

### Overview

### HP 1950 Switch Series



### Models

HP 1950-24G-2SFP+-2XGT Switch	JG960A
HP 1950-48G-2SFP+-2XGT Switch	JG961A
HP 1950-24G-2SFP+-2XGT-PoE+(370W) Switch	JG962A
HP 1950-48G-2SFP+-2XGT-PoE+(370W) Switch	JG963A

### Key features

- Four 10G uplinks for fast connection to servers and storage
- Two SFP+ and two 10GBASE-T ports -- supports fiber and cost-effective copper connectivity
- Four-high stacking allows for redundancy while simplifying administration
- Customized operation using intuitive Web interface
- Limited Lifetime warranty

### Product overview

The HP 1950 Switch Series consists of smart web-managed Gigabit Ethernet switches with 10-Gigabit uplinks, for advanced small business customers needing high-performance connections to servers and network storage.

The 1950 Switch Series includes four switches: two standard models and two PoE+ models in 24- and 48-port configurations. The switches each have two 10GBASE-T ports supporting copper-based Category 5e-based cabling, and two 10G SFP+ ports for fiber connectivity. The PoE+ models both have a PoE power budget of 370W to power up PoE/PoE+ compliant client devices.

The 1950 Switch Series has an intuitive Web-based interface for simple customization of network operation. It supports true-

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stacking, allowing up to four devices to be logically administered as a single entity, simplifying administration while supporting greater network redundancy. Models support both rack mounting and desktop operation. They have IPv4 and IPv6 operation, with Layer 2 switching as well as Layer 3 static routing. Other features include: link aggregation to boost link performance; VLANs, Access Control Lists, and 802.1X network login for enhanced security; and three versions of Spanning Tree Protocol for added network resiliency. The switches come with a limited lifetime warranty covering the unit, fans, and power supplies, as well as 24X7 phone support for the first three years of ownership.

### Features and benefits

#### Management

- **Four-high true stacking**  
simplifies administration of multiple devices. Create a single logical managed unit with up to four 1950 switches. Balance connections across multiple units with standard Link Aggregation (LACP) for enhanced network resiliency. Stack using affordable Cat 5e, or long distance fiber, or localized DAC cables. Stacked units can co-located or separated physically.
- **Intuitive Web browser-based management**  
allows for easy customization of the switch -- even by non-technical users.
- **Secure Web-management sessions with HTTPS / SSL**  
encrypts and otherwise protects management sessions through HTTP Secure (HTTPS). Prevents snooping of sensitive management information such as passwords.
- **SNMPv1, v2c, and v3**  
facilitates remote management of the switch, as the device can be discovered and monitored from an SNMP management station
- **Complete session logging**  
provides detailed information for problem identification and resolution
- **Dual flash images**  
provides independent primary and secondary operating system files for backup while upgrading
- **Port mirroring**  
enables traffic on a port to be simultaneously sent to a network analyzer for monitoring
- **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
- **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
- **Limited Command Line Interface (CLI)**  
facilitates in the deployment and initial configuration of the unit. Supports troubleshooting actions as well.
- **RMON**  
provides advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- **Default DHCP client modes**  
simplifies device deployment. Connect a new out-of-the box switch to a network with a DHCP server and the device will obtain its IP address automatically with plug-and-play operation. In the absence of a DHCP server, the switch will fall-back to a unique static address determined by the switch's MAC address.
- **Cable diagnostic tool**  
use to remotely detect cable issues with cables attached to the switch.

#### Quality of Service (QoS)

- **Broadcast control**  
allows limitation of broadcast traffic rate to cut down on unwanted network broadcast traffic
- **Rate limiting**  
sets per-port ingress enforced maximums and per-port, per-queue minimums
- **Traffic prioritization**  
makes it possible to prioritize important and/or time-sensitive traffic ahead of less important traffic. Use with VoIP or video to optimize its performance on the network. Recognizes both IEEE 802.1p and DSCP prioritization tagging. Packets

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are mapped to four hardware queues for more effective throughput.

### Connectivity

- **Auto-MDI/MDIX**  
adjusts automatically to straight-through or crossover cables on all 10/100/1000 and 10GBASE-T ports.
- **IEEE 802.3X flow control**  
provides a configurable flow throttling mechanism propagated through the network to prevent packet loss at a congested node.
- **Packet storm protection**  
protects against broadcast, multicast, or unicast storms with user-defined thresholds
- **Jumbo frame support up to 10-kilobyte frames**  
improves efficiency of data transfers by allowing more data into a given packet. This especially useful for transfers of large amounts of data. HP 1950 Switches support up to 10 kilobyte frame sizes.
- **IEEE 802.3at Power over Ethernet (PoE+)**  
delivers power to compliant devices over Ethernet cabling, greatly simplifying installation of those devices. The 1950 Series has two PoE+ enabled models. The PoE+ 802.3at standard supports delivery of up to 30 Watts of power to the attached devices, enough to support the latest models of IP phones, Wireless Access Points, video surveillance cameras, or other PoE/PoE+ enabled devices. HP 1950 PoE+ models support 370W of total PoE power.
- **IEEE 802.3af Power over Ethernet (PoE) ready**  
delivers power to compliant devices over Ethernet cabling, greatly simplifying installation of those devices. HP 1950 PoE+ models are fully backward compliant with the older PoE standard which provides up to 15.4 Watts of PoE power per port to attached devices.
- **Available redundant power for PoE+ models**  
optional Redundant Power System is available to add power redundancy and to supplement the PoE power of the PoE+ switches. With the optional RPS, the PoE+ power budget can be increased to 740 Watts; additionally, the switch will continue operating and powering downstream PoE devices even if the unit internal power supply should fail. Order the HP RPS1600 Redundant Power System (JG136A).
- **Fully IPv6 capable**
  - **IPv6 host**  
enables switches to be managed and deployed at the IPv6 network's edge
  - **IPv6 routing**  
supports IPv6 static routes
  - **MLD snooping**  
forwards IPv6 multicast traffic to the appropriate interface, preventing traffic flooding
  - **IPv6 ACL/QoS**  
supports ACL and QoS for IPv6 network traffic

### Security

- **Access Control Lists (ACLs)**  
gives granular control over what traffic goes where in the network. Allows for traffic filtering. ACLs rules can be based on MAC-address or IP-address. ACL rules can be time-based to implement access control during certain hours or days.
- **IEEE 802.1X and RADIUS network logins**  
controls port-based access for authentication and accountability  
Automatic VLAN assignment  
assigns users automatically to the appropriate VLAN based on their identity, location and time of day
- **STP BPDU port protection**  
blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- **STP root guard**  
protects the root bridge from malicious attacks or configuration mistakes
- **Automatic denial-of-service protection**  
protects the network by blocking malicious DoS attacks aimed at the switch itself.
- **Management password**

### Overview

provides security so that only authorized access to the Web browser interface is allowed

### Performance

- **Half-/full-duplex auto-negotiating capability on every port**  
doubles the throughput of every port
- **Selectable queue configurations**  
allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications
- **IGMP / MLD Snooping**  
improves network performance by filtering multicast traffic when there is no multicast receiver on a connection. Without this, multicast traffic is flooded to all ports. IGMP snooping is used in IPv4 networks. The IPv6 equivalent -- MLD Snooping -- is also supported.
- **10-Gigabit SFP+ based Fiber Uplinks**  
supports high-bandwidth connections over fiber. HP 1950 Switches each have two SFP+ transceiver slots supporting 10-Gigabit fiber-based connections using optional 10G transceivers. Fiber is particularly suited for connecting at distances beyond the 100 Meter limitation of copper-based Cat 5e cabling. Alternatively use the SFP+ ports for redundant stacking of up to four units using Direct Attached Cables (DAC).
- **10-Gigabit 10GBASE-T RJ45 Uplinks**  
supports high-bandwidth connections over Cat 5e cabling. HP 1950 Switches each have two 10GBASE-t RJ45 ports supporting 10-Gigabit copper-based connections. Cat 5e is economical and practical for distances up to 100 Meters. Alternatively use the 10GBASE-T ports for redundant stacking of up to four units.

### Layer 2 switching

- **VLAN support and tagging**  
supports IEEE 802.1Q (4,094 VLAN IDs) and 256 VLANs simultaneously
- **Spanning Tree Protocol (STP)**  
supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- **BPDU filtering**  
improves network efficiency by filtering unnecessary BPDU packets on a port. When Spanning Tree Protocol (STP) is enabled globally but disabled on specific ports, BPDU packets are not sent out the ports where STP is disabled.

### 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
- **DHCP relay**  
simplifies management of DHCP addresses in networks with multiple subnets

### Layer 3 routing

- **Static IPv4/IPv6 routing**  
provides basic routing (supporting up to 32 static routes and 8 virtual VLAN interfaces); allows manual routing configuration

### Resiliency and high availability

- **Link aggregation**  
groups together multiple ports (up to a maximum of two ports) automatically using Link Aggregation Control Protocol

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(LACP), or manually, to form an ultra-high-bandwidth connection to the network backbone; helps prevent traffic bottlenecks

### 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
- **Auto voice VLAN**  
recognizes IP phones and automatically assigns voice traffic to dedicated VLAN for IP phones
- **PoE Models For Converged Voice / Data Networks**  
simplifies and lowers the cost of installing a converged infrastructure. Power IP phones, Access Points, Video Surveillance cameras, or other PoE-enabled devices. HP 1950 Switches support multiple methods of allocating PoE power -- IEEE 802.3af class, LLDP-MED, or user-specified -- for more efficient energy usage.

### 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

### Warranty and support

- **Limited Lifetime Warranty 2.0**  
advance hardware replacement with next-business-day delivery (available in most countries). See [www.hp.com/networking/warrantysummary](http://www.hp.com/networking/warrantysummary) for duration details.
- **Electronic and telephone support (for Limited Lifetime Warranty 2.0)**  
limited 24x7 telephone support is available from HP for the first 3 years; 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)

### Configuration

**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 1950-24G-2SFP+-2XGT Switch <ul style="list-style-type: none"> <li>• 24 RJ-45 auto-negotiating 10/100/1000 ports</li> <li>• 2 SFP+ fixed 1000/10000 SFP+ ports</li> <li>• min=0 \ max=2 SFP+ Transceivers</li> <li>• 2 RJ-45 1/10GBASE-T port</li> <li>• 1U - Height</li> </ul>	JG960A See Configuration Note:1, 2
PDU Cable NA/MX/TW/JP <ul style="list-style-type: none"> <li>• C15 PDU Jumper Cord (NA/MX/TW/JP)</li> </ul>	JG960A #B2B
PDU Cable ROW <ul style="list-style-type: none"> <li>• C15 PDU Jumper Cord (ROW)</li> </ul>	JG960A #B2C
HP 1950-48G-2SFP+-2XGT Switch <ul style="list-style-type: none"> <li>• 48 RJ-45 auto-negotiating 10/100/1000 ports</li> <li>• 2 SFP+ fixed 1000/10000 SFP+ ports</li> <li>• min=0 \ max=2 SFP+ Transceivers</li> <li>• 2 RJ-45 1/10GBASE-T ports</li> <li>• 1U - Height</li> </ul>	JG961A See Configuration Note:1, 2
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### Configuration

PDU Cable NA/MX/TW/JP JG963A#B2B

- C15 PDU Jumper Cord (NA/MX/TW/JP)

PDU Cable ROW JG963A#B2C

- C15 PDU Jumper Cord (ROW)

### Configuration Rules:

**Note 1**                      The following Transceivers install into this switch:

J4858C - HP X121 1G SFP LC SX Transceiver  
 J4859C - HP X121 1G SFP LC LX Transceiver  
 J8177C - HP X121 1G SFP RJ45 T Transceiver  
 JD118B - HP X120 1G SFP LC SX Transceiver  
 JD119B - HP X120 1G SFP LC LX Transceiver  
 JD089B - HP X120 1G SFP RJ45 T Transceiver  
 JD092B - HP X130 10G SFP+ LC SR Transceiver  
 JD094B - HP X130 10G SFP+ LC LR Transceiver  
 J9150A - HP X132 10G SFP+ LC SR Transceiver  
 J9151A - HP X132 10G SFP+ LC LR Transceiver  
 JD095C - HP X240 10G SFP+ SFP+ 0.65m DAC Cable  
 JD096C - HP X240 10G SFP+ SFP+ 1.2m DAC Cable  
 JD097C - HP X240 10G SFP+ SFP+ 3m DAC Cable  
 JG081C - HP X240 10G SFP+ SFP+ 5m DAC Cable

**Note 2**                      Localization (Wall Power Cord) required on orders without #B2B or #B2C (PDU Power Cord). (See Localization Menu)

**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)

## Transceivers

### SFP Transceivers

HP X121 1G SFP LC SX Transceiver	J4858C
HP X121 1G SFP LC LX Transceiver	J4859C
HP X121 1G SFP RJ45 T Transceiver	J8177C
HP X120 1G SFP LC SX Transceiver	JD118B
HP X120 1G SFP LC LX Transceiver	JD119B
HP X120 1G SFP RJ45 T Transceiver	JD089B

### SFP+ Transceivers

HP X130 10G SFP+ LC SR Transceiver	JD092B
HP X130 10G SFP+ LC LR Transceiver	JD094B
HP X132 10G SFP+ LC SR Transceiver	J9150A
HP X132 10G SFP+ LC LR Transceiver	J9151A
HP X240 10G SFP+ SFP+ 0.65m DAC Cable	JD095C

### Configuration

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

### Cables

#### Multi-Mode Cables

HP .5m Multi-mode OM3 LC/LC FC Cable	AJ833A
HP 1m Multi-mode OM3 LC/LC FC Cable	AJ834A
HP 2 m Multimode OM3 LC/LC FC Cable	AJ835A
HP 5 m Multimode OM3 LC/LC FC Cable	AJ836A
HP 15 m Multimode OM3 LC/LC FC Cable	AJ837A
HP 30 m Multimode OM3 LC/LC FC Cable	AJ838A
HP 50 m Multimode OM3 LC/LC FC Cable	AJ839A
HP Premier Flex LC/LC OM4 2f 1m Cbl	QK732A
HP Premier Flex LC/LC OM4 2f 2m Cbl	QK733A
HP Premier Flex LC/LC OM4 2f 5m Cbl	QK734A
HP Premier Flex LC/LC OM4 2f 15m Cbl	QK735A
HP Premier Flex LC/LC OM4 2f 30m Cbl	QK736A
HP Premier Flex LC/LC OM4 2f 50m Cbl	QK737A

### Switch Enclosure Options

#### External/Redundant Power Supplies

HP RPS1600 Redundant Power System	JG136A
<ul style="list-style-type: none"> <li>Height = 1U</li> <li>includes 1 x c13, 1600w and Power Supply port</li> </ul>	See Configuration Note:2, 3, 4
HP RPS1600 1600W AC Power Supply	JG137A
<ul style="list-style-type: none"> <li>Installs into JG136A only</li> </ul>	See Configuration Note:1, 3

#### Configuration Rules:

Note 1	If this power supply is selected, The JG136A - HP A-RPS1600 Redundant Power System must be on order or onsite.
Note 2	Localization required.
Note 3	Each switch will only support 1 JG136A and 1 JG137A Power supply systems.
Note 4	This power supply only supported on switches JG962A and JG963A.

#### External/Redundant Power Cables

HP X290 1000 A JD5 2m RPS Cable	JD187A
	See Configuration



### Configuration

Note:1

Remarks: These cables are used to connect the External Power System to Switch.

#### Configuration Rules:

Note 1 This Cable is only supported on switches JG962A and JG963A when used with the RPS 1600 (JG136A)

### Technical Specifications

#### HP 1950-24G-2SFP+-2XGT Switch (JG960A)

<b>I/O ports and slots</b>	24 RJ-45 auto-negotiating 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T) 2 SFP+ fixed 1000/10000 SFP+ ports 2 RJ-45 1/10GBASE-T ports														
<b>Additional ports and slots</b>	1 RJ-45 console port to access limited CLI port														
<b>Physical characteristics</b>	<table border="0"> <tr> <td style="vertical-align: top;"><b>Dimensions</b></td> <td>17.17(w) x 6.3(d) x 1.73(h) in (43.6 x 16 x 4.4 cm) (1U height)</td> </tr> <tr> <td style="vertical-align: top;"><b>Weight</b></td> <td>6.61 lb (3 kg)</td> </tr> </table>	<b>Dimensions</b>	17.17(w) x 6.3(d) x 1.73(h) in (43.6 x 16 x 4.4 cm) (1U height)	<b>Weight</b>	6.61 lb (3 kg)										
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<b>Memory and processor</b>	128 MB flash; Packet buffer size: 1.5 MB, 1 GB SDRAM														
<b>Mounting and enclosure</b>	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)														
<b>Performance</b>	<table border="0"> <tr> <td style="vertical-align: top;"><b>100 Mb Latency</b></td> <td>&lt; 5 <math>\mu</math>s</td> </tr> <tr> <td style="vertical-align: top;"><b>1000 Mb Latency</b></td> <td>&lt; 5 <math>\mu</math>s</td> </tr> <tr> <td style="vertical-align: top;"><b>10 Gbps Latency</b></td> <td>&lt; 1.5 <math>\mu</math>s</td> </tr> <tr> <td style="vertical-align: top;"><b>Throughput</b></td> <td>up to 95.2 Mpps (64-byte packets)</td> </tr> <tr> <td style="vertical-align: top;"><b>Routing/Switching capacity</b></td> <td>128 Gbps</td> </tr> <tr> <td style="vertical-align: top;"><b>Routing table size</b></td> <td>32 entries (IPv4), 32 entries (IPv6)</td> </tr> <tr> <td style="vertical-align: top;"><b>MAC address table size</b></td> <td>16384 entries</td> </tr> </table>	<b>100 Mb Latency</b>	< 5 $\mu$ s	<b>1000 Mb Latency</b>	< 5 $\mu$ s	<b>10 Gbps Latency</b>	< 1.5 $\mu$ s	<b>Throughput</b>	up to 95.2 Mpps (64-byte packets)	<b>Routing/Switching capacity</b>	128 Gbps	<b>Routing table size</b>	32 entries (IPv4), 32 entries (IPv6)	<b>MAC address table size</b>	16384 entries
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<b>Reliability</b>	<b>MTBF (years)</b> 87.2														
<b>Environment</b>	<table border="0"> <tr> <td style="vertical-align: top;"><b>Operating temperature</b></td> <td>32°F to 113°F (0°C to 45°C)</td> </tr> <tr> <td style="vertical-align: top;"><b>Operating relative humidity</b></td> <td>10% to 90%, noncondensing</td> </tr> <tr> <td style="vertical-align: top;"><b>Nonoperating/Storage temperature</b></td> <td>-40°F to 158°F (-40°C to 70°C)</td> </tr> <tr> <td style="vertical-align: top;"><b>Nonoperating/Storage relative humidity</b></td> <td>5% to 95%, noncondensing</td> </tr> <tr> <td style="vertical-align: top;"><b>Altitude</b></td> <td>up to 16,404 ft (5 km)</td> </tr> <tr> <td style="vertical-align: top;"><b>Acoustic</b></td> <td>Low-speed fan: 19.0 dB, High-speed fan: 44.5 dB; ISO 7779 Dual speed fan</td> </tr> </table>	<b>Operating temperature</b>	32°F to 113°F (0°C to 45°C)	<b>Operating relative humidity</b>	10% to 90%, noncondensing	<b>Nonoperating/Storage temperature</b>	-40°F to 158°F (-40°C to 70°C)	<b>Nonoperating/Storage relative humidity</b>	5% to 95%, noncondensing	<b>Altitude</b>	up to 16,404 ft (5 km)	<b>Acoustic</b>	Low-speed fan: 19.0 dB, High-speed fan: 44.5 dB; ISO 7779 Dual speed fan		
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<b>Electrical characteristics</b>	<table border="0"> <tr> <td style="vertical-align: top;"><b>Frequency</b></td> <td>50/60 Hz</td> </tr> <tr> <td style="vertical-align: top;"><b>Voltage</b></td> <td>100 - 240 VAC, rated (depending on power supply chosen)</td> </tr> <tr> <td style="vertical-align: top;"><b>Maximum power rating</b></td> <td>34 W</td> </tr> <tr> <td style="vertical-align: top;"><b>Notes</b></td> <td>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.</td> </tr> </table>	<b>Frequency</b>	50/60 Hz	<b>Voltage</b>	100 - 240 VAC, rated (depending on power supply chosen)	<b>Maximum power rating</b>	34 W	<b>Notes</b>	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.						
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<b>Safety</b>	UL 60950; IEC 60950-1; EN 60950-1; GB 4943.1														
<b>Emissions</b>	FCC part 15 Class A; VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; EN 61000-3-2 2000, 61000-3-3; ICES-003 Class A														
<b>Management</b>	IMC - Intelligent Management Center; Limited command-line interface; Web browser; SNMP Manager; HTTPS; RMON1; FTP; Supported by HP IMC and generic SNMP management platforms. Refer to documentation for MIB support details.														
<b>Notes</b>	Transceivers under accessories are recommended versions. Here is the list of fully supported transceivers. 10G SFP+: JD092B, JD093B, JD094B, JG234A, J9150A, J9151A, J9152A, J9153A. GE SFP: JD118B, JD119B, JD089B, J4858C, J4859C, J8177C.														
<b>Services</b>	Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level														

### Technical Specifications

descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

#### HP 1950-48G-2SFP+-2XGT Switch (JG961A)

<b>I/O ports and slots</b>	48 RJ-45 auto-negotiating 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)	
	2 SFP+ fixed 1000/10000 SFP+ ports	
	2 RJ-45 1/10GBASE-T ports	
<b>Additional ports and slots</b>	1 RJ-45 console port to access limited CLI port	
<b>Physical characteristics</b>	<b>Dimensions</b>	17.32(w) x 10.63(d) x 1.73(h) in (44 x 27 x 4.4 cm) (1U height)
	<b>Weight</b>	11.02 lb (5 kg)
<b>Memory and processor</b>	128 MB flash; Packet buffer size: 3 MB, 1 GB SDRAM	
<b>Mounting and enclosure</b>	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
<b>Performance</b>	<b>100 Mb Latency</b>	< 5 $\mu$ s
	<b>1000 Mb Latency</b>	< 5 $\mu$ s
	<b>10 Gbps Latency</b>	< 1.5 $\mu$ s
	<b>Throughput</b>	up to 130.9 Mpps (64-byte packets)
	<b>Routing/Switching capacity</b>	176 Gbps
	<b>Routing table size</b>	32 entries (IPv4), 32 entries (IPv6)
	<b>MAC address table size</b>	16384 entries
<b>Reliability</b>	<b>MTBF (years)</b>	51
<b>Environment</b>	<b>Operating temperature</b>	32°F to 113°F (0°C to 45°C)
	<b>Operating relative humidity</b>	10% to 90%, noncondensing
	<b>Nonoperating/Storage temperature</b>	-40°F to 158°F (-40°C to 70°C)
	<b>Nonoperating/Storage relative humidity</b>	5% to 95%, noncondensing
	<b>Altitude</b>	up to 16,404 ft (5 km)
	<b>Acoustic</b>	Low-speed fan: 38.4 dB, High-speed fan: 47.0 dB; ISO 7779 Dual speed fan
<b>Electrical characteristics</b>	<b>Frequency</b>	50/60 Hz
	<b>Voltage</b>	100 - 240 VAC, rated (depending on power supply chosen)
	<b>Maximum power rating</b>	54 W
	<b>Notes</b>	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.
<b>Safety</b>	UL 60950; IEC 60950-1; EN 60950-1; GB 4943.1	
<b>Emissions</b>	FCC part 15 Class A; VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; EN 61000-3-2 2000, 61000-3-3; ICES-003 Class A	
<b>Management</b>	IMC - Intelligent Management Center; Limited command-line interface; Web browser; SNMP Manager; HTTPS; RMON1; FTP; Supported by HP IMC and generic SNMP management platforms. Refer to documentation for MIB support details.	
<b>Notes</b>	Transceivers under accessories are recommended versions. Here is the list of fully supported transceivers. 10G SFP+: JD092B, JD093B, JD094B, JG234A, J9150A, J9151A, J9152A, J9153A. GE SFP:	

### Technical Specifications

JD118B, JD119B, JD089B, J4858C, J4859C, J8177C.

#### 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 1950-24G-2SFP+-2XGT-PoE+(370W) Switch (JG962A)

##### I/O ports and slots

24 RJ-45 auto-negotiating 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3af PoE, IEEE 802.3at)

2 SFP+ fixed 1000/10000 SFP+ ports

2 RJ-45 1/10GBASE-T ports

##### Additional ports and slots

1 RJ-45 console port to access limited CLI port

##### Physical characteristics

**Dimensions** 17.32(w) x 14.17(d) x 1.73(h) in (44 x 36 x 4.4 cm) (1U height)

**Weight** 13.23 lb (6 kg)

##### Memory and processor

128 MB flash; Packet buffer size: 1.5 MB, 1 GB SDRAM

##### Mounting and enclosure

Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)

##### Performance

**100 Mb Latency** < 5  $\mu$ s

**1000 Mb Latency** < 5  $\mu$ s

**10 Gbps Latency** < 1.5  $\mu$ s

**Throughput** up to 95.2 Mpps (64-byte packets)

**Routing/Switching capacity** 128 Gbps

**Routing table size** 32 entries (IPv4), 32 entries (IPv6)

**MAC address table size** 16384 entries

##### Reliability

**MTBF (years)** 44.4

##### Environment

**Operating temperature** 32°F to 113°F (0°C to 45°C)

**Operating relative humidity** 10% to 90%, noncondensing

**Nonoperating/Storage temperature** -40°F to 158°F (-40°C to 70°C)

**Nonoperating/Storage relative humidity** 5% to 95%, noncondensing

**Altitude** up to 16,404 ft (5 km)

**Acoustic** Low-speed fan: 37.3 dB, High-speed fan: 47.1 dB; ISO 7779 Dual speed fan

##### Electrical characteristics

**Frequency** 50/60 Hz

**Voltage** 100 - 240 VAC, rated (depending on power supply chosen)

**Maximum power rating** 425 W

**PoE power** 370 W PoE+

##### Notes

Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

PoE power is the power supplied by the internal power supply. It is dependent on the type and quantity of power supplies and may be supplemented with the use of an external power supply (EPS).

When supplemented with the use of an HP RPS1600 Redundant Power System, up to 720W of PoE+ can be supplied. Unit max. power

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consumption with RPS is 750W.

<b>Safety</b>	UL 60950; IEC 60950-1; EN 60950-1; GB 4943.1
<b>Emissions</b>	FCC part 15 Class A; VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; EN 61000-3-2 2000, 61000-3-3; ICES-003 Class A
<b>Management</b>	IMC - Intelligent Management Center; Limited command-line interface; Web browser; SNMP Manager; HTTPS; RMON1; FTP; Supported by HP IMC and generic SNMP management platforms. Refer to documentation for MIB support details.
<b>Notes</b>	Transceivers under accessories are recommended versions. Here is the list of fully supported transceivers. 10G SFP+: JD092B, JD093B, JD094B, JG234A, J9150A, J9151A, J9152A, J9153A. GE SFP: JD118B, JD119B, JD089B, J4858C, J4859C, J8177C.
<b>Services</b>	Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

#### HP 1950-48G-2SFP+-2XGT-PoE+(370W) Switch (JG963A)

<b>I/O ports and slots</b>	48 RJ-45 auto-negotiating 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3af PoE, IEEE 802.3at) 2 SFP+ fixed 1000/10000 SFP+ ports 2 RJ-45 1/10GBASE-T ports	
<b>Additional ports and slots</b>	1 RJ-45 console port to access limited CLI port	
<b>Physical characteristics</b>	<b>Dimensions</b>	17.32(w) x 16.54(d) x 1.73(h) in (44 x 42 x 4.4 cm) (1U height)
	<b>Weight</b>	15.43 lb (7 kg)
<b>Memory and processor</b>	128 MB flash; Packet buffer size: 3 MB, 1 GB SDRAM	
<b>Mounting and enclosure</b>	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included)	
<b>Performance</b>	<b>100 Mb Latency</b>	< 5 $\mu$ s
	<b>1000 Mb Latency</b>	< 5 $\mu$ s
	<b>10 Gbps Latency</b>	< 1.5 $\mu$ s
	<b>Throughput</b>	up to 130.9 Mpps (64-byte packets)
	<b>Routing/Switching capacity</b>	176 Gbps
	<b>Routing table size</b>	32 entries (IPv4), 32 entries (IPv6)
	<b>MAC address table size</b>	16384 entries
<b>Reliability</b>	<b>MTBF (years)</b>	26.8
<b>Environment</b>	<b>Operating temperature</b>	32°F to 113°F (0°C to 45°C)
	<b>Operating relative humidity</b>	10% to 90%, noncondensing
	<b>Nonoperating/Storage temperature</b>	-40°F to 158°F (-40°C to 70°C)
	<b>Nonoperating/Storage relative humidity</b>	5% to 95%, noncondensing
	<b>Altitude</b>	up to 16,404 ft (5 km)
	<b>Acoustic</b>	Low-speed fan: 47.3 dB, High-speed fan: 50.0 dB; ISO 7779 Dual speed fan
<b>Electrical characteristics</b>	<b>Frequency</b>	50/60 Hz
	<b>Voltage</b>	100 - 240 VAC, rated (depending on power supply chosen)
	<b>Maximum power rating</b>	470 W
	<b>PoE power</b>	370 W PoE+

### Technical Specifications

<b>Notes</b>	<p>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.</p> <p>PoE power is the power supplied by the internal power supply. It is dependent on the type and quantity of power supplies and may be supplemented with the use of an external power supply (EPS). When supplemented with the use of an HP RPS1600 Redundant Power System, up to 800W of PoE+ can be supplied. Unit max. power consumption with RPS is 910W.</p>
<b>Safety</b>	UL 60950; IEC 60950-1; EN 60950-1; GB 4943.1
<b>Emissions</b>	FCC part 15 Class A; VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; EN 61000-3-2 2000, 61000-3-3; ICES-003 Class A
<b>Management</b>	IMC - Intelligent Management Center; Limited command-line interface; Web browser; SNMP Manager; HTTPS; RMON1; FTP;; Supported by HP IMC and generic SNMP management platforms. Refer to documentation for MIB support details.
<b>Notes</b>	Transceivers under accessories are recommended versions. Here is the list of fully supported transceivers. 10G SFP+: JD092B, JD093B, JD094B, JG234A, J9150A, J9151A, J9152A, J9153A. GE SFP: JD118B, JD119B, JD089B, J4858C, J4859C, J8177C.
<b>Services</b>	Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

### Standards and protocols (applies to all products in series)

#### Device management

RFC 2819 RMON

#### General protocols

IEEE 802.1D MAC Bridges  
 IEEE 802.1D Spanning Tree Protocol  
 IEEE 802.1p Priority  
 IEEE 802.1Q VLANs  
 IEEE 802.1s Multiple Spanning Trees  
 IEEE 802.1W Rapid Spanning Tree Protocol  
 IEEE 802.1X  
 IEEE 802.3 Type 10BASE-T  
 IEEE 802.3ab 1000BASE-T  
 IEEE 802.3ad Link Aggregation Control Protocol (LACP)  
 IEEE 802.3af Power over Ethernet  
 IEEE 802.3at PoE+  
 IEEE 802.3i 10BASE-T  
 IEEE 802.3x Flow Control  
 IEEE 802.3z 1000BASE-X

#### MIBs

RFC 1213 MIB II  
 RFC 1493 Bridge MIB  
 RFC 2021 RMONv2 MIB  
 RFC 2233 Interface MIB  
 RFC 2233 Interfaces MIB  
 RFC 2571 SNMP Framework MIB  
 RFC 2572 SNMP-MPD MIB  
 RFC 2573 SNMP-Notification MIB  
 RFC 2573 SNMP-Target MIB  
 RFC 2613 SMON MIB

### Technical Specifications

- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2667 IP Tunnel MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (Version 2)
- RFC 3414 SNMP-User based-SM MIB
- RFC 3415 SNMP-View based-ACM MIB
- RFC 3418 MIB for SNMPv3

#### **Network management**

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.1D (STP)
- RFC 1215 SNMP Generic traps

#### **QoS/Cos**

- IEEE 802.1p (CoS)

#### **Security**

- IEEE 802.1X Port Based Network Access Control

### Accessories

#### HP 1950 Switch Series accessories

#### Transceivers

HP X121 1G SFP LC SX Transceiver	J4858C
HP X121 1G SFP LC LX Transceiver	J4859C
HP X121 1G SFP RJ45 T Transceiver	J8177C
HP X132 10G SFP+ LC SR Transceiver	J9150A
HP X132 10G SFP+ LC LR Transceiver	J9151A
HP X132 10G SFP+ LC LRM Transceiver	J9152A

#### Cables

HP 0.5 m Multimode OM3 LC/LC Optical Cable	AJ833A
HP 1 m Multimode OM3 LC/LC Optical Cable	AJ834A
HP 2 m Multimode OM3 LC/LC Optical Cable	AJ835A
HP 5 m Multimode OM3 LC/LC Optical Cable	AJ836A
HP 15 m Multimode OM3 LC/LC Optical Cable	AJ837A
HP 30 m Multimode OM3 LC/LC Optical Cable	AJ838A
HP 50 m Multimode OM3 LC/LC Optical Cable	AJ839A
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A



### Accessory Product Details

**NOTE:** Details are not available for all accessories. The following specifications were available at the time of publication.

<p><b>HP X121 1G SFP LC SX Transceiver (J4858C)</b></p>	<p><b>Ports</b> <b>Physical characteristics</b></p>	<p>1 LC 1000BASE-SX port; Duplex: full only Dimensions: 2.24(d) x 0.54(w) x 0.48(h) in. (5.69 x 1.37 x 1.22 cm) Weight: 0.04 lb. (0.02 kg) Transceiver form factor: SFP</p>
<p>A small form-factor pluggable (SFP) Gigabit SX transceiver that provides a full-duplex Gigabit solution up to 550 m on multimode fiber.</p>	<p><b>Environment</b></p>	<p>Operating temperature: 32°F to 158°F (0°C to 70°C) Operating relative humidity: 5% to 85%, noncondensing Nonoperating/Storage temperature: -40°F to 203°F (-40°C to 85°C) Altitude: up to 10,000 ft. (3 km)</p>
	<p><b>Electrical characteristics</b></p>	<p>Power consumption typical: 0.4 W Power consumption maximum: 0.7 W</p>
	<p><b>Cabling</b></p>	<p>Type:</p> <ul style="list-style-type: none"> <li>62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively;</li> </ul> <p>Maximum distance:</p> <ul style="list-style-type: none"> <li>2-220 m (62.5 µm core diameter, 160 MHz*km bandwidth)</li> <li>2-275 m (62.5 µm core diameter, 200 MHz*km bandwidth)</li> <li>2-500 m (50 µm core diameter, 400 MHz*km bandwidth)</li> <li>2-550 m (50 µm core diameter, 500 MHz*km bandwidth)</li> </ul>
	<p><b>Services</b></p>	<p>Cable length: 2-550m Fiber type: Multi Mode Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.</p>
<p><b>HP X121 1G SFP LC LX Transceiver (J4859C)</b></p>	<p><b>Ports</b> <b>Physical characteristics</b></p>	<p>1 LC 1000BASE-LX port (IEEE 802.3z Type 1000BASE-LX); Duplex: full only Dimensions: 2.24(d) x 0.54(w) x 0.486(h) in. (5.69 x 1.37 x 1.23 cm) Weight: 0.04 lb. (0.02 kg)</p>
<p>HP X121 1G SFP LC LX Transceiver: An SFP format gigabit transceiver with LC connectors using LX technology.</p>	<p><b>Environment</b></p>	<p>Operating temperature: 32°F to 158°F (0°C to 70°C) Operating relative humidity: 0% to 85%, noncondensing Nonoperating/Storage temperature: -40°F to 212°F (-40°C to 100°C) Altitude: up to 10,000 ft. (3 km)</p>
	<p><b>Cabling</b></p>	<p>Type:</p> <ul style="list-style-type: none"> <li>Either single mode or multimode; 62.5/125 µm or 50/125 µm (core/cladding) diameter, graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively; Low metal content, single-mode fiber-optic, complying with ITU-T G.652 and ISO/IEC 793-2 Type B1;</li> </ul> <p>Maximum distance:</p> <ul style="list-style-type: none"> <li>2-550 m (multimode 62.5 µm core diameter, 500 MHz*km)</li> </ul>

### Accessory Product Details

- bandwidth)
- 2-550 m (multimode 50 µm core diameter, 400 MHz\*km bandwidth)
- 2-550 m (multimode 50 µm core diameter, 500 MHz\*km bandwidth)
- 2-10,000 m (single-mode fiber)

<b>Notes</b>	A mode conditioning patch cord may be needed in some multimode fiber installations. Wavelength: 1310nm Power Consumption: < 500mW Typical
<b>Services</b>	Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.

#### HP X121 1G SFP RJ45 T Transceiver (J8177C)

HP X121 1G SFP RJ45 T Transceiver: An SFP format gigabit transceiver with RJ45 connectors using 1000BaseT technology.

<b>Ports</b>	1 RJ-45 1000BASE-T port (IEEE 802.3ab Type 1000BASE-T); Duplex: full only
<b>Physical characteristics</b>	Dimensions: 2.71(d) x 0.54(w) x 0.55(h) in. (6.88 x 1.37 x 1.4 cm) Weight: 0.06 lb. (0.03 kg)
<b>Environment</b>	Operating temperature: 32°F to 158°F (0°C to 70°C); with 100 LFM airflow over the SFP module Operating relative humidity: 0% to 95% @ 75°F (25°C), noncondensing Nonoperating/Storage temperature: -40°F to 185°F (-40°C to 85°C) Nonoperating/Storage relative humidity: 0% to 95% @ 77°F (25°C), noncondensing Altitude: up to 10,000 ft. (3000 km)
<b>Cabling</b>	Cable type: 1000BASE-T: Category 5 (5E or better recommended), 100 ù differential 4-pair unshielded twisted pair (UTP) or shielded twisted pair (STP) balanced, complying with IEEE 802.3ab 1000BASE-T;  Maximum distance: <ul style="list-style-type: none"> <li>• 100 m</li> </ul>
<b>Notes</b>	Power consumption is nominally 1 watt. For supported platforms and minimum software requirements to support this product, see the document titled "Support for the J8177C 1000Base-T Mini-GBIC" on the "HP Mini-GBICs and SFPs" Manuals Web page. The J8177C Gigabit copper mini-GBIC is not supported on dual-personality ports. The J8177C is capable of 100 Mb operation. This is supported on only the HP E8200zl, E5400zl, and HP E6200-24G-mGBIC yl Switches using software version K.12.21 or later. Use the "auto-100" port setting to enable 100 Mb operation. Important: The earlier J8177B does not support 100 Mb operation. When used in the Switch gl 20-Port 10/100/1000 Module (J4908A), the J8177C mini-GBIC can be installed in either the upper or lower mini-GBIC port, but will block access to the other port.

### Accessory Product Details

#### 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 0.5 m Multimode OM3 Cabling LC/LC Optical Cable (AJ833A)

#### Cable type:

50/125  $\mu\text{m}$  (core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m

#### Maximum distance:

10Gbps Transfer Rate (Ethernet): 300m

#### Notes

Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125  $\mu\text{m}$  fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

- Dimensions: Core diameter:  $50 \pm 3.0\mu\text{m}$  Cladding diameter:  $125 \pm 2.0\mu\text{m}$  Coating diameter:  $245 \pm 10\mu\text{m}$
- Optical glass: Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical glass: Bandwidth: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber and designed to work in both the 850 and 1300 nm wavelength windows.
- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.
- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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 1 m Multimode OM3 Cabling LC/LC Optical Cable (AJ834A)

#### Cable type:

50/125  $\mu\text{m}$  (core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m

#### Maximum distance:

10Gbps Transfer Rate (Ethernet): 300m

#### Notes

Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125  $\mu\text{m}$  fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

### Accessory Product Details

- Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um
- Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows.
- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.
- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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 2 m Multimode OM3 LC/LC Optical Cable (AJ835A)

#### Cabling

##### Cable type:

50/125 µm (core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m;

##### Maximum distance:

10Gbps Transfer Rate (Ethernet): 300m

#### Notes

Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 um fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

- Dimensions: Core diameter: 50 ± 3.0um Cladding diameter: 125 ± 2.0um Coating diameter: 245 ± 10um
- Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows.
- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003

### Accessory Product Details

dB/M added for lengths > 30 meters.

- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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 5 m Multimode OM3 LC/LC Optical Cable (AJ836A)

#### Cabling

##### Cable type:

50/125 µm core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m;

##### Maximum distance:

10Gbps Transfer Rate (Ethernet): 300m

#### Notes

Cable Specs: This specification defines the detail requirements for a tight buffered duplex fiber optic multimode OM3 50/125 µm fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

- Dimensions: Core diameter: 50 ± 3.0µm Cladding diameter: 125 ± 2.0µm Coating diameter: 245 ± 10µm
- Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125µm multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows.
- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.
- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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 15 m Multimode OM3 LC/LC Optical Cable (AJ837A)

#### Cabling

##### Cable type:

50/125 µm (core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m;

### Accessory Product Details

#### Notes

**Maximum distance:**

10Gbps Transfer Rate (Ethernet): 300m

Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125  $\mu$ m fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

- Dimensions: Core diameter:  $50 \pm 3.0\mu\text{m}$  Cladding diameter:  $125 \pm 2.0\mu\text{m}$  Coating diameter:  $245 \pm 10\mu\text{m}$
- Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows.
- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.
- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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 30 m Multimode OM3 LC/LC Optical Cable (AJ838A) Cabling

**Cable type:**

50/125  $\mu$ m (core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m;

**Maximum distance:**

10Gbps Transfer Rate (Ethernet): 300m

#### Notes

Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125  $\mu$ m fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

- Dimensions: Core diameter:  $50 \pm 3.0\mu\text{m}$  Cladding diameter:  $125 \pm 2.0\mu\text{m}$  Coating diameter:  $245 \pm 10\mu\text{m}$
- Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125um multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows.

### Accessory Product Details

- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.
- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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 50 m Multimode OM3 LC/LC Optical Cable (AJ839A)

#### Cabling

##### Cable type:

50/125 µm (core/cladding) diameter, multimode fiber optic, with effective modal bandwidth of 2000 MHz/km as detailed in TIA-492AAAC for distances of up to 300 m;

##### Maximum distance:

10Gbps Transfer Rate (Ethernet): 300m

#### Notes

Cable Specs: Tight buffered duplex fiber optic multimode OM3 50/125 µm fiber optic cable and Ethernet assembly with LC duplex connectors on one end and LC duplex connectors on other end.

- Dimensions: Core diameter: 50 ± 3.0µm Cladding diameter: 125 ± 2.0µm Coating diameter: 245 ± 10µm
- Optical Glass Bandwidth: For LED sources: 1500/500 MHz-km @850/1300nm.
- Optical Glass: For Laser sources: 2000/500 MHz-km @850/1300nm. VCSEL Laser sources: Shall achieve 600 / 600 meters @850/1300nm for Gigabit Ethernet compliant links.
- CABLE: The cable is duplex zipcord graded index 50/125µm multimode optical fiber. The cable is designed to work in both the 850 and 1300 nm wavelength windows.
- BULK CABLE & CABLE ASSEMBLY CONFIGURATION:
- Jacket Material: Riser Grade - Low Smoke Zero Halogen thermoplastic.
- Jacket Color: Aqua for OM3 multimode per TIA 598
- Boot Color: White
- Insertion Loss: less than 0.5 dB @ 850 with LED source, 0.003 dB/M added for lengths > 30 meters.
- Maximum Cable attenuation: 3.0 dB/km @ 850 nm, 1.0 dB/Km @ 1310 nm @ 23°C as tested in accordance with EIA 455-46.
- Weight: Air Packed Weight: 1 LB Net Weight: 0.454Kg

#### 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.

### Accessory Product Details

**HP Premier Flex LC/LC  
Multi-mode OM4 2 fiber  
1m Cable (QK732A)**      **Notes**

Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end.

- Core Diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um
- Bandwidth: 3000 MHz-km @ 850nm (Laser)
- Jacket Color: Blue
- Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic
- Boot Color: White
- Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable.
- Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m
- Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45

**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 Premier Flex LC/LC  
Multi-mode OM4 2 fiber  
2m Cable (QK733A)**      **Notes**

Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end.

- Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um
- Bandwidth: 3000 MHz-km @ 850nm (Laser)
- Jacket Color: Blue
- Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic
- Boot Color: White
- Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable.
- Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m
- Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45

**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 Premier Flex LC/LC  
Multi-mode OM4 2 fiber  
5m Cable (QK734A)**      **Notes**

Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end.

- Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um
- Bandwidth: 3000 MHz-km @ 850nm (Laser)
- Jacket Color: Blue



### Accessory Product Details

		<ul style="list-style-type: none"> <li>• Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic</li> <li>• Boot Color: White</li> <li>• Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable.</li> <li>• Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths &gt;30m</li> <li>• Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45</li> </ul> <p><b>Services</b></p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.</p>
<p><b>HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)</b></p>	<p><b>Notes</b></p> <p>Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end.</p> <ul style="list-style-type: none"> <li>• Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um</li> <li>• Bandwidth: 3000 MHz-km @ 850nm (Laser)</li> <li>• Jacket Color: Blue</li> <li>• Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic</li> <li>• Boot Color: White</li> <li>• Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable.</li> <li>• Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths &gt;30m</li> <li>• Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45</li> </ul> <p><b>Services</b></p> <p>Refer to the HP website at <a href="http://www.hp.com/networking/services">www.hp.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local HP sales office.</p>	
<p><b>HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)</b></p>	<p><b>Notes</b></p> <p>Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end.</p> <ul style="list-style-type: none"> <li>• Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um</li> <li>• Bandwidth: 3000 MHz-km @ 850nm (Laser)</li> <li>• Jacket Color: Blue</li> <li>• Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic</li> <li>• Boot Color: White</li> <li>• Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable.</li> <li>• Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths &gt;30m</li> </ul>	

### Accessory Product Details

#### Services

- Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
- 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 Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)

#### Notes

Cable Specs: Graded-index, "bendable" fiber optic multimode OM3+ 50/125um duplex cable and Ethernet assembly with LC duplex connectors on each end.

#### Services

- Core diameter: 50um ±3um, Cladding diameter: 125um ±2um; Coating diameter: 245 ± 10um
  - Bandwidth: 3000 MHz-km @ 850nm (Laser)
  - Jacket Color: Blue
  - Jacket Material: Riser Grade – Low Smoke Zero Halogen (LSZH) thermoplastic
  - Boot Color: White
  - Outer Jacket Print: HP PremierFlex OM3+ Fiber Optic Cable, 50/125um, Type OFNR (UL), LSZH, cUL, OFN FT4, ROHS. Cable also has a longitudinal white stripe that runs the entire length of the cable.
  - Insertion Loss: Less than 0.5dB @ 850nm with LED source, 0.003dB/m added for lengths >30m
  - Maximum Cable Attenuation: 3.0 dB/km @ 850nm, 1.0 dB/km @ 1310nm @ 23°C as tested in accordance with EIA 455-45
- 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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