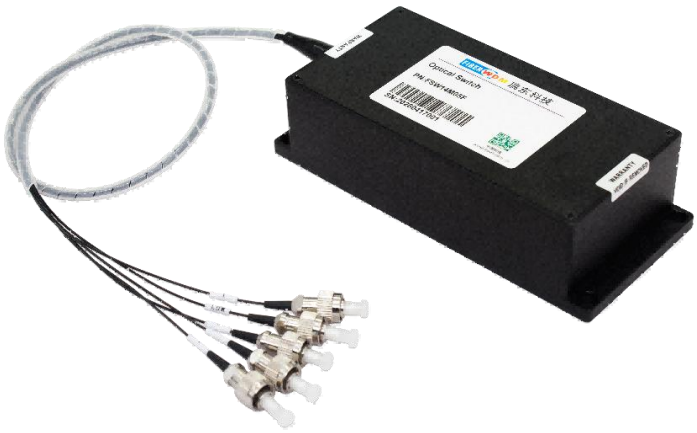
FSW14M05F

1X4 Step-index multimode fiber Optical switch 405-640nm 50/125um (NA0.22)

0.9mm 0.5m fiber, FC/UPC, RS-232 Serial Port, 135x60x35 module



FSW14M05F is a 1×4 (4×1) optical switch developed by Guangzhou Ruid Electronic Technology Co., Ltd., utilizing step-index multimode fiber and specially designed for the visible light band of 405–640 nm. This product adopts precision micro-electromechanical or solid-state optical switching technology to achieve fast and reliable optical path switching between one input channel and four output channels. It is suitable for high-precision applications requiring dynamic multi-channel optical path selection, such as industrial inspection, biomedical imaging, spectral analysis, laser beam splitting, and scientific research experiments.

Features:

- **Wide spectral compatibility**
  Covers the complete visible light band from 405 nm (violet) to 640 nm (red), compatible with common semiconductor lasers, LEDs, and xenon light sources, meeting diverse requirements such as fluorescence detection and confocal imaging.

- **Low insertion loss and high channel isolation**
  Precision optical alignment and matched design with step-index multimode fiber ensure low insertion loss and low crosstalk between channels, guaranteeing signal integrity and measurement accuracy.

- **Robust and durable with industrial-grade reliability**
  Equipped with 0.9 mm fiber and FC/UPC connectors, featuring high mechanical strength and excellent insertion-extraction repeatability. The fully metal shielded housing effectively resists electromagnetic interference, adapting to both laboratory and industrial on-site environments.

- **Compact modular design**
  Small dimensions of 135×60×35 mm for easy system integration and rack mounting. Controlled via the standard RS-232 serial port with a simplified command set, supporting direct driving by PCs, PLCs, and embedded systems.

- **Flexible channel switching**
  1-input 4-output architecture (or 4-input 1-output selection), supporting unidirectional optical path selection. Fast switching response and precise channel positioning enable automated multi-channel time-division acquisition when combined with software.

Application:

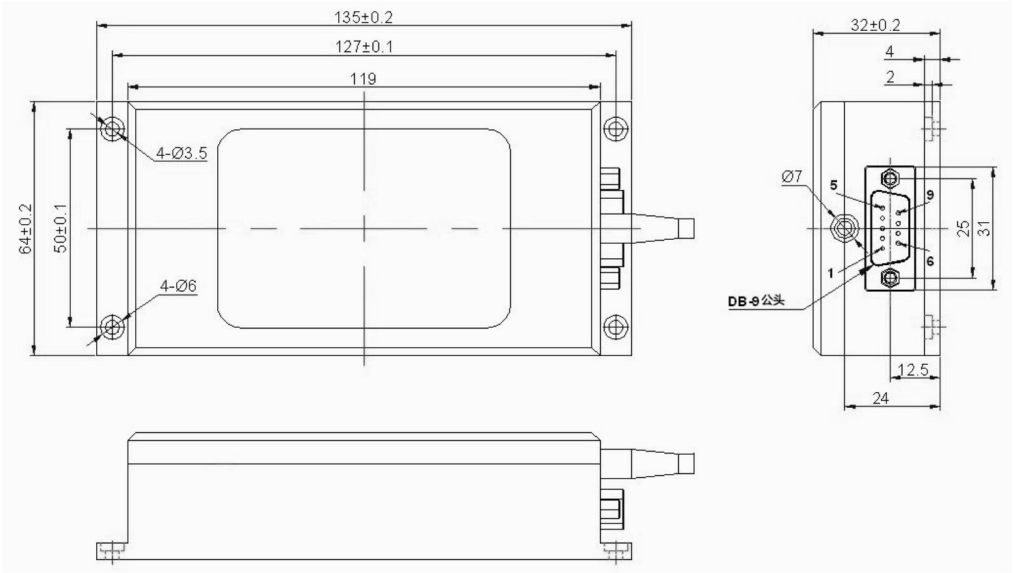
- **Biomedical Applications:** Flow cytometry, confocal microscopy, multi-channel fluorescence detection for endoscopes.
- **Spectral Analysis:** Automatic switching of multi-channel sample cells, LIBS/OES spectral acquisition systems.
- **Industrial Inspection:** Multi-station light source switching for machine vision, laser marking beam splitting systems.
- **Scientific Research Experiments:** Automatic optical path configuration, time-division multiplexing of multiple detectors, quantum optics experiment platforms.

Specifications:

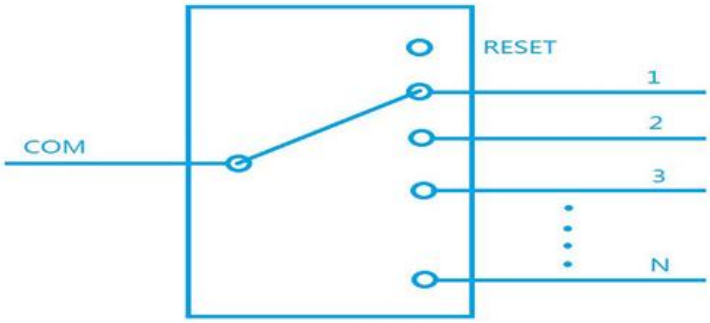
Parameters	Value
Model	FSW14M05F
Insertion Loss	1x4(4x1)
	≤1.0 dB
Operating Wavelength	405-640nm
Test Wavelength	450/650nm

Return Loss	MM ≥ 30
Channel Crosstalk	MM ≥ 50
Polarization Dependent Loss	≤0.05 dB
Wavelength Dependent Loss	≤0.25 dB
Temperature Dependent Loss	≤0.25 dB
Repeatability	≤0.02 dB
Switching Life	≥10^7
Switching Time	≤20ms (Adjacent Channels)
Optical Power	≤500 mw
Fiber Type	Step-index multimode fiber 50/125um (NA0.22)
Connector	FC/UPC(or others)
Control Method	RS-232
Operating Voltage	5V
Operating Current	600 mA
Operating Temperature	-20 ℃ ~ +70 ℃
Storage Temperature	-40 ℃ ~ +85 ℃

Product Dimensions:



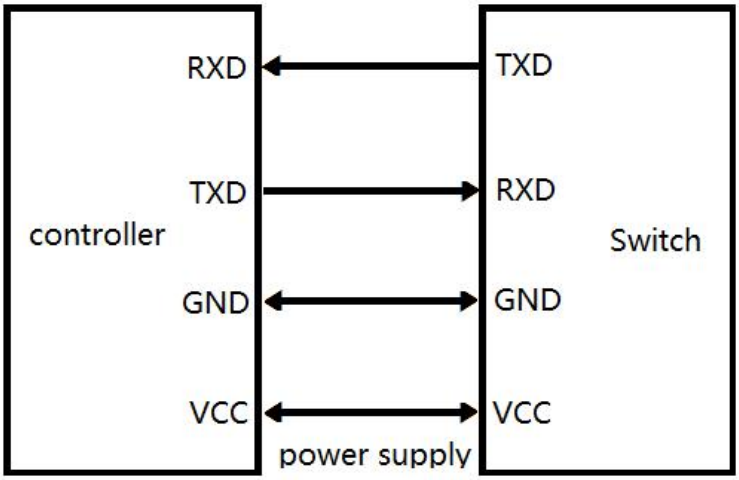
Optical Route:



Pin Configurations:

DB9 Male connector			
PIN	Model	Name	Function
2	Input	RXD	RS-232 RX
3	Out	TXD	RS-232 TX
5，8	Power	GND	Power GND
9	Power	VCC	Power VCC（5V，500mA）
1,4,,6,7	NC	NC	Null

Control Diagram:



Control Commands:

- "_" stands for underscore.
- All letters in the communication protocol shall be in uppercase.
- This module can execute only one command at a time. Normally, the next command can be entered only after the program returns a response.
- In actual operation, enter the angle bracket " < " as the start character and " > " as the end character.

Name	Commands	Description
Set Optical Switch Channel	Commands:<OSW_OUT_XX> Response 1:<OSW_OUT_OK> Response 2:<OSW_OUT_OVERFLOW>	This command is used to set and select the optical switch channel. When XX is 00, the channel is reset. When XX is 01, the switch switches to Channel 1.Response 1 will be returned if the setting is successful.If the input XX exceeds the number of optical switch channels, Response 2 will be returned
Query Current Channel of Optical Switch	Commands:<OSW_OUT_?> Response:<OSW_OUT_XX>	This command is used to query the current channel of the optical switch.A valid response command will be returned upon successful query, where XX indicates the current channel.
Query Optical	Commands:<OSW_TYPE_?>	This command is used to query the

Switch Information	Response:<OSW_TYPE_OSW-1XNN_1260~1650_SM,9/125_90_10_R_FA>	information of the optical switch, and the returned response indicates: Module Model: OSW-1XNN Operating Wavelength: 1260~1650 nm Fiber Type: SM, 9/125 μm Fiber Boot: 0.9 mm Pigtail Length: 1 m Control Interface: RS-232 Connector: FC/APC

Note: The module serial port baud rate is 9600, data bits: 8, stop bits: 1, no parity.If the sent command is invalid, the optical switch returns the response command <OSW_ERROR> 。

Order Information ：

Model	Specification Description
FSW14M05F	1X4 Step-index multimode fiber Optical switch 405-640nm 50/125um (NA0.22) 0.9mm 0.5m fiber，FC/UPC, RS-232 Serial Port，135x60x35 module

Note: For other customized specifications, please contact us at: **sale@fiberwdm.com**