RLH Industries, Inc.

USER GUIDE

The leader in rugged fiber optic technology.

U-013 2017A-0411

4 Wire 9.6k DDS Fiber Link Card System

SYSTEM INSTALLATION INFORMATION

4 Wire 9.6k DDS Fiber Link Card

Description

Our 9.6 kbps DDS cards are designed to process incoming bipolar signals (3.2V P-P Max) with a digital data signal rates from 2.4 to 9.6kpbs. It also supports analog data with a bandwidth of 50 kHz to 500 Hz at a maximum of 9.6 kbps.

An electrical copper signal is converted into an optical signal and transmitted over 2 strands of fiber optic cable. This hardened, rugged Fiber Link Card system is covered by our **Limited Lifetime Warranty.**

CO Side Card (Central Office)

The CO Card provides an interface between a Telco Central Office copper 4 wire and transmits these signals optically to a 9.6 kbps Sub Card. The CO Card also receives the optical signal transmitted by the Sub Card, and converts it back to the original electrical signal and transmits this signal to the Telco Central Office. The CO card is typically line powered. It will operate from 24-54VDC at a minimum of 18mA sealing current on the send and receive Telco pairs. The CO Card can also be local powered by an isolated power source (24-54VDC).

Sub Side Card (Subscriber)

The Sub Card receives the optical signal transmitted by the CO Card and converts it back into the original electrical signal and transmits this signal to the subscriber equipment. The Sub Card also provides the interface between an electrical 9.6 kbps signal coming from the subscriber equipment and optically transmit it to the CO Card. The Sub Card is typically powered by a 24-54VDC, 18mA local source. It may also be powered by simplexed current on the send and receive pairs from the subscriber equipment. The power input on the Sub Card is not polarity sensitive.

Contents

Compliance Information

The 4 Wire 9.6 kbps Fiber Link Card 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

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.

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.

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

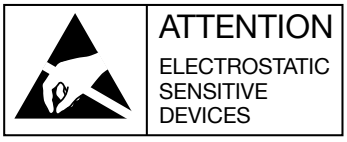
- Never install during a lightning storm or where unsafe high voltages are present.
- Active phone lines may carry high DC voltages. Use caution when handling copper wiring.
- The DIN chassis must be grounded using the ground screw to reduce the risk of damage from lightning.

HVP information

The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building 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.

Special handling requirements

Be careful when handling electronic components

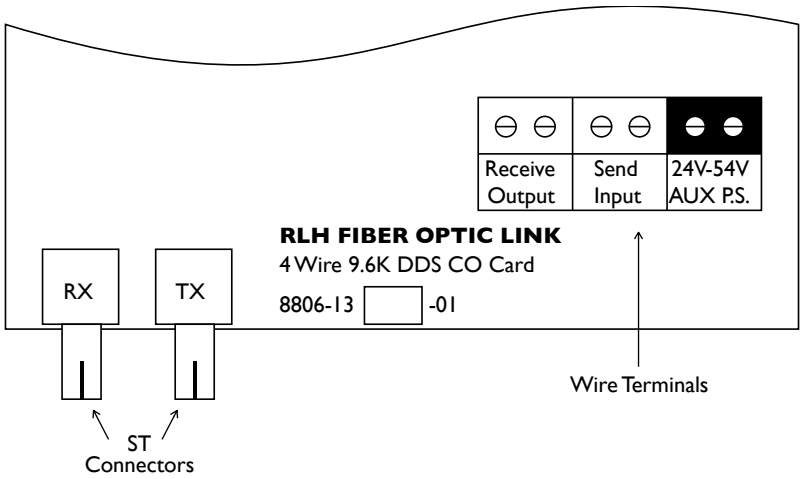


- This product contains static sensitive components.
- Handle Fiber Link Cards at their edges only.
- Follow proper electrostatic discharge procedures.

The Fiber Link 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 damage to the card and prevent proper operation.

Installation

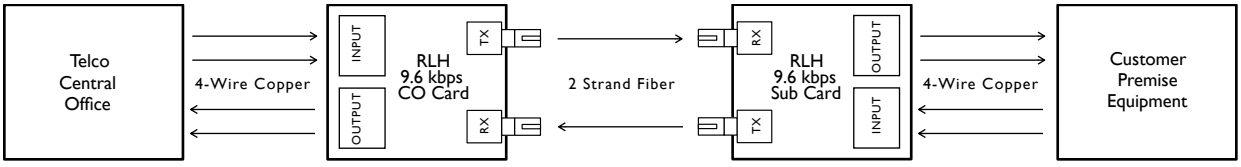
After unpacking the card, immediately inspect it for shipping damage. If damage is discovered file a claim immediately with the carrier, then contact RLH customer service. The 4 Wire 9.6k DDS Fiber Link Card can be installed into any RLH card housing. All electrical and fiber optic connection are made directly onto the card.



Connect fiber optic cable

Each Fiber Link Card has a transmit (TX) and receive (RX) optical connector. Both multimode and single-mode cards have female ST connectors. Be sure the TX optical is connected to the RX optical on the opposite end of the 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. The transmit terminal is gray, the receive terminal is blue. The connectors on the plastic duplex jumper are also color- coded (blue/gray). Connect the gray (male) to the gray (female) connector, and the blue (male) to the blue (female) connector on the card.



System Diagram

Connect 4-wire copper pair

The 4-wire 9.6 kbps line from the Telco CO connects to the green screw- down terminals provided on the 9.6 kbps CO Card. The Telco Receive pair connects to the RECEIVE / OUTPUT terminal (signal comes out of card). The Telco SEND connects to the SEND / INPUT terminal (signal goes into card).

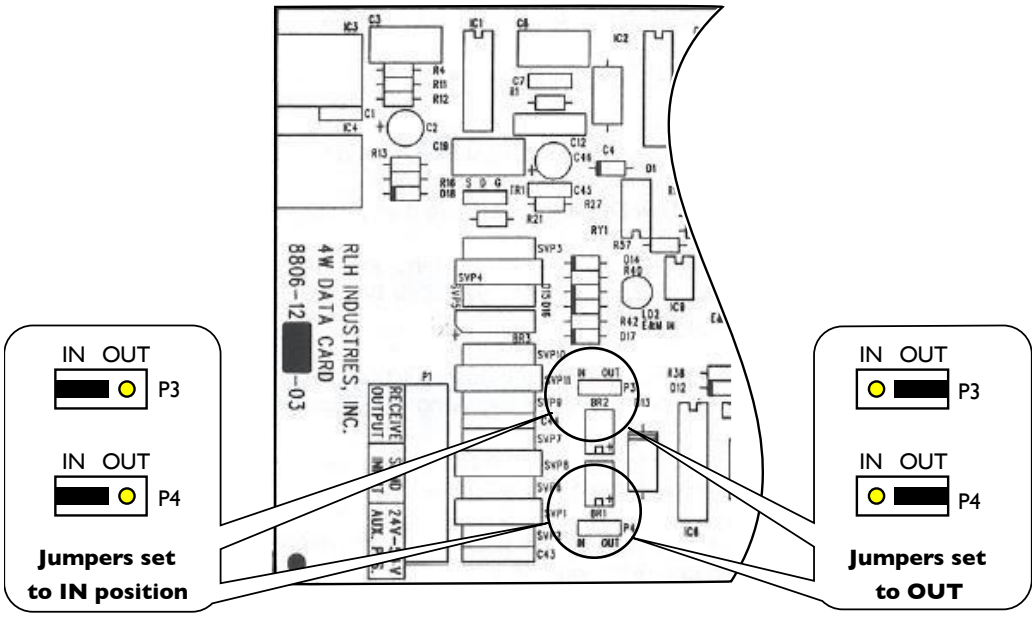
The 9.6 kbps 4-wire line from the Subscriber equipment connects to the green screw- down terminals provided on the 9.6 kbps Sub Card. The Subscriber RECEIVE pair connects to the RECEIVE / OUTPUT terminal (signal comes out of card). The Subscriber SEND pair connects to the SEND / INPUT terminal (signal goes into card).

Connect Power

The 9.6 kbps CO Card is typicalO\ powered from Telco sealing current (24-54V DC, 18mA). The Sub Card is local powered with a 24-54V DC, 18mA source connected to the AUX. P.S. terminal on the 9.6 kbps Card (this terminal is not polarity sensitive). The 9.6 kbps Sub Card will supply 18mA sealing current to Subscriber equipment

Note: The 9.6k Fiber Link Card system can be line powered through the Adtran Total Reach system, by using the Remote NIU Part# 1292023L5. The List 5 NIU will pass through sealing current to the Fiber Link 9.6 kbps CO Card.

9.6k DDS Revision-02



Jumper location on PCB

CO Card Line/Local power selector:

The 9.6K CO card has two (2) jumpers (P3, P4) to set Line or Local powering.

- Line Power – "OUT"
  The 9.6 CO Card will be pre-set to the Line Power or "OUT" position. This allows for the Card to be operated from simplex power of 22-56V DC and a minimum of 15mA.
- Local Power – "IN"
  When the CO Card is powered via the AUX. P.S Terminal, both jumpers should be set to the "IN" position.

Sub Card Sealing Current ON/OFF selector:

The RLH 9.6K Sub card has two (2) jumpers (P3, P4) to select sealing current on the 4-wire transmit and receive pairs.

- Sealing Current – "IN"
  The 9.6K Sub Card will be pre-set to the Sealing Current or "IN" position. This setting will simplex the power supply voltage (1.5VDC less) onto 4-wire transmit and receive pairs. Polarity is determined by the input to the AUX. P.S terminal. Current is limited by a 1.3K Ohm resistor.
- No Sealing Current – "OUT"
  The Sub Card will not simplex power onto 4-wire transmit and receive 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.

General Specifications

Transmission method *Frequency modulated light via two optical fiber*	Multimode:	820nm
	Single-mode:	1310nm
	Short Haul:	650nm
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. Fiber condition, splices and connectors may affect actual range.	
Fiber Type	Multimode: 62.5/125µm, 50/125µm	
	Single-mode: 9/125µm	
Fiber Type Connectors	ST or SC	
PCB Dimensions	CO and Sub Cards: 7.0”x4.0” (180x100 mm)	
Insertion Loss	0dB +/- 1dB in each direction	
Bandwidth	500 Hz to 50 kHz	
Signal to Noise	>45 dB for line attenuation up to 30 dB at 4.8 kHz	
Digital Data Type	Bipolar digital data stream with no DC reference	
Maximum Data Rate	9600 bps (9.6Kbps) (analog)	
BER	<10-9	
Input Level	3.2 V P-P Maximum	
Transmit Level	Equal to input level (3.2 V P-P Max.)	
Surge Protection	PTC thermistors, varistors, zener diodes, bridge rectifiers, metal oxide Resistors, gas tube	
Power Requirements	CO Card: 24-54 VDC, 18mA Sub Card: 24-54VDC, 18mA (up to 45mA if card simplexes power to Subscriber equipment)	
Powering Method	CO Card:	24-54 VDC, 18mA sealing current on Telco pairs
		local power source (24-54VDC)
	Sub Card:	24-54 VDC, 18mA local DC power source
Simplex Current Output Option	18mA@24VDC on XMIT pairs, Sub side only	
Operating Temperature	-40° to +160° F (-40° to +70° C)	
Humidity	95% non-condensing	
Dimensions	Standard RLH Fiber Link Card, 7”x4”x1”	
Warranty	Limited Lifetime Warranty	

Ordering Information

Each 4 Wire 9.6k DDS card is identified with the part number.

Optics	Distance	Fiber	Description	Part Number	CLEI
Multimode ST	2km / 1.2 mi	62.5µm	CO Card	**8806-1313-01**	-
			SUB Card	**8806-1323-01**	-
Multimode SC	2km / 1.2 mi	62.5µm	CO Card	**8805-1313-01**	-
			SUB Card	**8805-1323-01**	-
Single-mode ST	15km / 9 mi	8~9µm	CO Card	**8806-1343-01**	-
			SUB Card	**8806-1353-01**	-
Single-mode SC	15km / 9 mi	8~9µm	CO Card	**8805-1343-01**	NPIFMD01AA
			SUB Card	**8805-1353-01**	NPIFND01AA
Long Haul Single-mode ST	50 km / 31 mi	8~9µm	CO Card	**8806-1343-01-LH**	-
			SUB Card	**8806-1353-01-LH**	-
Long Haul Single-mode SC	50 km / 31 mi	8~9µm	CO Card	**8805-1343-01-LH**	-
			SUB Card	**8805-1353-01-LH**	-

- 62.5µm multimode fiber compatibility is standard, add **-50** to part number for 50µm fiber compatibility
- Add **-RJ** to part number for installed RJ48S adapter
- Add **-S** to part number for simplex current output option on Sub card only.

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