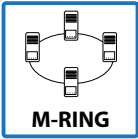
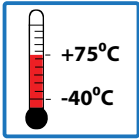
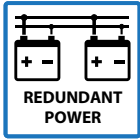


**HARDENED LAYER-3 IEC 61850-3 MODULAR 28-PORT RACK MOUNT
 MANAGED GIGABIT ETHERNET SWITCH WITH 4 SLOTS**

MANAGED ETHERNET SWITCH
FEATURES

- Designed for power substation / Railway application and fully compliant with the requirement of IEC 61850-3 and IEEE 1613
- Modular design makes network planning easy
- Supports Layer 3 static routing, RIP and VRRP function
- Supports M-Ring (recovery time < 30ms over 250 units of connection) and MSTP (RSTP/STP compatible) for Ethernet Redundancy
- Open-Ring supports the other vendor's ring technology in open architecture
- M-Chain allows multiple redundant network rings
- Supports standard IEC 62439-2 MRP (Media Redundancy Protocol) function
- Supports IEEE 1588v2 clock Synchronization
- Supports IPV6 new internet protocol version
- Supports Modbus TCP protocol
- VLAN unaware : Supports priority-tagged frames to be received by specific IEDs
- Supports HTTPS/SSH protocol to enhance network security
- Supports IEEE 802.3az Energy-Efficient Ethernet technology
- Supports SMTP client and NTP server protocol
- Supports IP-based bandwidth management
- Supports application-based QoS management
- Supports Device Binding security function
- Supports DOS/DDOS auto prevention
- IGMP v2/v3 (IGMP snooping support) for filtering multicast traffic
- Supports SNMP v1/v2c/v3 & RMON & 802.1Q VLAN Network Management
- Supports port mirror function to monitor port data
- Support ACL, TACACS+ and 802.1x User Authentication for security
- Supports 9.6K Bytes Jumbo Frame
- Multiple notification for warning of unexpected event
- Web-based ,Telnet, Console (CLI), and Windows utility (SpectraVision) configuration
- Support for LLDP Protocol
- Supports CB1J backup unit to quickly backup/restore device configurations via RJ-45 console port
- Supports redundant power inputs with optional voltage range
- 19 inches rack mountable design

DESCRIPTION

Meridian's MS28GM4L3 is a modular 28-port managed redundant ring Layer 3 Ethernet switch with 4 slots for plug-in signal modules.

The switch is designed for power substation application and rolling stock application, fully compliant with the requirement of IEC 61850-3 and IEEE 1613.

Using its M-Ring fast recover technology (recovery time <30ms over 250 units of connection) and MSTP (RSTP/STP compatible), this switch can easily protect your mission critical applications from network interruptions or temporary outages.

This switch features extended operating temperatures of -40° to +75°C for 1Gig interfaces and -20° to +65°C when using the 10Gig SFP module.

MS28GM4L3 can also be managed by SpectraVision, Except the Web-based interface, Telnet and console (CLI) configuration.

With its advanced features, the MS28GM4L3 is one of the most reliable choices for your configurable fiber Ethernet system requirements.

- **M-Ring** : Meridian's proprietary redundant ring technology, with recovery time of less than 30 milliseconds and up to 250 nodes. The M-Ring redundant ring technology can protect mission-critical applications from network interruptions or temporary malfunction with fast recovery technology.
- **Open-Ring** : Open-Ring is an enhanced redundancy technology that makes Meridian's switches compatible with other vendor's proprietary redundant ring technologies. It enables Meridian's switches to form a single ring with other vendor's switches. In cases where the ring is setup using proprietary technology, Meridian offers a compatibility service where Meridian can make its switches compatible with your particular network requirements.
- **M-Chain** : The revolutionary network redundancy technology that provides the add-on network redundancy topology for any backbone network, M-Chain allows multiple redundant network rings of different redundancy protocols to join and function together as a larger and more robust compound network topology. M-Chain providing ease-of-use while maximizing fault-recovery swiftness, flexibility, compatibility, and cost-effectiveness in one set of network redundancy topology.
- **MRP** : Media Redundancy Protocol (MRP) is a data network protocol standardized by the IEC 62439-2. It allows rings of Ethernet switches to overcome any single failure with recovery time much faster than achievable with Spanning Tree Protocol.
- **IP-based Bandwidth Management** : The switch provides advanced IP-based bandwidth management which can limit the maximum bandwidth for each IP device. The user can allocate more bandwidth to certain inputs such as those from IP cameras and NVRs while limiting the bandwidth to other, lower speed channels.
- **Application-Based QoS** : The switch also support application-based QoS. Application-based QoS can set highest priority for data stream according to TCP/UDP port number.
- **Device Binding Function** : Meridian special Device Binding function can only permit allowed IP address with MAC address to access the network. Hacker cannot access the IP surveillance network without permission. It can avoid hacker from stealing video privacy data and attacking IP camera, NVR and controllers.
- **Advanced DOS/DDOS Auto Prevention** : The switch also provides advanced DOS/DDOS auto prevention. If there is any incremental excessive IP data flow the switch will lock out the source IP address for a period of time to mitigate the perceived network penetration. It has hardware based prevention so it can prevent DOS/DDOS attack immediately and completely.
- **Modbus TCP** : This is a Modbus variant used for communications over TCP/IP networks.
- **IEEE 802.3az Energy-Efficient Ethernet** : This is a set of enhancements to the twisted-pair and backplane Ethernet family of networking standards that will allow for less power consumption during periods of low data activity. The intention was to reduce power consumption by 50% or more.
- **IEEE 1588v2 Technology** : The IEEE 1588v2 technology can fulfill precision time synchronization requirements for protection and control applications.
- **Modular Design** : The switch's modular design allows greater network flexibility by providing various Ethernet/Optical plug-in modules for improved switch configurations.

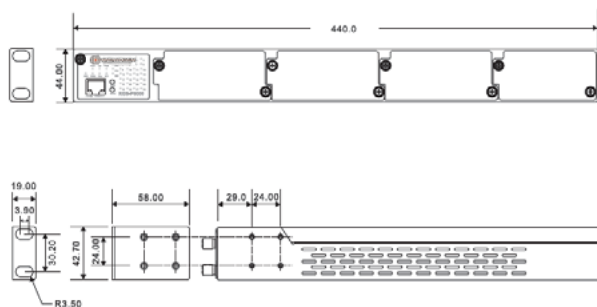
SPECIFICATIONS

Physical Ports			
Slot Number	4 (up to 3 slots for 8x1G ports and 1 slot for 4x10G port)	Jumbo Frames	Up to 9.6K Bytes
Technology		Network Redundancy	M-Ring, Open-Ring, M-Chain, MRP, MSTP (RSTP/STP compatible)
Ethernet Standards	IEEE 802.3 for 10Base-T IEEE 802.3u for 100Base-TX and 100Base-FX IEEE 802.3ab for 1000Base-T IEEE 802.3z for 1000Base-X IEEE 802.3ae for 10Gigabit Ethernet IEEE 802.3x for Flow control IEEE 802.3ad for LACP (Link Aggregation Control Protocol) IEEE 802.1p for COS (Class of Service) IEEE 802.1Q for VLAN Tagging IEEE 802.1w for RSTP (Rapid Spanning Tree Protocol) IEEE 802.1s for MSTP (Multiple Spanning Tree Protocol) IEEE 802.1x for Authentication IEEE 802.1AB for LLDP (Link Layer Discovery Protocol)	Switch Properties	Switching latency: 7 us Switching bandwidth: 128Gbps Max. Number of Available VLANs: 256 IGMP multicast groups: 128 for each VLAN Port rate limiting: User Define
MAC Table	32k MAC addresses	RS-232 Serial Console Port	RS-232 in RJ-45 connector with console cable. 115200 bps, 8, N, 1
Packet Buffer	32Mbits	Security Features	Device Binding security feature Enable/disable ports, MAC based port security Port based network access control (802.1x) Single 802.1x and Multiple 802.1x MAC-based authentication QoS assignment Guest VLAN, MAC address limit TACACS+ VLAN (802.1Q) to segregate and secure network traffic Radius centralized password management SNMPv3 encrypted authentication and access security Https / SSH enhance network security Web and CLI authentication and authorization Authorization (15 levels) IP source guard NTP server
Flash Memory	128Mbits		
DRAM Size	1Gbits		
Processing	Store-and-Forward		
Priority Queues	8		

SPECIFICATIONS

Software Features	Hardware routing, RIP and static routing IEEE 1588v2 clock synchronization IEEE 802.1D Bridge, auto MAC address learning/aging and MAC address (static) Multiple Registration Protocol (MRP) MSTP (RSTP/STP compatible) Redundant Ring (M-Ring) with recovery time less than 30ms over 250 units TOS/Diffserv supported Quality of Service (802.1p) for real-time traffic VLAN (802.1Q) with VLAN tagging IGMP v2/v3 Snooping IP-based bandwidth management Application-based QoS management DOS/DDOS auto prevention Port configuration, status, statistics, monitoring, security DHCP Server/Client, DHCP Relay, Modbus TCP, DNS client proxy, SMTP Client	Smart LED Display system Link/Act(LK/ACT) / Speed(SPD) / Duplex(FDX) / Remote (RMT) green LED indicator x 4 Mode select Button (MODE) : Link/Act(LK/ACT) / Speed(SPD) / Duplex(FDX) / Remote (RMT) mode select button Port 1 ~ 28 Link/Act(LK/ACT) LED show : Green x 28
Fault contact		
Relay	Relay output to carry capacity of 1A at 24VDC	
Power		
Redundant Input Power	Dual 88~264 VAC / 100~370 VDC power inputs at terminal block	
Power Consumption (Typ.)	43.5 Watts max.	
Overload Current Protection	Yes	
Physical Characteristic		
Enclosure	19-inch rack-mountable	
Dimension (W x D x H)	440 (W) x 325 (D) x 44 (H) mm (17.32 x 12.8 x 1.73 inches)	
Weight (g)	6600 g (14.3 lb)	
Environmental		
Storage Temperature	-40 to 85°C (-40 to 185°F)	
Operating Temperature	10G SFP+ module absent : -40 to 75°C (-40 to 167°F) 10G SFP+ module present : -20 to 65 °C (-4 to 149°F)	
Operating Humidity	5% to 95% Non-condensing	
Regulatory approvals		
Power Automation	IEC 61850-3, IEEE 1613	
EMI	FCC Part 15, CISPR (EN55022) class A, EN50155 (EN50121-3-2, EN55011, EN50121-4)	
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11	

LED Indicators	
Power Indicator (PWR)	Green : Indicates that the system ready. The LED is blinking when the system is upgrading firmware
Power Indicator (PWR1 / PWR2)	Green : Power LED x 2
Ring Master Indicator (R.M.)	Green : Indicates that the system is operating in M-Ring Master mode
M-Ring Indicator (Ring)	Green : System is operating in M-Ring Master mode Green Blinking : Ring is broken
Fault Indicator (Fault)	Amber : Indicate unexpected event occurred
Reset To Default Running Indicator (DEF)	Green : System resets to default configuration
Supervisor Login Indicator (RMT)	Green : System is accessed remotely





UNIT = mm







Ordering Information			Packing List	
	Part Number	Description		
Model	MS28GM4L3	Hardened Layer-3 IEC 61850-3 modular 28-port rack mount managed Gigabit Ethernet switch with 4 slots, high-voltage power input - Dual 88~264 VAC / 100~370 VDC, US power cord	Modular rack mount switch	1
SpectraVISION Software	Consult factory for pricing and availability		M-Ring Tool CD	1
			Quick Installation Guide	1
			Rack-Mount Kit	1
			Console Cable	1

OPTIONAL MODULES

10G MODULES

	PART NUMBER	FIBER MODE	MAX DISTANCE	DESCRIPTION
	MP2PX2	SFP DEPENDENT	SFP DEPENDENT	Industrial 2-port 10G SFP+ module with 2x10GBase-X, SFP+ socket
	MP4PX4	SFP DEPENDENT	SFP DEPENDENT	Industrial 4-port 10G SFP+ module with 4x10GBase-X, SFP+ ports

1G MODULES

	MP8GT8	NA	NA	Industrial 8-port Gigabit Ethernet switch module with 8x10/100/1000Base-T(X) ports
	MP4GX4	SFP DEPENDENT	SFP DEPENDENT	Industrial 4-port Gigabit fiber module with 4x100/1000Base-X, SFP socket, for 4th slot
	MP8GX8	SFP DEPENDENT	SFP DEPENDENT	Industrial 8-port Gigabit fiber module with 8x100/1000Base-X, SFP socket
	MP4GS4SC	SINGLE-MODE	10 Km	Industrial 4-port Gigabit fiber module with 4x1000Base-FX, Single-mode, SC Fiber ports
	MP4GM4SC	MULTIMODE	550 m	Industrial 4-port Gigabit fiber module with 4x1000Base-FX, Multimode, SC Fiber ports
	MP4GS4ST	SINGLE-MODE	10 Km	Industrial 4-port Gigabit fiber module with 4x1000Base-FX, Single-mode, ST Fiber ports
	MP4GM4ST	MULTIMODE	550 m	Industrial 4-port Gigabit fiber module with 4x1000Base-FX, Multimode, ST Fiber ports
	MP4GS4LC	SINGLE-MODE	10 Km	Industrial 4-port Gigabit fiber module with 4x1000Base-FX, Single-mode, LC Fiber ports
	MP4GM4LC	MULTIMODE	550 m	Industrial 4-port Gigabit fiber module with 4x1000Base-FX, Multimode, LC Fiber ports

100Base MODULES

	MP4FS4SC	SINGLE-MODE	30 Km	Industrial 4-port Gigabit fiber module with 4x100Base-FX, Single-mode, SC Fiber ports
	MP4FM4SC	MULTIMODE	2 Km	Industrial 4-port Gigabit fiber module with 4x100Base-FX, Multimode, SC Fiber ports
	MP4FS4ST	SINGLE-MODE	30 Km	Industrial 4-port Gigabit fiber module with 4x100Base-FX, Single-mode, ST Fiber ports
	MP4FM4ST	MULTIMODE	2 Km	Industrial 4-port Gigabit fiber module with 4x100Base-FX, Multimode, ST Fiber ports
	MP4FS4LC	SINGLE-MODE	30 Km	Industrial 4-port Gigabit fiber module with 4x100Base-FX, Single-mode, LC Fiber ports
	MP4FM4LC	MULTIMODE	2 Km	Industrial 4-port Gigabit fiber module with 4x100Base-FX, Multimode, LC Fiber ports