



4 Line POTS Fiber Link System

Extend Analog Phone Over Fiber Optic Cable

Introduction

The RLH 4 Line Analog Phone or Plain Old Telephone Service (POTS) Fiber Link system transports four analog phone lines over fiber optic cable. This rugged system is designed to operate reliably in harsh environments over a wide temperature range.

Common applications include connecting analog lines over fiber for the benefit of electrical isolation, extending service over long distances, or reducing EMI in electrically noisy environments. The system is compatible with all traditional analog phone services, dial-up modems, meters, and fax machines.

A comprehensive set of LEDs on the front panel indicate the status of the power, fiber link, and phone lines. The standard system powering requirement is 12-48VDC, and a 125VDC option is available. The system also features dual redundant power inputs with a system status alarm contact relay, and comes standard with DIN clip and wall mount ears for flexible installation.

RLH Fiber Link systems are designed in the USA, and are covered by our Lifetime warranty.



4 Line POTS FXO Fiber Optic Converter

Features

Supports MSA compliant Gigabit SFPs

Supports Caller ID

Supports Call-Forward Disconnect (Hook Flash)

Supports Ringdown Function (FXS to FXS Hotline Phone)

Standard 2-wire analog phone lines, dial-up modems, and fax machines

Hardened to operate in -40°F to +158°F (-40°C to +70°C)

Dual redundant power inputs (12~48VDC)

DC power, fiber break, or system failure alarm contacts

DIN rail or wall mount (mounting ears included)

Lifetime warranty

Designed in the USA

General Safety Practices

Intended Audience

This guide is intended for use by knowledgeable installation, operation and repair personnel. Every effort has been made to ensure the accuracy of the information in this guide. However, due to constant product improvement, specifications and information contained in this document are subject to change without notice.

Conventions

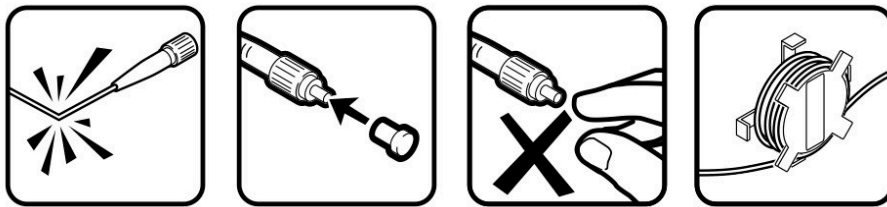
Symbols for notes, attention, and caution are used throughout this manual to provide readers with additional information, advice when special attention is needed, and caution to prevent injury or equipment damage.

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.
- Do not open the enclosure, there are no user serviceable parts.

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 fiber spools at site

Laser Safety



Do not look directly into a fiber-optic transceiver or into the ends of fiber-optic cables. Fiber-optic transceivers and fiber-optic cable connected to a transceiver emit laser light that can cause eye damage.

Acronyms

Commonly used acronyms and abbreviations

Acronym/Abbreviation	Description
POTS	Plain Old Telephone Service (analog phone)
FXO	Foreign Exchange Office or Central Office location
FXS	Foreign Exchange Station or Subscriber Side location
TX	Transmit
RX	Receive
MM	Multimode
SM	Single Mode
PBX	Private Branch Exchange

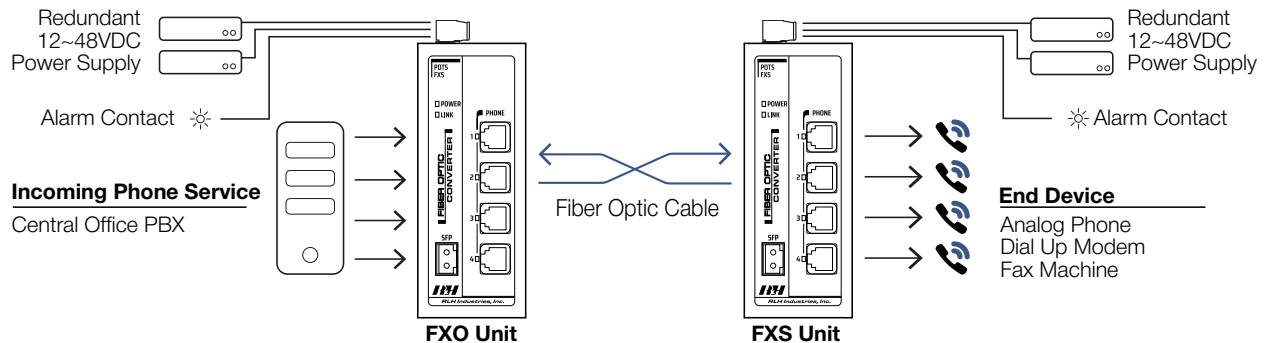
System Description

FXO Side

The RLH 4 Line POTS FXO device provides the electrical-optical interface between a service provider's inbound telephone line or analog PBX phone line, and fiber optic cable.

FXS Side

The RLH 4 Line POTS FXS device provides the optical-electrical interface between fiber optic cable and an inbound telephone line to a telephone, fax, or modem. The FXS device is powered by a local DC power source. LED Indicators on the unit indicate power, fiber link, ringing, and off-hook conditions.

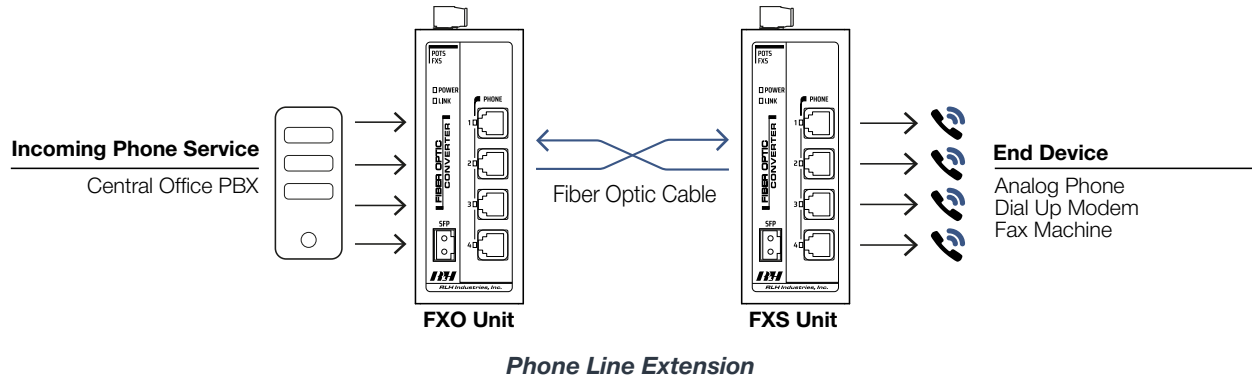


System Diagram

System Description

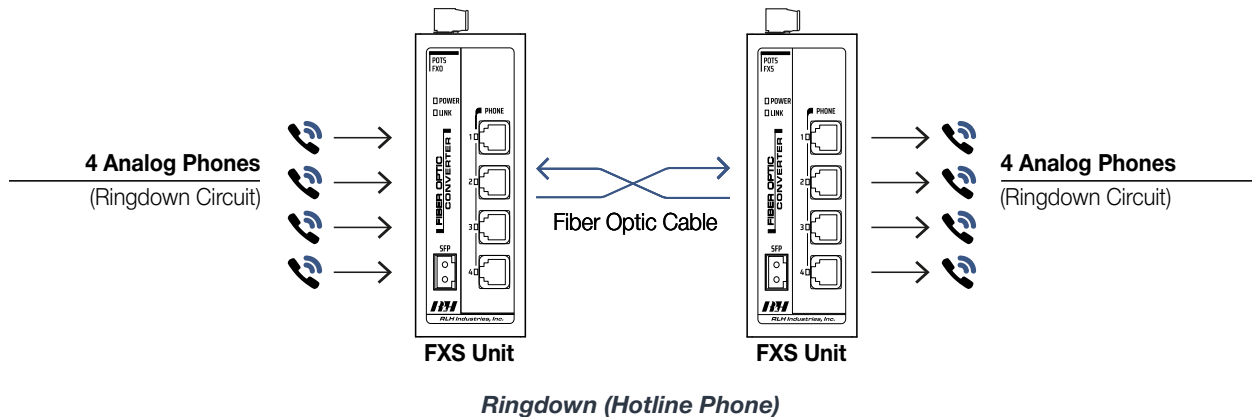
FXO to FXS - Phone Line Extension

When a fiber link is established between an RLH 4 Line Analog Phone FXO and FXS device, the complete system will act as an electrically isolated analog phone line extender. The inbound phone line connects to the FXO device, transmits over an optical medium to the FXS device, and transparently returns its analog phone signal back to copper for use by end devices.



FXS to FXS - Ringdown (Hotline Phone)

When a fiber link is established between two (2) RLH 4 Line Analog Phone FXS devices, the system's four lines implement a ringdown signaling method. This type of configuration creates a closed circuit point-to-point telephone system for each line. When a phone connected to one FXS device is taken off-hook, the opposing FXS device's phone residing on the same analog line will ring until answered. An active call will then exist until either phone on that line hangs up.



Call-Forward Disconnect

Also known as "disconnect supervision", this feature enables the RLH 4 Line Analog Phone system to transmit battery drops to the FXO interface. This informs the remote party that the phone has been hung up. In addition to Call-Forward Disconnect, this system supports Hook Flash for traditional analog telephones.

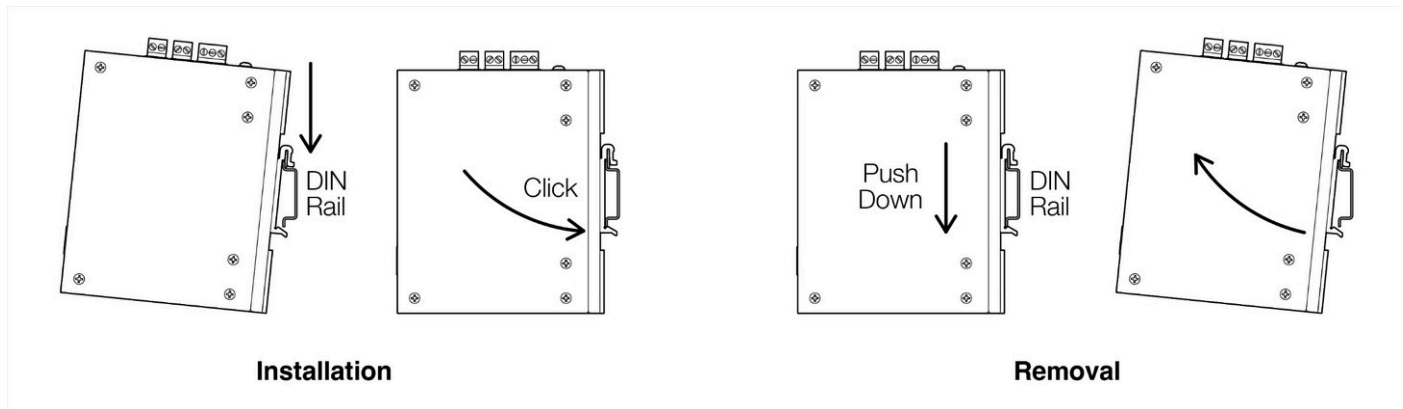
Caller ID (CLID)

This system fully supports Caller ID Passthrough for both Single Data Message Format (SDMF) and Multiple Data Message Format (MDMF). If present, both the Calling Party Name and Calling Party Number will be transmitted to the remote party.

Installation

DIN Rail Mounting

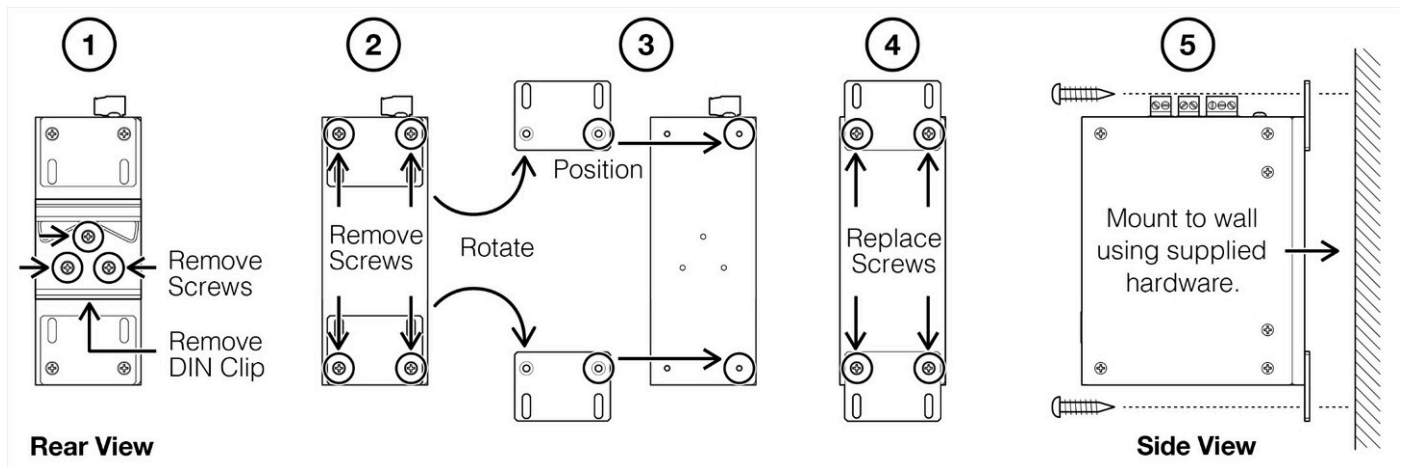
The DIN clip for mounting the system is mounted onto the rear panel. Hook the DIN clip on the top flange of the DIN rail, press down and rotate to the locked position to install. To remove, push down to depress the spring latch and rotate off of the DIN rail.



DIN Rail Mounting

Wall Mounting

The system can be easily wall mounted by attaching the provided wall mount ears and hardware. Attache the wall mount ears by following the instructions below.



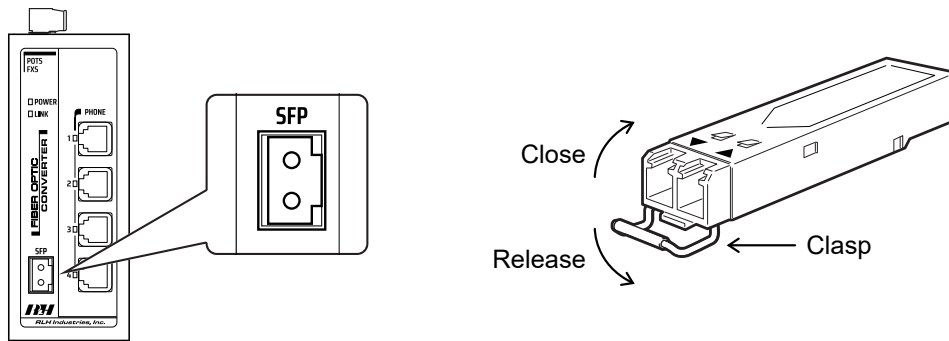
Wall Mounting

Installation

Install SFP Transceiver

This system requires MSA compliant, Gigabit fiber optic SFP transceivers. An Industrial grade SFP is recommended to enable reliable operation throughout the entire operational range. SFP transceivers are sold separately.

- Dual fiber systems require identical SFP transceivers.
- Single fiber systems require a matching pair, side A and side B.
- Close clasp and slide the SFP transceiver into the port.
- To remove, pull the clasp back to release it, and then slide it out



SFP Transceiver

Connect Fiber Optic Cable

The optical ports are for use with SFP transceivers only. Remove the dust caps from the SFP transceiver and fiber connectors. Plug the cable(s) securely into the SFP.

- Dual fiber systems require the TX fiber port to be connected to the RX fiber port on the other end.
- Once the system is properly connected and power is applied, the LINK LED should turn ON.

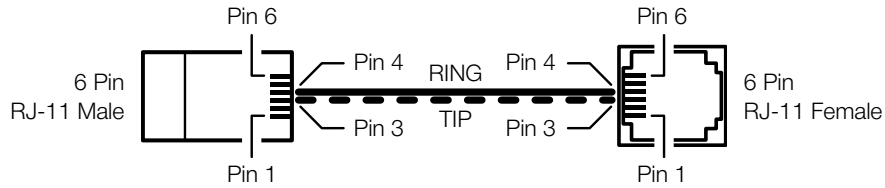
Connect RJ-11

Each device has four RJ-11 female connectors, one for each of the phone lines. The active pins are the center two pins of the RJ-11 connector. The RJ-11 male connector pinouts are indicated in the following table and diagrams.

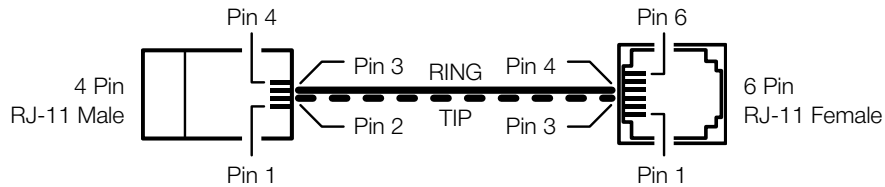
RJ-11 Pinout Table

	POTS Line/Phone	RJ-11 Female (On Device)	6 Pin RJ-11 Male	4 Pin RJ-11 Male
1~4	Ring	3	3	2
	TIP	4	4	3

6 Pin RJ-11 male to 6 Pin RJ-11 Female



4 Pin RJ-11 male to 6 Pin RJ-11 Female



Alarm Wiring

Connect the wire pair for alarm relay monitoring equipment to the alarm contact screw-down terminals located on the top of the unit.

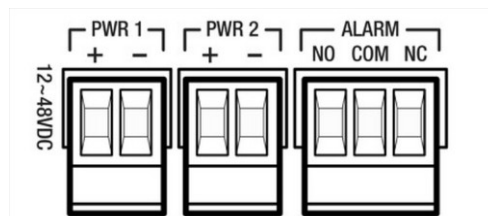
- Use the NO or NC (SPDT) contact positions as required.
- The alarm terminal block is removable and accepts 16~26 AWG wire sizes.
- Fully seat the terminal block back into the connector before operating the system.

Connect Power

Ensure power supply is OFF prior to wiring the system. Connect a 12-48VDC power supply to the screw-down terminals located on the top of the unit.

- Requires one (1) 12-48VDC power supply. Use a second power source for redundant power.
- The terminal blocks are removable and accept wire sizes 16~26 AWG.
- Fully seat the terminal blocks back into the connector before operating the system.

Note: The power inputs are polarity insensitive. Be sure to confirm the appropriate power source is being used before wiring.



Power and Alarm Terminals

Operation

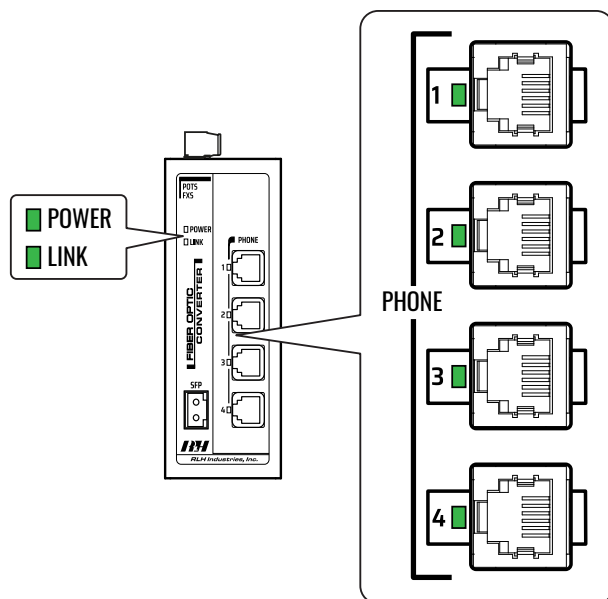
System Alarm Contacts

The alarm contact operates based on the System Status.

- Alarms on power failure.
- Alarms when fiber links down.

LED Indicators

The 4 Line Analog Phone Fiber System has several LED Indicators to indicate system status. Please refer to the following diagram.



Indicator	State	Description
Power	OFF	No power present
	ON	Power applied
LINK	OFF	No Link
	Flashing	Link established
PHONE 1 - 4	OFF	Phone ON Hook
	ON	Phone OFF Hook
	Flashing	Phone Ringing

LED Indicators

Troubleshooting

If trouble is encountered, verify all copper and fiber connections, signal and voltage levels. If the alarm is on, check the fiber cable and connections, or the power supply and connections of the unit at the other end. If trouble persists, contact technical support at RLH Industries, Inc.

support@fiberoptick.com

Toll Free: 855-RLH-24X7 (855-754-2497)

System Specifications

Fiber Port	1 Gigabit SFP Slot, Accepts MSA compliant 1.25Gbps SFPs(Available separately)		
Phone Connectors	(4) RJ-11 Female		
Audio Bandwidth	300Hz to 3400Hz		
Analog Phone (POTS) Interface	FXO Device	Impedance	600 ohms
		Ring Frequency	Acceptable 20 ~50Hz
	FXS Device	Impedance	600 ohms
		Dial	DTMF and Pulse
		Battery Source	48VDC ± 4V
		Ring Voltage	80Vrms at 20Hz (Depending on the ringing load)
		REN	REN 3.0 (Ring Equivalence Number)
Ringing Waveform	Sine wave		
Ring Cadence	FXS to FXS	ON → 2 seconds, OFF → 4 seconds	
	FXO to FXS	Reproduces the cadence detected by the FXO	
Ringing Standard	Designed for use with Typical North American Telephone Networks		
Return Loss	40dB		
Supports	Caller ID & Call Forwarding		
LED Indicators	Power, Fiber, Phone or Line 1-4		
Power Input	12~48VDC (11~53V)		
	-A powering option	125VDC (42~160V)	
	Dual redundant power options - Polarity insensitive		
Power Consumption	≤10W		
System Alarm Relay	Normally Open / Closed Relay. (SPDT)		
DC Input Isolation (in/out)	1.5KV		
Overcurrent Protection	1.0A (Automatic Recovery)		
Temperature	Storage	-40°C to + 85°C (-40°F to +185°F)	
	Operating	-40°C to + 70°C (-40°F to +158°F)	
Dimensions	H 5.2" x W 2.2" x D 4", (131mm x 56mm x 102mm) - not including DIN clip		
Weight	1.6 lbs. (0.73kg)		
Mounting	Includes standard T-35 DIN rail clip and wall mount ears		
Humidity	95% non-condensing		
Safety	FCC Class B, CE, RoHS, CB Scheme		
Warranty	Lifetime - Visit www.fiber optic link.com for warranty information and coverage details		

Ordering Information

Description	Type	Part Number
Industrial POTS Fiber Media Converter, 4 Channels, FXO, 12-48VDC	FXO	FBX-POTS-FXO-4-1
Industrial POTS Fiber Media Converter, 4 Channels, FXS, 12-48VDC	FXS	FBX-POTS-FXS-4-1

- A complete system requires 2 devices of either configuration:
 - One (1) FXO device paired with one (1) FXS device for a typical phone line extension, or
 - Two (2) FXS devices paired for a ringdown hotline
- Add **-A** to the part number for 124VDC Power Option

RLH Certified SFP Transceivers

Description	Mode	Conn.	Distance	Fibers	Wavelength	Part Number
Multimode, LC, 550m/1804 feet, Dual Fiber, 850nm	MM	LC	550m/1804 feet	Dual Fiber	850nm	SFP-1G-03-2
Multimode, LC, 2km/1.2 miles, Dual Fiber, 1310nm	MM	LC	2km/1.2 miles	Dual Fiber	1310nm	SFP-1G-04-2
Singlemode, LC, 20km/12.4 miles, Dual Fiber, 1310nm	SM	LC	20km/12.4 miles	Dual Fiber	1310nm	SFP-1G-30-2
Singlemode, LC, 60km/37 miles, Dual Fiber, 1550nm	SM	LC	60km/37 miles	Dual Fiber	1550nm	SFP-1G-31-2
Singlemode, LC, 120km/74 miles, Dual Fiber, 1550nm, with Digital Diagnostic Monitoring	SM	LC	120km/74 miles	Dual Fiber	1550nm	SFPD-1G-34-2
Singlemode, LC, 20km/12.4 miles, Single Fiber – Side A, Tx1310/Rx1550	SM	LC	20km/12.4 miles	Single Fiber Side A	T-1310/ R-1550	SFP-1G-20-2
Singlemode, LC, 20km/12.4 miles, Single Fiber – Side B, Rx1310/Tx1550	SM	LC	20km/12.4 miles	Single Fiber Side B	T-1550/ R-1310	SFP-1G-21-2
Singlemode, LC, 60km/37 miles, Single Fiber – Side A, Tx1310/Rx1550, with Digital Diagnostic Monitoring	SM	LC	60km/37 miles	Single Fiber Side A	T-1310/ R-1550	SFPD-1G-24-2
Singlemode, LC, 60km/37 miles, Single Fiber – Side B, Rx1310/Tx1550, with Digital Diagnostic Monitoring	SM	LC	60km/37 miles	Single Fiber Side B	T-1550/ R-1310	SFPD-1G-25-2

- Single fiber (bi-directional) SFP transceivers must always be paired, side A and side B

Contact

By Mail	AN: Sales RLH Industries, Inc. 936 N. Main Street Orange, CA 92867
By Phone:	Local 714-532-1672
Sales/Service	Toll Free 800-877-1672
Mon - Fri, 6am - 6pm, PST	866-DO-FIBER
By email:	info@fiberoptick.com
By Fax:	714-532-1885

Support

By email:	support@fiberoptick.com
By Phone:	Toll Free 855-754-2497 855-RLH-24X7