RETIRED: This document has been officially retired, and the base products listed herein are now considered obsolete and are no longer available for sale. Consequently, the information contained within may no longer be current. This document is provided exclusively for reference and informational purposes.

Overview

HPE FlexNetwork 5510 HI Switch Series

The HPE FlexNetwork 5510 HI Switch Series comprises Gigabit Ethernet switches that deliver resiliency, security, and multiservice support capabilities at the edge layer of data center, large campus, and metro Ethernet networks.

With Intelligent Resilient Fabric (IRF) support and available dual power supplies, the HPE FlexNetwork 5510 HI Series Switch can deliver high levels of resiliency and manageability. In addition, the PoE+ models provide up to 1440 W of PoE+ power with the dual power supply configuration.

Designed with four fixed 10GbE ports and supports additional modular uplinks, these switches can provide up to six 10GbE uplink ports. With complete IPv4/IPv6, OpenFlow, and MPLS/VPLS features, the series provides investment protection with an easy transition from IPv4 to IPv6 networks.



HPE FlexNetwork 5510 24G 4SFP+ HI 1-slot Switch

Key features

- Scalable with 10 Gigabit uplinks and 9-chassis IRF with up to 160 GB/s stacking bandwidth
- 40G QSFP+ ports for uplink or stacking
- 4 convenient built-in SFP+ 10GbE uplinks provide performance for bandwidth hungry applications
- PoE+ for up to 30 Watts of PoE power per port on all ports simultaneously
- MACsec support

Models

HPE FlexNetwork 5510 24G 4SFP+ HI 1-slot Switch	JH145A
HPE FlexNetwork 5510 48G 4SFP+ HI 1-slot Switch	JH146A
HPE FlexNetwork 5510 24G PoE+ 4SFP+ HI 1-slot Switch	JH147A
HPE FlexNetwork 5510 48G PoE+ 4SFP+ HI 1-slot Switch	JH148A
HPE FlexNetwork 5510 24G SFP 4SFP+ HI 1-slot Switch	JH149A

Standard Features

Features and benefits

Software-defined networking

- **OpenFlow**
  supports OpenFlow 1.3 specification to enable SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths

Quality of Service (QoS)

- **Advanced classifier-based QoS**
  classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- **Traffic policing**
  supports Committed Access Rate (CAR) and line rate
- **Powerful QoS feature**
  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, or remark; supports the following congestion actions: strict priority (SP) queuing, weighted round robin (WRR), weighted fair queuing (WFQ), weighted random early discard (WRED), weighted deficit round robin (WDRR), SP+WDRR, and SP+WFQ
- **Storm restraint**
  allows limitation of broadcast, multicast, and unknown unicast traffic rate to reduce unwanted broadcast traffic on the network
- **Broadcast control**
  allows limitations of broadcast traffic rate to cut down on unwanted network broadcast traffic

Management

- **Friendly port names**
  allows assignment of descriptive names to ports
- **sFlow (RFC 3176)**
  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
- **Complete session logging**
  provides detailed information for problem identification and resolution
- **Remote configuration and management**
  enables configuration and management through a CLI located on a remote device
- **Manager and operator privilege levels**
  provides read-only (operator) and read/write (manager) access on CLI management interfaces
- **Management VLAN**
  segments traffic to and from management interfaces, including CLI/Telnet and SNMP
- **Command authorization**
  leverages RADIUS/HWTACACS to link a custom list of CLI commands to an individual network administrator's login; also provides an audit trail
- **Remote monitoring (RMON)**
  uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
- **Multiple configuration files**
  stores easily to the flash image
- **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

Standard Features

- **In-service software upgrade (ISSU)**
  enables operators to perform upgrades in the shortest possible amount of time with reduced risk to network operations or traffic disruptions
- **In-service software upgrade (ISSU)**
  enables operators to perform upgrades in the shortest possible amount of time with reduced risk to network operations or traffic disruptions
- **Network Management**
  SNMP v1/v2c/v3, MIB-II with Traps, and RADIUS Authentication Client MIB (RFC 2618); embedded HTML management tool with secure access
- **IPv6 management**
  provides future-proof networking because the switch is capable of being managed whether the attached network is running IPv4 or IPv6; supports pingv6, tracertv6, Telnetv6, TFTPv6, DNSv6, syslogv6, FTPv6, SNMPv6, DHCPv6, and RADIUS for IPv6
- **Troubleshooting**
  ingress and egress port monitoring enables network problem-solving; virtual cable tests provide visibility into cable problems
- **HPE Intelligent Management Center (IMC)**
  integrates fault management, element configuration, and network monitoring from a central vantage point; built-in support for third-party devices enables network administrators to centrally manage all network elements with a variety of automated tasks, including discovery, categorization, baseline configurations, and software images; the software also provides configuration comparison tools, version tracking, change alerts, and more

Connectivity

- **Auto-MDIX**
  automatically adjusts for straight-through or crossover cables on all 10/100/1000 ports
- **Packet storm protection**
  protects against broadcast, multicast, or unicast storms with user-defined thresholds
- **Ethernet operations, administration and maintenance (OAM)**
  detects data link layer problems that occurred in the "last mile" using the IEEE 802.3ah OAM standard; monitors the status of the link between two devices
- **Flow control**
  provides back pressure using standard IEEE 802.3x, reducing congestion in heavy traffic situations
- **Fixed 10GbE ports**
  provides four fixed SFP+ ports for a 20 GbE connection to the network without the need for additional extension interface modules
- **Optional 10GbE or 40GbE ports**
  deliver, through the use of optional modules, additional 10GbE or 40GbE connections, which are available for uplinks or high-bandwidth server connections; flexibly support copper, SFP+, or 40GbE QSFP+ connections
- **Jumbo packet support**
  supports up to 10000-byte frame size to improve the performance of large data transfers
- **IEEE 802.3at Power over Ethernet (PoE+)**
  provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments

Performance

- **Hardware-based wirespeed access control lists (ACLs)**
  help provide high levels of security and ease of administration without impacting network performance with a feature-rich TCAM-based ACL implementation
- **Nonblocking architecture**
  delivers up to 336 Gb/s of wire-speed switching with a nonblocking switching fabric and up to 250 million pps throughput

Standard Features

Virtual private network (VPN)

- **Generic Routing Encapsulation (GRE)**
  transports Layer 2 connectivity over a Layer 3 path in a secured way; enables the segregation of traffic from site to site

Resiliency and high availability

- **Separate data and control paths**
  separates control from services and keeps service processing isolated; increases security and performance
- **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
- **Intelligent Resilient Fabric (IRF)**
  creates virtual resilient switching fabrics, where two to nine switches perform as a single L2 switch and L3 router; switches do not have to be co-located and can be part of a disaster-recovery system; servers or switches can be attached using standard LACP for automatic load balancing and high availability; can eliminate need for complex protocols like Spanning Tree Protocol, Equal-Cost Multipath (ECMP), or VRRP, thereby simplifying network operation
- **Rapid Ring Protection Protocol (RRPP)**
  connects multiple switches in a high-performance ring using standard Ethernet technology; traffic can be rerouted around the ring in less than 50 ms, reducing the impact on traffic and applications
- **Smart Link**
  Allows under 100ms failover between links
- **Virtual Router Redundancy Protocol (VRRP)**
  allows groups of two routers to dynamically back each other up to create highly available routed environments
- **IRF Capability**
  provides single IP address management for a resilient virtual switching fabric of up to nine switches using up to 160 Gb/s bidirectional using QSFP+ links
- **Spanning Tree/PVST+, MSTP, RSTP**
  provides redundant links while preventing network loops
- **Internal Dual Redundant Power Supply**
  provides high reliability by keeping network up while delivering up to 1440 Watts of PoE+

Manageability

- **Dual flash images**
  provides independent primary and secondary operating system files for backup while upgrading
- **Multiple configuration files**
  allow multiple configuration files to be stored to a flash image
- **Troubleshooting**
  allows ingress and egress port monitoring, enabling network problem solving; virtual cable tests provide visibility into cable problems
- **IPv6 management**
  future-proofs networking, as the switch is capable of being managed whether the attached network is running IPv4 or IPv6; supports pingv6, tracertv6, Telnetv6, TFTPv6, DNSv6, and ARPv6

Layer 2 switching

- **GARP VLAN Registration Protocol**
  allows automatic learning and dynamic assignment of VLANs
- **IP multicast snooping and data-driven IGMP**
  automatically prevents flooding of IP multicast traffic
- **Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping**
  controls and manages the flooding of multicast packets in a Layer 2 network
- **32K MAC addresses**
  provide access to many Layer 2 devices
- **IEEE 802.1ad QinQ and selective QinQ**
  increase the scalability of an Ethernet network by providing a hierarchical structure; connect multiple LANs on a high-speed campus or metro network

Standard Features

- **10GbE port aggregation**
  allows grouping of ports to increase overall data throughput to a remote device
- **Spanning Tree/MSTP, RSTP, and STP root guard**
  prevent network loops
- **64 MSTP instances**
  allow multiple configurations of STP per VLAN group
- **Isolation at data link layer with private VLANs**
  provides, through a two-tier VLAN structure, an additional layer of protection, simplifying network configuration while saving VLAN resources
- **VLAN support and tagging**
  supports the IEEE 802.1Q (4094 VLAN IDs)

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; supports client; DHCP Relay enables DHCP operation across subnets
- **Loopback interface address**
  defines an address that can always be reachable, improving diagnostic capability
- **User Datagram Protocol (UDP) helper function**
  allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP
- **Route maps**
  provide more control during route redistribution; allow filtering and altering of route metrics
- **DHCP server**
  centralizes and reduces the cost of the IPv4 address management

Layer 3 routing

- **IPv4 routing protocols**
  support static routes, RIP, OSPF, ISIS, and BGP
- **IPv6 routing protocols**
  provide routing of IPv6 at wire speed; support static routes, RIPng, OSPFv3, IS-ISv6, and BGP4+ for IPv6
- **PIM-SSM, PIM-DM, and PIM-SM (for IPv4 and IPv6)**
  support IP Multicast address management and inhibition of DoS attacks
- **MPLS support**
  provides extended support of MPLS, including MPLS VPNs and MPLS Traffic Engineering (MPLS TE)
- **Virtual Private LAN Service (VPLS)**
  establishes point-to-multipoint Layer 2 VPNs across a provider network
- **Bidirectional Forwarding Detection (BFD)**
  enables link connectivity monitoring and reduces network convergence time for RIP, OSPF, BGP, IS-IS, VRRP, MPLS, and IRF
- **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
- **IPv6 tunneling**
  allows a smooth transition from IPv4 to IPv6 by encapsulating IPv6 traffic over an existing IPv4 infrastructure

Standard Features

Security

- **Access control lists (ACLs)**
  provide IP Layer 2 to Layer 4 traffic filtering; support global ACL, VLAN ACL, port ACL, and IPv6 ACL; up to 3K ingress ACLs and 1K egress ACLs are supported
- **IEEE 802.1X**
  defines an industry-standard method of user authentication using an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server
- **MAC-based authentication**
  client is authenticated with the RADIUS server based on the client's MAC address
- **Identity-driven security and access control**
  - **Per-user ACLs**
    permits or denies user access to specific network resources based on user identity and time of day, allowing multiple types of users on the same network to access specific network services without risking network security or providing unauthorized access to sensitive data
  - **Automatic VLAN assignment**
    automatically assigns users to the appropriate VLAN based on their identities
- **Port security**
  allows access only to specified MAC addresses, which can be learned or specified by the administrator
- **Secure FTP/ SCP**
  allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- **STP BPDU port protection**
  blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- **DHCP protection**
  blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- **DHCP snooping**
  helps ensure that DHCP clients receive IP addresses from authorized DHCP servers and maintain a list of DHCP entries for trusted ports; prevents reception of fake IP addresses and reduces ARP attacks, improving security
- **DHCPv6 snooping**
  ensures that DHCPv6 clients obtain IPv6 addresses from authorized DHCPv6 servers and record IP-to-MAC mappings of DHCPv6 clients
- **Dynamic ARP protection**
  blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- **STP root guard**
  protects the root bridge from malicious attacks or configuration mistakes
- **Guest VLAN**
  provides a browser-based environment to authenticated clients that is similar to IEEE 802.1X
- **Port isolation**
  secures and adds privacy, and prevents malicious attackers from obtaining user information
- **Endpoint Admission Defense (EAD)**
  provides security policies to users accessing a network
- **RADIUS/HWTACACS**
  eases switch management security administration by using a password authentication server
- **Secure management access**
  delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2, SSL, HTTPS and/or SNMPv3
- **Unicast Reverse Path Forwarding (URPF)**
  allows normal packets to be forwarded correctly, but discards the attaching packet due to lack of reverse path route or incorrect inbound interface; prevents source spoofing and distributed attacks; supports distributed URPF
- **IP source guard**
  helps prevent IP spoofing attacks
- **IPv6 source guard**
  help prevent IPv6 spoofing attacks using ND Snooping as well as DHCPv6 Snooping
- **ND Snooping**
  allows only packets with a legally obtained IPv6 address to pass

Standard Features

Convergence

- **LLDP-MED (Media Endpoint Discovery)**
  defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones
- **Internet Group Management Protocol (IGMP)**
  utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3
- **IEEE 802.1AB Link Layer Discovery Protocol (LLDP)**
  facilitates easy mapping using network management applications with LLDP automated device discovery protocol
- **Multicast Source Discovery Protocol (MSDP)**
  allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications
- **Multicast VLAN**
  allows multiple VLANs to receive the same IPv4 or IPv6 multicast traffic, lessening network bandwidth demand by reducing or eliminating multiple streams to each VLAN
- **LLDP-CDP compatibility**
  receives and recognizes CDP packets from Cisco's IP phones for seamless interoperation
- **IEEE 802.3at Power over Ethernet (PoE+)**
  provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- **PoE allocations**
  supports multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user-specified) to allocate PoE power for more efficient energy savings
- **Voice VLAN**
  automatically assigns VLAN and priority for IP phones, simplifying network configuration and maintenance
- **IP multicast snooping (data-driven IGMP)**
  prevents flooding of IP multicast traffic

Additional information

- **Green initiative support**
  provides support for RoHS and WEEE regulations
- **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
- **Unified Hewlett Packard Enterprise Comware operating system with modular architecture**
  provides an easy-to-enhance-and-extend feature set, which doesn't require whole-scale changes; all switching, routing, and security platforms leverage the Comware OS, a common unified modular operating system
- **Energy Efficient Ethernet (EEE) support**
  Reduces power consumption in accordance with IEEE 802.3az

Warranty and support

- **Limited Lifetime Warranty**
  See **http://www.hpe.com/networking/warrantysummary** for warranty and support information included with your product purchase.
- **Software releases**
  to find software for your product, refer to **http://www.hpe.com/networking/support**; for details on the software releases available with your product purchase, refer to **http://www.hpe.com/networking/warrantysummary**

Configuration Information

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.

BTO Models

Switch Chassis

Rule #	Description	SKU
2	HPE FlexNetwork 5510 24G 4SFP+ HI 1-slot Switch • 24 RJ-45 autosensing 10/100/1000 ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH145A
2	HPE FlexNetwork 5510 48G 4SFP+ HI 1-slot Switch • 48 RJ-45 autosensing 10/100/1000 ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH146A
2	HPE FlexNetwork 5510 24G PoE+ 4SFP+ HI 1-slot Switch • 24 RJ-45 autosensing 10/100/1000 PoE+ ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH147A
2	HPE FlexNetwork 5510 48G PoE+ 4SFP+ HI 1-slot Switch • 48 RJ-45 autosensing 10/100/1000 PoE+ ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH148A
1. 2	HPE FlexNetwork 5510 24G SFP 4SFP+ HI 1-slot Switch • 16 SFP fixed Gigabit Ethernet SFP ports (min=0 \ max=16 SFP Transceivers) • 8 RJ-45/ SFP fixed combo ports (min=0 \ max=8 SFP Transceivers) • 4 fixed SFP+ ports (min=0 \ max=4 SFP+ Transceivers) • 1 open module slots, or a combination • Must select min 1 power supply • 1U - Height	JH149A

Related Options

	Configuration Rules	
Rule #	**Description**	**SKU**
1	The following Transceivers install into this Switch: (SFP Ports)	
	HPE X115 100M SFP LC FX Transceiver	JD102B
	HPE X110 100M SFP LC LX Transceiver	JD120B
	HPE X115 100M SFP LC BX 10-U Transceiver	JD100A
	HPE X115 100M SFP LC BX 10-D Transceiver	JD101A
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X120 1G SFP LC LH100 Transceiver	JD103A
2	The following Transceivers install into this Switch: (SFP+ Ports)	
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X130 10G SFP+ LC SR Transceiver	JD092B
	HPE X130 10G SFP+ LC LR Transceiver	JD094B
	HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPE X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
Notes:	Iris note - If the below cables are selected for the JH146A and JH148A, then 4 RJ 45 ports are disabled:	
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A
Notes:	OCA Only Model Selection Form - HPE Offering > Aruba > Switches - FlexNetwork: 5510 HI Switch Series	

Related Options

Rack Level Integration CTO Models

Switch Chassis

Rule #	Description	SKU
2, 10	HPE FlexNetwork 5510 24G 4SFP+ HI 1-slot Switch • 24 RJ-45 autosensing 10/100/1000 ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH145A
2, 3, 10	HPE FlexNetwork 5510 48G 4SFP+ HI 1-slot Switch • 48 RJ-45 autosensing 10/100/1000 ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH146A
2, 10	HPE FlexNetwork 5510 24G PoE+ 4SFP+ HI 1-slot Switch • 24 RJ-45 autosensing 10/100/1000 PoE+ ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH147A
2, 10	HPE FlexNetwork 5510 48G PoE+ 4SFP+ HI 1-slot Switch • 48 RJ-45 autosensing 10/100/1000 PoE+ ports • 4 fixed Gigabit Ethernet SFP+ ports • (min=0 \ max=4 SFP/SFP+ Transceivers) • 1 port expansion module slots • Must select min 1 power supply • 1U - Height	JH148A
1, 2, 10	HPE FlexNetwork 5510 24G SFP 4SFP+ HI 1-slot Switch • 16 SFP fixed Gigabit Ethernet SFP ports (min=0 \ max=16 SFP Transceivers) • 8 RJ-45/ SFP fixed combo ports (min=0 \ max=8 SFP Transceivers) • 4 fixed SFP+ ports (min=0 \ max=4 SFP+ Transceivers) • 1 open module slots, or a combination • Must select min 1 power supply • 1U - Height	JH149A

Related Options

	Configuration Rules	
Rule #	**Description**	**SKU**
1	The following Transceivers install into this Switch: (SFP Ports)	
	HPE X115 100M SFP LC FX Transceiver	JD102B
	HPE X110 100M SFP LC LX Transceiver	JD120B
	HPE X115 100M SFP LC BX 10-U Transceiver	JD100A
	HPE X115 100M SFP LC BX 10-D Transceiver	JD101A
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X120 1G SFP LC LH100 Transceiver	JD103A
2	The following Transceivers install into this Switch: (SFP+ Ports)	
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X130 10G SFP+ LC SR Transceiver	JD092B
	HPE X130 10G SFP+ LC LR Transceiver	JD094B
	HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPE X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
3	If this Switch is integrated into an SGI 8600 Rack(Q2P32A), then Min 2 // Max 2 of the following Power Supplies and Power Cords per switch must be selected	
	HPE X361 150W 100-240VAC to 12VDC Power Supply	JD362B
	(When installed into Q2P32A please override Regional Power Cord rules and Default Qty 2 of JD362B#B2B Power Cord for all regions)	
10	If HPE CTO Switch Chassis is selected for Rack Level Integration, Then the Switch needs to integrate (with #0D1) to the Rack.	
Notes:	No Rail Kit required Iris note - If the below cables are selected for the JH146A and JH148A, then 4 RJ 45 ports are disabled:	
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A

Related Options

Enter the following menu selections as integrated to the CTO Model X above if order is factory built.

Modules

	System (std 0 // max 1) User Selection (min 0 // max 1)	
	HPE FlexNetwork 5130/5510 10GBASE-T 2p Module	JH156A
	• No Transceivers	
1	HPE FlexNetwork 5130/5510 10GbE SFP+ 2p Module	JH157A
	• min=0 \ max=2 SFP+ Transceivers	
2	HPE FlexNetwork 5510 2-port QSFP+ Module	JH155A
	• min=0 \ max=2 QSFP+ Transceivers	
	Configuration Rules	
Rule #	**Description**	**SKU**
1	The following Transceivers install into this Module (SFP+ Ports)	
	HPE X130 10G SFP+ LC SR Transceiver	JD092B
	HPE X130 10G SFP+ LC LR Transceiver	JD094B
	HPE X130 10G SFP+ LC LH80 tunable Transceiver	JL250A
	HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPE X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
2	The following 40G Transceivers install into this Module: (Use #0D1 or #B01 if switch is CTO)	
	HPE X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver	JG709A
	HPE X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
	HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A

Related Options

Transceivers

Rule #	Description	SKU
	SFP Transceivers	
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X120 1G SFP LC LH100 Transceiver	JD103A
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X115 100M SFP LC BX 10-U Transceiver	JD100A
	HPE X115 100M SFP LC FX Transceiver	JD102B
	HPE X110 100M SFP LC LX Transceiver	JD120B
	HPE X115 100M SFP LC BX 10-D Transceiver	JD101A
	SFP+ Transceivers	
	HPE X130 10G SFP+ LC ER 40km Transceiver	JG234A
	HPE X130 10G SFP+ LC SR Transceiver	JD092B
	HPE X130 10G SFP+ LC LR Transceiver	JD094B
	HPE X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE X130 10G SFP+ LC LH80 tunable Transceiver	JL250A
	HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPE X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
Notes:	Requires R1122P02 or later code for AOC cable support	
	HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
Notes:	Requires R1122P02 or later code for AOC cable support	
	HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
Notes:	Requires R1122P02 or later code for AOC cable support	
	QSFP+ Transceivers	
	HPE X140 40G QSFP+ LC LR4 SM 10km 1310nm Transceiver	JG661A
	HPE X140 40G QSFP+ MPO SR4 Transceiver	JG325B
	HPE X140 40G QSFP+ MPO MM 850nm CSR4 300m Transceiver	JG709A
	HPE X140 40G QSFP+ LC BiDi 100m MM Transceiver	JL251A
	HPE FlexNetwork X240 40G QSFP+ QSFP+ 1m Direct Attach Copper Cable	JG326A
	HPE FlexNetwork X240 40G QSFP+ QSFP+ 3m Direct Attach Copper Cable	JG327A
	HPE FlexNetwork X240 40G QSFP+ QSFP+ 5m Direct Attach Copper Cable	JG328A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A

Related Options

Cables

Rule #	Description	SKU
	Console Cables	
	(std 0 // max 99) User Selection (min 0 // max 99) per switch	
	Aruba X2C2 RJ45 to DB9 Console Cable	JL448A
	Multi-Mode Cables	
	(std 0 // max 99) User Selection (min 0 // max 99) per switch	
	HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
	HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A

Internal Power Supplies

	System (std 0 // max 2) User Selection (min 1 // max 2) per switch enclosure	
1	HPE X361 150W 48-60VDC to 12VDC Power Supply	JD366B
1, 3, 4	HPE X361 150W 100-240VAC to 12VDC Power Supply • includes 1 x c13, 910w	JD362B
	HPE X361 150W 100-240VAC to 12VDC Power Supply PDU NA, JP or TW • C13 PDU Jumper Cord (NA/MEX/TW/JP)	JD362B#B2B
	HPE X361 150W 100-240VAC to 12VDC Power Supply PDU ROW • C13 PDU Jumper Cord (ROW)	JD362B#B2C
	HPE X361 150W 100-240VAC to 12VDC Power Supply United States 220 volt • HPE 2.3M C13 to NEMA L6-20P Power Cord(J9936A)	JD362B#B2E
	HPE X361 150W 100-240VAC to 12VDC Power Supply • No Localized Power Cord Selected	JD362B#AC3
2, 3, 4	HPE X362 720W 100-240VAC to 56VDC PoE Power Supply • includes 1 x c13, 720w	JG544A
	HPE X362 720W 100-240VAC to 56VDC PoE Power Supply PDU Cable NA/JP/TW • C15 PDU Jumper Cord (NA/MEX/TW/JP)	JG544A#B2B
	HPE X362 720W 100-240VAC to 56VDC PoE Power Supply PDU Cable ROW • C15 PDU Jumper Cord (ROW)	JG544A#B2C
	HPE X362 720W 100-240VAC to 56VDC PoE Power Supply 220V N.A. - english localized • NEMA L6-20P Cord (NA/MEX/JP/TW)	JG544A#B2E
2, 3, 4	HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply • includes 1 x c13, 1100w	JG545A
	HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply PDU Cable NA/JP/TW • C15 PDU Jumper Cord (NA/MEX/TW/JP)	JG545A#B2B
	HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply PDU Cable ROW • C15 PDU Jumper Cord (ROW)	JG545A#B2C

Related Options

HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply 220V N.A. - english localized JG545A#B2E

- NEMA L6-20P Cord (NA/MEX/JP/TW)

Configuration Rules

Rule #	Description	SKU
1	This power supply is only supported on JH145A, JH146A, and JH149A	
2	This power supply is only supported on JH147A and JH148A,	
3	Localization (Wall Power Cord) required on orders without #B2B, #B2C (PDU Power Cord). (See Localization Menu)	
4	When Switches/Routers are Factory Racked, Then #B2B, or #B2C should be the Defaulted Power Cable option on the Switches/Routers.	

Notes:

- DC Power Supply does not require Localization (CLIC Rule does not require looking for Localization)
- Mixing of power supplies is supported
- 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)
- High Volt Switch/Router/Power Supply to Wall Power Cord - #B2E Option. (Offered only in North America, Mexico, Taiwan, and Japan)

Related Options

Accessories

Rule #	Description	SKU
	Modules	
	HPE FlexNetwork 5510 2-port QSFP+ Module	JH155A
	HPE FlexNetwork 5130/5510 10GBASE-T 2p Module	JH156A
	HPE FlexNetwork 5130/5510 10GbE SFP+ 2p Module	JH157A
	Transceivers	
	HPE X115 100M SFP LC BX 10-U Transceiver	JD100A
	HPE X115 100M SFP LC BX 10-D Transceiver	JD101A
	HPE X115 100M SFP LC FX Transceiver	JD102B
	HPE X110 100M SFP LC LX Transceiver	JD120B
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X120 1G SFP LC LH100 Transceiver	JD103A
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X130 10G SFP+ LC SR Transceiver	JD092B
	HPE X130 10G SFP+ LC LR Transceiver	JD094B
	HPE X2A0 10G SFP+ to SFP+ 7m Active Optical Cable	JL290A
	HPE X2A0 10G SFP+ to SFP+ 10m Active Optical Cable	JL291A
	HPE X2A0 10G SFP+ to SFP+ 20m Active Optical Cable	JL292A
	HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPE X130 10G SFP+ LC ER 40km Transceiver	JG234A
	HPE X130 10G SFP+ LC LH 80km Transceiver	JG915A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A
	HPE X130 10G SFP+ LC LH80 tunable Transceiver	JL250A
	Cables	
	Aruba X2C2 RJ45 to DB9 Console Cable	JL448A
	HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A
	HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A

Related Options

HPE FlexNetwork 5510 24G 4SFP+ HI 1-slot Switch (JH145A)	
HPE X361 150W 100-240VAC to 12VDC Power Supply	JD362B
HPE X361 150W 48-60VDC to 12VDC Power Supply	JD366B
HPE FlexNetwork 5510 48G 4SFP+ HI 1-slot Switch (JH146A)	
HPE X361 150W 100-240VAC to 12VDC Power Supply	JD362B
HPE X361 150W 48-60VDC to 12VDC Power Supply	JD366B
HPE FlexNetwork 5510 24G PoE+ 4SFP+ HI 1-slot Switch (JH147A)	
HPE X362 720W 100-240VAC to 56VDC PoE Power Supply	JG544A
HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply	JG545A
HPE FlexNetwork 5510 48G PoE+ 4SFP+ HI 1-slot Switch (JH148A)	
HPE X362 720W 100-240VAC to 56VDC PoE Power Supply	JG544A
HPE X362 1110W 115-240VAC to 56VDC PoE Power Supply	JG545A
HPE FlexNetwork 5510 24G SFP 4SFP+ HI 1-slot Switch (JH149A)	
HPE X361 150W 100-240VAC to 12VDC Power Supply	JD362B
HPE X361 150W 48-60VDC to 12VDC Power Supply	JD366B

Notes:

- Module supports MACsec
- Supported only on JH149A (HPE 5510 24G SFP 4SFP+ HI 1-Slot Switch) and only in 1G downlink configuration
- Transceiver cannot be used on optional module JH157A (HPE 5130/5510 10GbE SFP+ 2-port Module)
- Requires R1122P02 code version or later
- Supported only on optional module JH157A
- Products covered by 1 year warranty. See details at **http://www.hpe.com/networking/warrantyquickref**

Technical Specifications

HPE FlexNetwork 5510 24G 4SFP+ HI 1-slot Switch (JH145A)		
I/O ports and slots	24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Media Type: Auto-MDIX; Duplex: ports 1-24 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); ports 1 - 8 support MACSec 4 SFP+ 10GbE ports 1 port expansion module slot Supports a maximum of 6 SFP+ ports or 2 1/10GBASE-T ports or 2 40GbE ports, with optional module	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) 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	Airflow direction is Front (port side) to Back (power cord side)	
Physical characteristics	**Dimensions**	17.32(w) x 14.17(d) x 1.72(h) in (44.00 x 36.00 x 4.37 cm) (1U height)
	Weight	16.53 lb (7.5 kg) shipping weight
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 214 Mpps
	Routing/Switching capacity	288 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	32768 entries
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	10% to 90%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 52.8 dB, High-speed fan: 66.7 dB; ISO 7779
Electrical characteristics	**Frequency**	50/60 H
	Maximum heat dissipation	365 BTU/hr (385.08 kJ/hr), Ranges from 167 BTU/hr to 392 BTU/hr, depending on power supply configuration
	Voltage	100 - 240 VAC, rated (90 - 264 VAC, max) -48 to -60 VDC, rated (-36 to -72 VDC, max) (depending on power supply chosen)
	Maximum power rating	107 W
	Idle power	55 W
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – 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.	

Technical Specifications

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; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

HPE FlexNetwork 5510 48G 4SFP+ HI 1-slot Switch (JH146A)		
I/O ports and slots	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Media Type: Auto-MDIX; Duplex: ports 1-48 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); ports 1 - 8 support MACSec 4 SFP+ 10GbE ports 1 port expansion module slot Supports a maximum of 6 SFP+ ports or 2 1/10GBASE-T ports or 2 40GbE ports, with optional module	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) 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	Airflow direction is Front (port side) to Back (power cord side)	
Physical characteristics	**Dimensions**	17.32(w) x 14.17(d) x 1.72(h) in (44.0 x 36.0 x 4.37 cm) (1U height)
	Weight	16.53 lb (7.5 kg)
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 250 Mpps
	Routing/Switching capacity	336 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	32768 entries
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	10% to 90%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 49.9 dB, High-speed fan: 64.8 dB; ISO 7779
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	238 BTU/hr (686.81 kJ/hr), Ranges from 201 BTU/hr to 443 BTU/hr, depending on power supply configuration

Technical Specifications

	Voltage	100 - 240 VAC, rated (90 - 264 VAC, max) -48 to -60 VDC, rated (-36 to -72 VDC, max) (depending on power supply chosen)
	Maximum power rating	150 W
	Idle power	70 W
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – 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.	
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; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

HPE FlexNetwork 5510 24G PoE+ 4SFP+ HI 1-slot Switch (JH147A)		
I/O ports and slots	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: ports 1-24 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); ports 1 - 8 support MACSec 4 SFP+ 10GbE ports 1 port expansion module slot Supports a maximum of 6 SFP+ ports or 2 1/10GBASE-T ports or 2 40GbE ports, with optional module	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) 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	Airflow direction is Front (port side) to Back (power cord side)	
Physical characteristics	**Dimensions**	17.32(w) x 18.11(d) x 1.72(h) in (43.99 x 46 x 4.37 cm) (1U height)
	Weight	27.56 lb (12.5 kg) shipping weight
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	

Technical Specifications

Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 214 Mpps
	Routing/Switching capacity	288 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	32768 entries
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	10% to 90%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 57.6 dB, High-speed fan: 66.9 dB; ISO 7779
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	2217 BTU/hr (3599.66 kJ/hr), Ranges from 228 BTU/hr to 3412 BTU/hr, depending on power supply configuration
	Voltage	100 - 240 VAC, rated (90 - 264 VAC, max)
	Maximum power rating	650 W
	Idle power	67 W
	PoE power	740 W PoE+
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – 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. – PoE+ power range is from 450W to 740W. PoE+ power is the power supplied by the internal power supply(ies). It is dependent on the type and quantity of power supplies. Device supports 1 or 2 internal modular power supplies.	
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; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

Technical Specifications

HPE FlexNetwork 5510 48G PoE+ 4SFP+ HI 1-slot Switch (JH148A)		
I/O ports and slots	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: ports 1-48 support 10BASE-T/100BASE-TX, 1000BASE-T (full only); ports 1 - 8 support MACSec 4 SFP+ 10GbE ports 1 port expansion module slot Supports a maximum of 6 SFP+ ports or 2 1/10GBASE-T ports or 2 40GbE ports, with optional module	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) 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	Airflow direction is Front (port side) to Back (power cord side)	
Physical characteristics	**Dimensions**	17.32(w) x 18.11(d) x 1.72(h) in (43.99 x 46 x 4.37 cm) (1U height)
	Weight	27.56 lb (12.5 kg) shipping weight
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 250 Mpps
	Routing/Switching capacity	336 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	32768 entries
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	10% to 90%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 57.6 dB, High-speed fan: 66.9 dB; ISO 7779
Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	2286 BTU/hr (2411.73 kJ/hr), Heat dissipation ranges from 256 BTU/hr to 6142 BTU/hr, depending on power supply configuration
	Voltage	100 - 240 VAC, rated (90 - 264 VAC, max)
	Maximum power rating	670 W
	Idle power	75 W
	PoE power	1440 W PoE+
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – 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. – PoE+ power range is from 450W to 1440W. PoE+ power is the power supplied by the internal power supply(ies). It is dependent on the type and quantity of power supplies. – Device supports 1 or 2 internal modular power supplies.	

Technical Specifications

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; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

HPE FlexNetwork 5510 24G SFP 4SFP+ HI 1-slot Switch (JH149A)		
I/O ports and slots	16 fixed Gigabit Ethernet SFP ports; Ports 1 - 8 support MACSec 8 Combo GbE (SFP and RJ45) dual-personality 1000 Mbps port, IEEE 802.3ab Type 1000BASE-T); Duplex: Ports 1-24 support 10BASE-T/100BASE-TX, 1000BASE-T (full only) 4 SFP+ 10GbE ports 1 port expansion module slot Supports a maximum of 6 SFP+ ports or 2 1/10GBASE-T ports or 2 40GbE ports, with optional module	
Additional ports and slots	1 dual-personality (RJ-45 or mini USB) 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	Airflow direction is Front (port side) to Back (power cord side)	
Physical characteristics	**Dimensions**	17.32(w) x 14.17(d) x 1.72(h) in (43.99 x 35.99 x 4.37 cm) (1U height)
	Weight	16.53 lb (7.5 kg) shipping weight
Memory and processor	2 GB SDRAM; Packet buffer size: 4 MB, 512 MB flash	
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
Performance	IPv6 Ready Certified	
	1000 Mb Latency	< 5 µs
	10 Gbps Latency	< 3 µs
	Throughput	up to 214 Mpps
	Routing/Switching capacity	288 Gbps
	Routing table size	32768 entries (IPv4), 16384 entries (IPv6)
	MAC address table size	32768 entries
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	10% to 90%, noncondensing
	Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Non-operating/Storage relative humidity	5% to 95%, noncondensing
	Acoustic	Low-speed fan: 50.5 dB, High-speed fan: 66.9 dB; ISO 7779

Technical Specifications

Electrical characteristics	**Frequency**	50/60 Hz
	Maximum heat dissipation	409 BTU/hr (431.49 kJ/hr), Heat dissipation ranges from 163 BTU/hr to 498 BTU/hr, depending on power supply configuration
	Voltage	100 - 240 VAC, rated (90 - 264 VAC, max) -48 to -60 VDC, rated (-36 to -72 VDC, max) (depending on power supply chosen)
	Maximum power rating	120 W
	Idle power	48 W
	Notes: – Idle power is the actual power consumption of the device with no ports connected. – 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.	
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; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; ROHS Compliance; AS/NZS 60950-1; GB 4943; EAC (EurAsian Conformity Certification)	
Emissions	EMC Directive 2004/108/EC; FCC (CFR 47, Part 15) Class A; EN 61000-4-11:2004; ANSI C63.4-2009; EN 61000-3-3:2008; VCCI V-3/2012.04; EN 61000-3-2:2006+A1:2009+A2:2009 ; EN 61000-4-3:2006; EN 61000-4-4:2012; EN 61000-4-5:2006; EN 61000-4-6:2009; CISPR 22:2008 Class A; EN 55022:2010 Class A; EN 61000-4-29: 2000; CISPR 24:2010; EN 300 386 V1.6.1; VCCI V-3/2013.04 Class A	
Immunity	**Generic**	EN 55024
	ESD	EN300 386
Management	IMC - Intelligent Management Center; Command-line interface; SNMP manager	
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	

Standards and protocols (applies to all products in series)

BGP

- RFC 1657 Definitions of Managed Objects for BGPv4
- RFC 1771 BGPv4
- RFC 2385 BGP Session Protection via TCP MD5
- RFC 2858 BGP-4 Multi-Protocol Extensions

Device Management

- RFC 1155 Structure and Mgmt Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1305 NTPv3
- RFC 2573 (SNMPv3 Applications)
- RFC 2578-2580 SMIv2
- RFC 2819 (RMON groups Alarm, Event, History and Statistics only)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)
- HTML and telnet management
- Multiple Configuration Files
- SNMP v3 and RMON RFC support
- SSHv1/SSHv2 Secure Shell
- TACACS/TACACS+
- Web UI

Technical Specifications

General Protocols

- IEEE 802.1ad Q-in-Q
- IEEE 802.1ak Multiple Registration Protocol (MRP) and Multiple VLAN Registration Protocol (MVRP)
- IEEE 802.1AE MACsec
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1D MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q (GVRP)
- 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 802.1X PAE
- IEEE 802.3 Type 10BASE-T
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ac (VLAN Tagging Extension)
- IEEE 802.3ad Link Aggregation (LAG)
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3ae 10-Gigabit Ethernet
- IEEE 802.3af Power over Ethernet
- IEEE 802.3at Power over Ethernet Plus
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3i 10BASE-T
- IEEE 802.3u 100BASE-X
- IEEE 802.3x Flow Control
- IEEE 802.3z 1000BASE-X
- 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 855 Telnet Option Specification
- RFC 894 IP over Ethernet
- RFC 925 Multi-LAN Address Resolution
- RFC 950 Internet Standard Subnetting Procedure
- RFC 951 BOOTP
- RFC 959 - File Transfer Protocol (FTP)
- RFC 1027 Proxy ARP
- RFC 1042 IP Datagrams
- RFC 1058 RIPv1
- RFC 1071 Computing the Internet Checksum
- RFC 1122 Requirements for Internet Hosts - Communication Layers
- RFC 1123 Requirements for Internet Hosts
- RFC 1141 Incremental updating of the Internet checksum
- RFC 1166 - IP Addresses
- RFC 1191 Path MTU discovery
- RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
- RFC 1256 - ICMP Router Discovery Protocol (IRDP)



Technical Specifications

- RFC 1305 NTPv3
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1519 CIDR
- RFC 1533 DHCP Options and BOOTP Vendor Extensions
- RFC 1542 BOOTP Extensions
- RFC 1591 DNS (client only)
- RFC 1643 - Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 1723 RIP v2
- RFC 1812 IPv4 Routing
- RFC 1866 Hypertext Markup Language - 2.0
- RFC 1887 An Architecture for IPv6 Unicast Address Allocation
- RFC 1901 - Introduction to Community-based SNMPv2
- RFC 1902-1907 - SNMPv2
- RFC 2131 DHCP
- RFC 2236 IGMP Snooping
- RFC 2338 VRRP
- RFC 2375 IPv6 Multicast Address Assignments
- RFC 2462 IPv6 Stateless Address Autoconfiguration
- RFC 2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers
- RFC 2475 Architecture for Differentiated Services
- RFC 2597 Assured Forwarding PHB Group
- RFC 2616 Hypertext Transfer Protocol -- HTTP/1.1
- RFC 2644 Directed Broadcast Control
- RFC 2665 Definitions of Managed Objects for the Ethernet-like Interface Types
- RFC 2668 Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)
- RFC 2711 IPv6 Router Alert Option
- RFC 2784 Generic Routing Encapsulation (GRE)
- RFC 2865 Remote Authentication Dial In User Service (RADIUS)
- RFC 2866 RADIUS Accounting
- RFC 2868 RADIUS Attributes for Tunnel Protocol Support
- RFC 3046 - DHCP Relay Agent Information Option
- RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels
- RFC 3246 Expedited Forwarding PHB
- RFC 3410 Applicability Statements for SNMP
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3416 Protocol Operations for SNMP
- RFC 3417 Transport Mappings for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 3484 Default Address Selection for Internet Protocol version 6 (IPv6)
- RFC 3493 Basic Socket Interface Extensions for IPv6
- RFC 3542 Advanced Sockets Application Program Interface (API) for IPv6
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 3580 - IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 3596 DNS Extensions to Support IP Version 6
- RFC 3623 Graceful OSPF Restart
- RFC 3704 Unicast Reverse Path Forwarding (URPF)
- RFC 3768 Virtual Router Redundancy Protocol (VRRP)
- RFC 3810 Multicast Listener Discovery Version 2 (MLDv2) for IPv6



Technical Specifications

- RFC 4090 Fast Reroute Extensions to RSVP-TE for LSP Tunnels
- RFC 4113 Management Information Base for the User Datagram Protocol (UDP)
- RFC 4213 Basic IPv6 Transition Mechanisms
- RFC 4250 The Secure Shell (SSH) Protocol Assigned Numbers
- 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 4291 IP Version 6 Addressing Architecture
- RFC 4443 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 4575 A Session Initiation Protocol (SIP) Event Package for Conference State
- RFC 4594 Configuration Guidelines for DiffServ Service Classes
- RFC 4675 RADIUS VLAN & Priority
- RFC 4750 OSPF Version 2 Management Information Base
- RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- 802.1r - GARP Proprietary Attribute Registration Protocol (GPRP)

IP Multicast

- RFC 1112 IGMPv1
- RFC 2236 IGMPv2
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 3376 IGMPv3
- RFC 3569 An Overview of Source-Specific Multicast (SSM)
- RFC 3618 Multicast Source Discovery Protocol (MSDP)
- RFC 3973 PIM Dense Mode
- RFC 4601 PIM Sparse Mode

IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2460 IPv6 Specification
- RFC 2461 IPv6 Neighbor Discovery
- RFC 2463 ICMPv6
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2545 Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing
- RFC 3162 RADIUS and IPv6
- RFC 3306 Unicast-Prefix-based IPv6 Multicast Addresses
- RFC 3307 IPv6 Multicast Address Allocation
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPv6
- RFC 3736 Stateless Dynamic Host Configuration Protocol (DHCP) Service for IPv6
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4293 MIB for IP
- RFC 4443 ICMPv6
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 6724 Default Address Selection for Internet Protocol Version 6 (IPv6)

Technical Specifications

MIBs

- RFC 1212 Concise MIB Definitions
- RFC 1213 MIB II
- RFC 1215 A Convention for Defining Traps for use with the SNMP
- RFC 1493 Bridge MIB
- RFC 1757 Remote Network Monitoring MIB
- RFC 2096 IP Forwarding Table MIB
- RFC 2233 Interface MIB
- RFC 2571 SNMP Framework MIB
- RFC 2572 SNMP-MPD MIB
- RFC 2573 SNMP-Notification MIB
- RFC 2573 SNMP-Target MIB
- RFC 2574 SNMP USM MIB
- RFC 2618 RADIUS Authentication Client MIB
- RFC 2620 RADIUS Accounting Client MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual Extensions
- RFC 2737 Entity MIB (Version 2)
- RFC 2819 RMON MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 3414 SNMP-User based-SM MIB
- RFC 3415 SNMP-View based-ACM MIB
- RFC 3418 MIB for SNMPv3
- RFC 3621 Power Ethernet MIB

MPLS

- RFC 2961 RSVP Refresh Overhead Reduction Extensions
- RFC 3031 Multiprotocol Label Switching Architecture
- RFC 3032 MPLS Label Stack Encoding
- RFC 3036 LDP Specification
- RFC 4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling

Network Management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1215 Convention for defining traps for use with the SNMP
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2818 HTTP over TLS
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
- RFC 6398 IP Router Alert Considerations and Usage
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3

OSPF

- RFC 1587 OSPF NSSA
- RFC 1850 OSPFv2 Management Information Base (MIB), traps
- RFC 2328 OSPFv2
- RFC 2370 OSPF Opaque LSA Option

Technical Specifications

QoS/CoS

- RFC 2474 DS Field in the IPv4 and IPv6 Headers
- RFC 3260 New Terminology and Clarifications for DiffServ

Security

- IEEE 802.1X Port Based Network Access Control
- RFC 1492 TACACS+
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 3260 New Terminology and Clarifications for DiffServ
- RFC 4716 SSH Public Key File Format
- Secure Sockets Layer (SSL)
- SSHv2 Secure Shell

Summary of Changes

Date	Version History	Action	Description of Change
19-Apr-2021	Version 21	Changed	Technical Specifications section was updated.
03-Feb-2020	Version 20	Changed	Technical Specifications section was updated.
15-Jul-2019	Version 19	Changed	Overview, Configuration Information and Related Options sections were updated. SKU description were updated.. Obsolete SKUs were removed.
01-Oct-2018	Version 18	Changed	Recommended and Extended markings removed from the document.
04-Sep-2018	Version 17	Changed	Accessories and Configuration updated
06-Aug-2018	Version 16	Changed	Configuration section updated: Added AOC compatibility and appropriate SFP+ Rules
07-May-2018	Version 15	Changed	Configuration section updated
05-Feb-2018	Version 14	Changed	Standards and protocols updated
18-Dec-2017	Version 13	Changed	Configuration section updated
04-Dec-2017	Version 12	Changed	Configuration section updated
03-Jul-2017	Version 11	Added	SKU added: JL448A
09-Jan-2017	Version 10	Added	SKUs added: JH677A, JH678A, JH679A, JH680A, JH681A, JH693A, JH694A, JH695A, JH696A, JH697A, JH698A, JH699A, JH700A
03-Oct-2016	Version 9	Added	SKUs added: JD362B, JD366B
19-Aug-2016	Version 8	Changed	Updates made on Standards and protocols, Configuration and Accessories
01-Aug-2016	Version 7	Added	SKU added: JL250A
		Changed	Updates made on Technical Specifications
20-May-2016	Version 6	Changed	Updates made on Technical Specifications and Accessories
08-Apr-2016	Version 5	Changed	Changes made on Configuration section, SKUs descriptions updated
16-Feb-2016	Version 4	Changed	Configuration and Standards and protocols updated
08-Jan-2016	Version 3	Changed	Accessories section updated
11-Dec-2015	Version 2	Changed	Transceivers updated.
01-Dec-2015	Version 1	New	New QuickSpecs

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