# OptiSwitch MR3349-S4C L3 Gigabit With 10G Expansion Switch

48 - ports 10/100/1000Base-T Gigabit Routing Stackable Switch - 44 ports 10/100/1000 Base-T and 4 combo Gigabit ports each comprised of a RJ-45 and a SFP plus 1 optional I/O module for 10G uplink.



## Product Overview

The MRV MR3349-S4C is a 48 ports Gigabit Ethernet Layer 3 Routing Stackable switch with advanced routing capabilities and intelligent Quality Of Service (QoS) features. The MR3349-S4C switch is composed of 44 10/100/1000 Base-T ports and 4 combo Gigabit ports plus 1 optional I/O module for 10G uplink. Each combo port combines a RJ45 conector 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 switch 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, SNMP v1, v2c, v3, RMON and Web management are all standard features.

With hardware-based IP routing and the Enhanced Multilayer Software, the MRV MR3349-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 the Routing Information Protocol (RIP) and the Open Shortest Path First (OSPF) protocol, the MRV MR3349-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 MR3349-S4C switch ideal for intensive multicast environments.

The MR3349-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 MR3349-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, 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 to the administrator's email box. The MR3325-S4C Jumbo packets can support up to 9K bytes under Gigabit speed that give administrators the flexibility to make performance-enhancing adjustments. The MR3325-S4C provides multiple security algorithms such as Port Security, SSL, Web management Encryption, RADIUS, TACACS+ and 802.1x.

## MR3349-S4C Feature Highlights

• 49 ports 10/100/1000 44 ports 10/100/1000 Base-T and 4 combo Gigabit ports each comprised of a RJ-45 and a SFP plus 1 optional I/O module for 10G uplink.

• 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, 802.1W

— 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 MR3349-S4C 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 MR3349-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 MR3349-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 MR3349-S4C 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 MR3349-S4C 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 MR3349-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 MR3349-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 OptiSwitch 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 secures 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.

### Network Control through Advanced QOS and Rate Limiting

The MR3349-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 MR3349-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.

### Network Scalability through High-Performance IP Routing

With hardware-based IP routing and the Enhanced Multilayer Software, the MR3349-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 MR3349-S4C is perfectly equipped for networks requiring multicast support.

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Multicast routing protocol (PIM*) and Internet Group Management Protocol (IGMP) snooping in hardware make the MR3349-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), support routing multicast packets. These protocols work in conjunction with IGMP to filter and route multicast traffic.

### Interface Options using SFP

Effective for future expansion convenience and investment savings, the MR3349-S4C provides one optional I/O module for 10G uplink to fulfill any bandwidth-eager customer requirements. the benefits that 10 Gigabit Ethernet slot 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 number of Links simplify fiber cross connect management

### 10G Uplink Capability

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MR10G-XEN Xenpak Expansion Module

### Network Bottlenecks Elimination

To secure bandwidth for bandwidth-hungry traffic, the MR3349-S4C offersthe basic IEEE 802.3ad Link Aggregation protocol, the MR3349-S4C also Cisco's Ether Channel for static trunks. Users have the option to choose the protocol, which is best, suited to their needs.

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### Advanced Stacking Architecture

MRV advanced closed loop stacking architecture allows you to connect up to 8 units of MR3349-S4C into a single manageable unit of up to 560 ports. The MR3349-S4C can be mixed stacked with any MR3325-S4C / MR3349-S4C which provides you more flexibility of future expansion as your business grows. The closed loop stacking architecture is designed to protect your network investment with resilient links. As one of stacked units crashes, the other units in the same stack can still keep running. Furthermore, the stacking bandwidth is up to 40 Gbps.

## MR3349-S4C switch properties

### Physical Ports

- 44 Giga RJ-45 ports
- 4 Giga combo port-RJ45/ SFP
- 1 optional I/O module for 10G uplink or 8-port Gigabit SFP
- 1 RS232 port
- 1 Redundant Power (DC) connector
- 1 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 16K 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 256 VLANs entries, out of 4K VLAN ID
- Supports Port-based VLAN
- Supports Protocol-Based VLAN (IEEE 802.1v)
- Private VLAN
- Supports GVRP protocol for dynamic VLAN management (number of VLANs 256)
- 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 32 instance
- Proprietary Fast forwarding mode supported.

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- Provides 802.3ad Link Aggregation and LACP

- Complies to IEEE 802.3ad

- Cisco EtherChannel compatible

- Standalone Configuration

- Up to 6 trunk links group

- Up to 8 ports per trunk link group

- Stacking configuration (for 8 units)

- Up to 12/32 trunk links (depends on the number of device in the stack)

- Up to 2/8 gigabit ports per trunk link

- Up to 2/4 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 routing at wire speed

- Provides up to 4K IP address entries

- Provides Static IP routes (128 entries)

- Provides Multi-netting

- Provides Supernetting (CIDR)

- Provides RIP I (RFC1058) and RIP II (RFC2453)

- Provides OSPF (RFC2328) routing

- Provides IP Multicast Routing: DVMRP, PIM-DM/SM

- IP Redundancy - VRRP (RFC 2338) supported

- ARP (RFC 826)

- Provides DHCP/BOOTP (RFC 951) relay

- Provides DHCP server (RFC 2131)/client

- DNS support server (proxy)

## Security

- User/Password protected system management terminal

- L2/L3/L4 access control list

- RADIUS client

- TACACS+ client

- Secure Shell (SSH/Secure Telnet)

- HTTPS/SSL

- 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

• Provides 1 Male DB9 RS-232C console interface configured as DTE

• Provide 1 out of band Ethernet management port

• 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

• Support ARP Proxy

• Supports Remote Ping

• Supports dual copies of code

• 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

### Stacking Features

Stacks up to 8 units

• Mix stack of MR3325-S4C / MR3349-S4C

• Max number of ports in the stack: 384 ports

• Auto master selection

• 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 41cm x 4.4cm (17.3 x 16.1 x 1.7in)

### Performance

• Switch Fabric: 160Gbps

• MAC addresses: 16K

## Safety

• CSA/NRTL (UL1950, CSA 22.2.950)

• TUV/GS (EN60950)

• CB

## Temperature

• Operating: 0 to 50°C (32 to 122°F)

• Storage: -40 to 70°C (-40 to 158°F)

## Humidity

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

## AC Input

• 100 to 240 V, 50-60 Hz, 2A

## Power Supply

• Internal , auto-ranging transformer: 90 to 240 VAC, 47 to 63 Hz

• External, supports connection for redundant power supply.

• RPS/DC Input 12V

## Power Consumption

• 100 Watts (with no expansion module installed)

• 120 Watts (with expansion model installed)

## 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

## Ordering Info

| MR3349-S4C | 48 - ports 10/100/1000Base-T Gigabit Routing Stackable Switch - 44 ports 10/100/1000 Base-T and 4 combo Gigabit ports each comprised of a RJ-45 and a SFP plus 1 optional I/O module for 10G uplink. |
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| | |
| **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 |

MRV has more than 50 offices throughout the world. Addresses, phone numbers and fax numbers are listed at www.mrv.com. Please e-mail us at **sales@mrv.com** or call us for assistance.

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