Overview

HPE FlexNetwork MSR1000 Router Series

Models

HPE FlexNetwork MSR1002 4 AC Router	JG875A
HPE FlexNetwork MSR1003 8 AC Router	JG732A
HPE FlexNetwork MSR1003 8S AC Router	JH060A

Key features

- Up to 500Kpps IP forwarding; converged high-performance routing, switching, security, voice, mobility
- Embedded security features with hardware-based encryption, IPS, firewall, NAT, and VPNs
- Industry-leading breadth of LAN and WAN connectivity options
- No additional licensing complexity; no cost for advanced features
- Zero-touch solution, with single-pane-of-glass management

Product overview

The HPE FlexNetwork MSR1000 Router Series is a next generation multi-services router designed to deliver unmatched application performance for small branch offices. The MSR1000 provides a flexible multiservice end point for small branches and remote offices that quickly adapts to changing business requirements while delivering integrated, concurrent services on a single, easy-to-manage platform.

Features and benefits

Performance

- **Excellent forwarding performance**
  provides forwarding performance up to 500 Kpps; meets current and future bandwidth-intensive application demands of enterprise businesses
- **Powerful encryption capacity-**
  includes embedded hardware encryption accelerator to improve encryption performance

Product architecture

- **SDN/OpenFlow**
  OpenFlow is the communications interface defined between the control and forwarding layers of a SDN (Software-Defined Networking) architecture. OpenFlow separates the data forwarding and routing decision functions. It keeps the flow-based forwarding function and employs a separate controller to make routing decisions. OpenFlow matches packets against one or more flow tables. MSR support OpenFlow 1.3.1
- **Ideal multiservice platform**
  provides WAN router, Ethernet switch, wireless LAN, 3G/4G WAN, firewall, VPN, and SIP/voice gateway all in one box
- **High-density voice interfaces**
  provide flexible analog voice interface options for easy integration within a wide range of deployments
- **USB interface**
  uses USB memory disk to download and upload configuration files; supports an external USB 3G modem for a 3G WAN uplink

Overview

- **Advanced hardware architecture**
  Gigabit ethernet switching and a PCIE bus.

Connectivity

- **VXLAN (Virtual eXtensible LAN)**
  VXLAN (Virtual eXtensible LAN, scalable virtual local area network) is an IP-based network, using the "MAC in UDP" package of Layer VPN technology. VXLAN can be based on an existing ISP or enterprise IP networks for decentralized physical site provides Layer 2 communication, and can provide service isolation for different tenants.
- **Virtual Private LAN Service (VPLS)**
  Virtual Private LAN Service (VPLS) delivers a point-to-multipoint L2VPN service over an MPLS or IP backbone. The backbone is transparent to the customer sites, which can communicate with each other as if they were on the same LAN. The following protocols support on MSRs, RFC4447, RFC4761 and RFC4762, BFD detection in VPLS, Support hierarchical HOPE (H-VPLS), MAC address recovery in H-VPLS to speed up convergence.
- **NEMO (Network Mobility)**
  Network mobility (NEMO)enables a node to retain the same IP address and maintain application connectivity when the node travels across networks. It allows location-independent routing of IP datagrams on the Internet
- **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/4G access support**
  provides 3G/4G LTE wireless access for primary or backup connectivity via a 3G/4G LTE SIC modules certified on various cellular networks; optional carrier 3G/4G USB modems available
- **Flexible port selection**
  provides a combination of fiber and copper interface modules, 100/1000BASE-X auto-speed selection, and 10/100/1000BASE-T auto-speed detection plus auto duplex and MDI/MDI-X
- **Multiple WAN interfaces**
  provide a traditional link with E1, T1, ADSL, ADSL2, ADSL2+, G.SHDSL, Serial, and ISDN backup; provide high-density Ethernet access with Fast Ethernet/Gigabit Ethernet, mobility access with IEEE 802.11b/g/n Wi-Fi and 3G/4G LTE options
- **High-density port connectivity**
  Integrate 4 or 8 Giga LAN switching ports (all switching ports can be configured as routed ports), 2 or 3 SIC slots and up to 30 module options

Layer 2 switching

- **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)
- **Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping**
  controls and manages the flooding of multicast packets in a Layer 2 network
- **Port mirroring**
  duplicates port traffic (ingress and egress) to a local or remote monitoring port
- **VLANs**
  support IEEE 802.1Q-based VLANs
- **sFlow**
  allows traffic sampling
- **Define port as switched or routed**
  supports command switch to easily change switched ports to routed (max. eight GE ports)

Overview

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
- **Open shortest path first (OSPF)**
  delivers faster convergence; uses this link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
- **Border Gateway Protocol 4 (BGP-4)**
  delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large network
- **Intermediate system to intermediate system (IS-IS)**
  uses a path vector Interior Gateway Protocol (IGP), which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
- **Static IPv6 routing**
  provides simple manually configured IPv6 routing
- **Dual IP stack**
  maintains separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design
- **Routing Information Protocol next generation (RIPng)**
  extends RIPv2 to support IPv6 addressing
- **OSPFv3**
  provides OSPF support for IPv6
- **BGP+**
  extends BGP-4 to support Multiprotocol BGP (MBGP), including support for IPv6 addressing
- **IS-IS for IPv6**
  extends IS-IS to support IPv6 addressing
- **IPv6 tunneling**
  allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6to4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels; is an important element for the transition from IPv4 to IPv6
- **Multiprotocol Label Switching (MPLS)**
  uses BGP to advertise routes across Label Switched Paths (LSPs), but uses simple labels to forward packets from any Layer 2 or Layer 3 protocol, which reduces complexity and increases performance; supports graceful restart for reduced failure impact; supports LSP tunneling and multilevel stacks
- **Multiprotocol Label Switching (MPLS) Layer 3 VPN**
  allows Layer 3 VPNs across a provider network; uses Multiprotocol BGP (MP-BGP) to establish private routes for increased security; supports RFC 2547bis multiple autonomous system VPNs for added flexibility; supports IPv6 MPLS VPN
- **Multiprotocol Label Switching (MPLS) Layer 2 VPN**
  establishes simple Layer 2 point-to-point VPNs across a provider network using only MPLS Label Distribution Protocol (LDP); requires no routing and therefore decreases complexity, increases performance, and allows VPNs of non-routable protocols; uses no routing information for increased security; supports Circuit Cross Connect (CCC), Static Virtual Circuits (SVCs), Martini draft, and Kompella-draft technologies
- **Policy routing**
  allows custom filters for increased performance and security; supports ACLs, IP prefix, AS paths, community lists, and aggregate policies

Layer 3 services

Overview

- **WAN Optimization**
  MSR performs optimization using TFO and a combination of DRE, Lempel-Ziv (LZ) compression to provide the bandwidth optimization for file service and web applications. The policy engine module determines which traffic can be optimized and which optimization action should be taken. A pair of WAN optimization equipment can discover each other automatically and complete the negotiation to establish a TCP optimization session.
- **NAT-PT**
  Network Address Translation – Protocol Translation (NAT-PT) enables communication between IPv4 andIPv6 nodes by translating between IPv4 and IPv6 packets. It performs IP address translation, and according to different protocols, performs semantic translation for packets. This technology is only suitable for communication between a pure IPv4 node and a pure IPv6 node.
- **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
- **User Datagram Protocol (UDP) helper**
  redirects UDP broadcasts to specific IP subnets to prevent server spoofing
- **Dynamic Host Configuration Protocol (DHCP)**
  simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets

Quality of Service (QoS)

- **Traffic policing**
  supports Committed Access Rate (CAR) and line rate
- **Congestion management**
  supports FIFO, PQ, CQ, WFQ, CBQ, and RTPQ
- **Weighted random early detection (WRED)/random early detection (RED)**
  delivers congestion avoidance capabilities through the use of queue management algorithms
- **Other QoS technologies**
  support traffic shaping, FR QoS, MPLS QoS, and MP QoS/LFI

Security

- **IPS**
  Built-in Intrusion Prevention System (IPS) detects and protects the branch office from security threats. Optional HPE integration filters for client-side, branch protection from exploits and vulnerabilities
- **Enhanced stateful firewall**
  Application layer protocol inspection, Transport layer protocol inspection, ICMP error message check, and TCP SYN check. Support more L4 and L7 protocols like TCP, UDP, UDP-Lite, ICMPv4/ICMPv6, SCTP, DCCP, RAWIP, HTTP, FTP, SMTP, DNS, SIP, H.323, SCCP.
- **Zone based firewall**
  Zone-Based Policy Firewall changes the firewall configuration from the older interface-based model to a more flexible, more easily understood zone-based model. Interfaces are assigned to zones, and inspection policy is applied to traffic moving between the zones. Inter-zone policies offer considerable flexibility and granularity, so different inspection policies can be applied to multiple host groups connected to the same router interface.
- **Auto Discover VPN (ADVPN)**
  collects, maintains, and distributes dynamic public addresses through the VPN Address Management (VAM) protocol, making VPN establishment available between enterprise branches that use dynamic addresses to access the public network; compared to traditional VPN technologies, ADVPN technology is more flexible and has richer features, such as NAT traversal of ADVPN packets, AAA identity authentication, IPSec protection of data packets, and multiple VPN domains
- **Access control list (ACL)**
  supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent unauthorized users from

Overview

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

- **Terminal Access Controller Access-Control System (TACACS+)**
  delivers an authentication tool using TCP with encryption of the full authentication request, providing additional security
- **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-PT to support multiple connections; supports blacklist in NAT/NAT-PT, and a limit on the number of connections, session logs, and multi-instances
- **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
- **IPSec VPN**
  supports DES, 3DES, and AES 128/192/256 encryption, and MD5 and SHA-1 authentication
- **Attack Detection and Protection**
  responding to network attacks and threats by MSR Comware, support max connection limitation, single-packet attacks protection, Scanning attack protection, flood attack protection, TCP and ICMP Attack Protection etc.

Convergence

- **Internet Group Management Protocol (IGMP)**
  utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3
- **Protocol Independent Multicast (PIM)**
  defines modes of Internet IPv4 and IPv6 multicasting to allow one-to-many and many-to-many transmission of information; supports PIM Dense Mode (DM), Sparse Mode (SM), and Source-Specific Multicast(SSM)
- **Multicast Source Discovery Protocol (MSDP)**
  allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications
- **Multicast Border Gateway Protocol (MBGP)**
  allows multicast traffic to be forwarded across BGP networks and kept separate from unicast traffic

Integration

- **Embedded NetStream**
  improves traffic distribution using powerful scheduling algorithms, including Layer 4 to 7 services; monitors the health status of servers and firewalls
- **Embedded VPN firewall**
  provides enhanced stateful packet inspection and filtering; delivers advanced VPN services with Triple DES (3DES) and Advanced Encryption Standard (AES) encryption at high performance and low latency and application prioritization and enhancement

Resiliency and high availability

- **Backup Center**
  acts as a part of the management and backup function to provide backup for device interfaces; delivers reliability by switching traffic over to a backup interface when the primary one fails

Overview

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

Management

- **Ease of deployment**
  Zero-touch deployment, supports TR069, USB disk auto deployment and 3G SMS auto deployment
- **Industry-standard CLI with a hierarchical structure**
  reduces training time and expenses, and increases productivity in multivendor installations
- **Management security**
  restricts access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide telnet and SNMP access; local and remote syslog capabilities allow logging of all access
- **SNMPv1, v2, and v3**
  provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption
- **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**
  offers different mechanisms for configuration updates; FTP allows bidirectional transfers over a TCP/IP network; trivial FTP (TFTP) is a simpler method using User Datagram Protocol (UDP); Secure File Transfer Protocol (SFTP) runs over an SSH tunnel to provide additional security
- **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 timekeeping consistent among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time
- **Information center**
  provides a central repository for system and network information; aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules
- **Management interface control**
  provides management access through modem port and terminal interface; provides access through terminal interface, telnet, or SSH
- **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

Additional information

- **OPEX savings**
  simplifies and streamlines deployment, management, and training through the use of a common operating system, thereby cutting costs as well as reducing the risk of human errors associated with having to manage multiple operating systems across different platforms and network layers
- **High reliability**
  provides a state-of-the-art unified code base
- **Faster time to market**
  allows new and custom features to be brought rapidly to market through engineering efficiencies, delivering better initial and ongoing stability

Overview

- **Green initiative support**
  provides support for RoHS and WEEE regulations

Warranty and support

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

Configuration

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.

Router Chassis

HPE FlexNetwork MSR1003 8S AC Router — JH060A
See Configuration
NOTE:1, 2, 3

- 2 RJ-45 autosensing 10/100/1000 WAN port
- 8 RJ-45 autosensing 10/100/1000 LAN ports
- 3 - SIC module slots / 1 DSIC
- 1 USB 2.0 Port for 3G modem and USB disk
- 1 CON/AUX port
- 0 - VPM slot
- 1GB DDR3 SDRAM included (default=1GB \ max=1GB SDRAM)
- AC Power Supply included
- 1U - Height

PDU Cable NA/MEX/TW/JP — JH060A#B2B

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

PDU Cable ROW — JH060A#B2C

- C15 PDU Jumper Cord (ROW)

High Volt Switch/Router to Wall Power Cord — JH060A#B2E

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

No Power Cord — JH060A#AC3

- No Localized Power Cord Selected

HPE FlexNetwork MSR1003 8 AC Router — JG732A
See Configuration
NOTE:1, 2, 3

- 2 RJ-45 autosensing 10/100/1000 WAN port
- 8 RJ-45 autosensing 10/100/1000 LAN ports
- 3 - SIC module slots / 1 DSIC
- 1 USB 2.0 Port for 3G modem and USB disk
- 1 CON/AUX port
- 0 - VPM slot
- 512MB DDR3 SDRAM included (default=512MB \ max=512MB SDRAM)
- AC Power Supply included
- 1U - Height

PDU Cable NA/MEX/TW/JP — JG732A#B2B

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

PDU Cable ROW — JG732A#B2C

- C15 PDU Jumper Cord (ROW)k

Configuration

High Volt Switch/Router to Wall Power Cord — JG732A#B2E
- NEMA L6-20P Cord (NA/MEX/JP/TW)

No Power Cord — JG732A#AC3
- No Localized Power Cord Selected

HPE FlexNetwork MSR1002 4 AC Router — JG875A
See Configuration
NOTE:1, 2, 3, 4, 5
- 1 RJ-45 autosensing 10/100/1000 WAN port
- 4 RJ-45 autosensing 10/100/1000 LAN ports
- 1 SFP port (min=0 \ max=1 SFP Transceiver)
- 2 - SIC module slots / 1 DSIC
- 1 USB 2.0 Port for 3G modem and USB disk
- 1 CON/AUX port
- 0 - VPM slot
- 1GB DDR3 SDRAM included (default=1GB \ max=1GB SDRAM)
- AC Power Supply included
- 1U - Height

PDU Cable NA/MEX/TW/JP — JG875A#B2B
C15 PDU Jumper Cord (NA/MEX/TW/JP)

PDU Cable ROW — JG875A#B2C
C15 PDU Jumper Cord (NA/MEX/TW/JP)

High Volt Switch/Router to Wall Power Cord — JG875A#B2E
NEMA L6-20P Cord (NA/MEX/JP/TW)

No Power Cord — JG875A#AC3
- No Localized Power Cord Selected

Configuration Rules:

Note 1 **AC Power Supply included**

Note 2 **Localization required on orders without #B2B, #B2C or #B2E options.**

Note 3 **#B2E is Offered only in NA, Mexico, Taiwan and Japan.**

Note 4 **The following Transceivers install into this Router:**

HPE X115 100M SFP LC FX Transceiver	JD102B
HPE X110 100M SFP LC LX Transceiver	JD120B
HPE X110 100M SFP LC LH40 Transceiver	JD090A
HPE X110 100M SFP LC LH80 Transceiver	JD091A

Note 5 **The following Transceivers install into this Router:**

HPE X120 1G SFP LC SX Transceiver	JD118B
HPE X120 1G SFP LC LX Transceiver	JD119B
HPE X125 1G SFP LC LH40 1310nm Transceiver	JD061A
HPE X120 1G SFP LC LH40 1550nm Transceiver	JD062A

Configuration

HPE X125 1G SFP LC LH70 Transceiver	JD063B
HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
HPE X120 1G SFP LC LH100 Transceiver	JD103A
HPE X120 1G SFP RJ45 T Transceiver	JD089B

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)
High Volt Switch/Router/Power Supply to Wall Power Cord - #B2E Option. (Offered only in North America, Mexico, Taiwan, and Japan)
MSR1003-8 (JG732A) is Comware v5 based.

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

Modules

SIC Modules

System (std 0 // max 3 or 2 or 1) User Selection (min 0 // max 3 or 2 or 1) per Host (See Modules for Port information)

HPE FlexNetwork MSR 4-port 10/100 SIC Module	JD573B See Configuration **NOTE:**16, 18
HPE FlexNetwork MSR 9-port 10/100 DSIC Module	JD574B See Configuration **NOTE:**3
HP MSR 1-port 10/100 SIC Module	JD545B See Configuration **NOTE:**16, 18
HP 1-port 100Mbt SFP SIC Router Module • min=0 \ max=1 SFP Transceivers	JF280A See Configuration **NOTE:**5, 16, 18
HPE FlexNetwork MSR 2-port FXO SIC Module	JD558A See Configuration **NOTE:**2
HP MSR 1-port FXO SIC Module	JD559A See Configuration **NOTE:**2

Configuration

HPE FlexNetwork MSR 2-port FXS SIC Module	JD560A See Configuration **NOTE:**2
HP MSR 1-port FXS SIC Module	JD561A See Configuration **NOTE:**2
HPE FlexNetwork MSR 4-port FXS/1-port FXO DSIC Module	JG189A See Configuration **NOTE:**3
HP 2-port ISDN-S/T Voice Interface SIC Module	JF821A See Configuration **NOTE:**2
HPE MSR 1-port E1/T1 Voice SIC Module • min=0 \ max=1 E1 or T1 Cable	JH240A See Configuration **NOTE:**4, 9
HPE FlexNetwork MSR 2 FXS +1 FXO Voice Interface SIC Module	JD632A See Configuration **NOTE:**2
HPE FlexNetwork MSR 1-port Fractional E1 SIC Module • min=0 \ max=1 E1 or 2E1 Cable	JD634B See Configuration **NOTE:**2, 7, 10
HPE FlexNetwork MSR 1-port Fractional SIC Module • min=0 \ max=1 T1 Cable	JD538A See Configuration **NOTE:**2, 14
HPE FlexNetwork MSR 2-port Fractional E1 SIC Module • min=0 \ max=1 2E1 Cable	JF842A See Configuration **NOTE:**2, 10
HPE FlexNetwork MSR 1-port Enhanced Serial SIC Module • min=0 \ max=1 Serial Port Cable	JD557A See Configuration **NOTE:**1, 11
HPE FlexNetwork MSR 1-port ISDN S/T SIC Module	JD571A See Configuration **NOTE:**2
HPE FlexNetwork 8-port Asynchronous Serial Interface SIC Router Module • Must select 1 8AS Communication Cable (min=1 \ max=1 cable)	JF281A See Configuration **NOTE:**2, 12

Configuration

HPE 802.11b/g/n Wireless AP SIC Module	JF819A See Configuration **NOTE:**20
HPE MSR 802.11b/g/n Wireless Access Point (NA) SIC Module	JG211A See Configuration **NOTE:**20
HPE FlexNetwork MSR 16-port Async Serial SIC Module • Must select 4 HP X260 mini D-28/4-RJ45 0.3m Rtr Cables (min=4 \ max=4 cables)	JG186A See Configuration **NOTE:**2, 13
HP MSR HSPA/WCDMA SIC Module	JG187A See Configuration **NOTE:** 16, 18
HPE MSR HSPA+/WCDMA SIC Module	JG929A See Configuration **NOTE:** 16, 18
HP MSR 1-port ADSL2+ SIC Module	JD537A See Configuration **NOTE:** 16, 18
HPE FlexNetwork MSR 1-port 8-wire G.SHDSL (RJ45) DSIC Module	JG191A See Configuration **NOTE:**3
HPE FlexNetwork MSR 1-port E1/CE1/PRI SIC Module • min=0 \ max=1 E1 Cable	JG604A See Configuration **NOTE:**2, 7
HP MSR 4G LTE SIC Module for Verizon/LTE 700 MHz/CDMA Rev A	JG742A See Configuration **NOTE:** 8, 16, 18
HPE Flex Network MSR 4G LTE SIC Module for LTE 700/1700/2100 MHz CDMA UMTS/HSPA+/HSPA/EDGE/GPRS/GSM	JG742B See Configuration **NOTE:** 8, 16, 18
HP MSR 4G LTE SIC Module for ATT/LTE 700/1700/2100 MHz and UMTS/HSPA+/HSPA/EDGE/GRPS/GSM	JG743A See Configuration **NOTE:** 8, 16, 18
HPE MSR 4G LTE SIC Module for Global/LTE 800/900/1800/2100/2600MHz UMTS/HSPA+/HSPA/EDGE/GRPS/GSM	JG744B

Configuration

	See Configuration **NOTE:** 8, 16, 18
HP MSR 4-port 10/100 PoE SIC Module	JD620A See Configuration **NOTE:** 17
HP MSR 9-port 10/100 PoE DSIC Module	JD621A See Configuration **NOTE:** 19
HPE FlexNetwork MSR 2-port Enhanced Sync/Async Serial SIC Module • min=0 \ max=2 Serial Port Cable	JG736A See Configuration **NOTE:** 2,11,15
HPE FlexNetwork MSR 4-port Enhanced Sync/Async Serial SIC Module • min=0 \ max=4 Serial Port Cable	JG737A See Configuration **NOTE:** 2,11,15
HPE FlexNetwork MSR 1-port GbE Combo SIC Module • min=0 \ max=1 SFP Transceiver	JG738A See Configuration **NOTE:** 6, 16, 18
HPE FlexNetwork MSR 4-port Gig-T Switch SIC Module	JG739A See Configuration **NOTE:** 17
HPE FlexNetwork MSR 4-port Gig-T PoE Switch SIC Module	JG740A See Configuration **NOTE:** 17

Configuration Rules:

Note 1 These Modules can install directly to the Routers (JG732A, JH060A, JG875A)
min=0\ max=2 per enclosure (JG732A, JH060A)- only supported in Slots 2 and 3)

Note 2 These Modules can install directly to Router JG732A, JH060A
min=0\ max=3 per enclosure

Note 3 These Modules can install directly to the Routers (JG732A, JH060A, JG875A)
min=0\ max=1 per enclosure (This Module takes up two slots, and is installed in Slots 1 + 2)

Note 4 These Modules can install directly into the following Routers:
JH060A, min=0\ max=3 per enclosure
JG875A, min=0\ max=2 per enclosure

Note 5 The following Transceivers install into this Module:

HPE X115 100M SFP LC FX Transceiver	JD102B
HPE X110 100M SFP LC LX Transceiver	JD120B

Configuration

	HPE X110 100M SFP LC LH40 Transceiver	JD090A
	HPE X110 100M SFP LC LH80 Transceiver	JD091A
Note 6	**The following Transceivers install into this Module:**	
	HPE X120 1G SFP LC SX Transceiver	JD118B
	HPE X120 1G SFP LC LX Transceiver	JD119B
	HPE X125 1G SFP LC LH40 1310nm Transceiver	JD061A
	HPE X120 1G SFP LC LH40 1550nm Transceiver	JD062A
	HPE X125 1G SFP LC LH70 Transceiver	JD063B
	HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
	HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
	HPE X120 1G SFP LC LH100 Transceiver	JD103A
	HPE X120 1G SFP RJ45 T Transceiver	JD089B
Note 7	**The following E1 Cables install into this Module:**	
	HPE FlexNetwork X260 E1 (2) BNC 75 ohm 3m Router Cable	JD175A
	HPE FlexNetwork X260 E1 BNC 20m Router Cable	JD514A
	HP X260 E1 2 BNC 75 ohm 40m Router Cable	JD516A
Note 8	**The following Antenna Cables install into this Module:**	
	HPE MSR 3G RF 2.8m Antenna Cable	JG522A
	HPE MSR 3G RF 6m Antenna Cable	JG666A
	HPE MSR 3G RF 15m Antenna Cable	JG667A
Note 9	**The following E1/T1 Cables install into this Module:**	
	HPE FlexNetwork X260 E1 RJ45 to 2xBNC 75ohm 3m Router Cable	JH294A
	HPE FlexNetwork X260 E1 RJ45 120 ohm 2m Router Cable	JC156A
	HPE FlexNetwork X260 E1 RJ45 120 ohm 15m Router Cable	JC151A
	HPE FlexNetwork X260 E1 RJ45 120 ohm 30m Router Cable	JC152A
	HPE FlexNetwork X260 T1 Router Cable	JD518A
Note 10	**The following 2E1 Cables install into this Module:**	
	HPE FlexNetwork X260 2E1 BNC 3m Router Cable	JD643A
Note 11	**The following Cables install into this Module:**	
	HPE FlexNetwork X260 RS449 3m DCE Serial Port Cable	JF826A
	HPE FlexNetwork X260 RS449 3m DTE Serial Port Cable	JF825A
	HPE FlexNetwork X200 V.24 DTE 3m Serial Port Cable	JD519A
	HPE FlexNetwork X200 V.35 DTE 3m Serial Port Cable	JD523A
	HPE FlexNetwork X260 RS530 3m DTE Serial Port Cable	JF827A
	HPE FlexNetwork X200 V.35 DCE 3m Serial Port Cable	JD525A
	HPE FlexNetwork X260 RS530 3m DCE Serial Port Cable	JF828A
	HPE FlexNetwork X200 V.24 DCE 3m Serial Port Cable	JD521A
Note 12	**The following Cables install into this Module:**	
	HPE FlexNetwork X260 SIC 8AS RJ45 0.28m Router Cable	JD642A

Configuration

Note 13 If this module is selected Then 4 - JG263A HP X260 mini D-28/4-RJ45 0.3m Rtr Cable are required to be on the same order.

Note 14 The following T1 Cables install into this Module:

HPE FlexNetwork X260 T1 Router Cable	JD518A

Note 15 These Modules can install directly to Router JG875A
min=0\ max=2 per enclosure

Note 16 These Modules can install directly to the Routers (JG732A, JH060A)
min=0\ max=1 per enclosure (only supported in Slot 2)

Note 17 These Modules can install directly to the Router JG875A
min=0\ max=1 per enclosure (only supported in Slot 2)

Note 18 These Modules can install directly to the Routers (JG875A)
min=0\ max=2 per enclosure (only supported in Slots 2 and 3)

Note 19 These Modules can install directly to the Routers (JG875A)
min=0\ max=1 per enclosure (This Module takes up two slots, and is installed in Slots 1 + 2)

Note 20 These Modules can install directly to the Routers (JG732A)
min=0\ max=2 per enclosure (only supported in Slots 2 and 3)

Remarks: PoE Modules JG740A, JD620A and JD621A can be used as non-POE modules on chassis without PoE power supplies.

Transceivers

SFP Transceivers

HPE X115 100M SFP LC FX Transceiver	JD102B
HPE X110 100M SFP LC LX Transceiver	JD120B
HPE X110 100M SFP LC LH80 Transceiver	JD091A
HPE X120 1G SFP LC SX Transceiver	JD118B
HPE X120 1G SFP LC LX Transceiver	JD119B
HPE X120 1G SFP LC LH40 1550nm Transceiver	JD062A
HPE X110 100M SFP LC LH40 Transceiver	JD090A
HPE X125 1G SFP LC LH40 1310nm Transceiver	JD061A
HPE X125 1G SFP LC LH70 Transceiver	JD063B
HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
HPE X120 1G SFP LC LH100 Transceiver	JD103A
HPE X120 1G SFP RJ45 T Transceiver	JD089B

Internal Power Supplies

Configuration

Internal Power Supplies included

Cables

HPE FlexNetwork X260 Mini D-28 to 4-RJ45 0.3m Router Cable	JG263A
HPE FlexNetwork X200 V.24 DTE 3m Serial Port Cable	JD519A
HPE FlexNetwork X200 V.24 DCE 3m Serial Port Cable	JD521A
HPE FlexNetwork X200 V.35 DTE 3m Serial Port Cable	JD523A
HPE FlexNetwork X200 V.35 DCE 3m Serial Port Cable	JD525A
HPE FlexNetwork X260 RS449 3m DTE Serial Port Cable	JF825A
HPE FlexNetwork X260 RS449 3m DCE Serial Port Cable	JF826A
HPE FlexNetwork X260 RS530 3m DTE Serial Port Cable	JF827A
HPE FlexNetwork X260 RS530 3m DCE Serial Port Cable	JF828A
HPE FlexNetwork X260 Auxiliary Router Cable	JD508A
HPE FlexNetwork X260 E1 (2) BNC 75 ohm 3m Router Cable	JD175A
HPE FlexNetwork X260 E1 BNC 20m Router Cable	JD514A
HP X260 E1 2 BNC 75 ohm 40m Router Cable	JD516A
HPE FlexNetwork X260 E1 RJ45 BNC 75-120 ohm Conversion Router Cable	JD511A
HPE FlexNetwork X260 T1 Router Cable	JD518A
HPE FlexNetwork X260 2E1 BNC 3m Router Cable	JD643A
HPE FlexNetwork X260 SIC 8AS RJ45 0.28m Router Cable	JD642A

Remarks **The following cable is used for RJ45 BNC Conversion**

HPE FlexNetwork X260 E1 RJ45 BNC 75-120 ohm Conversion Router Cable	JD511A

Router Enclosure Options

Antenna Cables

System (std 0 // max 2) User Selection (min 0 // max 2) per SIC Module (JG742A, JG742B, JG743A)

HPE MSR 3G RF 2.8m Antenna Cable	JG522A
HPE MSR 3G RF 6m Antenna Cable	JG666A
HPE MSR 3G RF 15m Antenna Cable	JG667A

Opacity Shield Kit

System (std 0 // max 1) User Selection (min 0 // max 1)

HPE FlexNetwork MSR2003 Opacity Shield Kit	JG598A

NOTE:

Supported on the HPE MSR1003-8 AC and MSR1002-4 AC Routers (JG732A, JH060A and JG875A).

Tamper Evidence Labels

Configuration

System (std 0 // max 1) User Selection (min 0 // max 1)

HPE 12mm x 60mm Tamper Evidence (30) Labels JG585A

NOTE:

Supported on the HPE MSR1003-8 AC and MSR1002-4 AC Routers (JG732A, JH060A and JG875A).

Remarks: **Each JG598A would use 1 of JG585A.**

Technical Specifications

HPE FlexNetwork MSR1002 4 AC Router (JG875A)

I/O ports and slots	2 SIC slots, or 1 DSIC slot 1 RJ-45 autosensing 10/100/1000 WAN port 1 SFP fixed Gigabit Ethernet SFP port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 Serial port	
Additional ports and slots	1 USB 2.0 1 RJ-45 console port to access limited CLI port	
AP characteristics	**Radios** (via optional modules)	3G, 4G LTE
Physical characteristics	**Dimensions**	14.17(w) x 11.81(d) x 1.74(h) in (36 x 30 x 4.42 cm) (1U height)
	Weight	6.83 lb (3.10 kg)
Memory and processor	RISC @ 667 MHz, 1 GB DDR3 SDRAM, 256 MB flash	
Mounting and enclosure	Desktop or can be mounted in a EIA standard 19-inch telco rack when used with the rack-mount kit in the package.	
Performance	**Throughput**	up to 500 Kpps (64-byte packets)
	Routing table size	200000 entries (IPv4), 200000 entries (IPv6)
	Forwarding table size	200000 entries (IPv4), 200000 entries (IPv6)
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 95%, 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)
Electrical characteristics	**Maximum heat dissipation**	92 BTU/hr (97.06 kJ/hr)
	Voltage	100 - 240 VAC, rated
	Maximum power rating	30 W
	Frequency	50/60 Hz
	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.
Reliability	**MTBF (years)**	137.5
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; GB 4943.1	
Emissions	VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; EN 300 386 v1.6.1; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; FCC (CFR 47, Part 15) Class A	
Telecom	FCC part 68; CS-03	

Technical Specifications

Management	IMC - Intelligent Management Center; command-line interface; Web browser; out-of-band management (serial RS-232C); out-of-band management (DB-9 serial port console); SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

HPE FlexNetwork MSR1003 8 AC Router (JG732A)

I/O ports and slots	3 SIC slots, or 1 DSIC slot, and 1 SIC slot 2 RJ-45 autosensing 10/100/1000 WAN ports 8 RJ-45 autosensing 10/100/1000 LAN ports	
Additional ports and slots	1 USB 2.0 1 RJ-45 console port to access limited CLI port	
AP characteristics	**Radios** (via optional modules)	3G, 4G LTE
Physical characteristics	**Dimensions**	14.17(w) x 11.81(d) x 17.4(h) in (36 x 30 x 4.42 cm)
	Weight	6.94 lb (3.15 kg)
Memory and processor	RISC @ 667 MHz, 512 MB DDR3 SDRAM, 256 MB flash	
Mounting and enclosure	Desktop or can be mounted in a EIA standard 19-inch telco rack when used with the rack-mount kit in the package.	
Performance	**Throughput**	up to 500 Kpps (64-byte packets)
	Routing table size	30000 entries (IPv4), 30000 entries (IPv6)
	Forwarding table size	30000 entries (IPv4), 30000 entries (IPv6)
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 95%, 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)
Electrical characteristics	**Maximum heat dissipation**	65 BTU/hr (68.58 kJ/hr)
	Voltage	100 - 240 VAC, rated
	Maximum power rating	30 W
	Frequency	50/60 Hz
	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.
Reliability	**MTBF (years)**	137.5
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; GB 4943.1	
Emissions	VCCI Class A;EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; EN 300 386 v1.6.1; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; FCC (CFR 47, Part 15) Class A	
Telecom	FCC part 68; CS-03	

Technical Specifications

Management	IMC - Intelligent Management Center; command-line interface; Web browser; out-of-band management (serial RS-232C); out-of-band management (DB-9 serial port console); SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

HPE FlexNetwork MSR1003 8S AC Router (JH060A)

I/O ports and slots	3 SIC slots, or 1 DSIC slot, and 1 SIC slot 2 RJ-45 autosensing 10/100/1000 WAN ports 8 RJ-45 autosensing 10/100/1000 LAN ports	
Additional ports and slots	1 USB 2.0 1 RJ-45 console port to access limited CLI port	
AP characteristics	**Radios** (via optional modules)	3G, 4G LTE
Physical characteristics	**Dimensions**	14.17(w) x 11.81(d) x 17.4(h) in (36 x 30 x 44.2 cm)
	Weight	6.94 lb (3.15 kg)
Memory and processor	RISC @ 667 MHz, 1GB DDR3 SDRAM, 256 MB flash	
Mounting and enclosure	Desktop or can be mounted in a EIA standard 19-inch telco rack when used with the rack-mount kit in the package.	
Performance	**Throughput**	up to 500 Kpps (64-byte packets)
	Routing table size	200,000 entries (IPv4), 200,000 entries (IPv6)
	Forwarding table size	200,000 entries (IPv4), 200,000 entries (IPv6)
Environment	**Operating temperature**	32°F to 113°F (0°C to 45°C)
	Operating relative humidity	5% to 95%, 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)
Electrical characteristics	**Maximum heat dissipation**	65 BTU/hr (68.58 kJ/hr)
	Voltage	100 - 240 VAC, rated
	Maximum power rating	30 W
	Frequency	50/60 Hz
	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.
Reliability	**MTBF (years)**	137.5
Safety	UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; GB 4943.1	
Emissions	VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; EN 300 386 v1.6.1; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; FCC (CFR 47, Part 15) Class A	
Telecom	FCC part 68; CS-03	

Technical Specifications

Management	IMC - Intelligent Management Center; Command-line interface; Web browser; Out-of-band management (serial RS-232c); Out-of-band management (DB-9 serial port console); SNMP manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet mib
Services	Refer to the Hewlett Packard Enterprise website at **http://www.hpe.com/networking/services** for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

Standards and protocols (applies to all products in series)

BGP

RFC 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 1997 BGP Communities Attribute
RFC 1998 An Application of the BGP Community Attribute in Multi-home Routing
RFC 2385 BGP Session Protection via TCP MD5
RFC 2439 BGP Route Flap Damping

Denial of service protection

CPU DoS Protection
Rate Limiting by ACLs

Device management

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

General protocols

RFC 2385 BGP Session Protection via TCP MD5
RFC 1027 Proxy ARP
RFC 1034 Domain names - concepts and facilities
RFC 1035 Domain names - implementation and specification
RFC 1048 BOOTP (Bootstrap Protocol) vendor information extensions
RFC 1054 Host extensions for IP multicasting
RFC 1058 RIPv1
RFC 1059 Network Time Protocol (version 1) specification and implementation
RFC 1060 Assigned numbers
RFC 1063 IP MTU (Maximum Transmission Unit) discovery options
RFC 1071 Computing the Internet Checksum
RFC 1072 TCP extensions for long-delay paths
RFC 1079 Telnet terminal speed option
RFC 1084 BOOTP (Bootstrap Protocol) vendor information extensions
RFC 1091 Telnet Terminal-Type Option
RFC 1093 NSFNET routing architecture
RFC 1101 DNS encoding of network names and other types
RFC 1119 Network Time Protocol (version 2) specification and implementation
RFC 1122 Requirements for Internet Hosts - Communication Layers
RFC 1141 Incremental updating of the Internet checksum
RFC 1142 OSI IS-IS Intra-domain Routing Protocol
RFC 1164 Application of the Border Gateway Protocol in the Internet
RFC 1166 Internet address used by Internet Protocol (IP)
RFC 1171 Point-to-Point Protocol for the transmission of multi-protocol datagrams over Point-to-Point links

Technical Specifications

RFC 1172 Point-to-Point Protocol (PPP) initial configuration options
RFC 1185 TCP Extension for High-Speed Paths
RFC 1191 Path MTU discovery
RFC 1195 OSI ISIS for IP and Dual Environments
RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
RFC 1253 (OSPF v2)
RFC 1265 BGP Protocol Analysis
RFC 1266 Experience with the BGP Protocol
RFC 1268 Application of the Border Gateway Protocol in the Internet
RFC 1271 Remote Network Monitoring Management Information Base
RFC 1284 Definitions of Managed Objects for the Ethernetlike Interface Types
RFC 1286 Definitions of Managed Objects for Bridges
RFC 1294 Multiprotocol Interconnect over Frame Relay
RFC 1305 NTPv3 (IPv4 only)
RFC 1321 The MD5 Message-Digest Algorithm
RFC 1323 TCP Extensions for High Performance
RFC 1331 The Point-to-Point Protocol (PPP) for the Transmission of Multi-protocol Datagrams over Point-to-Point Links
RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
RFC 1333 PPP Link Quality Monitoring
RFC 1334 PPP Authentication Protocols
RFC 1349 Type of Service
RFC 1350 TFTP Protocol (revision 2)
RFC 1364 BGP OSPF Interaction
RFC 1370 Applicability Statement for OSPF
RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)
RFC 1393 Traceroute Using an IP Option
RFC 1395 BOOTP (Bootstrap Protocol) Vendor Information Extensions
RFC 1398 Definitions of Managed Objects for the Ethernet-Like Interface Types
RFC 1403 BGP OSPF Interaction
RFC 1444 Conformance Statements for version 2 of the Simple Network Management Protocol (SNMPv2)
RFC 1449 Transport Mappings for version 2 of the Simple Network Management Protocol (SNMPv2)
RFC 1471 The Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol
RFC 1473 The Definitions of Managed Objects for the IP Network Control Protocol of the Point-to-Point Protocol
RFC 1483 Multiprotocol Encapsulation over ATM Adaptation Layer 5
RFC 1490 Multiprotocol Interconnect over Frame Relay
RFC 1497 BOOTP (Bootstrap Protocol) Vendor Information Extensions
RFC 1519 CIDR
RFC 1531 Dynamic Host Configuration Protocol
RFC 1532 Clarifications and Extensions for the Bootstrap Protocol
RFC 1533 DHCP Options and BOOTP Vendor Extensions
RFC 1534 Interoperation Between DHCP and BOOTP
RFC 1541 Dynamic Host Configuration Protocol
RFC 1542 BOOTP Extensions
RFC 1542 Clarifications and Extensions for the Bootstrap Protocol
RFC 1548 The Point-to-Point Protocol (PPP)
RFC 1549 PPP in HDLC Framing
RFC 1570 PPP LCP (Point-to-Point Protocol Link Control Protocol) Extensions
RFC 1577 Classical IP and ARP over ATM
RFC 1597 Address Allocation for Private Internets
RFC 1618 PPP over ISDN
RFC 1619 PPP over SONET/SDH (Synchronous Optical Network/Synchronous Digital Hierarchy)
RFC 1624 Incremental Internet Checksum

Technical Specifications

RFC 1631 NAT
RFC 1650 Definitions of Managed Objects for the Ethernet-like Interface Types using SMIv2
RFC 1661 The Point-to-Point Protocol (PPP)
RFC 1662 PPP in HDLC-like Framing
RFC 1700 Assigned Numbers
RFC 1701 Generic Routing Encapsulation
RFC 1702 Generic Routing Encapsulation over IPv4 networks
RFC 1717 The PPP Multilink Protocol (MP)
RFC 1721 RIP-2 Analysis
RFC 1722 RIP-2 Applicability
RFC 1723 RIP v2
RFC 1724 RIP Version 2 MIB Extension
RFC 1757 Remote Network Monitoring Management Information Base
RFC 1777 Lightweight Directory Access Protocol
RFC 1812 IPv4 Routing
RFC 1825 Security Architecture for the Internet Protocol
RFC 1826 IP Authentication Header
RFC 1827 IP Encapsulating Security Payload (ESP)
RFC 1829 The ESP DES-CBC Transform
RFC 1877 PPP Internet Protocol Control Protocol Extensions for Name Server Addresses
RFC 1884 IP Version 6 Addressing Architecture
RFC 1885 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
RFC 1886 DNS Extensions to support IP version 6
RFC 1889 RTP (Real-Time Protocol): A Transport Protocol for Real-Time Applications. Audio-Video Transport Working Group
RFC 1933 Transition Mechanisms for IPv6 Hosts and Routers
RFC 1945 Hypertext Transfer Protocol -- HTTP/1.0
RFC 1962 The PPP Compression Control Protocol (CCP)
RFC 1966 BGP Route Reflection An alternative to full mesh IBGP
RFC 1970 Neighbor Discovery for IP Version 6 (IPv6)
RFC 1971 IPv6 Stateless Address Autoconfiguration
RFC 1972 A Method for the Transmission of IPv6 Packets over Ethernet Networks
RFC 1981 Path MTU Discovery for IP version 6
RFC 1982 Serial Number Arithmetic
RFC 1989 PPP Link Quality Monitoring
RFC 1990 The PPP Multilink Protocol (MP)
RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
RFC 2001 TCP Slow Start, Congestion Avoidance, Fast Retransmit, and Fast Recovery Algorithms
RFC 2002 IP Mobility Support
RFC 2003 IP Encapsulation within IP
RFC 2011 SNMPv2 Management Information Base for the Internet Protocol using SMIv2
RFC 2012 SNMPv2 Management Information Base for the Transmission Control Protocol using SMIv2
RFC 2013 SNMPv2 Management Information Base for the User Datagram Protocol using SMIv2
RFC 2018 TCP Selective Acknowledgement Options
RFC 2021 Remote Network Monitoring Management Information Base Version 2 using SMIv2
RFC 2073 An IPv6 Provider-Based Unicast Address Format
RFC 2082 RIP-2 MD5 Authentication
RFC 2091 Triggered Extensions to RIP to Support Demand Circuits
RFC 2104 HMAC: Keyed-Hashing for Message Authentication
RFC 2131 DHCP
RFC 2132 DHCP Options and BOOTP Vendor Extensions
RFC 2136 Dynamic Updates in the Domain Name System (DNS UPDATE)
RFC 2138 Remote Authentication Dial In User Service (RADIUS)
RFC 2205 Resource ReSerVation Protocol (RSVP) -- Version 1 Functional Specification
RFC 2209 Resource ReSerVation Protocol (RSVP) -- Version 1 Message Processing Rules

Technical Specifications

RFC 2210 Use of RSVP (Resource Reservation Protocol) in Integrated Services
RFC 2225 Classical IP and ARP over ATM
RFC 2236 IGMP Snooping
RFC 2246 The TLS Protocol Version 1.0
RFC 2251 Lightweight Directory Access Protocol (v3)
RFC 2252 Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions
RFC 2283 MBGP
RFC 2292 Advanced Sockets API for IPv6
RFC 2309 Recommendations on queue management and congestion avoidance in the Internet
RFC 2327 SDP: Session Description Protocol
RFC 2338 VRRP
RFC 2344 Reverse Tunneling for Mobile IP
RFC 2358 Definitions of Managed Objects for the Ethernet-like Interface Types
RFC 2364 PPP Over AAL5
RFC 2365 Administratively Scoped IP Multicast
RFC 2373 IP Version 6 Addressing Architecture
RFC 2374 An IPv6 Aggregatable Global Unicast Address Format
RFC 2375 IPv6 Multicast Address Assignments
RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
RFC 2427 Multiprotocol Interconnect over Frame Relay
RFC 2428 FTP Extensions for IPv6 and NATs
RFC 2433 Microsoft PPP CHAP (Challenge Handshake Authentication Protocol) Extensions
RFC 2451 The ESP CBC-Mode Cipher Algorithms
RFC 2452 IP Version 6 Management Information Base for the Transmission Control Protocol
RFC 2453 RIPv2
RFC 2454 IP Version 6 Management Information Base for the User Datagram Protocol
RFC 2461 Neighbor Discovery for IP Version 6 (IPv6)
RFC 2462 IPv6 Stateless Address Autoconfiguration
RFC 2463 Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
RFC 2465 Management Information Base for IP Version 6: Textual Conventions and General Group
RFC 2466 Management Information Base for IP Version 6: ICMPv6 Group
RFC 2472 IP Version 6 over PPP
RFC 2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers
RFC 2507 IP Header Compression
RFC 2508 Compressing IP/UDP/RTP Headers for Low-Speed Serial Links
RFC 2509 IP Header Compression over PPP
RFC 2510 Internet X.509 Public Key Infrastructure Certificate Management Protocols
RFC 2516 A Method for Transmitting PPP Over Ethernet (PPPoE)
RFC 2519 A Framework for Inter-Domain Route Aggregation
RFC 2529 Transmission of IPv6 over IPv4 Domains without Explicit Tunnels
RFC 2543 SIP: Session Initiation Protocol
RFC 2548 (MS-RAS-Vendor only)
RFC 2553 Basic Socket Interface Extensions for IPv6
RFC 2570 Introduction to Version 3 of the Internet-standard Network Management Framework
RFC 2581 TCP Congestion Control
RFC 2597 Assured Forwarding PHB Group
RFC 2598 An Expedited Forwarding PHB
RFC 2615 PPP over SONET/SDH (Synchronous Optical Network/Synchronous Digital Hierarchy)
RFC 2616 HTTP Compatibility v1.1
RFC 2617 HTTP Authentication: Basic and Digest Access Authentication
RFC 2618 RADIUS Authentication Client MIB
RFC 2620 RADIUS Accounting Client MIB
RFC 2644 Changing the Default for Directed Broadcasts in Routers
RFC 2661 L2TP

Technical Specifications

RFC 2663 NAT Terminology and Considerations
RFC 2665 Definitions of Managed Objects for the Ethernet-like Interface Types
RFC 2668 Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs)
RFC 2675 IPv6 Jumbograms
RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5
RFC 2685 Virtual Private Networks Identifier
RFC 2686 The Multi-Class Extension to Multi-Link PPP
RFC 2694 DNS extensions to Network Address Translators (DNS_ALG)
RFC 2698 A Two Rate Three Color Marker
RFC 2702 Requirements for Traffic Engineering Over MPLS
RFC 2711 IPv6 Router Alert Option
RFC 2716 PPP EAP TLS Authentication Protocol
RFC 2747 RSVP Cryptographic Authentication
RFC 2763 Dynamic Name-to-System ID mapping
RFC 2784 Generic Routing Encapsulation (GRE)
RFC 2787 Definitions of Managed Objects for the Virtual Router Redundancy Protocol
RFC 2827 Network Ingress Filtering: Defeating Denial of Service Attacks Which Employ IP Source Address Spoofing
RFC 2833 RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals
RFC 2865 Remote Authentication Dial In User Service (RADIUS)
RFC 2866 RADIUS Accounting
RFC 2868 RADIUS Attributes for Tunnel Protocol Support
RFC 2869 RADIUS Extensions
RFC 2884 Performance Evaluation of Explicit Congestion Notification (ECN) in IP Networks.
RFC 2894 Router Renumbering for IPv6
RFC 2917 A Core MPLS IP VPN Architecture
RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations
RFC 2961 RSVP Refresh Overhead Reduction Extensions
RFC 2963 A Rate Adaptive Shaper for Differentiated Services
RFC 2965 HTTP State Management Mechanism
RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS
RFC 2973 IS-IS Mesh Groups
RFC 2976 The SIP INFO Method
RFC 2993 Architectural Implications of NAT
RFC 3011 The IPv4 Subnet Selection Option for DHCP
RFC 3022 Traditional IP Network Address Translator (Traditional NAT)
RFC 3024 Reverse Tunneling for Mobile IP, revised
RFC 3025 Mobile IP Vendor/Organization-Specific Extensions
RFC 3027 Protocol Complications with the IP Network Address Translator
RFC 3031 Multiprotocol Label Switching Architecture

IP multicast

RFC 1112 IGMP
RFC 2236 IGMPv2
RFC 2283 Multiprotocol Extensions for BGP-4
RFC 2362 PIM Sparse Mode
RFC 2365 Administratively Scoped IP Multicast
RFC 2710 Multicast Listener Discovery (MLD) for IPv6
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

Technical Specifications

RFC 2462 IPv6 Stateless Address Auto-configuration
RFC 2463 ICMPv6
RFC 2464 Transmission of IPv6 over Ethernet Networks
RFC 2472 IP Version 6 over PPP
RFC 2473 Generic Packet Tunneling in IPv6
RFC 2475 IPv6 DiffServ Architecture
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
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

Technical Specifications

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
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)

IKEv1

RFC 2865 - Remote Authentication Dial In User Service (RADIUS)
RFC 3748 - Extensible Authentication Protocol (EAP)

Accessories

HPE FlexNetwork MSR1000 Router Series accessories

Transceivers

HPE X115 100M SFP LC FX Transceiver	JD102B
HPE X110 100M SFP LC LX Transceiver	JD120B
HPE X110 100M SFP LC LH40 Transceiver	JD090A
HPE X110 100M SFP LC LH80 Transceiver	JD091A
HPE X120 1G SFP LC SX Transceiver	JD118B
HPE X120 1G SFP LC LX Transceiver	JD119B
HPE X125 1G SFP LC LH40 1310nm Transceiver	JD061A
HPE X120 1G SFP LC LH40 1550nm Transceiver	JD062A
HPE X125 1G SFP LC LH70 Transceiver	JD063B
HPE X120 1G SFP LC LH100 Transceiver	JD103A
HPE X120 1G SFP LC BX 10-U Transceiver	JD098B
HPE X120 1G SFP LC BX 10-D Transceiver	JD099B
HPE X120 1G SFP RJ45 T Transceiver	JD089B

Cables

HPE FlexNetwork X200 V.24 DTE 3m Serial Port Cable	JD519A
HPE FlexNetwork X200 V.24 DCE 3m Serial Port Cable	JD521A
HPE FlexNetwork X200 V.35 DTE 3m Serial Port Cable	JD523A
HPE FlexNetwork X200 V.35 DCE 3m Serial Port Cable	JD525A
HPE FlexNetwork X260 RS449 3m DTE Serial Port Cable	JF825A
HPE FlexNetwork X260 RS449 3m DCE Serial Port Cable	JF826A
HPE FlexNetwork X260 RS530 3m DTE Serial Port Cable	JF827A
HPE FlexNetwork X260 RS530 3m DCE Serial Port Cable	JF828A
HPE FlexNetwork X260 Auxiliary Router Cable	JD508A
HPE FlexNetwork X260 E1 RJ45 3m Router Cable	JD509A
HPE FlexNetwork X260 E1 (2) BNC 75 ohm 3m Router Cable	JD175A
HPE FlexNetwork X260 E1 BNC 20m Router Cable	JD514A
HPE FlexNetwork X260 E1 RJ45 BNC 75-120 ohm Conversion Router Cable	JD511A
HPE FlexNetwork X260 2E1 BNC 3m Router Cable	JD643A
HPE FlexNetwork X260 T1 Router Cable	JD518A
HPE FlexNetwork X260 SIC 8AS RJ45 0.28m Router Cable	JD642A
HPE FlexNetwork X260 E1 RJ45 20m Router Cable	JD517A
HPE FlexNetwork X260 Mini D-28 to 4-RJ45 0.3m Router Cable	JG263A

Mounting Kit

HPE 3100/4210 16/8 PoE Rackmount Kit	JD323A

License

HPE IPS Activation for MSR1000 E-LTU	JH226AAE
HPE DV Essential IPS Filter Service for MSR1000 1yr E-LTU	JH230AAE

Router Modules

HPE FlexNetwork MSR 9-port 10/100 DSIC Module	JD574B
HPE FlexNetwork MSR 4-port 10/100 SIC Module	JD573B

Accessories

HPE FlexNetwork MSR 4-port Gig-T Switch SIC Module	JG739A
HPE FlexNetwork MSR 1-port GbE Combo SIC Module	JG738A
HPE FlexNetwork MSR 2-port FXO SIC Module	JD558A
HPE FlexNetwork MSR 2-port FXS SIC Module	JD560A
HPE FlexNetwork MSR 2 FXS +1 FXO Voice Interface SIC Module	JD632A
HPE FlexNetwork MSR 1-port 8-wire G.SHDSL (RJ45) DSIC Module	JG191A
HPE FlexNetwork MSR 1-port Fractional E1 SIC Module	JD634B
HPE FlexNetwork MSR 2-port Fractional E1 SIC Module	JF842A
HPE FlexNetwork MSR 1-port Fractional SIC Module	JD538A
HPE FlexNetwork MSR 1-port Enhanced Serial SIC Module	JD557A
HPE FlexNetwork MSR 2-port Enhanced Sync/Async Serial SIC Module	JG736A
HPE FlexNetwork MSR 4-port Enhanced Sync/Async Serial SIC Module	JG737A
HPE FlexNetwork MSR 1-port ISDN S/T SIC Module	JD571A
HPE FlexNetwork MSR 16-port Async Serial SIC Module	JG186A
HPE FlexNetwork 8-port Asynchronous Serial Interface SIC Router Module	JF281A
HPE 802.11b/g/n Wireless AP SIC Module	JF819A
HPE MSR 802.11b/g/n Wireless Access Point (NA) SIC Module	JG211A
HPE FlexNetwork MSR 1-port E1/CE1/PRI SIC Module	JG604A
HPE FlexNetwork MSR 4-port FXS/1-port FXO DSIC Module	JG189A
HP MSR HSPA/WCDMA SIC Module	JG187A
HP MSR 4G LTE SIC Module for ATT/LTE 700/1700/2100 MHz and UMTS/HSPA+/HSPA/EDGE/GRPS/GSM	JG743A
HPE MSR HSPA+/WCDMA SIC Module	JG929A
HPE MSR 4G LTE SIC Module for Global/LTE 800/900/1800/2100/2600MHz UMTS/HSPA+/HSPA/EDGE/GRPS/GSM	JG744B
HPE MSR 1-port E1/T1 Voice SIC Module	JH240A
HPE Flex Network MSR 4G LTE SIC Module for LTE 700/1700/2100 MHz CDMA UMTS/HSPA+/HSPA/EDGE/GPRS/GSM	JG742B

Summary of Changes

Date	Version History	Action	Description of Change:
05-Feb-2018	Version 15	Changed	Minor edits on Technical Specification
05-Sep-2016	Version 14	Added	SKU added: JG742B
		Changed	Features and Benefits updated
01-Aug-2016	Version 13	Changed	Adding #AC3 Option on Configuration section Technical Specifications updated
06-June-2016	Version 12	Changed	Document name changed to HPE FlexNetwork MSR1000 Router Series Product description updated.
29-Apr-2016	Version 11	Changed	SKU descriptions updated on all the document. Accessories updated. Minor changes made on Technical Specifications.
31-Mar-2016	Version 10	Added	SKUs added: JH240A, JH226AAE, JH230AAE
		Changed	Features and Benefits updated
01-Dec-2015	Version 9	Changed	Overview and Technical Specifications updated
28-Aug-2015	Version 8	Changed	Minor edit on Technical Specification
17-Aug-2015	Version 7	Added	Added 1 new model: JH060A Added 1 new accessories: JG929A
		Changed	Updated Features and Benefits, Configuration and Technical Specifications
24-Feb-2015	Version 6	Changed	Minor change on Configuration section
06-Oct-2014	Version 5	Removed	Removed SKU JD572A
		Changed	Configuration section updated
18-August-2014	Version 4	Added	Added 1 new model: JG875A Added 7 new accessories: JG736A, JG737A, JG738A, JG739A, JG742A, JG743A, JG744A
		Changed	Content Edits
10-June-2014	Version 3	Added	New accessories added.
20-Mar-2014	Version 2	Changed	Configuration was added and Accessories were revised.
18-Feb-2014	Version 1	Created	Document creation

Summary of Changes

Sign up for updates

To learn more, visit: **http://www.hpe.com/networking**

c04212582 - 14824 - Worldwide - V15 - 05-February-2018

Hewlett Packard Enterprise