Datasheet

OptiSwitch MRS3326-S4C L3

24 - ports 10/100/1000Base-T Gigabit Routing IP Stackable Switch - 20 ports 10/100/1000 Base-T , 4 combo Gigabit ports each comprised of a RJ-45 and a SFP plus 2 optional I/O module for 10G uplink, with both IPv4/IPv6 Management, Policy-maps, ACLs , QoS.

MRS3326-S4C Product Overview

The MRV MRS3326-S4C is a 24 ports Gigabit Ethernet Layer 3 Routing IP Stackable switch with advanced routing capabilities and intelligent Quality Of Service (QoS) features. The MRS3326-S4C switch is composed of 20 10/100/1000 Base-T ports and 4 combo Gigabit ports plus 2 optional I/O module for 10G uplink. Each combo port combines a RJ45 connector and a SFP fiber-optic transceiver for flexibility of connections to the network and to other devices. It is a routing switch that combines the speed Layer 2 switching with the ability to route at a Layer 3 level and provides comprehensive network management functions Spanning Tree protocol for standard bridging, GVRP for VLAN configuration, IPv4/IPv6 Management, IPv4/IPv6 Policy-maps, IPv4/IPv6 ACLs, IPv4/IPv6 QoS, SNMP v1, v2c, v3, RMON and Web management are all standard features.

With hardware-based IPv4/IPv6 routing and the Enhanced Multilayer Software, the MRV MRS3326-S4C 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 Static routes, Routing Information Protocol (RIP), Open Shortest Path First (OSPF) protocol and Border Gateway Protocol (BGP), the MRV MRS3326-S4C is perfectly equipped for networks requiring multicast support. Protocol Independent Multicast (PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the MRV MRS3326-S4C switch ideal for intensive multicast environments.

The MRS3326-S4C 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.

The MRS3326-S4C 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, 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 to the administrator's email box when fault conditions occur. The MRS3326-S4C Jumbo packets can support up to 9K bytes under Gigabit speed that give administrators the flexibility to make performance-enhancing adjustments. The MRS3326-S4C provides multiple security algorithms such as Port Security, SSL, Web management Encryption, RADIUS, TACACS+ and 802.1x.

Feature Highlights:

- 24 - ports 10/100/1000Base-T Layer 2/4 Gigabit Ethernet Stackable Switch - 20 ports 10/100/1000 Base-T and 4 combo Gigabit ports each comprised of an RJ-45 and an SFP plus 2 optional I/O modules for 10G XFP uplink.
- Complete layer 3 standard features including:
  - — IPv4/6 routing at wire speed
  - — IPv4/6 routing/multicast/neighbor discovery/ICMPv6
  - — Provides RIP I (RFC1058) and RIP II (RFC2453)
  - — Provides OSPF (RFC2328) routing
  - — Border Gateway Protocol (BGP) up to 64K entries,
  - — Provides IP Multicast Routing: IGMPv1/v2/v3, DVMRP, PIM-DM/SM
  - — IP Redundancy - VRRP (RFC 2338) supported
  - — ARP (RFC 826) supported
  - — Provides Supernetting (CIDR)
  - — Up to 7K IP address entries
  - — Provides Multi-netting
  - — Provides DHCP/BOOTP relay
  - — Provides DHCP server /client
- 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 8K MAC address entries

Port-based VLAN, Private VLAN

Spanning Tree IEEE 802.1D, 802.1W, 802.1s*

QinQ

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, IPv4/IPv6 ACL, SSL

High Performance

The MRS3326-S4C Switch boosts L3 IPv4/IPv6 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 MRS3326-S4C 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 MRS3326-S4C 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 MRS3326-S4C Switch provides routing features such as IPv4 routing at wire speed, VRRP (IP redundancy), ICMP, RIP I and RIP II, OSPF,BGP and DHCP / BOOTP relay and a comprehensive set of features, including: IPv4/IPv6 Management, IPv4/IPv6 Policy-map, IPv4/IPv6 ACL, IPv4/IPv6 QoS. The MRS3326-S4C Switch also implements various switching functions including Port Trunking, broadcast storm protection, extensive VLAN support, IGMP snooping, Rapid Spanning Tree,QinQ and link aggregation.

Fault-Tolerance

Spanning tree is a link management protocol that provides path redundancy while preventing undesirable loops in the network. The MRS3326-S4C delivers the IEEE802.1D protocol (Spanning Tree), the IEEE802.1s* (Multiple Spanning Tree) and IEEE802.1w (Rapid Spanning Tree) protocol for Fault-Tolerance. The MRS3326-S4C also provides a redundant power supply inlet in the rear panel for power-fault-tolerance to ensure a reliable system.

Enhanced Security Features

The 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) ,and network management information are supported, 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.

Network Control through Advanced QOS and Rate Limiting

The MRS3326-S4C 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 MRS3326-S4C 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.

sFlow provides the ability to continuously monitor application level traffic flows at wire speed on all interfaces simultaneously.

Network Scalability through High-Performance IP Routing

With hardware-based IP routing and the Enhanced Multilayer Software, the MRS3326-S4C 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 MRS3326-S4C is perfectly equipped for networks requiring multicast support. Multicast routing protocol (PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the MRS3326-S4C 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), Sparse-Mode (PIM-SM), support routing multicast packets. These protocols work in conjunction with IGMP to filter and route multicast traffic.

Interface Options using SFP

The MRS3326-S4C switch offers 4 combination ports, each comprised of an SFP interface for fiber-optic hookup and an RJ-45 connector for category 5 copper cable connection. 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.

10G Uplink Capability

Effective for future expansion convenience and investment savings, the MRS3326-S4C provides two optional I/O modules for 10G uplink to fulfill any bandwidth-eager customer requirements. The benefits that 10 Gigabit Ethernet slots can provide for the core and metro application are:

- Improved performance
- Future fiber cost savings—Fiber optic Ethernet link utilization is improved by a factor of 10G uplink to fulfill any bandwidth-eager customer requirements
- Simplified operations — reduced numbers of Links simplify fiber cross connect management

10G XFP module for MRX326-S4C

Interface Options using XFP

The MRS3326-S4C switch supports XFP pluggable optics. The XFP interface supports both single mode and multi mode 10 Gigabit fiber-optic communication, allowing network managers the flexibility to upgrade their networks connecting the network backbone using SX, MMX, LR and IR2 optics. Fiber optic transmission enables distances of

300m, 500m, 10km and 40km, respectively.

Network Bottlenecks Elimination

To secure bandwidth for bandwidth-hungry traffic, the MRS3326-S4C offers the basic IEEE 802.3ad Link Aggregation protocol. The MRS3326-S4C also Cisco's Ether Channel for static trunks. Users have the option to choose the protocol, which is best, suited to their needs.

Advanced IP Stacking Architecture

MRV advanced IP stacking architecture allows you to connect up to 24 units of MRS3326-S4C into a single manageable unit of up to 624 ports.Management station communicates directly with the commander via the unique IP address of the cluster. The IP stacking architecture is designed to protect your network investment with resilient links. As one of the stacked units crashes, the other units in the same stack can still keep running. Furthermore, the stacking bandwidth is up to 40 Gbps.

MRS3326-S4C switch properties

Physical Ports

- 20 Giga RJ-45 ports
- 4 Giga combo port-RJ45/ SFP
- 2 optional I/O module for 10G uplink
- 1 Redundant Power (DC) connector
- 1 RS232 port (RJ-45) management port

L2 Features

- Provides Redundant Power Supply (RPS)
- The10/100/1000BASE-TX ports support auto-sensing, auto-negotiation
- Supports Jumbo frame up to 9KB
- Provides wire speed of L2/3 switch/routing performance
- Supports up to 8K MAC address entries
- Supports Flow Control
- Provides IEEE802.1x for full duplex mode
- Back-Pressure flow control in half duplex mode
- Provides store-and-forward forwarding scheme
- Provides HOL (Head of Line) blocking prevention
- Provides Broadcast storm protection
- Supports IGMP snooping
- VLAN Supports
- Supports IEEE 802.3ac frame extension for VLAN tagging
- Supports IEEE 802.1Q VLAN
- Supports 4K VLANs entries

- Supports QinQ
- Supports Port-based VLAN
- Supports MAC-based VLAN
- Supports SUBNET-based VLAN
- Supports VOICE-based VLAN
- Supports Protocol-Based VLAN (IEEE 802.1v)
- Private VLAN
- Private VLAN-translation*

- Supports GVRP protocol for dynamic VLAN management
- Provides Spanning Tree
- Provides Spanning Tree (IEEE 802.1D)
- IEEE 802.1w, Rapid Reconfiguration Spanning Tree
- IEEE 802.1s* Multiple Spanning Tree supported up to 48 instances
- Proprietary Fast forwarding mode supported.
- Provides 802.3ad Link Aggregation and LACP
- Complies to IEEE 802.3ad
- Cisco EtherChannel compatible
- Standalone Configuration
- Up to 8 trunk links group
- Up to 8 ports per trunk link group
- Up to 2/8 gigabit ports per trunk link
- Up to 2 10GE ports per trunk link
- 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

L3 Features

- Provides IPv4/IPv6 routing at wire speed
- Provides up to 2K IP address entries
- Provides Static IP routes (512 entries)
- Provides Multi-netting
- Provides Supernetting (CIDR)
- Provides RIP I and RIP II
- Provides OSPF routing
- Provides BGP routing up to 64K entries
- Provides IP Multicast Routing: DVMRP, PIM-DM/SM
- IP Redundancy - VRRP supported
- ARP
- Provides DHCP/BOOTP relay

- Provides DHCP server/client
- Supports RIPng
- Supports OSPFv3
- Supports ISIS*
- Supports Policy based routing
- Supports IGMPv1/v2/v3
- Supports IPv6 manual tunnel
- Supports IPv6 6to4 tunnel
- Supports IPv6 ISATAP tunnel

Management

- Provides 1 Male DB9 RS-232C console interface configured as DTE
- Supports Cisco-liked Command Line Interface (CLI) using VT-100 style terminal, 4 sessions
- Supports Telnet management
- Supports Embedded Web-based Management
- Supports software upgrade/download via XMODEM or TFTP
- Supports configuration download/upload via TFTP
- Support Port Mirroring
- Supports BOOTP/DHCP client for IP address Assignment
- Supports Remote Ping
- Supports dual copies of Firmware image
- Supports multiple copies of configuration
- Supports System/Crash/Error log
- Supports SNTP (RFC 2030)
- Supports SNMPv1/v2c/v3
- Supports RFC 2819 RMON group (1,2,3 & 9)
- Supports MIBs
- Supports IPv6 management

Security

- User/Password protected system management terminal
- L2/L3/L4 access control list
- RADIUS client
- TACACS+ client
- Secure Shell (SSH/Secure Telnet)
- IEEE 802.1x

Quality of Service

- 802.1p based CoS
- 8 priority queues per port
- WRR for priority queue
- Strict Scheduling priority queue
- IP TOS/Precedence based CoS
- DSCP based CoS
- TCP/UDP port-based CoS
- Bandwidth Management: both Ingress and Egress
- DiffServ

Management

- Provide 1 out of band Ethernet management port
- Supports Cisco-liked Command Line Interface (CLI) using VT-100 style terminal, 5 sessions
- Supports Telnet management
- Supports Embedded Web-based Management
- Supports software upgrade/download via XMODEM or TFTP
- Supports configuration download/upload via TFTP
- Support Port Mirroring
- Supports BOOTP/DHCP client for IP address assignment
- Support ARP Proxy
- Supports Remote Ping
- Supports multiple copies of configuration*
- Supports System/Crash/Error log
- Supports SNTP (RFC 2030)
- Supports SNMPv1/v2c/v3
- Supports RFC 2819 RMON group (1, 2,3 & 9)
- Supports MIBs

IP Stacking Features

- IP stacking up to 24 switches - virtual stacking
- Auto configuration update
- Resilient stacking: hot insertion and removal of units within stack
- 40Gbps for Stacking Bandwidth

Mechanical

- Dimensions: (W x D x H): 44cm x 33cm x 4.4cm

Performance

- Switch Fabric: 144Gbps
- MAC addresses: 8K

Safety

- CSA/NRTL (UL1950, CSA 22.2.950)
- TUV/GS (EN60950)
- CB

Safety

- CSA/NRTL (UL1950, CSA 22.2.950)
- TUV/GS (EN60950)
- CB

IEEE Standards

- IEEE 802.3 10BASE-T [1]
- IEEE 802.3u 100BASE-TX and 100BASE-FX [2]
- IEEE 802.3z[3] 1000BASE-SX
- IEEE 802.3x flow control support
- IEEE 802.1D (Bridging), 1993
- IEEE 802.1Q (Virtual LAN) 1998
- IEEE 802.3ad (LACP)
- IEEE 802.1s*
- IEEE 802.1w

* Future specification

Datasheet

Ordering Info	
MRS3326-S4C	Layer 3 Managed Switch 24 - ports 10/100/1000Base-T Gigabit Routing IP Stackable Switch - 20 ports 10/100/1000 Base-T and 4 combo Gigabit ports each comprised of a RJ-45 and a SFP plus 2 optional I/O module for 10G uplink.
10 Gigabit Ethernet module Ordering Information	
MR10G-XFP	10G XFP module for MRX326-S4C
10 Gigabit Ethernet XFP Ordering Information	
XFP-10GD-SX	XFP 10-GbE, or 10GFC, MM, 850nm, .3km
XFP-10GD-MMX	XFP 10-GbE, or 10GFC, Extended MM, 1310nm, .5km
XFP-10GD-LR	XFP OC192/STM-64, 10GE or 10G FC, SM, 1310nm, 10km
XFP-10GD-IR2	OC192/STM-64, 10GE or 10G FC, SM, 1550nm, 40km
Gigabit Ethernet SFP Ordering Information	
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
Stackable Cable for the MR3325/49 and MRX326:	
MRXX25-49-26-SC	Stackable Cable for the MR3325/49 and MRX326
MRXX25-49-26-LSC	Long Stackable Cable 130 cm for the MR3325/49 and MRX326

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