Datasheet

Da Vinci MR2228-S2C L2/4 Stackable Switch

24 - ports 10/100BASE-T (RJ-45) and two Combo Gigabit ports each comprised of a RJ-45 and a SFP for uplink and two 1000BASE-T ports for stacking.

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 Managed 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 Managed 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.

* To be introduced in Nov. 2004.

Datasheet

MR2228-S2C Product Overview

The MR2228-S2C Switch is a stackable, managed Layer 2/4 10/100 Switch designed for Enterprises and workgroups. Built-instackablity electronics allows stacking of up to 8 units. Data can be transferred between 8 stackable units atfull wire-speed using a single IP address management. The MR2228-S2C is a high-end switch providing intelligent service features such as VLANs, GVRP and IGMP Snooping. It also delivers QOS and advanced security features like Rate Limiting and Security Filtering to the network edge, while maintaining the simplicity of traditional LAN switching. The MR2228-S2C delivers wire-speed performance on all ports with a switching fabric capability of 8.8 Gbps connecting remote stations and users to the local LAN.

MR2228-S2C supports comprehensive layer 2 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, 4-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 MR2228-S2C Jumbo packets can support up to 9K bytes under Gigabit speed that give administrators the flexibility to make performance-enhancing adjustments. The MR2228-S2C provides multiple security algorithms such as Port Security, SSL, Web management Encryption, RADIUS, TACACS+ and 802.1x.

MR2228-S2C switch Feature Highlights:

- Cost-effective solution for high-performance LAN environments in 1-RU form factor.
- Wire-speed performance, auto-sensing, and auto MDI/MDIX on all ports.
- Combination Gigabit Ethernet ports deliver integrated RJ-45 (Copper) or SFP (fiber).
- Up to 8 stacked switches contained within one unit enclosure use a single IP address management.
- Support for jumbo frames of up to 9,000 bytes, ideal for high-end server connectivity and network attached file servers.
- Complete, Layer 2 Standard features including:
  - IEEE 802.1q and 802.1p (Class of Service) with 4 hardware queues per port to enable prioritization of mission-critical applications.
  - Port-base VLAN, Private VLAN.
  - Spanning Tree IEEE 802.1D, 802.1W
  - 802.3ad for automatic link aggregation and 802.1x for port security.
  - 802.1w Rapid Spanning Tree Protocol for superior network reliability.
  - Support for Generic VLAN Registration Protocol (GVRP).
  - Internet Group Management Protocol (IGMP) Snooping
- Robust Quality-of-Service features, including Class of Service (802.1p) mapping to Type of Service or DiffServ and support for priority queuing algorithm such as Weighted Round Robin and Strict.
- Low latency – as low as 10µs, ideal for advanced applications like VoIP and video conferencing over IP.
- Extensive management and monitoring features, including an industry-standard CLI, secure web-based GUI, integrated SNMP agent with mini-RMON and Secure Shell for secured and encrypted management access

High Performance:

The MR2228-S2C switch provides high performance architecture with 12 Gbps totalswitching fabric capacity. GVRP allows automatic configuration of VLAN. IGMP snooping enables identifying multicast traffic to make an efficient utilization of the switch bandwidth.

Link aggregation provides greater bandwidth between devices by supporting IEEE 802.3ad (LACP) and IEEE 802.1p, combined with four queues to help to prioritize time-sensitive applications such as multimedia voice traffic.

Fault-Tolerance

Spanning tree is a link management protocol that provides path redundancy while preventing undesirable loops in the network. The MR2228-S2C switch performs the IEEE802.1D (Spanning Tree) protocol, the IEEE802.1S*(Multiple Spanning Tree), and the IEEE802.1w* (Rapid Spanning Tree) protocol for Fault-Tolerance. The MR2228-S2C also provides redundant power supply hook-ups to enable simultaneous connections to two independent power sources to ensure the system reliability.

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 MR2228-S2C switch prioritizes each packet based on the required level of service, using four 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 MR2228-S2C 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 Availability

The MR2228-S2C provides efficient use of resources in bandwidth-hungry applications. It supportsthe Internet Group Management Protocol (IGMPv1/2) snooping, to identify multicast trafficand to ensure an efficient utilization of the bandwidth. The MR2228-S2C is ideal for server-to-server backups, and its jumbo frames capabilities are used to increasetransport efficiency by supporting packets lengths of up to 9KB. Advanced Stacking features of the MR2228-S2C includes support for stack-wide VLAN's, trunking and packet priority. The loop-stacking configuration provides automatic traffic load balancing to optimize the utilization of network bandwidth.

Full Range of Interface Options using SFP

The MR2228-S2C switch offers 2 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 Management

The MR2228-S2Cswitch supportsthe SNMPprotocol, and the Telnet interface delivers comprehensive in-band management. The system can be managed and monitored using the SNMP/RMON protocol through computers equipped with network management software or via an Internet web browser. LED indicators are located on the front panel to assist network administrators in troubleshooting. A Port Mirroring feature provides a non-intrusive mechanism for traffic inspection across the entire switch,

MR2228-S2C switch properties

Physical Ports

- 24 RJ-45 10/100Base-T ports
- 2 Combo G (RJ-45/SFP) ports
- 2 Gigabit (RJ-45) ports for stacking
- Packet buffering: 4Mb

L2 Features

- Full-duplex mode on port 25 and 26 when working in Gigabit speed (MR2324-4C)
- Stacking interface on the front panel
- Stacking up to 8 units via RJ-45 cables
- Auto MDI/MDIX on all 10/100Base-TX ports
- Up to 8K MAC address entries
- 4M-bit for packet buffer size
- Provides flow control mechanism: backpressure for half duplex; IEEE802.3x for full duplex operation
- Store-and-forward forwarding scheme
- HOL (Head of Line) blocking prevention
- Port mirroring
- Provides Link Aggregation

- Up to 8 ports in one trunk
- Up to 4 trunk groups
- Trunks across switches
- Supports 802.3ad (LACP)
- Cisco Ether-channel (static truck)
- Load Balance for both Unicast and Multicast traffics
- Supports VLAN
- IEEE 802.1Q tagging VLAN
- Port-based VLAN
- Up to 255 active VLANs
- GVRP protocol for automatic VLAN registration and dynamic VLAN management
- 802.1v Protocol-Based VLAN*
- Private VLAN
- IGMP (v1/v2) Snooping and Query function
- Broadcast Storm control
- Spanning Tree protocol
- IEEE 802.1D Spanning Tree protocol
- IEEE 802.1w Rapid Spanning Tree
- IEEE802.1s Multiple Spanning Tree*
- Jumbo Frame Support

Security

- RADIUS (Authentication)
- TACACS+
- SSL
- SSH (v1 5 / v2 0)
- Access Control List
- Supports IEEE 802.1x port based security Management
- Supports SNMP v1/v2c/v3* management functions
- Supports RMON (groups 1,2,3 and 9)
- Supports Web-based management
- Supports TELNET console interface
- Supports BOOTP and DHCP for IP address assignment
- Supports firmware upgraded by TFTP file transfer protocol through the Ethernet network
- Supports Firmware image upgrade by TFTP protocol
- Supports dual Firmware images
- Supports Configuration file upload/download by TFTP protocol
- Supports two or more Configuration files
- MegaVision (Windows)
- SNMP access IP filtering configuration
- Provides 1 Male DB9 RS-232C console interface configured as DTE for operation, diagnostics, status, and configuration information

- Provides Command Line Interface from the console port using a VT-100 terminal
- Supports SNTP
- Event / Error Log

Quality of Service

- L2/L3/L4Traffic Classification/Priority Management
- CoS by IEEE 802.1p 4 priority queues control
- Traffic Classification/Priority Management based on IP Precedence/TOS & DSCP/TOS
- Traffic Classification/Priority Management based on TCP/UDP port number
- Supports WRR for priority queues
- Strict scheduling for priority queue
- Rate Limiting (Ingress & Egress based)
- Supports DiffServ*
- Supports Random Early Detection (RED)
- Hot insertion and removal of stacking units
- Close Loop Stacking
- VLAN Membership across the stack
- Single IP address for management
- Trunking across the stack
- Packet Priority across the stack
- Port mirroring across stack

Mechanical

- Dimensions: 440mm x 324mm x 43mm (17.37" x 12.76" x 1.7")
- LED indicators: Port, Uplink, System, Diagnostic, Stack/Master

Performance

- Switch Fabric: 8.8 Gbps
- MAC address: 8K

Power Requirements

- NominalAC Input Voltages: 110-240V
- DC Input Voltage: 12V
- Line Input Frequency: 47-63 Hz
- Maximum Power Consumption: 35W

Safety

- CSA/NRTL (UL1950, CSA 22.2.9.50)
- TUV/GS (EN60950)

Electromagnetic Compatibility

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

IEEE Standards

- IEEE 802.3 10BASE-T
- IEEE 802.3u 100BASE-TX and 100BASE-FX
- IEEE 802.3z[3] 1000BASE-SX
- IEEE 802.3ab 1000BASE-T
- IEEE 802.ad Link Aggregation
- IEEE 802.3x flow control support
- IEEE 802.1p Priority support
- IEEE 802.3ac frame extension for VLAN tagging
- IEEE 802.1D (Bridging), 1993
- IEEE 802.1Q (Virtual LAN) 1998
- IEEE 802.1w Rapid Spanning Tree
- IEEE 802 1s Multiple Spanning Tree*
- IEEE 802 1x Port based security Management

Environmental

- Temperature:
- IEC 68-2-14
- 0 to 50 degrees C (Standard Operating)
- -40 to 70 degree C (Non-operating)
- Humidity: 10% to 90% (Non-condensing)
- Vibration: IEC 68-2-36, IEC 68-2-6
- Shock: IEC 68-2-29
- Drop: IEC 68-2-32

* future specification

Datasheet

Ordering Info

MR2228-S2C	24 - ports 10/100BASE-T (RJ-45) and two Combo Gigabit ports each comprised of a RJ-45 and a SFP for uplink and two 1000BASE-T ports for stacking.
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
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.
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