

# **SICOM3016 Industrial Ethernet Switch User Manual**

**Beijing Kyland Telecom Technology Co., Ltd**

# SICOM3016 Industrial Ethernet Switch User Manual

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# Preface

SICOM3016 is a high-performance network-managed industrial Ethernet switch specially designed by KYLAND Telecom Technology CO., LTD. for industrial applications. Its high-performance switch engine, solid and closed case design, high-efficient single-rib shape case heat dispersion surface without fans, overcurrent, overvoltage and EMC protection at power input side, and excellent EMC protection of RJ45 port allows SICOM3016 applicable in harsh and dangerous industrial environments. The redundant function of optical fiber network, independent entire network management channel, redundant power input function, and powerful entire network real-time management system provides multiplex guarantee for reliable operation of the system.

The User Manual for SICOM3016 Industrial Ethernet Switch mainly introduces the information on technical principles, performance indexes, installation and commissioning, network management etc. to provide users with references in startup, expansion and routine maintenance. It is a practical teaching material that can be used for knowledge and understanding of SICOM3016 industrial Ethernet Switch.

This manual mainly includes the following contents:

Chapter 1 Overview and system features;

Chapter 2 Performance and service functions;

Chapter 3 Hardware structure;

Chapter 4 Installation;

Chapter 5 Test methods;

Chapter 6 Networking modes and system configuration;

Chapter 7 WEB management software;

Chapter 8 CLI command;

Appendix A Twisted pair cable and pin distribution rules;

Appendix B Cable types and specifications;

Appendix C Abbreviations used in this manual;

Appendix D FTP application of software upgrade.

**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 visit our company's website or directly contact with our 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 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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# Chapter 1 System Overview

## 1.1 Product Overview

SICOM3016 is a high-performance network-managed industrial Ethernet switch specially designed by KYLAND Telecom Technology CO., LTD. for industrial applications. Its high-performance switch engine, solid and closed case design, high-efficient single-rib shape case heat dispersion surface without fans, over-current, over-voltage and EMC protection at power input side, and excellent EMC protection of RJ45 port allows SICOM3016 applicable in harsh and dangerous industrial environments. The redundant function of optical fiber network, independent entire network management channel, redundant power input function, and powerful entire network real-time management system provides multiplex guarantee for reliable operation of the system.

SICOM3016 series industrial Ethernet switch offers strong web-management which support CLI, Telnet, WEB, SNMP and OPC-based network management.

SICOM3016 supports DIN rail and wall-mounting for installation. It offers two (2) or four (4) pairs of redundant fiber ports of 100Base-FX (single mode or multimode) in front panel and sixteen (16) RJ45 ports of 10Base-T/100Base-TX. The redundant fiber or TP cable ring of 100M bit can be connected by fiber or RJ45 ports with recovery time less than 50ms. Each RJ45 port is adaptive and able to configure to 10Base-T or 100Base-TX and full-duplex or half-duplex. Auto MDI/MDI-X connection is also available.

## 1.2 System Features

### 1. High performance industrial Ethernet switch

Support various management software, easy entrance for user such as: WEB, CLI, TELNET, SNMP, OPC etc;

10Base-T/100Base-TX adaptive Ethernet ports (full/half duplex), auto MDI/MDI-X connection;

100Base-FX full-duplex redundant fiber ports, single mode or multimode;

Recovery time < 50ms increases the system reliability;

IEEE802.3/802.U/802.3X store and forward;

IGMP Snooping;

Port mirroring;

TRUNK;

Broadcasting storm control;

Redundancy like DT-Ring, DT-Ring+, RSTP etc;

VLAN;

ACL;

Alarm output;

SNMP supported;

Support 802.1P 、 IP TOS 、 DSCP;

Transparent transmission of VLAN Tag packets;

Online software upgrade based on FTP to make it easy for user to manage and maintain the devices.

## **2. Industrial Power Design**

Provide industrial power input: DC24V (DC18V~36V) ;

Reliable protection for over-current, over-voltage and EMC;

Redundant power input.

## **3. Rugged Design**

Ribbed aluminum case for heat-dissipation, operation at -40°C~+75°C;

Solid and closed case design, IP40, ensure it can be used in harsh environment.

DIN-Rail or wall-mounting for flexible installation environments.

### 1.3 Packing list and unpacking check

#### 1. Packing List: see the Packing List

#### 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 SICOM3016 from falling apart after opening the case. If a hard tool 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 SICOM3016 equipments (including main unit of SICOM3016, parts of equipment, user's manual, customer service guideline) according to the packing list, and check the appearance quality of SICOM3016.



#### **Warning:**

The equipment is built-in with precise components, please handle with care and avoid strenuous vibration to avoid affecting the performances of equipments.

---

# Chapter 2 Performance Specifications

## 2.1 System Specifications

The system performance specifications of SICOM3016 industrial Ethernet switch are shown in Table 2-1.

Table 2-1 System Specifications

Specs	SICOM3016
RJ45 ports	16 ×10Base-T/100Base-TX
Redundant fiber ports	2-4 pairs of 100Base-FX-SM/MM
System performance	Standard: IEEE802.3、IEEE 802.3x、IEEE 802.3u Max.store-and-Forward speed: 148810 bps Max. filtering speed: 1488100 bps Switching mode: Store-and-Forward Switching bandwidth of system: 4G 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. Port standard: comply with IEEE802.3 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) <2Km(MM) Connector type: LC, SC/FC Transmission rate: 125Mbps
Power supply	Input voltage: Dual DC24V (DC 18V~36V) Input power consumption: <9W Over-current Protection: build-in
Mechanical parameters	Physical dimensions (height×width×depth): 165×75×123 mm; Mounting mode: DIN-Rail or wall-mounting; Heat removal method: Ribbed aluminum casing without fan; Outlet type: front outlet for services, up for power, management, grounding, alarm; Shell protection: IP40 Weight: 1 kg
Ambient conditions	Operating temperature: -40℃~75℃ Storage temperature: -45℃~85℃ Humidity: 0%~95% (non-condensing)

## 2.2 Service Interface

1. 16 RJ45 ports of 10Base-T/100Base-TX, each RJ45 port is adaptive automatically to 10Base-T or 100Base-TX state and automatically working in full duplex or half duplex operation mode, supporting auto MDI/MDI-X connection. The transmission distance is 100m max.
2. 4 pairs of redundant fiber ports of 100Base-FX single mode or multi-mode. The maximum throughput of each pair of optical fiber interface is 100Mbps, and it is forced to work in 100M full duplex mode. They support optical fiber redundancy technology, with the recovery time less than 50ms.
3. Conform to IEEE802.3/802.3U/802.3X /802.3Z/ab.
4. Meanings of RJ45 port indicator: yellow lamp – rate indicator; on:100M, off: 10M; RJ45 Green lamp – connection state indicator, on: effective connection of network; blink: network active; off: no connection.

## 2.3 Service Function

The service functions for SICOM3016 mainly include:

1. LED Indicator

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

2. 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. SICOM3016 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. SICOM3016 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. SICOM3016 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. SICOM3016 supports four class of priority.

#### 5. Port Trunking

In SICOM3016, 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. Port Mirroring

The data of one port can be mapped to another port for user to real-time monitor the communication

#### 7. Configure Port Working Mode

SICOM3016 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.

#### 8. Configure Port Traffic Flow

You can configure all ports via the management software of SICOM3016 as 128K、256K、512K、1M、2M、10M、50M、100M.

#### 9. 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.

#### 10. IGMP

IGMP is Internet Group Multicast Protocol. SICOM3016 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.

#### 11. Broadcasting Storm Control

SICOM3016 series offers broadcast storm protection ensuring the smooth communication platform of the switch network. The switch will filter out the overflow once the bandwidth of broadcast flow exceeds the limit.

#### 12. 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 makes sure the Ethernet redundant ring is fast and reliable to meet the high requirements of industrial communications.

#### 13. 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.

#### 14. RSTP

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

#### 15. ACL

SICOM3016 offers ACL (Access Control List) function to define the access rules by using the protocols of source or object MAC addresses. It can limit the network traffic and increase the networking performance.

#### 16. Alarm Output

Alarm is significant when it is used for realtime transmission of device alarm output. SICOM3016 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.

#### 17. 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 systems employ it. It is easy to realize, open and

free, and can be used to control various devices.

#### 18. 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.

# Chapter 3 Hardware Structure

## 3.1 System Structure

SICOM3016 hardware is structured as Figure3-1:

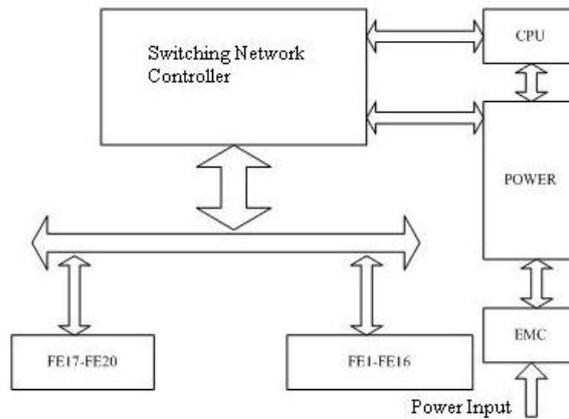


Figure 3-1 Hardware Structure

System hardware mainly consist the following parts:

1. Switching network controller employs ASIC chip technology, offering layer-2 wire-speed transfer of data packets.
2. Integrated module of transmitting and receiving for fiber interfaces.
3. Industrial power supply with protection of over-current, over-voltage and EMC.
4. EMC protection for all RJ45 ports.

## 3.2 Switch Structure

### 3.2.1 Chassis

SICOM3016 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 are a part of the heat dissipation system of the entire unit. The ribbed 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 SICOM3016 case is shown in Figure 3-2.

Its dimension (not including the dimensions of DIN rail and wall-mounting components) is 165 mm×75 mm×123 mm (H×W×D) :

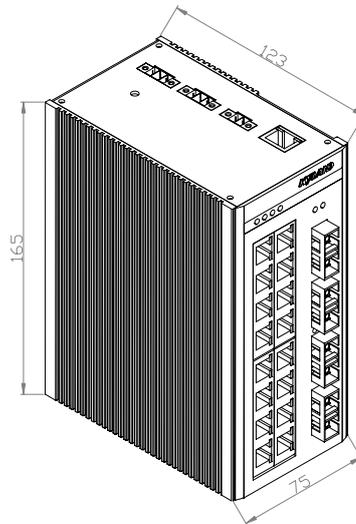


Figure 3-2 SICOM3016 Chassis



Warning:

The shell of this switch is a part of the heat dissipation system of the unit. It may get hot during working, so never touch the shell when the equipment is working to avoid burning.

---

### 3.2.2 Front Panel

The front panel of SICOM3016 industrial Ethernet switch has integrated 4 pairs of redundant optical fiber interfaces, 16 uplink redundant RJ45 interfaces of 10Base-T/100Base-TX and 6/8 system and port operation indicators. Its structure is shown as Figure 3-3

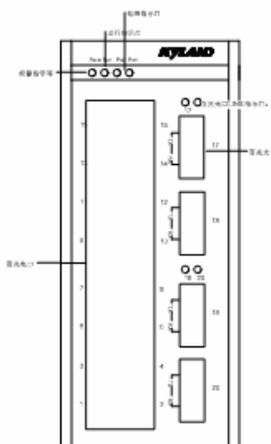


Figure 3-3 Front Panel

#### Optical Fiber Ports

SICOM3016 offers four (4) pairs of redundant 100Base-FX full duplex single mode or multi-mode optical fiber ports, with port number of 17-20 and SC or FC connector. Optical fiber ports should be used in pairs (TX and RX are a pair), TX port is the transmitting end connected to the receiving end RX of the optical fiber port of another remote switch; RX is the receiving end connected to the transmitting end TX of the same optical fiber port of the same remote switch. Four (4) pairs of redundant 100Base-FX optical fiber port 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.

#### Ethernet RJ45 Ports

SICOM3016 offers sixteen (16) RJ45 ports of 10Base-T/100Base-TX RJ45 with port number of 1-16. Each RJ45 port is adaptive, support auto MDI/MDI-X

connection and can be connected to end equipments, servers, hubs or other switches in straight-through or cross-over way. Each port supports IEEE802.3x, 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 ports does not support self-adaptation, the ports will be able to send at proper speed but transmission mode is default as half duplex

### LED Indicator

The indicators on the front panel of SICOM3016 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>		
RUN	Blinking	Switch runs normally
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>LED Optical fiber port state LED</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

The top panel of SICOM3016 industrial Ethernet integrates two power input terminals for redundant power supply, alarming relay output terminal, grounding protection terminal etc. Its structure is shown as Figure 3-6:

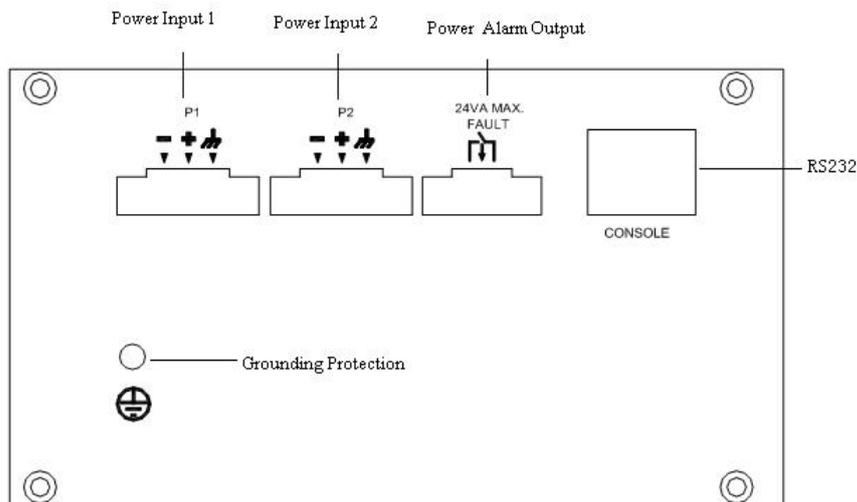


Figure 3-6 Top Panel

#### Power Input

SICOM3016 has redundant power input function. It has two power input terminals P1 and P2, each allowed to be used singly, or both to be used simultaneously to input power to SICOM3016 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. The diameter of power cable is less than 1.5 mm.

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

1. Strip 5mm-long sheath from power cable and twist the bare copper wires together into a bundle;
2. 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”;

3. 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.

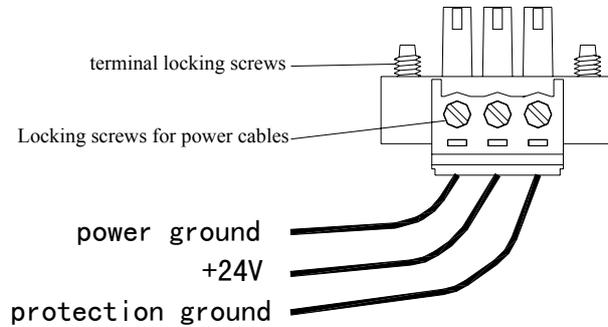


Figure 3-7 DC Power

### 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 DC30V and the maximum input power 24VA. Figure 3-8 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 Input.

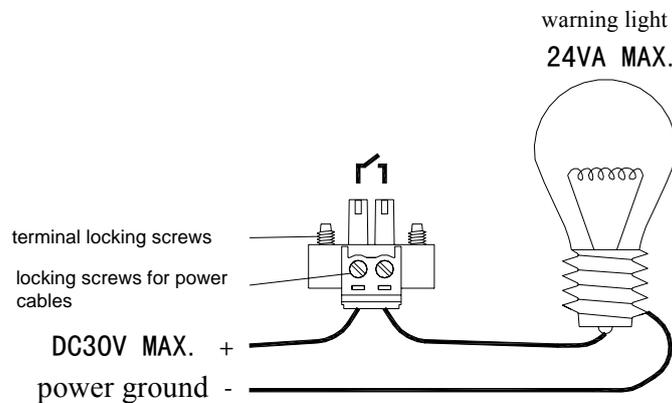


Figure 3-8 External alarming lamp of alarming relay output

**RS232 controller (CONSOLE)**

The network management interface of SICOM3016 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 SICOM3016 with the 9-pin serial port of the control computer. Operating the local management software to set up SICOM3016 by CLI. The wiring sequence for network management interface of SICOM3016 and the 9-pin serial port of PC computer is shown in Figure 3-9.

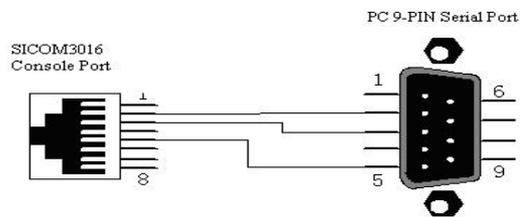


Figure 3-9 CONSOLE Port

# Chapter 4 Hardware Installation

## 4.1 Installation Requirements

As a single structure switch, SICOM3016 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 matches the installation requirements including power supply, enough space, and location with other networking devices. Please confirm the following:

1. Power supply: redundant DC24V (18VDC~36VDC)
2. Environment: -40°C ~75°C Relative humidity(non-condensing) 0% ~95%
3. Grounding resistance: <math><5\Omega</math>
4. Make sure all fiber cables and connectors are ready for use
5. Avoid sunshine, and strong EMC area
6. SICOM3016 provides DIN-Rail mounting only, for other mounting way, user should buy relevant accessories by themselves.
7. Check if you have all necessary cables and connectors.

## 4.2 Install Switch

### 4.2.1 DIN-Rail Mounting

For most industrial applications, 35mm standard DIN-Rail installation is very convenient. The DIN-Rail connector has been fixed in the rear panel of the switch when you pick the device out from the carton. Check the installation conditions as following:

1. Make sure that the DIN-Rail is locked-in, and if there still is enough space for the switch.
2. Make sure if there is a suitable power input for the switch in the DIN-Rail.

After selecting the installation position of the switch, install the switch to the DIN-Rail as the following:

3. Insert the bottom of the switch into the DIN-Rail slot, and turn the equipment as figure 4-2 a

4. As Figure 4-2 b, put the DIN-Rail into slot, and make sure the switch is completely fixed on the DIN-Rail.

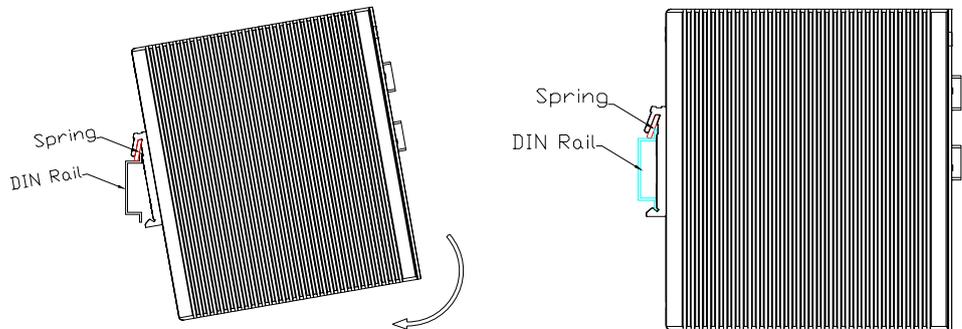


Figure 4-1 Install SICOM3016 into Rail

### 4.3 Connect TP Cables

After having installed the switch, the next step is to connect the cables for the following ports:

#### 1: Service Ports

SICOM3016 offers Ethernet RJ45 port of 10Base-T/100Base-TX, you can connect it to the terminal devices by straight-through cable and to networking devices by cross-over cables.

#### 2: Power Supply

The power supply to SICOM3016 should be DC24V, after connecting all the other cables, connect the power input.

### 4.4 Connect F/O Cables

SICOM3016 offers 4 pairs of redundant ports of 100Base-FX, full-duplex, single mode or multimode, which can form redundant fiber ring network. When a failure occurs to a device in the network or somewhere in the fiber cable, the network will be able to re-configure within 50ms. The fiber connector can be LC, SC or FC.



**Warning:**

The switch transmits signal through fiber optic cable by laser which comply with the requirements for class 1 laser products. Normal operation is harmless, but don't look direct to the transmission ports and fiber cable terminal when the device is powered.

---

Connect the fiber optic module as the following:

1. Remove the rubber cap of the fiber connectors, and keep and use them to protect the connector when unoccupied.
2. Inspect the fiber connector is clean and ensure it is in good condition. A dirty connector will affect the fiber transmission quality and performance.
3. Connect the fiber cable between two fiber ports of the devices as shown in

Figure 4-6:

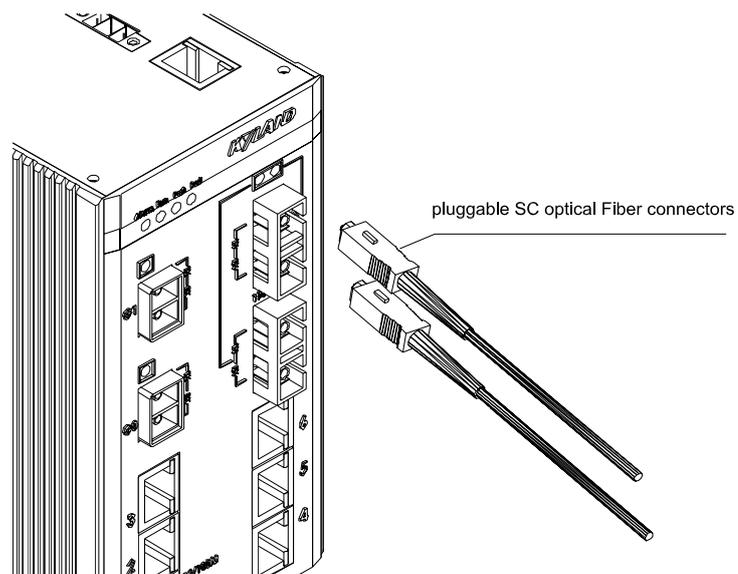


Figure 4-6 Connect Fiber Ports

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

## 4.5 Cable Wiring

Cable wiring should meet the following requirements:

1. Before 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.

---

# Chapter 5 Test Methods

## 5.1 Self Inspection

When the device is powered, all service port indicator lights will blink, and this proves the ports run well. Afterward, the POW indicator light will be always on and the RUN light will be on/off or blink (controlled by software).

## 5.2 Test RJ45 Port

As shown in Figure 5-1, SICOM3016 is powered on, connect any two RJ45 ports to two PCs by straight-through cable and send Ping command to each other, they can both get command from each other without packet loss, the yellow light of the port should be always on (PC work on 100M) or always off (PC work on 10M), the green light should be blinking. In the same way, test all other RJ45 ports (Operations on PING command is shown as the following example).

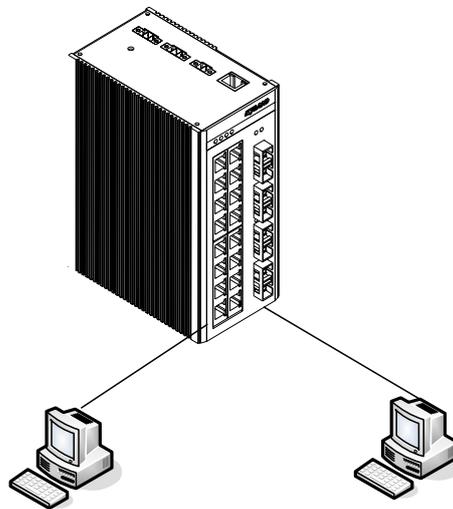


Figure 5-1 Test RJ45 Ports

### 5.3 Test Fiber Port

As shown in Figure 5-2, two units of SICOM3016 are connected by F/O cable, connect any one RJ45 port in each device to PCs by straight-through cable and send Ping command to each other, they can both get command from each other without packet loss, the LINK/ACT light of the fiber port should be always on. In the same way, test another pair of fiber ports.

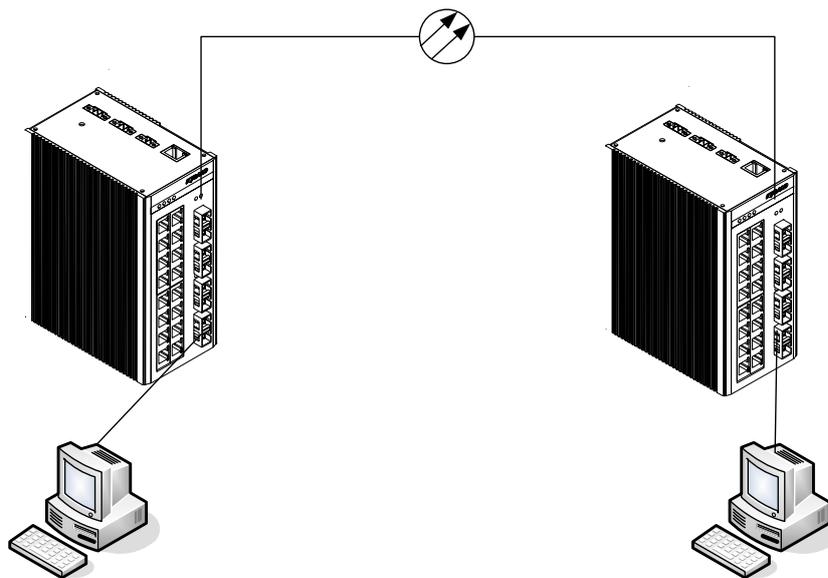


Figure 5-2 Test Fiber Ports

#### **PING Command 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” or ”command”, sending Ping 192.168.100.11 -l 1000 -t, operate the “begin” menu on the second computer, and select the: operation” item. input “cmd” or ”command”, sending ping 192.168.100.10 -l 1000 -t. return “Reply from 192.168.100.11: bytes=1000 time<10ms TTL=128”,for the second computer, Return “Reply from 192.168.100.10: bytes=1000 time<10ms TTL=128”,after ten minutes for operating ,use CTL+C command to Stat. the missing rate. If the missing rate is “0” shows the equipment are in good condition.

# Chapter 6 Networking and Configurations

## 6.1 Networking

SICOM3016 offers sixteen (16) RJ45 ports of 10Base-T/100Base-TX, each of which can provide link directly to the terminal devices, or to another industrial Ethernet switch/hub before terminal device as link share. SICOM3016 has four (4) pairs of redundant fiber ports of 100Base-FX single mode or multimode. The two pairs of redundant ports can be formed into redundant ring of 100M with recovery time less than 50ms. It is widely used in electric power, transportation, energy, water treatment and factory automation etc.

The typical networking topology of SICOM3016 is redundant ring. SICOM3016 can form the redundant fiber ring network as shown in Figure 6-1, in which one device is set as master and the rest are slave. The network can re-configure within 50ms when failure occurs.

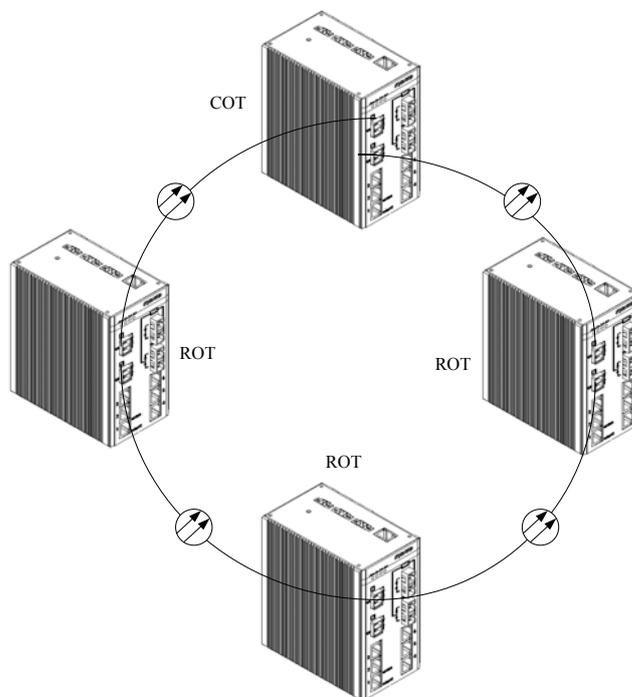


Figure 6-1 Fiber Ring of SICOM3016

## 6.2 Configurations

SICOM3016 is a single integrated structure, offering 16 RJ45 ports of 10Base-T/100Base-TX. The redundant port can be fiber port of 100Base-FX or RJ45 ports of 100Base-TX.

The power supply is DC24V. The specific specifications are shown in Table 6-1:

Table 6-1 SICOM3016 Model Details

Model	Descriptions
SICOM3016-4S-16T	4 x 100BaseFX, single mode; 16 x 10/100Base-T/TX, RJ45
SICOM3016-4M-16T	4 x 100BaseFX, multimode; 16 x 10/100Base-T/TX, RJ45
SICOM3016-2S-16T	2 x 100BaseFX, single mode; 16 x 10/100Base-T/TX, RJ45
SICOM3016-2M-16T	2 x 100BaseFX, multimode; 16 x 10/100Base-T/TX, RJ45

# Chapter 7 WEB Management

SICOM3016 supports for WEB management, by which its operation state, basic information can be shown and it can be configured and upgraded etc. SICOM3024、SICOM3024-M9、SICOM3048、SICOM3016、SICOM4000、SICOM6000 use the integrated management software.

## 7.1 Login WEB Page

Connecting the switch with a computer, input the IP address “192.168.1.71” in the IE browser, a page will pop up as Figure 7-1,the default user name and password are admin and 123.click “OK” to enter

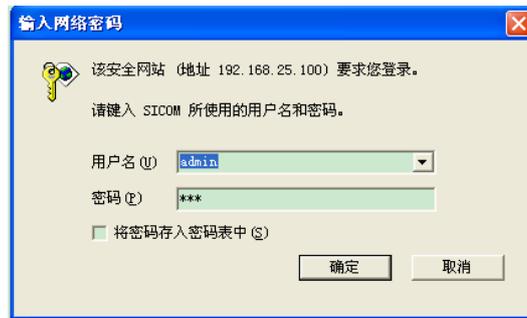


Figure 7-1 Login Page

The main page is as Figure 7-2

At the left of the page is the management tree menu including device state, basic configuration, advanced configuration, device management, save all changes. Restore default settings and so on. , each menu may include some submenus.



Figure 7-2 homepage

## 7.2 Show Device Status

The menu of device status includes three submenus: Basic Information, port status, Port Statistics.

### 7.2.1 Basic Info

Click “Basic info” and enter the interface as shown in Figure 7-3, which displays MAC address, IP address, software version, hardware version etc.



Figure 7-3 Basic Info

### 7.2.2 Port Status

Click “Port Status” and enter the page as shown in Figure 7-4, which displays the link state, port speed, full/half duplex and flow control state etc.

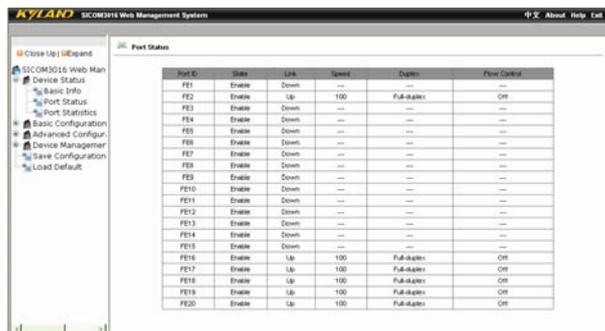


Figure 7-4 Port Status

### 7.2.3 Port Statistics

Click “Port Statistics” and enter the page as shown in Figure 7-5 which displays the port statistics of each port.

Port ID	State	Link	Bytes Sent	Packets Sent	Bytes Received	Packets Received	CRC Error	Packets x 64 bytes
FE1	Enable	Down	0	0	0	0	0	0
FE2	Enable	Up	173444	173444	13762330	15263	0	0
FE3	Enable	Down	0	0	0	0	0	0
FE4	Enable	Down	0	0	0	0	0	0
FE5	Enable	Down	0	0	0	0	0	0
FE6	Enable	Down	0	0	0	0	0	0
FE7	Enable	Down	0	0	0	0	0	0
FE8	Enable	Down	0	0	0	0	0	0
FE9	Enable	Down	0	0	0	0	0	0
FE10	Enable	Down	0	0	0	0	0	0
FE11	Enable	Down	0	0	0	0	0	0
FE12	Enable	Down	0	0	0	0	0	0
FE13	Enable	Down	0	0	0	0	0	0
FE14	Enable	Down	0	0	0	0	0	0
FE15	Enable	Down	0	0	0	0	0	0
FE16	Enable	Up	13738240	154308	17626470	187545	0	0
FE17	Enable	Up	137165722	153937	176766371	171717	0	0
FE18	Enable	Up	176766271	171717	137165722	153937	0	0
FE19	Enable	Up	137165722	153937	176766381	171718	0	0
FE20	Enable	Up	176766381	171718	137165832	153938	0	0

Figure 7-5 Port Statistics

### 7.3 Device Basic Configuration

In the menu of “Device Basic Configuration”, there are functions to configure IP address, device name, port, to change password, query software version and upgrade software etc

#### 7.3.1 Configure IP Address

Click the “IP address” in the left menu and enter the page (as Figure 7-6), where you can modify IP address, subnet mask and gateway with click on “Apply” button. To make the modification take effect, you need to reset the switch.

MAC Address	00-1E-C0-17-10-00
IP Address	192.168.0.2
Subnet Mask	255.255.255.0
Gateway	192.168.0.1

Apply Go

Figure 7-6 IP Address

#### 7.3.2 Configure Device Name

Click the “Device Name” in the left menu and enter the page (as Figure 7-7), fill in the device name and click “Apply” button.



Figure 7-7 Device Name

### 7.3.3 Configure Port

Click the “Configure Port” in the left menu and enter the page (as Figure 7-8), where you can configure port state (enable/disable), auto-negotiation (enable/disable), port speed (10/100M), duplex (full/half), flow control (open/close). After configuration, click “Apply” to make it take effect.

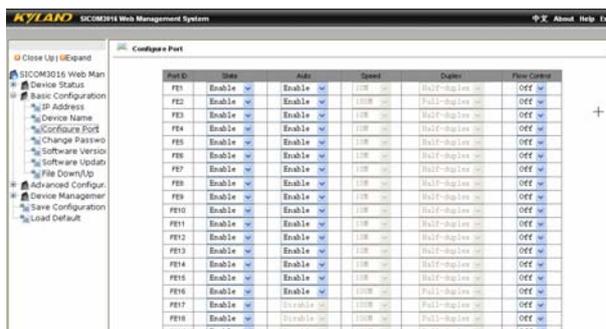


Figure 7-8 Configure Port

### 7.3.4 Change Password

Click the “Change Password” in the left menu and enter the page (as Figure 7-9), enter old password and new password, click “Apply” to take effect.

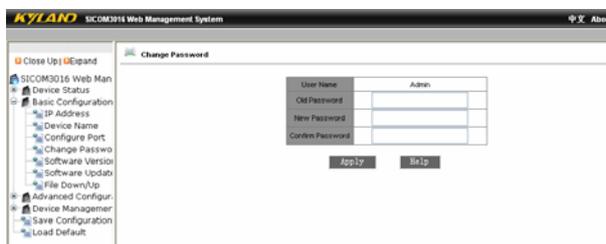


Figure 7-9 Change Password

### 7.3.5 Software Version

Click the “Software Version” in the left menu and enter the page (as Figure 7-10),

which displays two versions: one is startup and another is closed. This function is for the purpose of upgrading software.



Figure 7-10 Software Version

### 7.3.6 Software Update

Click the “Software Update” in the left menu and enter the page (as Figure 7-11). For detailed upgrading instructions, please refer to the Appendix D.

- Enter the main WEB page, click “upgrading bar” of basic configuration in navigation bar to enter into the upgrading page as shown in the following Figure:



Figure 7-11 Software Update

1. Configure IP address, user name, password and software name of the FTP server, click “Apply” button and record upgraded software ID as shown in Figure 7-12;
2. Wait for upgrading and see the successful message.
3. Click “Software Version” in navigation bar, set the software ID as startup version and click “OK” as shown in the Figure 7-10 of software version.
4. Click “Reboot” in the navigation bar and click “reset as shown in Figure 7-13.”

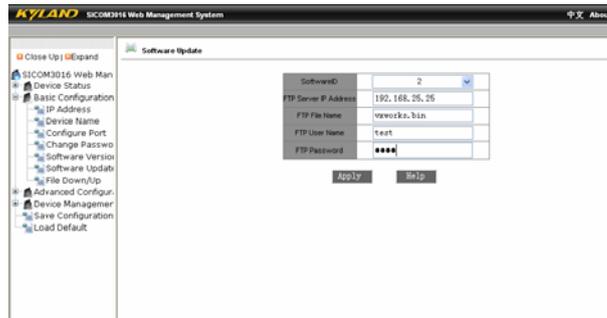


Figure 7-12 Software Update sample



Figure 7-13 reboot

- Wait for 30 seconds to start up network management system. Click “Device Basic Info”, check software version to confirm if it is upgraded successfully.

### 7.3.7 Configure Upload/Download

Click the “Upload/Download Configuration” in the left menu and enter the page (as Figure 7-14), enter server IP address and file name to be uploaded/downloaded, user name, password and click “Apply” to take effect. See the details of FTP configurations in “Appendix D”.

- Select “upload” or “download” file and set FTP server IP address, file name, user name, password and file name to be upgraded, click “Apply” as shown in Figure 7-15.
- After clicking “Apply”, upload or download successfully as shown in Figure 7-16.

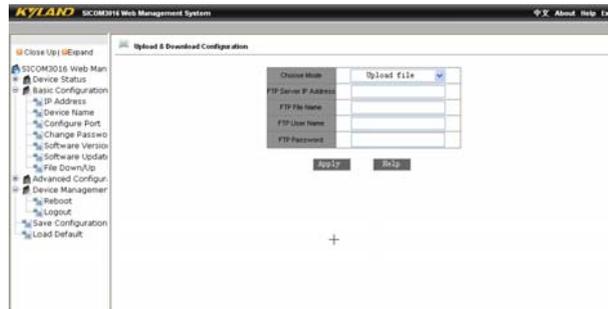


Figure 7-14 Upload & Download Configuration

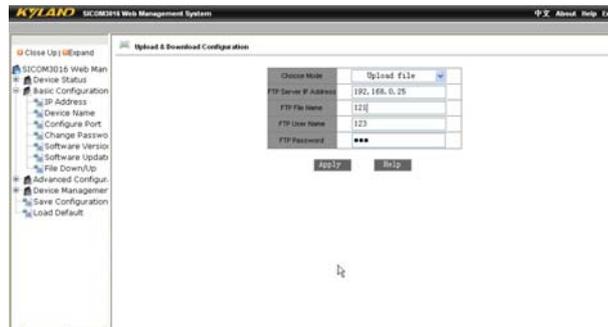


Figure 7-15 Upload sample



Figure 7-16 Upload successful

## 7.4 Device Advanced Configuration

The advanced configurations include port traffic flow, VLAN, port mirroring, port trunking, static multicasting address, IGMP Snooping, ACL, Alarm, SNMP, RSTP, DT-Ring, QoS and other settings etc.

### 7.4.1 Port Rate

Click the “Port Flow” in the left menu and enter the page (as Figure 7-17), where you can configure the RX/TX speed of each port as the range of 128K、256K、512K、1M、2M、10M、50M、100M for 100Mbps port. Click “Apply” to finish configuration. The

port rate can only be selected from the range set in the configurations.

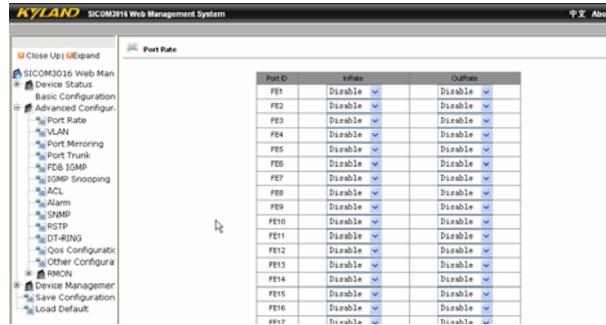


Figure 7-17 Port Rate

## 7.4.2 VLAN

Click the “VLAN” in the left menu and enter the page (as Figure 7-18) and select “based on 802.1Q” as VLAN mode, click “Add” to enter into the page as Figure 7-19. Enter VLAN name, ID(VLAN1 is the default), select VLAN member, tag or untag, click “Apply” to finish configuration. In the state of untagged, the port can be set for priority from 0 to 7.

 Note: in the default state, VLAN ID is “1”, the range of ID no. is from 2 to 4093.



Figure 7-18 add VLAN

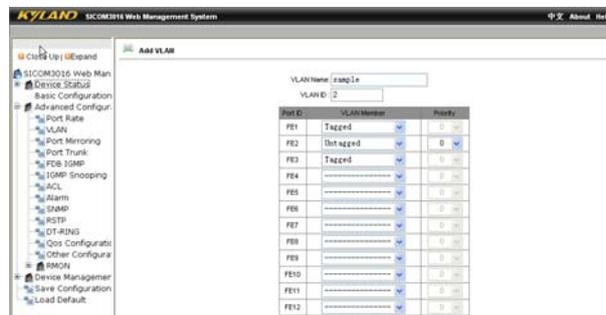


Figure 7-19 VLAN configuration

### 7.4.3 Port Mirroring

Click the “Port Mirroring” in the left menu and enter the page (as Figure 7-20), select mirroring port from range of port1~port20 and mirrored port from the range of TX, RX, TX&RX, click “Apply” to finish configuration.

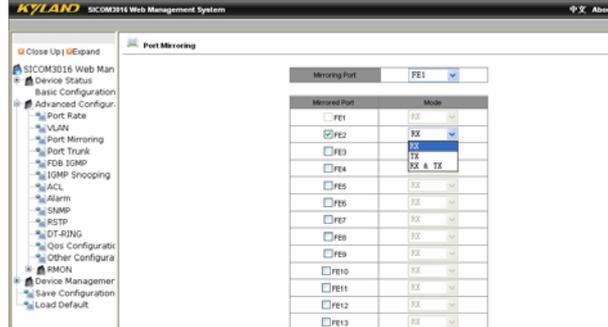


Figure 7-20 Port Mirroring

### 7.4.4 Port Trunking

Click the “Port Trunking” in the left menu and enter the page (as Figure 7-21), two trunk groups are supported. Max 4 ports are in one group, select the port in the normal group and click << , >> , to add or delete trunked port. Click “Apply” to finish configuration as shown in Figure 7-22.

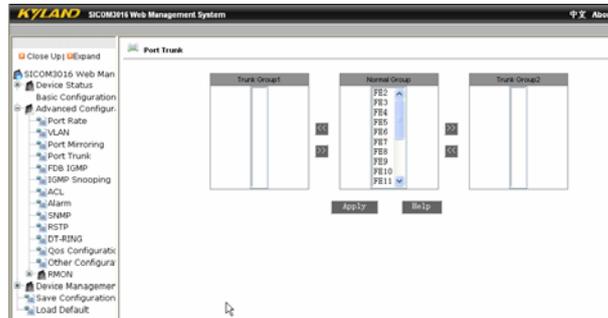


Figure 7-21 Port Trunking

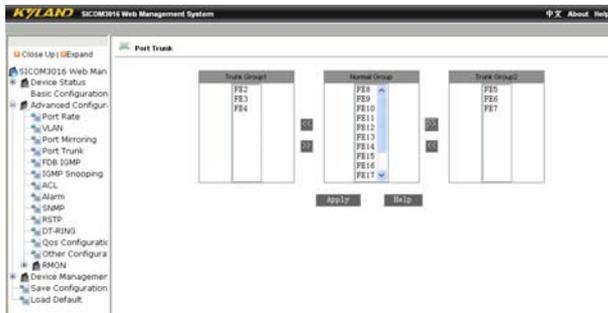


Figure 7-22 Port Trunk sample

## 7.4.5 Static Multicasting Address Table

Click the “Static FDB Multicasting” in the left menu and enter the page (as Figure 7-23), select “enabled” and click “Apply”, Add static multicasting MAC address, VLAN ID and select port as shown in Figure 7-24, click “Apply”. When it is finished, click the “Static Multicasting Address Table” in left menu, and see figure 7-25. To configure the multicasting address, click Add and reset MAC address. To delete the multicasting address, select the serial no. and delete.

Note: Before enabling static multicasting address table, “IGMP Snooping” must be closed firstly.

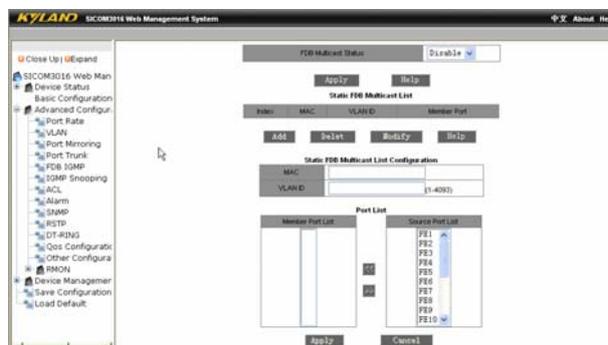


Figure 7-23 Static FDB Multicast

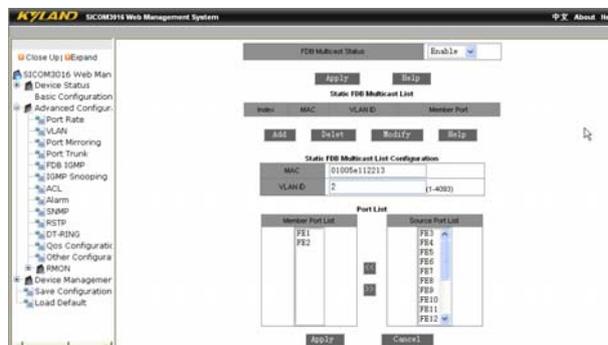


Figure 7-24 Static FDB Multicast sample

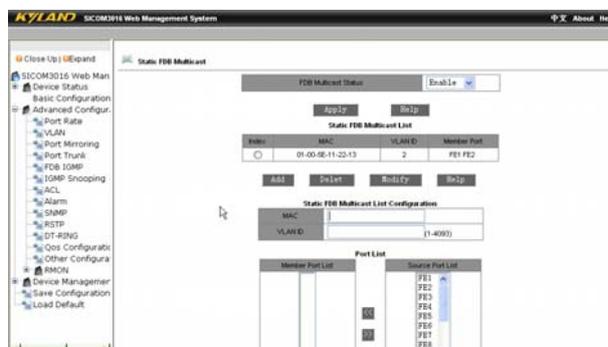


Figure 7-25 Static FDB Multicast configure successfully

### 7.4.6 IGMP Snooping

Click the “IGMP-Snooping” in the left menu and enter the page (as Figure 7-26), enable IGMP-SNOOPING and auto query, click “Apply” to finish configuration. Click “IGMP-Snooping” in the left menu again to shown configuration result as shown in Figure 7-27.

Note: Before enabling IGMP Snooping, static multicasting address table must be closed firstly.



Figure 7-26 IGMP Snooping

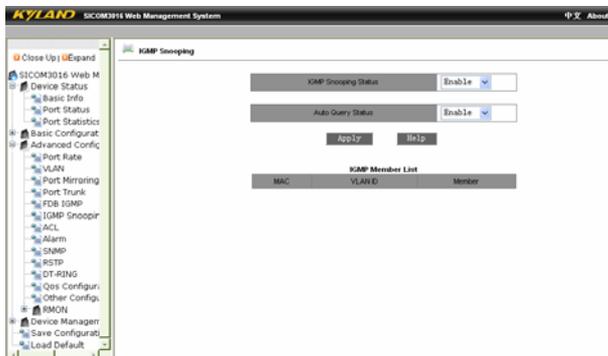


Figure 7-27 IGMP Snooping configure successfully

### 7.4.7 ACL

Click the “Configure ACL” in the left menu and enter the page (as Figure 7-28), select from “uncontrolled, accept or reject” in “port ACL mode configuration” and click “Apply”. You need to enter port’s MAC address if you select “accept” or “reject”, and click “Apply”. To remove ACL control, select serial in the ACL address table and click “Delete” as shown in Figure 7-29.

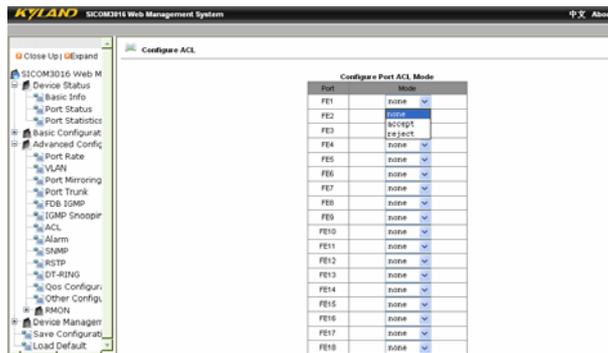


Figure 7-28 Configure ACL

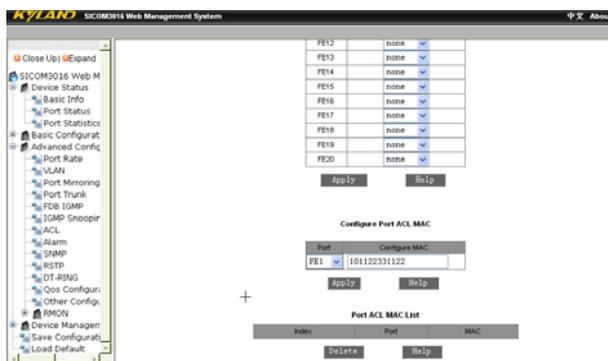


Figure 7-29 Configure ACL

## 7.4.8 Alarm

Click the “ Port Alarm” in the left menu and enter the page (as Figure 7-30 and 7-31) to select state for port and ring alarm, click “Apply”.

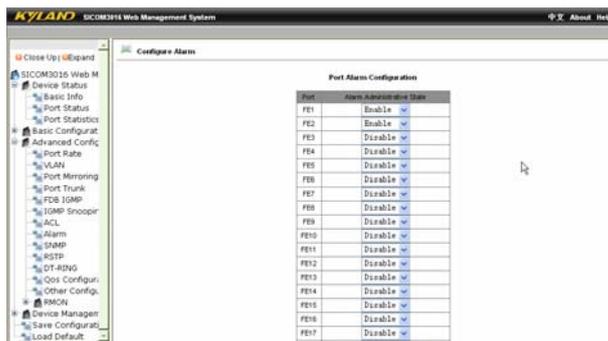


Figure 7-30 Port Alarm Configuration

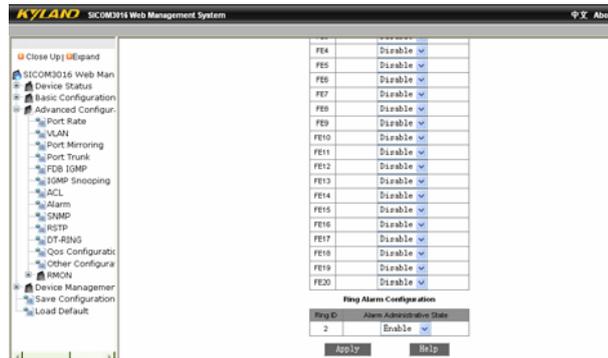


Figure 7-31 Ring Alarm Configuration

### 7.4.9 SNMP

Click the “SNMP Configuration” in the left menu and enter the page (as Figure 7-32), enable SNMP and set read/read&write name, enter TRAP server IP address, TRAP port no. and click “Apply”.

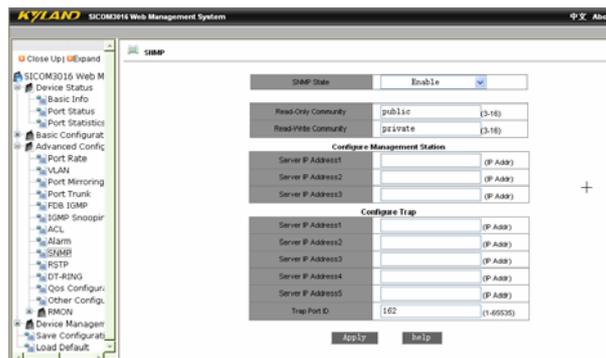


Figure 7-32 SNMP Configuration

### 7.5.0 RSTP

Click the “RSTP” in the left menu and enter the page (as Figure 7-33), select “RSTP” or “STP”, and click “Apply”. Additionally, you can configure protocol state of each port, priority, path cost etc.

Note: RSTP can not be used together with DT-Ring.

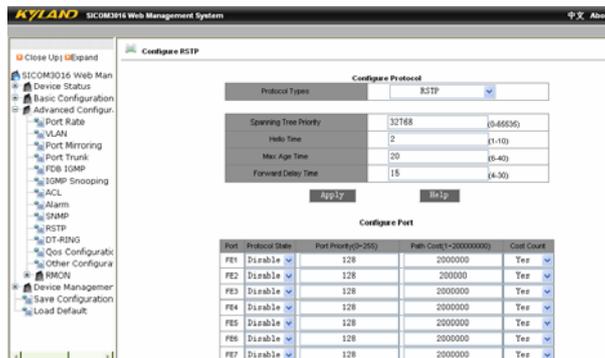


Figure 7-33 RSTP configuration

### 7.5.1 DT-ring

Click the “DT-Ring” in the left menu and enter the page (as Figure 7-34) to configure redundant ring based on port or VLAN. Click “Add” to enter into page as Figure 7-35, enter domain ID no. (ID=1~32), domain name, set master or slave station, select ring port. Additionally, there is DT-Ring+ in this device, you can select this function and enable it, select standby port and click “Apply”. Click ring name and see ring state in the DT-Ring page as Figure 7-34, see it as Figure 7-36.



**Attention:**

The devices in one ring have the same ring ID. The port with different ID no. can't be in one ring network. Redundant ring supports for DT-Ring. You can only configure one of ring based on ring and VLAN.

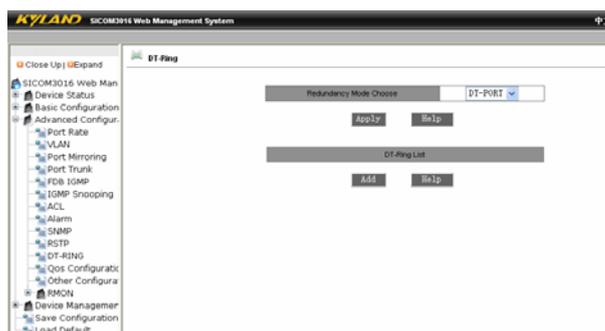


Figure 7-34 DT-Ring

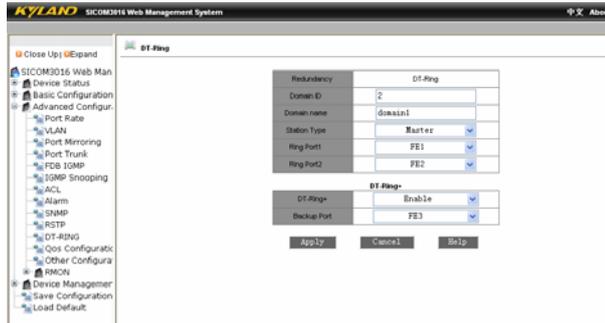


Figure 7-35 DT-Ring configuration



Figure 7-36 DT-Ring configuration state

### 7.5.2 QoS

Click the “QOS” in the left menu and enter the page (as Figure 7-37), enable QoS: weight (WRR) and preemption mode. Priority based on 802.1P or IO TOS, DSCP and port are for options. The priority based on 802.1p and IP TOS/DIFF can be used at the same time and they can not be used together with priority based on port.



Attention:

There are two classes for priority based on port and four queues for others.

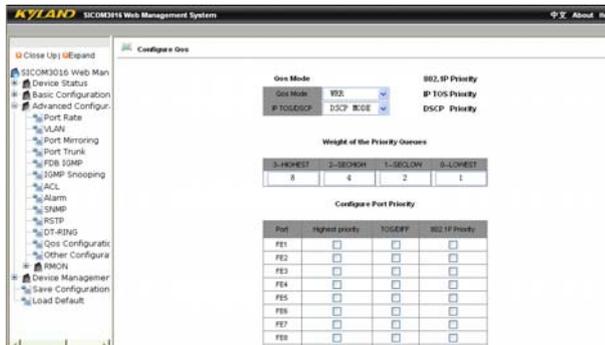


Figure 7-37 Qos configuration

Click “802.1P Priority” and enter the page as figure 7-38. There are total 8 classes for 802.1P and four for SICOM3016. You can select it and click “Apply”.

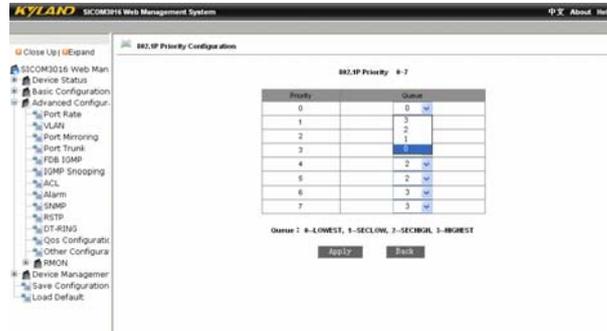


Figure 7-38 802.1P Priority configuration

Click “IPTOS Priority” and enter the page as figure 7-39. There are total 8 classes for IPTOS and four for SICOM3016. You can select it and click “Apply”.

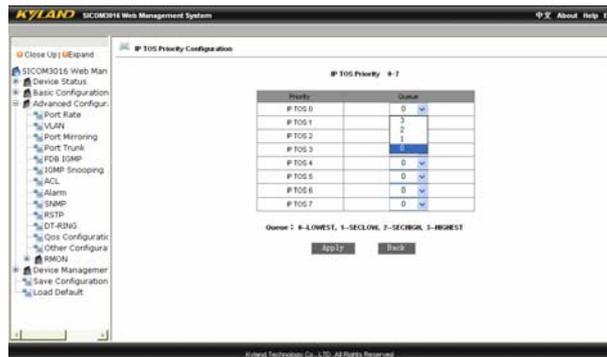


Figure 7-39 IPTOS Priority configuration

Click “DSCP Priority” and enter the page as figure 7-40. There are total 64 classes for DSCP and four for SICOM3016. You can select it and click “Apply”.

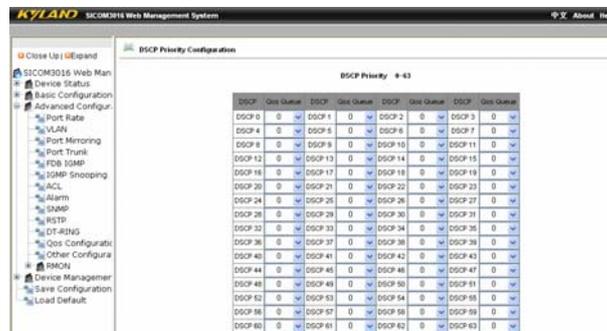


Figure 7-40 DSCP Priority configuration

**7.5.3 Other Configurations**

Click the “Other Configurations” in the left menu and enter the page (as Figure 7-41), which include two configurations of broadcasting storm control and MAC aging time.

There are totally five options for broadcasting storm control: disable、1/2、1/4、1/8、1/16. When the broadcasting packets occupy 1/2、1/4、1/8、1/16 of bandwidth, the packet are dropped. Disable state won’t control the broadcasting messages. MAC address aging time is selected from 10-3600sec and 300sec is selected normally. Click “Apply” to finish.



Figure 7-41 Other Configurations

**7.5.4 RMON**

Four RMON configurations can be done in SICOM3016 including statistics, history, Alarm and Event. Click “RMON Statistics” in the left menu to configure as figure 7-42. Enter index no.(from 1-65535) , owner serial no. (1-32), and select port no. (1-26). Click “Apply” to finish.

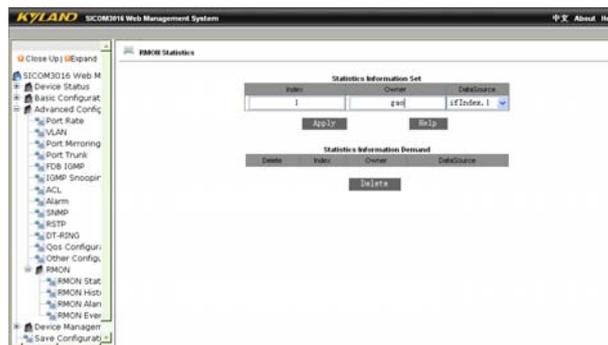


Figure 7-42 RMON Statistics

Click “RMON History” in the left menu to configure as figure 7-43. Enter index no.(from 1-65535) , owner serial no. (1-32), and select port no. (1-26), smapling no.( 1-65535, actual sampling no is max 100), and sampling interval (1-3600) . Click

“Apply” to finish.



Figure 7-43 RMON History

Click “RMON Alarm” in the left menu to configure as figure 7-44. Select alarm node in the MIB list and double click, the OID will finish automatically. In this page, enter index no.(from 1-65535) , owner serial no. (1-32), and select port no. (1-26), smapling type.( absolute/ delta), alarm type (rising alarm/ falling alarm/ rising or falling alarm), sampling interval (1-65535), rising threshold value(1-65535), falling threshold value(1-65535), rising event index(1-65535) and falling event index(1-65535). Click “Apply” to finish.

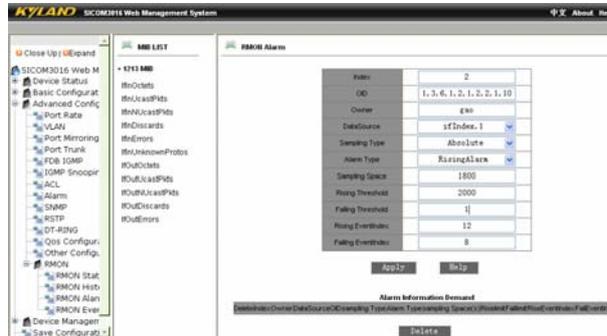


Figure 7-44 RMON Alarm

Click “RMON Event” in the left menu to configure as figure 7-45. Enter index no.(from 1-65535) , owner serial no. (1-32), event type (log/snmp-trap/log-and-trap), event description (1-127), and event group (1-127). Click “Apply” to finish.



Figure 7-45 RMON Event

## 7.6 Device Management

Device Management includes four options including reset, logout, save all changes and restore default settings.

### 7.6.1 Reset

Click “Reboot” in the left menu and enter the page as figure 7-46. Click “Reboot” to reset the device.



Figure 7-46 reboot

### 7.6.2 Logout

Click “Logout” in the left menu and enter the page as figure 7-47. Click “Logout” to exit.



Figure 7-47 Logout

### 7.6.3 Save Configurations

Click “Save Configurations” in the left menu and enter the page as figure 7-48. Click “Save” to save all settings.



Figure 7-48 Save Configurations

### 7.6.4 Load Default

Click “Load Default ” in the left menu and enter the page as figure 7-49. Click “Load Default” to restore all default settings.



Figure 7-49 Load Default

## Chapter 8 CLI Command

This chapter mainly introduces how to configure SICOM3016 via CLI command line, and the instructions of commands.

### 8.1 Login the Switch

#### 8.1.1 Command Line

You can connect and log in via Serial port or Telnet

To log in via Serial Port, connection between serial port and PC is required. The detailed connection method and serial line sequence, please refer to Chapter 3.2.3

Start up the switch, open the hyper terminal in the system, select the serial port, configure the COM port, click “restore default value”, set 9600 bytes/sec, enter into the main page and type “Enter”, you can see the prompt (default is “kyland>”)

---



#### **Attention:**

If you want to remain the change after the switch reboot, please use the “save” command after your configuration. See more details in Common Command Description.

---

#### 8.1.2 Command Grammar

To use the command line interface (CLI) as the following:

1. Type Enable after you enter CLI and command prompt pop up, start command line mode, there will be a command prompt “kyland#”.
2. Type the command name. If the command doesn't contain any parameter options, go to step three. If the command has parameter options, please type the parameter and the key value.

Command parameters are normally refers to the user input parameter, which could be a range of Numerical Value, Chat Script or IP address. The key value is the objective controlled by the command. If the command need more than one parameters, please

type each parameter and key value follow the command help, until the <cr> display in the command window.

3. After input the full command, type “enter”

□ Example (in the case of no parameters)

```
kyland# exit
```

“exit” is a command without parameter, command name is “exit” when input this command, type “enter” to finish.

□ Example (in the case parameters required)

### 8.1.3 Grammar Help

The help is integrated in command line interface. If not sure about the syntax, please type the first part with the wildcard “?” or “space + ?” The command line will automatically display rest of command and the possible command list. Users can choose the right command and type rest part until the command line show “<cr>”. Then type “enter” to finish.

### 8.1.4 Complete Command by Grammar Help

When you type key of “Tab”, management software can complete command. When you enter a part of commands and type key of “Tab”, the possible command will be listed if the matching command is more than one, and the command line will complete the rest of the command you entered and move the cursor to the end if there is only one matching command.

EX:

1. Enter the Command:

```
KYLAND#show
```

2. Type key of “Space” and click key of “Tab” to display the following:

Alarm	Show alarm infomation
broadcontrol	Broadcontrol
config	System configuration
static-mcast-table	Fdb

history	Display the session command history
igmp	Igmp snooping protocol
interface	Interface status and configuration
manager	Management station status
lldp	show lldp information
mirror	show mirror information
qos	show qos information
rmon	show rmon information
serial-num	device SN
memory	System memory statistics information
dt+	dtring+
dt-ring	dt-ring protocol
rstp	Rapid spanning tree protocol
running-config	Current operating configuration
snmp community	SNMP status
switch status	Show switch status
trunk	Show vlan information
uptime	Display the system uptime
version	System hardware and software status
vlan	Show vlan information

Above information are the possible commands users can use after the “show” command. You can type the correct command or part of the command with a “Tab”

### **8.1.5 Symbols in Commands**

In the management software, there is only one type of symbol supported, that is “<>”. It means in this part of the command a parameter is required.

For example: dt-ring new <1-32> domain <1-32> master

### 8.1.6 Command Type

Normally the command in an angle bracket “<>” is command parameters. There are four types of command parameters in this series switches.

#### □ Numerical Value

When the numbers in the angle bracket is connected by a Dash, which means the parameter is a number between this range.

For example: <1-255> means user can input any integer greater than 1 and less than 255. such as “2”.

#### □ IP address

The “A.B.C.D” in angle bracket means it is IP address. User must input a correct IP address.

For example: 192.168.0.1 is a leag

#### □ Chat Script

If the content in the angle bracket is not above two forms, it means the input parameters are chat script or hex number. Uses can input a “?” at this place to know the detail parameter description.

For example: <macaddr> means the required input is a hex Mac address, Such as 005023344325 is a legal Mac address. <name> means the input is a chat script as the subject’s name.

### 8.1.7 Command abbreviation

Command abbreviation means you can only input command or the first several letters, as long as that part don’t have different meaning, switch will recognize that command. Users can just type “enter” to run that command. The user input parameter, such as VLAN name (in the blow example, it is “market”) etc. need to be fully input

Example, add port1 to “market” VLAN as untagged form:

```
KYLAND>
```

```
KYLAND>enable
```

```
KYLAND#config terminal
```

```
KYLAND(config)#
```

```
KYLAND(config)#vlan 2
```

```
KYLAND(config-vlan2)#description market
```

```
KYLAND(config-vlan2)#add port 1 untag priority 0
```

(Above command line can be abbreviated as:)

```
KYLAND>
```

```
KYLAND>ena
```

```
KYLAND#con ter
```

```
KYLAND(config)#
```

```
KYLAND(config)#vlan 2
```

```
KYLAND(config-vlan2)#desc market
```

```
KYLAND(config-vlan2)#add port 1 un pr 0
```

Above commands have identical function).

---



**Attention: when using abbreviated commands, you must input enough letters to ensure there is no different meanings**

---

### 8.1.8 Histoty Command

The software can keep the latest 20 history commands.

To shown history command list, use the following command:

**show history**

Users can also use up or down in you keyboard to choose the above or next history command.

EX: Login and enter command:

show history

It will display:

enable

### 8.1.9 Common Command

This part mainly describe several common commands, some specially used commands will be discussed in the next chapters. Command lines provide two types of modes: one is Read Only, another is Configuring Mode. At Read Only mode, you can only read a part of system configuration information. At Configuring Mode, you can read or configure all the system configuration information. At this mode, you can use some commands to enter certain protocols' independent configuration mode. Such as: "KYLAND#" is interface configuration mode.

At Read Only mode, the prompt ends with ">" i.e. "KYLAND>"

At Configuring mode, the prompt ends with "#" i.e. "KYLAND#"

➤ **enable**

From Read Only mode to Configuring mode, to use this command:

```
KYLAND>enable
```

EX:

```
KYLAND>enable
```

"Enter" and password is required:

Password:

With correct password, you enter the Configuring Mode:

```
KYLAND#
```



**Attention:**

No password for default status.

---

➤ **enable password <1-20>**

At the Configuring Mode, you can set the password for command line.

Use the command:

KYLAND(config)# enable password <1-20>

➤ **exit**

To return to previous mode, use the command:

**exit**

➤ **show version**

To show software version, use the command:

**show version**

➤ **help**

At any mode, to get information of how to use “?” to get help, use command

**help**

For example: use help command:

Kyland# help

2-Help may be requested at any point in a command by entering a question mark '?'. If nothing matches, the help list will be empty and you must backup until entering a '?' shows the available options.

Two styles of help are provided:

1. Full help is available when you are ready to enter a command argument (e.g. 'show ?') and describes each possible argument.

Partial help is provided when an abbreviated argument is entered and you want to know what arguments match the input

(e.g. 'show pr?'.)

➤ **Hostname**

At Configuring Mode, to set host name, use the command:

**hostname** <hostname>

---

 **Attention:**

In one network, uniform the rule of hostname.

---

EX:

```
Kyland(config)# hostname userA
```

```
userA(config)#
```

➤ **clear**

At any modes, to clear screen display, use command: **clear**

---

 **Attention:**

Use this command when there is too much useless information displayed on the screen.

---

➤ **show running-config**

At Configuring Mode, to display system settings, use the command:

```
show running-config
```

---

 **Attention:**

This is a very useful command to help system administrator check current system configuration status.

---

EX:

```
!config
```

```
dt-ring new vlan domain 1 master
```

```
rstp hello-time 15
```

```
rstp forwarding-delay 0
```

```
!interface-eth 1
```

```
vlan tag 2
```

```
no flow-control
```

```
rate ingress 0
```

```
rate egress 0
```

```
!interface-eth 2
```

```
no auto-negotiation
```

```
duplex
```

```
no flow-control
```

```
rate ingress 0
```

```
rate egress 0
```

```
!interface-eth 3
```

```
no flow-control
```

```
rate ingress 0
```

```
rate egress 0
```

```
!interface-eth 4
```

```
no auto-negotiation
```

```
duplex
```

```
no flow-control
```

```
rate ingress 0
```

```
rate egress 0
```

```
!interface-eth 5
```

```
no flow-control
```

```
rate ingress 0
```

```
rate egress 0
```

```
!interface-eth 6
no auto-negotiation
duplex
no flow-control
rate ingress 0
rate egress 0
```

```
!interface-eth 7
no flow-control
rate ingress 0
rate egress 0
```

```
!interface-eth 8
no auto-negotiation
duplex
no flow-control
rate ingress 0
rate egress 0
```

```
!interface-eth 9
no auto-negotiation
speed 1000m
duplex
no flow-control
rate ingress 0
```

```
rate egress 0

!interface-eth 10

no auto-negotiation

speed 1000m

duplex

no flow-control

rate ingress 0

rate egress 0

!interface-down

!interface-backup

!vlan 2

description market

add port 1 untag priority 0

!dt-ring 1

protocol enable

ringport add 2

ringport add 5

!config terminal

fdb agetime 300
```

```
no bcast-control
```

➤ **save**

At configuring Mode, to save current configurations, use the command:

**Save**

---



If you want current configuration available after system reboot or powered off, use this command to save all changed configuration.

---

EX:

```
Kyland# save
```

```
Preparing configuration data to save...Done.
```

```
Starting write configuration data to flash...Done.
```

```
Configuration save to flash successfully.
```

➤ **load default**

At configuring Mode, to delete system start-up configurations in the switch, use the command:

**load default**

-1

---



If users want to reset switch start configuration, use this command to delete all old configuration.

---

EX:

```
KYLAND# load default
```

```
Trying erase all configuration from flash, please wait .....  
finished.
```

Successfully erase all configuration info from flash.

## 8.2 Switch Management Methods

SICOM3016 series switches are mainly managed by the following methods:

- using a terminal (or simulation software) to connect to switch's console port, to access switch's CLI interface
- using Telnet to manage switch (not available)
- using SNMP to manage switch (not available)

## 8.3 Console Management

You can connect to switch's CLI interface via the RJ45 port marked with "console" on the switch front board.

For SICOM3016series, the configuration of Console port is as below:

- Baud rate: 9600
- Bit : 8
- CRC : None
- Stop bit : 1
- Flow control : None

When connecting switch with Console port, VT100 simulation terminal is recommended.

Configuration steps are: at hyper terminal interface, open "file" menu, select "attribute" tool bar, and click "configure" at the window appeared, then select VT100 in the list.

## 8.4 Configure Port

### 8.4.1 Enable/Disable Port

For a switch that is started, all the ports are default enabled. You can also configure each port state based on requirements. To enable or disable one/more ports, you can use the following command:

```
KYLAND(config-if-eth1)#Lock/no lock
```

EX:

```
KYLAND>enable
```

```
  No password set!
```

```
KYLAND#config terminal
```

```
KYLAND(config)#interface ethernet 1
```

```
KYLAND(config-if-eth1)#lock
```

```
KYLAND(config-if-eth1)#no lock
```

## 8.4.2 Configure Port Rate, Duplex Mode and Flow Control

Fast Ethernet port can be connected in 10Base-T or 100Base-TX networks and works in half or full duplex mode, which require you to configure it according to application.

All ports are default set as adaptive mode. The software will adjust the port rate and duplex mode automatically. You can also configure the rate, duplex and flow control mode manually.



### Attention:

To configure the rate, duplex and flow control mode manually, you must close the adaptive mode firstly.

- 
- Configure adaptive mode

Use the following command to configure adaptive mode:

```
KYLAND(config-if-eth1)#auto-negotiation/ no  
auto-negotiation
```

- Configure port rate:

Use the following command to configure port rate:

```
KYLAND(config-if-eth1)#speed 10m/100m/1000m
```

- Configure duplex:

Use the following command to configure duplex mode:

```
KYLAND(config-if-eth1)#Duplex/ no duplex
```

- Configure flow control mode

Use the following command to configure flow control mode:

```
KYLAND(config-if-eth1)#Flow-control/ no flow-control
```

---



The 100Mbit and Gigabit fiber ports are both default set as closed auto-negotiation and full-duplex. The auto-negotiation, duplex and rate can not be configured.

---

### 8.4.3 View Port

Use the following command to view information on all ports:

```
KYLAND#show interface ethernet
```

Use the following command to view information on some port:

```
KYLAND#show interface ethernet <1-10>
```

### 8.4.4 View/Delete Port Statistics

Use the following command to view the port statistics:

```
KYLAND(config-if-eth1)#show stats
```

Use the following command to delete the port statistics and make it restart to count:

```
KYLAND(config-if-eth1)# clear stats
```

---



After the port statistics are deleted, the port data are set as zero.

---

## 8.5 TRUNK

You can enlarge the bandwidth of switches by creating trunk group. Trunk will bind several ports to act as one logic port. For example, the trunk group in the VLAN is a logic port. Trunk also offers assurance for the data packets between clients. When a port in the trunk group fails, the data packet can be distributed to other port and transmitted. If the fault port recovers, the data packet will be distributed into all ports in the trunk group to increasing the bandwidth of switch. SICOM3016 supports totally 3 trunk groups. 7 FE ports can be grouped into 2 trunks (port 1 can not be added into any

trunk group).

---

**5  Attention:**

You must set up trunk both in two connected switches or network loop will happen and cause the switch to fail.

---

The ports in the trunk group must be in the same duplex state and rate, and must be in the same VLAN.

It is very useful to increase transmission speed to create trunk group when more than 2 ports of one switch need to communicate with other switch.

Configure TRUNK

```
KYLAND>enable
```

```
No password set!
```

```
KYLAND#config terminal
```

```
KYLAND(config)#trunk <1-3>
```

```
KYLAND(config-trunk1)#create
```

```
KYLAND(config-trunk1)#add port <1, 10>
```

## 8.6 Port Mirroring

SICOM3016 supports port mirroring, which directs all data of given port to the mirrored port for diagnostics.

Configure mirroring port:

SICOM3016 only supports one mirroring port, to use the following command:

```
KYLAND(config)#interface ethernet <1-10>
```

```
KYLAND(config-if-eth1)#mirror enable
```

```
KYLAND(config-if-eth1)#mirror add ingress port <1-10>
```

mirror enable is to enable mirroring port:

mirror add/delete ingress/egress port <1-10> is for adding or deleting mirrored port.

## 8.7 Port Prioritization

Switch supports port prioritization by which the important task is protected. You can configure the priority of the ports(low and high). To validate port prioritization, you need to enable QOS firstly. When QOS is enabled default, all ports are in low priority. You need to configure the priority by command.

- Qos enabled command:

**KYLAND(config)#qos enable**

- Use the following command to configure priority:

**KYLAND(config)#qos add/delete hqport <1-10>**

## 8.8 VLAN

### 8.8.1 VLAN

VLAN (Virtual Local Area Networks) is a devices group which seems to work in the same physically local area network. It makes network manager to manage more easily by create VLAN for switches. Any group of any port(even all ports) can be considered as a VLAN, which is not limited by hardware physical connection. You can divide ports, create and define VLAN by command easily.

SICOM3016 supports total 4093 different VLANs. The name of each VLAN can be started with any letter and less than 30 characters, which can only be letters, figures or “\_” other marks are not allowed.

VLAN name is only a local mark, which means the name is only meaningful to the switch where the VLAN is set.



#### **Attention:**

For better network management, you should name VLAN universally.

---

### 8.8.2 Default VLAN

Each SICOM3016 has a factory default VLAN which is set as below:

- VLAN name is default ;
- Including all ports;
- All ports of default VLAN are untagged except for CPU port(tagged);
- default VLAN's ID is 1;
- default VLAN can not be changed;
- When a port is added into a VLAN in untagged way, it will be deleted in the default VLAN automatically. When a port is deleted in a VLAN in untagged way, it will be automatically added into the default VLAN.

### 8.8.3 Create VLAN

In the configuration mode, to create VLAN won't be shown. The VLAN will be deleted when there is no port in it. When a port is added into the VLAN in tagged/untagged way, VLAN is created automatically.

Use the following command to enter into VLAN configuration mode:

**KYLAND(config)#vlan <1-4093>**

<1-4093> is the ID range of VLAN.

### 8.8.4 Change VLAN Name

When you create a VLAN and want to change the name only, you can use the following command:

**KYLAND(config-vlan2)#description <1-31>**

### 8.8.5 Add/Delete VLAN Port

The ports of SICOM3016 can be added into a VLAN in two ways:

- IEEE 802.1Q tagged
- IEEE 802.1Q untagged

At default, all ports are added into default VLAN in untagged way.

In untagged way, a port can only be in one VLAN. In tagged way, a port can be in more than one VLAN simultaneously. Each port in VLAN can have only one default VID. The port's default VID is the VID of one of the VLANs where the port belongs to.

The data without 802.1Q Tag value received in the port will be transferred in the VLAN of default VID.

- **Use the following command to add untagged port into VLAN:**

**KYLAND(config-vlan2)#add port <1-10> untag priority <0-7>**

<1-10> is for port number; <1-7> is for the port priority。

- **Use the following command to add tagged port into VLAN:**

**KYLAND(config-vlan2)#add port <1-10> tag**

<1-10> is for port number。

- **Use the following command to delete VLAN port:**

**KYLAND(config-vlan2)#delete port <1-10>**

<1-10> is for port number。

## 8.8.5 Show VLAN

You can view the VLAN which has been configured by using the following command:

- Show some VLAN settings:

show vlan <2-4093>

<2-4093> is for VLAN ID

- Show all VLAN settings:

Show vlan

## 8.9 IGMP Snooping

### 8.9.1 IGMP Snooping

IGMP (Internet Group Management Protocol) is a part of IP protocol group to support and manage the IP multicast between PC and router. Multicast allow to discover resources and reduce network load the minimum, realizing the most efficient transmission.

SICOM3016 supports IGMP Snooping, which is used to monitor and process the IGMP report between PC and router. IGMP Snooping enables the switch to track each of its physically connected group members. It works between PC and router and manages group members.

SICOM 3016 supports not only automatic inquiry, but also restraint function. Its apply network environment without layer-three switch

## 8.9.2 Configure IGMP Snooping

### 8.9.2.1 Automatic inquiry of IGMP Snooping

It must configure IGMP automatic inquiry function if without layer-three switch. To start IGMP, you need to choose router-port firstly. Router-port is the connecting port of multicasting server

- Enable IGMP

**KYLAND(config)#igmp auto-query enable**

- Disable IGMP

**KYLAND(config)#igmp quto-query disable**

### 8.9.2.2 Enable/Disable IGMP Snooping

In the setting mode, use the following command to enable/disable IGMP:

- **Enable IGMP Snooping**

**KYLAND(config)#igmp enable**

- **Disable IGMP Snooping**



**Attend:**

**Router-port. You must configure router-port before start IGMP**

---

### 8.9.2.3 Display IGMP Snooping

In configuration mode to display information about team member:

- Display IGMP Snooping

**KYLAND#show igmp-snooping**

## 8. 10 DT-Ring

### 8.10.1 DT-Ring Overview

DT-Ring is developed and owned by Kyland ltd proprietarily. This protocol test the

state of ring port and pass few protocol messages to decide the state of port on ring and ensure the redundant ring network work properly, to make the redundant Ethernet fast and stable, and finally to meet the needs of industrial communication.

Network mode as figure 8-1;

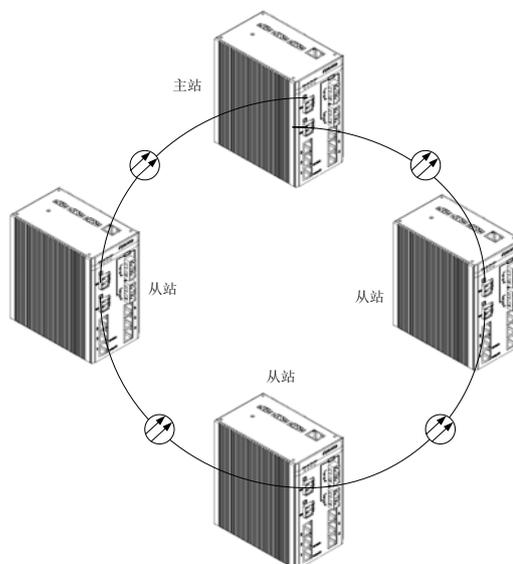


Figure 8-1 DT-Ring Network Mode

Configuration Instruction:

- On the same switch, can configure several domains to set the tangency ring network mode
- In the same ring, every switch needs to configure same ID of domain. For the convenience of maintaining, to set the same name of domain is better.
- In one ring, only one master, others are all slave
- 

### 8.10.2 Create/Delete DT-Ring Domain

- Create DT-Ring

**KYLAND(config)#dt-ring new <1-31> domain <1-32> master/slave**

The first parameter is domain name, the second one is domain ID

Can set DT-Ring as master, or as slave.

- Delete DT-Ring domain;

**KYLAND(config)#mr del domain <1-32>**



**Attend:**

**Set DT-Ring, need to create DT-Ring domain first.**

---

### 8.10.3 Add/Delete Ring-port

In DT-Ring, need to setup ring-port as needs to consist redundant network protection.

➤ Add Ring-port

**KYLAND(config)#mrp <1-32>**

**KYLAND(config-mrp-1)#ringport add <1-10>**

<1-32>indicate domain ID; <1-10>indicate Ring-port ID。

➤ Delete Ring-port

**KYLAND(config)#mrp <1-32>**

**KYLAND(config-mrp-1)#ringport delete <1-10>**

<1-32>indicate domain ID; <1-10>indicate port ID

---



**Attend:**

**There are only two Ring-ports; if setup just one ring-port may not work properly.**

---

### 8.10.4 DT-Ring Domain protocol enable/disable

Need to set Enable to make DT-Ring work

➤ DT-Ring domain enable

**KYLAND(config)#dt-ring <1-32>**

**KYLAND(config-dt-ring-1)#protocol enable**

<1-32>indicate domain ID

➤ DT-Ring domain disable

**KYLAND(config)#dt-ring <1-32>**

**KYLAND(config-dt-ring-1)#protocol disable**

<1-32>indicate domain ID

### 8.10.5 Show DT-Ring Domain State

Display DT-Ring state command, include basic setup and protocol state information.

➤ Display DT-Ring domain state

```
KYLAND#show mr <1-32>
```

<1-32>indicate domain ID

## 8.11 Configure Static Multicasting Address Table

### 8.11.1 FDB Enabled Command

```
KYLAND(config)#fdb static-mcast-table enable /*enable*/
```

```
KYLAND(config)#fdb static-mcast-table disable /*disable*/
```

### 8.11.2 FDB Add Static Multicasting Address

```
KYLAND(config)#fdb add <H:H:H:H:H:H> vlanid<1-4093> portid[1-MAX]
```

```
EX: KYLAND(config)#fdb add 01:00:5e:00:11:12 1 2
```

Static multicasting MAC address: 01:00:5e:00:11:12 VLAN ID 为 1 PORT ID 为 2

### 8.11.3 FDB Delete Static Multicasting Address

```
KYLAND(config)#fdb delete <H:H:H:H:H:H> vlanid<1-4093> portid[1-MAX]
```

### 8.11.4 Show FDB Domain State

```
Show static-mcast-table
```

## 8.12 DT-Ring+

### 8.12.1 DT-Ring+ Overview

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. Its networking

topology is shown as Figure 8-2:

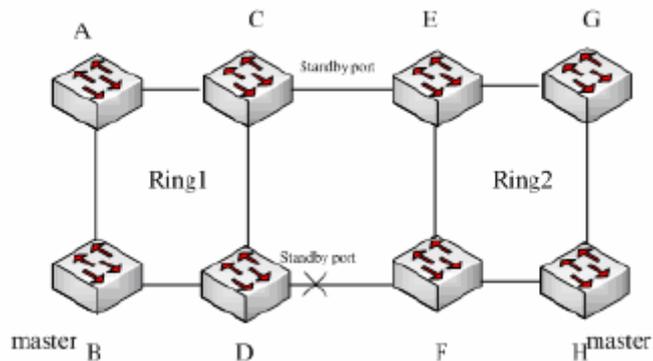


Figure 8-2 DT-Ring Networking

Configurations Notes:

- In one switch, the DT-Ring for configuration can have only one standby port.
- In one ring, total standby ports can be max 2.
- In one ring, there can be standby port for master station.

### 8.12.2 Create/Delete DT-Ring+

- Create DT-Ring+

```
KYLAND(config)#dt <1-32>
```

```
KYLAND(config-dt-ring-1)#dtring+ enable
```

<1-32> is for domain ID; <1-10> is for port ID.

- Close DT-Ring+;

```
KYLAND(config)#dt <1-32>
```

```
KYLAND(config-dt-ring-1)# dtring+ disable
```

<1-32> is for domain ID; <1-10> is for port ID.



Note: Before configuring DT-Ring+,DT-Ring domain must be created firstly.

### 8.12.3 Add/Delete Standby Port

In DT-Ring, you need to configure standby port according to your need to provide standby for redundant protection ring network.

- Add standby port

```
KYLAND(config)#dt <1-32>
```

```
KYLAND(config-dt-ring-1)#backport add
```

```
<1-10>
```

<1-32> is for domain ID; <1-10> is for port ID.

- □Delete standby port

```
KYLAND(config)#dt <1-32>
```

```
KYLAND(config-dt-ring-1)# backport delete
```

<1-32> is for domain ID; <1-10> is for port ID.



There can be two and only two ring ports. If only one ring port, the whole ring would work abnormally.

#### 8.12.4 Shown DT-Ring+ State

Command to show DT-Ring+ state, mainly information on standby port.

- To show DT-Ring+ state:

```
KYLAND#show d t +
```

<1-32> is for domain ID.

### 8.13 SNMP

#### 8.13.1 SNMP Configurations

- To configure device parameters:

```
KYLAND>enable
```

```
KYLAND#configure terminal
```

- To configure SNMP operation parameters:

```
KYLAND(config)#snmp enable
```

Function: enable SNMP

Unsuccessful: Error

KYLAND(config)#no snmp enable

Function: disable SNMP

Successful: OK

Unsuccessful: Error

KYLAND(config)#snmp add-trapip 1 192.168.1.123

Function: add configurations for SNMP trap IP address list, 1 is for ip no, from 1 to 5.

Successful: OK

Unsuccessful: Error

KYLAND(config)#snmp del-trapip 1 192.168.1.123

Function: delete configurations for SNMP trap IP address list, 1 is for ip no, from 1 to 5.

Successful: OK

Unsuccessful: Error

KYLAND(config)# snmp community public ro

Function: config read only community name from 1 to 16.

Successful: OK

Unsuccessful: Error

KYLAND(config)# snmp community private rw

Function: config read & write community name from 1 to 16.

Successful: OK

Unsuccessful: Error

KYLAND(config)# no snmp community ro

Function: config read only community name as default: public

Successful: OK

Unsuccessful: Error

KYLAND(config)# no snmp community rw

Function: config read & write community name as default: private

Successful: OK

Unsuccessful: Error

KYLAND(config)#snmp reqport 161

Function: config requirement port for SNMP from 1 to65535.

Successful: OK

Unsuccessful: Error

KYLAND(config)#snmp trport 162

Function: config trap max-age from 1 to 65535.

Successful: OK

Unsuccessful: Error

KYLAND(config)#snmp emsnum 3

Function: config management station number from 1 to 3

Successful: OK

Unsuccessful: Error

### **8.13.2SNMP Display Command**

KYLAND>enable

KYLAND#show snmp community

Function: display SNMP read&write community name

KYLAND#show snmp emsiplist

Function: display SNMP management station IP address table.

KYLAND#show snmp reqport

Function: display SNMP requirement port.

KYLAND#show snmp trport

Function: display SNMP trap port.

KYLAND(config)#show snmp trapiplist

Function: display SNMP trap list address table.

KYLAND#show snmp status

Function: display SNMP packet received, ex:

```
1000 SNMP packets input
0 Bad SNMP version errors
0 Unknown community name
0 Illegal operation for community name supplied
0 Encoding errors
20 Get-request PDUs
30 Get-next PDUs
10 Set-request PDUs
1000 SNMP packets output
0 Too big errors
0 No such name errors
0 Bad values errors
0 General errors
100 Get-response PDUs
20 SNMP trap PDUs
```

## 8.14 RSTP

### 8.14.1 RSTP Parameters

KYLAND>enable

KYLAND#configure terminal

To configure operation parameters for RSTP:

KYLAND(config)#rstp enable

Function: enable device bridge RSTP

Successful: set rstp enable OK

Unsuccessful: set rstp enable ERROR

KYLAND(config)#rstp disable

Function: disable device bridge RSTP

Successful: set rstp disable OK

Unsuccessful: set rstp disable ERROR

KYLAND(config)#rstp bridge priority 8000

Function: Config device bridge priority from 0x00 to 0xFFFF at step of 0x1000, with default of 0x8000.

Successful: Set bridge priority OK

Unsuccessful: Error in set bridge priority

KYLAND(config)#rstp forward-delay 15

Function: config bridge forward-delay from 4 to 30, with default of 15.

Successful: Set forward-delay OK

Unsuccessful: Error in Set forward-delay

KYLAND(config)# rstp hello-time 2

Function: config bridge hello-time from 1 to 10, with default of 2.

Successful: Set hello-time OK

Unsuccessful: Error in Set hello-time

KYLAND(config)# rstp max-age 2

Function: config bridge max-age from 6 to 40, with default of 20.

Successful: Set max-age OK

Unsuccessful: Error in Set max-age

KYLAND(config)# rstp forceversion 2

Function: config bridge's RSTP forceversion from 0 or 2, with default of 2.

Successful: Set ForceVersion OK

Unsuccessful: Error in set ForceVersion

KYLAND(config)#rstp port 1 enable

Function: enable port RSTP

Successful: Set port Enable OK

Unsuccessful: Error in set port Enable

KYLAND(config)#rstp port 1 disable

Function: disable port RSTP

Successful: Set port disable OK

Unsuccessful: Error in set port disable

KYLAND(config)#rstp port 1 path-cost 200000

Function: config port path cost, from port no.1 to port no. max, path cost from 1 to 200000

Successful: Set path cost OK

Unsuccessful: Error in Set path cost

KYLAND(config)#rstp port 1 priority 80

Function: config port priority, from port no.1 to port no. max, priority from 0x00 to 0x100, at the step of 0x10.

Successful: Set port priority OK

Unsuccessful: Error in Set port priority

### **8.14.2 Show RSTP Configurations**

KYLAND#show rstp

Function: show current bridge device state.

## **8.15 Configure QoS**

### **8.15.1 Enable/Disable QoS**

You can configure QoS to enable or disable by command line. This command is the general switch. Only after this function is opened, can other configurations be done.

Command line:

```
KYLAND (config) # qos enable
```

```
KYLAND (config) # qos disable
```

### 8.15.2 QoS Scheduling Mode

QoS supports for two scheduling mode:

1. HQ-PREEMPT: high priority preempt, when the highest priority packet is in, it will be forwarded firstly, after it is finished, WRR will schedule other priority of packets.

2. WRR: Weighted Round Robin, it schedule the packets in proportion.

HQ—PREEMPT is the system default scheduling mode.

Command line:

```
KYLAND (config) # qos schedule-mode hq
```

```
KYLAND (config) # qos schedule-mode wrr
```

### 8.15.3 Priority Weight

When scheduling mode is WRR, you can configure the priority weight.

The weight of 4 priority queues are 1: 2: 4: 8 as default.

Command line:

```
KYLAND (config) # qos weight-config queue-0<> queue-1<> queue-2 <>  
queue-3 <>
```

Priority levels are lowest、low、hight、highest

### 8.15.4 Scheduling Strategy

4 scheduling strategies are supported by the switch chip. At present, we just realize three scheduling strategies which are based on port, 802.1p and IP TOS/DIFF. They can be used simultaneously.

Priority mapping based on port supports 2 queues.

Priority mapping based on 802.1q and IP TOS/DIFF supports for 4 queues.

For one port, the priority based on port is repulsive to the other two

strategies.

Command line:

```
KYLAND (config) # qos policy port-based add/delete port <1-MAX>
```

```
KYLAND (config) # qos policy 802.1p-based add/delete port <1-MAX>
```

```
KYLAND (config) # qos policy tos-diff add/delete port <1-MAX>
```

### **8.15.5 VLAN Priority Mapping**

To configure 802.1p-based scheduling, the default mapping relation is 0-1 for lowest, 2-3 for lowest, 4-5 for high, 6-7 for highest.

You can configure its mapping as command line:

```
KYLAND (config) # qos vlan priority <0-7> map queue <0-3>
```

### **8.15.6 TOS Priority Mapping**

To configure TOS scheduling strategy, the default mapping relation is 0-7 for lowest.

You can configure its mapping as command line:

```
KYLAND (config) # qos tos priority <0-7> map queue <0-3>
```

### **8.15.7 DSCP Priority Mapping**

To configure DSCP scheduling strategy, the default mapping relation is 0-63 for lowest.

You can configure its mapping as command line:

```
KYLAND (config) # qos dscp priority <0-63> map queue <0-3>
```

### **8.15.8 Show QOS**

```
KYLAND# show qos
```

## 8.16 RMON

### 8.16.1 RMON Command

Enter into device parameter configurations:

```
KYLAND>enable
```

```
KYLAND#configure terminal
```

To configure RMON's operation parameters:

```
KYLAND(config)#rmon stats add index ifIndex owner
```

Function: device RMON statistics add configurations, index (1-65535), ifIndex(port number), owner(1-32.)

Successful: OK

Unsuccessful: ERROR

```
KYLAND(config)#rmon stats delete index
```

Function: device RMON statistics delete configurations, index (1-65535).

Successful: OK

Unsuccessful: ERROR

```
KYLAND(config)#rmon his add index ifIndex bucketsRequested interval owner
```

Function: device RMON history add configurations, index (1-65535), ifIndex (port number), bucketsRequested (1-65535, default 50), interval (1-3600, default 1800), owner (1-32) .

Successful: OK

Unsuccessful: ERROR

```
KYLAND(config)#rmon his delete index
```

Function: device RMON history delete configurations, index (1-65535).

Successful: OK

Unsuccessful: ERROR

KYLAND(config)#rmon alarm add index interval variable sampleType startupAlarm risingThreshold  
fallingThreshold risingEventIndex fallingEventIndex owner

Function: device RMON alarm add configurations, index(1-65535), interval(1-65535), variable  
(ifIndex OID or statisticsOID), sampleType (1. absoluteValue, 2. deltaValue),  
startupAlarm (message type1. risingAlarm, 2.fallingAlarm, 3. risingOrfallingAlarm),  
risingThreshold (1-65535), fallingThreshold (1- 65535), risingEventIndex (1-65535),  
fallingEventIndex (1-65535), owner (1-65535) .

Successful: OK

Unsuccessful: ERROR

KYLAND(config)#rmon his alarm index

Function: device RMON alarm delete configurations, index (1-65535).

Successful: OK

Unsuccessful: ERROR

KYLAND(config)#rmon event add index description eventType community  
owner

Function: device RMON event add configurations, index (1-65535), description (1-127),  
eventType(1. none, 2. log, 3. snmp-trap, 4. log-and-trap),community (1-127), owner  
(1, 32) .

Successful: OK

Unsuccessful: ERROR

KYLAND(config)#rmon his event index

Function: device RMON event delete configurations, index (1-65535).

Successful: OK

Unsuccessful: ERROR

### **8.16.2 RMON Display Command**

Start up SICOM devices integrated with RMON and use serial port or TELNET to connect.

```
KYLAND>enable
```

```
KYLAND#show rmon stats
```

Function: show RMON statistics group configurations.

```
KYLAND#show rmon ethhis
```

Function: show RMON history group records.

```
KYLAND#show rmon hisCtrl
```

Function: show RMON history control group configurations.

```
KYLAND#show rmon alarm
```

Function: show RMON alarm group configurations.

```
KYLAND#show rmon event
```

Function: show RMON event group configurations.

```
KYLAND#show rmon log
```

Function: show RMON log records.

# 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.

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

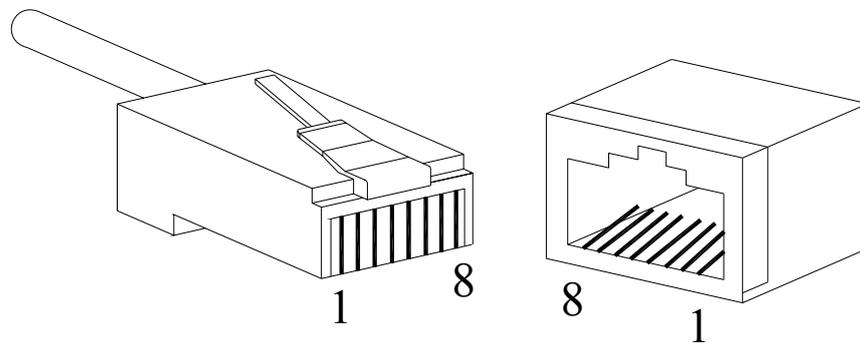


Figure A-1 Connector of RJ-45

## 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

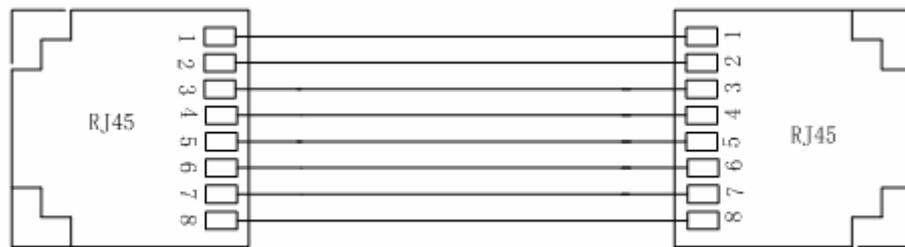
respectively. Cross-over cable must be used for switch or hub with MDI-X port. The pin distribution of 10Base-T/100Base-TX is listed in the table A-1.

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.

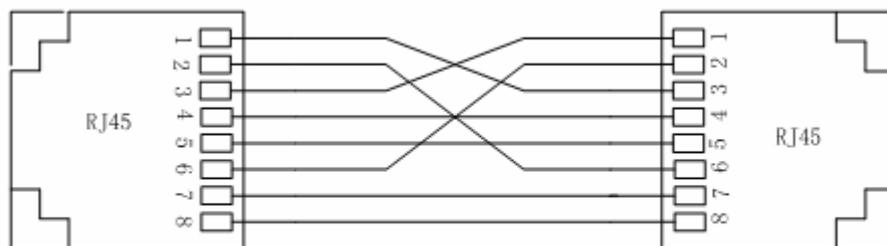
**Definition of straight-through cable from RJ45 (8-pin) to RJ45 (8-pin)**



The connection sequence is in turn: Orange-white, Orange, Green-white, Blue, Blue-white, Green, Brown-white and Brown

Figure A-2 Cable sequence of straight-through cable

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



The connection sequence is in turn: Orange-white, Orange, Green-white, Blue, Blue-white, Green, Brown-white and Brown  
Green-white, Green, Orange-white, Blue, Blue-white, Orange, Brown-white and Brown

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 specificati

Cable	Type	Max. length	Connect or
10Base-T	Cat 3,4 and 5 100 ohmUTP	100m (328foot)	RJ-45
100Base-TX	Cat 5 -100ohmUTP	100m (328foot)	RJ-45
100Base-FX	50/125 or 62.5/125 $\mu$ m core multi-mode fiber (MMF)	2km (1.24mile)	SC/FC
100Base-FX	9/125 $\mu$ m single-mode fiber (SMF)	20km (12.43mile)	SC/FC
1000Base-T	Cat 5-100 ohm UTP	100m (328foot)	RJ-45
1000Base-LX	9 $\mu$ m or 10 $\mu$ m core sigle-mode fiber(1310nm)	5km (3.1mile)	LC
1000Base-LX	50/125 or 62.5/125 $\mu$ m core multi-mode fiber ( MMF ) (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.
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.

## Appendix D FTP Application for Switch Software Update

You can use web management to upgrade SICOM3016 software through switch by FTP protocol (Switch as Ftp client; PC as Ftp server). Before update, you need to setup the Ftp server; FTP server is well-known software, and can be downloaded on the internet. Here is the step for configuring FTP server.

1. Install WFTPD in PC. Startup WFTPD; shown in figure D-1:

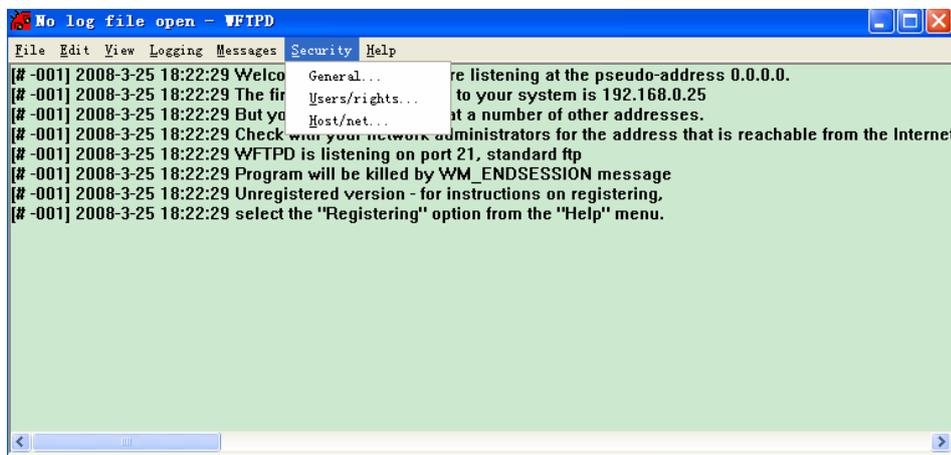


Figure D-1 WFTPD Startup sample

2. Type in user name, password, main path; click on Security menu, click on Users/rights, click on the New User in the User/Rights Security Dialog window. As FigureD-2

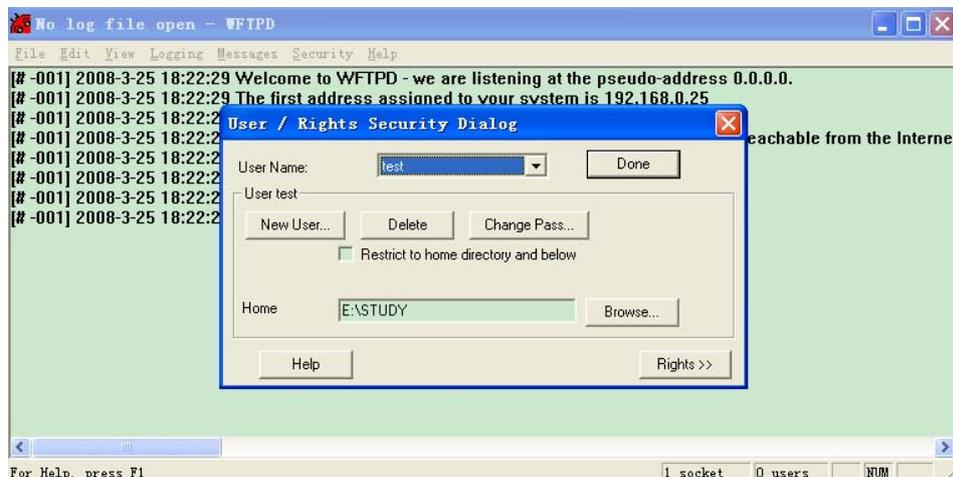


Figure D-2 WFTPD configure user name and password

3. Type in your user name in New User window; here is "test", click OK, as Figure3

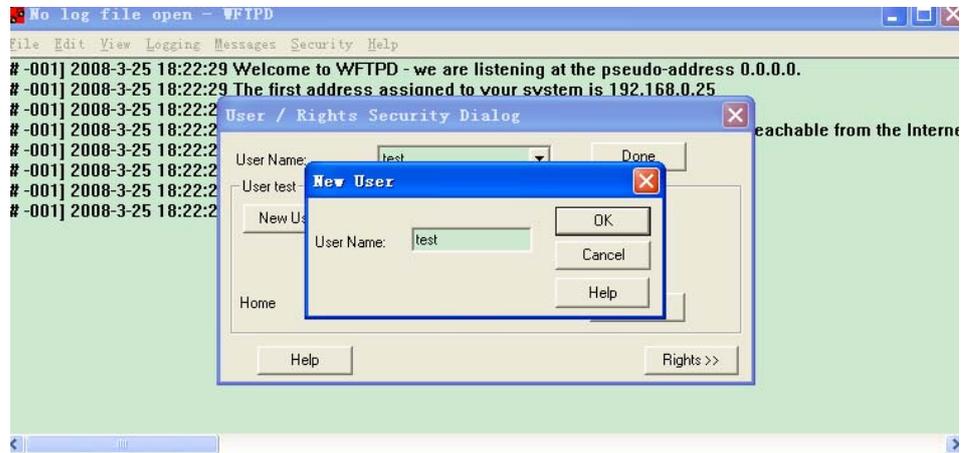


Figure D-3 WFTPD configure user name

4. In Change Password window, type in the password in New Password and Verify area, for instance "test", click OK.



Figure D-4 WFTPD configure password

5. Set home directory; here is C:\

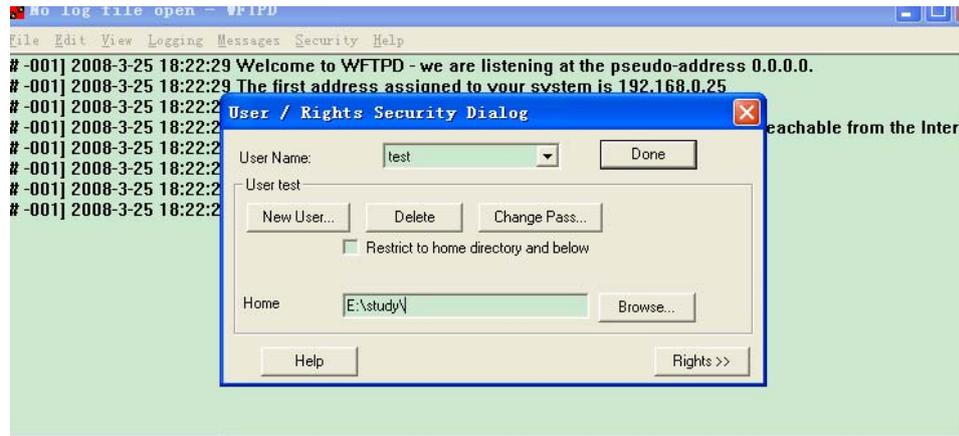


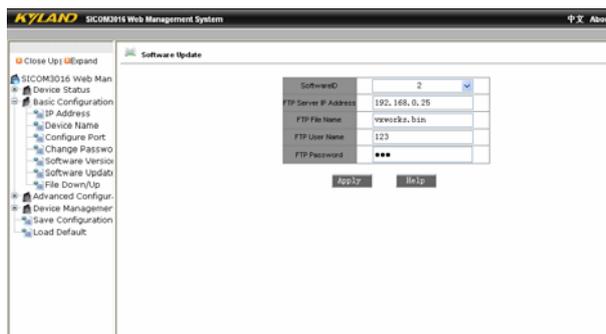
Figure D-5 configure home directory

Click Done to finish FTP server setup

Upload the software to home directory on FTP server, here is under E:\study\

FTP server setup is finished now. For the successful setup we support two software version: Host and Backup. The Host version is the one we currently used which is not allowed to update for the purpose of protecting software. We use WEB management software to upgrade it, steps:

1. Enter into WEB management page, click navigation bar to set Update, as FigureD-6:



FigureD-6 Software Update

2. Set FTP server IP address, user name, password, Update software name, click Apply button, record update software ID;
3. Wait for upgrade software, Update successful;
4. Click on navigation bar to check version; set updated software ID as startup version; as FigureD-7:



FigureD-7 inquireSoftware Version

5. Click Restart under equipment management in navigation bar; as Figure D-8:

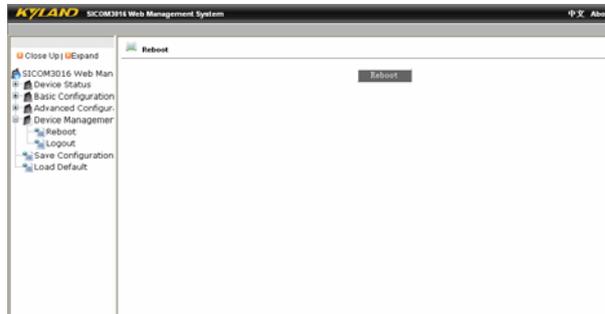


Figure D-8 reboot

6. Wait for 30 seconds, start Web management system; click on navigation bar to check equipment basic information; software version; sure about the update successfully. As Figure D-9:



Figure D-9 basic information

Update is Finished.