



RLH Industries, Inc.

DATA SHEET

The leader in
rugged fiber optic
technology.

R2010B-0510

RLH POTS Fiber Mux System

4 & 8 CHANNEL VOICE WITH DATA OVER FIBER OPTICS

Product Information and Specifications

Description

The 4 and 8 channel RLH POTS Fiber Mux Systems provide a comprehensive method of multiplexing analog (POTS) channels over a single pair of multimode or single mode fibers. This compact single rack unit (1RU) system solves the problem of adding POTS lines when available fiber is limited, reduces equipment space, and lowers overall equipment costs.

These POTS Mux Systems are available in capacities of either 4 or 8 analog phone lines, and includes four 10/100M Ethernet ports for LAN interconnection. The 8 channel model also has one RS-232 asynchronous data port as well. All ports operate simultaneously over the fiber optic cable.

FXO/CO (Central Office) Side Unit

The FXO/CO side unit provides the electrical-optical interface between PSTN or PABX 2-wire copper POTS lines, Ethernet devices or LAN, RS-232 data devices (where applicable) and the optical fiber cable. Powering options include local 115-240VAC or 48VDC power.

FXS/Sub (Subscriber Side) Side Unit

The FXS/Sub side provides the electrical-optical interface between the copper 2-wire POTS line devices (phones, fax, modem), Ethernet devices or LAN, RS-232 devices (where applicable) and the optical fiber cable. Powering options include local 115-240VAC (using the included power supply) or 48VDC local power.

FXS/Sub units are electrically different from FXO/CO units and cannot be interchanged.



ANALOG PHONE FIBER MUX SYSTEM

Contents

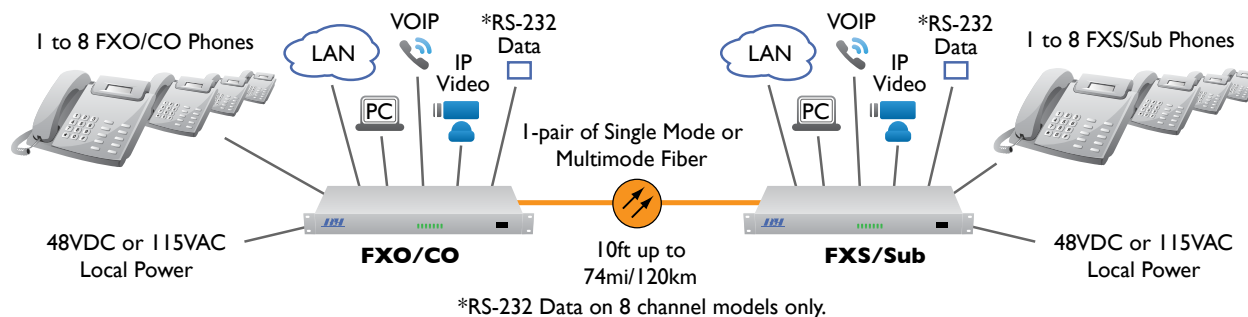
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Compliance Information

The RLH POTS Fiber Mux System is compliant with the following industry standards:

- **FCC PART-15**
- **IEEE 802.3**
- **ITU-T V.24**
- **ROHS**

Specifications subject to change without notice.



POTS Mux System Applications Diagram

Standard Features	
Low cost solution for delivering analog POTS lines over fiber	From 1 to 8 FXO ports for connection to PABX or PSTN
Four integrated 10/100 Base-T Ethernet ports for LAN, VOIP, video over IP or other applications.	From 1 to 8 FXS ports for connection of individual analog phones or faxes
Ethernet switch is full/duplex, auto negotiation	4 voice channels are connected to a single RJ-45. RJ-11 breakout adapter cables are provided.
Supports call forwarding	Optional ring down circuit is available
Available with ST, SC or FC connectors	8 Channel model Includes one asynchronous RS-232 port (via RJ-45) for data
Available in Single or Multi-mode fiber, up to 120km fiber range	EIA 19" 1RU rack mountable
Convenient front panel LED Status monitoring	Ethernet interface is AUTO-MDIX (auto crossover adapting)
May be powered by 48VDC local power source or the provided 115VAC power supply.	Exclusive Unconditional Lifetime Warranty

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

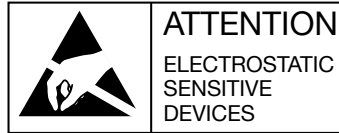
- Never install during a lightning storm or where unsafe high voltages are present.
- Active phone lines may carry high DC voltages. Use caution when handling copper wiring.
- The chassis must be grounded using the ground lug to reduce the risk of damage from lightning.

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.

Special handling requirements

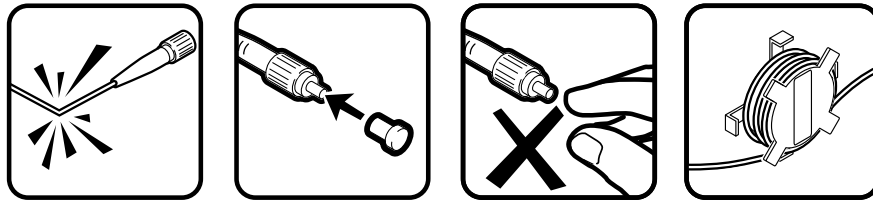
Be careful when handling electronic components



- This product contains static sensitive components.
- Do not open the metal enclosure.
- Follow proper electrostatic discharge procedures.

This unit utilizes circuitry that can be damaged by static electricity. When transporting the card, carry it in an ESD safe container such as the packaging provided with the unit. Before handling the units, discharge yourself of static electricity by physical bodily contact with earth ground. When installing, follow proper personnel grounding procedures and ground the chassis. 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 (2in./50mm bend radius minimum) 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.
- Clean fiber ends only with alcohol pad.
- Do not touch fiber ends.
- Store excess fiber on housing spools or fiber spools at site.

Front Panel

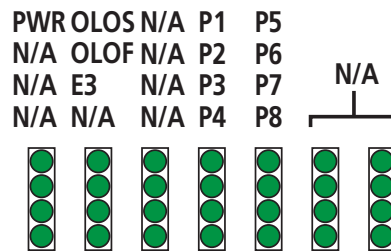
The POTS Mux System front panel contains the power switch and LED indicator display. The DIP switches, SNMP connector, and USB port are reserved for future use and are not used.



POTS Mux 8 Channel System Front Panel

LED status display

The LEDs on the front panel display status and activity.



POTS Mux 4/8 Channel LED indicators

Note: All LEDs are installed every unit, but only the LEDs corresponding to the actual POTS lines installed in your unit will function. For example, on a 4 Line model, only the LEDs corresponding to the first 4 lines will function. Refer to the product label for the number of POTS lines installed.

LED No.	Name	Status	Description
1	PWR	ON	Power ON
2 ~ 4	N/A	OFF	Not used
5	OLOS	ON	Optical Signal Lost
		Blinking	Remote device is powered OFF
6	OLOF	ON	Optical SYNC loss
7	E3	ON	Optical BER $\geq 10^{-3}$
8	N/A	OFF	Not used
9 ~ 12	N/A	OFF	Not used
13 ~ 16	P1 ~ P4	ON	POTS channel is on line or FXO side is in "off hook" state
		Blinking	Call initiated
*17 ~ 20	*P5 ~ P8	ON	POTS channel is on line or FXO side is in "off hook" state
		Blinking	Call initiated
21 ~ 28	N/A	OFF	Not used

***Note:** Not used on 4 channel models.

Back Panel

The POTS Mux System rear panel contains the power connections, Ethernet ports, fiber connectors, POTS ports, RS-232 Data ports and chassis ground lug.



POTS Mux 8 Channel System Back Panel

Power Connection

The POTS Mux system uses 48VDC power to the 3 position screw down terminal. A 115VAC to 48VDC external power supply is included, and any compatible 48VDC power source may be used to power the POTS Mux. The 115VAC AC power receptacle on the back of the POTS Mux is not used. Refer to the specifications section for power requirements.

Note: The power terminal is polarity sensitive. Verify the plus and minus wiring before connecting.

Ethernet RJ-45 Ports

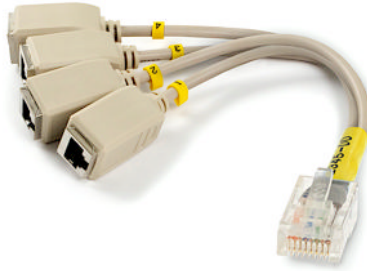
Four Ethernet ports use standard RJ-45 connectors. LED indicators on each port indicate if the port connection and speed. The LINK LED is ON when the port is connected to a LAN or other active link, and the SPD LED is ON when the port auto-detects 100M speed.

Optical Ports

The optical ports may be equipped with ST, SC or FC fiber connectors. A fiber pair is required for operation with dual fiber models, TX is the signal output side and RX is the signal input side. Bi-directional single fiber models combine input and output, and require only a single fiber.

POTS Ports

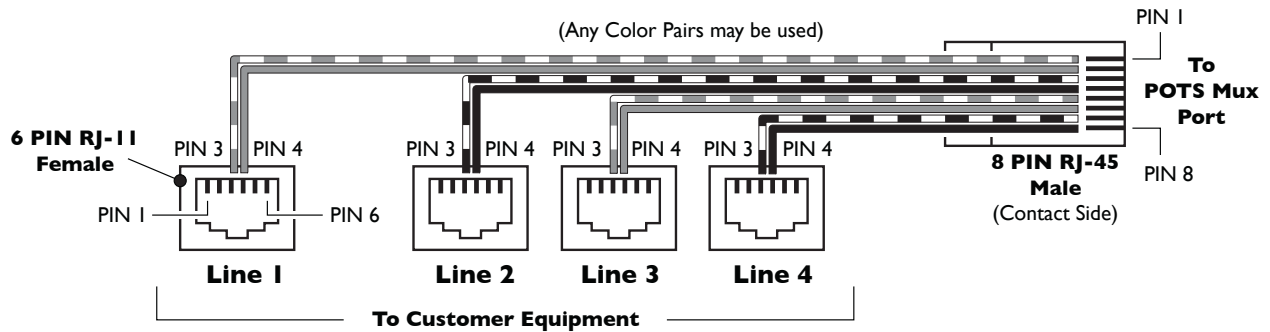
The POTS ports use all 8 pins of RJ-45 connectors. Although not standard for POTS lines, RJ-45 connectors allow for a denser system design. Use the included breakout adapters to attach standard RJ-11 connectors to the POTS Mux.



RJ-45 male to RJ-11 female breakout cable adapter (Included)

Breakout Cable Adapter

The POTS Mux breakout cable adapter wiring diagram is show below.



RJ-45 to RJ-11 breakout adapter cable diagram

- **4x1 POTS Mux:** Connect the RJ-45 to RJ-11 breakout adapter to port 1
- **8x1 POTS Mux:** Connect the RJ-45 to RJ-11 breakout adapter to ports 1 and 2

Data Port

The 8 line POTS Mux model includes one channel of RS-232 data. The port uses a RJ-45 connector.



Pin Description	
1 NC	5 GND
2 RS-232 TXD (Output)	6 NC
3 RS-232 RXD (Input)	7 NC
4 NC	8 NC

Installation

Prior to installation:

- Check for shipping damage
- Check the contents to ensure correct model and powering options
- Make sure you have the correct fiber type and power available
- Have a clean, dry installation environment ready

When installing:

- Install the POTS Mux System into a 19" equipment rack or other suitable location
- Check the polarity and voltage of the power with a multimeter before connecting to avoid damage
- Connect fiber cables to correct TX and RX ports, make sure the connections aren't accidentally flipped
- Do not remove fiber cable caps until you connect fiber to the unit, watch for contamination
- Observe anti-static precautions
- Ground the unit using a ground wire to the ground lug on the back panel

Once all connections are checked, turn the unit ON using the power switch on the front panel.

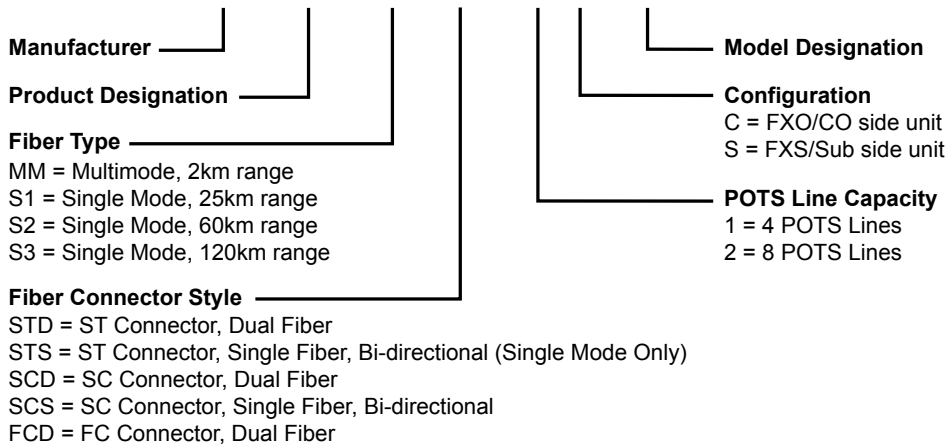
Note: The FXO and FXS units normally take a few minutes to sync with each other during initial setup or when power is turned OFF then ON.

See your RLH representative for power supplies with redundant power and battery backup, fiber optic cable, patch panels and other accessories compatible with the POTS Mux System.

Ordering Information

4/8 Channel POTS Mux Part Number Matrix

RLH - PM - S1 STD - 2 C - 01



Example: RLH-PM-S1STD-2C-01
RLH POTS Mux configured with Single Mode fiber, 25km range, dual fiber ST connectors, 8 POTS lines capacity, FXO/CO side unit.

- ▶ RJ-45 to RJ-11 break-out cables are included for easy connection to existing POTS lines
- ▶ 115VAC to 48VDC power adapter included
- ▶ Please contact your RLH sales representative for pricing and delivery information

General Specifications

Transmission method	Frequency modulated light via two optical fibers Multimode: 850nm/1310nm Single-mode: 1310nm/1550nm
Maximum Fiber Attenuation / Distance	Multimode: (62.5/125µm) 1.25 miles (2 km) Single-mode: (9/125µm) 15.5 miles/25km; 37 miles/60km; 74 miles/120km
Fiber Type	(ST, SC or FC connectors) Multimode: 62.5/125µm, Single-mode: 8-9/125µm
Operating Temperature	-20°F to +140°F (-29°C to +60°C)
Humidity	95% non-condensing
BER	<10 ⁻⁹
Dimensions	W 19in. x D 10in. x H 1.7 (1RU) (W 485mm x D 250mm x H 43mm)
Ethernet	10/100M, full/duplex, auto negotiation
Protocol	IEEE 802.3, IEEE 802.1Q (VLAN)
MAC Address Entries	4096
Ethernet Connector	RJ-45
RS-232 Port Interface*	ITU-T V.24 Standard
Data Rate	9600Kbps (Asynchronous)
Connector	RJ-45
Power	110VAC - 260VAC; 48VDC
Consumption	≤5W

***Note:** Applicable to 8 channel models only.

Warranty

RLH is recognized throughout the U.S. and offers the only **UNCONDITIONAL LIFETIME WARRANTY** in the telecommunications industry. We are very proud of our warranty which simply states that our Fiber Optic Link Assemblies are warranted to be free of defects in material and workmanship for the **LIFE OF THE PRODUCT**.

We can offer this warranty because:

- We believe our customers shouldn't have to incur additional costs due to failure or damage
- We engineer our products with total confidence in our quality
- We understand how safety and reliability impact the total cost of ownership
- We know that customer support extends beyond the initial sale, so **we stand behind our products**

RLH will replace any product, or part thereof, that fails **FOR ANY REASON**, provided the defective part is returned to RLH Freight prepaid. This warranty is **UNCONDITIONAL** and valid even when RLH products have been abused or mishandled, where unauthorized repairs have been attempted or performed, or product has been damaged as a result of a natural disaster. Compare this warranty to our competitors and see how our warranty will reduce your costs and simplify your maintenance activities. Not all RLH products are covered by this warranty.

To make a warranty claim, or schedule repair or replacement of your RLH product, please contact us for an RMA number. You will be promptly assisted by one of our warranty specialists. All returns must have an RMA number before we can receive any items.

Technical Support

Normal technical support: (Mon - Fri 6am - 6pm PST)	Local (714) 532-1672 Toll Free (800) 877-1672 Toll Free (866) DO-FIBER
24/7 Technical support:	(714) 366-2503 (714) 457-5740

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