MultiLink™

HARDENED ETHERNET SWITCHES

Ethernet Communications for Industrial Automation, Power Utility, and Traffic Control Markets

KEY BENEFITS

- Physically hardened and environmentally ruggedized for reliability in harsh environments
- Harsh chemical environment option available for circumstances that are corrosive or otherwise damaging to electronic equipment
- Enables cyber protection and network integrity with advanced security features
- Forensic auditing of activities and changes using event logging
- Flexible options for Ethernet port and media types allow integration into any project requirement
- Supports intelligent traffic planning and integration with network management systems using a complete set of Ethernet switch management functions
- Support for high speed recovery of redundant LANs for mission-critical applications
- Simple, powerful, and easy configuration using web management software
- Fully supported and viewable using EnerVista™ Viewpoint Monitoring

APPLICATIONS

- Safely and reliably extends Ethernet networks to harsh production environments for utility and industrial applications
- Allows critical devices to be managed, analyzed, or controlled from a single location
- Enables high speed, redundant connections to GE Universal Relays

FEATURES

Managed Networks

- Supports SNMPv3, with full backwards compatibility for v1 and v2
- Traffic segregation and prioritization control via IEEE® 802.1p and IEEE 802.1Q
- Hardware and software alarm contacts for detection of critical network or switch events
- Fully integrates with Viewpoint Monitoring software

Ease-Of-Use

- Support for industrial protocols (e.g. Modbus®)
- IP out-of-the-box for easy installation and initial setup
- Simple but powerful web management interface for all configuration functions

Industrially Hardened

- UL® listed/CE agency approved
- IEC® 61850 and IEEE 1613 approval for operation in electric substation environments
- Redundant and mixed power supply options for increased reliability
- Harsh chemical environment options ensures product function and viability
- RoHS (Reduction of Hazardous Substances) compliant

Secure

- Secure management via SSL
- Port security prevents unauthorized devices from gaining access to the network
- Multi-level passwords with levels of privilege and command for different users or groups
- Complete event logging for forensic and regulatory auditing and reporting

Ethernet Switches Designed for the Unique Needs of Critical Infrastructures

Designed for the Needs of Protective Relaying

The MultiLink Ethernet Switches have been designed for the specific requirements of devices used in utility and industrial environments, such as protective relays. MultiLink Ethernet Switches support many unique features that allow for full redundancy under network fault conditions.

Link Loss Alert

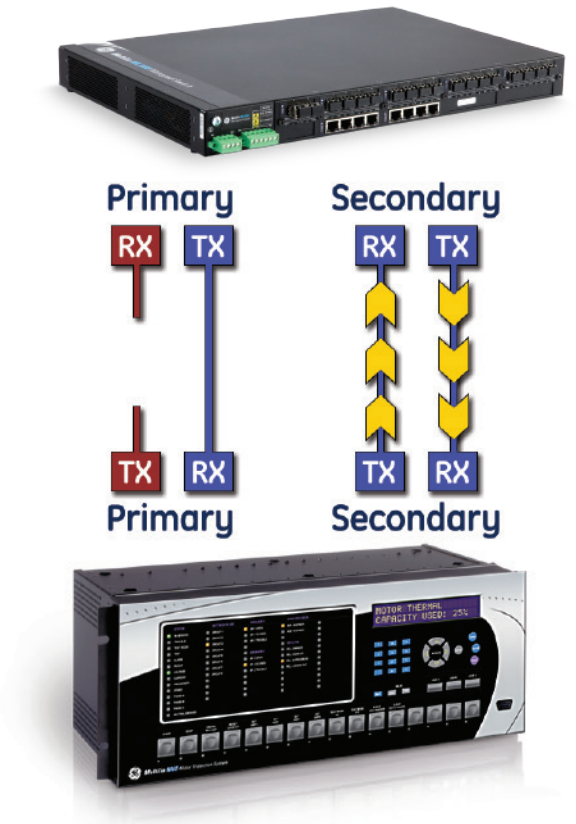
The MultiLink Ethernet Switch family's Link Loss Alert feature allows for protective relays to recover from situations where only one of the fiber cables connected to the relay is damaged. The Link Loss Alert feature works with both 10Mbit and 100Mbit fiber ports of GE's Multilin™ Universal Relay, and allows for seamless switching to the relay's secondary port under all network fault conditions.

Modbus Protocol Support

Identifying network communication problems and retrieving network statistics from the MultiLink Ethernet Switches can now be achieved in SCADA or DCS systems through the use of the supported Modbus TCP/IP protocol. Modbus is a protocol supported by most Human Machine Interfaces and PLC's and can therefore be integrated into existing systems without having to invest in additional SNMP or other Network Management Software.

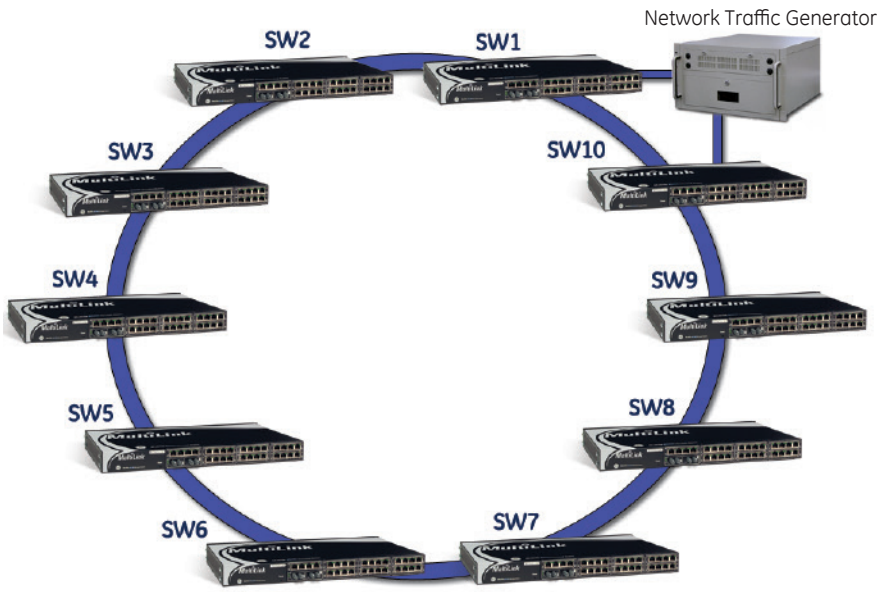
Enhanced High Speed Recovery of Redundant Ring Networks

The unique requirements of the Protection and Control Industry require Ethernet networks to be more reliable and to recover from network problems faster than is generally accepted in other commercially available equipment. The MultiLink Ethernet Switch's SMART RSTP feature allows for recovery from faults in ring network architectures in less than 5 milliseconds per switch in the network – 10 times faster than generally available in standard Ethernet switches.



Link Loss Alert allows recovery from a broken fiber connection in both 10Mbit and 100Mbit applications.

Network Fault Recovery Using MultiLink Ethernet Switches



Example of network fault recovery testing using MultiLink SMART RSTP in a ring network architecture.

Fault Between Switches	Recovery Time Per Switch (Hop)
SW1-SW2	1.90 ms
SW2-SW3	2.12 ms
SW3-SW4	2.11 ms
SW4-SW5	2.29 ms
SW5-SW6	1.95 ms
SW6-SW7	2.06 ms
SW7-SW8	2.18 ms
SW8-SW9	1.82 ms
SW9-SW10	2.27 ms
SW10-SW1	0.00 ms

Network recovery times.

Robust Ethernet Switches for Providing Secure and Reliable Networks

Ideal for Harsh Environments

GE's MultiLink Ethernet Switches have been tested and certified to meet the same rigorous environmental standards as all of our protection relays and meters.

- Operating temperature -40°C to +85°C without fans
- Type tested to IEC 61850-3, IEEE 1613 Class 2, NEBS level 3 substation requirements
- IP40 Rated
- Dual power supply option with the ability to mix the input sources used (i.e. 48 VDC and 125 VDC)

Enhanced Security

The MultiLink family of Ethernet Switches have implemented the most advanced techniques available for providing security in network communications including:

- SNMP v1/v2/v3 supplying secure access to network devices through authentication, and encryption
- Imbedded RADIUS and TACACS+ security for remote access and password verification
- SSL web encryption preventing eavesdropping, tampering or message forgery
- Port security through the disabling of packets from unauthorized MAC addresses
- Logging of events and sending email notification of unauthorized access attempts

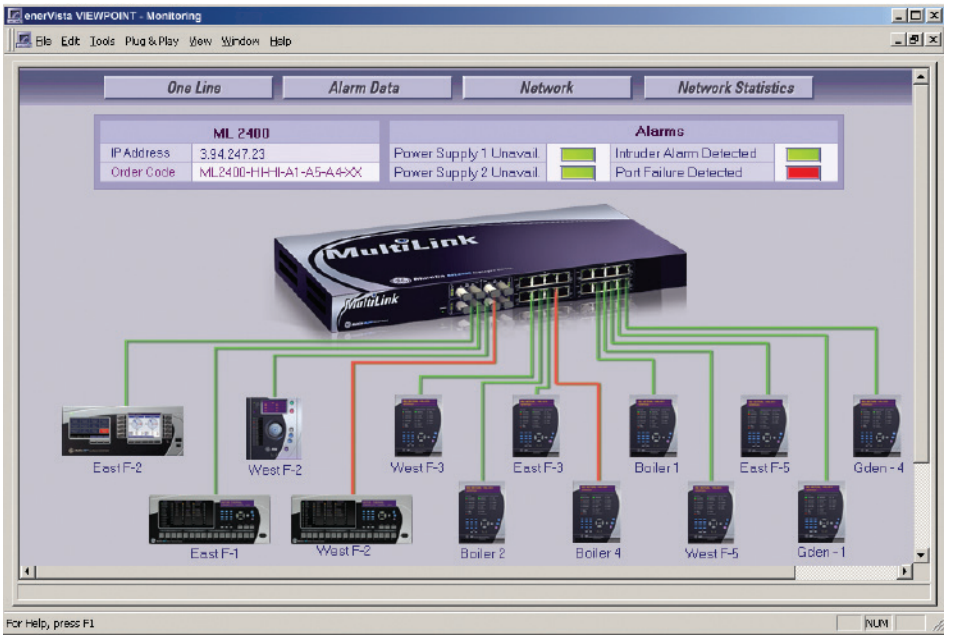
Full Network Management Capabilities

The MultiLink Ethernet Switches support most 802.1 network management features and are configurable using the Command Line Interface (CLI) and through our web management interface. Management functionality includes:

- SNMPv3 for secure configuration of network switches
- Full support of the CLI commands
- Web management interface for user-friendly configuration and monitoring
- RSTP (802.1w) industry standard method for providing recovery of redundant networks
- SMART RSTP (ring only mode) for enhanced fast recovery (<5ms/hop) of ring architecture networks
- RMON for monitoring of network status and statistics
- VLAN (802.1Q) providing the ability of segregating the network into smaller virtual networks (up to 256)
- QoS- (802.1Q) for prioritization of network traffic
- Port mirroring, assisting network troubleshooting
- IGMP snooping, enabling reductions in multicast traffic
- SNTP for synchronizing the switch's internal clock
- SMTP providing email notification when problems in the network have occurred
- Event logs creating a historical record of events occurring on the network
- IPv6 support, allowing for more addressable devices in a network

EnerVista Viewpoint Monitoring and Integrator Supported

The MultiLink Ethernet Switches are fully supported by the EnerVista Viewpoint Monitoring and Integrator software packages, allowing integration of LAN status, network alarm problems, and security alerts into your monitoring and control system.



EnerVista Viewpoint Monitoring provides monitoring of the status of all network ports, indication of network problems and alarming of unauthorized network access attempts.

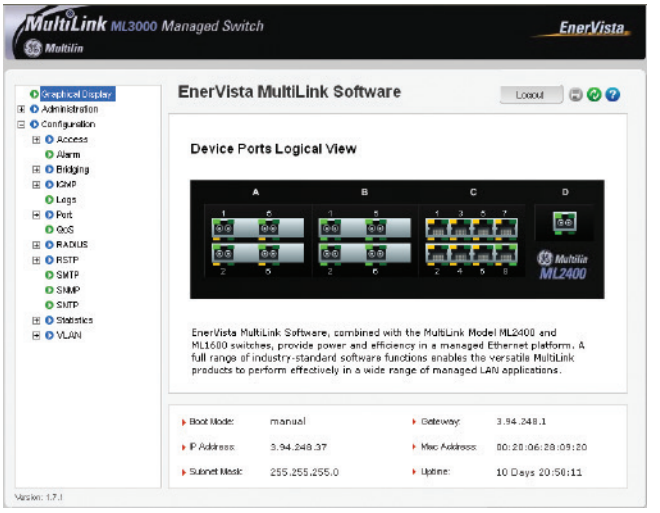
EnerVista Web Interface Provides User-Friendly Configuration and Network Monitoring

Easy-to-Use Web Configuration and Reporting Software

The EnerVista Web configuration software allows programming of all settings in the MultiLink Ethernet Switches using a simple web browser. Accessible by typing the pre-configured IP address of your switch into the address bar of a web browser, the user-friendly graphical interface allows for easy navigation, monitoring and configuration through simple point and click operations.

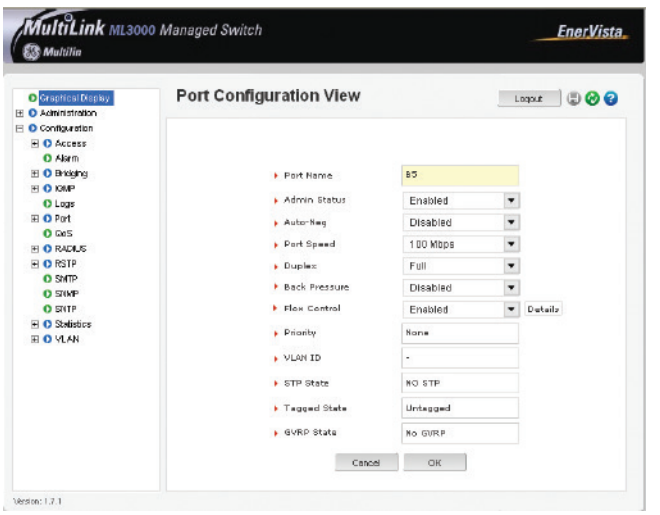
Communication Status & Port Navigation

- Instant graphical indication of the status of all communication ports
- Identify the configuration of all communication parameters
- The ability to click on any of the shown Ethernet terminals to jump immediately to the settings screen for that port



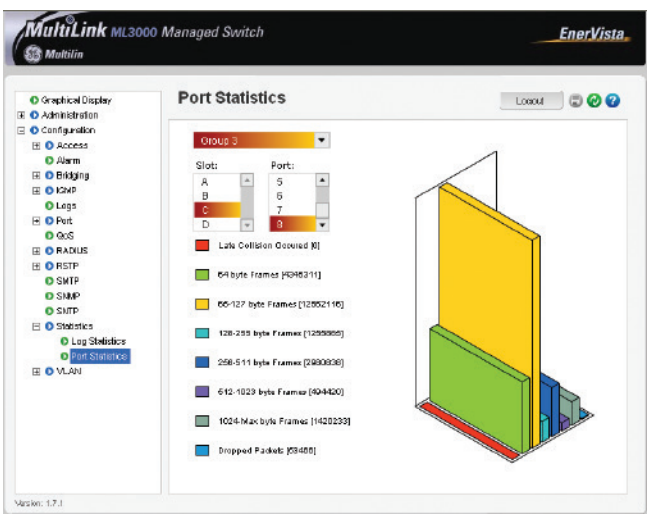
Intuitive Menu-Driven Configuration

- Navigate through configuration screens using an easy to understand categorized menu tree
- Configure all settings using menu-driven pull-down fields
- Program alarm triggers by selecting from a list of all possible conditions
- Eliminate the need to memorize any CLI commands



Powerful Troubleshooting Statistics

- Monitor traffic statistics using intuitive bar graph representations
- Identify the amount and type of traffic sent and received through each port of the switch
- Simplify troubleshooting by identifying the number of CRC errors, collisions, and dropped packets occurring on each port
- Clear and restart the capturing of port statistics to allow for the troubleshooting of specific network problems



Managed Switches

The MultiLink ML3000 Series, ML2400, ML1600, ML1200, ML810 and ML800 Managed Ethernet Switches provide extremely reliable networks with very fast reconfiguration times for recovering from faults occurring in the network. The complete set of network management functions available provides the configurability and monitoring capability needed for most applications, while the high level of security features available ensures your network is protected from tampering or illegal access.

ML3000 Series

ML3000 Series supports (model dependent):
Up to 32 ports 10/100 Mbit copper RJ45
Up to 16 ports 10 or 100 Mbit fiber
Up to 8 ports GigE fiber or copper
Up to 18 fiber ports depending on configuration
1588v2 timing
Redundant power supplies
Field replaceable power supply models available

ML2400

ML2400 supports:
Up to 32 ports 10/100 Mbit copper RJ45
Up to 16 ports 10/100 Mbit ST or SC fiber
Up to 12 ports 100 Mbit LC or MTRJ fiber
Up to 8 ports Gbit fiber or copper RJ45
Optional redundant power supply

ML1600

ML1600 supports:
16 ports 10/100 Mbit copper RJ45
8 ports 10 or 100 Mbit ST or SC fiber
12 ports 100 Mbit LC or MTRJ fiber
4 ports 1 Gbit fiber or copper RJ45
High voltage AC/DC power supplies

ML1200

ML1200 supports:
12 ports 10/100 Mbit copper RJ45
4 ports 10 or 100 Mbit ST or SC fiber
8 ports 100 Mbit LC or MTRJ fiber
2 ports 1 Gbit fiber or copper RJ45
Low, medium, and high voltage DC power supply

ML810

ML810 supports:
8 ports 10/100 Mbit copper RJ45
4 ports LC, ST, SC or MTRJ fiber
2 ports 1 Gbit fiber or copper RJ45

ML800

ML800 supports:
Up to 8 ports 10/100 Mbit copper RJ45
Up to 2 Gbit ports fiber or copper RJ45
Up to 3 ports LC, or MTRJ fiber

Unmanaged Compact Switch

The ML600 Unmanaged Ethernet Switch provides the ability to connect remote sites or stations that contain few Ethernet devices to your local network in a cost effective manner. The ML600 can be configured with several different port configurations allowing for use with many different device types and can be connected to other Ethernet switches, forming a ring architecture that provides redundancy throughout your critical networks.

ML600

ML600 supports:
6 ports 10/100 Mbit copper RJ45
2 ports 100 Mbit ST, or SC fiber
High voltage AC power supply

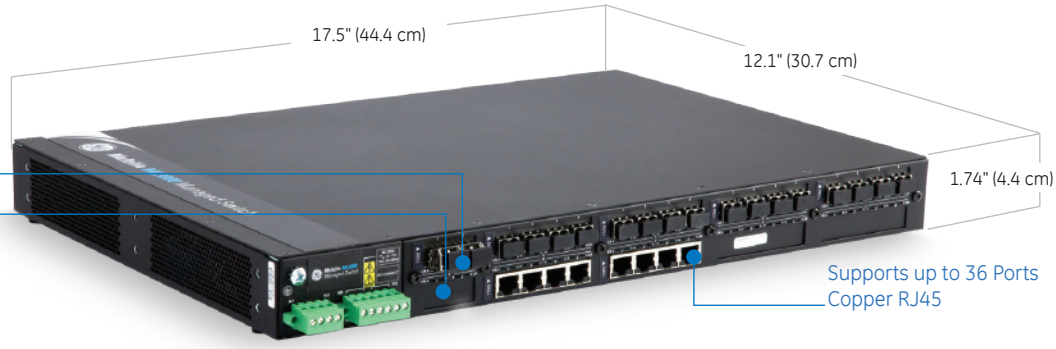
Port Selector Guide

Port Type	Typical Distance	Power Budget
10/100 Mbit RJ45 Copper	100 m	N/A
10 Mbit Multimode ST Fiber Optic	2 km	17 dB
100 Mbit Multimode ST Fiber Optic	2 km	14 dB
100 Mbit Multimode SC Fiber Optic	2 km	14 dB
100 Mbit Singlemode SC Fiber Optic	20 km	17.5 dB
100 Mbit Singlemode SC Fiber Optic	40 km	17.5 dB
100 Mbit Multimode LC Fiber Optic	2 km	14 dB
100 Mbit Singlemode LC Fiber Optic	15 km	17.5 dB
100 Mbit Multimode MTRJ Fiber Optic	2 km	14 dB
1 Gbit RJ45 Copper	100 m	N/A
1 Gbit Multimode SC Fiber Optic	2 km	12.5 dB
1 Gbit Singlemode 1310nm SC Fiber Optic	10 km	10.5 dB
1 Gbit Singlemode 1310nm SC Fiber Optic	25 km	17.5 dB
1 Gbit Singlemode 1550nm SC Fiber Optic	40 km	17.5 dB
1 Gbit Singlemode 1550nm SC Fiber Optic	70 km	20.5 dB
100 Mbit Multimode MTRJ Fiber Optic	2 km	15.8 dB

ML3000 Series

Supports up to 16, 10 or 100Mbit, ST, SC, LC or MTRJ Fiber Ports

Supports up to 8 Ports Gigabit Copper or Fiber and 1588v2 Timing



Ordering

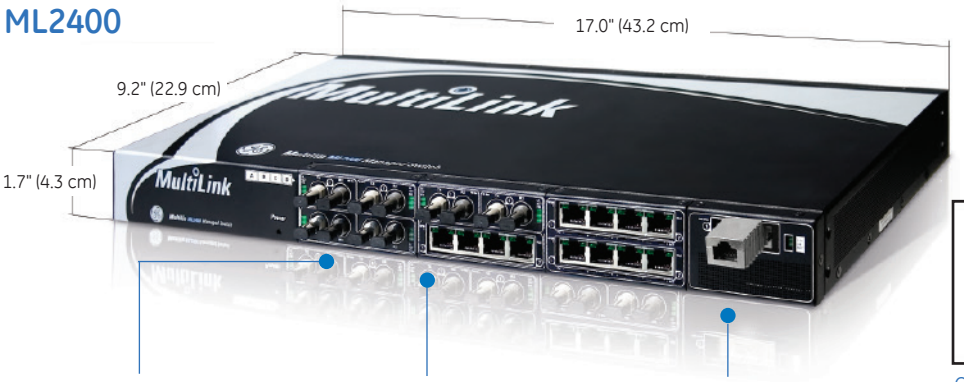
			GigE				10 or 100Mbps								
			1	2	3	4	5	6	7	8	9	10			
ML3000	*	**	*	*	*	*	*	*	*	*	*	*	*	**ML3000 Chassis with Fixed Power Supplies**	
Mounting	F													Front Mounted Ports	
	B													Rear Mounted Ports	
Power Supply		HX												Single Integrated 90 to 250V AC/DC Power Supply	
		HH												Dual Integrated 90 to 250V AC/DC Power Supplies	
		LX												Single Integrated 22 to 60 VDC Power Supply	
		LL												Dual Integrated 22 to 60 VDC Power Supplies	
		P1												Single Integrated 22 to 60 VDC Power Supply with PoE Support	
		P2												Dual Integrated 22 to 60 VDC Power Supply with PoE Support	
		HL												Combination of a 90 to 250V AC/DC and a 22 to 60 VDC Power Supply	
Gigabit			A	A										2 x 1000 Mbits RJ45 Fixed Ports	
			B	B										2 x 1000 Mbit SFP, LC Connector, Multimode Fiber, 550m	
			C	C										2 x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 2km	
			D	D										2 x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 10km	
			E	E										2 x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 25km	
			F	F										2 x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 40km	
			G	G										2 x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 70km	
			H	H										2 x 1000 Mbit SFP Ports (No Transceivers) Empty Cage	
			J	J										2x 1000 Mbit RJ-45 Fixed Ports with 1588 Timing	
			K	K										2x 1000 Mbit SFP, LC Connector, Multimode Fiber, 550m with 1588 Timing	
			L	L										2x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 2km with 1588 Timing	
			M	M										2x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 10km with 1588 Timing	
			N	N										2x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 25km with 1588 Timing	
			P	P										2x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 40km with 1588 Timing	
			Q	Q										2x 1000 Mbit SFP, LC Connector, Singlemode Fiber, 70km with 1588 Timing	
			R	R										2x 1000 Mbit SFP ports (no transceivers) empty cage with 1588 Timing	
			X	X										None	
100Mbps					A	A	A	A	A	A	A	A		4 x 10/100 Mbit - RJ45 Copper	
					B	B	B	B	B	B	B	B		4 x 10/100 Mbit - RJ45 Copper with PoE*	
					C	C	C	C	C	C	C	C		4 x 10/100 Mbit - RJ45 Copper with PoE+*	
					D	D	D	D	D	D	D	D		2 x 10Mbit - ST	
					E	E	E	E	E	E	E	E		2 x 100Mbit - ST Multimode Fiber	
					F	F	F	F	F	F	F	F		2 x 100Mbit - SC Multimode Fiber	
					G	G	G	G	G	G	G	G		4 x 100Mbit - LC Multimode Fiber	
					H	H	H	H	H	H	H	H		4 x 100Mbit - MTRJ Multimode Fiber	
					J	J	J	J	J	J	J	J		2 x 100Mbit - SC Singlemode Fiber 20km	
					K	K	K	K	K	K	K	K		4 x 100Mbit - LC Singlemode Fiber 20km	
					L	L	L	L	L	L	L	L		2 x 100Mbit - SC Singlemode Fiber 40km	
					M	M	M	M	M	M	M	M		4 x 100Mbit - LC Singlemode Fiber 40km	
					N	N	N	N	N	N	N	N		4 x 100Mbit SFP Ports (No Transceivers) Empty Cage	
					P	P	P	P	P	P	P	P		4x 10/100 Mbit - RJ45 Copper with 1588 Timing	
					Q	Q	Q	Q	Q	Q	Q	Q		2x 100Mbit - ST Multimode Fiber with 1588 Timing	
					R	R	R	R	R	R	R	R		2x 100Mbit - SC Multimode Fiber with 1588 Timing	
					S	S	S	S	S	S	S	S		4x 100Mbit - LC Multimode Fiber with 1588 Timing	
					T	T	T	T	T	T	T	T		4x 100Mbit - MTRJ Multimode Fiber with 1588 Timing	
					U	U	U	U	U	U	U	U		4x 100Mbit - LC Singlemode Fiber 20km with 1588 Timing	
					W	W	W	W	W	W	W	W		2x 100Mbit - ST Singlemode Fiber 20km with 1588 Timing	
					Y	Y	Y	Y	Y	Y	Y	Y		2x 100Mbit - SC Singlemode Fiber 20km with 1588 Timing	
					Z	Z	Z	Z	Z	Z	Z	Z		4x 100Mbit - LC Singlemode Fiber 40km with 1588 Timing	
					X	X	X	X	X	X	X	X		None	
Coating													X	None	
													H	Harsh Chemical Environment Conformal Coating	

			GigE				100Mbps					
			1	2	3	4	5	6	7	8		
ML3100	*	**	*	*	*	*	*	*	*	*	*	**ML3100 Chassis with Integrated Power Supplies**
Mounting	F											Front Mounted Ports
	B											Rear Mounted Ports
Power Supply		HX										Single Integrated 90 to 250V AC/DC Power Supply
		HH										Dual Integrated 90 to 250V AC/DC Power Supplies
		LX										Single Integrated 22 to 60 VDC Power Supply
		LL										Dual Integrated 22 to 60 VDC Power Supplies
		P1										Single Integrated 22 to 60 VDC Power Supply with PoE Support
		P2										Dual Integrated 22 to 60 VDC Power Supply with PoE Support
		HL										Combination of a 90 to 250V AC/DC and a 22 to 60 VDC Power Supply
Gigabit			A	A	A	A						2 x 1000 RJ45 or SFP Combo Ports, Ports are Auto-Detect, No SFT Transceivers, with 1588 Timing
			B	B	B	B						2 x 1000 RJ45 or SFP Combo Ports, Populated with 2 x SFP Multimode Fiber, 550m , with 1588 Timing
			C	C	C	C						2 x 1000 RJ45 or SFP Combo Ports, Populated with 2 x SFP Singlemode Fiber, 2km, with 1588 Timing
			D	D	D	D						2 x 1000 RJ45 or SFP Combo Ports, Populated with 2 x SFP Singlemode Fiber, 10km, with 1588 Timing
			E	E	E	E						2 x 1000 RJ45 or SFP Combo Ports, Populated with 2 x SFP Singlemode Fiber, 25km, with 1588 Timing
			F	F	F	F						2 x 1000 RJ45 or SFP Combo Ports, Populated with 2 x SFP Singlemode Fiber, 40km, with 1588 Timing
			G	G	G	G						2 x 1000 RJ45 or SFP Combo Ports, Populated with 2 x SFP Singlemode Fiber, 70km, with 1588 Timing
			X	X	X	X						None
100Mbps							A	A	A	A		4 x 10/100Mbit - RJ45 Copper
							C	C	C	C		4 x 10/100Mbit - RJ45 Copper with PoE+*
							D	D	D	D		2 x 10Mbit - ST
							E	E	E	E		2 x 100Mbit - ST Multimode Fiber
							F	F	F	F		2 x 100Mbit - SC Multimode Fiber
							G	G	G	G		4 x 100Mbit - LC Multimode Fiber
							H	H	H	H		4 x 100Mbit - MTRJ Multimode Fiber
							J	J	J	J		2 x 100Mbit - SC Singlemode Fiber 20km
							K	K	K	K		4 x 100Mbit - LC Singlemode Fiber 20km
							L	L	L	L		2 x 100Mbit - SC Singlemode Fiber 40km
							M	M	M	M		4 x 100Mbit - LC Singlemode Fiber 40km
							N	N	N	N		4 x 100Mbit SFP Ports (No Transceivers) Empty Cage
							P	P	P	P		4 x 10/100Mbit - RJ45 Copper with 1588 Timing
							Q	Q	Q	Q		2 x 100Mbit - ST Multimode Fiber with 1588 Timing
							R	R	R	R		2 x 100Mbit - SC Multimode Fiber with 1588 Timing
							S	S	S	S		4 x 100Mbit - LC Multimode Fiber with 1588 Timing
							T	T	T	T		4 x 100Mbit - MTRJ Multimode Fiber with 1588 Timing
							U	U	U	U		4 x 100Mbit - LC Singlemode Fiber 20km with 1588 Timing
							W	W	W	W		2 x 100Mbit - ST Singlemode Fiber 20km with 1588 Timing
							Y	Y	Y	Y		2 x 100Mbit - SC Singlemode Fiber 20km with 1588 Timing
							Z	Z	Z	Z		4 x 100Mbit - LC Singlemode Fiber 40km with 1588 Timing
							X	X	X	X		None
Environment											X	None
											H	Harsh Chemical Environment Conformal Coating

** The power source of the ML3000 must be in the range of 45-57 VDC for PoE and 52-56 VDC for PoE+. The power source of the ML3100 must be in the range of 52-56 VDC for PoE+. PoE and PoE+ modules are only supported on units ordered with P1 or P2 power supply options.*

Optional field replaceable power supplies are available with models ML3001 and ML3101. Please see online store for the latest module availability.

ML2400



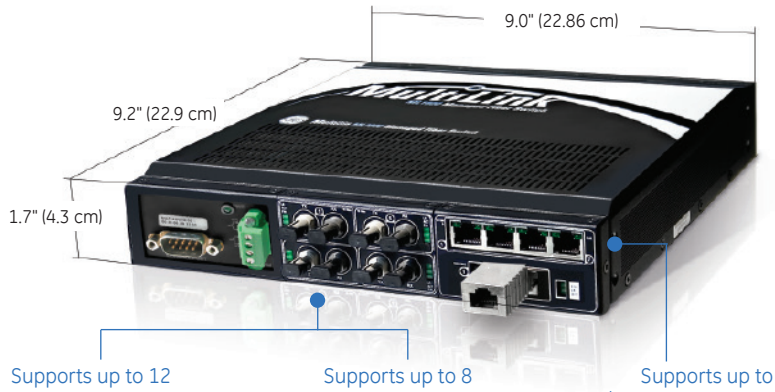
Optional Redundant Power Supply

Ordering

ML2400 - * - ** - ** - ** ** ** ** - *	Base Unit
Module	
Port Mounting	
F	Front Mounted Ports
B	Rear Mounted Ports
Power Supply	
AC	100-240 VAC Power Supply
HI	110-250 VDC/100-240 VAC Power Supply
LO	48 VDC Power Supply
Redundant Power Supply	
XX	No Redundant Power Supply
HI	110-250 VDC/100-240 VAC Power Supply
LO	48 VDC Power Supply
Modules	
A1 A1 A1 A1	4 x 10Mb ST mm Fiber
A2 A2 A2 A2	4 x 100Mb ST mm Fiber
A3 A3 A3 A3	4 x 100Mb SC mm Fiber
A4 A4 A4 A4	8 x 10Mb/100Mb RJ45 Copper
A5 A5 A5 A5	2 x 10Mb ST mm Fiber + 4 x 10/100Mb RJ45 Copper
A6 A6 A6 A6	2 x 100Mb ST mm Fiber + 4 x 10/100Mb RJ45 Copper
A7 A7 A7 A7	2 x 100Mb SC mm Fiber + 4 x 10/100Mb RJ45 Copper
A8 A8 A8 A8	2 x 100Mb SC sm Fiber 20km + 4 x 10/100Mb RJ45 Copper
A9 A9 A9 A9	2 x 100Mb SC sm Fiber 40km + 4 x 10/100Mb RJ45 Copper
AA AA AA AA	4 x 100Mb LC mm Fiber 2km + 4 x 10/100Mb RJ45 Copper
AB AB AB AB	8 x 100Mb LC mm Fiber 2km
AC AC AC AC	4 x 100Mb LC sm Fiber 15km + 4 x 10/100Mb RJ45 Copper
AD AD AD AD	8 x 100Mb LC sm Fiber 15km
AE AE AE AE	2 x 100Mb LC sm Fiber 15km + 6 x 10/100Mb RJ45 Copper
AF AF AF AF	2 x 10Mb ST mm Fiber + 2 x 100Mb ST mm Fiber
AG AG AG AG	2x 10/100Mb RJ45 Copper + 2x 1000Mb SC sm Fiber 70km
AH AH AH AH	8 x 100Mb MTRJ mm 2km
AJ AJ AJ AJ	4 x 10/100Mb RJ45 Copper + 4 x 100Mb MTRJ mm 2km
AK AK AK AK	6 x 10/100Mb RJ45 Copper + 2 x 100Mb MTRJ mm 2km
J1 J1 J1 J1	2x 1000Mb RJ45, Fixed Ports
F1 F1 F1 F1	2x 1000Mb LC mm (550m) SFP
F2 F2 F2 F2	2x 1000Mb LC mm (2km) SFP
F3 F3 F3 F3	2x 1000Mb LC sm (10km) SFP
F4 F4 F4 F4	2x 1000Mb LC sm (25km) SFP
F5 F5 F5 F5	2x 1000Mb LC sm (40km) SFP
F6 F6 F6 F6	2x 1000Mb LC sm (70km) SFP
H1 H1 H1 H1	1x 1000Mb LC mm (550m) SFP
H2 H2 H2 H2	1x 1000Mb LC mm (2km) SFP
H3 H3 H3 H3	1x 1000Mb LC sm (10km) SFP
H4 H4 H4 H4	1x 1000Mb LC sm (25km) SFP
H5 H5 H5 H5	1x 1000Mb LC sm (40km) SFP
H6 H6 H6 H6	1x 1000Mb LC sm (70km) SFP
F7 F7 F7 F7	6x 10/100 copper RJ-45 + 1x 1000Mb LC mm (550m) SFP
F8 F8 F8 F8	6x 10/100 copper RJ-45 + 1x 1000Mb LC mm (2km) SFP
F9 F9 F9 F9	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (10km) SFP
FA FA FA FA	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (25km) SFP
FB FB FB FB	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (40km) SFP
FC FC FC FC	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (70km) SFP
FD FD FD FD	1x 1000Mb RJ45 SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FE FE FE FE	1x 1000Mb LC mm (550m) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FG FG FG FG	1x 1000Mb LC mm (2km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FH FH FH FH	1x 1000Mb LC sm (10km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FJ FJ FJ FJ	1x 1000Mb LC sm (25km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FK FK FK FK	1x 1000Mb LC sm (40km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FM FM FM FM	1x 1000Mb LC sm (70km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
FR FR FR FR	1x 1000Mb RJ45 SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC
FS FS FS FS	1x 1000Mb LC mm (550m) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
FT FT FT FT	1x 1000Mb LC mm (2km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
FV FV FV FV	1x 1000Mb LC sm (10km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
FX FX FX FX	1x 1000Mb LC sm (25km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
FY FY FY FY	1x 1000Mb LC sm (40km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
FZ FZ FZ FZ	1x 1000Mb LC sm (70km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
Harsh Environment	
X	Standard Environment
H	Harsh Chemical Environment Option
Z	RoHS-compliant
Y	RoHS-compliant with Harsh Chemical Environment Coating

Additional modules and configurations available. Please see the Online Store for the latest module availability.

ML1600



Supports up to 12
100 Mbit LC or MTRJ
Fiber Ports

Supports up to 8
10 or 100 Mbit ST, or SC Fiber Ports

Supports up to 16
10/100 Mbit Copper RJ45 Ports

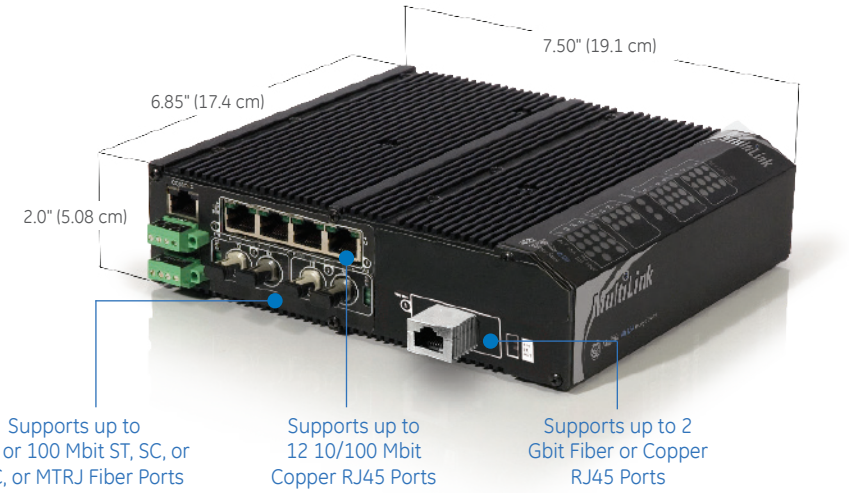
Supports up to 4
Gbit Fiber or Copper RJ45 Ports

Ordering

ML1600 - ** - ** ** - *				Base Unit
Module		A	B	
Power Supply	AC			100-240 VAC Power Supply
	HI			110-250 VDC/100-240 VAC Power Supply
	LO			48 VDC Power Supply
Modules		A1	A1	4 x 10Mb ST mm Fiber
		A2	A2	4 x 100Mb ST mm Fiber
		A3	A3	4 x 100Mb SC mm Fiber
		A4	A4	8 x 10Mb/100Mb RJ45 Copper
		A5	A5	2 x 10Mb ST mm Fiber + 4 x 10/100Mb RJ45 Copper
		A6	A6	2 x 100Mb ST mm Fiber + 4 x 10/100Mb RJ45 Copper
		A7	A7	2 x 100Mb SC mm Fiber + 4 x 10/100Mb RJ45 Copper
		A8	A8	2 x 100Mb SC sm Fiber 20km + 4 x 10/100Mb RJ45 Copper
		A9	A9	2 x 100Mb SC sm Fiber 40km + 4 x 10/100Mb RJ45 Copper
		AA	AA	4 x 100Mb LC mm Fiber 2km + 4 x 10/100Mb RJ45 Copper
		AB	AB	8 x 100Mb LC mm Fiber 2km
		AC	AC	4 x 100Mb LC sm Fiber 15km + 4 x 10/100Mb RJ45 Copper
		AD	AD	8 x 100Mb LC sm Fiber 15km
		AE	AE	2 x 100Mb LC sm Fiber 15km + 6 x 10/100Mb RJ45 Copper
		AF	AF	2 x 10Mb ST mm Fiber + 2 x 100Mb ST mm Fiber
		AG	AG	2x 10/100Mb RJ45 Copper + 2x 1000Mb SC sm Fiber 70km
		AH	AH	8 x 100Mb MTRJ mm 2km
		AJ	AJ	4 x 10/100Mb RJ45 Copper + 4 x 100Mb MTRJ mm 2km
		AK	AK	6 x 10/100Mb RJ45 Copper + 2 x 100Mb MTRJ mm 2km
		J1	J1	2x 1000Mb RJ45, Fixed Ports
		F1	F1	2x 1000Mb LC mm (550m) SFP
		F2	F2	2x 1000Mb LC mm (2km) SFP
		F3	F3	2x 1000Mb LC sm (10km) SFP
		F4	F4	2x 1000Mb LC sm (25km) SFP
		F5	F5	2x 1000Mb LC sm (40km) SFP
		F6	F6	2x 1000Mb LC sm (70km) SFP
		H1	H1	1x 1000Mb LC mm (550m) SFP
		H2	H2	1x 1000Mb LC mm (2km) SFP
		H3	H3	1x 1000Mb LC sm (10km) SFP
		H4	H4	1x 1000Mb LC sm (25km) SFP
		H5	H5	1x 1000Mb LC sm (40km) SFP
		H6	H6	1x 1000Mb LC sm (70km) SFP
		F7	F7	6x 10/100 copper RJ-45 + 1x 1000Mb LC mm (550m) SFP
		F8	F8	6x 10/100 copper RJ-45 + 1x 1000Mb LC mm (2km) SFP
		F9	F9	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (10km) SFP
		FA	FA	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (25km) SFP
		FB	FB	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (40km) SFP
		FC	FC	6x 10/100 copper RJ-45 + 1x 1000Mb LC sm (70km) SFP
		FD	FD	1x 1000Mb RJ45 SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FE	FE	1x 1000Mb LC mm (550m) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FG	FG	1x 1000Mb LC mm (2km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FH	FH	1x 1000Mb LC sm (10km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FJ	FJ	1x 1000Mb LC sm (25km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FK	FK	1x 1000Mb LC sm (40km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FM	FM	1x 1000Mb LC sm (70km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb mm LC
		FR	FR	1x 1000Mb RJ45 SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC
		FS	FS	1x 1000Mb LC mm (550m) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
		FT	FT	1x 1000Mb LC mm (2km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
		FV	FV	1x 1000Mb LC sm (10km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
		FX	FX	1x 1000Mb LC sm (25km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
		FY	FY	1x 1000Mb LC sm (40km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
		FZ	FZ	1x 1000Mb LC sm (70km) SFP + 2x 10/100 copper RJ45 + 4x 100Mb sm LC 15km
Harsh Environment			X	Standard Environment
			H	Harsh Chemical Environment Option
			Z	RoHS-compliant
			Y	RoHS-compliant with Harsh Chemical Environment Coating

Additional modules and configurations available. Please see the Online Store for the latest module availability.

ML1200

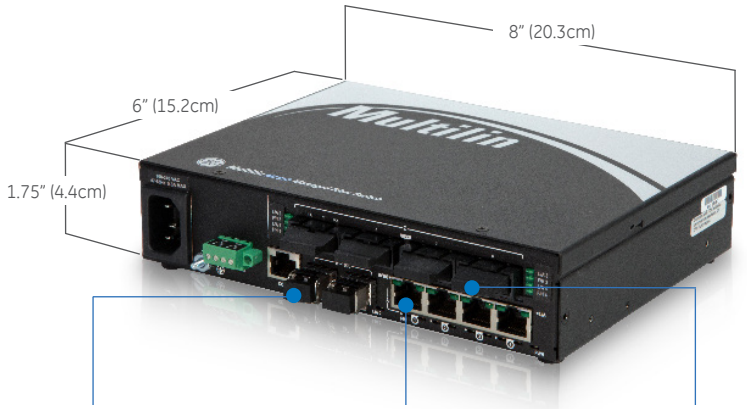


Ordering

ML1200 - ** - ** - ** - ** - ** - ** - **	Base Unit
Power Supply: 250S	ML1200 250VDC Chassis
125S	ML1200 125VDC Chassis
48VS	ML1200 48VDC Chassis
24VS	ML1200 24VDC Chassis
12VS	ML1200 12VDC Chassis
125D	ML1200 125VDC Chassis - Dual Input PSU
48VD	ML1200 48VDC Chassis - Dual Input PSU
24VD	ML1200 24VDC Chassis - Dual Input PSU
48PS	ML1200 48VDC Chassis - PoE enabled
48PD	ML1200 48VDC Chassis - PoE enabled with Dual Input PSU
Modules: XX XX XX	None
C1 C1 C1	4 x 10/100 RJ-45
C2 C2	4 x 10/100 RJ-45 PoE-enabled ports (only with ML1200-48 model)
C3 C3	2 x10/100 RJ-45 + 2x 100Mbit MTRJ mm Fiber
C4 C4	2x 10/100 RJ-45 + 2x 100Mbit LC mm Fiber
C5 C5	2x 10/100 RJ-45 + 2x 100Mbit LC sm Fiber 15km
C6 C6	2x 10/100 RJ-45 + 1x 100Mbit SC mm Fiber
C7 C7	2x 10Mbit ST mm Fiber
C8 C8 C8	2x 100Mbit ST mm Fiber
C9 C9 C9	2x 100Mbit SC mm Fiber
CA CA CA	2x 100Mbit SC sm Fiber 20km
CB CB CB	2x 100Mbit SC sm Fiber 40km
CC CC CC	4x 100Mbit MTRJ mm Fiber
CD CD CD	4x 100Mbit LC mm Fiber
CE CE CE	4x 100Mbit LC sm Fiber 15km
CF	1x 100Mbit ST mm Fiber
CG	1x 100Mbit SC mm Fiber
CH	1x 100Mbit SC sm Fiber 20km
CI	1x 100Mbit SC sm Fiber 40km
CJ	2x 100Mbit MTRJ mm Fiber
CK	2x 100Mbit LC mm Fiber
CL	2x 100Mbit LC sm Fiber 15km
H1	2x 1000Mbit LC mm Fiber
H2	2x 1000Mbit LC mm Fiber 2km
H3	2x 1000Mbit LC sm Fiber 10km
H4	2x 1000Mbit LC sm Fiber 25km
H5	2x 1000Mbit LC sm Fiber 40km
H6	2x 1000Mbit LC sm Fiber 70km
H7	2x 1000Mbit RJ-45 Copper
HA	1x 1000Mbit RJ-45 Copper + 1x 1000Mbit LC sm Fiber 10km
HB	1x 1000Mbit RJ-45 Copper + 1x 1000Mbit LC sm Fiber 25km
HC	1x 1000Mbit RJ-45 Copper + 1x 1000Mbit LC sm Fiber 40km
HD	1x 1000Mbit RJ-45 Copper + 1x 1000Mbit LC sm Fiber 70km
HG	1x 1000Mbit LC sm Fiber 10km
HH	1x 1000Mbit LC sm Fiber 25km
HI	1x 1000Mbit LC sm Fiber 40km
HJ	1x 1000Mbit LC sm Fiber 70km
HK	1x 1000Mbit RJ-45 Copper
Conformal Coating Option: X	Standard Environment
H	Harsh Chemical Environment Conformal Coating
Z	RoHS-compliant
Y	RoHS-compliant with Harsh Chemical Environment Coating

Additional modules and configurations available. Please see the Online Store for the latest module availability.

ML810

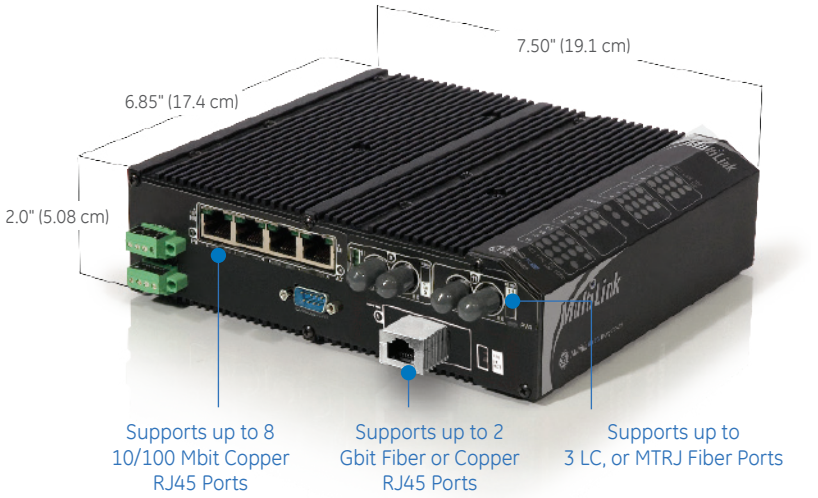


Ordering

ML810 - ** - ** - ** - ** - ** - ** - **		Base Unit
Power Supply	250S	ML810 250VDC Chassis
	125S	ML810 125VDC Chassis
	48VS	ML810 48VDC Chassis
	48PS	ML810 48VDC Chassis with PoE enabled
	24VS	ML810 24VDC Chassis
	12VS	ML810 12VDC Chassis
	125D	ML810 125VDC Chassis - Dual Input PSU
	48VD	ML810 48VDC Chassis - Dual Input PSU
	48PD	ML810 48VDC Chassis with PoE enabled - Dual Input PSU
	24VD	ML810 24VDC Chassis - Dual Input PSU
	12VD	ML810 12VDC Chassis - Dual Input PSU
	HIAC	ML810 100 - 240 VAC
Mount	P	Panel Mount Kit
	D	DIN Mount Kit
SlotA	C1	4x 10/100 RJ45
	C2	4x 10/100 RJ45 PoE-enabled ports (only with ML810-48PD models)
SlotB	H1	2x 1000Mb LC mm Fiber, SFP connector type
	H2	2x 1000Mb LC mm Fiber 2km, SFP connector type
	H3	2x 1000Mb LC sm Fiber 10km, SFP connector type
	H4	2x 1000Mb LC sm Fiber 25km, SFP connector type
	H5	2x 1000Mb LC sm Fiber 40km, SFP connector type
	H6	2x 1000Mb LC sm Fiber 70km, SFP connector type
	H7	2x 10/100/1000TX RJ45, fixed copper
	XX	None
SlotC	C1	4x 10/100 RJ45
	C2	4x 10/100 RJ45 PoE-enabled ports (only with ML810-48PD models)
	C3	2x 10/100 RJ45 + 2x 100Mbit MTRJ mm Fiber
	C4	2x 10/100 RJ45 + 2x 100Mbit LC mm Fiber
	C5	2x 10/100 RJ45 + 2x 100Mbit LC sm Fiber 20km
	C6	2x 10/100 RJ45 + 2x 100Mbit SC mm Fiber
	C7	2x 10/100 RJ45 + 2x 100Mbit SC sm 20km Fiber
	C8	2x 10/100 RJ45 + 2x 100Mbit ST mm Fiber
	CB	3x 10/100 RJ45 + 1x 100Mbit MTRJ mm Fiber
	CD	3x 10/100RJ45 + 1x 100Mbit LC mm Fiber
	CF	3x 10/100RJ45 + 1x 100Mbit LC sm 20km Fiber
	CH	3x 10/100RJ45 + 1x 100Mbit LC sm 40km Fiber
	CI	2x 10/100 RJ45 + 2x 100Mbit LC sm Fiber 40km
	CK	2x 10/100 RJ45 + 2x 100Mbit SC sm Fiber 40km
	E1	4x 100Mbit ST mm Fiber
	E2	4x 100Mbit SC mm Fiber
	E3	4x 100Mbit MTRJ mm Fiber
	E4	4x 100Mbit LC mm Fiber
	E5	4x 100Mbit SC sm 20km Fiber
	E6	4x 100Mbit LC sm 20km Fiber
	E7	4x 100Mbit SC sm 40km Fiber
	E8	4x 100Mbit LC sm 40km Fiber
	EA	1x 100Mbit MTRJ mm Fiber
	EB	1x 100Mbit LC mm Fiber
	EC	1x 100Mbit LC sm 20km Fiber
	ED	1x 100Mbit LC sm 40km Fiber
	EH	3x 100Mbit LC mm + 1x 100Mbit sm 20km Fiber
	EJ	2x 100Mbit LC mm + 2x 100Mbit sm 20km Fiber
	EK	2x 10/100 RJ45 + 1x 100Mbit LC mm + 1x 100Mbit sm 20km Fiber
	EL	2x 10FL + 2x 100FX ST (2km)
	EM	4x 10FL
	X	None
Coating	X	none
	H	Harsh Chemical Environmental Option

Additional modules and configurations available. Please see the Online Store for the latest module availability.

ML800



Ordering

ML800 - ** - ** - ** - ** - ** - **	Base Unit
Power Supply: 250S	ML800 250VDC Chassis
125S	ML800 125VDC Chassis
48VS	ML800 48VDC Chassis
24VS	ML800 24VDC Chassis
12VS	ML800 12VDC Chassis
125D	ML800 125VDC Chassis - Dual Input PSU
48VD	ML800 48VDC Chassis - Dual Input PSU
24VD	ML800 24VDC Chassis - Dual Input PSU
12VD	ML800 12VDC Chassis - Dual Input PSU
48PS	ML800 48VDC Chassis - PoE enabled
48PD	ML800 48VDC Chassis - PoE enabled with Dual Input PSU
HIAC	ML800 100-240V AC Chassis
Modules: XX	None
C1	4 x 10/100 RJ-45
C2	4 x 10/100 RJ-45 PoE-enabled ports (only with ML800-48P models)
C3	2 x10/100 RJ-45 + 2x 100Mbit MTRJ mm Fiber
C4	2x 10/100 RJ-45 + 2x 100Mbit LC mm Fiber
C5	2x 10/100 RJ-45 + 2x 100Mbit LC sm Fiber 15km
CB	3x 10/100 RJ-45 Copper + 1x mm MTRJ Fiber
CC	1x 10/100 RJ-45 Copper + 3x mm MTRJ Fiber
CD	3x 10/100 RJ-45 Copper + 1x mm LC Fiber
CE	1x 10/100 RJ-45 Copper + 3x mm LC Fiber
CF	3x 10/100 RJ-45 Copper + 1x sm LC 15km Fiber
CG	1x 10/100 RJ-45 Copper + 3x sm LC 15km Fiber
CH	3x 10/100 RJ-45 Copper + 1x sm LC 40km Fiber
CI	2x 10/100 RJ-45 Copper + 2x sm LC 40km Fiber
CJ	1x 10/100 RJ-45 Copper + 3x sm LC 40km Fiber
H1	2x 1000Mbit LC mm Fiber
H2	2x 1000Mbit LC mm Fiber 2km
H3	2x 1000Mbit LC sm Fiber 10km
H4	2x 1000Mbit LC sm Fiber 25km
H5	2x 1000Mbit LC sm Fiber 40km
H6	2x 1000Mbit LC sm Fiber 70km
H7	2x 1000Mbit RJ-45 Copper
HG	1x 1000Mbit LC sm Fiber 10km
HH	1x 1000Mbit LC sm Fiber 25km
HI	1x 1000Mbit LC sm Fiber 40km
HJ	1x 1000Mbit LC sm Fiber 70km
HK	1x 1000Mbit RJ-45 Copper
Conformal Coating Option: X	Standard Environment
H	Harsh Chemical Environment Conformal Coating
Z	RoHS-compliant
Y	RoHS-compliant with Harsh Chemical Environment Coating

Additional modules and configurations available. Please see the Online Store for the latest module availability.

ML600

6 - 10/100 Mbit Copper RJ45 Ports

4 - 10/100 Mbit Copper RJ45 Ports
2 - 100 Mbit ST, or SC Fiber Ports

Additional modules and configurations available. Please see the Online Store for the latest module availability.

Ordering

ML600 - ** - ** - **			Base Unit
Power Supply	AC		External 100 - 240 VAC Adaptor
	48		30 - 60 VDC Power Supply
	24		10 - 36 VDC Power Supply
Modules		XX	None
		B1	6 x 10/100 Mbit - RJ45 Copper
		B2	2 x 100 Mbit - ST mm Fiber + 4 x 10/100 Mbit - RJ45 Copper
		B3	2 x 100 Mbit - SC mm Fiber + 4 x 10/100 Mbit - RJ45 Copper
		B4	2 x 100 Mbit - SC sm Fiber + 4 x 10/100 Mbit - RJ45 Copper
Conformal Coating Option			X Standard Environment
			H Harsh Chemical Environment Conformal Coating
			Z ROHS Compliant
			Y ROHS Compliant with Harsh Chemical Environment Conformal Coating

Accessories for MultiLink Switches

- Industrial Power System Communications Learning CD — TRCD-ICOM-C-S-1
- MultiNet Serial to Ethernet Converter — MultiNet-FE
- EnerVista Integrator — EVI-1000

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