

## RLH 6+2 Port Hardened DIN/Wall Mount Managed Ethernet Fiber Switch

### ENTERPRISE DIN MOUNT SWITCH WITH FIBER OPTICS

The RLH 6+2 port hardened DIN/wall mount Ethernet fiber switch is a managed redundant switch that provides six 10/100Base-Tx copper ports and two 100Base-Fx optic ports that enable network extension up to 120km/74 miles over fiber optic cable. The switch may be used to extend a network connection, connecting to another RLH Ethernet Fiber switch, or may be connected directly to any 100Base-FX device.

The optic port can be used to establish SW-Ring redundancy for Ethernet ring networks, allowing for quick network recovery. It also supports numerous intelligent network management functions, including QoS, VLAN, Port Trunking, velocity configuration and alarm enabling functions.

The switch is DIN rail or wall mountable, with a rugged aluminum alloy enclosure, and is temperature hardened to operate at wide range of -40 to +85°C. Designed for plug and play installation, it features convenient network status LEDs, auto negotiation, auto MDI/MDI-X, and is powered by 24VDC power.

The RLH DIN mount fiber switch is covered by our Exclusive Unconditional Lifetime Warranty, and is an ideal option for utility/retail access points, medium/small enterprises and intelligent networks that need to accommodate various services such as video, VOIP and high speed data.



6+2 port DIN mount managed Ethernet fiber switch

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## Standard Features

Standard Features	
Fully compliant with IEEE802.3, IEEE802.3u, IEEE802.3ab, IEEE802.3z	QoS (Quality of Service ), 4 IEEE 802. IP Priority Queues
Compatible with 10Base-T UTP, 100Base-TX, and 100Base-FX Devices	Port Security Control, support Port MAC address aging, learning, 128 MAC addresses bridging per port
Six 10/100M RJ45 Ports have NWAY and Auto MDI/MDI-X	Supports Port Mirroring and Port Trunking for optimum bandwidth utilization
MM/SM ST/SC/FC ports with auto-negotiation between copper ports and optical ports	IEC 61850 Compliant
Supports IEEE802.3x Flow Control for full-duplex mode, and back pressure flow control for half-duplex mode	Supports fixed IP or DHCP client automatic distributing
Supports fast non-blocking full wire-speed throughput	Dual power backup with relay output warning for power failure and port break alarm
Store and forward architecture, 8K MAC Address Table	Port link and ring fault/abnormality alarm indication
Supports Port-based VLAN, IEEE802.1Q VLAN	Redundant 24VDC power input (12~36VDC)
Supports SW-Ring network technology with self-recovery time under 20ms	Environmentally rugged with wide operating range: -40°C to +85°C (-40°F to +185°F)

## Intended Audience

This manual is intended for use by knowledgeable telco/network installation, operation and repair personnel. Every effort has been made to ensure the accuracy of the information in this manual is accurate. However, due to constant product improvement, specifications and information contained in this document are subject to change without notice.

## Conventions

Symbols for notes, attention, and caution are used throughout this manual to provide readers with additional information, advice when special attention is needed, and caution to prevent injury or equipment damage.

## General Safety Practices

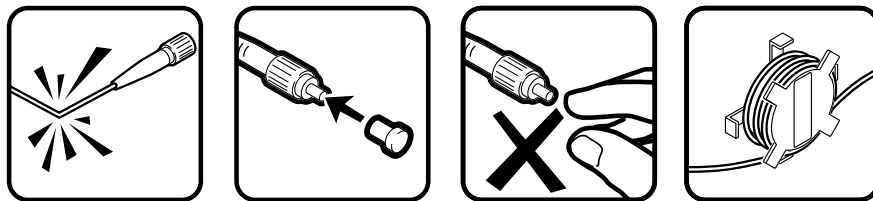
The equipment discussed in this manual may require tools designed for the purpose being described. RLH recommends that installation and service personnel be familiar with the correct handling and use of any equipment used, and follow all safety precautions including the use of protective personal equipment as required.

### Caution - Severe Shock Hazard

- Never install during a lightning storm or where unsafe high voltages are present.
- This equipment uses DC power. Use caution when handling power wiring.

### Laser Safety

- Radiation emitted by laser devices is dangerous to human eyes.
- Avoid eye exposure to direct or indirect radiation.
- Do not operate without fiber cable attached or dust caps installed.



- Do not bend fiber cable sharply. Use gradual and smooth bends to avoid damaging glass fiber.
- Keep dust caps on fiber optic connectors at all times when disconnected.
- Do not remove dust caps from unused fiber.
- Keep fiber ends and fiber connectors clean and free from dust, dirt and debris. Contamination will cause signal loss.
- Do not touch fiber ends.
- Store excess fiber on housing spools or fiber spools at site

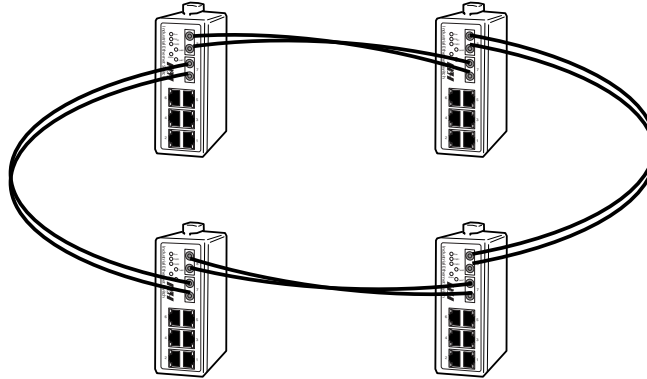
## Applications

Copper twisted pair Ethernet is limited to 100m/328ft without extenders. Using fiber optic cable provides long distance service (up to 120km/74mi.) without any additional equipment. It is immune to EMI/RF interference, ground loops, and high voltage surges from lightning or ground faults, and is ideal in electrically noisy environments such as near large power sources, electrical motors, and radio communications equipment.

Placement of all-dielectric fiber optic cable (instead of copper) completely eliminates the presence of a remote ground, which dramatically increases safety of personnel and reliability of equipment. By utilizing fiber optic cable, the Ethernet Fiber switch provides absolute electrical isolation between fiber network devices.

## Network Redundancy

The 6+2 switch may also be used to establish SW-Ring for the purpose of accomplishing redundancy for the Ethernet ring network. The intelligent redundancy system has a short self-recovery time of <20ms for automatic recovery of any network section.



**Redundant Ring Fiber Network Topology**

## Acronyms

Commonly used acronyms and abbreviations

Acronym/Abbreviation	Description
UTP	Unshielded Twisted Pair (commonly used in Ethernet networks)
TP	Twisted Pair (same as UTP)
TX	Transmit
RX	Receive
PWR	Power
LINK	Fiber Port Link
RUN	Switch Activity
VLAN	Virtual LAN
QoS	Quality of Service
10/100	TP Port Speed: 10Mbit/s or 100Mbit/s

# Installation

Prior to installation:

Check for shipping damage

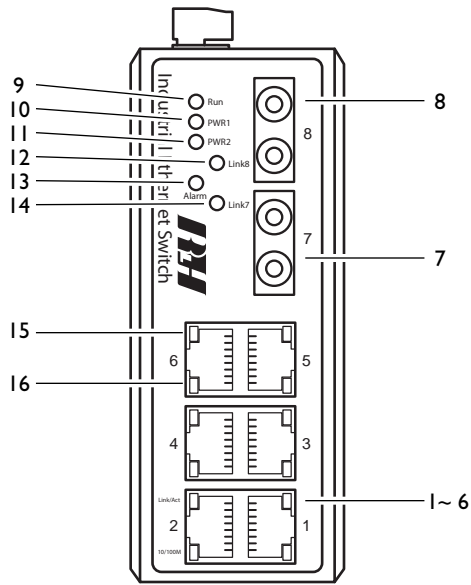
- Check the contents to ensure correct model and fiber type
- Have a clean, dry, installation environment ready

Required for installation:

- 24VDC (12~36VDC, 5W min. or 200mA@24VDC min.) power source
- DIN rail or other suitable mounting space
- This device is indoor rated only, and must be installed in a weatherproof enclosure for outdoor use

See your RLH representative for DIN mount power supplies with redundant power and battery backup, fiber optic cable, patch panels and other accessories compatible with the Ethernet Fiber Switch.

## Front Panel



Designation	Description
1~ 6	RJ-45 TP Ports
7	Fiber Port
8	Fiber Port
9	Run LED
10	PWR1 LED
11	PWR2 LED
12	Link8 LED
13	Alarm LED
14	Link7 LED
15	TP Port Link/Act LED
16	TP Port 10/100 LED

**Ethernet Switch Front Panel**

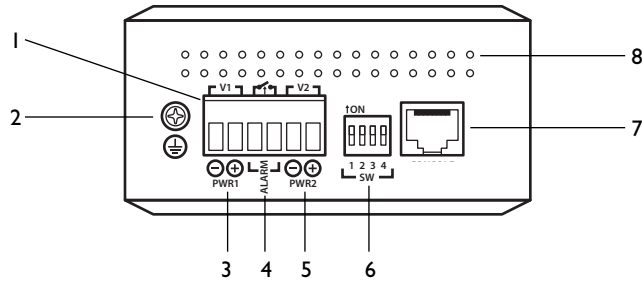
## LED indicators

The front panel contains the status LED indicators. The function of each LED is described in the table below.

Label	Name	Color	Status	Description
Run	Switch Status	Green	ON	Switch status is normal
			OFF	Switch status is non-operational
			Blinking	Switch is processing data
PWR1	Input Power Terminal 1	Green	ON	Power is present at PWR1 terminal
			OFF	Power is disconnected from PWR1 terminal
PWR2	Input Power Terminal 2	Green	ON	Power is present at PWR2 terminal
			OFF	Power is disconnected from PWR2 terminal
Alarm	Remote Alarm Indicator	Red	ON	Loss of power, fiber or copper signal
			OFF	Power, fiber or copper signal normal
Link/Act (TP ports)	TP Port Link/Activity	Green	ON	TP Port is active
			OFF	TP Port is inactive
			Blinking	Data is being transmitted
10/100 (TP ports)	TP Port Ethernet Speed	Yellow	ON	100Mbps is active (100Base-TX)
			OFF	10Mbps is active (10Base-T)
Link7	Fiber Port 7 Link	Green	ON	Fiber Port 7 is active
			OFF	Fiber Port 7 is inactive
			Blinking	Fiber Port 7 is transmitting data
Link8	Fiber Port 8 Link	Green	ON	Fiber Port 8 is active
			OFF	Fiber Port 8 is inactive
			Blinking	Fiber Port 8 is transmitting data

## Top Panel

The Power/Alarm connector may be removed by pulling it straight out of the top of the unit. This may make it easier to attach wiring to the connector during installation. Be sure to fully seat the connector when re-attaching.



**Ethernet Switch Top Panel**

Designation	Description
1	6 position wire terminal block
2	Ground screw
3	PWR1 input terminals
4	Alarm relay terminals
5	PWR2 input terminals
6	DIP switch (Download Program, Resume Defaults, SW-Ring Enable)
7	Port reserved for factory use
8	Chassis vents

## DIN rail mounting

Attach the switch to the DIN rail by first hooking the bottom of the DIN rail mount on the back of the switch, then rotate up and snap the top of the mount onto the rail. The switch may be removed first by lifting up and then rotating the top of the unit out from the DIN rail.

### Connect fiber optic cable

Multimode and single-mode units are equipped with either two ST, SC or FC female optical connectors, or a single bi-directional connector (SC only). Connect fibers to the Transmit (TX) and Receive (RX) optical connectors. The other end of the fiber may be connected to another Ethernet Fiber Switch or any 100BASE-FX Ethernet device. For bi-directional, single fiber models, there is only one SC connector used for transmitting and receiving.

Fiber cable should always be routed loosely avoiding tight bends.

### Connect Ethernet cable

The 10/100Base-T copper connection is made via the RJ45 ports located on the front of the unit.

### Connect Power

Connect a 12~36VDC 5W min. (200mA@24VDC min.) power source to either power screw-down terminal. The power inputs are polarity sensitive, so be sure to connect the positive wire to the ⊕ terminal. The terminal unplugs from the case to make wiring easier.

The switch accepts redundant power sources, and both PWR1 and PWR2 inputs may be used at the same time, automatically governing the power to supply the system. If power fails on either of these two inputs, the other inputs acts as a backup, seamlessly supplying power to the system without interruption.

**Note:** Do not overload current carrying capacity of power wiring. Calculate the maximum possible current and observe all electrical codes for the maximum current permissible for each wire size. Be sure to label the wiring to all devices as necessary.

### Relay (Alarm) Contact

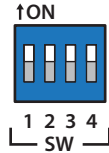
The relay consists of the two middle contacts of the terminal block on the top panel. The two terminal are used to detect both power faults and port faults. The default setting for the two wires of the alarm contact will form an open circuit when:

1. The system loses power from one of the DC power inputs
2. Any TP port is not properly connected
3. Either optical port is not connected or functioning properly

Using the management functions, the alarm may be turned off for specific ports or power terminals as required.

## DIP Switch

The DIP switch provides specific functions. Whenever a switch setting is changed, the system must be restarted for the change to be recognized.



### DIP Switch

Switch	Name	Setting	Description
1	Reserved	ON	Not used
		OFF	Not used
2	Resume Default	ON	Uses factory default settings
		OFF	Uses managed settings
3	SW-Ring Enabled	ON	Enables SW-Ring configuration for redundant ring Ethernet
		OFF	Turns SW-Ring configuration OFF
4	Reserved	ON	Not used
		OFF	Not used

## Settings

The switch may have been preconfigured at the factory depending on how it was ordered. Management software is provided on CD for configuring the switch using by connecting a PC directly to a TP port using an Ethernet cable. Port 1 is recommended when managing the switch. Please refer to the management software disc for additional information.

## Troubleshooting

If trouble is encountered, verify all copper and fiber connections and settings. Refer to the LED Indicators on the front panel. They show availability of power, modes of operation, and data being received by the fiber and TP ports.

Set the DIP Switch 2 to ON and restart to test in the factory default mode. If trouble persists, replace the unit and retest. If technical assistance is required, contact RLH Industries, Inc. technical support department:

800-877-1672 (6 am to 6 pm- PST),  
or call our 24/7 Technical/Customer Service: (714) 366-2503 or (714) 457-5740

# Ordering Information

RLH - ESM8 - XX -1

See Configuration Code

Config. Code	Multimode	Single Mode	Single Fiber Bi-Directional	Dual Fiber	SC Connector	ST Connector	FC Connector	2km/1.25mi. range	20km/12.4 mi. range	40km/24.9 mi. range	60km/37 mi. range	120km/74 mi. range	A Side	B Side	Either Side
01	●		●		●			●					●		
02	●		●		●			●						●	
03	●			●	●			●							●
04	●			●		●		●							●
05	●			●			●	●							●
10		●	●		●			●					●		
11		●	●		●			●						●	
12		●	●		●				●				●		
13		●	●		●					●				●	
14		●	●		●						●		●		
15		●	●		●						●			●	
20		●	●			●		●					●		
21		●	●			●		●						●	
22		●	●			●			●				●		
23		●	●			●				●				●	
24		●	●			●					●		●		
25		●	●			●					●			●	
30		●	●				●	●					●		
31		●	●				●	●						●	
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35		●	●				●				●			●	
40		●		●	●			●							●
41		●		●	●						●				●
42		●		●	●							●			●
50		●		●		●		●							●
51		●		●		●					●				●
52		●		●		●						●			●
60		●		●			●	●							●
61		●		●			●				●				●
62		●		●			●					●			●

- ▶ Bidirectional single fiber models require an A Side and B Side unit for a complete system.
- ▶ Bidirectional optic wavelength may be special ordered. Contact factory for availability.
- ▶ Please contact your RLH sales representative for pricing and delivery information.

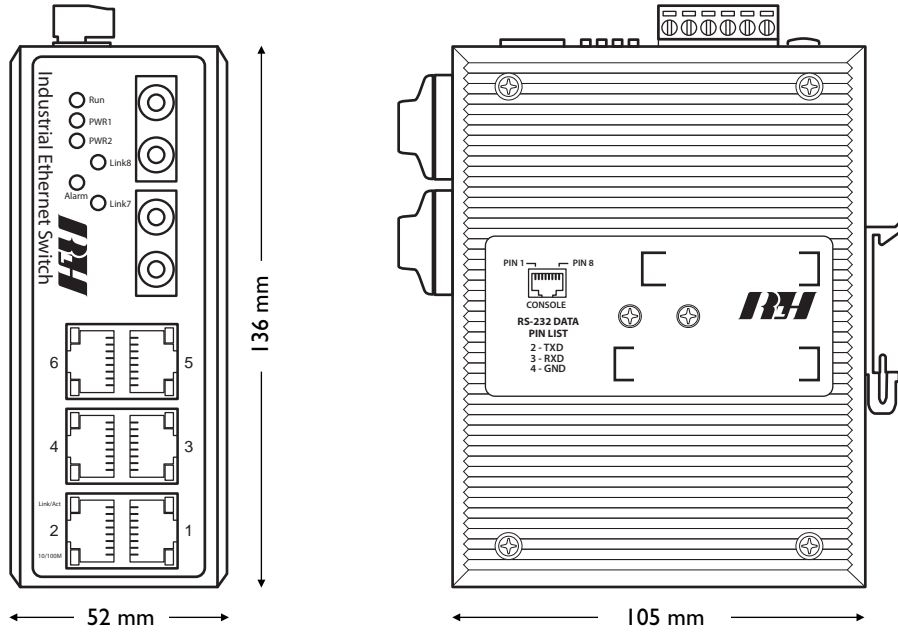
## General Specifications

<b>Standards</b>	IEEE802.3, IEEE802.3x, IEEE802.3u, IEEE802.1Q, IEEE802.1D, IEEE802.1W IEC 61850 Complaint			
<b>Ports</b>	6 10/100M RJ45 Ports with NWAY and Auto MDI/MDI-X 2 100M Multimode or Single-Mode optic ports with ST/SC/FC connectors			
<b>Transmit Rate</b>	148810pps			
<b>MAC address</b>	8K			
<b>Switching mode</b>	Store-and-Forward			
<b>System Exchange Bandwidth</b>	4.8G			
<b>VLAN</b>	Port-based			
<b>Flow Control Mode</b>	IEEE 802.3x full-duplex flow control and back pressure flow control			
<b>LED Indicators</b>	10/100M Ports: 1 LINK/ACT, 1 100M (Speed) Optic Ports: 1 LINK/ACT each port RUN PWR 1, PWR 2 Alarm			
<b>Port Management</b>	Via direct ethernet connection to TP port on front panel			
<b>Fiber Type / Connector / Distance</b> (See Note 1)	<b>Single Fiber, Bi-directional</b>	Multimode	SC	2km / 1.2 miles
		Single-mode	ST, SC, FC	20km / 12.4 miles 40km / 24.9 miles
	<b>Dual Fiber</b>	Multimode	ST, SC, FC	2km / 1.2 miles
		Single-mode	ST, SC, FC	20km / 12.4 miles 60km / 36 miles 120km / 74 miles
	<b>Fiber</b>	<b>Multimode</b>	62.5/125, 50/125 $\mu$ m	
	<b>Single-mode</b>	9/125 $\mu$ m		
<b>Dimensions</b>	W 2.0" x H 5.4" x D 4.1" / 52mm x 136mm x 105mm 35mm DIN Rail Mountable			
<b>Power</b>	24VDC (12~36VDC, 5W min. or 200mA@24VDC min.) Overload Current Protection, Dual redundant inputs			
<b>Alarm Relay</b>	Max voltage: 30VDC, 1A, dual power alarm supported Alarm enabling for power terminals, TP ports and fiber ports individually managed through software			
<b>Temperature</b>	<b>Operating</b>	-40°F to +185°F (-40°C to +85°C)		
	<b>Storage</b>	-58°F to +203°F (-50°C to +95°C)		
<b>Humidity</b>	5~90% non-condensing 100m / 328 feet			

**Note:**

1. Refer to ordering information for available connector/fiber type/distance configurations.

# Dimensional Information



## Warranty

RLH is recognized throughout the world and offers the only **UNCONDITIONAL LIFETIME WARRANTY** in the industry. We are very proud of our warranty which simply states that the product is warranted to be free of defects in material and workmanship for the **LIFE OF THE PRODUCT**.

RLH will replace this product, or part thereof, if it fails **FOR ANY REASON**, provided the defective part is returned to RLH Freight prepaid. This warranty is **UNCONDITIONAL** and valid even when this product has been abused, mishandled, or damaged as a result of a natural disaster. This warranty will reduce your costs and simplify your maintenance activities. Not all RLH products are covered by this warranty.

**To make a warranty claim, or schedule repair or replacement of your RLH product, please contact us for an RMA number.** You will be promptly assisted by one of our warranty specialists. All returns must have an RMA number before we can receive any items.

## Technical Support

<b>Normal technical support hours</b> (Mon - Fri 6am - 6pm PST)	Local (714) 532-1672 Toll Free (800) 877-1672 Toll Free (866) DO-FIBER
<b>24/7 Technical support</b>	(714) 366-2503 (714) 457-5740

## Contact Information

<b>Corporate Headquarters</b>	RLH Industries, Inc. 936 N. Main Street Orange, CA 92867 USA
<b>Phone</b>	Local (714) 532-1672 Toll Free (800) 877-1672 Toll Free (866) DO-FIBER
<b>Fax</b>	(714) 532-1885
<b>Email</b>	info@fiberopticlink.com
<b>Web site</b>	www.fiberopticlink.com



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