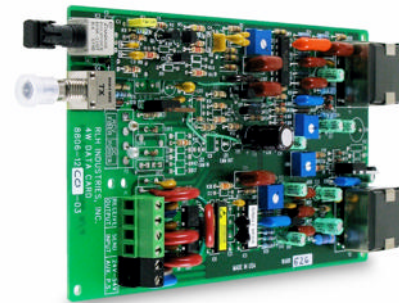


4-Wire Data Interface Fiber Optic Link System®

Specifications and Installation Information



Description

The Fiber Optic Link 4-wire Data system provides a transmission of 4-wire data signal over two optical fibers. The 4-wire data supports full duplex constant transmission up to 9600bps in voice-frequency or audio-tone range (300Hz-3.4KHz). LED indicators show fiber receive and power status (Cards with WARR # <625 do not have LEDs). Common applications include SCADA and protective relay systems.

4-Wire Data CO (Central Office) Side Card

The 4-Wire Data CO Card provides the electrical-optical interface between a Central Office or PBX 4-wire copper line and two fiber strands. The CO card is typically powered from Telco sealing current or line power (12mA minimum). If sealing current is not available the 4-wire Data CO card can be locally powered by a 24-56V DC power source. The power input is not polarity sensitive.

Note: The following Telco DST units can provide span through line powering to the 4-wire CO fiber card. Westell p/n's: 4368-02, 5496LG I2 (Verizon# 934461), 5497FA I3. The DST card must be installed into a Westell mounting assembly p/n: DAS296 or similar with SXR and SXT terminals.

4-Wire Data Sub (Subscriber) Side Card

The 4-Wire Data Sub Card provides the optical-electrical interface between the two fiber strands and a 4-wire copper line to a RTU, PBX, or modem. The Sub card is typically local powered by a 24-56VDC source.

Contents

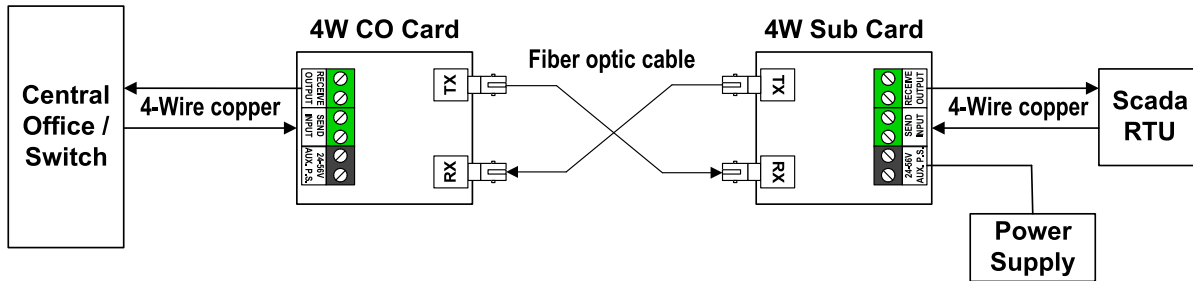
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Compliance Information

The RLH 4W Data Fiber Optic Link System is compliant with the following industry standards:

- **NEBS Level 3**
- **FCC PART-15**
- **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.



4-Wire Data System Diagram

General Safety Practices

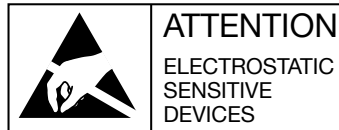
The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment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



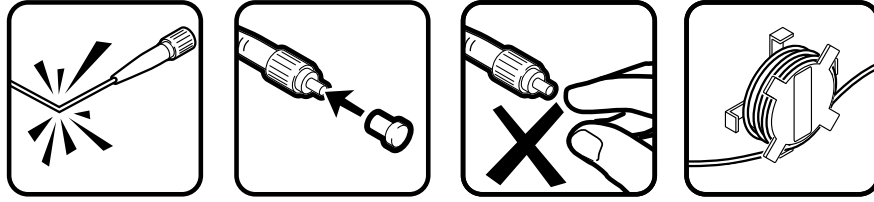
- This product contains static sensitive components.
- Handle the T1 cards at their edges only.
- Follow proper electrostatic discharge procedures.

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



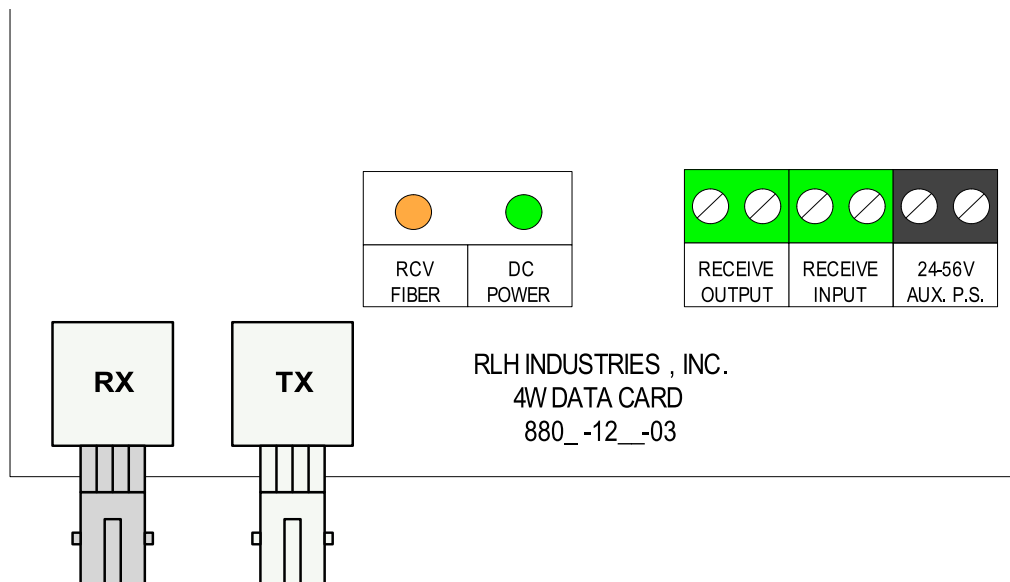
- Do not bend fiber cable sharply. Use gradual and smooth bends to avoid damaging glass fiber.
- Keep dust caps on fiber optic connectors at all times when disconnected.
- Do not remove dust caps from unused fiber.
- Keep fiber ends and fiber connectors clean and free from dust, dirt and debris. Contamination 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 4-wire data card can be installed into any RLH card housing. All electrical and fiber optic connection are made directly onto the card.

Connect fiber optic cable

Fiber Optic Link Cards are equipped with two optical connectors. Connect fibers to the transmitter and receiver marked "TX" and "RX". For example, if fiber #1 is connected to "TX" on the CO Card, fiber #1 must be connected to "RX" on the Sub Card. Fiber cable should always be routed loosely avoiding tight bends.



Connect 4-wire copper pair

The copper pair from the CO or PBX connects to the green “LINE” screw-down terminal on the CO Card. The copper pair from the telephone connects to the green “TEL” and screw-down terminals on the Sub Card.

Note: RJ48S adapters are available to connect cards via standard RJ connector, see figure 3. RJ jacks are gel filled to prevent corrosion. CO side RJ adapters connect pins 1,2 to the card input connector and pins 7,8 to the card output. Sub side RJ adapters connect pins 7,8 to the card input and 1,2 to the card output. RJ adapter part numbers: RLH-RJ4W-CO and RLH-RJ4W-SUB



Card with RJ adapter

Connect Power

Connect a 24-56VDC (12mA minimum) power source to the black “AUX. P.S.” screw-down terminal on the Card. The power input is not polarity sensitive.

Note: Local power is only connected in a case where simplex line power is not available on the 4-wire pairs.

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:

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

Warranty and Repair

All RLH Industries, Inc. products have an unconditional lifetime warranty. If a unit needs repair, call the RLH Customer Service department for a Return Material Authorization (RMA) number and return the defective unit with the RMA number, freight prepaid, along with a brief description of the problem:

RLH Industries, Inc.
936 N. Main St.
Orange, CA 92867
Attn: Repair & Return Dept.

Phone: 1-800-877-1672 or 1-866-DO-FIBER

Email: info@fiberopticlink.com

Web: www.fiberopticlink.com

As specified in our warranty RLH will repair and return the unit at no charge to the customer. If an out-of-service condition exists, an advance replacement unit can be obtained; however, a credit card or valid purchase order number will be required to ensure return of the replacement unit.

Ordering

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 4W Data card is identified with the part number.

Fiber Type	4W Data CO Card		4W Data Sub Card	
	Part Number	CLEI Code	Part Number	CLEI Code
Multimode ST	8806-1235-03	NPIFA401AA	8806-1245-03	NPIFAB401AA
Multimode SC	8805-1235-03	–	8805-1245-03	–
Single-mode ST	8806-1279-01	NPIFCC01AA	8806-1289-01	NPIFDC01AA
Single-mode ST (Long Haul)	8806-1279-01LH	–	8806-1289-01LH	–
Single-mode SC	8805-1279-01	–	8805-1289-01	–
Single-mode SC (Long Haul)	8805-1279-01LH	–	8805-1289-01LH	–

- ▶ Add "RJ" to part number for installed RJ48S adapter

General Specifications

Transmission method	Amplitude modulated light via two optical fiber Multimode: 850nm (Tx level: -23dB +/- 1dB) Single-mode: 1310nm (Tx level: -26dB +/- 1dB) SM Long Haul: 1310nm (Tx level: -6dB +/- 2dB)
Maximum Fiber Loss / Distance*	Multimode: 14dB / 2 miles (3.4km) Single-mode: 8dB / 9 miles (15km) SM Long Haul: 26dB / 31 miles (50km); minimum 8dB *Distance is equated using industry standard fiber and connector attenuation.
Fiber Type	Multimode: 62.5/125 μ m, 50/125 μ m ; Single-mode: 9/125 μ m
Fiber Connector Types	ST or SC
Wire Connector	Screw clamp, 12-26 AWG
Bandwidth	300 Hz to 3.4 KHz
Channel Noise	< 20dBmC (15dBmC typical)
DC Resistance Limits	2000 Ohms typical for 50V DC CO battery
Maximum Data Rate	9600 bps (analog)
Nominal Impedance	600 Ohm input and output
Insertion Loss	0dB +/- 0.5dB each direction
Overload Level	8dBm into 600 Ohms
Surge Protection	PTC thermistors, zener diodes and varistors
Power Requirements	12mA-20mA @ 24-56VDC
Powering Method	Line or Local Power
Operating Temperature	-40° to +158° F (-40° to +70° C), 95% non-condensing
Dimensions	7"x4"x1"



RLH Industries, Inc.
936 N. Main Street, Orange, CA 92867 USA
T: (714) 532-1672
F: (714) 532-1885
email: info@fiberopticlink.com
web: www.fiberopticlink.com

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

Specifications subject to change without notice.