revised in Configuration.</td>
</tr>
<tr>
<td>04-Mar-2014</td>
<td>From Version 19 to 20</td>
<td>Changed</td>
<td>Transceivers and Switch Options were revised.</td>
</tr>
<tr>
<td>25-Feb-2014</td>
<td>From Version 18 to 19</td>
<td>Changed</td>
<td>Transceivers and Switch Options were revised.</td>
</tr>
<tr>
<td>18-Feb-2014</td>
<td>From Version 17 to 18</td>
<td>Added</td>
<td>HP FF 5900CP-48XG -4QSFP+ Switch was added to Configuration.</td>
</tr>
<tr>
<td>12-Nov-2013</td>
<td>From Version 16 to 17</td>
<td>Changed</td>
<td>Build to Order, Box Level Integration CTO Models, Rack Level Integration CTO Models, Internal Power Supplies, and Switch Options were revised.</td>
</tr>
<tr>
<td>14-Oct-2013</td>
<td>From Version 15 to 16</td>
<td>Added</td>
<td>Added a new Transceiver in two locations in the Configuration section.</td>
</tr>
<tr>
<td>09-Aug-2013</td>
<td>From Version 14 to 15</td>
<td>Changed</td>
<td>Configuration as revised.</td>
</tr>
<tr>
<td>19-Jul-2013</td>
<td>From Version 13 to 14</td>
<td>Changed</td>
<td>Configuration as revised.</td>
</tr>
<tr>
<td>02-Jul-2013</td>
<td>From Version 9 to 13</td>
<td>Changed</td>
<td>The description of model JG336A was corrected throughout.</td>
</tr>
<tr>
<td>12-Jun-2013</td>
<td>From Version 8 to 9</td>
<td>Changed</td>
<td>Build-to-Order was revised.</td>
</tr>
<tr>
<td>10-Jun-2013</td>
<td>From Version 7 to 8</td>
<td>Changed</td>
<td>Configuration was revised.</td>
</tr>
<tr>
<td>25-Mar-2013</td>
<td>From Version 6 to 7</td>
<td>Added</td>
<td>Added Part numbers and descriptions to the following Sections:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Build to Order</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Box Level Integration CTO Models</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rack Level Integration CTO Models</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Switch Options Added Notes 3, and 4 to the Switch Options Section</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deleted</td>
<td>Deleted several part numbers to the Standards and Protocols Section</td>
</tr>
<tr>
<td>27-Feb-2013</td>
<td>From Version 5 to 6</td>
<td>Changed</td>
<td>The formatting of the new Configuration section was revised.</td>
</tr>
<tr>
<td>19-Feb-2013</td>
<td>From Version 3 to 5</td>
<td>Added</td>
<td>The configuration section was added. Line art was added.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Changed</td>
<td>Product overview, Features and benefits, Model specifications, and Accessories were revised.</td>
</tr>
<tr>
<td>04-Dec-2012</td>
<td>From Version 2 to 3</td>
<td>Changed</td>
<td>Updated Features and Benefits and made minor updates to the model specifications and accessories.</td>
</tr>
<tr>
<td>02-Apr-2011</td>
<td>From Version 1 to 2</td>
<td>Changed</td>
<td>Part number was revised.</td>
</tr>
</tbody>
</table>
QuickSpecs

Summary of Changes

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