

Overview

Models

HP A-MSR900 Router	JF812A
HP A-MSR920 Router	JF813A
HP A-MSR900-W Router	JF814A
HP A-MSR920-W Router	JF815A

Key features

- WAN, LAN, wireless, and firewall all in one box
- Integrated 2 Fast Ethernet WAN, 4/8 LAN on board
- Support for 11b/g and 3G access
- Embedded encryption, firewall, security feature
- Unified and ease management

Product overview

Featuring advanced software and an industry-leading hardware platform, the HP A-MSR 900 Series Multi-Service routers with IEEE 802.11b/g provide enhanced performance, security, and reliability for enterprise networks. The perfect appliance for delivering converged network solutions, including data, voice and video, IPv6 support, and robust quality of service (QoS), help ensure that these routers can not only handle the enterprise networking applications of today, but future connectivity and capacity demands as well. Additionally, a standards-based design provides complete interoperability in multivendor environments.

Features and benefits

Quality of Service (QoS)

- **Traffic policing:** supports Committed Access Rate (CAR) and line rate
- **Congestion management:** supports FIFO, PQ, CQ, WFQ, CBQ, and RTPQ
- **Congestion avoidance:** weighted Random Early Detection (WRED)/RED
- **Other QoS technologies:** support traffic shaping, FR QoS, MPLS QoS, and MP QoS/LFI

Management

- **Industry-standard CLI with a hierarchical structure:** reduces training time and expenses, and increases productivity in multivendor installations
- **Management security:** multiple privilege levels, with password protection, restrict access to critical configuration commands; ACLs provide telnet and SNMP access; local and remote syslog capability allow logging of all access
- **SNMPv1, v2, and v3:** provide complete support of SNMP; SNMPv3 supports increased security using encryption; provide full support of industry-standard MIBs plus private MIB extensions
- **Remote monitoring (RMON):** uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
- **FTP, TFTP, and SFTP support:** File Transfer Protocol allows bi-directional transfers over a TCP/IP network and is used for configuration updates; Trivial FTP is a simpler method using UDP
- **Debug and sampler utility:** supports ping and traceroute for both IPv4 and IPv6
- **Network Time Protocol (NTP):** synchronizes timekeeping among distributed time servers and clients; keeps consistent timekeeping among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time
- **Info center:** provides a central information center for system and network information; aggregates all logs, traps, and



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debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules

- **Network Quality Analyzer (NQA):** analyzes network performance and service quality by sending test packets, and provides network performance and service quality parameters such as jitter, TCP, or FTP connection delays; allows network manager to determine overall network performance and diagnose and locate network congestion points or failures

Connectivity

- **Packet storm protection:** protects against broadcast, multicast, or unicast storms with user-defined thresholds
- **Loopback:** supports internal loopback testing for maintenance purposes and an increase in availability; loopback detection protects against incorrect cabling or network configurations and can be enabled on a per-port or per-VLAN basis for added flexibility
- **3G access support:** allows use of SIC 3G module for high reliability; supports popular USB 3G modem

Performance

- **Excellent forwarding performance:** provides forwarding performance up to 100 Kpps; meets today's and future bandwidth-intensive application demands for enterprise businesses
- **Embedded encryption:** supports up to 100 VPN tunnels and 8 Mbps encryption throughput

Resiliency and high availability

- **Virtual Router Redundancy Protocol (VRRP):** allows a group of routers to dynamically back each other up to create highly available routed environments
- **Backup Centre:** functions as a part of the management and backup function to provide backup for interfaces on your device; delivers reliability by switching traffic over to a backup interface when the primary one fails

Layer 2 switching

- **Spanning Tree:** fully supports standard IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol
- **IGMP and MLD snooping:** effectively control and manage the flooding of multicast packets in a Layer 2 network
- **Port mirroring:** duplicates port traffic (ingress and egress) to a local or remote monitoring port
- **Port isolation:** increases security by isolating ports within a VLAN while still allowing them to communicate with other VLANs
- **VLANs:** support IEEE 802.1Q-based VLANs

Layer 3 services

- **Address Resolution Protocol (ARP):** determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network
- **Dynamic Host Configuration Protocol (DHCP):** simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets

Layer 3 routing

- **Static IPv4 routing:** provides simple, manually configured IPv4 routing
- **Routing Information Protocol (RIP):** uses a distance vector algorithm with UDP packets for route determination; supports RIPv1 and RIPv2 routing; includes loop protection
- **OSPF:** Interior Gateway Protocol (IGP) using link-state protocol for faster convergence; supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- **Border Gateway Protocol 4 (BGP-4):** Exterior Gateway Protocol (EGP) with path vector protocol uses TCP for enhanced reliability for the route discovery process, reduces bandwidth consumption by advertising only incremental updates, and



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supports extensive policies for increased flexibility, as well as scales to very large networks

- **Intermediate system to intermediate system (IS-IS):** Interior Gateway Protocol (IGP) using path-vector protocol, which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
- **Static IPv6 routing:** provides simple, manually configured IPv6 routing
- **Dual stack:** maintains separate stacks for IPv4 and IPv6 to ease transition from an IPv4-only network to an IPv6-only network design
- **Routing Information Protocol next generation (RIPng):** extends RIPv2 to support IPv6 addressing
- **OSPFv3:** extends OSPFv2 to support IPv6 addressing
- **BGP+:** extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing
- **IS-IS for IPv6:** extends IS-IS to support IPv6 addressing
- **IPv6 tunneling:** is an important element for the transition from IPv4 to IPv6; allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6to4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels
- **Policy routing:** allows custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies

Security

- **Access control list (ACL):** supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent illegal users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header; rules can be set to operate on specific dates or times
- **TACACS+:** is an authentication tool using TCP with encryption of the full authentication request that provides added security
- **MAC authentication:** provides simple authentication based on a user's MAC address; supports local or RADIUS-based authentication
- **Network login:** standard IEEE 802.1x allows authentication of multiple users per port
- **RADIUS:** eases security access administration by using a password authentication server
- **Network address translation (NAT):** supports one-to-one NAT, many-to-many NAT, and NAT control, enabling NAT to support multiple connections; supports blacklist in NAT/NAPT, a limit on the number of connections, session log, and multi-instance
- **Secure Shell (SSHv2):** uses external servers to securely login into a remote device or securely login into MSR from a remote location; with authentication and encryption, it protects against IP spoofing and plain text password interception; increases the security of SFTP transfers
- **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

Convergence

- **Internet Group Management Protocol (IGMP):** is used by IP hosts to establish and maintain multicast groups; supports v1, v2, and v3; utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks
- **Protocol Independent Multicast (PIM):** is used for IPv4 and IPv6 multicast applications; supports PIM dense mode (PIM-DM), sparse mode (PIM-SM), and source-specific mode (PIM-SSM)
- **Multicast Source Discovery Protocol (MSDP):** is used for inter-domain multicast applications, allowing multiple PIM-SM domains to interoperate
- **Multicast Border Gateway Protocol (MBGP):** allows multicast traffic to be forwarded across BGP networks, separate from unicast traffic

Integration

- **Embedded NetStream:** local and global server load balancing module improves traffic distribution using powerful scheduling algorithms, including Layer 4 to 7 services; monitors the health status of servers and firewalls



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- **Embedded VPN firewall:** provides enhanced stateful packet inspection and filtering; provides advanced VPN services with Triple DES (3DES) and Advanced Encryption Standard (AES) encryption at high performance and low latency, Web content filtering, and application prioritization and enhancement

Additional information

- **Green initiative support:** provides support for RoHS and WEEE regulations
- **OPEX savings:** a common operating system simplifies and streamlines deployment, management, and training, thereby cutting costs, as well as reducing the chance for human error associated with having to manage multiple operating systems across different platforms and network layers
- **Faster time to market:** engineering efficiencies allow new and custom features to be brought rapidly to the market with better initial and ongoing stability

Warranty and support

- **1-year warranty:** with advance replacement and 30-calendar-day delivery (available in most countries)
- **Electronic and telephone support:** limited electronic and telephone support is available from HP; refer to: www.hp.com/networking/warranty for details on the support provided and the period during which support is available
- **Software releases:** refer to: www.hp.com/networking/warranty for details on the software releases provided and the period during which software releases are available for your product(s)



Technical Specifications

HP A-MSR900 Router (JF812A)

Ports	2 RJ-45 autosensing 10/100 WAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full 4 RJ-45 autosensing 10/100 LAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full
Physical characteristics	Dimensions 6.3(d) x 9.06(w) x 1.74(h) in. (16 x 23 x 4.42 cm) Weight 3.97 lb. (1.8 kg)
Memory and processor	Processor RISC @ 266 MHz, 256 MB DDR SDRAM, 256 MB flash
Performance	Throughput up to 70 Kpps (64-byte packets) Routing table size 10000 entries
Environment	Operating temperature 32°F to 113°F (0°C to 45°C) Operating relative humidity 5% to 90% Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C) Nonoperating/Storage relative humidity 5% to 90%
Electrical characteristics	Maximum heat dissipation 20 BTU/hr (21.1 kJ/hr) DC Voltage 12 V Maximum power rating 15 W 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.
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+ A1:2001 + A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68
Management	IMC - Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Services	3-year, parts only, global next-day advance exchange (UY865E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UY866E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UY869E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UY872E) 3-year, 24x7 SW phone support, software updates (UY875E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UY867E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UY870E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY873E) 4-year, 24x7 SW phone support, software updates (UY876E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UY868E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UY871E)



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5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY874E)

5-year, 24x7 SW phone support, software updates (UY877E)

3 Yr 6 hr Call-to-Repair Onsite (UY878E)

4 Yr 6 hr Call-to-Repair Onsite (UY879E)

5 Yr 6 hr Call-to-Repair Onsite (UY880E)

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

Standards and protocols

(applies to all products in series)

BGP

RFC 1163 Border Gateway Protocol (BGP)
RFC 1267 Border Gateway Protocol 3 (BGP-3)
RFC 1657 Definitions of Managed Objects for BGPv4
RFC 1771 BGPv4
RFC 1772 Application of the BGP
RFC 1773 Experience with the BGP-4 Protocol
RFC 1774 BGP-4 Protocol Analysis
RFC 1965 BGP4 confederations
RFC 1997 BGP Communities Attribute
RFC 1998 PPP Gandalf FZA Compression Protocol
RFC 2385 BGP Session Protection via TCP MD5
RFC 2439 BGP Route Flap Damping

Device management

RFC 1305 NTPv3
RFC 1945 Hypertext Transfer Protocol -- HTTP/1.0
RFC 2271 FrameWork
RFC 2452 MIB for TCP6
RFC 2454 MIB for UDP6

General protocols

IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
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 856 TELNET
RFC 858 Telnet Suppress Go Ahead Option
RFC 894 IP over Ethernet
RFC 925 Multi-LAN Address Resolution
RFC 950 Internet Standard Subnetting Procedure

RFC 3032 MPLS Label Stack Encoding
RFC 3036 LDP Specification
RFC 3046 DHCP Relay Agent Information Option
RFC 3063 MPLS Loop Prevention Mechanism
RFC 3065 Support AS confederation
RFC 3137 OSPF Stub Router Advertisement
RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels
RFC 3210 Applicability Statement for Extensions to RSVP for LSP-Tunnels
RFC 3212 Constraint-Based LSP setup using LDP (CR-LDP)
RFC 3214 LSP Modification Using CR-LDP
RFC 3215 LDP State Machine
RFC 3268 Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)
RFC 3277 IS-IS Transient Blackhole Avoidance
RFC 3279 Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3392 Support BGP capabilities advertisement
RFC 3526 More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE)
RFC 3564 Requirements for Support of Differentiated Services-aware MPLS Traffic Engineering
RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec
RFC 3706 A Traffic-Based Method of Detecting Dead Internet Key Exchange (IKE) Peers
RFC 3784 ISIS TE support
RFC 3786 Extending the Number of IS-IS LSP Fragments Beyond the 256 Limit
RFC 3811 Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management
RFC 3812 Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information



Technical Specifications

RFC 959 File Transfer Protocol (FTP)	Base (MIB)
RFC 1006 ISO transport services on top of the TCP: Version 3	RFC 3847 Restart signaling for IS-IS
RFC 1027 Proxy ARP	IP multicast
RFC 1034 Domain Concepts and Facilities	RFC 1112 IGMP
RFC 1035 Domain Implementation and Specification	RFC 2236 IGMPv2
RFC 1042 IP Datagrams	RFC 2283 Multiprotocol Extensions for BGP-4
RFC 1058 RIPv1	RFC 2362 PIM Sparse Mode
RFC 1071 Computing the Internet Checksum	RFC 2934 Protocol Independent Multicast MIB for IPv4
RFC 1091 Telnet Terminal-Type Option	RFC 3376 IGMPv3
RFC 1122 Host Requirements	IPv6
RFC 1141 Incremental updating of the Internet checksum	RFC 1981 IPv6 Path MTU Discovery
RFC 1142 OSI IS-IS Intra-domain Routing Protocol	RFC 2080 RIPng for IPv6
RFC 1144 Compressing TCP/IP headers for low-speed serial links	RFC 2292 Advanced Sockets API for IPv6
RFC 1195 OSI ISIS for IP and Dual Environments	RFC 2373 IPv6 Addressing Architecture
RFC 1256 ICMP Router Discovery Protocol (IRDP)	RFC 2460 IPv6 Specification
RFC 1293 Inverse Address Resolution Protocol	RFC 2461 IPv6 Neighbor Discovery
RFC 1315 Management Information Base for Frame Relay DTEs	RFC 2462 IPv6 Stateless Address Auto-configuration
RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)	RFC 2464 Transmission of IPv6 over Ethernet Networks
RFC 1333 PPP Link Quality Monitoring	RFC 2472 IP Version 6 over PPP
RFC 1334 PPP Authentication Protocols (PAP)	RFC 2473 Generic Packet Tunneling in IPv6
RFC 1349 Type of Service	RFC 2529 Transmission of IPv6 Packets over IPv4
RFC 1350 TFTP Protocol (revision 2)	RFC 2545 Use of MP-BGP-4 for IPv6
RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)	RFC 2553 Basic Socket Interface Extensions for IPv6
RFC 1381 SNMP MIB Extension for X.25 LAPB	RFC 2740 OSPFv3 for IPv6
RFC 1471 The Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol	RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
RFC 1472 The Definitions of Managed Objects for the Security Protocols of the Point-to-Point Protocol	RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
RFC 1490 Multiprotocol Interconnect over Frame Relay	RFC 3513 IPv6 Addressing Architecture
RFC 1519 CIDR	RFC 3596 DNS Extension for IPv6
RFC 1534 DHCP/BOOTP Interoperation	MIBs
RFC 1542 Clarifications and Extensions for the Bootstrap Protocol	RFC 1213 MIB II
RFC 1552 The PPP Internetworking Packet Exchange Control Protocol (IPXCP)	RFC 1229 Interface MIB Extensions
RFC 1577 Classical IP and ARP over ATM	RFC 1286 Bridge MIB
RFC 1613 Cisco Systems X.25 over TCP (XOT)	RFC 1493 Bridge MIB
RFC 1624 Incremental Internet Checksum	RFC 1573 SNMP MIB II
RFC 1631 NAT	RFC 1724 RIPv2 MIB
RFC 1638 PPP Bridging Control Protocol (BCP)	RFC 1757 Remote Network Monitoring MIB



Technical Specifications

- RFC 1661 The Point-to-Point Protocol (PPP)
 - RFC 1662 PPP in HDLC-like Framing
 - RFC 1695 Definitions of Managed Objects for ATM Management Version 8.0 using SMIv2
 - RFC 1701 Generic Routing Encapsulation
 - RFC 1702 Generic Routing Encapsulation over IPv4 networks
 - RFC 1721 RIP-2 Analysis
 - RFC 1722 RIP-2 Applicability
 - RFC 1723 RIP v2
 - RFC 1795 Data Link Switching: Switch-to-Switch Protocol AIW DLSw RIG: DLSw Closed Pages, DLSw Standard Version 1
 - RFC 1812 IPv4 Routing
 - RFC 1829 The ESP DES-CBC Transform
 - RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses
 - RFC 1944 Benchmarking Methodology for Network Interconnect Devices
 - RFC 1973 PPP in Frame Relay
 - RFC 1974 PPP Stac LZS Compression Protocol
 - RFC 1990 The PPP Multilink Protocol (MP)
 - RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
 - RFC 2091 Trigger RIP
 - RFC 2131 DHCP
 - RFC 2132 DHCP Options and BOOTP Vendor Extensions
 - RFC 2166 APPN Implementer's Workshop Closed Pages Document DLSw v2.0 Enhancements
 - RFC 2205 Resource ReSerVation Protocol (RSVP) - Version 1 Functional Specification
 - RFC 2280 Routing Policy Specification Language (RPSL)
 - RFC 2284 EAP over LAN
 - RFC 2338 VRRP
 - RFC 2364 PPP Over AAL5
 - RFC 2374 An Aggregatable Global Unicast Address Format
 - RFC 2451 The ESP CBC-Mode Cipher Algorithms
 - RFC 2453 RIPv2
 - RFC 2510 Internet X.509 Public Key Infrastructure Certificate Management Protocols
 - RFC 2511 Internet X.509 Certificate Request Message Format
 - RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)
 - RFC 2644 Directed Broadcast Control
 - RFC 2661 L2TP
 - RFC 2663 NAT Terminology and Considerations
 - RFC 2466 ICMPv6 MIB
 - RFC 2618 RADIUS Client MIB
 - RFC 2620 RADIUS Accounting MIB
 - RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
 - RFC 2737 Entity MIB (Version 2)
 - RFC 2863 The Interfaces Group MIB
 - RFC 2933 IGMP MIB
 - RFC 3813 MPLS LSR MIB
- Network management**
- IEEE 802.1D (STP)
 - RFC 1155 Structure of Management Information
 - RFC 1157 SNMPv1
 - RFC 1905 SNMPv2 Protocol Operations
 - RFC 2272 SNMPv3 Management Protocol
 - RFC 2273 SNMPv3 Applications
 - RFC 2274 USM for SNMPv3
 - RFC 2275 VACM for SNMPv3
 - RFC 2575 SNMPv3 View-based Access Control Model (VACM)
 - RFC 3164 BSD syslog Protocol
- OSPF**
- RFC 1245 OSPF protocol analysis
 - RFC 1246 Experience with OSPF
 - RFC 1587 OSPF NSSA
 - RFC 1765 OSPF Database Overflow
 - RFC 1850 OSPFv2 Management Information Base (MIB), traps
 - RFC 2328 OSPFv2
 - RFC 2370 OSPF Opaque LSA Option
 - RFC 3101 OSPF NSSA
- QoS/CoS**
- IEEE 802.1P (CoS)
 - RFC 2474 DS Field in the IPv4 and IPv6 Headers
 - RFC 2475 DiffServ Architecture
 - RFC 2597 DiffServ Assured Forwarding (AF)
 - RFC 2598 DiffServ Expedited Forwarding (EF)
 - RFC 3168 The Addition of Explicit Congestion Notification (ECN) to IP
- Security**
- IEEE 802.1X Port Based Network Access Control
 - RFC 1321 The MD5 Message-Digest Algorithm
 - RFC 2082 RIP-2 MD5 Authentication
 - RFC 2104 Keyed-Hashing for Message Authentication
 - RFC 2138 RADIUS Authentication
 - RFC 2209 RSVP-Message Processing
 - RFC 2246 Transport Layer Security (TLS)
 - RFC 2716 PPP EAP TLS Authentication Protocol



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RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5	RFC 2865 RADIUS Authentication
RFC 2694 DNS extensions to Network Address Translators (DNS_ALG)	RFC 2866 RADIUS Accounting
RFC 2702 Requirements for Traffic Engineering Over MPLS	RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication
RFC 2747 RSVP Cryptographic Authentication	VPN
RFC 2763 Dynamic Name-to-System ID mapping support	RFC 2403 - HMAC-MD5-96
RFC 2765 Stateless IP/ICMP Translation Algorithm (SIIT)	RFC 2404 - HMAC-SHA1-96
RFC 2766 Network Address Translation - Protocol Translation (NAT-PT)	RFC 2405 - DES-CBC Cipher algorithm
RFC 2784 Generic Routing Encapsulation (GRE)	RFC 2547 BGP/MPLS VPNs
RFC 2787 Definitions of Managed Objects for VRRP	RFC 2796 BGP Route Reflection - An Alternative to Full Mesh IBGP
RFC 2961 RSVP Refresh Overhead Reduction Extensions	RFC 2842 Capabilities Advertisement with BGP-4
RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS	RFC 2858 Multiprotocol Extensions for BGP-4
RFC 2973 IS-IS Mesh Groups	RFC 2918 Route Refresh Capability for BGP-4
RFC 2993 Architectural Implications of NAT	RFC 3107 Carrying Label Information in BGP-4
RFC 3022 Traditional IP Network Address Translator (Traditional NAT)	IPsec
RFC 3027 Protocol Complications with the IP Network Address Translator	RFC 1828 IP Authentication using Keyed MD5
RFC 3031 Multiprotocol Label Switching Architecture	RFC 2401 IP Security Architecture
	RFC 2402 IP Authentication Header
	RFC 2406 IP Encapsulating Security Payload
	RFC 2407 - Domain of interpretation
	RFC 2410 - The NULL Encryption Algorithm and its use with IPsec
	RFC 2411 IP Security Document Roadmap
	RFC 2412 - OAKLEY
	RFC 2865 - Remote Authentication Dial In User Service (RADIUS)

HP A-MSR920 Router (JF813A)

Ports	2 RJ-45 autosensing 10/100 WAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full
	8 RJ-45 autosensing 10/100 LAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full
Physical characteristics	Dimensions 6.3(d) x 9.06(w) x 1.74(h) in. (16 x 23 x 4.42 cm)
	Weight 3.97 lb. (1.8 kg)
Memory and processor	Processor RISC @ 333 MHz, 256 MB DDR SDRAM, 256 MB flash
Performance	Throughput up to 100 Kpps (64-byte packets)
	Routing table size 10000 entries
Environment	Operating temperature 32°F to 113°F (0°C to 45°C)
	Operating relative humidity 5% to 90%
	Nonoperating/Storage temperature -40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity 5% to 90%
Electrical characteristics	Maximum heat dissipation 29 BTU/hr (30.6 kJ/hr)



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DC Voltage	12 V
Maximum power rating	15 W
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.

Safety UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J

Emissions ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+ A1:2001 + A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR22 Class B; FCC (CFR 47, Part 15) Class B

Telecom FCC part 68

Management IMC - Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB

Services
 3-year, parts only, global next-day advance exchange (UY881E)
 3-year, 4-hour onsite, 13x5 coverage for hardware (UY882E)
 3-year, 4-hour onsite, 24x7 coverage for hardware (UY885E)
 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UY888E)
 3-year, 24x7 SW phone support, software updates (UY891E)
 4-year, 4-hour onsite, 13x5 coverage for hardware (UY883E)
 4-year, 4-hour onsite, 24x7 coverage for hardware (UY886E)
 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY889E)
 4-year, 24x7 SW phone support, software updates (UY892E)
 5-year, 4-hour onsite, 13x5 coverage for hardware (UY884E)
 5-year, 4-hour onsite, 24x7 coverage for hardware (UY887E)
 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY890E)
 5-year, 24x7 SW phone support, software updates (UY893E)
 3 Yr 6 hr Call-to-Repair Onsite (UY894E)
 4 Yr 6 hr Call-to-Repair Onsite (UY895E)
 5 Yr 6 hr Call-to-Repair Onsite (UY896E)

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

Standards and protocols
 (applies to all products in series)

BGP	RFC 3032 MPLS Label Stack Encoding
RFC 1163 Border Gateway Protocol (BGP)	RFC 3036 LDP Specification
RFC 1267 Border Gateway Protocol 3 (BGP-3)	RFC 3046 DHCP Relay Agent Information Option
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RFC 1771 BGPv4	RFC 3065 Support AS confederation
RFC 1772 Application of the BGP	RFC 3137 OSPF Stub Router Advertisement
RFC 1773 Experience with the BGP-4 Protocol	RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels
RFC 1774 BGP-4 Protocol Analysis	RFC 3210 Applicability Statement for Extensions to RSVP for LSP-Tunnels
RFC 1965 BGP4 confederations	RFC 3212 Constraint-Based LSP setup using LDP
RFC 1997 BGP Communities Attribute	
RFC 1998 PPP Gandalf FZA Compression Protocol (CR-LDP)	



Technical Specifications

RFC 2385 BGP Session Protection via TCP MD5
RFC 2439 BGP Route Flap Damping

Device management

RFC 1305 NTPv3
RFC 1945 Hypertext Transfer Protocol -- HTTP/1.0
RFC 2271 FrameWork
RFC 2452 MIB for TCP6
RFC 2454 MIB for UDP6

General protocols

IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
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 856 TELNET
RFC 858 Telnet Suppress Go Ahead Option
RFC 894 IP over Ethernet
RFC 925 Multi-LAN Address Resolution
RFC 950 Internet Standard Subnetting Procedure
RFC 959 File Transfer Protocol (FTP)
RFC 1006 ISO transport services on top of the TCP: Version 3
RFC 1027 Proxy ARP
RFC 1034 Domain Concepts and Facilities
RFC 1035 Domain Implementation and Specification
RFC 1042 IP Datagrams
RFC 1058 RIPv1
RFC 1071 Computing the Internet Checksum
RFC 1091 Telnet Terminal-Type Option
RFC 1122 Host Requirements
RFC 1141 Incremental updating of the Internet checksum
RFC 1142 OSI IS-IS Intra-domain Routing Protocol
RFC 1144 Compressing TCP/IP headers for low-speed serial links
RFC 1195 OSI ISIS for IP and Dual Environments
RFC 1256 ICMP Router Discovery Protocol (IRDP)
RFC 1293 Inverse Address Resolution Protocol
RFC 1315 Management Information Base for Frame

RFC 3214 LSP Modification Using CR-LDP
RFC 3215 LDP State Machine
RFC 3268 Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)
RFC 3277 IS-IS Transient Blackhole Avoidance
RFC 3279 Algorithms and Identifiers for the Internet
X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3392 Support BGP capabilities advertisement
RFC 3526 More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE)
RFC 3564 Requirements for Support of Differentiated Services-aware MPLS Traffic Engineering
RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec
RFC 3706 A Traffic-Based Method of Detecting Dead Internet Key Exchange (IKE) Peers
RFC 3784 ISIS TE support
RFC 3786 Extending the Number of IS-IS LSP Fragments Beyond the 256 Limit
RFC 3811 Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management
RFC 3812 Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB)
RFC 3847 Restart signaling for IS-IS

IP multicast

RFC 1112 IGMP
RFC 2236 IGMPv2
RFC 2283 Multiprotocol Extensions for BGP-4
RFC 2362 PIM Sparse Mode
RFC 2934 Protocol Independent Multicast MIB for IPv4
RFC 3376 IGMPv3

IPv6

RFC 1981 IPv6 Path MTU Discovery
RFC 2080 RIPng for IPv6
RFC 2292 Advanced Sockets API for IPv6
RFC 2373 IPv6 Addressing Architecture
RFC 2460 IPv6 Specification
RFC 2461 IPv6 Neighbor Discovery
RFC 2462 IPv6 Stateless Address Auto-configuration
RFC 2464 Transmission of IPv6 over Ethernet



Technical Specifications

- Relay DTEs
- RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
- RFC 1333 PPP Link Quality Monitoring
- RFC 1334 PPP Authentication Protocols (PAP)
- RFC 1349 Type of Service
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)
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- RFC 1973 PPP in Frame Relay
- RFC 1974 PPP Stac LZS Compression Protocol
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- RFC 2740 OSPFv3 for IPv6
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- RFC 1724 RIPv2 MIB
- RFC 1757 Remote Network Monitoring MIB
- RFC 1850 OSPFv2 MIB
- RFC 2011 SNMPv2 MIB for IP
- RFC 2012 SNMPv2 MIB for TCP
- RFC 2013 SNMPv2 MIB for UDP
- RFC 2233 Interfaces MIB
- RFC 2454 IPV6-UDP-MIB
- RFC 2465 IPv6 MIB
- RFC 2466 ICMPv6 MIB
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (Version 2)
- RFC 2863 The Interfaces Group MIB
- RFC 2933 IGMP MIB
- RFC 3813 MPLS LSR MIB
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- RFC 1157 SNMPv1
- RFC 1905 SNMPv2 Protocol Operations
- RFC 2272 SNMPv3 Management Protocol
- RFC 2273 SNMPv3 Applications
- RFC 2274 USM for SNMPv3
- RFC 2275 VACM for SNMPv3
- RFC 2575 SNMPv3 View-based Access Control Model (VACM)
- RFC 3164 BSD syslog Protocol



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RFC 2205 Resource ReSerVation Protocol (RSVP) - Version 1 Functional Specification
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RFC 2284 EAP over LAN
RFC 2338 VRRP
RFC 2364 PPP Over AAL5
RFC 2374 An Aggregatable Global Unicast Address Format
RFC 2451 The ESP CBC-Mode Cipher Algorithms
RFC 2453 RIPv2
RFC 2510 Internet X.509 Public Key Infrastructure Certificate Management Protocols
RFC 2511 Internet X.509 Certificate Request Message Format
RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)
RFC 2644 Directed Broadcast Control
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RFC 2663 NAT Terminology and Considerations
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RFC 2961 RSVP Refresh Overhead Reduction Extensions
RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS
RFC 2973 IS-IS Mesh Groups
RFC 2993 Architectural Implications of NAT

OSPF

RFC 1245 OSPF protocol analysis
RFC 1246 Experience with OSPF
RFC 1587 OSPF NSSA
RFC 1765 OSPF Database Overflow
RFC 1850 OSPFv2 Management Information Base (MIB), traps
RFC 2328 OSPFv2
RFC 2370 OSPF Opaque LSA Option
RFC 3101 OSPF NSSA

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IEEE 802.1P (CoS)
RFC 2474 DS Field in the IPv4 and IPv6 Headers
RFC 2475 DiffServ Architecture
RFC 2597 DiffServ Assured Forwarding (AF)
RFC 2598 DiffServ Expedited Forwarding (EF)
RFC 3168 The Addition of Explicit Congestion Notification (ECN) to IP

Security

IEEE 802.1X Port Based Network Access Control
RFC 1321 The MD5 Message-Digest Algorithm
RFC 2082 RIP-2 MD5 Authentication
RFC 2104 Keyed-Hashing for Message Authentication
RFC 2138 RADIUS Authentication
RFC 2209 RSVP-Message Processing
RFC 2246 Transport Layer Security (TLS)
RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2865 RADIUS Authentication
RFC 2866 RADIUS Accounting
RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication

VPN

RFC 2403 - HMAC-MD5-96
RFC 2404 - HMAC-SHA1-96
RFC 2405 - DES-CBC Cipher algorithm
RFC 2547 BGP/MPLS VPNs
RFC 2796 BGP Route Reflection - An Alternative to Full Mesh IBGP
RFC 2842 Capabilities Advertisement with BGP-4
RFC 2858 Multiprotocol Extensions for BGP-4
RFC 2918 Route Refresh Capability for BGP-4
RFC 3107 Carrying Label Information in BGP-4

IPsec

RFC 1828 IP Authentication using Keyed MD5
RFC 2401 IP Security Architecture
RFC 2402 IP Authentication Header
RFC 2406 IP Encapsulating Security Payload



Technical Specifications

RFC 3022 Traditional IP Network Address Translator (Traditional NAT)	RFC 2407 - Domain of interpretation
RFC 3027 Protocol Complications with the IP Network Address Translator	RFC 2410 - The NULL Encryption Algorithm and its use with IPsec
RFC 3031 Multiprotocol Label Switching Architecture	RFC 2411 IP Security Document Roadmap
	RFC 2412 – OAKLEY
	RFC 2865 - Remote Authentication Dial In User Service (RADIUS)

HP A-MSR900-W Router (JF814A)

Ports	2 RJ-45 autosensing 10/100 WAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full	
	4 RJ-45 autosensing 10/100 LAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full	
AP characteristics	Radios	Single (b/g)
	Radio operation modes	Client access
	AP operation modes	Autonomous
	Wi-Fi Alliance Certification*	b/g Wi-Fi Certified
	* HP access points and access devices are Wi-Fi Certified, providing our customers with the assurance that these products have met and passed the rigorous interoperability testing performed by the Wi-Fi Alliance Organization. See the Specifications section of this series for more information.	
Physical characteristics	Dimensions	6.3(d) x 9.06(w) x 1.74(h) in. (16 x 23 x 4.42 cm)
	Weight	3.97 lb. (1.8 kg)
Memory and processor	Processor	RISC @ 266 MHz, 256 MB DDR SDRAM, 256 MB flash
Performance	Throughput	up to 70 Kpps (64-byte packets)
	Routing table size	10000 entries
Environment	Operating temperature	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 90%
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	5% to 90%
Electrical characteristics	Maximum heat dissipation	20 BTU/hr (21.1 kJ/hr)
	DC Voltage	12 V
	Maximum power rating	15 W
	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.
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	



Technical Specifications

Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+ A1:2001 + A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR22 Class B; FCC (CFR 47, Part 15) Class B
Telecom	FCC part 68
Management	IMC - Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Services	3-year, parts only, global next-day advance exchange (UY865E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UY866E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UY869E) 3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UY872E) 3-year, 24x7 SW phone support, software updates (UY875E) 4-year, 4-hour onsite, 13x5 coverage for hardware (UY867E) 4-year, 4-hour onsite, 24x7 coverage for hardware (UY870E) 4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY873E) 4-year, 24x7 SW phone support, software updates (UY876E) 5-year, 4-hour onsite, 13x5 coverage for hardware (UY868E) 5-year, 4-hour onsite, 24x7 coverage for hardware (UY871E) 5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY874E) 5-year, 24x7 SW phone support, software updates (UY877E) 3 Yr 6 hr Call-to-Repair Onsite (UY878E) 4 Yr 6 hr Call-to-Repair Onsite (UY879E) 5 Yr 6 hr Call-to-Repair Onsite (UY880E)

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Standards and protocols (applies to all products in series)

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	RFC 1998 PPP Gandalf FZA Compression Protocol	RFC 3214 LSP Modification Using CR-LDP
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	RFC 1945 Hypertext Transfer Protocol -- HTTP/1.0	RFC 3279 Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
	RFC 2271 FrameWork	RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL)
	RFC 2452 MIB for TCP6	
	RFC 2454 MIB for UDP6	



Technical Specifications

General protocols

IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
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
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RFC 894 IP over Ethernet
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RFC 1122 Host Requirements
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RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
RFC 1333 PPP Link Quality Monitoring
RFC 1334 PPP Authentication Protocols (PAP)
RFC 1349 Type of Service
RFC 1350 TFTP Protocol (revision 2)
RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)

Profile

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RFC 3564 Requirements for Support of Differentiated Services-aware MPLS Traffic Engineering
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RFC 2473 Generic Packet Tunneling in IPv6
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 - RFC 1765 OSPF Database Overflow
 - RFC 1850 OSPFv2 Management Information Base (MIB), traps
 - RFC 2328 OSPFv2
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RFC 2973 IS-IS Mesh Groups
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RFC 2865 RADIUS Authentication
RFC 2866 RADIUS Accounting
RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication

VPN

RFC 2403 - HMAC-MD5-96
RFC 2404 - HMAC-SHA1-96
RFC 2405 - DES-CBC Cipher algorithm
RFC 2547 BGP/MPLS VPNs
RFC 2796 BGP Route Reflection - An Alternative to Full Mesh IBGP
RFC 2842 Capabilities Advertisement with BGP-4
RFC 2858 Multiprotocol Extensions for BGP-4
RFC 2918 Route Refresh Capability for BGP-4
RFC 3107 Carrying Label Information in BGP-4

IPsec

RFC 1828 IP Authentication using Keyed MD5
RFC 2401 IP Security Architecture
RFC 2402 IP Authentication Header
RFC 2406 IP Encapsulating Security Payload
RFC 2407 - Domain of interpretation
RFC 2410 - The NULL Encryption Algorithm and its use with IPsec
RFC 2411 IP Security Document Roadmap
RFC 2412 - OAKLEY
RFC 2865 - Remote Authentication Dial In User Service (RADIUS)



Technical Specifications

Ports	2 RJ-45 autosensing 10/100 WAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full	
	8 RJ-45 autosensing 10/100 LAN ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX); Duplex: half or full	
AP characteristics	Radios	Single (b/g)
	Radio operation modes	Client access
	AP operation modes	Autonomous
	Wi-Fi Alliance Certification*	b/g Wi-Fi Certified
	* HP access points and access devices are Wi-Fi Certified, providing our customers with the assurance that these products have met and passed the rigorous interoperability testing performed by the Wi-Fi Alliance Organization. See the Specifications section of this series for more information.	
Physical characteristics	Dimensions	6.3(d) x 9.06(w) x 1.74(h) in. (16 x 23 x 4.42 cm)
	Weight	3.97 lb. (1.8 kg)
Memory and processor	Processor	RISC @ 333 MHz, 256 MB DDR SDRAM, 256 MB flash
Performance	Throughput	up to 100 Kpps (64-byte packets)
	Routing table size	10000 entries
Environment	Operating temperature	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 90%
	Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)
	Nonoperating/Storage relative humidity	5% to 90%
Electrical characteristics	Maximum heat dissipation	29 BTU/hr (30.6 kJ/hr)
	DC Voltage	12 V
	Maximum power rating	15 W
	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.
Safety	UL 60950-1; CAN/CSA 22.2 No. 60950-1; AS/NZS 60950; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; CAN/CSA-C22.2 No. 60950-1-03; EN 60950-1/A11; FDA 21 CFR Subchapter J	
Emissions	ANSI C63.4; EN 55022 Class B; ICES-003 Class B; ETSI EN 300 386 V1.3.3; EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-3-2:2006; EN 61000-3-3:1995 +A1:2001+A2:2005; EMC Directive 2004/108/EC; EN 55024:1998+ A1:2001 + A2:2003; EN 61000-4-11:2004; EN 61000-4-8:2001; AS/NZS CISPR22 Class B; FCC (CFR 47, Part 15) Class B	
Telecom	FCC part 68	
Management	IMC - Intelligent Management Center; command-line interface; Web browser; SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB	
Services	3-year, parts only, global next-day advance exchange (UY881E) 3-year, 4-hour onsite, 13x5 coverage for hardware (UY882E) 3-year, 4-hour onsite, 24x7 coverage for hardware (UY885E)	



Technical Specifications

3-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone support (UY888E)
3-year, 24x7 SW phone support, software updates (UY891E)
4-year, 4-hour onsite, 13x5 coverage for hardware (UY883E)
4-year, 4-hour onsite, 24x7 coverage for hardware (UY886E)
4-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY889E)
4-year, 24x7 SW phone support, software updates (UY892E)
5-year, 4-hour onsite, 13x5 coverage for hardware (UY884E)
5-year, 4-hour onsite, 24x7 coverage for hardware (UY887E)
5-year, 4-hour onsite, 24x7 coverage for hardware, 24x7 software phone (UY890E)
5-year, 24x7 SW phone support, software updates (UY893E)
3 Yr 6 hr Call-to-Repair Onsite (UY894E)
4 Yr 6 hr Call-to-Repair Onsite (UY895E)
5 Yr 6 hr Call-to-Repair Onsite (UY896E)

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

Standards and protocols (applies to all products in series)

BGP

RFC 1163 Border Gateway Protocol (BGP)
RFC 1267 Border Gateway Protocol 3 (BGP-3)
RFC 1657 Definitions of Managed Objects for BGPv4
RFC 1771 BGPv4
RFC 1772 Application of the BGP
RFC 1773 Experience with the BGP-4 Protocol
RFC 1774 BGP-4 Protocol Analysis
RFC 1965 BGP4 confederations
RFC 1997 BGP Communities Attribute
RFC 1998 PPP Gandalf FZA Compression Protocol
RFC 2385 BGP Session Protection via TCP MD5
RFC 2439 BGP Route Flap Damping

Device management

RFC 1305 NTPv3
RFC 1945 Hypertext Transfer Protocol -- HTTP/1.0
RFC 2271 FrameWork
RFC 2452 MIB for TCP6
RFC 2454 MIB for UDP6

General protocols

IEEE 802.1D MAC Bridges
IEEE 802.1p Priority
IEEE 802.1Q VLANs
IEEE 802.1s Multiple Spanning Trees
IEEE 802.1w Rapid Reconfiguration of Spanning Tree
RFC 768 UDP
RFC 783 TFTP Protocol (revision 2)
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP

RFC 3032 MPLS Label Stack Encoding
RFC 3036 LDP Specification
RFC 3046 DHCP Relay Agent Information Option
RFC 3063 MPLS Loop Prevention Mechanism
RFC 3065 Support AS confederation
RFC 3137 OSPF Stub Router Advertisement
RFC 3209 RSVP-TE Extensions to RSVP for LSP Tunnels
RFC 3210 Applicability Statement for Extensions to RSVP for LSP-Tunnels
RFC 3212 Constraint-Based LSP setup using LDP (CR-LDP)
RFC 3214 LSP Modification Using CR-LDP
RFC 3215 LDP State Machine
RFC 3268 Advanced Encryption Standard (AES) Ciphersuites for Transport Layer Security (TLS)
RFC 3277 IS-IS Transient Blackhole Avoidance
RFC 3279 Algorithms and Identifiers for the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
RFC 3392 Support BGP capabilities advertisement
RFC 3526 More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE)
RFC 3564 Requirements for Support of Differentiated Services-aware MPLS Traffic Engineering
RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec
RFC 3706 A Traffic-Based Method of Detecting Dead Internet Key Exchange (IKE) Peers



Technical Specifications

- RFC 826 ARP
 - RFC 854 TELNET
 - RFC 855 Telnet Option Specification
 - RFC 856 TELNET
 - RFC 858 Telnet Suppress Go Ahead Option
 - RFC 894 IP over Ethernet
 - RFC 925 Multi-LAN Address Resolution
 - RFC 950 Internet Standard Subnetting Procedure
 - RFC 959 File Transfer Protocol (FTP)
 - RFC 1006 ISO transport services on top of the TCP: Version 3
 - RFC 1027 Proxy ARP
 - RFC 1034 Domain Concepts and Facilities
 - RFC 1035 Domain Implementation and Specification
 - RFC 1042 IP Datagrams
 - RFC 1058 RIPv1
 - RFC 1071 Computing the Internet Checksum
 - RFC 1091 Telnet Terminal-Type Option
 - RFC 1122 Host Requirements
 - RFC 1141 Incremental updating of the Internet checksum
 - RFC 1142 OSI IS-IS Intra-domain Routing Protocol
 - RFC 1144 Compressing TCP/IP headers for low-speed serial links
 - RFC 1195 OSI ISIS for IP and Dual Environments
 - RFC 1256 ICMP Router Discovery Protocol (IRDP)
 - RFC 1293 Inverse Address Resolution Protocol
 - RFC 1315 Management Information Base for Frame Relay DTEs
 - RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
 - RFC 1333 PPP Link Quality Monitoring
 - RFC 1334 PPP Authentication Protocols (PAP)
 - RFC 1349 Type of Service
 - RFC 1350 TFTP Protocol (revision 2)
 - RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)
 - RFC 1381 SNMP MIB Extension for X.25 LAPB
 - RFC 1471 The Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol
 - RFC 1472 The Definitions of Managed Objects for the Security Protocols of the Point-to-Point Protocol
 - RFC 1490 Multiprotocol Interconnect over Frame Relay
 - RFC 1519 CIDR
 - RFC 1534 DHCP/BOOTP Interoperation
 - RFC 1542 Clarifications and Extensions for the Bootstrap Protocol
 - RFC 3784 ISIS TE support
 - RFC 3786 Extending the Number of IS-IS LSP Fragments Beyond the 256 Limit
 - RFC 3811 Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management
 - RFC 3812 Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB)
 - RFC 3847 Restart signaling for IS-IS
- IP multicast**
- RFC 1112 IGMP
 - RFC 2236 IGMPv2
 - RFC 2283 Multiprotocol Extensions for BGP-4
 - RFC 2362 PIM Sparse Mode
 - RFC 2934 Protocol Independent Multicast MIB for IPv4
 - RFC 3376 IGMPv3
- IPv6**
- RFC 1981 IPv6 Path MTU Discovery
 - RFC 2080 RIPvng for IPv6
 - RFC 2292 Advanced Sockets API for IPv6
 - RFC 2373 IPv6 Addressing Architecture
 - RFC 2460 IPv6 Specification
 - RFC 2461 IPv6 Neighbor Discovery
 - RFC 2462 IPv6 Stateless Address Auto-configuration
 - RFC 2464 Transmission of IPv6 over Ethernet Networks
 - RFC 2472 IP Version 6 over PPP
 - RFC 2473 Generic Packet Tunneling in IPv6
 - RFC 2529 Transmission of IPv6 Packets over IPv4
 - RFC 2545 Use of MP-BGP-4 for IPv6
 - RFC 2553 Basic Socket Interface Extensions for IPv6
 - RFC 2740 OSPFv3 for IPv6
 - RFC 2893 Transition Mechanisms for IPv6 Hosts and Routers
 - RFC 3056 Connection of IPv6 Domains via IPv4 Clouds
 - RFC 3513 IPv6 Addressing Architecture
 - RFC 3596 DNS Extension for IPv6
- MIBs**
- RFC 1213 MIB II
 - RFC 1229 Interface MIB Extensions
 - RFC 1286 Bridge MIB
 - RFC 1493 Bridge MIB
 - RFC 1573 SNMP MIB II
 - RFC 1724 RIPv2 MIB



Technical Specifications

- RFC 1552 The PPP Internetworking Packet Exchange Control Protocol (IPXCP)
 - RFC 1577 Classical IP and ARP over ATM
 - RFC 1613 Cisco Systems X.25 over TCP (XOT)
 - RFC 1624 Incremental Internet Checksum
 - RFC 1631 NAT
 - RFC 1638 PPP Bridging Control Protocol (BCP)
 - RFC 1661 The Point-to-Point Protocol (PPP)
 - RFC 1662 PPP in HDLC-like Framing
 - RFC 1695 Definitions of Managed Objects for ATM Management Version 8.0 using SMIv2
 - RFC 1701 Generic Routing Encapsulation
 - RFC 1702 Generic Routing Encapsulation over IPv4 networks
 - RFC 1721 RIP-2 Analysis
 - RFC 1722 RIP-2 Applicability
 - RFC 1723 RIP v2
 - RFC 1795 Data Link Switching: Switch-to-Switch Protocol AIW DLSw RIG: DLSw Closed Pages, DLSw Standard Version 1
 - RFC 1812 IPv4 Routing
 - RFC 1829 The ESP DES-CBC Transform
 - RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses
 - RFC 1944 Benchmarking Methodology for Network Interconnect Devices
 - RFC 1973 PPP in Frame Relay
 - RFC 1974 PPP Stac LZS Compression Protocol
 - RFC 1990 The PPP Multilink Protocol (MP)
 - RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
 - RFC 2091 Trigger RIP
 - RFC 2131 DHCP
 - RFC 2132 DHCP Options and BOOTP Vendor Extensions
 - RFC 2166 APPN Implementer's Workshop Closed Pages Document DLSw v2.0 Enhancements
 - RFC 2205 Resource ReSerVation Protocol (RSVP) - Version 1 Functional Specification
 - RFC 2280 Routing Policy Specification Language (RPSL)
 - RFC 2284 EAP over LAN
 - RFC 2338 VRRP
 - RFC 2364 PPP Over AAL5
 - RFC 2374 An Aggregatable Global Unicast Address Format
 - RFC 2451 The ESP CBC-Mode Cipher Algorithms
 - RFC 2453 RIPv2
 - RFC 2510 Internet X.509 Public Key Infrastructure
 - RFC 1757 Remote Network Monitoring MIB
 - RFC 1850 OSPFv2 MIB
 - RFC 2011 SNMPv2 MIB for IP
 - RFC 2012 SNMPv2 MIB for TCP
 - RFC 2013 SNMPv2 MIB for UDP
 - RFC 2233 Interfaces MIB
 - RFC 2454 IPV6-UDP-MIB
 - RFC 2465 IPv6 MIB
 - RFC 2466 ICMPv6 MIB
 - RFC 2618 RADIUS Client MIB
 - RFC 2620 RADIUS Accounting MIB
 - RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
 - RFC 2737 Entity MIB (Version 2)
 - RFC 2863 The Interfaces Group MIB
 - RFC 2933 IGMP MIB
 - RFC 3813 MPLS LSR MIB
- Network management**
- IEEE 802.1D (STP)
 - RFC 1155 Structure of Management Information
 - RFC 1157 SNMPv1
 - RFC 1905 SNMPv2 Protocol Operations
 - RFC 2272 SNMPv3 Management Protocol
 - RFC 2273 SNMPv3 Applications
 - RFC 2274 USM for SNMPv3
 - RFC 2275 VACM for SNMPv3
 - RFC 2575 SNMPv3 View-based Access Control Model (VACM)
 - RFC 3164 BSD syslog Protocol
- OSPF**
- RFC 1245 OSPF protocol analysis
 - RFC 1246 Experience with OSPF
 - RFC 1587 OSPF NSSA
 - RFC 1765 OSPF Database Overflow
 - RFC 1850 OSPFv2 Management Information Base (MIB), traps
 - RFC 2328 OSPFv2
 - RFC 2370 OSPF Opaque LSA Option
 - RFC 3101 OSPF NSSA
- QoS/CoS**
- IEEE 802.1P (CoS)
 - RFC 2474 DS Field in the IPv4 and IPv6 Headers
 - RFC 2475 DiffServ Architecture
 - RFC 2597 DiffServ Assured Forwarding (AF)
 - RFC 2598 DiffServ Expedited Forwarding (EF)
 - RFC 3168 The Addition of Explicit Congestion Notification (ECN) to IP
- Security**
- IEEE 802.1X Port Based Network Access Control



Technical Specifications

Certificate Management Protocols	RFC 1321 The MD5 Message-Digest Algorithm
RFC 2511 Internet X.509 Certificate Request Message Format	RFC 2082 RIP-2 MD5 Authentication
RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)	RFC 2104 Keyed-Hashing for Message Authentication
RFC 2644 Directed Broadcast Control	RFC 2138 RADIUS Authentication
RFC 2661 L2TP	RFC 2209 RSVP-Message Processing
RFC 2663 NAT Terminology and Considerations	RFC 2246 Transport Layer Security (TLS)
RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5	RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2694 DNS extensions to Network Address Translators (DNS_ALG)	RFC 2865 RADIUS Authentication
RFC 2702 Requirements for Traffic Engineering Over MPLS	RFC 2866 RADIUS Accounting
RFC 2747 RSVP Cryptographic Authentication	RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication
RFC 2763 Dynamic Name-to-System ID mapping support	VPN
RFC 2765 Stateless IP/ICMP Translation Algorithm (SIIT)	RFC 2403 - HMAC-MD5-96
RFC 2766 Network Address Translation - Protocol Translation (NAT-PT)	RFC 2404 - HMAC-SHA1-96
RFC 2784 Generic Routing Encapsulation (GRE)	RFC 2405 - DES-CBC Cipher algorithm
RFC 2787 Definitions of Managed Objects for VRRP	RFC 2547 BGP/MPLS VPNs
RFC 2961 RSVP Refresh Overhead Reduction Extensions	RFC 2796 BGP Route Reflection - An Alternative to Full Mesh IBGP
RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS	RFC 2842 Capabilities Advertisement with BGP-4
RFC 2973 IS-IS Mesh Groups	RFC 2858 Multiprotocol Extensions for BGP-4
RFC 2993 Architectural Implications of NAT	RFC 2918 Route Refresh Capability for BGP-4
RFC 3022 Traditional IP Network Address Translator (Traditional NAT)	RFC 3107 Carrying Label Information in BGP-4
RFC 3027 Protocol Complications with the IP Network Address Translator	IPsec
RFC 3031 Multiprotocol Label Switching Architecture	RFC 1828 IP Authentication using Keyed MD5
	RFC 2401 IP Security Architecture
	RFC 2402 IP Authentication Header
	RFC 2406 IP Encapsulating Security Payload
	RFC 2407 - Domain of interpretation
	RFC 2410 - The NULL Encryption Algorithm and its use with IPsec
	RFC 2411 IP Security Document Roadmap
	RFC 2412 - OAKLEY
	RFC 2865 - Remote Authentication Dial In User Service (RADIUS)

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