

# 1×N Optical Switch

Polarization-Maintaining (PM) Fiber, RS232 / USB Version



## User Manual

This user manuals (PDF files) can be downloaded from the Lfiber website.

[www.lfiber.com](http://www.lfiber.com)

## 1×N Polarization-Maintaining (PM) Fiber Switch



### FEATURES

- ✓ Low Insertion Loss and High Reliability
- ✓ Serial Interface (RS-232)
- ✓ Modularized Design
- ✓ Epoxy-free on Optical Path

### APPLICATIONS

- Optical Signal Switching and Routing
- Optical Network Monitoring
- Testing of Fiber Optic Component
- Military Communications

### Specifications of the Polarization-Maintaining (PM) Fiber Switch

|                                 |  |
|---------------------------------|--|
| Channel Number (N)              | 1×N (N ≤ 16) or other channel counts on request          |
| Fiber Type                      | Panda PM fibers  |
| Insertion Loss (dB)             | Typ: 0.5; Max: 0.8                                       |
| Extinction Ratio (dB)           | ≥ 20 dB (standard) or better                             |
| Operating Wavelength (nm)       | 1310-1550  |
| Testing Wavelength (nm)         | 1310 or 1550   |
| Return Loss (dB)                | ≥ 50   |
| Crosstalk (dB)                  | ≥ 70   |
| Wavelength Dependent Loss (dB)  | ≤ 0.25   |
| Temperature Dependent Loss (dB) | ≤ 0.25   |
| Repeatability (dB)              | ≤ 0.02   |
| Lifetime (cycles)               | 10 <sup>7</sup>  |
| Switching Time (ms)             | ≤ 8 (adjacent channel)                                   |
| Power Handling (mW)             | ≤ 500  |
| Power Supply                    | 5V / 500mA   |
| Control Mode                    | RS-232   |
| Connector                       | FC, LC, SC, ST, etc.                                     |
| Operating Temperature (°C)      | -20 to +70   |
| Storage Temperature (°C)        | -40 to +85   |
| Dimension (mm)                  | 135 × 64 × 32 mm, 19" rack or different sizes on request |

#### Notes:

1. Unless otherwise specified, the slow axis of the fiber is aligned with the key of the PM fiber connector.
2. The PM fiber optical switch is powered by a universal AC/DC adaptor that is able to convert 100-250 VAC to 5 VDC.
3. Lfiber can offer a plug and play solution for programming (RS232 control) the switch via USB upon request. If there is a need, we can offer software solutions (based on Microsoft Windows OS) so that users can easily control the PM fiber switches.
4. This PM fiber switch can be installed in 1U units on standard 19-inch racks. We offer customization upon request if needed.
5. The polarization-maintaining (PM) fiber switch is customizable and above specifications are subject to change without notice.
6. For product customization or special requirements, please contact Lfiber's sales representative.



Optical Components, Fiber Optic Devices, Modules, and more.

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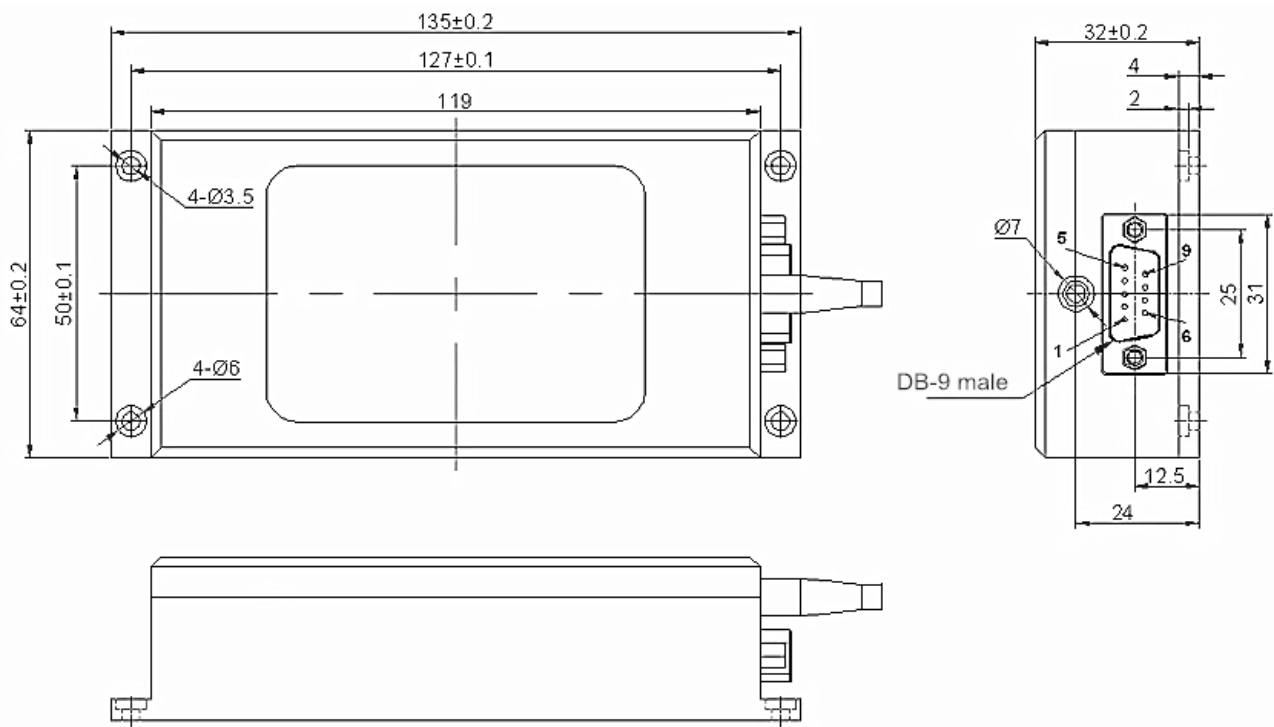
Email: [sales@lfiber.com](mailto:sales@lfiber.com)

## Pin Configurations of the Polarization-Maintaining (PM) Fiber Switch

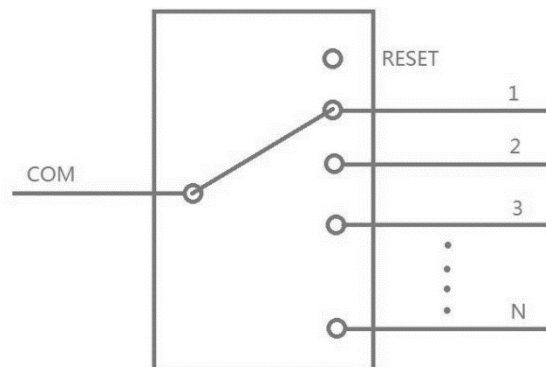
### DB-9 Male Connector

| Pin No.    | I / O | Signal | Description                       |
|------------|-------|--------|-----------------------------------|
| 2          | Input | RXD    | Receive Data                      |
| 3          | Out   | TXD    | Send Data                         |
| 5          | Power | GND    | Ground                            |
| 8          | Power | GND    | Ground                            |
| 9          | Power | VCC1   | 5.0 ± 5% VDC Power Supply (500mA) |
| 1, 4, 6, 7 | NC    | NC     | Vacancy                           |

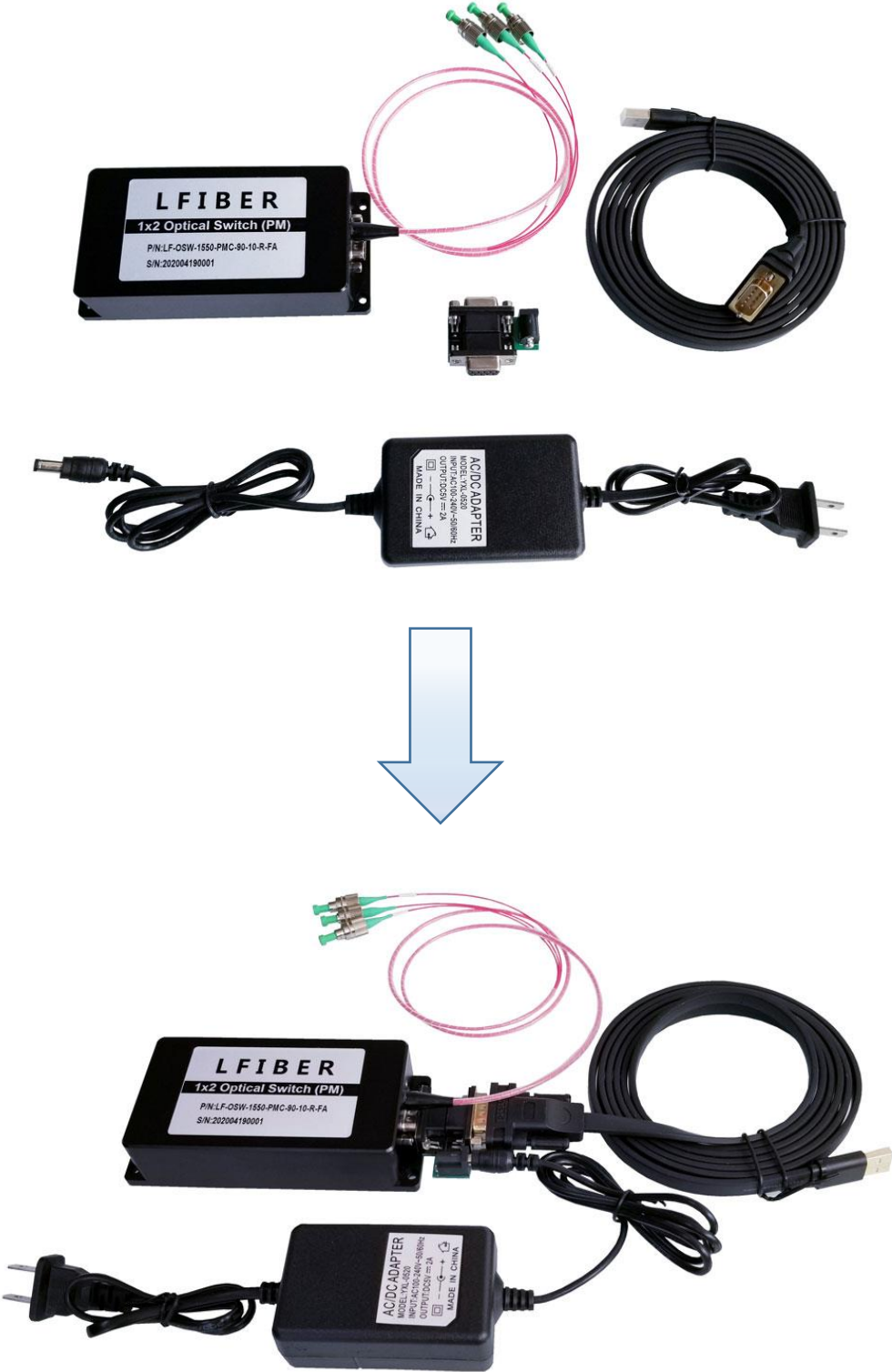
## Dimension of the Polarization-Maintaining (PM) Fiber Switch



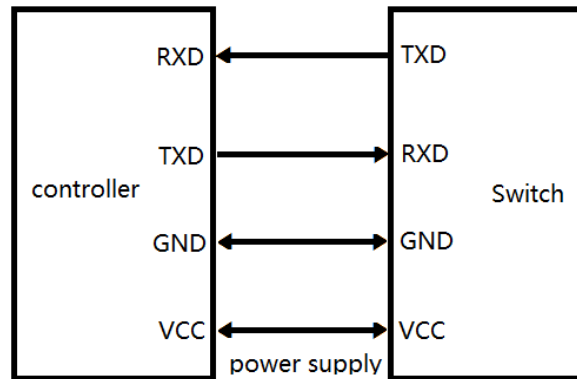
## Optical Route of the Polarization-Maintaining (PM) Fiber Switch



# RS232 Control via USB: Hardware Connection of the PM Fiber Switch



## Control Chart of the Polarization-Maintaining (PM) Fiber Switch



### Communication Protocol

- “\_” expression underline.
- Communication protocols are all capital letters.
- The communication protocol commands, “<” as the start, “>” as a terminator.

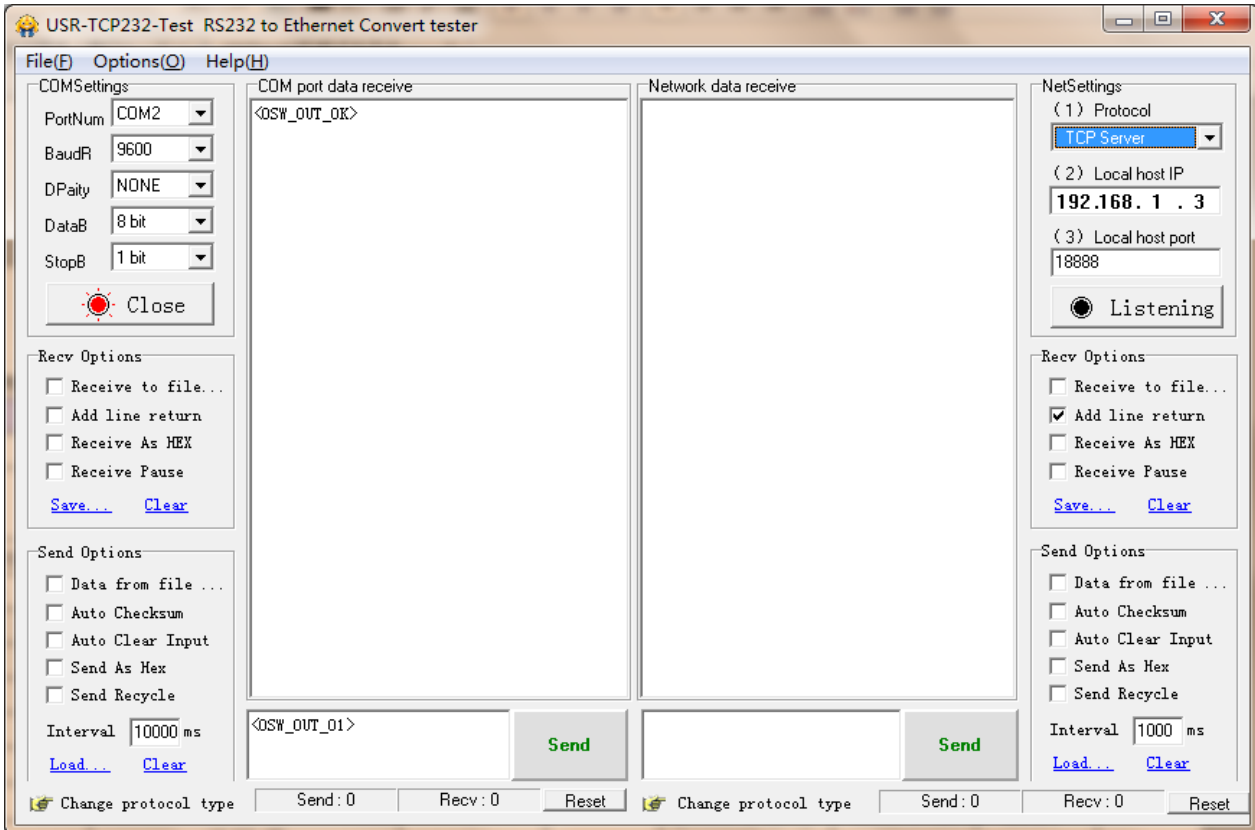
| Usage                         | Instruction   | Description   |
|-------------------------------|---|---|
| Set optical switch channels   | Send:<br><OSW_OUT_XX>                                     | Set the "XX" value to select the fiber channel. When "XX" is 00, the switch will be reset. Set 01 to select channel 1. A successful setup will return 1. It returns 2 when "XX" is larger than total channel amount.  |
|                               | Return1:<br><OSW_OUT_OK>                                  |   |
|                               | Return2:<br><OSW_OUT_OVERFLOW>                            |   |
| Query optical switch channels | Send:<br><OSW_OUT_?>                                      | Send the query command and it will return an "XX" value to indicate the current channel.  |
|                               | Return:<br><OSW_OUT_XX>                                   |   |
| Query optical switch type     | Send:<br><OSW_TYPE_?>                                     | Send the query command and it will return following basic information of the switch.<br>Model: LF-OSW-1×N<br>Wavelength Range: 1310-1550 nm<br>Fiber Type: Panda PM fibers<br>Protective Casing: 0.9 mm<br>Fiber Length: 0.5 m<br>Control Interface: RS-232<br>Connector type |
|                               | Return:<br><OSW_TYPE_LF-OSW-1X16_1310~1550_PM_90_05_R_FA> |   |

## Operating Instructions

### COM Settings

Baud rate: 9600 | Data bits: 8 bit | Stop bit: 1 bit | Parity bit: None | Command error return "<OSW\_ERROR>"

### Software Control Chart (For Reference Only)



- The optical switch transmits the command to control the optical switch through RS232 serial communication. The optical switch receives the command successfully and returns the response.
- To program the PM fiber switch directly over USB (RS232 control), we can throw in a USB 2.0 to DB9 male serial cable (RS232 converter/adaptor), and then the switch can be connected to the USB port on your device. To download the driver for the converter/adaptor, visit: <https://www.lfiber.com/usb-2-0-to-db9-male-serial-cable-driver-for-lfibers-optical-switches/>
- The PM fiber optical switch is bidirectional in operation.

### Ordering Information for the Polarization-Maintaining (PM) Fiber Switch

| Port/Channel Number | Test Wavelength | Fiber Type      | Control Mode         | Fiber Length | Connector  |
|---------------------|-----------------|-----------------|----------------------|--------------|------------|
| 1×N (N ≤ 16)        | 1310 nm         | Panda PM fibers | RS232 (via DB9 Male) | 0.50 m       | None       |
| Custom ...          | 1550 nm         |                 | RS232 (via USB)      | 1.00 m       | LC/UPC     |
|                     | Custom ...      |                 |                      | 1.50 m       | LC/APC     |
|                     |                 |                 |                      | Custom ...   | SC/UPC     |
|                     |                 |                 |                      |              | SC/APC     |
|                     |                 |                 |                      |              | FC/UPC     |
|                     |                 |                 |                      |              | FC/APC     |
|                     |                 |                 |                      |              | Custom ... |



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