

## USER GUIDE

### Gigabit Ethernet SFP Fiber Link Card System

#### Gigabit Ethernet Card With Integrated Relay Alarms to Indicate Fiber and Copper Link States

The Gigabit Ethernet with Alarms Fiber Link Cards extend Ethernet over fiber optic cable. They are hardened for utility use in substations and other critical applications. These cards operate over a wide temperature range and have been designed to provide reliability in harsh environments.

Common applications include extending Ethernet over fiber for the benefit of electrical isolation, to achieve long distances, or to reduce EMI through noisy environments. These cards are compatible 10/100/1000 speed Ethernet circuits and offer two relay alarms representing the fiber and copper port link statuses. The relays assist with diagnosing where a problem may exist in installation and are useful in remote locations where remote monitoring is necessary.

RLH Fiber Link Cards are designed and Made in the USA, and are covered by our Limited Lifetime Warranty.

#### Key Features

- Wide operating temperature range
- 40°C to +70°C (-40°F to +158°F)
- Extends Ethernet both short and long distances with SFPs
- Dual Rate SFP Port - 100Mbps & 1Gbps
- Copper link state relay alarm
- Fiber link state relay alarm
- Uses 24~48VDC local power
- Critical, high voltage, remote or unmanned locations operating 24/7/365
- Fiber Link Card is compatible with RLH card housings
- Limited Lifetime Warranty
- Made in USA

#### Ordering Information

Description	Part Number
Gigabit Ethernet SFP Card with Built-In Alarm Relays	EG4-SFP-1



Gigabit Ethernet SFP Card



Gigabit Ethernet SFP Card

## General Safety Practices

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

### Intended Audience

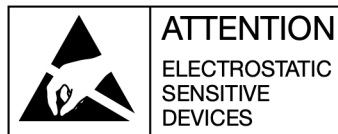
This guide is intended for use by knowledgeable telco/network installation, operation and repair personnel. Every effort has been made to ensure the accuracy of the information in this guide is accurate. However, due to constant product improvement, specifications and information contained in this document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

### CAUTION - SEVERE SHOCK HAZZARD

- Never install during a lightning storm or where unsafe high voltages are present
- Use caution when handling copper wiring and follow appropriate safety regulations

### Special Handling Requirements

Be careful when handling electronic components

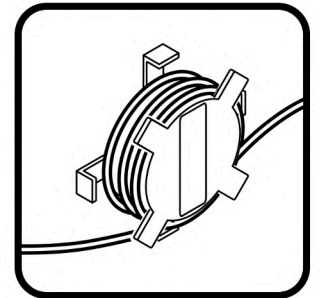
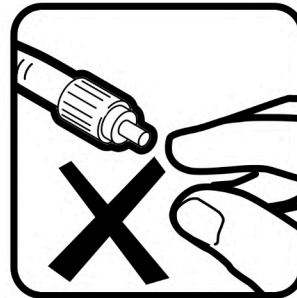
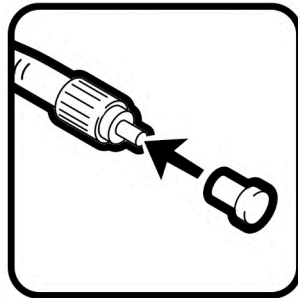


- This product contains static sensitive components
- Handle the cards at their edges only
- Follow proper electrostatic discharge procedures
- When transporting the card, carry it in an ESD safe container such as the antistatic bag provided with the card

This card utilizes circuitry that can be damaged by static electricity. When transporting the card, carry it in an ESD safe container such as the antistatic bag provided with the card. Before handling cards, discharge yourself of static electricity by physical bodily contact with earth ground. When handling cards, hold by outer edges and avoid touching circuitry. Failure to follow ESD precautions may cause serious damage to the card and prevent proper operation.

### **General Safety Practices (cont'd)**

#### **Guidelines for Handling Terminated Fiber Cable**



- 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

### **Installation**

Prior to installation:

- Check for shipping damage
- Check the contents to ensure correct model and options for application are present
- Make sure you have the correct fiber type and power available
- Have a clean, dry installation environment ready
- Observe anti-static precautions

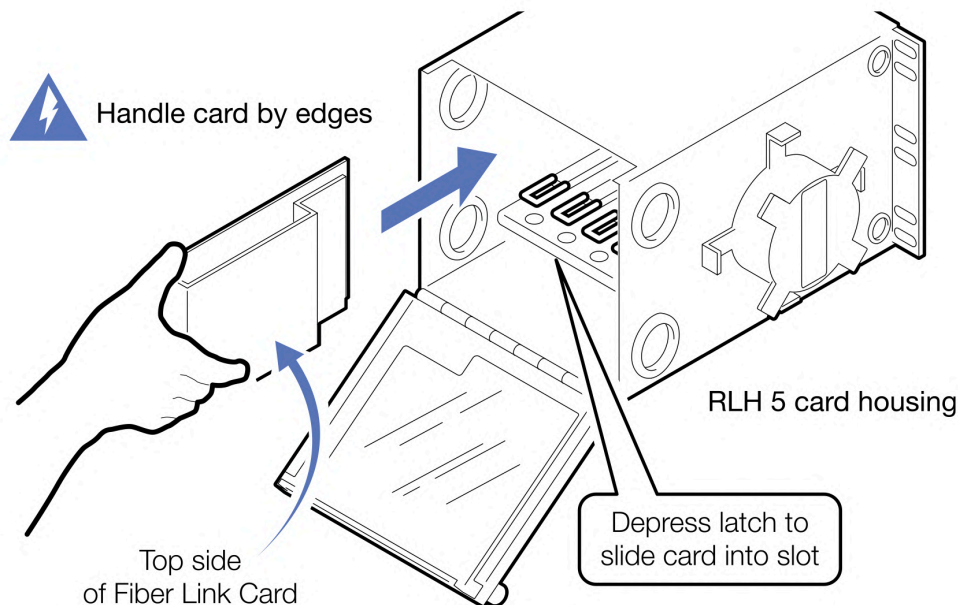
Required for installation:

- RLH Card Housing to hold the Fiber Link Card
- RLH Fast Ethernet or Gigabit Speed SFP, or MSA Compliant SFP
- 24~48VDC power supply
- Flat head screw driver

Measure the DC voltage of the source power to ensure that it is 24~56VDC. All electrical and fiber optic connections are made directly onto the card. The Ethernet fiber link card is designed to be installed into any RLH card housing.

### **Install into Card Housing**

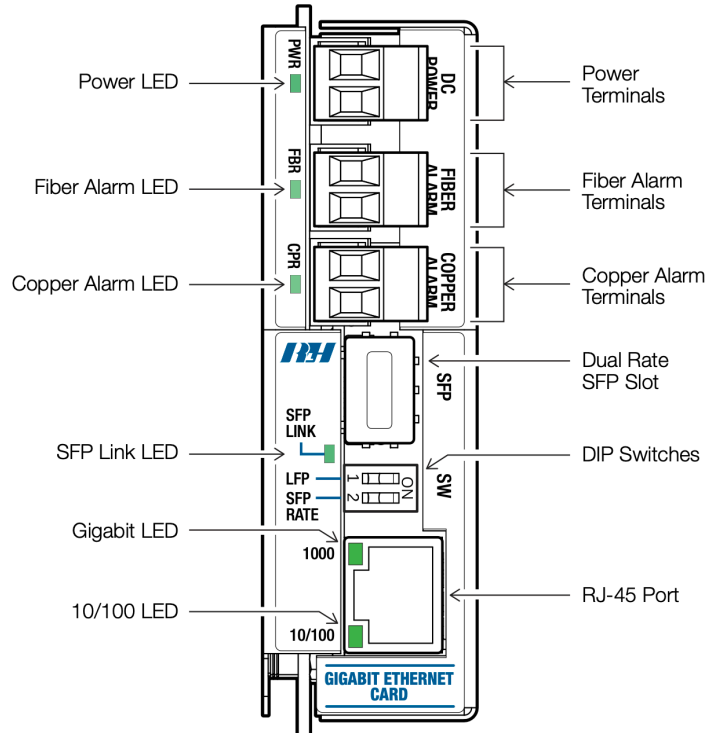
Install the Fiber Link Card into the desired RLH Card Housing by depressing the card retainer slightly while sliding the card into the guide rails. See example below with our RLH 5 Card Housing.



### **Installation into RLH Fiber Link Card Housing**

## Operation

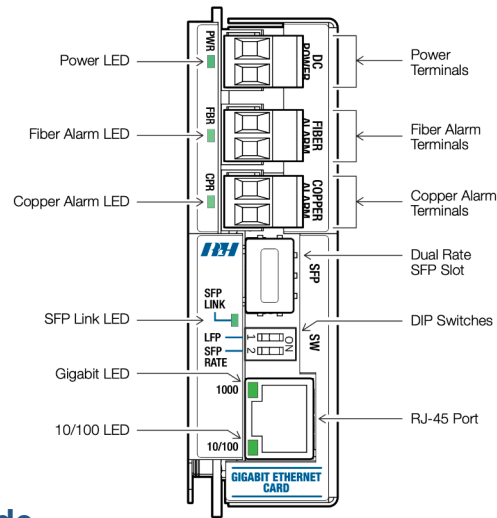
### Status and Activity LED Display



### Status and Activity LED Display

Name	LED Label	LED Status	Description
Power LED	PWR	ON	System Power OK
Fiber Alarm LED	FBR	ON OFF	Fiber is disconnected Fiber is connected
Copper Alarm LED	CPR	ON OFF	Copper RJ-45 port is disconnected Copper RJ-45 port is connected
SFP Link LED	SFP LINK	ON/Blinking	SFP has established a link, blinks with activity
Gigabit LED	1000	ON/Blinking	Copper interface operating at 1000 speed, blinks with activity
10/100 LED	10/100	ON/Blinking	Copper interface operating at 10 or 100 speed, blinks with activity

### Operation (cont'd)



### Port and Application Guide

Name	Port Label	Description
Power Terminals	DC Power	Terminals are not polarity sensitive, 24~48 DC power is required
Fiber Alarm Terminals	Fiber Alarm	Fiber Disconnected – Relay contacts are closed Fiber Link Established – Relay contacts are open System Power Loss – Relay contacts are closed
Copper Alarm Terminals	Copper Alarm	Copper Disconnected – Relay contacts are closed Copper Link Established – Relay contacts are open System Power Loss – Relay contacts are closed
Dual Rate SFP Slot	SFP LINK	Accepts SFPs, both Fast Ethernet & Gigabit SFPs can be used SFP Speed is selected with the SFP Rate Dip Switch
DIP Switches	LFP	ON Position – Enables Link Fault Pass through OFF Position (default) – Disables Link Fault Pass Through  <i>Application Note: LFP should not be enabled when the fiber and copper alarm relays are in use. LFP will cause the alarm relays to not reflect the actual state of the physical connections to the fiber and copper ports. One or the other should be selected for each installation.</i>
	SFP Rate	ON Position – Sets SFP slot speed to Fast Ethernet, will now accept only Fast Ethernet SFPs  OFF Position (default) – Sets SFP slot speed to Gigabit Ethernet, will now accept only Gigabit Ethernet SFPs
RJ-45 Port	N/A	Accepts standard RJ-45 connectors

## USER GUIDE

### Key Specifications

<b>Data Process:</b>	Store & Forward, CSMA/CD
<b>Standards:</b>	IEEE 802.3 10BaseT Ethernet IEEE 802.3u 100BaseTX Fast Ethernet IEEE 802.3ab 1000BaseT IEEE 802.3z Gigabit Fiber
<b>Transfer Rate:</b>	14,880pps – Ethernet 148,800pps – Fast Ethernet 1,488,000pps – Gigabit Ethernet
<b>Transmission Distance:</b>	Up to 100 meters over twisted pair
<b>Transmission Speed:</b>	Up to 1000 Mbps
<b>MAC Address:</b>	8K table size
<b>Ethernet Interface:</b>	Supports Jumbo Frames, Auto MDI/MDI-X, Auto-Negotiation
<b>Ethernet Ports:</b>	(1) 10/100/1000 Mbps (1) SFP Slot, Dual Rate, accepts 100 or 1000 Mbps speed modules
<b>DIP Switches:</b>	1 – LFP (Link Fault Pass) Enable/Disable 2 – SFP 1000Mbps / SFP 100Mbps
<b>Contact Rating:</b>	60Vp, 24Vac, 1Arms, 1Adc
<b>Relay Switching Speed:</b>	5mS (NC,NO)
<b>Alarm Response Time:</b>	5 Seconds (on link loss or link established):
<b>Power Protection:</b>	Over Current, Power Reversal, Polarity Protection
<b>Power Input:</b>	24~48VDC (2 position pluggable terminal block), Not polarity sensitive
<b>Maximum Power Consumption:</b>	8 Watts
<b>Operating Temperature:</b>	-40°C to +70°C (-40° to +158°F), 95% non-condensing
<b>Storage Temperature:</b>	-40°C to +85°C (-40° to +185°F), 95% non-condensing
<b>Construction:</b>	Standard RLH Card Form Factor, For use with RLH Card Housings
<b>Warranty:</b>	Limited Lifetime

**USER GUIDE**[www.fiberopticlink.com](http://www.fiberopticlink.com)**Contact**

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**Tech Support**

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