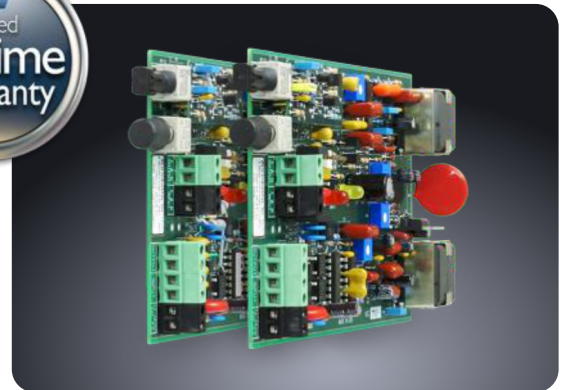


4 Wire Data E&M Fiber Link Card System

SYSTEM INSTALLATION INFORMATION



4 Wire Data E&M Fiber Link Card

Description

The 4 Wire Data E&M Fiber Link Card system provides simultaneous transmission of 4 wire data E&M over two optical fibers. The 4 wire data is full duplex and supports constant transmission up to 9600bps (9.6Kbps) in voice frequency range (300Hz-3.4KHz).

The card also interfaces with an E&M input and provides a output on the far end. The system includes convenient E&M input and output status LED indicators.

The **CO** (Central Office) Side Card provides the electrical-optical interface between a Central Office or PBX 4 wire copper line and two fiber strands, and the **Sub** (Subscriber) Side Card provides the optical-electrical interface between the fiber and a 4 wire copper line to a RTU, PBX, modem or other customer supplied equipment.

This industrial hardened Fiber Link Card system may be installed into any RLH card housings, and is covered by our **Limited Lifetime Warranty**.

Powering

The 4 Wire Data E&M Fiber Link CO and Sub Cards may be powered by local or line power. Cards can accept local power from 22-56VDC@18 mA maximum, or line power supplied from the serving office @15mA.

Note: To maintain high voltage isolation, Fiber Link CO and Sub Cards must be powered from separate power sources.

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Compliance Information

The 4 Wire E&M Fiber Link System is compliant with the following industry standards:

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

General Safety Practices

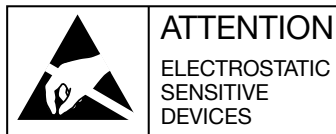
The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment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

Caution - Severe Shock Hazard

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

Special handling requirements

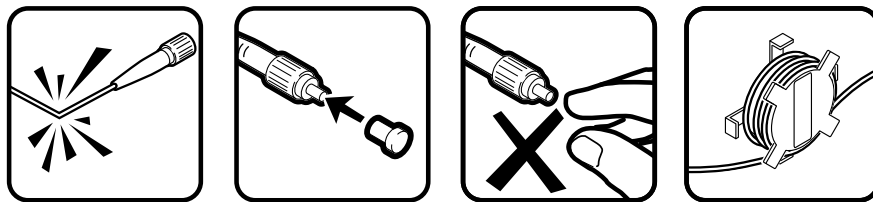
Be careful when handling electronic components



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

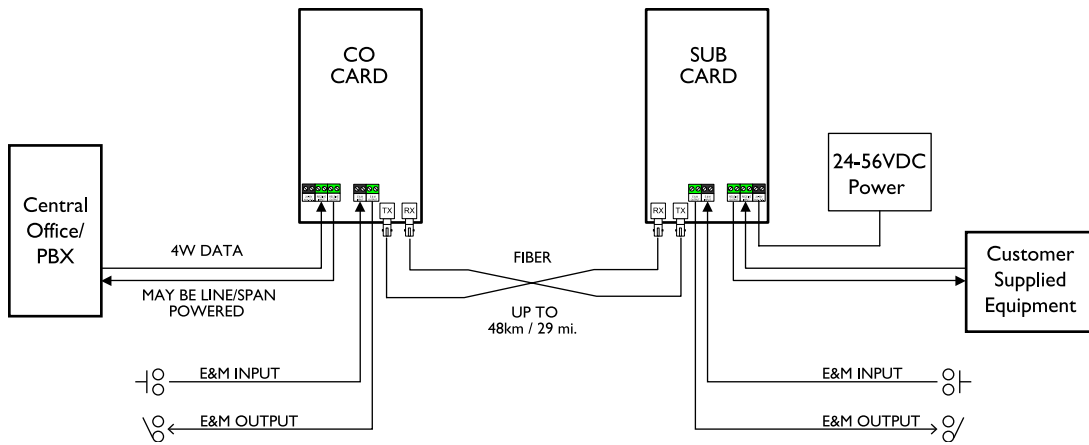
This card utilizes circuitry that can be damaged by static electricity. When transporting the card, carry it in an ESD safe container such as the antistatic bag provided with the card. Before handling cards, discharge yourself of static electricity by physical bodily contact with earth ground. When handling 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.

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



4-Wire Data E&M System Diagram

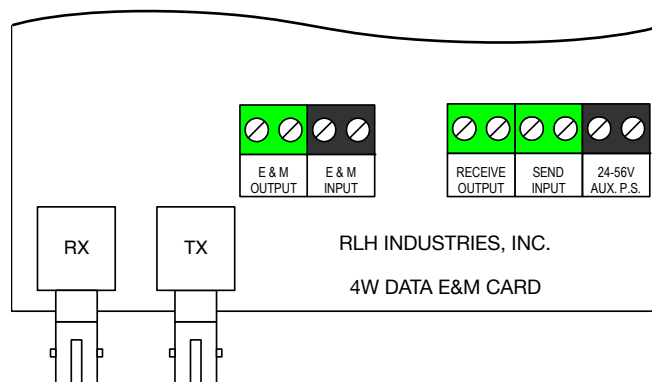
Before installing

- Check for shipping damage. In case of damage, file a claim immediately with the carrier, then contact RLH customer service.
- Check the contents to ensure correct model, mode and fiber connector type.
- Have a clean, dry installation environment ready.

Required for installation

- RLH card housing for Fiber Link Cards.
- 24-56VDC@18mA local power sources as needed.

The 4-Wire Data E&M Fiber Link Card is designed to be installed into any RLH card housing. The housing should be properly installed before installing the card. All electrical and fiber optic connection are made directly onto the card.



4-Wire Data E&M Card Connectors

Connect fiber optic cable

Fiber Link Cards are equipped with two optical connectors. Connect fibers to the transmitter and receiver marked TX and RX. Connect the transmitter (TX) fiber on one card to the receiver (RX) fiber on the other card and vice versa. Always route fiber cable loosely, avoiding tight bends.

Connect 4 wire data pairs

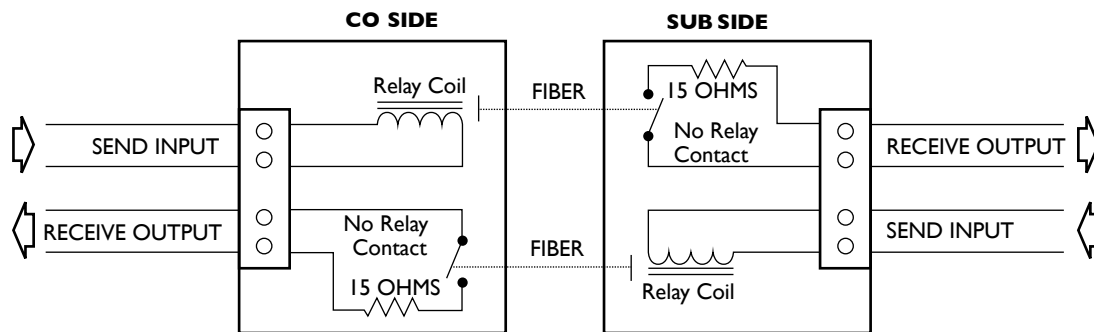
The analog voice-frequency data transmission supports constant send and receive up to 9600 bps. The module has a receive output that corresponds to the send input on the opposite end module.

The copper pairs from the CO or PBX connect to the green SEND/INPUT and RECEIVE/OUTPUT screw-down terminals on the CO Card.

The copper pairs from the remote terminal connect to the green SEND/INPUT and RECEIVE/OUTPUT screw-down terminals on the Sub Card.

Connect E&M Leads

Connect the E&M leads to the black E&M INPUT and green E&M OUTPUT screw terminals. The RECEIVE of one side corresponds to the SEND at the other end. The standard (wet contact) model E&M input is activated by 6VDC@5mA, and can accept up to 48VDC.



E&M Connection Diagram

E&M operation status may be determined from the 2 status LED's. The red LED is ON when the input is active, and OFF when no input is present. The yellow LED is ON when the E&M output is closed, and OFF when the output is open.

Connect Power

Connect a 24-56VDC (15mA minimum) local power source to the black AUX. P.S. screw-down terminals on the Card. The power input is not polarity sensitive. The CO card can operate off of simplex line power on the SEND/INPUT and RECEIVE/OUTPUT pairs where available.

Troubleshooting

If trouble is encountered, verify all 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. Refer to the contact information at the end of this document.

General Specifications

Transmission method	Frequency modulated light via two optical fibers	
	Multimode:	850nm
	Single-mode:	1310nm
Maximum Fiber Loss / Distance*	Multimode:	8dB / 1.2 miles (2km)
	Single-mode:	8dB / 9 miles (15km)
	SM Long Haul:	26dB / 31 miles (50km); minimum 8dB
	*Note: Distances equated using industry standard fiber and connector attenuation. (Multimode: 3.5dB/km, Single-mode: 0.4db/km, + 0.5dB per connector, + 0.3dB per splice)	
Fiber Type	Multimode: 62.5/125µm, 50/125µm ; Single-mode: 9/125µm	
Fiber Connector Types	ST or SC	
Analog Bandwidth	300 Hz to 3.4 KHz	
Maximum Analog Data Rate	9600 bps (9.6Kbps)	
DDS Data Rate	2.4Kbps and 4.8Kbps	
E&M Input	5mA-200mA @ 6VDC, 48V Max.	
E&M Output	2500VRMS isolation by solid state relay: Closed resistance 15 Ohms (220VAC or 330VDC @ 150mA max.) Open resistance >1M Ohms	
Response Time	On: 1.4µs / Off: 1.9 msec (Dry Contact Only)	
LED Indicators	Yellow Contact Output Status (LD1)	ON: Closed, OFF: Open
	Red Contact Input Status (LD2)	ON: Closed, OFF: Open
Channel Noise	< 20dBmC (15dBmC typical)	
DC Resistance Limits	2000 Ohms typical for 50V DC CO battery	
Nominal Impedance	600 Ohm input and output	
Insertion Loss	0dB +/- 0.5dB each direction	
Signal Input Level	+8 to -16dBm	
Surge Protection	PTC thermistors, zener diodes and varistors	
Power Requirements	Line: 15mA ; Local: 24-56VDC, card current limits at 18mA	
Power Connector	Screw type connector terminal, 12-26 AWG	
Powering Method	Simplex line power or local DC power supply connected to AUX. P.S.	
Operating Temperature	-40° to +158° F (-40° to +70° C), 95% non-condensing	
Dimensions	7 "x 4" x 1" Standard RLH Fiber Link Card form factor	
Warranty	Limited Lifetime	Visit www.fiberopticlink.com for warranty details

Ordering Information

Each 4 Wire Data E&M Fiber Link Card is identified with the part number.

Optics	Distance	Fiber	Description	Part Number
Multimode ST	2km / 1.25 mi.	62.5 μ m	CO Card	8806-1238-02
			Sub Card	8806-1248-02
Single-mode ST	15km / 9 mi.	8~9 μ m	CO Card	8806-1277-01
			Sub Card	8806-1287-01
Single-mode SC	15km / 9 mi.	8~9 μ m	CO Card	8805-1277-01
			Sub Card	8805-1287-01
Long Haul Single-mode ST	50km / 31 mi.	8~9 μ m	CO Card	8806-1277-01-LH
			Sub Card	8806-1287-01-LH
Long Haul Single-mode SC	50km / 31 mi.	8~9 μ m	CO Card	8805-1277-01-LH
			Sub Card	8805-1287-01-LH

- ▶ 62.5 μ m multimode fiber compatibility is standard, add **-50** to part number for 50 μ m
- ▶ A complete system requires one CO card and one Sub card

Technical Support

Normal technical support: (Mon - Fri 6am - 6pm PST)	(714) 532-1672 Toll Free 1-800-877-1672 Toll Free 1-866-DO-FIBER
Email:	support@fiberopticlink.com
24/7 technical support: (Outside normal business hours)	Toll Free 1-855-RLH-24X7 Toll Free 1-855-754-2497

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F: (714) 532-1885



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

Specifications subject to change without notice.