



RLH Industries, Inc.

USER GUIDE

The leader in
rugged fiber optic
technology.

U-008 2017A-0330

2 Wire Digital Phone Fiber Link Card System

SYSTEM INSTALLATION INFORMATION

Description

The 2 Wire Digital Phone Fiber Link Card system interfaces a single line from a switch or digital PBX over fiber optic cable to a digital telephone that would otherwise be connected through a copper pair.

Electrical signals received from the copper pair are converted into optical signals and transmitted through fiber optic cable to the opposite end card. The optical signals are converted back to electrical signals and transmitted to the copper pair. Fiber optics not only extend transmission capability up to 1 mile (1.6km), but also provide immunity to EMI/RFI and transient surges.

The 2 Wire Digital Phone system is compatible with any Fiber Link Card housing or shelf, is temperature hardened for tough environmental conditions, and is covered by our **Limited Lifetime Warranty.**

2 Wire Digital Phone CO (Central Office) Side Card

The 2 Wire Digital Phone CO Card provides the electrical-optical interface between a digital PBX 2 wire line and two fiber strands. The Tip and Ring connections to the switch or PBX provide the correct load and are recognized as a normal connection.

2 Wire Digital Phone Sub (Subscriber) Side Card

The 2 Wire Digital Phone Sub Card provides the optical-electrical interface between the two fiber strands and a 2 wire line to the digital telephone handset. The Sub Card supplies power over the copper pair to the digital telephone set.



2 Wire Digital Phone Fiber Link Card

Contents

Description	1
General Safety Practices	2
Special Handling Requirements	2
Installation	3
LEDs	4
Troubleshooting	5
Ordering Information	6
General Specifications	6

Compliance Information

The 2 Wire Digital Phone 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

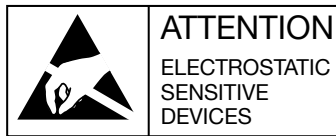
The equipment discussed in this document may require tools designed for the purpose being described. RLH recommends that service personnel be familiar with the correct handling and use of any installation equipment used, and follow all safety precautions including the use of protective personal equipment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

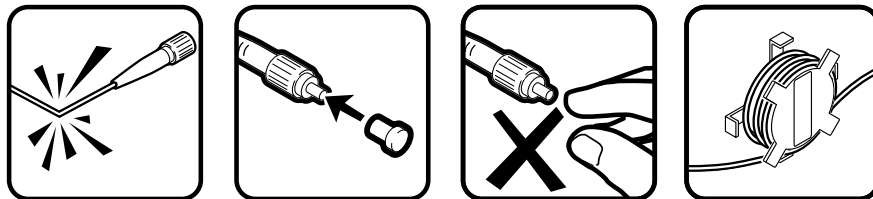
Be careful when handling electronic components



- 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.

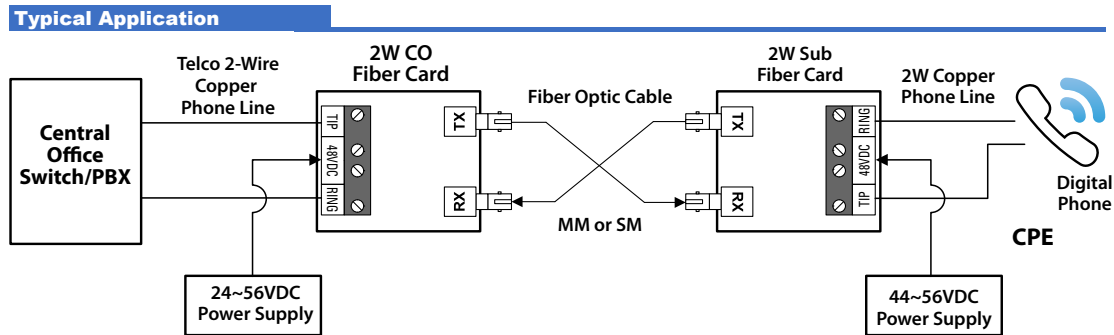
Guidelines for handling terminated fiber cable



- 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

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 2-wire Digital Phone 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

Fiber Link Cards are equipped with two optical connectors. Connect fiber to the transmit and receive terminals 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.

The copper pair is protected by thermistors and a gas discharge tube connected between tip and ring. Transients appearing on the power input are limited by thermistors and a varistor.

Connect 2 wire copper pair

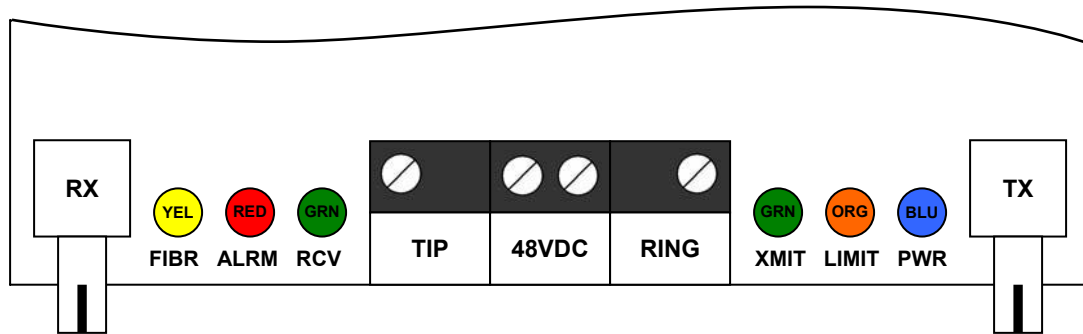
The copper pair from the PBX connects to the black “Tip” and “Ring” screw-down terminals on the CO Card. The copper pair from the telephone connects to the black “Tip” and “Ring” screw-down terminals on the Sub Card.

The copper pair is protected by thermistors and a gas discharge tube connected between tip and ring. Transients appearing on the power input are limited by thermistors and a varistor.

Connect power

Connect a 24-56 VDC (70mA minimum) power source to the 48VDC terminal on the CO Card. Connect a 44-56 VDC (90mA minimum) power source to the “48VDC” terminal on the Sub Card. The power input is not polarity sensitive.

Note: The cards are not polarity sensitive. However, if your digital phone set is polarity sensitive, you may have to switch the leads on the Sub card power terminals if your handset is unresponsive.



2-Wire Digital Phone Card Connectors and LEDs

LED	Color	On*	Off
Fiber (FIBR)	Yellow	Fiber is connected between CO and SUB Cards	No fiber continuity. Switch SW2 is Off on far end.
Alarm (ALRM)	Red	Loss of Signal	Normal operation
Receive (RCV)	Green	Signal is received from Fiber	Low Level or No Signal is received from Fiber
Transmit (XMIT)	Green	Signal received at Copper Input	Low Level or No Signal received at Copper Input
Limit	Orange	Copper Input Signal Overload	Copper Input Signal Level not in Overload
Power (PWR)	Blue	DC Power Connected	No DC Power Connected

* All LED's will be on for approximately 5 seconds following power up.

Set system level

CO and Sub optic transmit levels are set by the GAIN SELECT jumper on the cards by observing the "XMIT" and "LIMIT" L.E.D.s to indicate the optimum setting.

Gain is set in 6dB increments by selecting the highest numbered position that will keep the green XMIT LED on, but will not turn on the orange LIMIT LED.

Note: If the LIMIT LED is on, the XMIT LED will also be on.

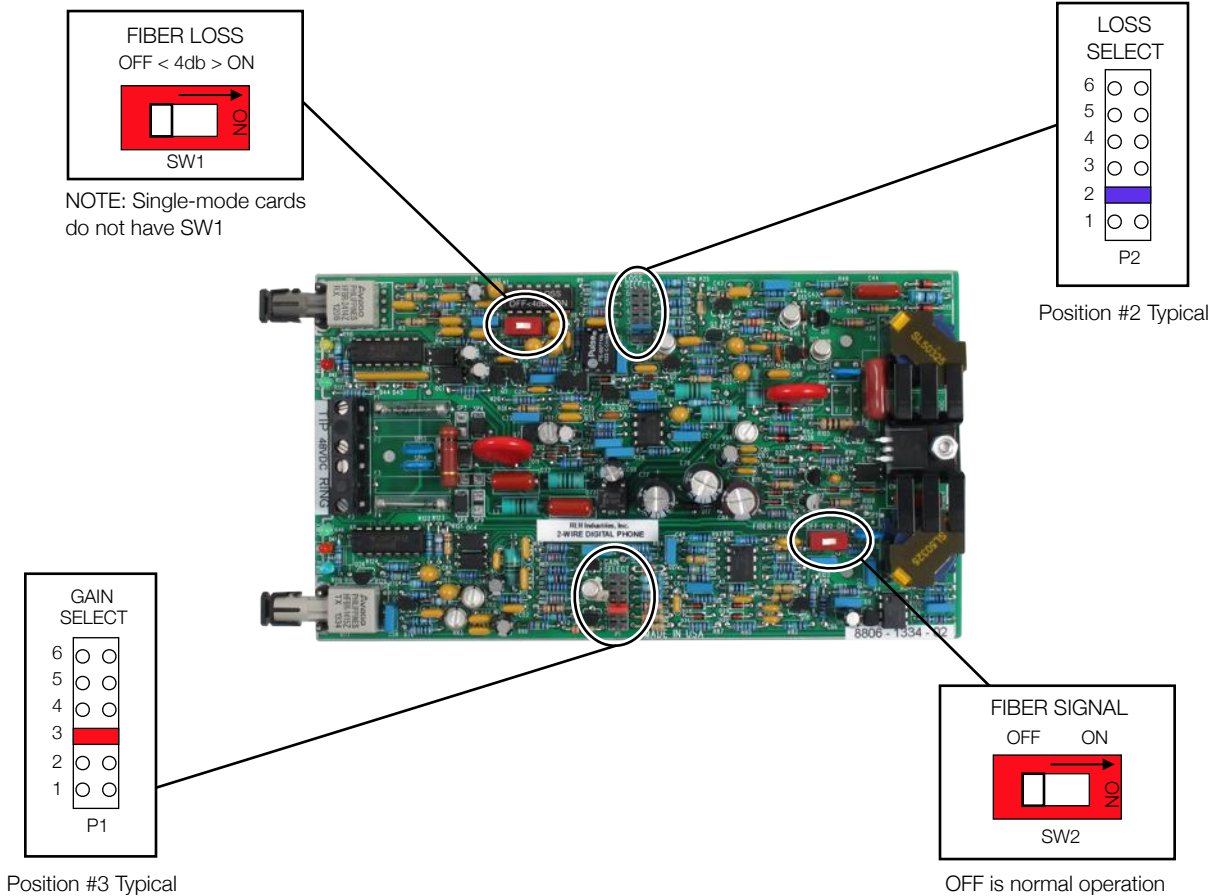
The LIMIT LED indicates signal overload. If the XMIT LED is not on, move the jumper to a higher number position until the LIMIT LED is on, then set the jumper to the next lower numbered position. The LOSS SELECT jumper should remain at position 1. Repeat with the other card in the opposite direction.

Switch SW1

A single position dip switch used for Multimode fiber cards to increase margin. The switch SW1 is typically set in the "OFF" position. A minimum of 4dB loss or 4,000 foot distance on multimode is needed for proper operation in the "ON" position. Single mode fiber Cards do not have SW1.

Switch SW2

A single position dip switch used to turn on and off a fiber test signal that will illuminate the yellow fiber (FIBR) L.E.D. on the far end card when fiber is connected between both cards. Set SW2 to the "OFF" position for normal operation.



Adjustment settings location on PCB (CO PBX Card shown)

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

Each 2W Digital Phone Fiber Link Card is identified with the part number.

Optics	Distance	Fiber	Description	Part Number
Multimode ST	1 mi. / 1.6km	62.5µm	CO Card - (PBX)	8806-1334-02
			Sub Card - (TEL SET)	8806-1344-02
Multimode SC	1 mi. / 1.6km	62.5µm	CO Card - (PBX)	8805-1334-02
			Sub Card - (TEL SET)	8805-1344-02
Single-mode ST	1 mi. / 1.6km	8~9µm	CO Card - (PBX)	8806-1361-02
			Sub Card - (TEL SET)	8806-1371-02
Single-mode SC	1 mi. / 1.6km	8~9µm	CO Card - (PBX)	8805-1361-02
			Sub Card - (TEL SET)	8805-1371-02

▶ 62.5µm multimode fiber compatibility is standard, add **-50** to part number for 50µm fiber compatibility

General Specifications

Transmission method	Amplitude modulated light via two optical fiber	
	Multimode:	850nm
	Single-mode:	1310nm
Maximum Fiber Loss / Distance*	Multimode:	10dB / 1 mile (1.6km)
	Single-mode:	8dB / 1 mile (1.6km)
	<small>*Note: Length of system limited by digital PBX maximum allowable delay. Distances equated using industry standard fiber and connector attenuation of 3dB/Km. Fiber condition, splices and connectors may affect actual range.</small>	
Fiber Type	Multimode: 62.5/125µm, 50/125µm; Single-mode: 9/125µm	
Fiber Connector Types	ST or SC	
Wire Connector	Screw clamp, 12-26 AWG	
Bandwidth	100 kHz to 10 MHz	
Signal to Noise	>45 dB for line attenuation up to 30 dB at 772 kHz	
Digital Data Type	Bipolar digital data stream with no dc reference	
Maximum Data Rate	3.152 Mbps	
BER: Transmit Level	<10 ⁻⁹	
(Loss Select at position 1)	2.5V P-P Nominal at 20°C (68°F) 2.0V P-P to 3.1V P-P from -40°C to 70°C (-40°F to +158°F)	
Surge Protection	PTC thermistors, gas tube and varistors	
Power Requirements	CO Card: 24-56VDC, 70mA, Sub Card: 44-56VDC 90mA	
Powering Method	DC power source connected to "48VDC" input	
Operating Temperature	-40° to +158° F (-40° to +60° C)	
Dimensions	Standard RLH Fiber Link Card, L7" x W4"x H1.24"	
Humidity	95% non-condensing	
Warranty	Limited Lifetime	Visit www.fiberopticlinc.com for warranty details

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@fiberopticlinc.com
24/7 technical support: (Outside normal business hours)	Toll Free 1-855-RLH-24X7 Toll Free 1-855-754-2497