



KGS-2422-TG

**Managed 26-Port Modular Gigabit Ethernet
Switches with 10G Uplink Support**

Installation Guide



DOC.230626A

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For more information, contact:

United States KTI Networks Inc.
P.O. BOX 631008
Houston, Texas 77263-1008

Phone: 713-2663891

Fax: 713-2663893

E-mail: kti@ktinet.com

URL: <http://www.ktinet.com/>

International Fax: 886-2-26983873
E-mail: kti@ktinet.com.tw
URL: <http://www.ktinet.com.tw/>

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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 Directive of 2014/30/EU

EN 55032

CISPR 32

EN 61000-3-2

EN 61000-3-3 Class A

EN 55024

IEC 61000-4-2

IEC 61000-4-3

IEC 61000-4-4

IEC 61000-4-5

IEC 61000-4-6

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IEC 61000-4-11

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1. Introduction

The 26-port Managed Gigabit Ethernet Switches are standard L2 switches that meets all IEEE 802.3/u/x/z/ae 10 Gigabit Ethernet, Gigabit Ethernet, and Fast Ethernet specifications. The switches provide three 8-port modular slots. Each slot can accommodate one 8-port module. A variety of modules is available for selection. They include 10/100/1000M copper module, 100/1000M SFP module, Copper and SFP mixed modules, and Fast Ethernet fiber modules. Different modules can be installed flexibly in one device rack. The system detects the types of the installed modules and configures the modules automatically. With variety of modules and flexibility of installation, the switches can meet most requirements of deployment of fiber networks no matter they are Gigabit Ethernet base, Fast Ethernet base or even combination of both.

The switches provide two 10GBASE SFP+ slots on the back rear panel. The SFP+ slots can be installed with 10GBASE optical fiber transceivers for high bandwidth fiber connection. They are used as uplink ports to the backbone networks. They also can be used as a high-bandwidth inter-connection between two switches and support full wire speed forwarding between two switches.

The switches support Telnet CLI, Web GUI, SNMP and console CLI 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 powerful security functions such as SSH, HTTPS, IEEE 802.1x & MAC-based authentication, and ACL control to make them suitable for office core applications.

The following figure illustrates the switch has 3 empty slots with no module installed.



Model Definition

| Model No. | Model | Power Input Rating | Power connector |
|---------------|------------------|--------------------|-----------------|
| KGS-2422-TG-S | AC powered model | AC 100 ~ 240V | IEC320 |
| KGS-2422-TG-D | DC powered model | DC +/-48V | Screw terminals |

1.1 Features

- Fully modular design with three 8-port module slots supporting Gigabit and Fast Ethernet
- A variety of optional 8-port modules is available for selection including Gigabit copper, Gigabit fiber, Gigabit mix of copper and fiber, and Fast Ethernet fiber
- The copper ports support 10/100/1000Mbps auto-negotiation and auto-MDI/MDI-X detection.
- The SFP port can support both 100BASE fiber transceivers and 1000BASE SFP fiber transceivers
- Support connectivity for Fast Ethernet fiber, 100BASE-FX with SC/ST/BiDi transceivers
- Flexible installation with any combination of different modules in one rack
- Provide two 10G SFP+ uplink ports
- The SFP+ port can support both 1000BASE fiber transceivers and 10GBASE fiber transceivers
- Provide L2 switching at Gigabit full wire speed
- Provide L3 switching functions for IPv4/IPv6 Unicast routing and IPv4 Multicast routing
- Support power saving mode when port link down
- Support 802.3x flow control for full-duplex and backpressure for half-duplex
- Support console and in-band Web/Telnet/SSH/HTTPS/SNMP interfaces for switch management
- Support configurable maximum frame length from 1518 up to 10056 jumbo frame
- Support port-based ,802.1Q tag-based VLAN and private VLAN
- Provide QoS function
- Support port bandwidth control for ingress and egress
- Support packets storm control function for broadcast, unicast and multicast
- Support MAC address learning, ageing and filtering control
- Support LACP port link aggregation
- Support IEEE 802.1d, 802.1w, 802.1s STP (Spanning Tree Protocol), RSTP, MSTP
- Provide port mirroring function
- Provide IP Multicasting with IGMP & MLD Snooping function
- Support DHCP client & server for dynamic IP configuration
- Support DHCP option 82 relay
- Support 802.1X port-based radius authentication for access security
- Provide ACL filtering function
- Provide port data rate control function
- Support NTPv4 Client
- Support LLDP
- Provide SNMP v1/v2C/v3 agent and event trap function
- Support Configuration download and upload
- 19” rack mountable
- Both AC powered model and DC powered model are available for choic
- **Security upgrade with TLS 1.2/1.3 support**

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 8 active priorities
 - Port QoS configuration
 - QoS Control List for policy rules
 - Port bandwidth control for ingress and egress
 - Storm Control for UC, MC and Unknown MAC
 - Port ingress bandwidth policer
 - Policers for ACL rules
 - Port egress bandwidth shaper
 - Queue egress bandwidth shaper
 - DiffServ (RFC2474) DSCP based classification and remarking
 - Tag based remarking
 - Port scheduler mode for egress queue
- Layer2
 - Auto MAC address learning and ageing
 - Static MAC address filtering
 - 802.1Q VLAN
 - Private VLAN, Port Isolation, MAC-based VLAN, Protocol-based VLAN, IP subnet-based VLAN
 - VLAN trunking
 - LAN Trunking
 - Multiple Registration Protocol – MRP
 - IEEE-802.1ad Provider Bridge (Native or Translated VLAN)
 - Link Aggregation - LACP
 - MSTP, RSTP, STP
 - Port Mirroring
 - IGMP, MLD snooping
 - DHCP client for IP configuration
- Layer 3 Switching
 - DHCP option 82 relay
 - UPNP
 - IPv4 Unicast: Static routing
 - IPv4 Unicast: RIPv1/RIPv2
 - IPv4 Multicast Routing

- IPv6 Unicast Routing
- Security features
 - Port-based 802.1X
 - Single 802.1X
 - Multiple 802.1X
 - MAC-based authentication
 - ADIUS Accounting
 - MAC Address Limit
 - MAC address limit by VLAN
 - MAC Freeze - All learned MAC addresses on specified ports become static MAC addresses
 - MAC Spoofing - Network protection against changing MAC address to bypass the ACL services
 - IP MAC binding
 - IP/MAC binding dynamic to static
 - TACACS+ Protocol for authenticating users that wish to manage the switch.
 - TACACS+ Accounting
 - Web & CLI Authentication
 - User Authorization Levels for CLI and Web management.
 - Web-based Authentication
 - Authorization (15 user levels)
 - ACLs for filtering/policing/port copy
 - Access Control Lists for filtering, policing or port copy
 - IP source guard - Access Control List for L2/L3 protocol filtering, ingress rate limit, port copy
- Management
 - DHCP Client
 - DHCPv6 Client
 - DHCP Server
 - DNS client, proxy
 - HTTP Server - Web management with TLS 1.2/1.3 support
 - Console CLI
 - Telnet CLI
 - Industrial Standard CLI
 - Industrial Standard Configuration
 - Management access filtering
 - HTTPS
 - SSHv2
 - System Syslog
 - Software Upload via web



- SNMP v1 / v2c / v3 Agent
- RMON (Group 1, 2, 3 & 9)
- SNMP trap group
- Link Layer Discovery – LLDP
- LLDP-MED
- Cisco Discovery filtering – CDP
- sFlow
- Software Download via Web
- Configuration download and upload
- SNMP MIBs



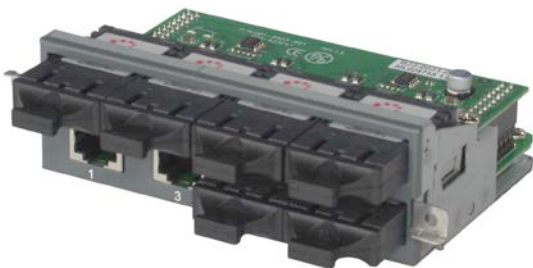

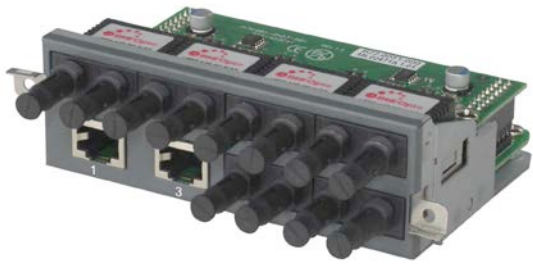
1.2 Product Panels

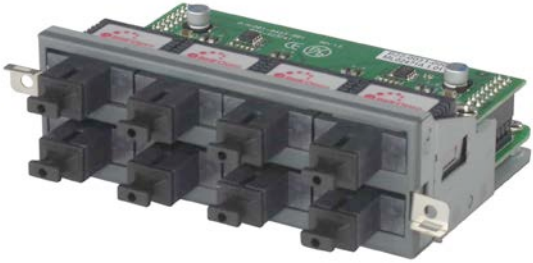
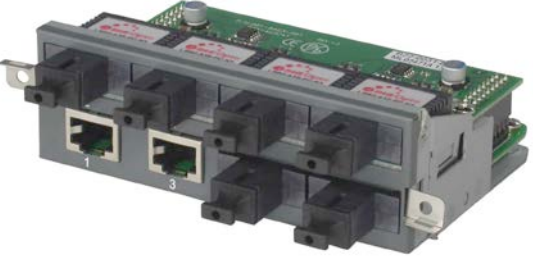
The following figure illustrates the front panel and rear panel of the switch:

| Model | Front Panel | Rear Panel (Power Input) |
|------------------|---|--|
| AC powered model |  |  |
| DC powered model | |  |

1.3 Optional 8-port Modules

| Module Part No. | Image | Specifications |
|-----------------|---|--|
| 8GT |  | <ul style="list-style-type: none"> ● 8 10/100/1000 copper ports ● 8 RJ-45 jacks |
| 8GX |  | <ul style="list-style-type: none"> ● 8-port 100/1000 SFP module ● 8 dual-speed SFP slots ● Supports standard 100M or 1000M SFP optical fiber transceivers |

| | | |
|---------|---|---|
| 8G4 |  | <ul style="list-style-type: none"> ● 4 10/100/1000 copper ports (4 RJ-45) support 10/100/1000Mbps ● 4 dual-speed SFP slots support standard 100M or 1000M SFP optical fiber transceivers |
| 8FX-xxx |  | <ul style="list-style-type: none"> ● 8 fixed 100M fiber ports ● 8 duplex SC transceivers support 100Mbps ● Options: MMF 2km, SMF 20km |
| 8FM-xxx |  | <ul style="list-style-type: none"> ● 6 fixed 100M fiber ports with 6 duplex SC transceivers supporting 100Mbps ● 2 10/100/1000 copper ports (2 RJ-45) ● Fiber options: MMF 2km, SMF 20km |
| 8FX-T |  | <ul style="list-style-type: none"> ● 8 fixed 100M fiber ports ● 8 duplex ST transceivers support 100Mbps and MMF 2km |
| 8FM-T |  | <ul style="list-style-type: none"> ● 6 fixed 100M fiber ports with 6 duplex ST transceivers supporting 100Mbps and MMF 2km ● 2 10/100/1000 copper ports (2 RJ-45) |

| | | |
|----------------------|---|--|
| 8FX-W _{xyy} |  | <ul style="list-style-type: none"> ● 8 fixed 100M fiber ports ● 8 BiDi SC transceivers support 100Mbps ● Options: Tx1310/Rx1550 SMF 20km Tx1550/Rx1310 SMF 20km |
| 8FM-W _{xyy} |  | <ul style="list-style-type: none"> ● 6 fixed 100M fiber ports with 6 BiDi SC transceivers support 100Mbps ● 2 10/100/1000 copper ports (2 RJ-45) ● Fiber options: Tx1310/Rx1550 SMF 20km Tx1550/Rx1310 SMF 20km |

1.3.1 Optional Module Table

| Module Part No. | 10/100/1000M Copper ports | 100/1000M pluggable SFP | Fixed 100M Fiber |
|------------------------|---------------------------|-------------------------|----------------------------------|
| 8GT | 8 RJ-45 | | |
| 8GX | | 8 SFP | |
| 8G4 | 4 RJ-45 | 4 SFP | |
| 8FX-T | | | 8 ST for MMF 2km |
| 8FX-C | | | 8 SC for MMF 2km |
| 8FX-SL2 | | | 8 SC for SMF 20km |
| 8FX-W3520 8FX-W5320 | | | 8 BiDi SC for single SMF 20km |
| 8FM-SL2 | 2 RJ-45 | | 6 SC for SMF 20km |
| 8FM-C | 2 RJ-45 | | 6 SC for MMF 2km |
| 8FM-T | 2 RJ-45 | | 6 ST for MMF 2km |
| 8FM-W3520 8FM-W5320 | 2 RJ-45 | | 6 BiDi SC for single SMF 20km |

1.4 LED Indicators

| <u>LED</u> | <u>Function</u> |
|-------------------|--|
| PWR | Power status |
| Mngt | Management status |
| 1000M | Port speed 1000Mbps status |
| Link/Act. | Port link and activity status (Port 1 – Port 24) |
| 25, 26 | Port 25, Port 26 link and activity status |

1.5 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 |

Dual-speed SFP Slots

| | |
|-----------------------|--|
| Compliance | IEEE 802.3z 1000BASE-SX/LX (mini-GBIC) IEEE 802.3u 100BASE-FX |
| Connectors | SFP slot supports optional both 100M and 1000M SFP type fiber transceivers |
| Configuration options | Auto-negotiation 1000Mbps Full duplex Forced 100Mbps Full duplex (Software configurable) |
| Network cables | MMF 50/125 μ m 60/125 μ m, SMF 9/125 μ m |
| Eye safety | IEC 825 compliant |

Fixed 100M Fiber Ports

| | |
|-------------------|--|
| Compliance | IEEE 802.3u 100BASE-FX |
| Connector options | Duplex SC for multimode fiber Duplex SC for single mode fiber Duplex ST for multimode fiber BiDi SC for single SM fiber |
| Configuration | 100Mbps, full duplex |
| Network cables | MMF 50/125 μ m 60/125 μ m, SMF 9/125 μ m |
| Eye safety | IEC 825 compliant |

10G SFP+ Slots

| | |
|-----------------------|---|
| Compliance | IEEE 802.3 10GBASE SFP+ |
| Connectors | Dual-speed SFP+ slot supports optional both 1000BASE SFP and 10GBASE SFP+ type fiber transceivers, Direct Attach Cable (DAC) and Active Optical Cable (AOC) |
| Configuration options | Auto-negotiation 1000Mbps Full duplex, Auto-negotiation 10Gbps Full duplex (Software configurable) |
| Auto-negotiation | Flow control pause setting, Remote fault signaling |
| Network cables | MMF 50/125 μ m 62.5/125 μ m, SMF 9/125 μ m |
| Eye safety | IEC 825 compliant |

Console Port

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

Switch Functions

| | |
|------------------------|---|
| MAC Addresses Table | 32K entries |
| Forwarding & filtering | Non-blocking, full wire speed |
| Switching technology | Store and forward |
| Maximum packet length | 10240 bytes (Jumbo frame support) |
| Packet Buffer | 16Mbit |
| 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 | 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 (AC powered models)

| | |
|--------------------------|--------------------------|
| Interfaces | IEC320 receptacle |
| Operating Input Voltages | 100 ~ 240VAC / 0.85-0.3A |
| Power Consumption | 48W max. |

DC Power Input (DC powered models)

| | |
|--------------------------|----------------------------|
| Interfaces | Screw-type terminal block |
| Operating Input Voltages | +40 ~ +60VDC, -40 ~ -60VDC |
| Power Consumption | 48W 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 | -25°C ~ +85°C |
| Relative Humidity | 10% ~ 90% non-condensing |

Electrical Approvals

| | |
|--------|-----------------------------|
| FCC | Part 15 rule Class A |
| CE | EMC Directive of 2014/30/EU |
| VCCI | Class A |
| Safety | LVD, IEC60950-1 |

2. Installation

2.1 Unpacking

The product package contains:

- The switch unit
- One AC power cord (AC powered model)
- One 19" rack mounting kit

2.2 Safety Cautions

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

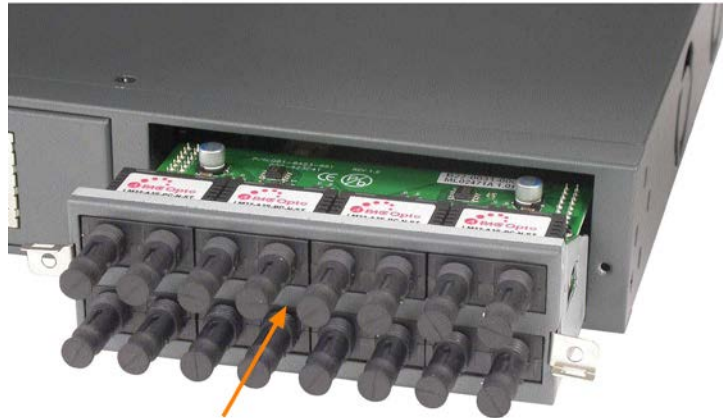
- Do not service any product except as explained in your system documentation.
- Opening or removing covers may expose you to electrical shock.
- Only a trained service technician should service components inside these compartments.
- If any of the following conditions occur, unplug the product from 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 Installing Module

The steps to install a module are:

1. Unscrew and open the cover of the module slot.
2. Insert the module into the slot until it is plugged on the slot connector properly.

Insert the module into a slot



3. Screw the module on the front panel of the base chassis securely.

Screw the module into the base



The module screwed



2.4 Removing the Module

The steps to remove an installed module from a base chassis are:



1. Unscrew the module first.



2. Loosen two screw brackets and pull them out as shown below:



3. Use the brackets as handles to pull the module out from the module slot connector.



4. Remove the module from the slot.

2.5 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 mounting



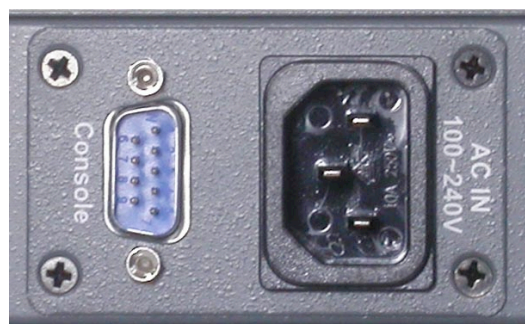
2. Mount the switch onto 19-inch rack with rack screws securely.



3. Turn the power to the switch on.

2.6 Applying 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

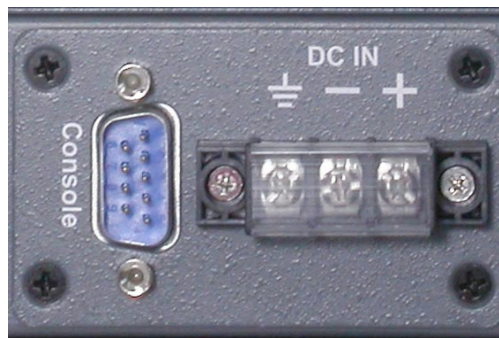
Power Consumption: 48W max.

Important Notes:

1. *The socket-outlet shall be installed near the switch and shall be easily accessible.*
2. *Use of an approved power supply cord not lighter than IEC 60227, H03VV-F, 3G, 0.75mm² or alternatively IEC 60245, H05RR-F, 3G, 0.75mm².*

2.7 Applying 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 ~ +60VDC or -40 ~ -60VDC

Power Consumption: 48W max.

Contacts

- + Vdc+ input
- Vdc- input
- ⏏ Protective earth (Connected chassis and isolated with Vdc+ & Vdc-)

Important Note:

1. *For a PERMANENTLY CONNECTED SWITCH EQUIPMENT, a readily accessible power disconnect device shall be incorporated external to the switch equipment.*
2. *The power disconnecting device be installed near the switch and shall be easily accessible.*

3. The power wiring between the DC power supply and the switch must be stranded copper wire within the range of 10 to 24 AWG.

2.8 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 for more than five seconds until all LEDs blink. Then, release button. | Restore factory default settings & reboot the switch. |
| Press the button and release during switch operation | Re-boot the switch unit |

2.9 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.

2.10 Making SFP Fiber Connection

The dual-speed 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.

Since the SFP slot is dual-speed support, it may be installed with a 1000M SFP fiber transceiver or a 100M SFP fiber transceiver. Choose a right transceiver which matches the requirements for connection speed, fiber type and connection distance for your application.

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.

Insert SFP transceiver into a slot



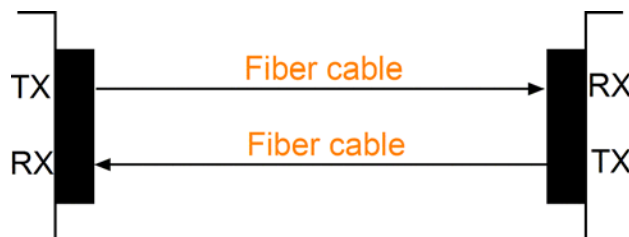
3. Until the SFP transceiver is seated securely in the slot, place the bail in lock position.

The transceiver seated properly



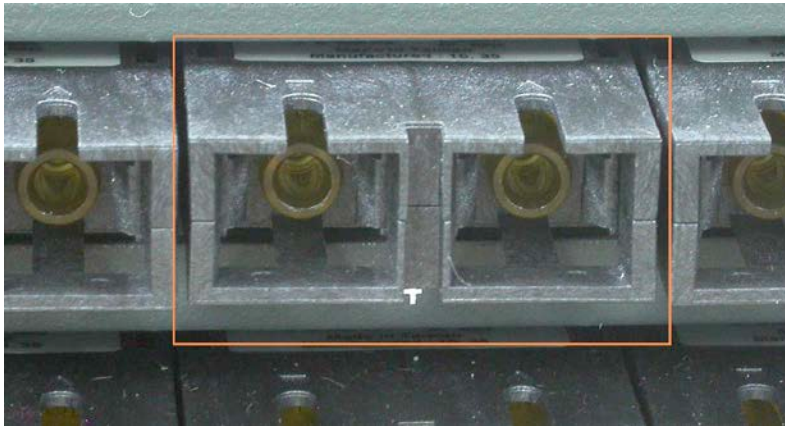
Connecting Fiber Cables

LC connectors are commonly equipped on most SFP transceiver modules. Identify TX and RX connector before making cable connection. Plug in the cables as shown below. Make sure RX-to-TX connection rule is followed between two ends of the connected cable.



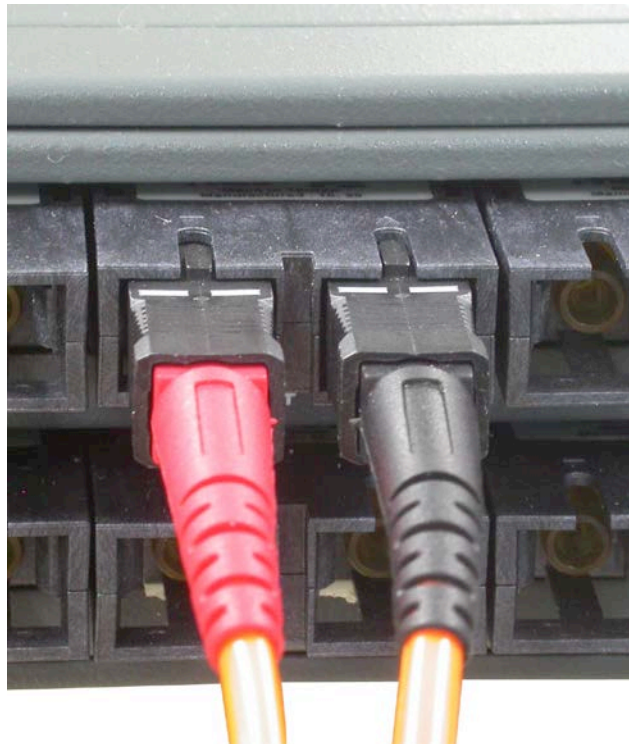
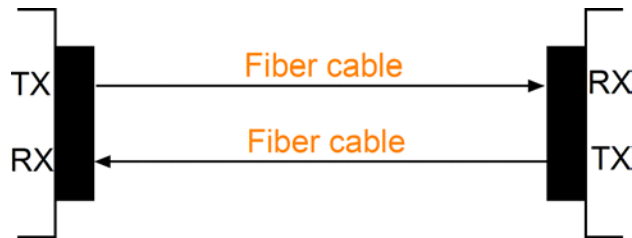
2.11 Making Fixed Duplex Fiber Connection

The following figure illustrates an example of fixed duplex fiber port with duplex SC connectors.



A module with fixed duplex ST connectors is also available in the listed optional modules.

Identify TX and RX connector before making cable connection. Plug in the cables as shown below. Make sure RX-to-TX connection rule is followed between two ends of the connected cable.

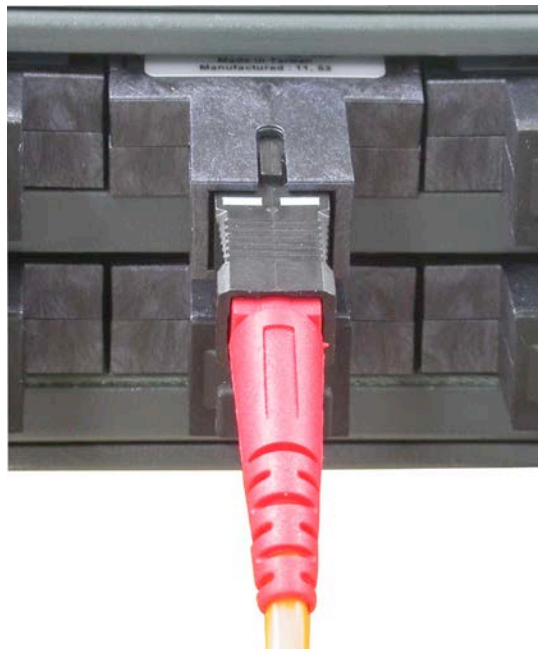
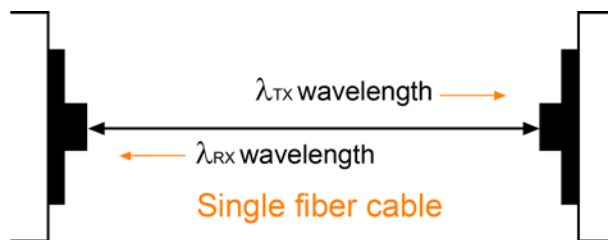


2.12 Making Fixed Bi-Di (Bi-Directional) Fiber Connection

The following figure illustrates an example of fixed Bi-Di (Bi-directional) fiber port with one SC connector.



A Bi-Di port supports single fiber connection. It uses different optical wavelengths for transmission and receiving individually as figure illustrated below:



2.13 Making 10G SFP+ Connections

The 10G SFP+ slot can support the following types of connection:

- 10GBASE-X SFP+ fiber transceivers
- 1000BASE-X SFP fiber transceivers
- Direct Attach Cable (DAC)
- Active Optical Cable (AOC)

10GBASE-X SFP Fiber Transceivers

The following table lists the IEEE 802.3 standard 10GBASE specifications:

| Standard | Wavelength | Fiber | Distance *1 |
|---------------------|------------|----------------------------|-------------|
| 10GBASE-SR | 850nm | MMF 62.5/125 μ m (OM1) | 33m |
| | | MMF 50/125 μ m (OM2) | 82m |
| 10GBASE-LR | 1310nm | SMF | 10km |
| 10GBASE-ER/-LR40 *2 | 1550nm | SMF | 40km |
| 10GBASE-ZR *2 | 1550nm | SMF | 80km |

*1 Reference distance

*2 Extended reach, proprietary standards

More proprietary transceivers which support longer connected distance and different optical specifications are available in the market. Consult your dealer for more information.

1000BASE-X SFP Fiber Transceivers

The following table lists the IEEE 802.3 standard 1000BASE-X specifications:

| Standard | Wavelength | Fiber | Distance *1 |
|----------------|------------------------|--------------------|-------------|
| 1000BASE-SX | 850nm | MMF | 550m |
| 1000BASE-LX | 1310nm | SMF | 10km |
| 1000BASE-BX10 | TX:1310nm RX:1550nm | Bi-Directional SMF | 10km |
| 1000BASE-EX *2 | 1310nm | SMF | Up to 40km |
| 10GBASE-ZX *2 | 1550nm | SMF | Up to 110km |

*1 Reference distance

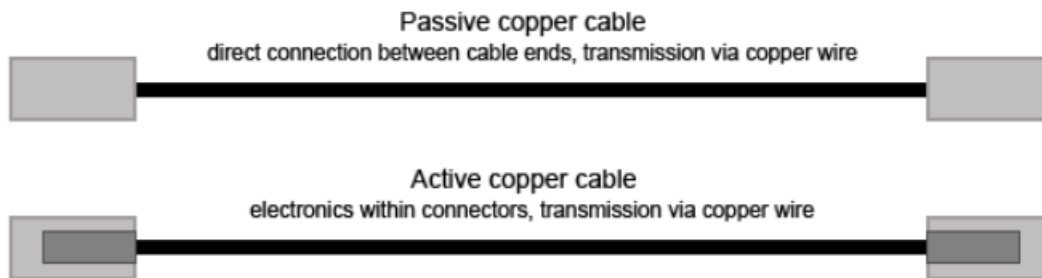
*2 Extended reach, proprietary standards

More proprietary transceivers which support longer connected distance and different optical specifications are available in the market. Consult your dealer for more information.

SFP+ Direct Attach Cable (DAC)

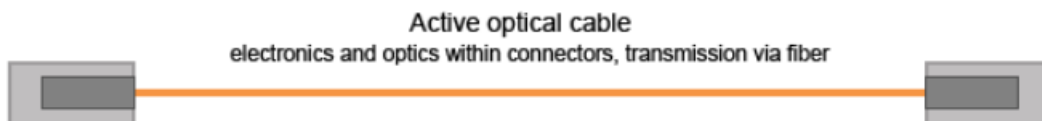
DAC cables are made from copper and are factory terminated copper/twinax cables. DAC cables are used to connect switches, routers and servers. They're assembled from shielded copper cables with a fixed length and are fitted with transceivers on either end of the cable with gauges attached. These can be from 24 up to 30 AWG, while 15 meters of interconnection is possible via the copper cable. There are passive and active types of DAC cables. Active copper wires use electronics to connect via the connections and transmissions are made via the copper ends. To put it simply, passive DAC cables do not contain any components that are electrical, minimizing power usage. Active cables benefit from boosted signals and use more power but ensure better quality transmissions.

The SFP+ Passive DAC cable is a high-performance, cost effective solutions for 10Gb Ethernet and 10G Fiber Channel applications. SFP+ Passive DAC cable enables hardware manufacturers and data center operators to achieve high port density, configurability and utilization at a very low cost and with reduced power requirements.

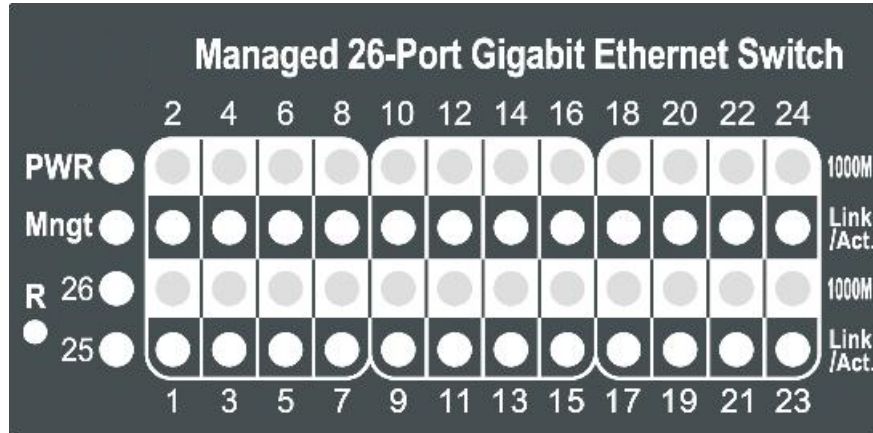


SFP+ Active Optical Cable (AOC)

AOC is one of the forms of DAC cable. It integrates multimode optical fiber, fiber optic transceivers, and modules. AOCs have many benefits such as lighter weight, high performance, low power consumption, low interconnection loss, EMI immunity, and flexibility etc. Primarily, active optical cable (AOC) assemblies were invented to replace copper technology in data centers and high performance computing (HPC) applications. As we know, copper passive twinax cable is heavy and bulky, making it difficult to physically manage the datacenter. And due to the nature of electrical signals, electromagnetic interference (EMI) limits copper's performance and reliability.



2.14 LED Indication



| LED | Function | Color | State | Interpretation |
|-----------|------------------------|--------|-------|---|
| PWR | Power status | Green | ON | The power is supplied to the switch. |
| | | | OFF | The power is not supplied to the switch. |
| Mngt | Management status | Green | 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 | Green | ON | 1000Mbps is selected |
| | | | OFF | 100Mbps or 10Mbps is selected. |
| Link/Act. | Port link status | Green | ON | Port link is established. (No traffic) |
| | | | BLINK | Port link is up and there is traffic. |
| | | | OFF | Port link is down. |
| 25, 26 | Port 25,26 link status | Green | ON | 10Gbps port link is established. (No traffic) |
| | | | BLINK | 10Gbps port link is up and there is traffic. |
| | | Yellow | ON | 1000Mbps port link is established. (No traffic) |
| | | | BLINK | 1000Mbps port link is up and there is traffic. |
| | | | OFF | Port link is down. |

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

Console Pins

COM Port Pins

| | | | | |
|-------|-----|-------|-------|-----|
| 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. Managing 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**

Fixed Username: **admin**

Privilege level: **15**

No password

The switch supports local authentication instead of RADIUS authentication with factory defaults. 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 via console and telnet CLI

The steps to configure a fixed IPv4 address for the switch via CLI are:

Example for Fixed IP address:

```
# configure terminal
(config)# interface vlan 1
(config-if-vlan)# ip address 192. 168. 4. 171 255. 255. 255. 0
```

Remark:

1. With factory default, vlan 1 is the only one that includes all switched ports as port members.
2. Address **192.168.4.171 255.255.255.0** is assigned to vlan 1.

Example for DHCP:


```
# configure terminal
(config)# interface vlan 1
(config-if-vlan)# ip address dhcp fallback 192.168.4.171 255.255.255.0
```

Remark:

1. With factory default, vlan 1 is the only one that includes all switched ports as port members.
2. vlan 1 uses dhcp for IP configuration.
3. Address 192.168.4.171 255.255.255.0 is the fallback IP address when dhcp server is not available.

3.3 Configuring Local Authentication via console and telnet CLI

Example:

```
(config)# username michael privilege 15 password unencrypted 12345
```

Remark:

1. The username example is Michael and the password is unencrypted 12345.
2. Michael is given privilege 15, the highest level.
3. The username and password is used as local authentication for CLI and web UI.

Since default username `admin` can not be deleted and not protected with password, it is necessary to configure a password for `admin` for security purpose.

Configure password for default username `admin`:

```
(config)# username admin password unencrypted 12345
```

Password `unencrypted 12345` is an example.

3.4 Configuring IP Address & Password via Web Interface

Start Web Browser

Start your browser software and enter the default IP address 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 the switch

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

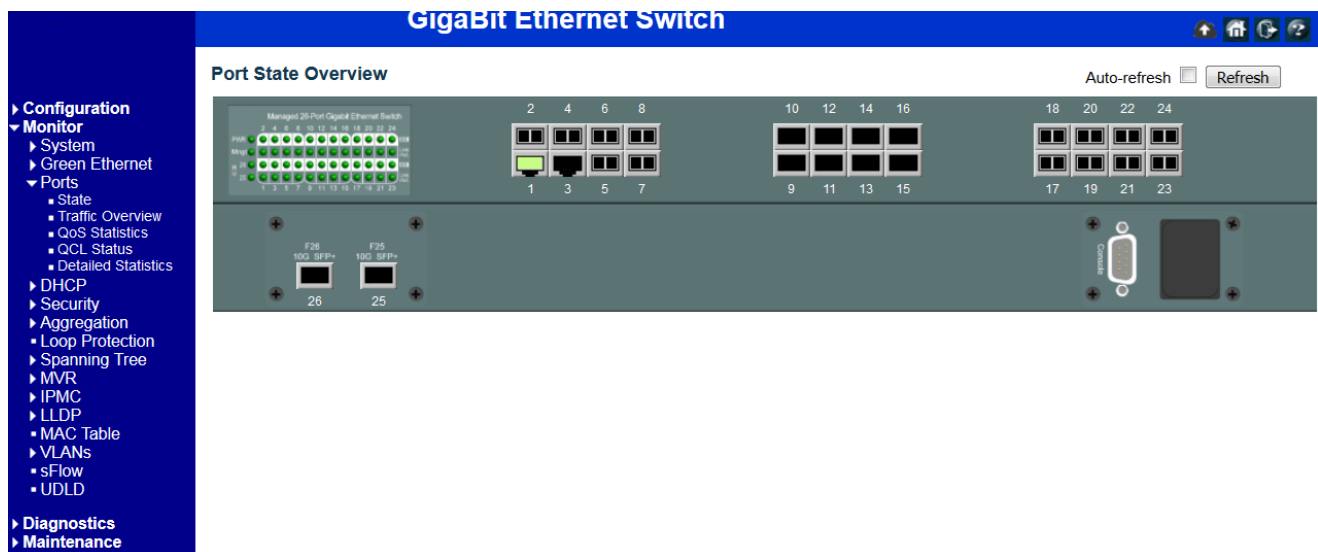


Enter the following default values in the login page:

Fixed User Name: **admin**

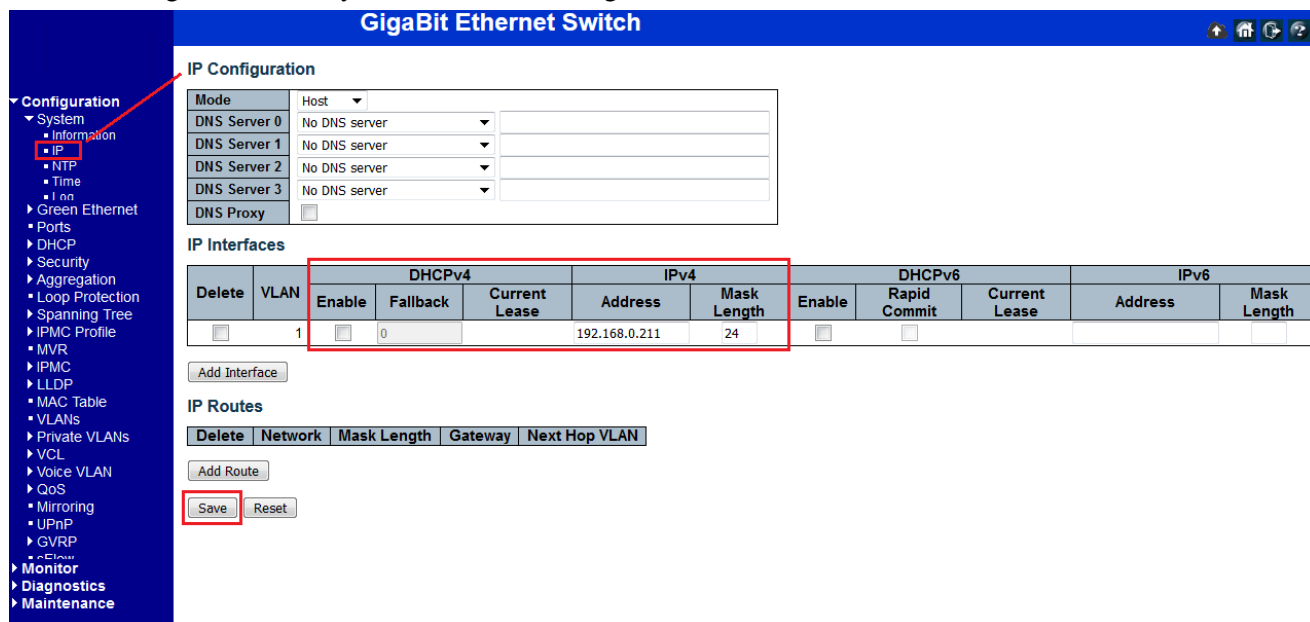
No password is required.

Click **OK** to login into the switch.



IP Address Configuration

Select [Configuration] -> [System] -> [IP] to configure IP address for VLAN 1



| Configuration | Description |
|---------------|--|
| IPv4 DHCP | DHCP client configuration |
| Enable | Enable the DHCP client by checking this box. If this option is enabled, the system will configure the IPv4 address and mask of the interface using the DHCP protocol. |
| Fallback | The number of seconds for trying to obtain a DHCP lease. After this period expires, a configured IPv4 address will be used as IPv4 interface address. A value of zero disables the fallback mechanism, such that DHCP will keep retrying until a valid lease is obtained. Legal values are 0 to 4294967295 seconds. |
| Current Lease | For DHCP interfaces with an active lease, this column shows the current interface address, as provided by the DHCP server. |
| Address | The IPv4 address of the interface in dotted decimal notation. If DHCP is enabled, this field configures the fallback address. The field may be left blank if IPv4 operation on the interface is not desired - or no DHCP fallback address is desired. |
| Mask Length | The IPv4 network mask, in number of bits (<i>prefix length</i>). Valid values are between 0 and 30 bits for a IPv4 address. If DHCP is enabled, this field configures the fallback address network mask. The field may be left blank if IPv4 operation on the interface is not desired - or no DHCP fallback address is desired. |
| Save | Click to save the changes. |
| Reset | Click to undo any changes made locally and revert to previously saved values. |

User Configuration

Select [Configuration] -> [Security] -> [Switch] -> [Users] to configure a new user, Michael as an example.

The screenshot shows the configuration interface for a GigaBit Ethernet Switch. On the left is a navigation tree under 'Configuration'. The path 'Configuration' -> 'Security' -> 'Switch' -> 'Users' is highlighted. The main content area is titled 'Users Configuration' and contains a table with the following data:

| User Name | Privilege Level |
|-----------|-----------------|
| admin | 15 |

Below the table is a button labeled 'Add New User', which is highlighted with a red rectangular box. A red arrow points from this button to the 'Users' item in the navigation tree.

| Configuration | Description |
|------------------------------|---|
| User Name | The name identifying the user. This is also a link to Add/Edit User interface. |
| Privilege Level | The privilege level of the user. The allowed range is 1 to 15. If the privilege level value is 15, it can access all groups, i.e. that is granted the fully control of the device. But others value need to refer to each group privilege level. User's privilege should be same or greater than the group privilege level to have the access of that group. By default setting, most groups privilege level 5 has the read-only access and privilege level 10 has the read-write access. And the system maintenance (software upload, factory defaults and etc.) need user privilege level 15. Generally, the privilege level 15 can be used for an administrator account, privilege level 10 for a standard user account and privilege level 5 for a guest account. |
| Add New User | Click to add a new user. |

Add New User

Add User

| User Settings | |
|------------------|---------|
| User Name | michael |
| Password | ●●●●● |
| Password (again) | ●●●●● |
| Privilege Level | 15 |

| Configuration | Description |
|------------------|---|
| User Name | A string identifying the user name that this entry should belong to. The allowed string length is 1 to 31. The valid user name allows letters, numbers and underscores. |
| Password | The password of the user. The allowed string length is 0 to 31. Any printable characters including space are accepted. |
| Password (again) | Re-enter the password again. |
| Privilege Level | The privilege level of the user. The allowed range is 1 to 15. If the privilege level value is 15, it can access all groups, i.e. that is granted the fully control of the device. But others value need to refer to each group privilege level. User's privilege should be same or greater than the group privilege level to have the access of that group. By default setting, most groups privilege level 5 has the read-only access and privilege level 10 has the read-write access. And the system maintenance (software upload, factory defaults and etc.) need user privilege level 15. Generally, the privilege level 15 can be used for an administrator account, privilege level 10 for a standard user account and privilege level 5 for a guest account. |

| | |
|---------------------------------------|---|
| <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="Cancel"/> | Click to undo any changes made locally and return to the Users. |

Click

Users Configuration

| User Name | Privilege Level |
|-----------|-----------------|
| admin | 15 |
| michael | 15 |

Configure password for **admin** user

Select [Configuration] -> [Security] -> [Switch] -> [Users] to show all users.

Users Configuration

| User Name | Privilege Level |
|-----------|-----------------|
| admin | 15 |
| michael | 15 |

Add New User

Click admin to edit configuration.

Users Configuration

| User Name | Privilege Level |
|-----------|-----------------|
| admin | 15 |
| michael | 15 |

Add New User

Click

Edit user page to configure password for **admin** user:

Edit User

| User Settings | |
|------------------|-------|
| User Name | admin |
| Password | |
| Password (again) | |
| Privilege Level | 15 |

Save Reset Cancel

3.5 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.

3.6 Configuration for SNMP Management

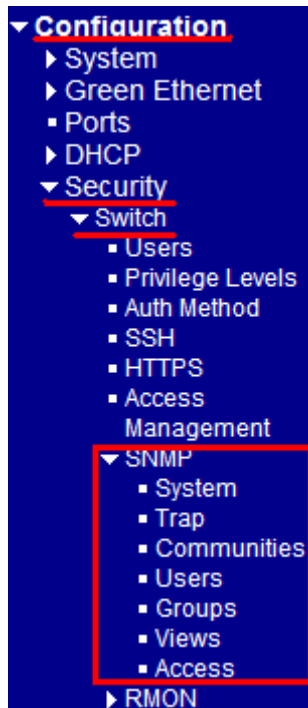
The switch supports SNMP v1, SNMP v2c, and SNMP v3 management. Make sure the related settings are well-configured for the switch before you start the SNMP management from an SNMP manager.

Using Telnet CLI

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

```
(config)# snmp-server ?  
  access          access configuration  
  community       Set the SNMP community  
  contact         Set the SNMP server's contact string  
  engine-id       Set SNMP engine ID  
  host            Set SNMP host's configurations  
  security-to-group security-to-group configuration  
  trap           Set trap's configurations  
  user           Set the SNMPv3 user's configurations  
  version         Set the SNMP server's version  
  view           MIB view configuration
```

Using Web Interface



The commands supports configuration for:

- Basic system configuration for SNMP v1, SNMP v2c and SNMP v3
- Basic system configuration for SNMP v1 trap, SNMP v2c trap and SNMP v3 trap
- Communities that permit to access to SNMPv3 agent
- User table for SNMPv3
- Group table for SNMPv3
- Viewer table for SNMPv3
- Accesses group table for SNMPv3

3.7 SNMP MIBs

The switch provides the following SNMP MIBs:

| | |
|---|---|
| RFC 1213 - MIB II | MIB for Network Management of TCP/IP-based internets. |
| RFC 2674 - Q-Bridge MIB (VLAN MIB) | VLAN Bridge MIB module for managing Virtual Bridged LANs, as defined by IEEE802.1Q-1998. |
| RFC 2819 - RMON (Group 1, 2, 3 & 9) | MIB module for managing remote monitoring device implementations. |
| RFC 2863 - Interface Group (IF) MIB | MIB module to describe generic objects for network interface sub-layers. |
| RFC 3411 - SNMP Management Frameworks | |
| RFC 3414 - User Based Security Model (USM) | MIB module for the SNMP User-based Security Model. |
| RFC 3415 - View Based Access Control Model (VACM) | MIB module for the View-based Access Control Model for SNMP, |
| RFC 3635 - EtherLike MIB | MIB module to describe generic objects for Ethernet-like network interfaces. |
| RFC 3636 - 802.3 Medium Attachment Units (MAUs) MIB | MIB module for 802.3 MAU. |
| RFC 4133 - Entity MIB | MIB module for representing multiple logical entities supported by a single SNMP agent. |
| RFC 4188 - Bridge MIB | Bridge MIB module for managing devices that support IEEE 802.1D |
| RFC4292-IP-Forwarding-MIB | |
| RFC4293-IP-MIB | |
| RFC4668 - RADIUS Authentication Client MIB | MIB module for entities implementing the client side of the RADIUS authentication protocol. |
| RFC4670-RADIUS-ACC-CLIENT-MIB | MIB module for entities implementing the client side of the |

| | |
|--|---|
| | RADIUS accounting protocol. |
| RFC 5519 - Multicast Group Membership Discovery (MGMD) MIB | MIB module for MGMD management (Obsoletes RFC 2933 and RFC 3019 MIBs) |
| IEEE 802.1 MSTP MIB | MIB module for managing devices that support IEEE 802.1 multiple spanning tree groups. |
| IEEE 802.1AB LLDP MIB | MIBs defined in 802.1AB. |
| IEEE 802.1X Port Access Entity (PAE) MIB | MIBs defined in 802.1X. |
| IEEE 802.1-Q-BRIDGE MIB | The VLAN Bridge MIB module for managing Virtual Bridged LANs, as defined by IEEE 802.1Q-2005. |
| IEEE 802.3ad Link Aggregation (LAG) MIB | MIBs defined in 802.3ad. |
| TIA 1057 LLDP Media Endpoint Discovery (MED) MIB | The LLDP MIB extension module for TIA-TR41.4 Media Endpoint Discovery information. |
| Private - SFLOW MIB | |

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