

MIEN5208 Series

Managed Industrial Ethernet Switch

User Manual

(Edition: V3.1)

Wuhan Maiwe Communication Co., Ltd.

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Clarification

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Statement

Due to continuous update and improvement of products and technology, the contents of this document may not be completely consistent with the actual products, appreciate for your understanding. If necessary to inquiry the updates of the product, please check our official website or contact our representative directly.

Revise history :

Version	Date	Reason
V1.0	2016.09	Create files
V2.0	2018.03	Added the import and export function of RSTP and configuration files.Modify QOS and VLAN function

Safe Use Instruction

This product performance is excellent and reliable in the designed range of use, **but it's necessary to avoid man-made damage or destroy for the equipment.**

- Read the manual carefully and keep this manual for reference if need afterwards.
- Do not put the device close to the water sources or damp places.
- Do not put anything on the power cable, it should be placed out of reach.
- To avoid causing fire, do not knot or wrap the cable.
- Power connector and other device connectors should be firmly connected with each other, frequently inspection is needed.
- Please keep the fiber socket and plug clean. Do not look directly at the fiber section when the equipment is working.
- Please keep the equipment clean and wipe it with a soft cotton cloth if necessary.
- Please do not repair the equipment by yourself, unless there is clear instructions in the manual.

Under the following circumstances, please cut off power immediately and contact us.

- Equipment water damage.
- The equipment is broken or the casing is broken.
- The equipment works abnormally or the performance has completely changed.
- The equipment produces odor, smoke or noise.

Statement: Information requiring explanation in use of the managed software.

Attention: Matters requiring specific attention in the use of the managed software.

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1. Introduction

1.1. Product introduction

Wuhan Maiwe industrial Ethernet switch is specially designed for industrial high speed communications network. It provides the advanced industrial Ethernet solution, which makes the industrial communications more fluent, dependable and fast..

MIEN5208-2F managed industrial ethernet switch has 2x100M fiber ports+ 6x10/100M RJ45 port; The RJ45 ports are self-adaptive and can be automatically configured to 10Base-T or 100Base-TX and full-duplex or half-duplex operation modes, and can automatically perform MDI/MDI-X connections. All ports support fast ring network redundancy. When the system fails, the ring redundancy switching time is less than 20mS. It supports one-button recovery from the factory settings, and the operation is simple and convenient.

1.2. Product features

1.2.1. High-performance Ethernet switch interface

100Base-FX full-duplex multimode/single mode redundant fiber interface (provided by 2 fiber ports + 6 copper ports)

10Base-T/100Base-TX adaptive Ethernet interface (full-duplex, half-duplex), support automatic MDI/MDI-X connection

Fast ring network redundancy technology with less than 20mS enhances system communication reliability

Supports port control, bandwidth control, VLAN, QoS, static multicast, port mirroring, port aggregation, fault alarm, broadcast storm suppression

Support web network management

1.2.2. Industrial power supply design

Multiple power options are available:

DC power input range: DC12~48V.

AC power input range: DC110V~370V and AC85V~264V

DC power supply models support dual power supply redundant input, AC power models only support single power input

Power supply with reliable overcurrent, overvoltage protection and EMC protection

Relay alarm output function, can be connected to other sound and light alarm devices

Industrial Application Design

Single ribbed aluminum chassis cooling surface design, the system can

work reliably in the environment of $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

High-strength enclosed aluminum housing allows the system to work reliably in harsh and dangerous industrial environments

Standard products are DIN rail mounted, and it can also provide other accessories required for installation.

1.3. Packing list

Items	Quantity
MIEN5208 series industrial ethernet switch	1
User manual	1

1.3.1. Product selections

Available models	Ports				Power range
	100M copper port	100M fiber port (SC/ST/FC)			
Standard models			Single mode	Single mode single fiber	Multi mode
MIEN5208-S2	6	2			1. DC power supply: DC12~48V 2. AC power supply: DC110V~370V and AC85V~264V adaptive
MIEN5208-TS2	6		2		
MIEN5208-2M	6			2	
MIEN5208	8				

Note:

Each model can be powered by the above two types of power supplies.

2. Technical indicators

System indicators	MIEN5208
RJ45 port number	6 *10Base-T/100Base-TX
Fiber ports	2*100Base-FX (2 fiber ports+6 copper)
System parameters	Support standards: IEEE 802.3i, IEEE 802.3u, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q Exchange bandwidth: 2Gbps MAC address table: 2K Exchange mode: store and forward Broadcast storm suppression
Copper ports parameters	Physical interface: RJ-45 with shielding RJ-45 port: 10Base-T/100Base-TX, supports auto-negotiation Interface standard: in line with IEEE802.3 standard Transmission distance: 100 meters
Fiber port parameter	Luminous power: >-12dBm (single mode)>-17dBm (multimode) Light absorption sensitivity: <-38dBm(single mode) <-35dBm (multimode) Wavelength: 1310nm (single mode) 1550nm (single mode) 1310nm (multimode) Transmission distance: 20~80Km optional (single mode) <5Km (multimode) Connector Type: SC/FC/ST Transmission rate: 155Mbps
Power parameter	Input voltage: DC power input range: DC12~48V (supports dual power supply redundant input) AC power input range: DC110V~370V and AC85V~264V (single power input) Input power consumption: <5W@24VDC Overcurrent protection: built-in
Mechanical parameters	Dimension: 136mm54mm110mm (excluding DIN rail assembly size) Installation method: DIN rail type Weight: 0.61kg
working environment	Working temperature: -40°C~+85°C Storage temperature: -40°C~+85°C Humidity: 0 to 95%(no condensation)

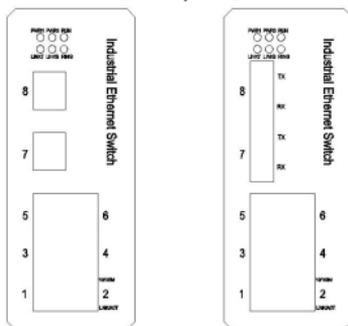
3. Hardware installation and testing

3.1. Hardware structure

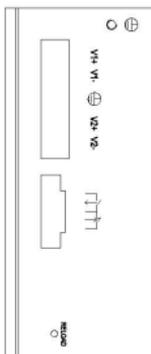
3.1.1. Machine mechanism

The chassis of MIEN5208 series switch is DIN rail structure. The whole machine adopts six-sided fully enclosed structure. Its external dimensions (excluding DIN rail size) are: 136mm × 54mm × 110mm (height × width × depth).

The front panel of the MIEN5208 series switches has two structures: the front panel of the 2 fiber ports and 6 copper ports which are equipped with 2* 100Base-FX fiber interfaces and 6* 10Base-T/100Base-TX Ethernet RJ45 ports; the front of the 8-port model The panel is configured with 8*10Base-T/100Base-TX Ethernet RJ45 ports, as shown in Figure.



The side panel of the MIEN5208 series switch is equipped with a 5-position power terminal with a lock of 5.08mm pitch and a 3-digit 3.81 pitch relay terminal and a factory reset button, as shown in Figure below.



Power input:

The DC power supply model of the MIEN5208 series switches supports DC12~48V power supply, supports dual power input, and the two power supplies are backup each other.

The AC power supply model of MIEN5208 series switches supports DC110V~370V and AC85V~264V power supply. When using AC model, V only input from V1+ and V1-, V1+ is connected to fire line L, V1-connected to zero line N, please do not V2+, V2- access, and pay attention to safety to prevent electric shock.

Power failure alarm output

The MIEN5208 series switches support the alarm function, with a normally open node and a normally closed node. The left side is a normally open node, the right side is a normally closed node, and the middle one is a common end. When the switch works normally, the normally open node is powered on and closed, and the normally closed node is disconnected. When the system is powered off, the port is dropped, or the ring network is alarmed, the normally open node is powered off and the normally closed node is closed. The relay recommended switch load capacity is 1A (24VDC). The user can use the relay contact to output other external sound and light alarm devices.

RELOAD button

MIEN5208 series switches are equipped with 1-position button switch. After long press for 5s, the device will automatically restore the factory settings.

3.1.2. LED indicator lights

The LED indicators on the front panel of the MIEN5208 series switch can show the status of the system operation and port, which is easy to find and solve the fault.

Description of the LED indicator

LED	Conditions	Status
System status LED		
PWR1/ PWR2	on	The power is connected and working properly
	off	The power is unconnected or working abnormal
RUN	blinking	The system is running normally
	off	The system is running abnormal
RING	on	Ring open
	off	Ring close
Fiber port status LED		
LINK	On	The port has established an active

		network connection
	blinking	Port has network activity
	off	The port does not have a valid network connection
Ethernet RJ45 port status LED		
Each Ethernet RJ45 port has two indicators, a yellow light for the port rate indicator and a green light for the port connection status indicator.		
10/100M (Yellow light)	On	100M (100Base-TX)
	off	10Mworking status (10Base-T)
LINK/ACT (Green light)	on	The port has established an active network connection
	blinking	Port has network activity
	off	The port does not have a valid network connection

3.1.3. Hardware installation

Din-rail installation

If the MIEN5208 series switch needs to be snapped onto the DIN rail, the DIN rail should be checked for installation before installation. Includes the following 2 items:

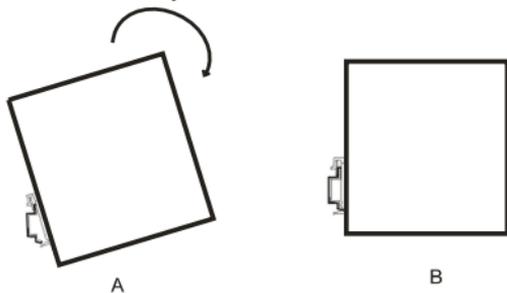
Weather the DIN rail fixed and strong, whether other equipment is installed on the DIN rail, and whether there is enough space for installing the switch.

Weather there is a power supply suitable for the operation of this switch on the DIN rail?

After selecting the installation location of the switch, install the switch to the DIN rail as follows:

Insert the upper part of the DIN rail into the card slot of the circlip on the upper part of the DIN rail connector. Rotate the device slightly downward on the upper panel of the switch and rotate the device as shown in Figure 3-5 A.

As shown in Figure B, insert the DIN rail into the DIN rail connector and confirm that the switch is securely mounted to the DIN rail.



3.1.4. Cable connections

After the MIEN5208 series switches are properly installed, the cable can be installed and connected, mainly including the cable connections of the following interfaces.

Copper port

The terminal device interface provided by the MIEN5208 series switches is a 10Base-T/100Base-TX Ethernet RJ45 interface. It is connected to the terminal device by using a DC network cable and connected to the network device by using a crossover network cable.

connect power supply

The MIEN5208 series switches use the power supply as indicated on the product label. When all other cables are connected, you can connect to the power supply.

3.1.5. Fiber connection

The 2 fiber ports + 6 copper ports version of the MIEN5208 series switches offer 100Base-FX full-duplex single-mode or multimode fiber interfaces. The type of fiber optic interface can be selected according to the needs of SC / ST / FC.

Attention:

This switch uses a laser to transmit signals over fiber optic cables. The laser meets the requirements of Class 1 laser products, and normal operation is harmless to the eyes. However, when powering up the unit, do not look directly at the optical transmission port and the fiber optic terminator end face.

Connection fiber cable , please use following steps:

- When use fiber cable port, remove SC/FC/ST port cover; When it finish work, please put the plastic cover to protect the fiber optic head, keep clean.
- Check the fiber optic cable head whether it clean or not. If it not clean, will effect port and communication quality.
- One fiber optic head connect with Ethernet switch optic port, the other fiber head connect with another equipment fiber optic interface equipment.
- After connection, please check switch the front interface's LNK/ACT LED lights. If lights on, connection is available.

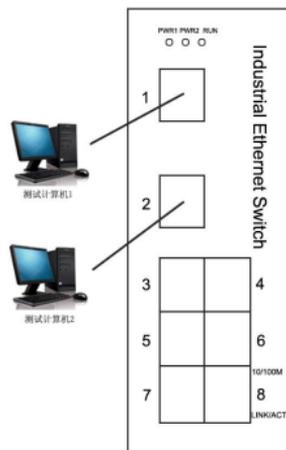
3.2. Simple testing

3.2.1. Self-examination

When connection equipment, the front panel power supply indicator light will blink once, it means working well. After a while Power supply indicator light is on. Run indicator light (system status LED) will blink interval 1s.

3.2.2. Copper port testing

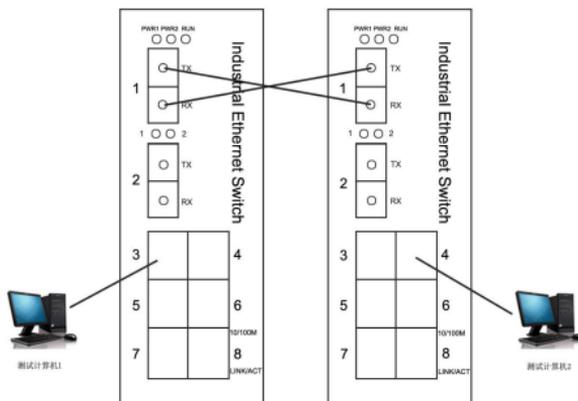
As below picture. Powering on the switch, connect any two copper ports to the network ports of the two test computers through the direct connection network cable, and send ping commands to each other. Both parties can correctly ping each other without losing packets. At the same time, the yellow light on the corresponding port should be always on (the computer network card works in the 100M state) or often off (the computer network card works in the 10M state), and the green light on the corresponding port should flash. The hardware of the two electrical ports tested is working properly. The following test diagram takes the 8-port product of the MIEN5208 series switch as an example.



3.2.3. Fiber testing

The device with the fiber interface is composed of the fiber chain network shown in Figure 3-5 (TX is connected to another RX, and RX is connected to another TX). Each of the copper interfaces of each device is connected to the test computer through a direct-connected network cable and sends ping commands to each other. Both parties can correctly ping each other without losing packets. At the same time, the LINK lamp corresponding to the optical

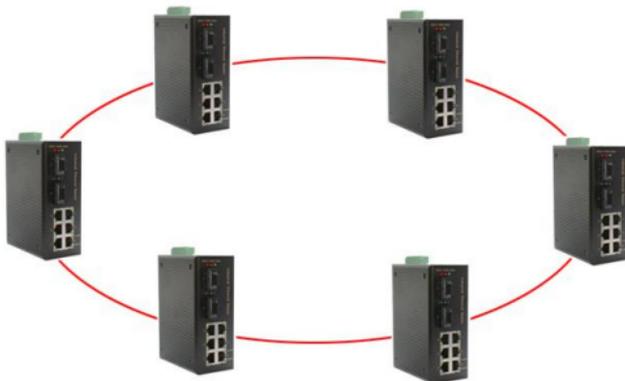
port should flash, indicating that the two optical ports tested are working properly. Figure 3-5 shows the optical port test of the M light 5208 series switch.



3-5

3.2.4. Networking topology

Generally, the device requires three or more switches of the series to form a ring. Figure 3-6 is a typical application example based on ring network technology.



3-6

4. Management function

Statement

The interface and configuration of all the following functions are subject to the actual product.

The MIEN5208 100M Industrial Ethernet Switch Embedded Module has a built-in web server that provides a convenient way to access and configure the switch. Users can access the switch using IE, Firefox or Google Chrome.

When accessing the switch through the Web, the IP address of the switch and the PC must be in the same network segment. Therefore, you must modify the IP address of the PC to ensure that it and the IP of the switch are in the same local area network. For Windows users, please refer to the following operations:

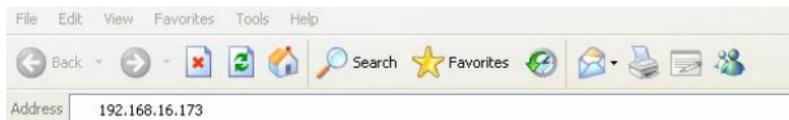
Start → Control Panel → Network and Internet Connections → Network Connections → Local Area Connection → Properties → Internet Protocol (TCP/IP)

The default IP address of this model switch is: 192.168.16.253. Set the IP address of the PC to: 192.168.16.X (X is any valid value from 2 to 254 except 253).

After changing the IP address of the PC, you can access the web page of the switch through the default IP address 192.168.16.253 and perform related configuration operations.

4.1. Log in WEB

Open browser, searching that series Ethernet switch default IP address in the Address Field



Click enter , will popup a forms, Prompting login name and password.



There are three types of login users on this switch. The first type is a normal user. The user name and the initial password are both "admin". It is used when the web is accessed normally. The second type is the guest. The username and password are both "none". You can only view the current switch configuration after login. The third type is the administrator. The user name is "admin". The password is the last six digits of the MAC address of the switch. When we forget the password of the ordinary user, you can use the administrator account to log in and modify the local password.

After entering the user name and password, click OK. The server performs authentication. After the authentication succeeds, the main page of the web server is displayed.

Attention:

1. User can use IE, Firefox, Google that browser visiting Web server, different browser Show pages may different, if effect the normal usage, please change to IE, Firefox, Google
2. That Ethernet switch have using IE, Firefox, Google that browser to do testing, all can normal use, we suggest when upgrading core program use IE browser, avoiding other browsers have problem.

4.2. Main page introduction

After the correct user name and password are entered and the authentication is successful, the main page of the web is entered. The main

page can be roughly divided into three areas, the upper area displays the logo, the lower left area is the function menu area, and the lower right area is the main function display area.

4.2.1. Function menu

The left side of the page is the function menu area, which shows all configurable software functions of the switch. The first level menus are device information, basic functions, advanced functions, bus configuration and device management. Each level menu contains several second-level sub-menus. Its function is shown in below.

Menu items	Page mark	Functions
Equipment information	Basic information	Display device information such as name, number, software version, IP address, etc. Display port status, such as: quantity, type, connection status, etc.
Basic functions	Port configuration	Configure basic information about each port, such as rate mode, duplex mode, and flow control.
	Rate configuration	Configure the packet type and import/export rate limit rule for each port.
Advanced Functions	QoS	Configuring QoS features
	VLAN	Configuring IEEE 802.1Q VLAN functionality
	Fast network ring	Configure fast ring function
	Multicast configuration	Configure the mapping between static multicast MAC addresses and their member ports.
	Alarm configuration	Configure relay alarm function
	Port mirroring	Configuring port mirroring
Equipment management	website address	Configure the device's IP address, subnet mask, and default gateway.
	user password	Configure the password of a normal user.
	system message	Configure the device name, number, etc.
	System Management	Switch reboot, factory reset and upgrade

4.2.2. Help files

The top right of the main function area is the help link. Clicking "Help" on any page will bring up the help page of the current page function.

4.3. Equipment information

4.3.1. Basic information

The basic information page contains two parts: device information and port information.

The device information part is used to display some specific information about the current device, including device model, device name, device number, system time, hardware version, software version, IP address, and MAC address.

Equipment model: The model number of the switch.

Device Name: The name of the switch, which can be customized by the user on the System Information page.

Device number: The number of the switch.

System time: The current time of the switch, synchronized with the time of the PC accessing the switch.

Hardware version: The current hardware version of the switch.

Software version: The current software version of the switch.

IP address: The IP address of the switch.

MAC address: The MAC address of the switch.

The Port Information section displays the real-time status of each port of the switch, including connection status, port rate, duplex mode, and port type. The status of the port is automatically refreshed and does not require manual refresh.

4.4. Basic function

The basic function include basic information.

4.4.1. Port information

The basic information page contains two parts: device information and port information.

The function of the device information part is to display some specific information of the current device, including device model, device name, Device number, system time, hardware version, software version, IP address and MAC address.

Device model: The model of the switch.

Device name: The name of the switch, the user can customize it on the "System Information" page.

Device Number: The number of the switch.

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System time: The current time of the switch is synchronized with the time of the PC accessing the switch.

Hardware version: The current hardware version of the switch.

Software version: The current software version of the switch.

IP address: The IP address of the switch.

MAC address: MAC address of the switch.

The port information part displays the real-time status of each port of the switch, including connection status, port speed, duplex mode and

Port type. The status of the port will be refreshed automatically, without manual refresh.

4.5. Basic function

Basic functional include: port configuration, speed configuration.

4.5.1. basic information

Port configuration is used to configure the parameters of each port of the switch,

Port setting as below page :

System status Port config Link layer Link backup Access control Remote monitor Statistics Diagnose System management							
current page >> port config >> port config help							
Port ID	Interface Type	Speed Mode	Duplex Mode	Port Status	Flow Control	Extreme Line Transform	
1	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
2	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
3	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
4	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
5	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
6	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
7	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	
8	Electric	auto-negotiation	full-duplex	<input checked="" type="checkbox"/>	<input type="checkbox"/>	auto change	

port setting is default setting , every setting as below :

Port ID : showing the Ethernet switch's all ports , as picture have 8 ports .

Interface Type : that show every communication port style , such as : RJ45 port or optic connector , above picture RJ-45 port and optic port have , have no related with connector.

Baud rate Mode : including auto—negotiation, 10 M , 100M rate three kinds. Auto—negotiation is default , 10 M , 100M rate is force style.

Duplex mode: having 2 choice, full duplex and half duplex, just start using at enforcement rate(when auto-negotiation , its invalid)

Port status : If choose that port will use, if not choose , that port will forbid.

Flow control: flow control is used to manage data transferring of two node points, two node points must all support flow control is valid , If network

equipment do not support flow control

Extreme line transform: MDI (Medium Dependent Interface) , MDIX(“X” cross line), that is the way Ethernet port connect to router, HUB , Ethernet switch . That series just use Auto-MDI/MDIX,have auto –turn over function, that choice user can not change .

For a detailed description of port configuration, see below table:

Setting item	Description	Defaults
Port type	Media interface type, Copper or fiber port	Free factory setting
Rate mode	Port transfer rate	Auto-negotiation
Duplex mode	Port transfer mode	Full duplex
Port enable	Enable or disable ports	Enable
flow control	Data transfer management between two network nodes	Not enabled
Extreme line transform	Media interface wiring type	Automatic flip

Statement:

The MIEN5208 series managed industrial Ethernet switches provide web page function configuration. All configuration parameters will be submitted to the switch after clicking the configuration button. Before exiting this page, any changes made by the user will be canceled. Clicking the Cancel button will not submit the changes made by the user and restore the page to what it was before the modification.

The pages mentioned below are basically the same, that is, the settings are saved after clicking Configure.

After clicking the configuration button, the web page first jumps to the waiting interface, and the progress bar in the interface prompts the progress of the configuration. When the configuration is completed, the web page automatically jumps back to the previously configured function page. If the configuration is successful, the values of the parameters in the page at this time are the previously configured parameter values.

During the configuration process, the switch cannot be powered off or perform other operations. Otherwise, the configuration will fail.

Attention:

- 1.Auto-negotiation mode are all RJ-45 port default mode , when RJ-45 ports are all auto-negotiation mode , the connected equipment should also use auto-negotiation Mode, otherwise auto-negotiation failed the Ethernet switch ports will default half-duplex mode , lead to communication problem .
- 2.flow control is used to manage data transferring of two node points, two node points must all support flow control is valid , If network equipment do not support flow control , we suggest close that function.
- 3.Flow control can be started or forbid , default as forbid . Using flow control will generate many pause ifybc, if quantity too large , may cause pause ifybc storm ,so please choose flow control function carefully .

4.5.2. Rate configuration

The device provides port-based speed limits, including entry and exit speed limits, as well as the ability to specify restricted message types. The configuration page is shown in Figure 3-9. Users can limit the traffic of each port's egress or portal to a fixed rate, ranging from 128Kbps to 8Mbps. The device provides rate limiting in both directions, where the ingress speed is the actual speed from other devices, such as a PC, to the switch port, and the egress speed is the actual speed at which the switch port flows to the device. If the inlet and outlet speeds of the connection ports of two connected devices are simultaneously limited, the actual speed is the smaller of the two. The restricted packet types include unicast packets, multicast packets, broadcast packets, and all data packets. The options are as shown in the figure. Users can configure them according to actual needs

Attention :

1. When the port reaches the specified rate, the switch does not immediately limit the speed. This is because both the ingress and egress have data buffers, and the real speed limit is only available when the buffer is exhausted.
2. When using port speed limit, if flow control is enabled on both sides, the speed change between devices will be a smooth curve. The switch determines whether to/or discard the over-traffic message according to whether the flow control is enabled.
3. When the port is used for rate limiting, if both sides of the communication are enabled for flow control, the packet should not be lost. The appearance of the packet loss is the transmission speed.

4. The port speed limit requires high quality of the network cable, otherwise a large number of conflict packets and broken packets will appear.

4.6. Advanced function

Advanced function include: Qos, VLAN, fast ring, multicast configuration, alarm configuration, and port mirroring.

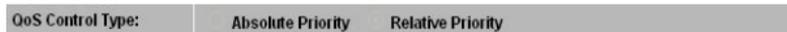
4.6.1. QoS

QoS (Quality of Service) QoS (Quality of Service) is quality function, that will realize by switch chip' 4 interior priority line. Packets in the high priority queue are held in the switch for a short period of time, with some latency-sensitive traffic supporting a lower latency, and packets in a lower-priority queue being the opposite. According to the port ID, MAC address, 802.1P priority label, DiffServ and IP TOS, Wuhan management network series switches can classify packets to a corresponding level. The QoS full line rate operation mechanism, the actual scheduling is performed based on the advantageous mode rotation or the high priority queue mixing mode. Deal with different priority data packet, each port most 4 queues.

When QoS forbidden, all choices are forbidden, if you want to setting QoS must first choose start, as below:



Then you choose absolute priority. relative priority when you choose absolute priority, Ethernet switch will first deal with high priority queue data packet, then deal with low priority data packet, four queues transmit percentage from high to low are 8 : 4 : 2:1. As below picture:



There are two priority types: port priority and 802.1P priority. Several types can be arbitrarily enabled. When both types are enabled at the same time, the 802.1P priority function takes precedence over the port priority function.

The principle of port-based priority is: When a port is enabled with a port priority, packets received by that port will enter the corresponding priority queue. For example, if the priority of a port configuration is "fastest queue", all packets entering from this port will enter the highest priority queue of the switch. The data of this port will have a greater probability than other ports. Forward (relative priority mode), or only the data of the port is sent, and then send data of other ports (absolute priority mode).

802.1P is an extension protocol of the IEEE 802.1Q (VLAN Labeling

Technology) standard. In essence, it provides a mechanism for performing QoS at the Layer 2 MAC (Media Access Control) layer. The VLAN tag has two parts: VLAN ID (12 bits) and priority (3 bits). The priority field is not defined and used in the IEEE 802.1Q VLAN standard, and is defined in 802.1P, so the IEEE802.1P priority has 8 classification levels (3 bits) available.

Priority 0 is the default and is automatically enabled if no other priority values are set. The device default priority 0 and priority 1 are mapped to the first queue, which is the queue with the lowest priority. Priority 2 and priority 3 are mapped to the second queue, priority 4 and priority 5 are mapped to the third queue, and priority 6 and priority 7 are mapped to the highest priority queue, that is, the fastest forwarding queue.

Attention:

1. There are only four forwarding priority queues in the switch. Therefore, although 802.1P has eight priority levels, it must be implemented through the switch. Therefore, multiple priorities of 802.1P in the default setting will be in the same forwarding queue. Packets in the same forwarding queue have the same priority on the real "hardware" level, regardless of whether they may be set to different priorities at the software level.

2. The absolute priority is to process the data of the fastest priority queue before processing the data of the lower priority queue, and finally the data of the lowest priority queue; the relative priority is the most processed. At the same time as the fast priority queue data, the data in the low priority queue will be processed. The ratio of the forwarding of the four queues is from 8:4:2:1.

3. When both priorities are enabled at the same time, the priority ranking is: 802.1P > Port; 802.1P is an extension of 802.1Q. The priority identifier is stored in the VLAN tag. Therefore, it is valid only for 802.1Q VLAN packets.

4.6.2. VLAN

VLAN (Virtual Local Area Network) refers to virtual local area network technology. VLAN is an effective means of network management, and can effectively suppress the occurrence of broadcast storms. The MIEN5208 series of managed industrial Ethernet switches support IEEE 802.1Q VLANs.

Virtual LAN can be divided across multiple switches through the IEEE802.1Q protocol. The switch supports the standard IEEE802.1Q protocol, is compatible with other switches that support the IEEE802.1Q protocol standard, and also supports 802.1Q tag modification. It can connect devices that can identify 802.1Q tags or cannot identify 802.1Q tags. It is very convenient to use this series of switches to configure IEEE802.1Q VLAN.

Port number: The label of the switch port. There are 8 ports .

PVID: The default VLAN ID of the port. The PVID of the access port is the same as the VLAN it allows to pass. The PVID of the trunk port and the hybrid port must be one of the VLANs it allows to pass.

Port mode: The type of switch port, which is divided into access port, trunk port, and hybrid port.

Access port: Access port, connected to PC or terminal, can only belong to 1 VLAN.

Trunk port: A trunk port that connects to a network device with VLAN function. It can allow multiple VLANs to pass through and receive and send packets of multiple VLANs.

Hybrid port: A hybrid port that can be used to connect between switches. It can also be used to connect to a PC. It can allow multiple VLANs to pass through and can receive and send packets of multiple VLANs.

List of allowed VLANs: A collection of VLANs that are allowed to pass, or a collection of VLANs that are added to this port. The access port allows only one VLAN to pass through. The trunk port and the hybrid port allow multiple VLANs to pass through, but they are limited by the switch chip. There can be at most 64 and cannot be empty. The value range is 1-4094, and the values are connected by "," and "~". For example, "1, 2, 4~6" means that the port allows VLANs 1, 2, 4, 5, and 6 to pass.

Export unmarked VLAN list: A collection of outgoing VLANs that are not marked. For the access port, the value of this packet is fixed to "1~4094", which means that the label of all outgoing packets will be stripped. For the trunk port, this value is fixed to null by default, indicating that all outgoing packets are not labeled. It will be stripped; for Hybrid ports, this value can be configured, ranging from 1-4094, with "," and "~" connections between values. For example, "1, 2, 3~6" means that if the VID is out of the port, if the VID is 1, 2, 3, 4, 5 or 6, the label will be stripped, and the labels of other messages will be retained.

View the currently configured VLAN table.:After the VLAN configuration is complete, click View the currently configured VLAN table. The current configured VLAN group is displayed in the box below. If the target is not met, you can continue to configure it in the upper configuration area. The goal has been reached and can be saved by clicking on "Configuration".

Attention:

Note that the default VLAN of the switch is 1, and all ports are defaulted as access ports and added to VLAN 1.

1. The VLANs allowed to pass through each port cannot be empty.
2. This series of switches supports up to 64 VLANs with a VID range of 1-4094.
3. A PC can only access a switch directly connected to itself. If you want to access a switch that is not directly connected, the switch port that needs to be connected to the PC must be added to the same VLAN as the pvid of the VLAN trunk port.

4.6.3. Fast Ring network

Mwring technology is developed and designed by Wuhan Maiwe Communication Co., Ltd. for high reliability industrial control network applications. This technology allows switches to be connected by redundant links. When one of them is disconnected, the other link can be quickly and automatically restored. It has link redundancy and fast self-healing capabilities in the event of a network outage or network failure.

Mwring technology In a ring network composed of switches, the network disconnection self-recovery time is less than 20 milliseconds. It allows the user to designate some of the port's ports as ring redundancy ports and connect to other switches. When one of the network connections is interrupted, the redundancy mechanism will enable the backup link and quickly resume network communication. below is a comparison of recovery time based on redundancy technology and is for reference only.

Recovery time comparison table based on redundancy technology

Redundancy technology	Mwring	RSTP	STP
Recovery Time	<20ms	>5s	>30s

Generally, Mwring technology requires three or more switches of the series to form a ring and allows one or more rings to exist simultaneously on the same network, but each ring must be configured with a unique ID. This ID is the switch in the ring.

Ring networking: The switch supports up to four ring networks. You can enable several rings at any time. It is recommended to enable a single ring to meet the needs and not to enable multiple, so as to avoid increasing the complexity of the network link.

Network ID: The ring ID mentioned above, the range is an integer between 1 and 254. Each ring must have a unique ID, and this ID is shared by all switches that make up the ring, that is, all connected The switches in this ring use this ID for network identification.

Ring port 1: Join the first port of the ring group.

Ring 2: Join the second port of the ring group.

Ring network type: The type of the ring network group, which is usually a single ring network.

Enable: Enable the ring group, usually enable the entire ring function first, and then enable the required ring group. If the ring group enable option is not checked, the ring group is turned off even if the ring function is enabled.

Attention:

1. Mwring belongs to the company's private ring network protocol and can only be used in the same series of switches of the company. It is not compatible with switches other than the company;
2. When the fast ring is enabled, all switches have a short time to quickly exchange packets to block redundant links, and then the ring will be in a transient state; once the primary link is disconnected, There is also a short time between the switches to quickly exchange data packets to enable the blocked redundant links to achieve self-healing purposes, and then the ring network will be in another transient state, in this state transition There will be packet loss, but the time will be very short (<20ms);
3. It is recommended that the user enable the number of ring network groups as little as possible. If a single ring is enabled, multiple single rings should not be enabled to avoid increasing the complexity of the network link.
4. The self-healing time of the ring network is related to the number of switches in the ring and the complexity of the ring network. The self-healing time less than 20 ms is measured when four switches form a single ring.
5. Note that when Mwring is enabled, do not use port mirroring and port speed limit for ports participating in the ring.

4.6.4. Multicast configuration

The switch provides the function of manually adding or deleting static multicast MAC address forwarding entries.

The entry for this function is defined as static in the multicast table, and the MAC address must be a multicast address. A static multicast MAC address fulfills the forwarding function, but it is not subject to aging processing. Packets whose destination address contains a static multicast MAC address will be forwarded to the specified port. The switch supports up to 32 multicast forwarding entries. The parameters are as follows:

MAC address: Enter the multicast MAC address to be added in this box. The format is XX-XX-XX-XX-XX-XX. The first three bytes of the multicast address are hexadecimal 01-00-5E. .

Port list: Select the default forwarding port of the multicast packet whose destination address is this multicast MAC address. To which port to forward, you can tick it.

Processing list: This column is used to operate the multicast table, buttons and to add and delete static MAC addresses. The existing static multicast entries are displayed in the following table. Whenever the user opens the web page or performs the operations of adding and deleting, the table frame is updated. As shown in Figure 3-21. Broadcast forwarding address (01-00-5E-00-00-01).

Attention :

1. Please do not use unicast address as input address;
2. Do not enter the reserved multicast MAC address, such as:
01-00-5E-00-00-XX (reserved multicast management MAC address),
01-80-C2-XX-XX-XX (reserved Ethernet bridge) Manage MAC address).

4.6.5. Alarm configuration

Relay alarm: The main switch of the relay alarm function, which is disabled by default.

Type of alarm: The type of alarm event of the relay, including ring status alarm and port status alarm. Each option is controlled by the relay alarm enable/disable. You can enable only one item or both.

Ring network status alarm: Monitors the loop status in the network. When the ring alarm is selected, if the network is looped, the alarm is generated. When the loop alarm is selected, the alarm is generated if the network is not looped. The alarm information is displayed after the corresponding item (shown in red).

Port status alarm: Monitors whether each port of the switch is offline. Selects to monitor one or more ports. As long as the port is offline, it will be alarmed (red). If there is no monitored port, even if the line is dropped, the alarm will not be triggered. The corresponding port only displays. Its actual connection status.

4.6.6. Port mirroring

The port mirroring function is to copy all the data sent and received by one or more ports to another designated port. By specifying one port as the mirror port of another port, you can observe all the data sent and received by other ports through this port. The port mirroring function is usually used to diagnose, debug, and analyze the network.

This series of switches supports port mirroring, allowing users to capture the entry, exit, or all data of the target port. The switch supports many-to-one

mirroring, which copies packets from multiple ports to one monitoring port. You can also specify the direction of the monitored packets, such as monitoring only the packets sent by the specified port.

Port mirroring: Enable or disable port mirroring, which is disabled by default.

Mirror mode: refers to the direction of data acquisition, whether it is import or export data, or all data. The concept of in and out is defined for the mirrored port, not from the perspective of the mirror port.

Mirrored port: refers to the port where data is collected. The function of mirroring means that the port for sending and receiving data will be copied, and several ports can be set.

Mirror port: refers to the port that collects data. The function of mirroring refers to collecting the data of the port being copied. Only one can be selected, that is, only one mirror port can exist at the same time.

Attention:

1. This function must be turned off during normal use, otherwise all port-based advanced management functions will not work properly.
2. The mirroring function only processes normal FCS packets and cannot handle various erroneous data frames.
3. The direction of data acquisition is whether to import or export data, or all data. The concept of in and out is defined for the collection port, not from the perspective of the mirror port.

4.6.7. Port aggregation

Port aggregation combines multiple physical ports into one logical path, increasing the bandwidth of the switch. Moreover, the data can also be transmitted simultaneously via multiple physical links that are bound, so that the link has redundancy. When the network fails or other reasons cause one or more of the links to be disconnected, the remaining links can continue to work.

The unit supports up to three aggregation groups, and each aggregation group supports up to four ports.

Attention:

You must ensure that the attributes of the ports that join the same aggregation group are the same, including the rate, duplex mode, and so on.

4.6.8. Rapid spanning tree

Spanning Tree Protocol (STP) introduction:

Spanning Tree Protocol is a layer 2 management protocol, which eliminates the network by selectively blocking redundant network links.

The purpose of network layer 2 loop, while having the backup function of

the link.

Rapid Spanning Tree Protocol (RSTP): The Rapid Spanning Tree Protocol (RSTP) is defined in the IEEE 802.1w standard,

As a supplement to the 802.1d standard.

MAIWE Optoelectronic Technology Co. Ltd. Logout
VISITOR IP:192.168.16.24 VISITOR MAC:08:0a:a9:0b:0b:0b

System status Port config Link layer Link backup Access control Remote monitor Statistics Diagnose
System management

current page>>>link backup>>>RSTP help

RSTP Config Enable Disable

Switch Priority

Polling Interval s (scope 1-10)

Forwarding Delay s (scope 4-30)

Max. Old Time s (scope 6-60)

RSTP Status

Port ID	Path Cost	Port Priority	Point To Point Link	Direct Terminal	Do Not Join RSTP
1	200000	128	Automatic	No	No
2	200000	128	Automatic	No	No
3	200000	128	Automatic	No	No
4	200000	128	Automatic	No	No
5	200000	128	Automatic	No	No
6	200000	128	Automatic	No	No
7	200000	128	Automatic	No	No
8	200000	128	Automatic	No	No

RSTP set : active / inactive Fast Spanning Tree function is disabled by default, Rapid Spanning Tree and Rapid Ring feature can not active, such as active the RSTP, it will automatically turn off fast ring, token ring network if you active the fast ring, it will automatically disable RSTP. When activated the RSTP, RSTP will disconnect all the ports, such as convergence phase is completed, will active and block certain ports, during which the Web server will lose the response. After it create a network generates a tree, you can re-use Web server.

Switch priority : setting Ethernet switch (bridge) priority, Ethernet switch priority and Ethernet switch MAC address composed as bridge ID, which Ethernet switch bridge ID is minimal , its will as network's root bridge. The minimal the figure, it more possible as root bridge, default figure as 32768

Polling interval: setting Ethernet switch how many time send BPDU data package once, if interval time is short will speed up self-healing , but also will Increase the network load, the figure set too big, will make the RSTP self-healing time longer. Default value is 2, value scale is 1~10 integer, unit as second.

Forwarding delay: Ethernet switch port status in listening and learning, maintain a forward delay time, unit as second. Default is 15, figure scale is 4~30 integer.

Max. ageing time: one Ethernet switch receive a BPDU data package

from other Ethernet switch, this data package valid time ,default figure is 20, default unit is second, figure scale is integer from 6~40.

Time setting figure need below formula: $2 * (\text{forward delay} - 1) \geq$

Maximum aging time

RSTP status information: click RSTP current status button to check RSTP status information.

At this time, the information on the page shows the current status of RSTP. RSTP is always in the process of dynamic detection and negotiation. Therefore, every time you refresh this page, you will see the latest status. Each time you refresh this page, the information is different.

Forwarding status: it has four kinds:

Disabled: this means port do not connect.

Discarding: in this status could receive BPDU data package, if this period not receive BPDU then change to learning state, when link just connect to ports will in discarding state.

Learning: in learning status, you can receive the data packet, immediately connected to the switch in the blocking state when the stay max ageing time = 20s time to determine the switch port it is possible to become a root port or designated port, during the send and receive BPDU packets to complete the generation root of the tree of the election, construction, completion port status whereabouts of the decision. If the decision is the root port or designated port, then it stays forward delay (= 15s) time, and continue to the port can not be calculated to determine the root port or designated port, this time with learning MAC addresses. If it is the root port or designated port to the forwarding state after the conversion, if not, then switch to blocking status.

Forwarding: forwarding status, then the normal port can send and receive packets.

To speed up the healing process RSTP to reduce network load, the user can use the following page details the configuration port information:

Port role: There are five types of roles for labeling ports.

Root: The port that receives the configuration packet sent by the root bridge periodically. That is, the root bridge is the only device in the entire network that does not have a root port. The alternate port is its standby port, but is blocked because it receives better configuration packets from other switches.

Unknown: Not when any of the above ports.

Forwarding status: refers to the running status of the port, there are four types:

Disabled: Disabled state, which means that this port is not connected, and the unconnected port is in this state.

Discarding: Blocking state, at this time BPDU packets can be received, if no BPDU is received during the period, it will go to learning

Status, the ports are all blocked when the link is just connected.

Learning: Learning state, you can receive data packets at this time, and the switch is in blocking state when connected immediately after connection

Stay max age=20s to determine whether this port of the switch may become a root port or a designated port. BPDU packets are sent and received between them, the election and construction of the root of the spanning tree are completed, and the port status is determined. If it is the root port or the designated port, it will stay forward delay=15s, and continue to calculate to determine whether the port can be. It is the root port or designated port, which has the function of learning MAC address. If it is the root port or designated commodity Switch to the forwarding state, and switch to the blocking state if not.

Port path cost: port link cost and port priority forming ID use to compare, link cost is decided by physical link, user could according physical to modify the figure .default 100M port link cost as 200000.

Port priority: ports priority and port link cost forming port ID as compare, that value smaller priority higher, default is 128.

Point to point network links: Ethernet switch port and Ethernet switch port just have direct connection, that port is port to port connection. RSTP is based on point to point link negotiation.

Directly terminal link: network remote Ethernet switch usually connect with terminal equipment, such as PC station. If allocate these ports(which connect with terminal equipment) as Edge ports, could realize port state quick swift, no need Discarding, Learning, Forwarding swift process, could realize port state quick swift.

Direct connection terminal: Switches at the edge of the network are typically connected to terminal devices, such as PCs and workstations. The port connected to these terminal devices is configured as an edge port, which can implement fast transition of port status without the need for the conversion process of Discarding, Learning, and Forwarding.

Participate in the spanning tree structure: specify whether the port participates in the operation of the spanning tree protocol, which can reduce the number of ports, Reduce the computational complexity of RSTP, thereby reducing the self-healing time of RSTP.

Attention:

1. The RSTP protocol is defined in the 802.1w standard and is an open standard protocol. The RSTP protocol of the switch produced by the company can be compatible with network devices that are not produced by the company but support the standard RSTP protocol.

2. The fast spanning tree and fast ring network functions cannot be enabled at the same time. If RSTP is enabled, the fast ring network will be automatically turned off. Similarly, if fast ring network is enabled, RSTP will be automatically disabled.

3. When RSTP is enabled, RSTP will disable all ports first. After the convergence period is completed, certain ports will be enabled and blocked. During this period, the web server will lose response. When convergence ends (about 10s or more), the network tree Once generated, you can re-use the web server;

4. Every time the link is changed, RSTP will re-converge with a different time, but it may also cause the Web server to be inaccessible. After the convergence is over, it can be re-accessed.

5. After RSTP is enabled, each switch periodically sends a query packet from each connection port according to the interval of sending packets set by the user, thus increasing the network load;

6. The following conditions must be met between the maximum aging time and the forwarding delay: $2 * (\text{forward delay} - 1) \geq \text{maximum aging time}$;

7. In order to reduce the network computing complexity and reduce the convergence time, you are advised to set the port information, reduce the number of ports, reduce the forwarding delay, and maximize the aging time to speed up the self-healing of RSTP.

8. When the quick spanning tree is enabled, check the Ethernet Control Packet and Address Query Failure Packet on the storm suppression interface. (The storm suppression defaults these two items are also checked).

4.7. Equipment management

The device management includes: network address, user password, system information, and system management.

4.7.1. Network address

The function of this function is to assign a specified IP address to the switch. The default IP address of the switch when it leaves the factory is 192.168.16.253.

IP address: An IP address is a 32-bit length address assigned to a device connected to the Internet. An IP address consists of two fields: a network number field (net-id) and a host number field (host-id). The IP address is assigned by the Network Information Center (NIC) of the US Defense Data Network. To facilitate the management of IP addresses, IP addresses are classified into five categories: A, B, and C addresses are unicast addresses; Class D addresses are multicast addresses; Class E addresses are reserved addresses for future use. Special use. Currently, a large number of IP addresses in use belong to the A, B, and C addresses.

Subnet mask: A mask is a 32-bit number corresponding to an IP address. Some of these numbers are 1, and others are 0. The mask can divide the IP address into two parts: the subnet address and the host address. The part of the IP address corresponding to the bit in the mask is the subnet address, and the other bits are the host address. The mask corresponding to the class A address is 255.0.0.0; the mask of the class B address is 255.255.0.0; the mask of the class C address is 255.255.255.0.

Default Gateway: The default gateway in the host is often referred to as the default route. The default route is the route selected by the router when no other route exists in the destination address of the IP packet. The default route is used for all packets whose destination is not in the router's routing table. This route will usually go to another router, and this router will also process the packet. If you know how to route the packet, the packet will be forwarded to the known route; otherwise, the packet will be forwarded to the default. Route to reach another router.

Attention:

1. When entering the waiting page after configuring IP, do not power off or perform other operations to avoid IP address modification failure.
2. The configured IP address and default gateway need to be in the same network segment.

4.7.2. User name

The web server of this switch provides users with three different permissions. The first type is a guest. It can only view the current configuration of the switch, but the configuration cannot be modified. The user name and password are both "none" and cannot be modified. The second type is the normal user. You can configure the switch's function parameters. It is admin, it cannot be modified, the initial password is "admin", which can be modified on this page; the third is administrator, the account has the highest authority, and when you forget the password of ordinary user, you can use the administrator

to log in and modify the machine. The password is fixed to "admin" and the password is the last six digits of the local MAC address. (If you don't know the MAC address of this machine, you can log in as a guest first)

The login password must be a legal character consisting of 4-12 English letters (case sensitive) and numbers. When changing the password, you need to enter it twice. You must ensure that the passwords entered twice are consistent.

User name: The local user name is fixed to "admin" and cannot be modified.

New password: Set the user password of this group, which consists of 4-12 English letters (case sensitive) and numbers.

New password confirmation: Enter the password repeatedly to prevent the password from being entered incorrectly.

Attention:

1. This page modifies the password of the ordinary user;
2. For security reasons, it is recommended to modify the default password after the first login;
3. Every time the user logs in to the web server, the server will invalidate the valid login authentication in about 5 minutes. At this time, the operation of the web page will re-request the user to log in. This is to prevent others from using the web when the administrator is absent. Misuse, this time is the software calculation time, not very accurate.

4.7.3. System information.

Equipment model: The model number of the switch.

Device Name: The user can customize the name of the switch.

Device platform: The name of the manufacturer platform, which is not configurable by the user.

Device number: The factory number of the switch.

4.7.4. System management

This page can perform some system operations on the switch, including restarting, restoring the factory configuration, and upgrading. It is recommended that users use it with caution. Improper operation may damage the switch.

Device restart: This function is used to restart the switch. Before the switch is completely restarted successfully, the switch does not work and cannot forward any data packets. This kind of restart is different from the hardware reset of power-on and restart, except that the switch system software is reset, just like the "hot boot" of the Windows operating system. The biggest

benefit of this feature is the ability to remotely reboot the switch, allowing users to remotely reboot as long as they have remote access to the switch.

The device restore factory configuration: This function is used to restore the switch to the factory settings and automatically restart the switch. Before the switch restarts successfully, the switch does not work and cannot forward any packets. This function can be restored to the factory default configuration value when the user fails to work properly if the wrong parameters are set. On the right side, there is a "Retain current IP address" option. When checked, the current IP address will be retained. If it is not checked, the IP address will also be restored to the factory default address: 192.168.16.253. Click the Start button, the page pops up a prompt box, click "OK" to jump to the waiting page, after the progress bar in the page is read, the switch resumes the factory configuration.

Device upgrade: This function is used to upgrade the software of the switch. Users can obtain the upgrade program of the switch through email or our website. Please pay attention to the matching of the model and version of the switch. Using the unmatched upgrade program may cause permanent damage to the switch.

Equipment upgrade: After the user gets the upgrade program, click the Browse button to select the upgrade program, and then click the Start button. The page pops up a prompt box. Click "OK" to jump to the Waiting page. After the progress bar in the page is read, the switch upgrade is completed.

Attention :

1. Restoring the factory default setting will cause all the settings to be in the factory state. If you want to keep the IP, please check the "Retain current IP address" on the right, otherwise the IP address will be restored to the default configuration of 192.168.16.253;
2. Do not upgrade the device casually. When the device needs to be upgraded, you must determine whether the upgrade file is correct. Otherwise, the software of the device may be damaged and the switch may be faulty.
3. Do not operate the switch during the upgrade process. Do not click the switch web page. If the upgrade is interrupted due to incorrect operation, restart the switch and try again.
4. The entire upgrade process does not allow power failure. Power failure may cause permanent damage to the switch. If the upgrade is interrupted, please mail the product to the company immediately to seek a possible solution.

When using web upgrade, you cannot use different language versions of the image for cross-upgrade; the Chinese version can only be upgraded with the Chinese version of the image, and the English version can only be upgraded with the English version. The Chinese version cannot be upgraded to the English version, and the English version cannot be upgraded to the Chinese version.

5. Maintenance and service

Since the date of product shipped, it provides five years warranty. In the warranty period, if there is any failure or functional product fails, it will repair or replace free of charge for users of the product. However, these commitments do not cover improper use, accidents, natural disasters, improper operation or improper installation caused the damage.

To ensure that consumers benefit of products, through the following ways to get help and problem solving:

- Internet services.
- Call the technical support office.
- Product repair or replacement.

5.1. INTERNET service

Through the website of Wuhan Technical Support section, you can get more useful information and tips.

5.2. Technical support phone services

By using the product user manual, you can connect with our technical support office, we have professional technical engineers to answer your questions, help you the first time resolve your product or issue.

5.3. The product repair or replacement

Product repair, replacement or refund, should first connect with our technical staff to confirm, and then sales staff to contact and get the problem handled. Above shall technical staff and sales staff through consultations, to complete the product maintenance, replacement or return.

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