

# **SICOM3000BA Industrial Ethernet Switch**

## **User's Manual**

**KYLAND Technology Co., Ltd.**

# SICOM3000BA Industrial Ethernet Switch

## User's Manual

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# Preface

SICOM3000BA is a high-security and high-performance network-managed industrial Ethernet switch, specially designed by KYLAND Technology CO., LTD. for industrial applications. Its high-performance switch engine, secure electrical design and excellent EMC protection of RJ45 port allow SICOM3000BA working in harsh and dangerous industrial environments. The multiple redundant functions of optical fiber network and powerful network management system provide multiple guarantees for reliable operation of the system.

The User's Manual for SICOM3000BA Industrial Ethernet Switch mainly introduces the information on technical principles, performance indexes, installation and commissioning, etc. to provide users with references in startup, expansion and routine maintenance. It is a practical teaching material that can be used by users in trainings and helps the relevant technical personnel to increase their knowledge and understanding of SICOM3000BA industrial Ethernet switch.

This manual mainly includes the following contents:

Chapter 1 introduces general description and system features of SICOM3000BA Gigabit industrial Ethernet switch;

Chapter 2 introduces performance indexes and service functions of SICOM3000BA Gigabit industrial Ethernet switch;

Chapter 3 introduces hardware structure of SICOM3000BA Gigabit industrial Ethernet switch;

Chapter 4 introduces field test methods for SICOM3000BA Gigabit industrial Ethernet switch;

Chapter 5 introduces network-forming modes and system configuration of SICOM3000BA Gigabit industrial Ethernet switch;

Chapter 6 introduces WEB management software of SICOM3000BA Gigabit industrial Ethernet switch;

Appendix A introduces twisted pair and pin distribution rules of SICOM3000BA industrial Ethernet switch;

Appendix B introduces cable types and specifications of SICOM3000BA industrial

Ethernet switch;

Appendix C introduces abbreviations used in this manual.

**Statement: as product and technology upgrades and improves constantly, the contents of this document may not completely accord with the actual product. For product upgrading information, please access our company's website or directly contact with our company's business representative.**

# Notice for Safety Operation

This product offers reliable performances as long as it is used within the designed scope. Artificial damage or destruction of the equipment should be avoided.

- Carefully read this manual and well preserve this manual for future reference;
- Do not place the equipments near water sources or damp places;
- Do not place anything on power cable which should be placed in unreachable places;
- Do not tie or wrap the cable to prevent fire.
- Power connectors and connectors for other equipments should be firmly interconnected and frequently checked.

In the following cases, please immediately disconnect the power supply and contact with our company:

1. Water gets into the equipments;
  2. Equipment damage or shell breakage;
  3. Abnormal operation conditions of equipment or the demonstrated performances have changed;
  4. The equipment emits odor, smoke or noise.
- Please keep optical fiber plugs and sockets clean. During operation of equipments, do not stare directly into the cross section of optical fiber;
  - Please keep the equipment clean; if necessary, wipe the equipment with soft cotton cloth;
  - Do not repair the equipment by yourself, unless it is clearly specified in the manual.

---

Explanation of Warning Marks:

This manual uses two kinds of noticeable warning signs to arouse special attention

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of users during operation. The implications of these signs are as follows:



Warning: pay special attention to the notes behind the mark, improper operation will result in serious damage of the switch or injury of operation personnel.



Caution, attention, warning, danger: remind the positions requiring attention during operation.

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# Chapter1 System overview

## 1. 1 Product Overview

SICOM3000BA is a high security and high performance network-managed industrial Ethernet switch, specially designed by KYLAND Telecom Technology CO., LTD. for industrial applications. Its high-performance switch engine, secure electrical design, solid and closed case design, high-efficient single-ribbed casing for heat dissipation without using fans, over-current, over-voltage and EMC protection at power input side, and excellent EMC protection of RJ45 port allow SICOM3000BA working in harsh and dangerous industrial environments. The multiple redundant functions of optical fiber network and powerful network management system provide multiple guarantees for reliable operation of the system.

SICOM3000BA series Gigabit industrial Ethernet switch have strong web-management which support CLI, Telnet, WEB, SNMP and OPC-based network management software.

SICOM3000BA has two ways for installation: DIN-Rail installation or wall-mounting installation. There are three 1000M uplink redundant SFP ports on the front panel which can form 1000Mbit redundant fiber ring network. Its recovery time is less than 50ms when the system is failure. Two Gigabit ports make up a ring network and the third one is uplinked. The six 10/100Base-TX Ethernet RJ45 ports are adaptive. Each RJ45 port can be automatically configured to 10Base-T or 100Base-TX state, full/half duplex operation mode and MDI/MDI-X auto-connection. .

## 1. 2 System Features

### 1. High performance industrial Ethernet switch

Plug and play for 1000M SFP Gigabit port, being fiber port or RJ45 port as you need.

Support various management softwares, easy access for users, such as: WEB、CLI、TELNET、SNMP、OPC;

10Base-T/100Base-TX self-adaptive Ethernet connector, automatically configured to 10Base-T or 100Base-TX state, full/half duplex operation mode and MDI/MDI-X auto-connection.

Recovery time (< 50ms) increase the system reliability.

IEEE802.3/802.U/802.3X store and forward switching mode

Support IGMP Snooping、port mirroring、broadcast storm control, DT-Ring、DT-Ring+、RSTP、VLAN、SNMP protocols.

802.1P、DSCP priority

Alarming function

FTP-based software online upgrade, easy for equipment management and renewal

## 2. Industrial Power Supply

Provide industrial power input: DC3.3V (3V~5.5V), DC24V (18V~36V), DC48V (36V~72V)

Power input over-current, over-voltage protection and EMC protection

Redundant power input increase system reliability.

Electrical design meets the security requirements

## 1.3 Packing list and unpacking check

### 1. Packing list

The packing case includes the following items:

SICOM3000BA	1 unit
User's Manual for SICOM3000BA Industrial Ethernet Switch	1 copy
Customer Service Guideline	1 copy
Network management line	1 piece

### 2. Unpacking check

Before opening the case, place it stably, pay attention to the direction of the packing case, and ensure its right side is facing upward, so as to prevent SICOM3000BA from falling apart after opening the case. If a hard object is used to unclench the case, do not overly extend the hard object into the case to avoid damage of the equipments inside the case.

After opening the case, check the amount of SICOM3000BA equipments (including main unit of SICOM3000BA, parts of equipment, user's manual, customer service

guideline) according to the packing list, and check the appearance quality of SICOM3000BA.

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Warning:

For the built-in precise parts of equipments, please handle with care and avoid strenuous vibration to avoid affecting the performances of equipments.

---

## Chapter2 Performance indexes

### 2.1 System indexes

The system performance indexes of SICOM3000BA Industrial Ethernet switch are shown in Table 2-1.

Table 2-1 System Indexes

System Indexes	SICOM3000BA
Quantity of RJ45 port	6x10Base-T/100Base-TX
Quantity of Gigabit redundant fiber port/RJ45 port	3x1000Base-SFP
System parameters	Supporting standard: IEEE802.3、IEEE 802.3x、IEEE 802.3u、IEEE802.1W、IEEE802.1d、IEEE802.1P、IEEE802.1q、IEEE802.3Z、IEEE802.3ab Store-and-Forward speed: 100M: 148810pps; Gigabit port: 148810pps Max. filtering speed: 1488100 pps Switching mode: Store-and-Forward Switching bandwidth of system: 7.2G Electromagnetic compatibility interference: EN55022 Electromagnetic compatibility immunity: EN50082-2
Ethernet port	Physical port: shielded RJ-45 RJ-45 port: 10Base-T/100Base-TX, supporting automatic negotiation function Port standard: in line with IEEE802.3 standard Transmission distance: <100m
Fiber port	Optical power: >-13dbm(SM) >-20dbm(MM) Receiving sensitivity: <-28dbm(SM) <-35dbm(MM) Wave length: 1310nm(SM) 1550nm(SM) 1310 nm(MM) Transmission distance: 20~80Km(SM) <5km(MM) Connector type: LC Transmission rate: 1.2Gbps(1000M), 125Mbps(100M)
Power supply	Input voltage: DC3.3V(3V~5.5V) double channel DC24V(18V~36V), DC48V(36V~72V) Input power consumption: <5.6
Mechanical parameter	Physical dimensions (height×width×depth): 61.5mmx150mmx110mm (DC3.3V) 140mmx75mmx123mm(DC24V, DC48V) (excluding the dimensions of DIN rail and wall-mounting components)

	Mounting mode: DIN rail or wall-mounting Heat removal method: Ribbed aluminum casing for heat dissipation without using fans Shell protection: IP40 Weight: 1.2kg
Ambient conditions	Operating temperature: -40℃~75℃ Storage temperature: -40℃~85℃ Humidity:0~95% (non-condensing)

## 2. 2 Service Interface

- Support 6 standard 10Base-T/100Base-TX Ethernet RJ45 ports, which are self-adaptive, capable of automatically configuring to 10Base-T or 100Base-TX state and automatically working in full duplex or half duplex operation mode, and supporting MDI/MDI-X auto-connection. The transmission distance is 100m max.Support the line redundant techonology, and form the twisted pair redundant ring network. Its recovery time is less than 50ms when the system is failure.
- Three pairs of redundant 1000M SFP (plug and play), support 1000Base-LX SM/MM fiber port or 1000Base-TX RJ45 module. The max throughput of each port is 1000Mbps, only support 1000M full duplex operation mode. Support line redundant techonology, recovery time < 50ms.
- In line with/meeting IEEE802.3、IEEE 802.3x、IEEE 802.3u、IEEE 802.1w、IEEE 802.1d 、IEEE 802.1p、 IEEE 802.1q、IEEE 802.3z、IEEE 802.3ab, etc.
- Meanings of RJ45 port indicator: yellow lamp - rate indicator; on:100M, off: 10M; Green lamp - connection state indicator, on: effective connection of network; blink: network active; off: no connection.

带格式的：项目符号和编号

## 2. 3 Service function

The service functions for SICOM3000BA mainly include:

- LED Indicator

The LEDs (front panel) indicate the port status correctly including transmission rate, link status and system status

- Layer-2 Switching

Switches work in two ways: Cut-Through and Store-and-Forward. In Cut-Through, a data packet is immediately relayed further after detecting the

target address; in Store-and-Forward, a data packet is first read-in completely and checked for errors before the switch relays the same. SICOM3000BA employs Store-and-Forward that is a switching mode widely used.

### 3. VLAN

VLAN will divide one network into multiple logical subnets. Data packets cannot be transmitted between different VLANs so as to control the broadcast domain and segment flow and improve the reliability, security and manageability. SICOM3000BA series supports IEEE802.1q VLAN tag. It can be divided into up to 4094 VLANs based on ports. The VLAN division can be realized via WEB, CLI etc. VLAN Tag packet is transmitted transparently.

### 4. Qos

IEEE 802.1p is the most popular priority solution in the LAN environment. SICOM3000BA series supports 802.1p, ( as well as IP TOS and DSCP), by which you can configure the port-based priority when the terminal does not support the above three configurations, and different priority for the ports is wanted. This configuration can only affect the packets without priority in the port. SICOM3000BA supports four class of priority.

### 5. Port Trunking

In SICOM3000BA, multiple physical ports can be aggregated into one logic port, which has the same rate, duplex and VLAN ID. Port Trunking can be configured in one single switch for max 4 ports. In this way, the pressure of network traffic is reduced.

### 6. Configure Port Working Mode

SICOM3000BA is able to configure the working mode of all ports through management: adaptive, 10M/half-duplex, 100M/ half-duplex, 10M/full-duplex, 100M/full-duplex.

### 7. Configure Port Traffic Flow

You can configure all ports via the management software of SICOM3000BA as 128K、256K、512K、1M、2M、10M、50M、100M for 100M ports, 100M、500M、1000M for 1000M ports.

### 8. Static Multicasting Communication

You can add multicasting users by adding static multicasting table manually. Compared to dynamic multicasting, it is more simple, reliable and faster without

protocols. You can forward the multicasting data by configuring static multicasting forwarding tables. Static multicasting can not be used together with IGMP simultaneously.

#### 9. IGMP

IGMP is Internet Group Multicast Protocol. SICOM3000BA series offers IGMP monitor and query functions. Data packets can be transmitted to multiple necessary host computers to prevent overloading. This solves the problems of occupied bandwidth when broadcasting

#### 10. Broadcasting Storm Control

SICOM3000BA series offers broadcast storm protection ensuring the smooth communication platform of the switch network. The switch will filter out the over flow once the bandwidth of broadcast flow exceed the limit

#### 11. DT-Ring

DT-Ring is specially designed and developed by Kyland. It determines the state of ring & port and ensures the redundant network won't form ring by inspecting the ring port state and less protocol messages. It make sure the Ethernet redundant ring is fast and reliable to meet the high requirements of industrial communications.

#### 12. DT-Ring+

Based on DT-Ring, DT-Ring+ realizes standby between two rings and determines the ring and port state according to the standby device ID ensuring the redundant network does not form ring.

#### 13. RSTP

RSTP and STP offer network redundancy protection for the switch network. RSTP can realize all the functions of STP, and additional reduce the delay from block to forward, resuming the network ASAP.

#### 14. Alarm Output

Alarm is significant when it is used for realtime transmission of device alarm output. SICOM3000BA offers the alarming functions for port and ring. Through management software, all the alarming functions can be enabled or disabled. The alarming information is shown from management interface.

#### 15. SNMP

SNMP (Simple Network Management Protocol) offers frame structure for low level network management. SNMP protocol is used so widely that many kinds of networking devices, softwares and system employ it. It is easy to realize, open and free, and can be used to control various devices.

#### 16. RMON

RMON is a standard monitoring regulation to switch the network monitoring data between network monitor and console system. It offers more selections for network operator to use the suitable console and network monitor for special requirements. It is also the expansion to SNMP functions and is specially useful for monitoring and managing LAN. The purpose of developing RMON is to provide statistic result of information flow and analyze network parameters so as to work out a comprehensive diagnoses, plan and regulation. By RMON, you can operate among multiple manufacturers for SNMP management and monitoring agent. What's more, it can offer a standard for a group of MIB to collect the network statistics which is not available via SNMP. RMON realizes previous network diagnoses by using powerful alarm group, it allows that a domain value is set for critical parameters so as to automatically send alarm signal to manager control center.



# Chapter3 Hardware structure

## 3.1 System structure

The hardware structure of SICOM3000BA industrial Ethernet switch is shown in Figure 3-1.

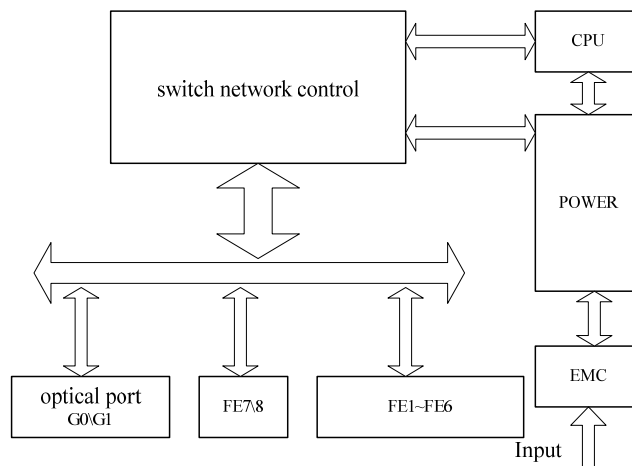


Figure 3-1 Hardware structure

The system hardware mainly consists of:

1. The switch controller employs high-performance ASIC chip technology, and provides two-layer wire speed forwarding of data packet.
2. Optical fiber transceiver module is used for optical fiber interface, offering reliable performance.
3. Industrial power supply with over current, overvoltage and EMC protection.
4. EMC protection is provided for all TP ports and CONSOLE interface.

## 3.2 Switch Structure

### 3.2.1 Case

SICOM3000BA case is a small DIN rail or wall mounting type structure. The entire unit has a six-side-enclosed structure, with protection class up to IP40. The case's left

and right side plates made of ribbed aluminum profile are a part of the heat dispersion system of the entire unit. The single-rib structure can double heat dissipation area. The heat generated when the unit is working is effectively dissipated into the environment via the ribbed heat-dissipation surface in the form of radiation and convection greatly increasing the high temperature resistance of equipment. Discarding the traditional form of axial fan heat dispersion reduces power consumption of the entire unit and increases the stability of the system. The figuration of SICOM3000BA case is shown in Figure 3-2.

Its contour dimension (not including the dimensions of DIN rail and wall-mounting components) is 140 mm×75 mm×123 mm(DC24V,DC48V), 61.5 mm×150 mm×110 mm (3.3VDC) (height×width×thickness)

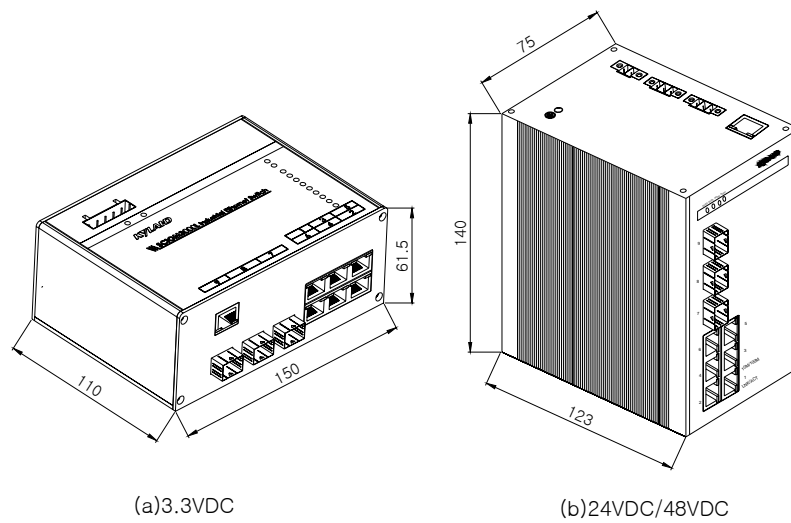


图 3-2 Outline drawing of SICOM3000BA

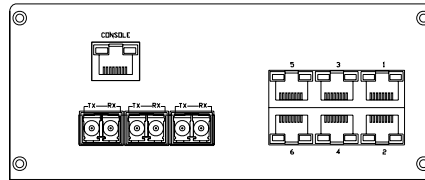


Warning:

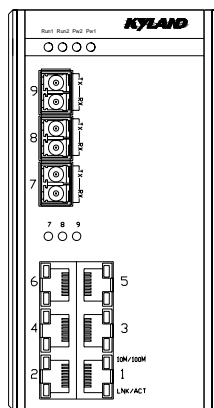
The chip in the back of the main board will get hot while working, so never touch the chip when the equipment is working to avoid scalding. Making the appropriate heat-dissipation treatments to the chip to prevent the overheating of the switch.

### 3. 2. 2 Front panel

The front panel of SICOM3000BA industrial Ethernet switch has 3 pairs of uplink redundant Gigabit optical fiber ports, 6 10Base-T/100Base-TX Ethernet RJ45 interfaces and six system and port operation indicators. Its structure is shown as Figure 3-3:



(a) 3. 3VDC



(b) 24VDC, 48VDC

Figure 3-3 Front panel

#### Gigabit Optical Fiber interface

SICOM3000BA offers three pairs of redundant 1000Base-LX full duplex single mode or multi-mode optical fiber interface (LC connector), or 1000Base-TX RJ45 (SFP connector) interface. Port numbers are G7,G8 and G9. Optical fiber interface should be used in pairs (TX and RX are a pair), TX interface is the transmitting end connected to the receiving end RX of the optical fiber interface of another remote switch; RX is the receiving end connected to the transmitting end TX of the same optical fiber interface of the same remote switch. Two pairs of redundant 1000Base-FX optical fiber interface can be used to form an optical fiber redundant ring network. In the event of the system fault, the recovery time

of the redundant ring network is less than 50ms, effectively increasing the reliability of network operation.



图 3-4 SFP 热插拔器件

Gigabit SFP FX/TX Plug and play steps:

Insert SFP unit, Figure 3-4:

- There are two breaks on Fiber-port (LC) and one break on Ethernet port (RJ45) of SFP unit.
- Insert the SFP into case backward to the PCB board. The position is right when you hear a sound. Ready for use if the SFP handle horizontal with connector.

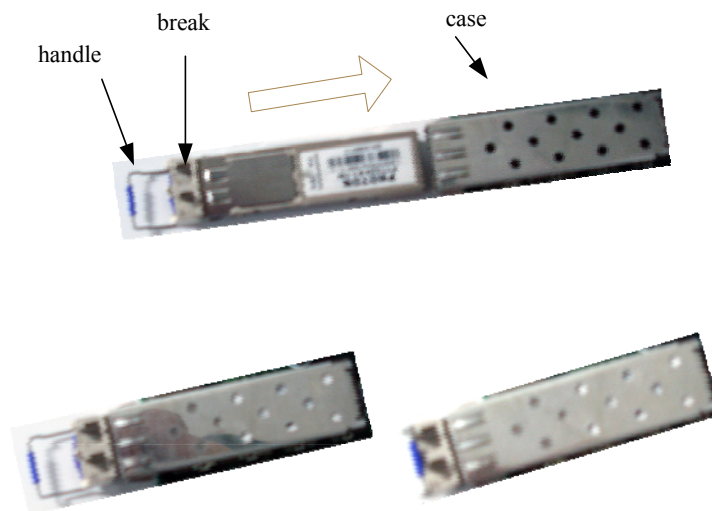


Figure 3-5 SFP Process for Plug and Play

Pull SFP unit:

- The fiber part could be separate from SFP case when angle 90 degree between handle of SFP unit and connector.
- Pull out the fiber part from case.

### RJ45 interface

SICOM3000BA offers six 10Base-T/100Base-TX RJ45 Ethernet ports numbering 1, 2, 3, 4, 5, 6. Each RJ45 port has self-adaptation function, and can be connected to end equipments, servers, hubs or other switches in straight-through or cross-over way. Each port supports IEEE802.3x self-adaptation, so the most suitable transmission mode (half duplex or full duplex) and data rate (10 Mbps or 100Mbps) will be automatically selected (the connected equipment should also support this characteristic). If the equipment connected to these port does not support self-adaptation, the ports will be able to send at proper speed but transmission mode is default as half duplex. The redundant 10Base-T/100Base-TX Ethernet RJ45 ports can make up a twisted redundant ring network. The recovery time is less than 50ms when the system run into failure, which can increase the reliability of the network operation.

### LED indicators

The LED indicators of SICOM3000BA can show system operation and port status, helping detect and eliminate faults.

Table 3-1 describes the meanings of all indication lights on the front panel

Table 3-1 descriptions for LED indicators

LED	Condition	State
<b>System state LED</b>		
RUN1	Blinking	CPU operates normally
	OFF	CPU not operate
RUN2	ON	
	Blinking 1	
POWER1	ON	POWER1 is connected and operates normally.
	OFF	POWER1 is not connected or operates abnormally.
POWER2	ON	POWER2 is connected and operates normally.
	OFF	POWER2 is not connected or operates abnormally.
<b>Gigabit Optical fiber interface state LED (optical fiber interface G7, G8,G9)</b>		

LINK/ACT	On	Effective network connection has been established for the port.
	Blinking	Network activities are available for the port.
	Off	No effective network connection has been established for the port.
<b>Ethernet RJ45 port state LED</b>		
Each RJ45 Ethernet port has two indicators, a yellow lamp and a green lamp. The yellow lamp indicates port speed, and the green lamp indicates port link state.		
10M/100M (Yellow)	On	100M working status (i.e. 100Base-TX)
	Off	10M working status (i.e. 10Base-T)
LINK/ACT (Green)	On	Effective network connection has been established for the port
	Blinking	Network activities are available at the port
	Off	No effective network connection has been established for the port.

### 3. 2. 3 Top panel (DC24V, DC48V)

The top panel of SICOM3000BA industrial Ethernet switch has integrated two power input terminals for redundant power supply, alarming relay output terminal, grounding line terminals etc.

Structure in Figure 3-6

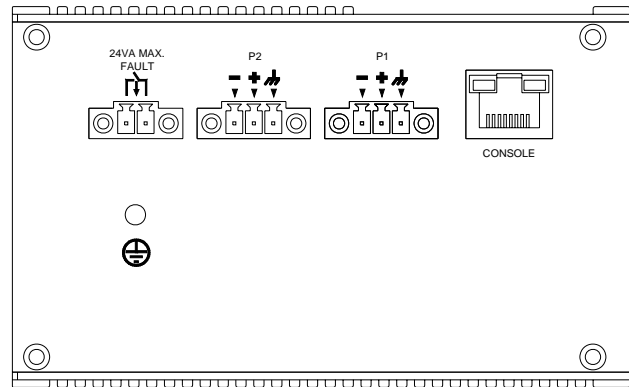


Figure 3-6 Top panel structure

#### Power input terminal

SICOM3000BA has redundant power input function. It has two

power input terminals P1 and P2 (DC24V, DC48V), each allowed to be used singly, or both to be used simultaneously to input power to SICOM3000BA from two independent sets of external DC power supply systems so that when either of the two sets of power supply systems fails, the equipment can operate uninterruptedly, thereby increasing the reliability of network operation. Three-wire terminal with interval of 3.81 mm is used for power connection.

Connection sequence is shown in Figure 3-7. Connection and mounting procedures are as follows:

1. Strip 5mm-long sheath from power cable and twist the bare copper wires together into a bundle; Use a 2.5 mm one-slot screwdriver to unscrew the “power cable locking screw”, insert the power cable into the hole at the terminal tail, and screw down the “power cable locking screw”;
2. Insert the power terminal into the DC power socket of the equipment and use a 2.5mm one-slot screwdriver to screw down the two “terminal locking screws” to firmly connect the terminal with the power connector.

带格式的: 项目符号和编号

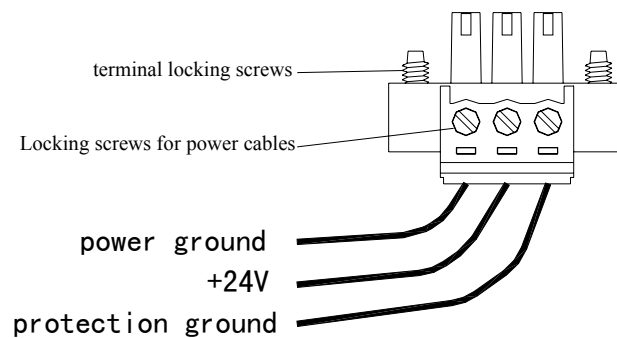


Figure 3-7 DC Power

### Alarming relay output terminal

The terminal is a group of normally open contacts of the alarming relay of equipment. In normal state without alarming, the terminal is in open state; when any alarming message appears, the terminal is in closed state. It can be externally connected to other switching value collecting equipments or alarming lamps or alarming buzzers so as to timely prompt the operation personnel in case alarming occurs. The maximum withstand voltage of the relay terminal is DC350V and the maximum input power 120mA. Figure 3-6 is the schematic diagram of the

equipment when it is connected an alarming indicator and the wiring method for other applications is similar.

Its wiring and mounting procedures are the same as those of power terminal.

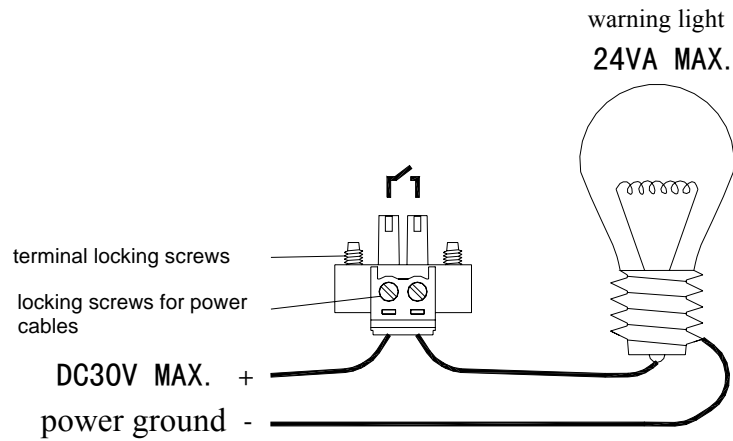


Figure 3-8 External alarming lamp of alarming relay output

### 3.2.4 top panel (DC3.3V)

The top panel of SICOM3000BA series industrial Ethernet switch has integrated DC3.3V power input interface, alarming relay output interface, AC and DC input alarming interface, the indicators showing system operation and port states. The structure as figure 3-9:

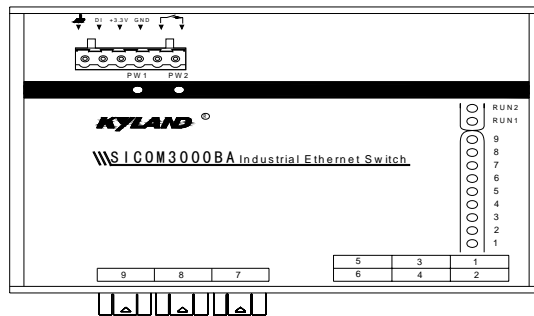


Figure 3-9: the structure of top panel



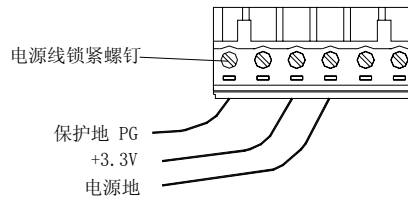
P1	P2	P3	P4	P5	P6
Protection grounding	AC/DC input alarming	+3.3V	GND	Relay alarming 1	Relay alarming 2

**Power input terminal (5.08mm)**

Using this terminals to connect the power lines under the requirement on the product instruction, when the input power is DC3.3V. Connection sequence is shown in Figure 3-7. Connection and mounting procedures are as follows:

1. Strip 5mm-long sheath from power cable and twist the bare copper wires together into a bundle; Use a 2.5 mm one-slot screwdriver to unscrew the “power cable locking screw”, insert the power cable into the hole at the terminal tail, and screw down the “power cable locking screw”;
2. Insert the power terminal into the DC power socket of the equipment and use a 2.5mm one-slot screwdriver to screw down the two “terminal locking screws” to firmly connect the terminal with the power connector.

带格式的: 项目符号和编号



**Network management interface (CONSOLE)**

The network management interface of SICOM3000BA is shielded RJ45 connector and its interface communication standard is 3-wire RS232. Users can use a network management cable with end bearing RJ45 plug and another end DB9F plug to connect the network management interface of SICOM3000BA with the 9-pin serial port of the control computer. Operating the local management software to set up SICOM3000BA by CLI. The wiring sequence for network management interface of SICOM3000BA and the 9-pin serial port of PC computer is shown in Figure 3-9.

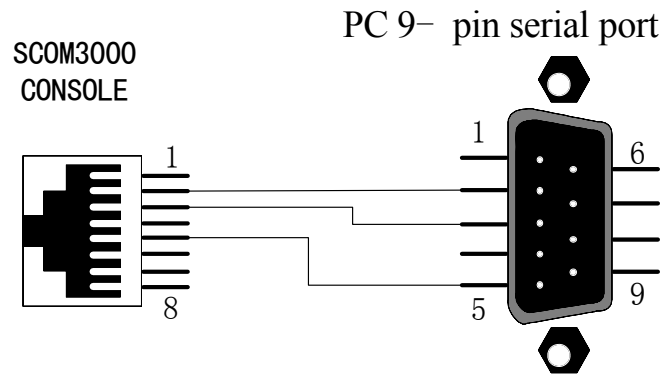


Figure 3-9 CONSOLE wiring diagram

# Chapter4 Hardware installation

## 4.1 Installation requirement

As a monomer structure switch. It can be fixed on standard 35 mm DIN-Rail ,also it can be put in the cabinet or fixed on the wall

Before installation, make sure all condition match the installation requirement.

- 1: Power supply: support redundant DC power supply, DC24V (18V~36V) , DC48V (36V~72V); DC3.3V (3V~5.5VDC)。
- 2: Environment: -40℃~75℃ Relative humidity(non-condensing) 0%~95% (
- 3: Earth resistance: <math><5\Omega</math>
- 4: Make sure all fiber are ready for use
- 5: Avoid sunshine, and strong EMC area
- 6: SICOM3000BA only provide DIN-Rail mounting components, Users need to get DIN-rail ready. If choose wall mounting, users should prepare the corresponding components, screws, nuts, and other tools for the wall mounting.
7. ensuring all cables and joints are ready before installation

## 4.2 Mainframe installation

### 4.2.1 DIN-Rail mounting

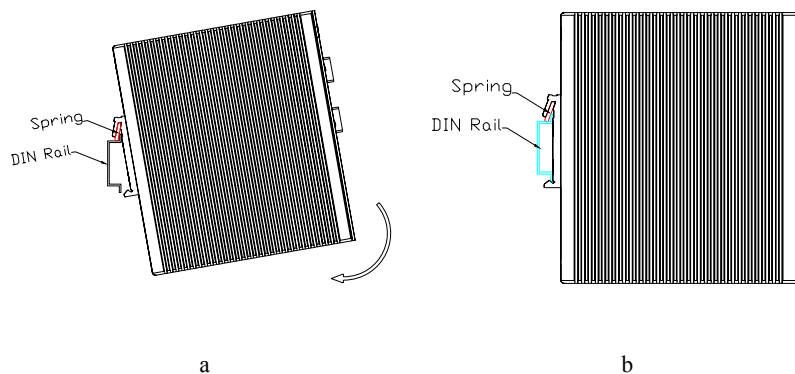
For most industrial applications, 35mm DIN-rail installation is very convenient. The back panel of SICOM3000BA has the fixed aluminum DIN-rail connecting slot. If the equipment will be installed on the DIN-rail, please check the rail before the installation. The checking method is as follows:

- 1: make sure the DIN-Rail is burliness, and there still have enough space for SICOM3000BA
- 2 the power supply is available for SICOM3000BA

带格式的：项目符号和编号

After selecting the mounting location. Fix the SICOM3000BA as following

- 1: Insert the bottom of SICOM3000BA into the DIN-Rail slot, and circumvolve the equipment as picture 4-2 a.
- 2: As picture 4-1b, put the DIN-Rail into slot, and make sure the equipment is completely fixed on the DIN-Rail.



Picture 4-1 mounting the SICOM3000BA on the DIN-Rail

### 4.3 Cable connecting

After fixed the SICOM3000BA, the next step is to connect the cables.

1: Service interface.

The terminal equipment interface of SICOM3000BA is 10Base-T/100Base-TX RJ45 interface. Using straight chain cables to connect the terminal equipment, and the crossover cables connecting the network equipments.

2: Connecting power

The power supply to the SICOM3000BA should be DC3.3V, DC24V, DC48V. After connecting all the cable, the equipment can be used

### 4.4 Optical Fiber Connection

SICOM3000BA provide three 1000M redundant SFP ports (plug and play), can consist 1000Mbit fiber or twisted pair redundant ring network. When the network or cable run into trouble, the recovery time is less than 50ms. The type of fiber port is LC.



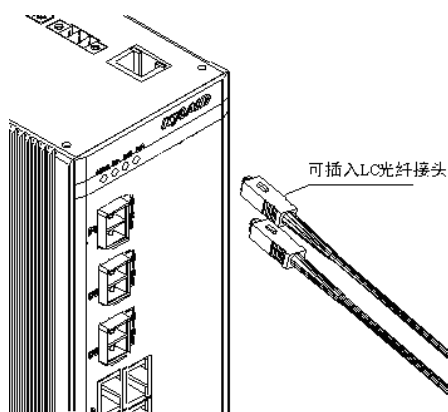
CAUTION :

This switch use laser to transmit signal on the fiber cable. In order to avoid hurting by

the laser, don't look at the fiber port and terminator directly after electrifying

The connecting procedure as below

- 1: Remove the rubber cape of the fiber interface. and keep them for protecting the fiber terminator when unused
2. Please check the optical fiber terminator and use a clean towel or wet cotton balls to gently wipe the cable plug. Dirty fiber terminator will affect the transmitting speed and quality.
- 3: Connecting the fiber port between the switch and terminal equipment .show as picture 4-2



Picture 4-2 :Fiber port connecting

4. After connecting, check the indicator light on the front panel, if the indicator light is light, shows the connecting is good

## 4.5 Cable wiring

Cable wiring should meet the following requirements:

1. Before cable wiring, check whether the specifications, models and quantities of all cables comply with the construction drawing design and contract requirements.
2. Before cable wiring, it is necessary to check whether there is damaged cable and whether the cables are accompanied by ex-factory records and vouchers

attesting their quality such as quality assurance certificate etc.

3. The specifications, quantities, route directions and laying position of the cables to be laid should meet the design requirements of construction drawings. The laying length of each cable should be determined according to its actual position.
  4. No intermediate break or joint is allowed for the cables to be laid.
  5. User's cables and power cable should be laid separately.
  6. Inside walkways, the cables should be properly arranged in good order, with uniform, smooth and flat turnings.
  7. Cables should be straightly laid in cable channels. Extruding of cable from cable channels to block other outlet or inlet holes is not allowed. The cables at the outlet part of cable channel or at turnings should be bundled and fixed.
  8. If cables, power line and grounding conductor are laid in the same channel, cables, power line and grounding conductor should be not folded or blended together. If a cable line is overly long, coil and place it in the middle of the cabling rack, do not let it cover on other cables.
  9. When laying the pigtail, avoid knotting of optical fiber cable, minimize the amount of turnings and avoid turnings with overly small radius. Bundle pigtails in proper tightness and avoid too tightly bundling. If laid on a cabling rack, it should be placed separately from other cables.
  10. There must be the relevant marks at both ends of cable and the information on the marks should be explicit to facilitate maintenance.
- 



Attention:

When laying pigtails, prevent optical fiber cable from knotting, minimize the amount of turnings and avoid turnings with too small radius, because turning with too small radius will result in serious consumption of optical signal of links, affecting communication quality.

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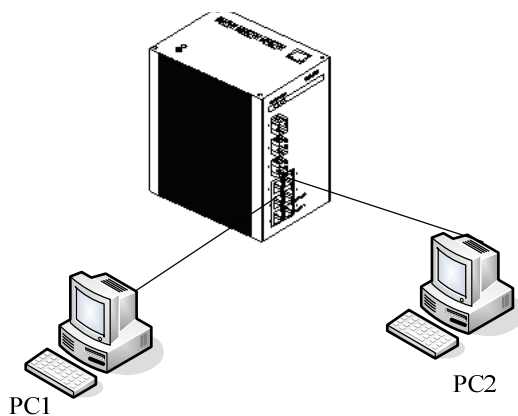
## Chapter5 Test methods

### 5. 1 Self inspection

When electrify the equipment, all service indicator light will flash, after 45 seconds, the POW indicator light will light and the RUN will flash(not flash be setting)

### 5. 2 TP Port Test

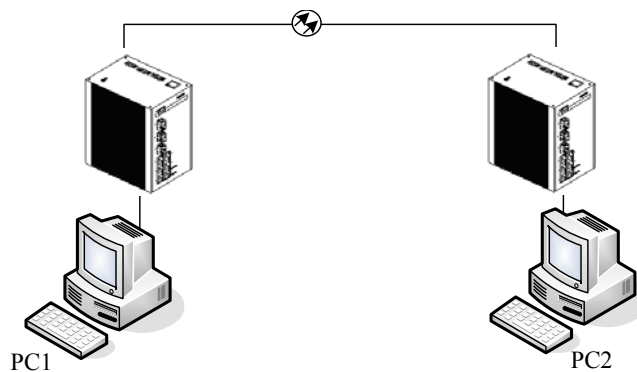
Showing as Picture 5-1.after electrifying, connect the TP port with the computer, send the “ping” command each other. Each part should receive complete command. The yellow indicator light will light (100M state)or quench (10M),these state shows the TP port are in good condition



Picture 5-1 TP port test

### 5. 3 Fiber Port Test

Connect two equipments as picture 5-2, and connect each equipment with computer through TP port. Send the “ping” commands each other, Both part should receive complete command, and the LINK/ACT lamp should light. these show the Fiber port are in good condition.



Picture 5-2 Fiber test

**Ping commands example**

Suppose the IP address for one computer is 192.168.100.10 and the other one is 192.168.100.11, operate the “begin” menu on the one computer, and select the: operation” item. input “cmd” (WIN2000) or ”command”(WIN98/95), sending Ping 192.168.100.11 -l 1000 -t, operate the “begin” menu on the second computer, and select the: operation” item. input “cmd”(WIN2000) or ”command”(WIN98/95), sending ping 192.168.100.10 -l 1000 -t.

PC1 return “Reply from 192.168.100.11: bytes=1000 time<10ms TTL=128”, PC2 return “Reply from 192.168.100.10: bytes=1000 time<10ms TTL=128”.

Keep computers operating for more than 10 minutes, then use CTL+C command to Stat. the missing rate. If the missing rate is “0” shows the equipment are in good condition

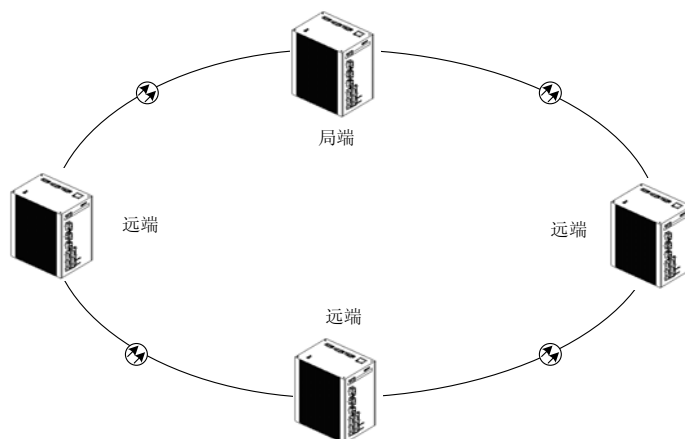


# Chapter6 Networking ways

## 6.1 Networking ways

SICOM3000BA provides six 10Base-T/100Base-TX Ethernet RJ45 port. each port can connect the terminal directly, or connect to another Industrial Ethernet Switch / Hub before the terminal, creating sharing links. Meanwhile, SICOM3000BA offer three 1000M redundant SFP ports (plug and play), consisting a 1000M fiber or twisted pairs redundant ring network. Its recovery time is less than 50ms when the system is failure. Two of the Gigabit ports make a ring network and one gigabit port uplink, which can be widely used in various industrial fields, such as power, transportation, energy, water treatment, factory automation, etc. The most typical way of network froming for SICOM3000BA is the redundant ring network. One equipment is set as the local end, and rest parts become remote ends. The communication recovery time is 50ms.

The picture 6-1 shows the redundancy ring



Picture 6-1 SICOM3000BA build the redundancy ring

## 6.2 System configuration

SICOM3000BA is a integrative industrial Ethernet switch, six 10Base-T/100Base-TX Ethernet RJ-45 port is its fixed configuration, the three SFP 1000M interfaces is optional. The power supply for SICOM3000BA should be DC3.3V (3V~5.5V) , DC24V(18V~36V) and DC48V(36V~48V)。 detailed configure showing as table 6-1

Table 6-1 SICOM3000BA configure table

Model	Description
SICOM3000BA-3GX-6TX	3 x SFP connector 6 x 10Base-T/100Base-TX
SICOM3000BA-6TX	6 x 10Base-T/100Base-TX

Power supply: DC3.3V, DC24V, DC48

# Appendix A Twisted-pair and Pin Distribution

For the connection of 10Base-T/100Base-TX, the twisted-pair must have two pair cable. Each pair is distinguished with two different colors. For example, one strand is green, and the other is the alternate of green and white stripes. RJ-45 connector should be equipped at both ends of the cable.



Warning:

Don't insert a telephone plug into any RJ-45 port. Only use twisted-pair with RJ45 connectors at both ends conforming to FCC standard.

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Fig. A-1 Shows how the connector of RJ-45 is numbered please make sure that the inserting direction is correct.

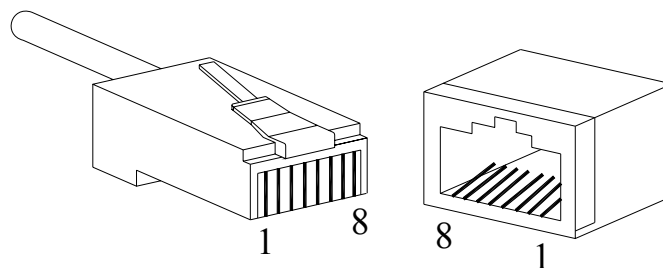


Figure A-1 Connector of RJ-45

## Pin distribution of 10Base-T/100Base-TX

Unshielded twisted-pair (UTP) or shielded twisted-pair (STP) will be used for the connection of RJ-45: for the connection of 10Mbps, category 3, 4 and 5 of 100 ohm will be used, and cat.5 of 100 ohm will be used for 100Mbps. Additionally, do make sure that the connecting length of any twisted-pair shall not exceed 100 meter.

Port of RJ-45 supports automatic MDI/MDI-X operation, PC or server may be connected with straight-through cable, or connect with other switch or hub. In straight-through cable, pin 1, 2, 3 and 6 at one end of the cable are connected to pin

1, 2, 3 and 6 at the other end of the straight-through cable respectively. Cross-over cable must be used for switch or hub with MDI-X port. The pin distribution of 10Base-T/100Base-TX is listed in the table A-1.

Table A-1 Pin distribution of 10Base-T/100Base-TX

Pin	MDI-X signal name	MDI signal name
1	Receiving data + (RD+)	Output data + (TD+)
2	Receiving data - (RD-)	Output data - (TD-)
3	Output data + (TD+)	Receiving data + (RD+)
6	Output data - (TD-)	Receiving data - (RD-)
4, 5, 7, 8	Unused	Unused

**Note:** “+” “-” denoting cable polarity.

Definition of straight-through cable from RJ45 (8-pin) to RJ45 (8-pin)

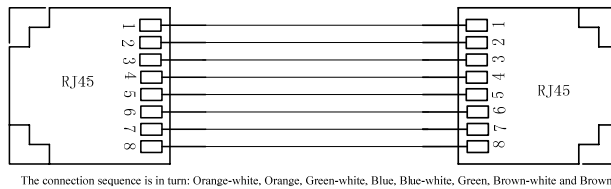


Figure A-2 Cable sequence of straight-through cable

Definition of Cross-over cable from RJ45 (8-pin) to RJ45 (8-pin)

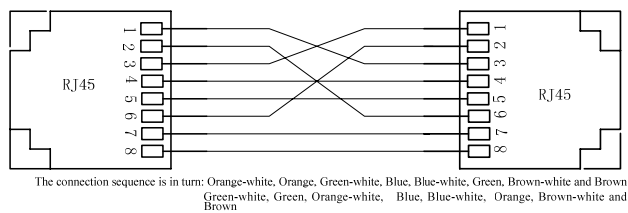


Figure A-3 Cable sequence of cross-over cable

# Appendix B Cable Type and Specifications

The cable type and specifications are shown as table B-1:

Table B-1 Cable type and specifications

Cable	Type	Max. length	Connector
10Base-T	Cat.3, 4 and 5 100 ohm UTP	100m (328 foot )	RJ-45
100Base-TX	Cat.5 –100 ohm UTP	100m (328 foot )	RJ-45
100Base-FX	50/125 or 62.5/125 $\mu$ m core multi-mode fiber (MMF)	2km (1.24 mile)	SC/FC
100Base-FX	9/125 $\mu$ m core single-mode fiber (SMF)	20km (12.43 mile)	SC/FC
1000Base-T	Cat.5 100ohmUTP	100m	RJ-45
1000Base-LX	9/10 $\mu$ m core single mode fiber cable (1310nm)	5km	LC
1000Base-LX	50/125 or 62.5/125 $\mu$ m core multi-mode fiber cable (850nm)	550m	LC



## Appendix C Glossary

Terminology	Explanation
10Base-T	Twisted-pair standard of Cat3, Cat4 and Cat5 in IEEE specification for 10Mbps Ethernet
100Base-TX	Twisted-pair standard of Cat5 or above in IEEE specification for 100Mbps Fast Ethernet
100Base-FX	Fast Ethernet which uses one pair of multi-mode or single mode optical fiber to transmit.
1000Base-T	The Gigabit Ethernet technology which use Cat.5 being network transmission medium. The transmitting distance is up to 100 meters Use all four pairs of wire (full duplex)
1000Base-LX	Gigabit Ethernet which uses one pair of single mode or multi-mode optical fiber to transmit
Adaptive	A characteristic that is automatically configured to adaptive mode for the speed, duplex and traffic control port.
Bandwidth	The information capacity that the channel can transmit. For instance, the bandwidth of the Fast Ethernet is 100Mbps (bit per second) .
Baud Rate	It expresses the signaling rate which is defined as the change times of the status for the electric or optical transmission medium within 1 second.
Bridge	One of network equipments which run on the layer2 in the OSI layer7 model, and it can be connected to the LAN or network segment which uses the same protocol. It presents the automatic network address learning and network configuration function.
Traffic Control	It is a congestion control mechanism. The network equipment sends the data to the equipment which has overloaded and causes the port to congest. The traffic control can prevent the data packet from loss and avoid the congestion for the port.
VLAN	It is the Virtual Local Area Network, which means that it takes the network management software to establish the point to point logic network which can cross different network segment and various network on the switching LAN.
Broadcast	One data packet is sent to all equipments on the network.
Broadcast storm	Restless forward broadcast frame or multicast frame on bridge caused by the bridge ring.
IGMP	IGMP means Internet Group Multicast Protocol.
Full Duplex	Use switches to set up the point to point connection among nodes in the LAN and allow them to receive and send data packet at the same time.



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Half Duplex	The communication for two nodes can only move toward one direction at the same time, but can not move toward both directions.
MDI	It is the Medium Dependent Interface, in which, one Ethernet port is taken as the receiving terminal to connect to the port of other equipment.
MDI-X	Medium Dependent Interface Cross-over





