2U Rack-Mounted 8-Group 1X6 Optical Switch

Product introduction

Optical switch is a kind of optical path control device, which plays the role of controlling and converting the optical path. And play an important role in optical communication application. The optical switch is mainly used in multi-channel optical monitoring, LAN multi-light source/detector automatic switching and optical sensing multi-point dynamic monitoring system in the optical transmission system, optical fiber, optical device, network and field engineering optical cable test in the optical test system; Optical device assembly and adjustment.

Product features

- It has the characteristics of low insertion loss and fast switching speed.
- The LCD display screen is used to display data intuitively and facilitate the user's operation.
- Light path switching can be set through panel keys and serial port commands. And that key operation can be loc through a serial port instruction.

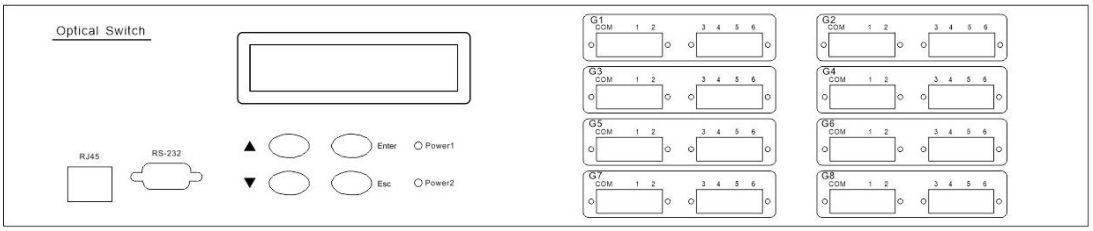
Technical parameters

Model	FSW8-1X61D-1U433
Operating wavelength	850nm
Test wavelength	850nm
Insertion loss	≤2.0 dB
Repeatability	≤±0.05 dB
Return loss	≥30dB
Crosstalk	≥30dB
Polarization dependent loss	≤0.05dB
Switching time	≤ 10ms (adjacent sequential switching)
Fiber type	MM（OM3）
Connector form	LC/PC
Monitoring port	RJ45、RS-232
Working power supply	Dual AC: 85 ~ 264 V (50/60Hz)
Operating temperature	-5 ~ + 60℃

Storage temperature	-40 ~ + 80°C
Chassis type	19-inch standard 2U rack (483 × 303 × 89mm) RAL9002

Front panel description

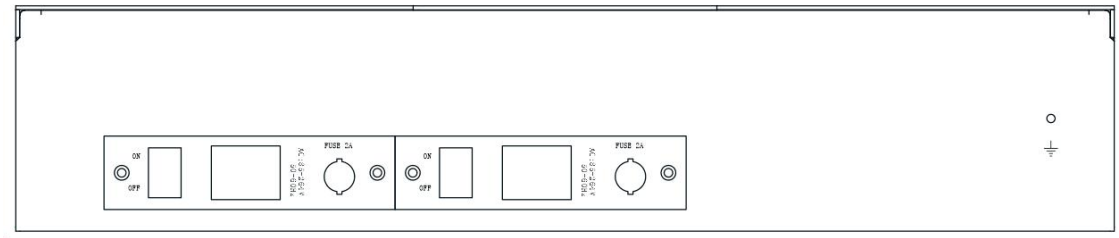
Front panel



- RJ45 Ethernet interface, RS-232 serial port: communication interface for equipment monitoring data information.
- LCD display: display of equipment address, current channel and related information.
- ▲ —— Move up key; ▼-Move down key; Enter-Enter key; Esc-Cancel key.
- Power indicator lamp Power 1, Power2: working power indicator.
- Optical interface description: the COM port on the equipment panel is the common port, and 1, 2, 3, 4, 5 and 6 are the channel numbers respectively.

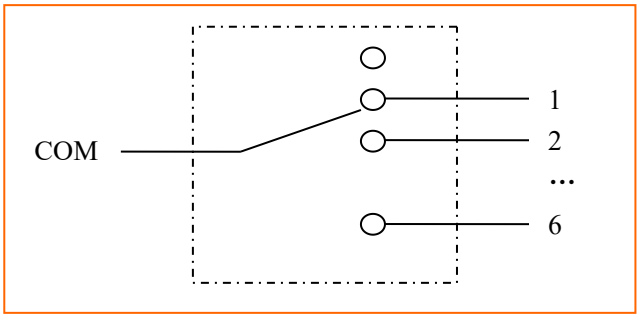
Rear panel description

Back panel



AC power interface: AC power input interface for equipment operation.

Schematic of internal optical path

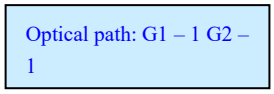


Schematic of internal optical path of single 1 × 6 optical switch (same for other 1 × 6)

Operating instructions for the panel

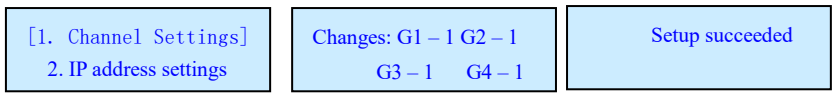
- Keyboard locking: Send corresponding commands through the communication interface of the equipment to set whether the keys on the panel are allowed to be used. See "Communication Protocol Description" for details. When the panel key is locked, the light path switching operation cannot be performed through the panel key.
- Panel key light path channel switching:

- Initial interface



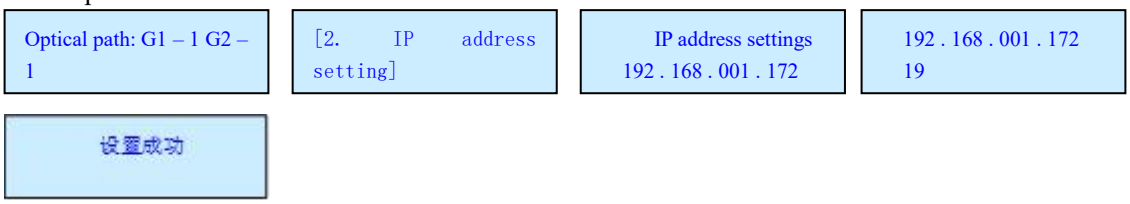
Channel selection interface:

- ① Press the "Enter" key to enter the channel setting interface; ② Press the "▲" or "▼" key to select the "G1" channel; ③ Press the "Enter" key to confirm the selection and enter the channel selection of the next group of optical switches; ④ Press the "Esc" key to return to the previous step.



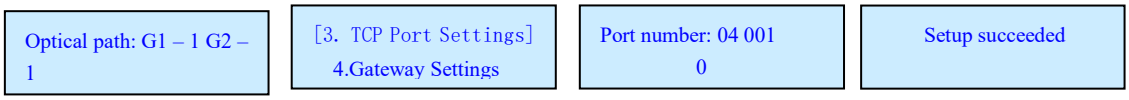
- IP address settings

- ① Press and hold the "Enter" key for 4 seconds to enter the menu; ② Press the "▲" or "▼" key to select "2. IP address setting"; ③ Press the "Enter" key to enter the current IP address; ④ Press the "Enter" key to enter the IP setting interface; ⑤ Press the "▲" or "▼" key to select "IP address". ⑥ Press the "Enter" key to confirm completion.



- TCP port settings

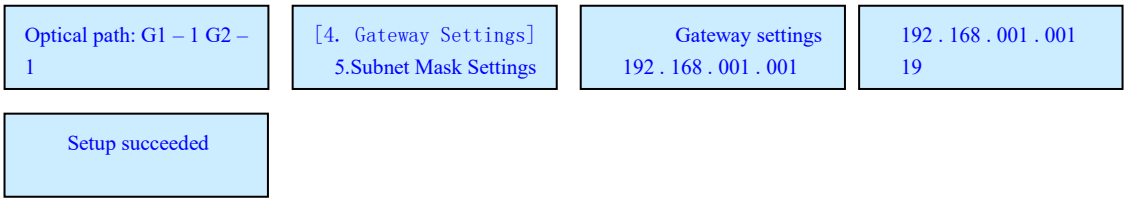
- ① Press and hold the "Enter" key for 4 seconds to enter the menu; ② Press the "▲" or "▼" key to select "3. TCP Port Settings"; ③ Press the "Enter" key to enter; ④ Press the "▲" or "▼" key to select the port number; ⑤ Press the "Enter" key to confirm completion.



- Gateway settings

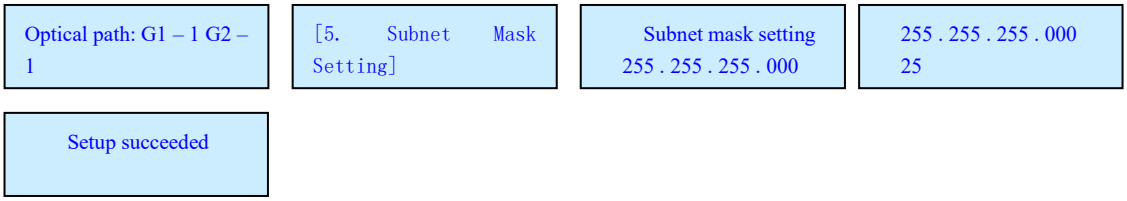
- ① Press and hold the "Enter" key for 4 seconds to enter the menu; ② Press the "▲" or "▼" key to select "4.

Gateway Setting"; ③ Press the "Enter" key to enter and view the current gateway address; ④ Press the "Enter" key to enter the gateway setting interface; ⑤ Press the "▲" or "▼" key to select "Gateway Address". ⑥ Press the "Enter" key to confirm completion.



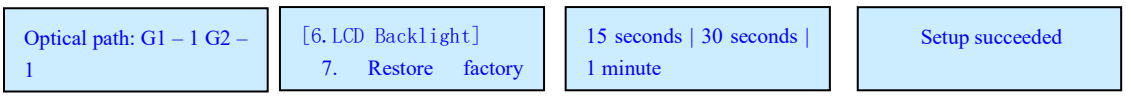
Subnet mask setting

- ① Press and hold the "Enter" key for 4 seconds to enter the menu; ② Press the "▲" or "▼" key to select "5. Subnet Mask Setting"; ③ Press the "Enter" key to view the current gateway address; ④ Press the "Enter" key to enter the subnet mask setting interface; ⑤ Press the "▲" or "▼" key to select "Subnet Mask Address". ⑥ Press the "Enter" key to confirm completion.



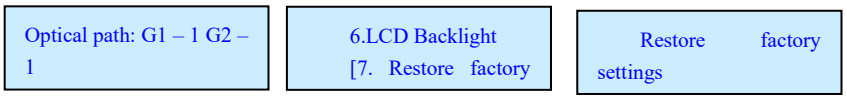
LCD backlight

- ① Press and hold the "Enter" key for 4 seconds to enter the menu; ② Press the "▲" or "▼" key to select "6. LCD backlight"; ③ Press the "Enter" key to enter; ④ Press the "▲" or "▼" key to select the time; ⑤ Press the "Enter" key to confirm completion.



Restore factory settings

- ① Press and hold the "Enter" key for 4 seconds to enter the menu; ② Press the "▲" or "▼" key to select "7. Restore factory settings"; ③ Press the "Enter" key to enter; ④ Press the "Enter" key to confirm completion.



Upper computer monitoring description

The device can receive control signals from a computer through the RS-232 interface on the front panel to realize automatic measurement or real-time monitoring (by using a serial monitoring system or serial software), and can also carry out remote monitoring through an Ethernet port.

Programmed instruction

The instrument can only execute one command at a time. The next instruction is usually entered after the program returns the corresponding value.

- Please use capital letters.
- In the actual operation, enter the angle bracket "<" as the start character and the angle bracket ">" as the end character.

Optical switch instruction set

Command	Description	Examples
<OSW_A_?>	Query the channel status Successful return: < OSW _ A _ G1 corresponding channel _ G2 corresponding channel _ G3 corresponding channel _ G4 corresponding channel _ G5 corresponding channel _ G6 corresponding channel _ G7 corresponding channel _ G8 corresponding channel >	Successfully returned: <OSW_A_1_1_1_1_1_1_1_1> The current light path is: G1 → 01, G2 → 01, G3 → 01, G4 → 01, G5 → 01, G6 → 01, G7 → 01, G8 → 01;
<OSW_SW_g1_g2_g3_g4_g5_g6_g7_g8>	Channel switching G1, G2, G3, G4, G5, G6, G7 and G8 are the channels corresponding to G1, G2, G3, G4, G5, G6, G7 and G8 respectively, and the values are from 1 to 6	Successfully returned: <OSW_SW_g1_g2_g3_g4_g5_g6_g7_g8_OK>

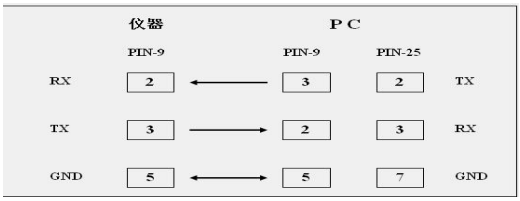
Device parameter instruction set

<SET_IP_xxx_xxx_xxx_xxx>	Set/query local IP address (effective after restart) 1. If XXX is 000 ~ 255, the IP address is set. 2. Successful return: < SET _ IP _ OK > 3.<IP_? > to query the IP address 4. Failure return: < ER >	Send: < SET _ IP _ 192 _ 168 _ 002 _ 011 > Indicates that the IP is set to: 192.168.2.11 Send: < IP _? > Return: < IP _ 192 _ 168 _ 002 _ 011 > Indicates that the current IP is: 192.168.2.11
<SET_GW_xxx_xxx_xxx_xxx>	Setup/Query Gateway (Restart takes effect) 1. If XXX is 000 ~ 255, the gateway is set. 2. Successful return: < SET _ GW _ OK > 3.<GW_? > indicates the query gateway address 4. Failure return: < ER >	Send: < SET _ GW _ 192 _ 168 _ 002 _ 001 > Indicates that the gateway is set to 192.168.2.1 Send: < GW _? > Return < GW _ 192 _ 168 _ 002 _ 001 > Indicates that the current gateway is: 192.168.2.1
<SET_SM_xxx_xxx_xxx_xxx>	Set/Query Subnet Mask (Restart takes effect) 1. If XXX is 000 ~ 255, the subnet mask is set. 2. Successfully returned: < SET _ SM _ OK > 3.<SM_? > to query the subnet mask 4. Failure return: < ER >	Send: < SET _ SM _ 255 _ 255 _ 255 _ 000 > Indicates that the subnet mask is set to 255.255.255.0 Send: < SM _? > Return: < SM _ 255 _ 255 _ 255 _ 000 > Indicates that the current subnet mask is 255.255.255.0
<SET_TCPP_xxxxx>	Set/query TCP communication port number (effective after restart)	Send: < SET _ TCPP _ 04001 > Indicates to set the TCP communication port number: 4001

	1.xxxxx is the 00000 ~ the 65534 indicates that the TCP communication port number is set 2. Successfully returned: < SET _ TCPP _ OK > 3.<TCPP_? > to query the TCP communication port number 4. Failure return: < ER >	
<BAUD_x>	Set or query the serial port baud rate 1. X is from 1 to 9, representing baud rates 2400, 4800, and 9600, 14400, 19200, 38400, 56000, 57600, and 115200, respectively. Success return: < BAUD _ X _ OK > 2. Send < BAUD _? > Query the baud rate	Send: < BAUD _ 5 > Success return: < BAUD _ 5 _ OK > Set the device serial port baud rate to the 19200.
<SET_KEY_x>	Set or query the permission of the device button 1.x value: 0 means forbidden; 1 indicates permission; 2. Successfully returned: < SET _ KEY _ OK > 3. < KEY_? > Indicates the permission status of the query key; Success returned: < KEY _ 0 > or < KEY _ 1 >	< SET _ KEY _ 1 > indicates that the key is allowed to be used; < SET _ KEY _ 0 > indicates that the key is forbidden to use; <KEY_? > If the key is allowed to be used, return: < KEY _ 1 >; if the key is not allowed to be used, return: < KEY _ 0 >
<RESET>	Restart the device Failure return: < ER >	Successful serial port return: < RESET _ OK > Note: If the network port does not return, the TCP connection will be automatically disconnected after success;
<RESTORE>	Restore factory settings Failure return: < ER >	Successful serial port return: < RESET _ OK > Note: 1. If the network port does not return, the TCP connection will be automatically disconnected after success; 2. The command only restores the network parameters to the default values;
<INFO_?>	Query device information Failure return: < ER >	Successfully returned: <OSW-4×1× 6-SM_VERV1.00_SN01234567890_ C06.02.00020> Indicates a 4 × 1 × 6-MM optical switch, version 1.00, SN No.01234567890, product No. C06.02. 00020;

Serial port connection mode and control

- Pin definition and connection mode of RS-232
- RS-232 pin definition: DB9 pin type, # 2-RXD, # 3-TXD, # 5-GND, and other pins are not connected.
- RS-232 connection mode between the instrument and PC:



RS-232 serial port connection diagram

- Serial port setting of PC
- The serial port setting of the PC is: The serial port setting of the computer should be the same as the serial port setting of the device.
- Serial port to network debugging assistant USR-TCP232-Test is used for the serial port and network port debugging software of the device. The software can be downloaded from the following link:http://www.usr.cn/Download/27.html。 The left side of the USR-TCP232-Test software is the serial port debugging assistant, and the right side is the network debugging assistant, as shown in the figure:

USR-TCP232-Test interface of serial port to network debugging assistant

- Serial debugging uses the left part of the USR-TCP232-Test software. The RS-232 serial port is set to 19200 baud, 8 data bits, 1stop bit, and no parity. Generally, the serial port number of the built-in serial port of the desktop computer is COM 1, while the serial port number of some USB to serial port cables plugged into different USB ports will be different, so the serial port number must be set as the serial port number of the actual connection between the device and the computer.

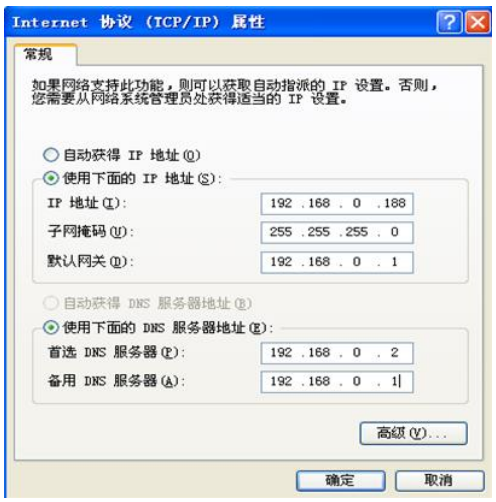
- When the device is connected to the serial port of the host computer, use the serial port debugging assistant to send relevant commands, and the device will return relevant data to monitor the relevant situation of the device. As shown in the figure:

Serial debugging interface

Network port monitoring

- When the RJ45 Ethernet port on the device is used to monitor the device, the IP address of the upper computer (computer) must be in the same network segment as the IP address of the device. For example, the IP address of the computer whose IP address has not been changed is 192.168.2.45, and the subnet mask is 255.255.255.0. Default gateway: 192.168.2.1; the IP, mask and gateway of the device should be changed to be similar to 192.168.2.11, 255.255.255.0 and 192.168.2.1. The following are the specific operating instructions.

- Set the IP address of the computer
- First, change the computer IP to 192.168.0.188, the subnet mask to 255.255.255.0, the default gateway to 192.168.0.1, and the DNS part can be left blank. (Because the factory IP address of the device is 192.168.0.178, the device can only be accessed and changed by setting the same network segment as the device.). As shown in the figure:



Change Computer IP Diagram

- Network Debugging Assistant Monitoring
- After connecting the network port of the device to the computer, set the protocol type TCP Client, the server IP address as the device IP, and the server port number as 4001 in the network debugging assistant part on the right side of the USR-TCP232-Test software. Send relevant commands after connection, and the device will return relevant data to monitor the relevant situation of the device.

Network Debug Assistant Change Device IP Diagram

- Change the IP address of a computer
- If the IP address of the device is modified, you need to change the IP address of the computer to the same network segment as the device to access and change the device. For example, in the above step, the IP, mask and gateway of the device are changed to 192.168.2.11, 255.255.255.0 and 192.168.2.1, The IP, mask, and gateway of the computer should be changed to something like 192.168.2.45, 255.255.255.0, and 192.168.2.1 to connect to the device.

Precautions

- When using this equipment, each port must be correctly connected according to the optical path connection instructions.
- The power supply shall be grounded to ensure that the input power supply voltage is within the range required by the equipment.
- If the host is abnormal due to sudden interference, it should be shut down first and then handled.
- The optical input must be well connected and accurately positioned, otherwise the measurement results and insertion loss may be incorrect.
- It is normal to have slight vibration or sound when switching the optical path.

Equipment maintenance

- Reasonable use and proper storage of equipment can maintain good performance indicators for a long time and prolong its service life, so proper maintenance is required:
- The equipment shall be free from strong mechanical vibration, collision, falling and other mechanical damages. There must be good packaging and vibration damping, rain-proof and waterproof measures during transportation;
- The equipment shall be kept clean, and the working environment shall be free of acid, alkali and other corrosive gases. Gently scrub the chassis and panel with a clean towel dampened with water or soapy water. It is forbidden to scrub with alcohol and other solvents.
- When removing the optical fiber connecting line, cover the dust cap in time to prevent hard objects, dust or other dirt from touching the end face of the optical fiber.

Factory Default Configuration

Project	Factory default configuration	Remark
Use of panel keys	Permission to use	
Baud rate setting	9600	8 data bits, 1stop bit, no parity.
LCD backlight	15 seconds	There is no panel key operation within "15 seconds", and the backlight is turned off.
Device IP	192.168.1.178	Working mode: TCP Server; Working port: 4001

Factory Default Configuration List

Common fault handling

Fault manifestation	Possible causes	The solution
No display when starting up	The power supply is not connected properly.	Reconnect the power supply and turn it on.
Excessive insertion loss	Contamination of end face of connecting head	Clean end face of the optical connector again and fix the connector. Check the end face for damage.
The upper computer command is invalid	Baud rate settings are inconsistent	Check the baud rate of the device in the menu "Baud rate setting" of the device, and set it as required.

	The network cable and serial port cable are not connected properly	Turn off the machine first, check the network cable and serial port cable again, and then turn on the machine.