Da Vinci MR3312-4C Layer 3 Managed Switch

12- Gigabit SFP ports and 4- 10/100/1000 Base-T ports (combo ports) Ethernet Routing standalone Switch.

Introduction to the DaVinci Family of switches

The DaVinci family of Intelligent Ethernet Switches is a line of enterprise-class, stackable, multilayer switches that provide high availability, security and quality of service (QoS) to enhance the operation of the network. With a range of Fast Ethernet and Gigabit Ethernet configurations. The DaVinci Series can serve as a powerful access layer switch for small medium and large enterprise wiring closets, as well as a backbone switch for networks. Customers can deploy network-wide intelligent services, such as advanced QoS, rate-limiting, MRV's security-access-control lists, multicast management, and high-performance IP routing, while maintaining the simplicity of traditional local area network (LAN) switching. Also embedded in the the DaVinci series of switches is the MRV's Operating and Management Software, which is common to all the switches in the DaVinci series. The DaVinci Series of Switches enhances any network performance by intelligently providing 10, 100, and 1000 Mbps communication over existing Category 5 copper cabling as well as High Speed fiber-optic connectivity to the backbone through Small Form-Factor Pluggable (SFP) optical transceivers. The DaVinci Series Switches are in a 1-RU form factor ideal for wiring closet installation. Members of the DaVinci family are:

- **MR2228-S2C L2/4 Stackable Switch** — A switch comprised of 24 10/100BASE-T(RJ-45) ports, two Gigabit combo ports each comprised of an RJ-45 and an SFP interface for Gigabit uplink, and two 1Gbps ports for stacking
- **MR2252-S2C L2/4 Stackable Switch*** — A switch comprised of 48 10/100BASE-T(RJ-45) ports, two Gigabit combo ports each comprised of an RJ-45 and an SFP interface for Gigabit uplink, and two 1Gbps ports for stacking
- **MR2324-4C L2/4 Gigabit Managed Switch** — A 24 ports 10/100/1000 Layer 2 Gigabit Ethernet standalone switch comprised of 20 ports 10/100/1000 Base-T, and 4 Gigabit combo ports each comprised of an RJ-45 and an SFP.
- **MR3312-4C Layer 3 Managed Switch** — A 12 Gigabit SFP ports and 4- 10/100/1000 Base-T ports (combo ports) Ethernet Routing standalone Switch.
- **MR3325-S4C Layer 3 With 10G Expansion Switch** — A 24 ports 10/100/1000 Ethernet Routing, Stackable Switch comprised of 20 10/100/1000 Base-T ports, and 4 Gigabit combo ports each comprised of an RJ-45 and an SFP plus 1 optional I/O module for 10G uplink.
- **MR3349-S4C Layer 3 With 10G Expansion Switch** — A 44 ports 10/100/1000 Ethernet Routing Stackable Switch comprised of 40 10/100/1000 Base-T ports, 4 Gigabit combo ports each comprised of an RJ-45 and an SFP, and one optional I/O module for 10G uplink.
- **MR2226-POE L2/4 Stackable Switch** — A switch comprised of 24 10/100BASE-T(RJ-45) ports, two Gigabit combo ports each comprised of an RJ-45 and an SFP interface for Gigabit uplink, two 1Gbps ports for stacking, and Power Over Ethernet provision.

*** Check for availability**

MRV MR3312-4C Product Overview

The MRV MR3312-4C is a 12 ports Gigabit Ethernet Layer 3 switch with advanced routing capabilities and inteligent Quality Of Service (QoS) features. The MR3312-4C switch is composed of 8 SFP fiber-optic ports and 4 combo Gigabit ports. Each combo port combines a RJ45 conector and a SFP fiber-optic transceiver for flexibility of connections to the network and to other devices.

With hardware-based IP routing and the Enhanced Multilayer Software, the MR3312-4C 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 MR3312-4C is perfectly equipped for networks requiring multicast support. Protocol Independent Multicast (PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the MR3312-4C switch ideal for intensive multicast environments.

The MR3312-4C 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 MR3312-4C 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.

MR3312-4C 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 MR3312-4C Jumbo packets can support up to 9K bytes under Gigabit speed that give administrators the flexibility to make performance-enhancing adjustments. The MR3312-4C provides multiple security algorithms such as Port Security, SSL, Web management Encryption, RADIUS, TACACS+ and 802.1x.

MR3312-4C Feature Highlights

- 12- SFP ports comprising 8 1000Base-X SFP ports and 4 1GBE combo ports.
- 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
  - Supports Hot Standby Routing Protocol (HSRP)
  - 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
- 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 MR3312-4C 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 MR3312-4C 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 MR3312-4C 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 MR3312-4C 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 MR3312-4C Switch also implements vaious 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 MR3312-4C delivers the IEEE802.1D protocol (Spanning Tree) and the IEEE802.1s (Multiple Spanning Tree), IEEE802.1w (Rapid Spanning Tree) protocol for Fault-Tolerance. The MR3312-4C also provides a redundant power supply inlet in the rear panel for power-fault-tolerance to ensure a reliable system.

Enhanced Security Features

The DaVinci 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, 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 *DaVinci* Series switches offer VLAN, router and port-based ACLs.

Network Control through Advanced QOS and Rate Limiting

The MR3312-4C 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 MR3312-4C 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 MR3312-4C 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 MR3312-4C is perfectly equipped for networks requiring multicast support. Protocol Independent Multicast(PIM) and Internet Group Management Protocol (IGMP) snooping in hardware make the MR3312-4C switch ideal for intensive multicast environments.
Hot Standby Router Protocol (HSRP) and Virtual Router Redundancy Protocol (VRRP) both use 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 MR3312-4C 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. 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 MR3312-4C offers the basic IEEE 802.3ad Link Aggregation protocol, the MR3312-4C also Cisco's Ether Channel for static trunks. Users have the option to choose the protocol which is best suited to their needs.

MR3312-4C switch properties

Physical Ports

- 8 1000Base-X SFP ports
- 4 Gigabit RJ45 / SFP combo ports
- 1 RS232 port
- 1 Redundant Power (DC) connector
- 1 RJ-45 management port

Switching Features

- Provides 8 1000Base-X SFP and 4 gigabit combo ports (RJ45/SFP)
- Provides Redundant Power Supply (RPS)
- 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 16K MAC address entries
- Flow Control supported:
- Provides IEEE802.3x 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
- VLANs support, GVRP, IEEE802.1Q, IEEE802.1v
- Supports IGMP snooping
- Provides 8-level priority in switching
- Provides Spanning Tree (IEEE 802.1D)
- Multiple Spanning Tree and Rapid Spanning Tree (802.1s, 802.1w)
- Provides Link Aggregation (802.3ad with LACP)

Advanced 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: IGMP, DVMRP, PIM-DM
- IP Redundancy - VRRP (RFC 2338) supported
- Supports Hot Standby Routing Protocol (HRSP)
- ARP (RFC 826) supported
- Provides DHCP/BOOTP (RFC 951) relay
- Provides DHCP server (RFC 2131)/client
- DNS support (proxy) server

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
- Supports Port Mirroring
- Supports BOOTP/DHCP client for IP address

Assignment

- Supports Proxy ARP
- 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

Quality of Service

- Provides DiffServ
- Bandwidth Management: Ingress and Egress

Security

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

Mechanical

- Dimensions: (H x W x D): 44cm x 44cm x 23cm

Performance

- Switch Fabric: 24Gbps
- MAC addresses: 16K

Power Requirements

- Nominal Input Voltages: 110V & 230V
- Input Voltage Range: 90-240V RMS
- Input Frequency: 50/60Hz
- Maximum iinput current: 1.2A@110V, 0.6A@230V

Safety

- CSA/NRTL (UL1950, CSA 22 2 950)
- TUV/GS (EN60950)
- CB

Electromagnetic Compatibility

- CE Mark
- FCC Class A
- VCCI Class A
- CISPR Class A

Environmental

- Temperature: IEC 68-2-14
- 0 to 50 degrees C (Standard Operating)
- -40 to 70 degree C (Non-operational)
- Humidity: 5% to 95% (Non-condensing)
- Vibration: IEC 68-2-36, IEC 68-2-6
- Shock: IEC 68-2-29
- Drop: IEC 68-2-32

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
- IEEE 802.1x

* Future specification

Ordering Information	
MR3312-4C	Layer 3 Managed Switch 12-port 10/100/1000 Ethernet Routing standalone Switch - 8 1000Base-X SFP port and 4 Gigabit combo ports each comprised of an RJ-45 and an SFP.
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