Datasheet

OptiSwitch-MR MR3228-2S L3 Switch

24 10/100Base-T ports, 2 Gigabit SFP ports and 2 10/100/1000 Base-T ports Ethernet Routing standalone Switch.

Product Overview

The MRV MR3228-2S is a 24 10/100Base-T ports, 2 Gigabit SFP ports and 2 10/100/1000 Base-T ports Ethernet Routing standalone Switch with advanced routing capabilities and intelligent Quality Of Service (QoS) features. The MR3228-2S switch is composed of SFP fiber-optic ports and 10/100Base-T ports for flexibility of connections to the network and to other devices.

With hardware-based IP routing and the Enhanced Multilayer Software, the MR3228-2S switch delivers high performance dynamic IP routing. The routing architecture allows for increased scalability and performance. This architecture allows for very high-speed lookups while also ensuring the stability and scalability necessary to meet the needs of future requirements. In addition to dynamic IP unicast routing supported with the Routing Information Protocol (RIP) and the Open Shortest Path First (OSPF) protocol , the MR3228-2S is perfectly equipped for networks requiring multicast support. Protocol Independent Multicast (PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the MR3228-2S switch ideal for intensive multicast environments.

The MR3228-2S switch offers superior Layer 3 routing properties combined with L2/L3/L4 features such as Quality of Service, bandwidth allocation, and access control with advanced powerful management. These features ensure that network traffic is classified, prioritized, and congestion is avoided in the best possible manner.

The MR3228-2S switch delivers LAN-edge QoS based on the IEEE 802.1p standard. It honors the class-of-service (CoS) value at the ingress point and assigns the packet to the appropriate queue, or the packets can be reclassified based on a default CoS value assigned to the ingress port by the network administrator. CoS classification and reclassification can be based on criteria as specific as the source/destination IP address, source/ destination Media Access Control (MAC) address or the Layer 4 Transmission Control Protocol (TCP)/User Datagram Protocol (UDP) port.

MR3228-2S supports comprehensive layer 2/4 features such as Private VLAN, IEEE 802.3ad (LACP) trunking and Link aggregation; port-based 802.1x, Access Control Lists, HTTPS/SSL and SSH security features and L4 QoS features include 802.1p and DiffServ, rate-limiting, WRR, strict scheduling, 8-level priority in switching to ensure the steadiness of data communication. Furthermore, its unique SMTP function will send alerts for unusual packets to the administrator's email box. The MR3228-2S Jumbo packets can support up to 9K bytes under Gigabit speed that give administrators the flexibility to make performance-enhancing adjustments. The MR3228-2S provides multiple security algorithms such as Port Security, SSL, Web management Encryption, RADIUS, TACACS+ and 802.1x.

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MR3228-2S Feature Highlights

- 24 10/100Base-T ports, 2 Gigabit SFP ports and 2 10/100/1000 Base-T ports comprised of a RJ-45 and a SFP.
- Complete layer 3 standard features including:
  - IPv4 routing at wire speed
  - Provides RIP I (RFC1058) and RIP II (RFC2453)
  - Provides OSPF (RFC2328) routing
  - Provides IP Multicast Routing: IGMP, DVMRP, PIM-DM
  - IP Redundancy - VRRP (RFC 2338) supported
  - ARP (RFC 826) supported
  - Provides Supernetting (CIDR)
  - Up to 4K IP address entries
  - Provides Multi-netting
  - Provides DHCP/BOOTP (RFC 951) relay
  - Provides DHCP server (RFC 2131)/client
  - DNS support (proxy) server
- L4 features: Bandwidth Management, Class of Service (802.1p) mapping to Type of Service, DiffServ, priority queuing algorithm including Weighted Round Robin and Strict
- Complete layer 2 standard features including:
  - IEEE 802.1q and 802.1p (Class of Service) with 8 hardware queues per port enabling prioritization of mission-critical applications
  - Supports up to 16K MAC address entries
  - Port-based VLAN, Private VLAN
  - Spanning Tree IEEE 802.1D, 802.1W, 802.1S
  - IEEE 802.3ad for automatic link aggregation
  - Support for Generic VLAN Registration Protocol (GVRP)
- Supports jumbo frames of up to 9,000 bytes. Ideal for high-end server connectivity and network attached file servers.
- Management – L2/L3/L4 control list, Cisco look alike CLI interface, SNMP V1/V2c/V3, RMON, WEB Management, Telnet console interface, BOOTP client, DHCP client, SNTP, Syslog.
- Security- IEEE 802.1X, RADIUS, TACACS+, Port Security, SSH, HTTPS/SSL

High Performance

The MR3228-2S Switch boosts L3 switching performance and eliminates network bottlenecks with wire-speed switching capability. In addition to wire-speed switching, it offers a feature rich software package to manage and secure network communication.

The MR3228-2S Layer 3 Managed Gigabit Switch provides both Layer 2 and Layer 3 managed switching functionality. High emphasis is given to Quality of Service (QoS), and the MR3228-2S Switch delivers Layer 3 routing combined with L2/L3/L4 Quality of Service; bandwidth provisioning and access control features enable Voice over IP (VoIP) telephony, and video conferencing. The MR3228-2S Switch provides routing features such as IPv4 routing at wire speed, VRRP (IP redundancy), ICMP, RIP I and RIP II, OSPF, and DHCP / BOOTP relay. The MR3228-2S Switch also implements various switching functions including Port Trunking,

broadcast storm protection, extensive VLAN support, IGMP snooping, Rapid Spanning Tree, and link aggregation.

Fault-Tolerance

Spanning tree is a link management protocol that provides path redundancy while preventing undesirable loops in the network. The MR3228-2S delivers the IEEE802.1D protocol (Spanning Tree) and the IEEE802.1s (Multiple Spanning Tree), IEEE802.1w (Rapid Spanning Tree) protocol for Fault-Tolerance. The MR3228-2S also provides a redundant power supply inlet in the rear panel for power-fault-tolerance to ensure a reliable system.

Enhanced Security Features

The OptiSwitch-MR Series switches offer enhanced data security through a wide range of security features that protect network management and administrative traffic, secure the network from unauthorized users, provide granular levels of network access to users, and track where users are located.

Secure Shell (SSH), Secure Telnet (v1.5/2.0) port based security, Simple Network Management Protocol version 3 (SNMPv3) secure the network, thereby protecting it from tampering or eavesdropping. Terminal Access Controller Access Control System (TACACS+) or Remote Access Dial-In User Service (RADIUS) authentication enables centralized access control of switches and restricts unauthorized users from altering the configurations. Alternatively, a local username and password database can be configured on the switch itself. Multi levels of authorization on the switch console and two levels on the web-based management interface provide the ability to give different levels of configuration capabilities to different administrators.

Port security and 802.1x provide the ability to keep unauthorized users from accessing the network. Port security limits access on an Ethernet port based on the MAC address of the device that is connected to it. It can also be used to limit the total number of devices plugged into a switch port, thereby reducing the risks of rogue wireless access points or hubs. 802.1x can be used to authenticate users based on username and password (or other credentials) via a centralized RADIUS server. This is particularly useful for a mobile workforce because the authentication will be executed regardless of where the user connects to the network.

ACLs restrict access to sensitive portions of the network by denying packets based on source and destination MAC addresses, IP addresses, or TCP/UDP ports. ACL lookups are done in hardware; therefore, forwarding and routing performance is not compromised when implementing ACL-based security in the network. The OptiSwitch-MR Series switches offer port-based ACLs

Network Control through Advanced QOS and Rate Limiting

The MR3228-2S switch prioritizes each packet based on the required level of service, using eight priority queues with strict or Weighted Round Robin Queuing. It uses IEEE 802.1p and 802.1Q tags to prioritize incoming traffic based on input from the end-station application. These functions can be used to provide independent priorities for delay-sensitive data and best-effort data.
The MR3228-2S switch also supports several common methods of prioritizing layer 3/4 traffic to meet application requirements. Traffic can be prioritized based on the priority bits in the IP frame's Type of Service (ToS) octet. When these services are enabled, the priorities are mapped to a Class of Service value by the switch, and the traffic then
sent to the corresponding output queue.

The Rate Limiting feature controls the maximum rate for traffic transmitted or received on an interface. Rate limiting is configured on interfaces at the edge of a network to limit traffic into or out of the network. Traffic that falls within the rate limit is transmitted, while packets that exceed the acceptable amount of traffic are dropped.

Network Scalability through High-Performance IP Routing

With hardware-based IP routing and the Enhanced Multilayer Software, the MR3228-2S switch delivers high performance dynamic IP routing. In addition to dynamic IP unicast routing supported with the Routing Information Protocol (RIP) and the Open Shortest Path First (OSPF) protocol, the MR3228-2S is perfectly equipped for networks requiring multicast support. Protocol Independent Multicast(PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the MR3228-2S switch ideal for intensive multicast environments.

Virtual Router Redundancy Protocol (VRRP) uses a virtual IP address to support a primary router and multiple backup routers. The backups can be configured to take over the workload if the master fails or to load share the traffic.
Specific multicast traffic can be assigned to its own VLAN to ensure that it does not interfere with normal network traffic and to guarantee real-time delivery by setting the required priority level for the designated VLAN. The switch uses IGMP Snooping and Query at Layer 2 and IGMP at Layer 3 to manage multicast group registration.

The Distance Vector Multicast Routing Protocol (DVMRP) and Protocol-Independent Multicasting - Dense Mode (PIM-DM), support routing multicast packets. These protocols work in conjunction with IGMP to filter and route multicast traffic.

Interface Options using SFP

The SFP interface supports both single mode and multi mode Gigabit fiber-optic communication, allowing network managers the flexibility to upgrade their networks connecting the distribution back to the enterprise backbone using SX, LX, or EZX optics. Fiber-optic transmission enables distances of 300m, 5Km,or up to 120Km, respectively. This solution delivers a cost-effective and efficient aggregation of wiring closets within an enterprise network.

Network Bottlenecks Elimination

To secure bandwidth for bandwidth-hungry traffic, the MR3228-2S offers the basic IEEE 802.3ad Link Aggregation protocol, the MR3228-2S also Cisco's Ether Channel for static trunks. Users have the option to choose the protocol, which is best, suited to their needs.

MR3228-2S switch properties

Switching Features

- 24 10/100BASE-T , 2 gigabit SFP ports and 2 10/100/1000Base-T ports
- Provides Redundant Power Supply (RPS) connectivity
- The 10/100Base-TX and 10/100/1000BASE-TX ports support auto-sensing, auto-negotiation.
- Supports Jumbo frame up to 9KB
- Provides wire speed L2/3 switch

- Supports up to 32MB of packet buffer.
- Supports up to 16K MAC address entries
- Aggregate Bandwidth
  - 12.8 Gbps
- Flow Control supported
  - Provides IEEE 802.3x for full duplex mode
  - Back pressure flow control half duplex mode
- Provides store-and-forward forwarding scheme
- Provides HOL (Head of Line) blocking prevention
- Provides Broadcast storm protection (multicast protection)
  - Per port configuration based on rate control and limit
- VLANs support :
  - Supports IEEE 802.3ac frame extension for VLAN tagging
  - Supports IEEE 802.1Q VLAN
  - Supports 256 VLANs entries, out of 4K VLAN ID
  - Supports Port-based VLAN
  - Supports Protocol-Based VLAN (IEEE 802.1v)
    - Number of protocol VLAN entries is 7 per port
    - VLAN grouped by frame type or protocol type
    - Supports 3 protocol types as following:
      - IP
      - ARP / IPX
      - RARP / Appletalk
    - Supports 3 frame types as following:
      - Ethernet type II
      - LLC IPX
      - RFC 1042 frame Appletalk
- Private VLAN
  - Supports GVRP protocol for dynamic VLAN management (number of VLANs 256)
  - Supports IGMP snooping (v1/v2)
  - Supports IGMP v1/v2 querier
- Spanning Tree:
  - Provides Spanning Tree (IEEE 802.1D)
  - IEEE 802.1w, Rapid Reconfiguration Spanning Tree
  - IEEE 802.1s Multiple Spanning Tree supported up to 32 instance
- Provides Link Aggregation
  - Complies to IEEE 802.3ad
  - Cisco EtherChannel compatible
  - Trunk Group:
    - Standalone version: Up to 12 trunk-link groups in 10/100Base-T port and 2 trunk-link groups in Gigabit port
  - Up to 8 ports per trunk link group
  - Supports unicast/multicast traffic balance over trunk ports
  - Traffic balancing for unicast traffic is based on source/destination MAC address
  - Traffic balancing for multicast traffic is based on destination MAC address

Routing Features

- Provides IPv4 routing at wire speed
- Provides up to 4K IP address entries (Host Table)
- Provides up to 16K Routing Net Table
- Provides 256 static IP routes entries
- Supports up to 256 multicast groups
- Provides Multi-netting
  - Up to 256 IP interface
- Provides Supernetting (CIDR)
- Provides RIP I (RFC1058) and RIP II (RFC2453) routing
  - 16K Net entries
- Provides OSPF (RFC2328) routing
  - up to 5 areas
- Provides IP Multicast Routing
  - IGMP v1/v2
  - DVMRP
  - PIM – DM (Dense Mode)
- IP Redundancy – VRRP (RFC 2338) supported
- ARP (RFC 826)
  - Up to 8K entries
- Proxy ARP (RFC 1027)

Quality of Service Features

- Provides 8-level priority in switching (IEEE 802.1p)
- Priority queue scheduling scheme:
  - Weighted Round Robin (WRR)
  - Strict Priority
- Per port bandwidth management
  - Ingress and egress

    Fast Ethernet Port:

    Range 64Kbps ~ 100Mbps

    Resolution 64Kbps

    Gigabit Ethernet Port

    Range 1Mbps ~1000Mbps

    Resolution 1Mbps
- Traffic classification and priority management based on the following parameters:
- IEEE 802.1p (COS)
  - IP Precedence (TOS)
    - IP precedence based COS
    - DSCP based COS
- TCP/UDP port based COS

- Support different rules set of for ingress and egress port

Security Features

- User/Password protected system management terminal (SNMP, Telnet, Web)
  - Local Authentication up to 5 sets of user/password
  - Remote Authentication via RADIUS/TACACS+
- Static Port Security (MAC based)
  - Support up to 1024 MAC entries per system
  - Supports up to 100 MAC entries per port
- IP filtering configuration for management interface (SNMP, Telnet, Web)
- L2/L3/L4 access control list
  - 8 10/100Mbps ports as a group share 173 rules and 7 mask
  - Parameters are as following:
    - MAC SA/DA
    - VLAN based
    - IP SA/DA
    - Subnet based
    - TCP/UDP port number
- RADIUS Authentication
  - Multiple RADIUS Server: 2 servers
  - Encryption: MD5
- TACACS+ Authentication
  - Encryption: MD5
  - Single Server
- Secure Shell (SSH, secure Telnet session)
- HTTPS/SSL
- IEEE 802.1x port-based
  - The following supplicants are supported:
    - Win XP
    - Win 2000 with SP4
    - Win 95/98 with AEGIS

Management Features

- Provides 1 Male DB9 RS-232C console interface configured as DTE for operation, diagnostics, status, and configuration information.
- Supports Cisco-liked Command Line Interface (CLI) for local console or remote telnet management using VT-100 style terminal, 4 sessions
- Supports Telnet management (4 sessions)
- Supports Embedded Web-based Management
- Supports software upgrade/download via XModem or TFTP

- Boot code upgrade/download via XModem only
- S/W upgrade/download during run time is via TFTP only

- Supports configuration download/upload via TFTP
- Supports dual copies of code
- Supports dual or more copies of configuration
- Supports BOOTP client for IP address assignment
- Supports Remote Ping
- Supports Port Mirroring:
- Support up to 1 mirror sessions
  - 1 mirrored port (TX) to 1 mirroring port
  - 1 mirrored port (RX) to 1 mirroring port
- Provides DHCP
  - Server(RFC 2131,): 8 subnets, 512 entries/subnet
  - Client
  - Relay: 5 entries/VLAN
- DNS support
  - Client
  - Proxy: 2560 entries
- Supports Event/Error log
  - Store to local flash: 4080 entries in 255Kbyte Flash
  - Store to remote server via System Log (RFC3164) supports up to 5 servers
- Via SMTP (RFC 821) supports up to 3 servers
- The following faults are monitored:
  - Thermal Monitor (LED definition)
  - Fan fail (LED definition)
- Simple Network Time Protocol (SNTP, RFC2030)
- Supports SNMPv1/v2c/v3
  - v1: 5 SNMP community string, 5 trap receivers
  - v2C: 5 SNMP community string, 5 trap receivers
- Supports RFC 2819 RMON group (1,2,3 & 9)
  - Statistic: total 24 entries, average 1 entry per port
  - History: total 24 entries, average 2 entries per port
  - Alarm: total 24 entries
  - Event: total 24 entries
  - RMON configuration will not be save to flash rom.
- Supports MIBs
  - IEEE 802.1 PAE MIB
  - IEEE 802.3 LAG MIB
  - IP Forward MIB (RFC 2096)
  - OSPF MIB (RFC 1850)
  - RMON MIB (RFC 2819)

- RMON 2 MIB (RFC 2021)
- RIP v2 MIB (RFC 1724)
- Bridge MIB (RFC 1493)
- P-Bridge MIB (RFC 2674P)
- Q-Bridge MIB (RFC 2674Q)
- V-Bridge MIB
- MAU MIB (RFC 2668)
- IF MIB (RFC 2863)
- DNS Reslover MIB (RFC 1612)
- Ether-Like MIB (RFC 2665)
- Entity MIB (RFC 2737)
- IP MIB (RFC 2011)
- TCP MIB (RFC 2012)
- UDP MIB (RFC 2013)
- VRRP MIB (RFC 2787)
- IPMROUTE STD MIB (RFC 2932)
- IGMP STD MIB (RFC 2933)
- PIM MIB (RFC 2934)
- PEA Equipment MIB
- SNMP v2 MIB (RFC 1907)
- SNMP FrameWork (RFC 3411)
- SNMP MPD MIB (RFC 3412)
- SNMP Target MIB (RFC 3413)
- SNMP Notify MIB (RFC 3413)
- SNMP User-Based SM MIB (RFC 3414)
- SNMP View-Based ACM MIB (RFC 3415)
- Private MIB

Weight

3.1 kg (6.86 lbs)

Size

44.0 x 23.0 x 4.4 cm (17.4 x 9.1 x 1.7 in.)

Temperature

Operating: 0 to 50ºC (32 to 122ºF)

Storage: -40 to 70ºC (-40 to 158ºF)

Humidity

Operating: 5% to 95% (non-condensing)

AC Input

100 to 240 V, 50-60 Hz, 0.8A

Power Supply

Inernal, auto-ranging transformer: 90 to 240 VAC, 47 to 63 Hz External, supports connection for 12-pin redundant power supply

Power Consumption

28.44 Watts maximun

RPS/DC Input 12V

Safety

CSA/CUS (UL 60950-1, CSA 60950-1)

TÜV/GS (EN60950-1)

CB (IEC60950-1)

Standards

IEEE 802.1D (Bridging)

IEEE 802.3-2002

Ethernet, Fast Ethernet, Gagabit Ether

Full-duplex flow control

Link Aggregation Control Protocol

ISO/IEC 8802-3

Immuniy

EN 61000-4-2/3

MR3228-2S	Layer3 Switch 24 10/100Base-T ports, 2 Gigabit SFP ports and 2 10/100/1000 Base-T ports Ethernet Routing standalone Switch.
Gigabit Ethernet SFP	
SFP-G-SX	SFP 1000Base-SX, MM, 850nm, 0-550m.
SFP-G-MMX	SFP 1000Base-SX, Extended MM, 1310nm, 0-2km.
SFP-G-LX	SFP 1000Base-LX, SM, 1310nm, 10km.
SFP-GD-ELX	SFP 1000Base-ELX, SM, 1310nm, 25km
SFP-GD-XD	SFP 1000Base-XD, SM, 1550nm, 50km
SFP-GD-ZX	SFP 1000Base-ZX, SM, 1550nm, 80km
SFP-GD-EZX	SFP 1000Base-EZX, SM 1550nm, 120km

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