



KGS-2421

**Managed 24-Port Gigabit Ethernet Switches
with 4 SFP Slots**

Installation Guide



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TRADEMARKS

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FCC NOTICE

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including the interference that may cause undesired operation.

CE NOTICE

Marking by the symbol indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EMC Class A

EN55022:2006/A1:2007

EN61000-3-2:2006

EN61000-3-3:1995/A1:2001/A2:2005 Class A

EN 55024:1998/A1:2001/A2:2003

IEC 61000-4-2:2001

IEC 61000-4-3:2002/A1:2002

IEC 61000-4-4:2004

IEC 61000-4-5:2001

IEC 61000-4-6:2003

IEC 61000-4-8:2001

IEC 61000-4-11:2001

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1. Introduction

The 24-port Managed Gigabit Ethernet Switches are standard L2 switches that meets all IEEE 802.3/u/x/z Gigabit, Fast Ethernet specifications. The switches have 20 10/100/1000Mbps copper ports and 4 combo ports with copper and Gigabit SFP slots. The switches support console CLI, Telnet CLI, Web GUI and SNMP interface for switch management. The network administrator can logon the switch to monitor and configure port operating mode, Quality of Service, and powerful L2 switching functions such as VLAN, IGMP, RSTP etc. In addition, the switches are also featured with security functions such as IEEE802.1x and ACL control to make them suitable for office applications.

The switch is featured with the following switched ports and advantages in a 1U rack box:

- 20 10/100/1000Mbps Gigabit copper ports
- 4 combo ports - 10/100/1000Mbps copper & 1000Base-X SFP



Model Definition

Model	Description	Management	Power Input
KGS-2421-S	AC powered model	Managed	AC 100 ~ 240V
KGS-2421-D	DC powered model	Managed	DC 40 ~ 72V

Plug and Play

The switch is shipped with factory default configuration which behaves like an unmanaged Gigabit switch for workgroup. It provides 24 10/100/1000Mbps copper ports for connections to Ethernet, Fast Ethernet, and Gigabit Ethernet devices. With the featured auto-negotiation function, the switch can detect and configure the connection speed and duplex automatically. The switch also provides auto MDI/MDI-X function, which can detect the connected cable and switch the transmission wire pair and receiving pair automatically. This auto-crossover function can simplify the type of network cables used.

Fiber Connectivity

Four combo ports provide four 1000M SFP slots, which can be installed with optional SFP optical fiber transceivers to support four Gigabit 1000Base-X fiber connections respectively when needed.

Management

The switch is embedded with an Http server and telnet server which provide management functions for advanced network functions including Port Control, Quality of Service, and Virtual LAN functions. The management can be performed via Web browser based interface or telnet CLI over TCP/IP network. The switch also provides SNMP agent to support management from an SNMP manager.

AC & DC Power Options

In addition to standard AC power input, the switches provide DC options for applications with DC power system.

1.1 Features

- Provides 24 10/100/1000Mbps RJ-45 and four Gigabit SFP slots (4 combo ports)
- Provides in-band console CLI, web and SNMP management interfaces
- All copper ports support auto-negotiation and auto-MDI/MDI-X detection
- Power saving support
- The SFP slots support 1000BASE-X SFP transceivers
- Provides Gigabit full wire speed forwarding
- Supports 802.3x flow control for Full-duplex and backpressure for Half-duplex
- Support jumbo frames
- 19” rack mountable
- Both AC powered model and DC powered model are available for choice.

Management Features:

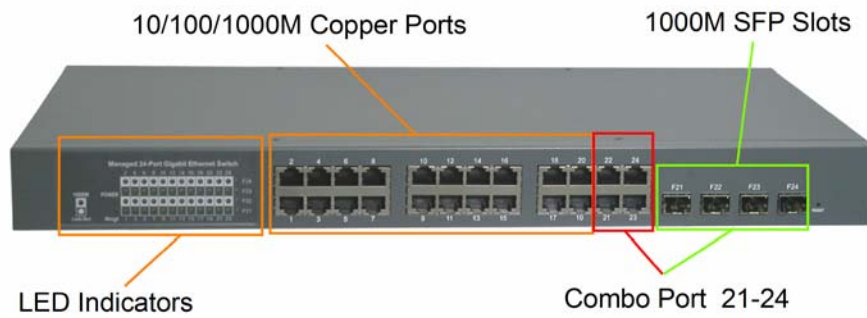
- Port Control
 - Port Speed/Duplex Mode/Flow Control/Power saving configuration
 - Port frame size control (Jumbo frame support)
- QoS
 - Traffic Classification up to 4 active priorities
 - Port QoS configuration
 - QoS Control List for policy rules
 - Port bandwidth control for ingress and egress
 - Storm Control for UC, MC and BC
- Layer2

- Auto MAC address learning and ageing
- Static MAC address filtering
- Port-based and 802.1Q Tag-based VLAN
- Link Aggregation - LACP
- Rapid Spanning tree - RSTP
- Port Mirroring
- IGMP snooping
- DHCP client for IP configuration
- Security features
 - Access Control List for L2/L3 protocol filtering, ingress rate limit, port copy
 - Port Access Control based on IEEE 802.1X
- Management
 - Web management
 - Console CLI
 - Telnet CLI
 - Software Download via Web
 - SNMP Client
 - SNMP v1/v2c Agent
 - SSH v2 & HTTPS
 - RMON group 1, 2, 3, and 9
 - Restore to default configuration
 - Configuration download and upload
 - System syslog
- SNMP MIBs

1.2 Product Panels

The following figure illustrates the front panel and rear panel of the switch:

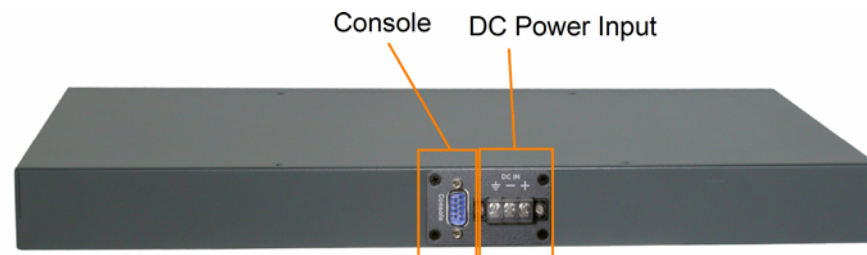
Front panel



Rear panel – Managed models with AC power



Rear panel – Managed models with DC power



1.3 LED Indicators

<u>LED</u>	<u>Function</u>
POWER	Power status
Mngt	Management status
1000M	Port speed 1000Mbps status (Port 1 – Port 24)
Link/Act.	Port link and activity status (Port 1 – Port 24)
F21 – F24	SFP Fiber is selected on Port 21 – Port 24

1.4 Specifications

10/100/1000 Copper Ports

Compliance	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, IEEE 802.3u 1000Base-T
Connectors	Shielded RJ-45 jacks
Pin assignments	Auto MDI/MDI-X detection
Configuration	Auto-negotiation or software control
Transmission rate	10Mbps, 100Mbps, 1000Mbps
Duplex support	Full/Half duplex
Network cable	Cat.5 UTP

Combo Ports (Port 21 ~ Port 24) with 10/100/1000 RJ-45 and 1000Mbps SFP

10/100/1000 Copper Port Interface

Same as above 10/100/1000 Copper Ports

Fiber interface

Compliance	IEEE 802.3z 1000Base-SX/LX (mini-GBIC)
Connectors	SFP slot for optional SFP type fiber transceivers
Configuration	Auto/Forced, 1000Mbps, Full duplex
Transmission rate	1000Mbps
DDM support	Yes
Network cables	MMF 50/125 60/125, SMF 9/125
Eye safety	IEC 825 compliant

Console Port

Interface	RS-232, DTE type
Connector	9-pin D-sub

Switch Functions

MAC Addresses Table	8K entries
---------------------	------------

Forwarding & filtering	Non-blocking, full wire speed
Switching technology	Store and forward
Maximum packet length	9600 bytes (Jumbo frame support)
Flow control	IEEE 802.3x pause frame base for full duplex operation Back pressure for half duplex operation
VLAN function	Port-based VLAN and IEEE 802.1Q Tag-based VLAN
VLAN support	4096 VLANs (IEEE 802.1Q)
Aggregation	Static and LACP Port link aggregation (port trunking)
QoS function	Ethernet type, IP-based, DSCP, TOS-based, VID-based, VLAN Tag-based packet classification Port rate control, storm control
Port Mirroring	Mirror received frames to a sniffer port

AC Power Input

Interfaces	IEC320 receptacle
Operating Input Voltages	100 ~ 240VAC
Power Consumption	34W max.

DC Power Input

Interfaces	Screw-type terminal block
Operating Input Voltages	+40 ~ +72VDC
Power Consumption	34W max.

Mechanical

Dimension (base)	443 x 245 x 43 mm (WxDxH)
Housing	Enclosed metal
Mounting	Desktop mounting, 19" rack mounting

Environmental

Operating Temperature	Typical -5°C ~ +50°C
Storage Temperature	-20°C ~ +85°C
Relative Humidity	10% ~ 90% non-condensing

Electrical Approvals

FCC	Part 15 rule Class A
CE	EMC, CISPR22 Class A
Safety	LVD, IEC60950

2. Installation

2.1 Unpacking

The product package contains:

- The switch unit
- One AC power cord (AC powered Model)
- One 19" rack mounting kit
- One product CD-ROM

2.2 Safety Cautions

To reduce the risk of bodily injury, electrical shock, fire and damage to the product, observe the following precautions.

- Do not service any product except as explained in your system documentation.
- Opening or removing covers may expose you to electrical shock.
- Only a trained service technician should service components inside these compartments.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:
 - The power cable, extension cable, or plug is damaged.
 - An object has fallen into the product.
 - The product has been exposed to water.
 - The product has been dropped or damaged.
 - The product does not operate correctly when you follow the operating instructions.
- Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
- Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.

2.3 Mounting the Switch

Desktop Mounting

The switch can be mounted on a desktop or shelf. Make sure that there is proper heat dissipation from and adequate ventilation around the device. Do not place heavy objects on the device.



Rack Mounting

Two 19-inch rack mounting brackets are supplied with the switch for 19-inch rack mounting.

The steps to mount the switch onto a 19-inch rack are:

1. Turn the power to the switch off.
2. Install two brackets with supplied screws onto the switch as shown in figure below.

Install rack mounting brackets



After bracket installation



2. Mount the switch onto 19-inch rack with rack screws securely.



3. Turn the power to the switch on.

2.4 AC Power Supply

If the purchased switch is with AC power input, one AC power cord which meets the specification of your country of origin was supplied in package. Before installing AC power cord to the switch, make sure the AC power is OFF and the AC power to the power cord is turned off.



AC power input specifications

Connector: IEC320 type

Power Rating: 100 ~ 240VAC, 50/60Hz

Voltage Range: 90 ~ 264VAC

Frequency: 47 ~ 63 Hz

Power Consumption: 34W max.

2.5 DC Power Supply

If the purchased switch is with DC power input, the power connector is shown below:



DC power input specifications

Receptacle: Screw-type terminal block

Operating Voltages: +40 ~ +72VDC

Power Consumption: 34W max. @48VDC

2.6 Reset Button



The reset button is used to perform a reset to the switch. It is not used in normal cases and can be used for diagnostic purpose. If any network hanging problem is suspected, it is useful to push the button to reset the switch without turning off the power. Check whether the network is recovered.

The button can also be used to restore the software configuration settings to factory default values. The operations are:

Operation	Function
Press the button more than 4 seconds when power up	Restore factory default settings
Press the button and release during switch operation	Re-boot the switch

2.7 Making UTP Connections

The 10/100/1000 RJ-45 copper ports support the following connection types and distances:

Network Cables

10BASE-T: 2-pair UTP Cat. 3, 4, 5, EIA/TIA-568B 100-ohm

100BASE-TX: 2-pair UTP Cat. 5, EIA/TIA-568B 100-ohm

1000BASE-T: 4-pair UTP Cat. 5 or higher (Cat.5e is recommended), EIA/TIA-568B 100-ohm

Link distance: Up to 100 meters

Auto MDI/MDI-X Function

This function allows the port to auto-detect the twisted-pair signals and adapts itself to form a valid MDI to MDI-X connection with the remote connected device automatically. No matter a straight through cable or crossover cable are connected, the ports can sense the receiving pair automatically and configure themselves to match the rule for MDI to MDI-X connection. It simplifies the cable installation.

Auto-negotiation Function

The ports are featured with auto-negotiation function and full capability to support connection to any Ethernet devices. The port performs a negotiation process for the speed and duplex configuration with the connected device automatically when each time a link is being established. If the connected device is also auto-negotiation capable, both devices will come out the best configuration after negotiation process. If the connected device is incapable in auto-negotiation, the switch will sense the speed and use half duplex for the connection.

Port Configuration Management

For making proper connection to an auto-negotiation INCAPABLE device, it is suggested to use port control function via software management to set forced mode and specify speed and duplex mode which match the configuration used by the connected device.

2.8 Making Fiber Connection

The SFP slot must be installed with an SFP fiber transceiver for making fiber connection. Your switch may come with some SFP transceivers pre-installed when it was shipped.

Installing SFP Fiber Transceiver

To install an SFP fiber transceiver into SFP slot, the steps are:

1. Turn off the power to the switch.
2. Insert the SFP fiber transceiver into the SFP slot. Normally, a bail is provided for every SFP transceiver. Hold the bail and make insertion.
Hold the bail and make insertion.

Insert the transceiver into the SFP slot.

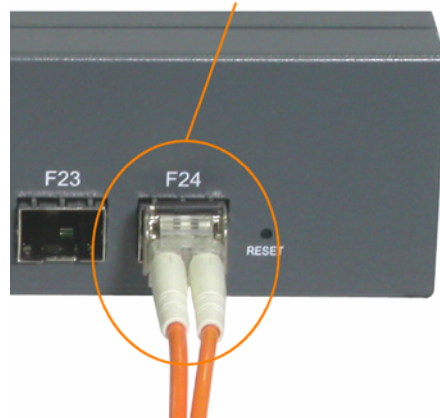


3. Until the SFP transceiver is seated securely in the slot, place the bail in lock position.

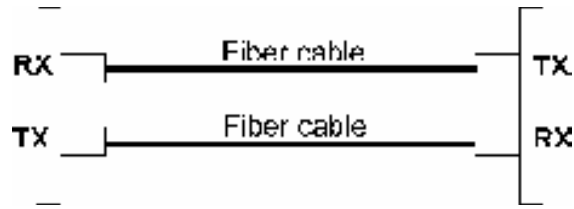
Connecting Fiber Cables

LC connectors are commonly equipped on most SFP transceiver modules. Identify TX and RX connector before making cable connection.

Connect the fiber cables.



The following figure illustrates a connection example between two fiber ports:



Make sure the Rx-to-Tx connection rule is followed on the both ends of the fiber cable.

Network Cables

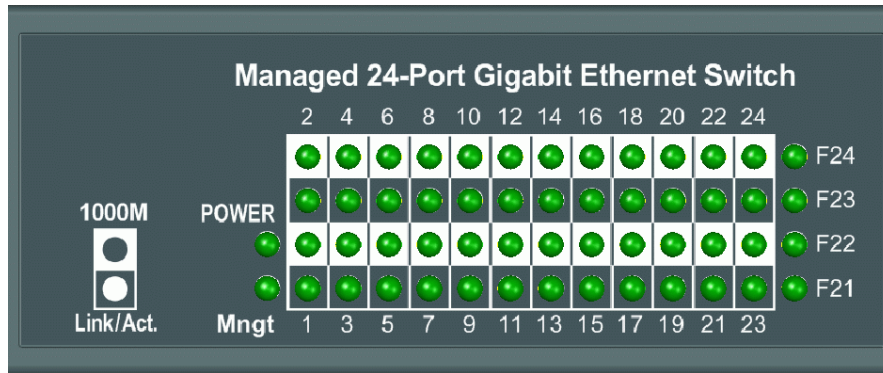
Multimode (MMF) - 50/125µm, 62.5/125 µm

Single mode (SMF) - 9/125 µm

Fiber Port Configuration

For 1000M fiber application on Port 21, 22, 23, and 24, just leave the default port configuration *Auto* for fiber connection.

2.9 LED Indication



LED	Function	State	Interpretation
POWER	Power status	ON	The power is supplied to the switch.
		OFF	The power is not supplied to the switch.
Mngt	Management status	OFF	The switch is in initialization and diagnostics.
		BLINK	The switch is initialized completely with diagnostic error.
		ON	The switch is initialized completely and normal.
1000M	Port speed status	ON	A speed of 1000Mbps is selected.
		OFF	A speed of 10/100Mbps is selected.
Link/Act.	Port link status	ON	A link is established. (No traffic)
		BLINK	Port link is up and there is traffic.

		OFF	Port link is down.
F21	F21 status	OFF	RJ-45 copper connection is selected on Port 21.
		ON	SFP fiber connection is selected on Port 21.
F22	F22 status	OFF	RJ-45 copper connection is selected on Port 22.
		ON	SFP fiber connection is selected on Port 22.
F23	F23 status	OFF	RJ-45 copper connection is selected on Port 23.
		ON	SFP fiber connection is selected on Port 23.
F24	F24 status	OFF	RJ-45 copper connection is selected on Port 24.
		ON	SFP fiber connection is selected on Port 24.

2.10 Making Console Connection

Console port is a DB9 connector. It serves as an RS-232 DTE port.

Pin Definitions

Pin 2	RXD
Pin 3	TXD
Pin 5	GND
Pin 1,4,6-9	NC

Use simple RS232 null modem without handshaking to connect the console port to PC's DB9 COM port as follows:

<u>Console Pins</u>		<u>COM Port Pins</u>	
Pin 2	RXD -----	Pin 3	TXD
Pin 3	TXD -----	Pin 2	RXD
Pin 5	GND -----	Pin 5	GND

Baud Rate Information

Baud rate: 115200

Data bits: 8

Parity: none

Stop bit: 1

Flow control: disabled

3. Manage the Switch

The switch provides the following methods to configure and monitor the switch as follows:

- Making out of band management via RS-232 console port
- Making in-band management via telnet interface over TCP/IP network
- Making in-band management via web interface over TCP/IP network
- Making in-band SNMP management over TCP/IP network

3.1 IP Address & Password

The IP Address is an identification of the switch in a TCP/IP network. Each switch should be designated a new and unique IP address in the network. The switch is shipped with the following factory default settings for software management:

Default IP address of the switch: **192.168.0.2 / 255.255.255.0**

The switch uses local authentication instead of RADIUS authentication with factory defaults.

Fixed Username: **admin**

Default password:

No password is required with factory default. However, the password is used for local authentication in accessing to the switch via console, telnet and Http web-based interface. For security reason, it is recommended to change the default settings for the switch before deploying it to your network.

3.2 Configuring IP Address & Password via console and telnet

[Password] setting command is in System command group.

```
>System password <password>↵
```

Parameters:

<password>: The allowed password string length is 0 to 31, and the allowed content is the ASCII characters from 32 to 126.

[IP] command group is used to configure the switch's IP settings. The command syntax is:

```
>IP DHCP [enable/disable]
```

```
>IP Setup [<ip_addr>] [<ip_mask>] [<ip_router>] [<vid>]
```

Parameters:

<ip_addr>: IP address (a.b.c.d), default: Show IP address

<*ip_mask*>: IP subnet mask (a.b.c.d), default: Show IP mask

<*ip_router*>: IP router (a.b.c.d), default: Show IP router

<*vid*>: VLAN ID (1-4095), default: Show VLAN ID

3.3 Configuring IP Address & Password via Web Interface

Start Web Browser

Start your browser software and enter the default IP address of the switch unit to which you want to connect. The IP address is used as URL for the browser software to search the device.

URL: <http://192.168.0.2/>

Login to Switch Unit

When browser software connects to the switch unit successfully, a Login screen is provided for you to login to the device as the left display below:



Enter the following default values in the login page:

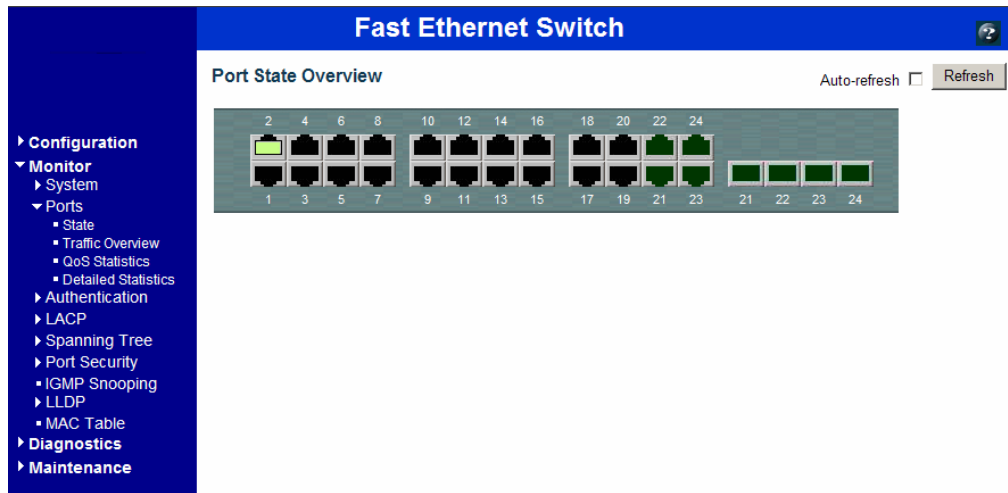
Fixed User Name: *admin*

Default password:

No password is required.

Click to login into the switch.

Web Page after a Successful Login



Select [Configuration] -> [System] -> [Password] to configure new password

System Password

Old Password	<input type="text"/>
New Password	<input type="text"/>
Confirm New Password	<input type="text"/>

Configuration	Description
Old Password	Enter the current system password. If this is incorrect, the new password will not be set.
New Password	New system password to be used The allowed string length is 0 to 31, and the allowed content is the ASCII characters from 32 to 126.
Confirm New Password	Re-enter the new system password.
<input type="button" value="Save"/>	Click to save the changes.

Select [Configuration] -> [System] -> [IP & Time] to configure IP address

IP Configuration

	Configured	Current
DHCP Client	<input type="checkbox"/>	<input type="button" value="Renew"/>
IP Address	192.168.0.217	192.168.0.217
IP Mask	255.255.255.0	255.255.255.0
IP Router	192.168.0.1	192.168.0.1
VLAN ID	1	1
SNTP Server	192.168.0.210	192.168.0.210

Configuration	Description
DHCP Client	Enable the DHCP client by checking this box.
IP Address	Provide the IP address of this switch unit.
IP Mask	Provide the IP mask of this switch unit.
IP Router	Provide the IP address of the default router for this switch unit.
VLAN ID	Provide the managed VLAN ID. The allowed range is 1 through 4095.
SNTP Server	Provide the IP address of the SNTP Server.
<input type="button" value="Save"/>	Click to save the changes.
<input type="button" value="Reset"/>	Click to undo any changes made locally and revert to previously saved values.
<input type="button" value="Renew"/>	Click to renew DHCP. This button is only available if DHCP is enabled.

Note:

1. If DHCP failed and the configured IP address is zero, DHCP will retry. If DHCP failed and the configured IP address is non-zero, DHCP will stop and the configured IP settings will be used. The DHCP client will announce the configured System Name as hostname to provide DNS lookup.
2. The IP addresses should be in dotted decimal notation.

3.4 Reference Manuals for Web, Console, Telnet Management

The following operation manuals are also provided separately for Console, Telnet and Web management:

Operation manual - telnet & console management xxxxxx.doc

Operation manual - web management xxxxx.doc

The manuals describe the detailed commands and information.

3.5 Configuration for SNMP Management

The switch supports SNMP v1, SNMP v2c, and SNMP v3 management. Make sure the related settings are well-configured for the switch before you start the SNMP management from an SNMP manager.

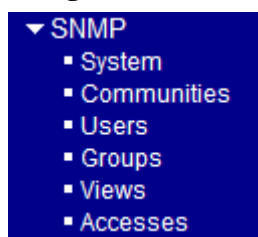
Using Telnet Interface

The following are available commands in telnet SNMP command group to configure SNMP-related settings:

- >SNMP Configuration*
- >SNMP Mode [enable/disable]*
- >SNMP Version [1/2c/3]*
- >SNMP Read Community [<community>]*
- >SNMP Write Community [<community>]*
- >SNMP Trap Mode [enable/disable]*
- >SNMP Trap Version [1/2c/3]*
- >SNMP Trap Community [<community>]*
- >SNMP Trap Destination [<ip_addr_string>]*
- >SNMP Trap Authentication Failure [enable/disable]*
- >SNMP Trap Link-up [enable/disable]*
- >SNMP Trap Inform Mode [enable/disable]*
- >SNMP Trap Inform Timeout [<timeout>]*
- >SNMP Trap Inform Retry Times [<retries>]*
- >SNMP Trap Probe Security Engine ID [enable/disable]*
- >SNMP Trap Security Engine ID [<engineid>]*
- >SNMP Trap Security Name [<security_name>]*
- >SNMP Engine ID [<engineid>]*
- >SNMP Community Add <community> [<ip_addr>] [<ip_mask>]*
- >SNMP Community Delete <index>*
- >SNMP Community Lookup [<index>]*
- >SNMP User Add <engineid> <user_name> [MD5/SHA] [<auth_password>] [DES] [<priv_password>]*
- >SNMP User Delete <index>*
- >SNMP User Changekey <engineid> <user_name> <auth_password> [<priv_password>]*
- >SNMP User Lookup [<index>]*
- >SNMP Group Add <security_model> <security_name> <group_name>*

>SNMP Group Delete <index>
 >SNMP Group Lookup [<index>]
 >SNMP View Add <view_name> [included/excluded] <oid_subtree>
 >SNMP View Delete <index>
 >SNMP View Lookup [<index>]
 >SNMP Access Add <group_name> <security_model> <security_level> [<read_view_name>] [<write_view_name>]
 >SNMP Access Delete <index>
 >SNMP Access Lookup [<index>]

Using Web Interface



The commands supports configuration for:

- Basic system configuration for SNMP v1 and SNMP v2c
- Basic system configuration for SNMP v1 trap, SNMP v2c trap and SNMP v3 trap
- Communities that permit to access to SNMPv3 agent
- USM (User-based Security Model) user table for SNMPv3
- VACM (View-based Access Control Model) Viewer table for SNMPv3
- Group table for SNMPv3
- Accesses group table for SNMPv3

3.6 SNMP MIBs

The switch provides the following SNMP MIBs:

- RFC 1213 MIB II
- RFC 4188 Bridge MIB
- RFC 3635 Ethernet-like MIB
- RFC 2863 Interface Group MIB using SMI v2
- RFC 2933 IGMP MIB
- RFC 3636 802.3 Medium Attachment Units (MAUs) MIB

- RFC 4133 Entity MIB v3
- IEEE 802.3AB LLDP MIB

One product MIB file is also available in the product CD for SNMP manager software.