

## 2-Wire Data Fiber Optic Link System

4RU Plug-in card Installation Information

### Description

The Fiber Optic Link 2 Wire Data system provides 2-wire analog data service up to 9600 bps for AC data transmission services that do not require ringing. Such services may include 2-wire on-line modems, SCADA systems, and audio-tone protective relaying systems. The 2 Wire Data System provides a constant transmission path in the VF range.

The copper signal is converted to optical, transmitted over fiber optic cable, and converted back into the original copper signal. This allows for network extension over long distances, and provides electrical isolation between both ends of the network.

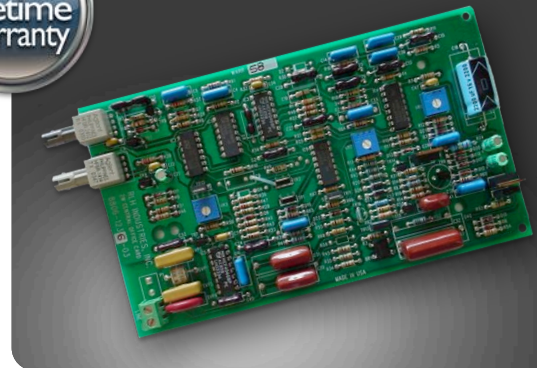
The 2 Wire Data system is compatible with any RLH 4RU card housing or shelf, is temperature hardened for tough environmental conditions, and is covered by our **Exclusive Unconditional Lifetime Warranty**.

#### 2-Wire Data CO (Central Office) Card

The 2 Wire Data CO Card is line powered by a minimum of 18V DC and 18mA and is not polarity sensitive. It can transmit a maximum of 1.5 miles on multimode fiber optic cable and up to 37 miles (60km) on single-mode fiber.

#### 2-Wire Data Sub (Subscriber) Card

The 2 Wire Data Sub Card is powered by a 20-30V DC, 45mA local power source. The Sub Card has a LED power indicator that shows it is in operation.



RLH 2 Wire Data CO Card

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#### Compliance Information

The RLH 2-Wire Data Fiber Optic Link System is compliant with the following industry standards:

- **FCC PART-68B**
- **IEEE-80, IEEE-367**
- **IEEE-487**
- **IEEE-1590**
- **IEEE-1615**
- **Motorola R56**
- **BR 876-310-100 BT (Telcordia)**
- **Bellcore SR-3966**
- **GR-1089**
- **GR-63**

Specifications subject to change without notice.

## General Safety Practices

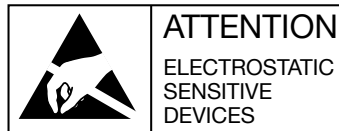
The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment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

### Caution - Severe Shock Hazard

- Never install during a lightning storm or where unsafe high voltages are present.
- Active phone lines may carry high DC voltages. Use caution when handling copper wiring.

## Special Handling Requirements

### Be careful when handling electronic components



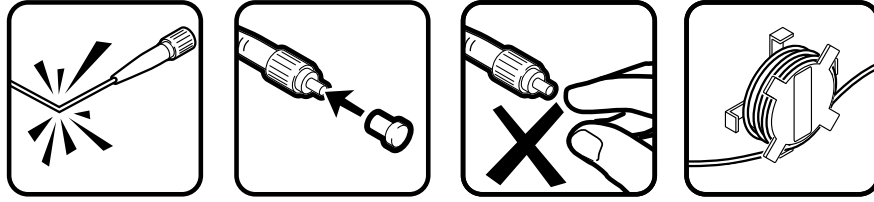
- This product contains static sensitive components.
- Handle the cards at their edges only.
- Follow proper electrostatic discharge procedures.

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.

## Warning

The intra-building port(s) of the equipment or subassembly is suitable for connection to intrabuilding or unexposed wiring or cabling only. The intra-building port(s) of the equipment **MUST NOT** be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.

## 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

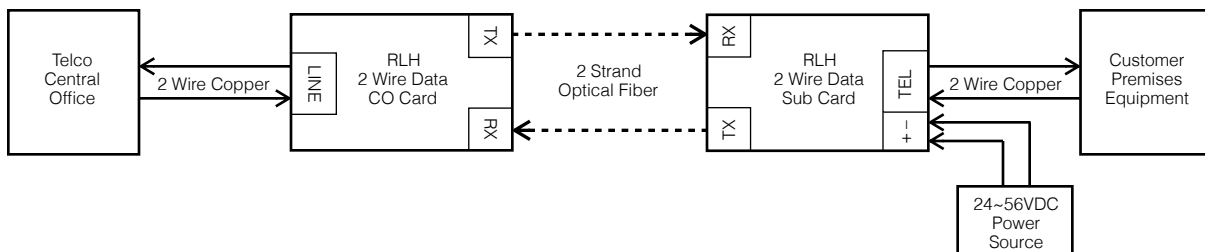
After unpacking the card, immediately inspect it for shipping damage. If damage is discovered file a claim immediately with the carrier, then contact RLH customer service. The Fiber Optic Link 2-wire data card can be installed into any RLH card housing. All electrical and fiber optic connection are made directly onto the card.

Check to make sure that you have the fiber connector type and fiber cable range.

### Connect fiber optic cable

Fiber is connected via transmit (TX) and receive (RX) optical connectors on the RLH 2 Wire Card. Be sure to route fiber loosely to avoid excessive optical loss. The TX optical fiber must be connected to the RX optical fiber on the opposite end of fiber, i.e., if the #1 fiber is connected to the TX optical on the CO Card, then the #1 fiber must be connected to the RX optical on the Sub Card.

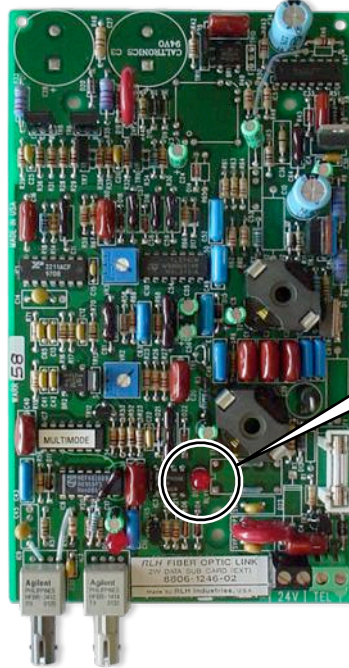
Short Haul systems have color-coded optical connectors, transmit is gray and receive is blue. The connectors on the plastic duplex jumper are also color-coded (gray/blue).



**2-Wire Data System Diagram**



**2-Wire Data CO Card**  
(Line powered model shown)



**2-Wire Data Sub Card**

The red LED is ON when the Sub card is operating.

### 2-Wire Data Card Connectors and LEDs

#### Connect 2-wire copper pair

2 Wire Data CO and Sub Cards can be mounted in any RLH Card Housing. Copper telephone wires are connected to green screw down terminals marked TEL or LINE. The TEL / LINE terminals on the RLH 2 Wire Data CO and Sub Cards are not polarity sensitive.

#### Connect Power

DC Power for the Subscriber side card is connected to the black screw down terminal marked 24V with positive and negative indicators.

## Troubleshooting

If trouble is encountered, verify all installer connections, signal and voltage levels. If trouble persists, replace the unit and retest. If technical assistance is required, contact RLH Industries, Inc. Technical support department.

## Ordering Information

RLH Fiber Optic Link products are available directly through RLH Industries, Inc. or its distributors nationwide. Please call RLH customer service for ordering assistance.

Each 2W Data card is identified with the part number.

Fiber Type	Connector	2W Data CO Card		2W Data Sub Card Local Power
		Line Powered	Line or Local Power	
Multimode <sup>1</sup>	ST	8806-1236-02	8806-1236-02LP	8806-1246-05
	SC	8805-1236-02	8805-1236-02LP	8805-1246-05
Single-mode	ST	8806-1363-01	8806-1363-01LP	8806-1373-03
	SC	8805-1363-01	8805-1363-01LP	8805-1373-03
Single-mode Long Haul	ST	8806-1363-01LH	8806-1363-01LPLH	8806-1373-03
Short Haul <sup>2</sup>	Versatile Link Non-latching	8806-1239-02	8806-1239-02LP	8806-1249-02

- ▶ <sup>1</sup> 62.5µm multimode fiber compatibility is standard, add **-50** to part number for 50µm fiber compatibility
- ▶ <sup>2</sup> Short Haul cards are for additions and maintenance applications only.
- ▶ A complete system requires 1 TX unit and 1 RX unit
- ▶ Please contact your RLH sales representative for pricing and delivery information

## General Specifications

<b>Transmission method</b>	Amplitude modulated light via two optical fiber		
	Multimode	820nm	
	Single-mode	1310nm	
	Short Haul	650nm	
<b>Maximum Fiber Loss / Distance*</b>	Short Haul	66 feet (20m)	
	Multimode	10dB / 1.5 miles (2.5km)	
	Single-mode	8dB / 9 miles (15km)	
	SM Long Haul	26dB / 37 miles (60km)	
*Note: Distances equated using industry standard fiber and connector attenuation of 3dB/Km. Fiber condition, splices and connectors may affect actual range.			
<b>Fiber Type</b>	Multimode: 62.5/125 $\mu$ m, 50/125 $\mu$ m ; Single-mode: 9/125 $\mu$ m		
<b>Fiber Connector Types</b>	ST or SC		
<b>Frequency Response</b>	Terminated with 600 Ohms at 1000 Hz: 300-3400 Hz +0.5 to -2.0 dB		
<b>Insertion Loss</b>	0.0 dB +/- 0.5 dB		
<b>Overload Level</b>	+5 dBm into 600 Ohms		
<b>Channel Noise</b>	Less than 20 dBmC (10 dBmC typical)		
<b>DC Resistance Limits</b>	1600 Ohms loop (including CO DC feed)		
<b>Maximum Data Rate</b>	9600 bps (9.6Kbps) (analog)		
<b>Insertion Loss</b>	0dB +/- 0.5dB each direction		
<b>Drop Voltage</b>	48V DC		
<b>Drop Current</b>	30mA into 300 ohms plus phone; 23mA minimum into 700 ohms plus phone		
<b>Power Requirements and Method</b>	CO Card	Standard	Line powered from CO 18-54V DC, 18mA minimum
		-LP models	Line powered from CO 18-54V DC, 18mA minimum or 24~56VDC 45mA Local power
	Sub Card	All models	Local power, 24~56VDC 45mA
<b>Operating Temperature</b>	-40° to +170° F (-40° to +76° C)		
<b>Humidity</b>	95% non-condensing		

Specifications subject to change without notice.

## Warranty

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

### We can offer this warranty because:

- We believe our customers shouldn't have to incur additional costs due to failure or damage
- We engineer and manufacture our Fiber Optic Links in the USA, with total confidence in our quality
- We understand how safety and reliability impact the total cost of ownership
- We know that customer support extends beyond the initial sale, so **we stand behind our products**

RLH will replace any product, or part thereof, that fails **FOR ANY REASON**, provided the defective part is returned to RLH Freight prepaid. This warranty is **UNCONDITIONAL** and valid even when RLH Fiber Optic Link Assemblies have been abused or mishandled, where unauthorized repairs have been attempted or performed, or product has been damaged as a result of a natural disaster. Compare this warranty to our competitors and see how our warranty will reduce your costs and simplify your maintenance activities.

**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:</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) 396-8982 (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

# RLH FIBER OPTIC LINK

RLH Industries, Inc., The Leader in Fiber Optic Telecom Isolation Technology

LIFETIME

## UNCONDITIONAL WARRANTY

RLH INDUSTRIES, INC. FIBER OPTIC LINK assemblies are warranted to be free of defects in materials and workmanship for the life of the product. This lifetime warranty is effective for RLH products sold from February 2, 1988, to the present, with the exception of fiber optic cable assemblies which are warranted only to be free of defects in manufacturing and batteries, which carry a 5-year unconditional replacement warranty.

RLH Industries, Inc. will repair or replace any product, or part thereof, that fails for any reason, provided the defective part is returned to RLH, freight prepaid.

This warranty is UNCONDITIONAL and is valid even when RLH Fiber Optic Link assemblies have been abused or mishandled, where unauthorized repairs have been attempted or performed, or product has been damaged as a result of a natural disaster.

Authorized by:



J. RANDALL MEARS, Vice President, Engineering



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Please contact your RLH sales representative for pricing and delivery information.

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