

ROLINE Gigabit Ethernet Switch,
6x (5xGbE + 1x Gbic (SFP)), managed

21.14.3523

Firmware Rev 1.0 up

Installation Guide

The information contained in this document is subject to change without prior notice.

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1. Introduction

The device is a 6-port Gigabit Ethernet switch which is featured with the following communication ports in a small footprint box:

- Five 10/100/1000Mbps Gigabit copper ports
- One dual-speed SFP slot for 100Base-FX 1000Base-X



Plug and Play

The switch is shipped with factory default configuration which behaves like an unmanaged Gigabit switch for workgroup. It provides five 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

The mini-GBIC SFP slot can be installed with an optional SFP optical fiber transceiver to support one Gigabit, or Fast Ethernet fiber connection when needed.

Web Management

The switch is embedded with an Http server which provides 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 over TCP/IP network.

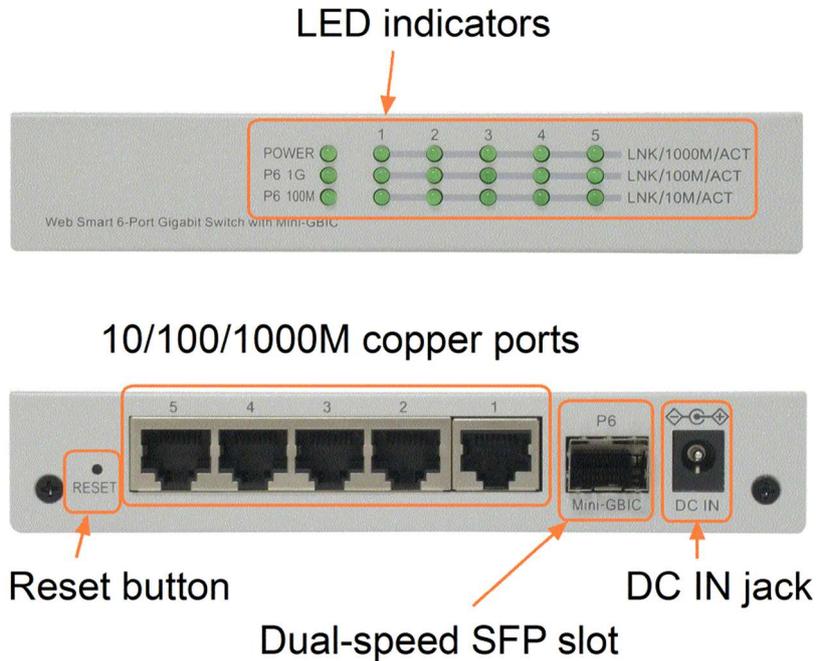
1.1 Features

- Five 10/100/1000Mbps RJ-45 and one dual-speed SFP slot
- All copper ports support auto-negotiation and auto-MDI/MDI-X detection.
- The SFP slot supports dual speed for 100BASE-FX and 1000BASE-X SFP transceivers.
- Full wire speed forwarding
- Supports 802.3x flow control for full-duplex and backpressure for half-duplex
- Supports SFP with Digital Diagnostic Monitoring (DDM)
- Provides Fiber Optical Power Alarm (OPA) function

- Provides Automatic Laser Shutdown (ALS) function
- Management:
 - HTTP/HTTPS/SSHv2/CLI telnet/SNMP v1/v2c/v3/RMON
 - DHCP/DHCPv6 client, DHCP relay, DNS client, NTPv4
 - IPv6 support, System Syslog, Configuration download/upload, Software upload
- Security:
 - NAS, 802.1X, MAC-based/Web/CLI authentication
 - IP MAC binding, TACACS+, IP source guard
- Layer 2:
 - QoS, 802.1Q/MAC-based/Protocol-based/Private/IP subnet VLAN, Port Isolation
 - Storm control for UC/MC/BC packets, Static MAC configuration
 - IGMP v2/v3 snooping, MLD v1/v2 snooping, DHCP snooping
 - Multiple Spanning Tree - MSTP, RSTP, STP
- Specific SNMP implementation:
 - Private MIB for reading DDM status
 - Private MIB for remote boot the device over SNMP
 - Private MIB for TFTP firmware update over SNMP
 - Private MIB for configuring OPA function
 - Private MIB for configuring ALS function
 - OPA alarm traps

1.2 Product Panels

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



1.3 LED Indicators

LED	Function
POWER	Power status
LNK/1000M/ACT	Network port 1000Mbps link status (Port 1 - Port 5)
LNK/100M/ACT	Network port 100Mbps link status (Port 1 - Port 5)
LNK/10M/ACT	Network port 10Mbps link status (Port 1 - Port 5)
P6 1G	Port 6 1000Mbps link status
P6 100M	Port 6 100Mbps link status

1.4 Specifications

10/100/1000 Copper Ports (Port 1 ~ Port 5)

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 Slot (Port 6)

Compliance	IEEE 802.3u 100Base-FX IEEE 802.3z 1000Base-SX/LX (mini-GBIC)
Connectors	SFP for optional SFP type fiber transceivers
Configuration	Auto 1000Mbps, Full duplex Forced 100Mbps, Full duplex
Transmission rate	100Mbps and 1000Mbps
Network cables	MMF 50/125 62.5/125, SMF 9/125
Eye safety	IEC 825 compliant

Switch Functions

MAC Addresses Table	8K entries
Forwarding & filtering	Non-blocking, full wire speed
Switching technology	Store and forward
Maximum packet length	9.6K bytes
IP Multicast groups	8192 supported
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 4095 VLANs supported, IVL support
QoS function	Port-based, 802.1p-based, IP DSCP-based
Port control	Port configuration control via software management
Storm control	Broadcast, Multicast storm protection control via software management
Aggregation	Link aggregation (port trunking)
Port Mirroring	Mirror receives frames to a sniffer port

Software Management Functions

Interfaces	Web browser
Management objects	System configuration - IP settings, Name, Password Port configuration control and status, VLAN function settings Port Link Aggregation function settings Link Aggregation LACP settings, RSTP settings 802.1X port access control, Port mirroring settings QoS function settings, Storm protection control settings Port statistic, LACP status, RSTP status Configuration file backup and restore Reboot, restore factory default, update firmware

DC Power Input

Interfaces	DC Jack (-D 6.3mm / + D 2.0mm)
Operating Input Voltages	+5V - 30VDC(+/-5%) via external power adapter
Power consumption	5.4W @12V (DC IN) 6W @5V (DC IN)

Mechanical

Dimension (base)	144 x 104.5 x 26 mm
Housing	Enclosed metal with no fan
Mounting	Desktop mounting, wall mounting

Environmental

Operating Temperature	Typical -10°C ~ +45°C (Main device) (* The operating temperature range of the bundled power adapter may differ from the temperature range of the main device.)
Storage Temperature	-40°C ~ +85°C
Relative Humidity	5% ~ 95%

2. Installation

2.1 Unpacking

The product package contains:

- The switch unit
- One power adapter
- One product CD-ROM

2.2 Safety Cautions

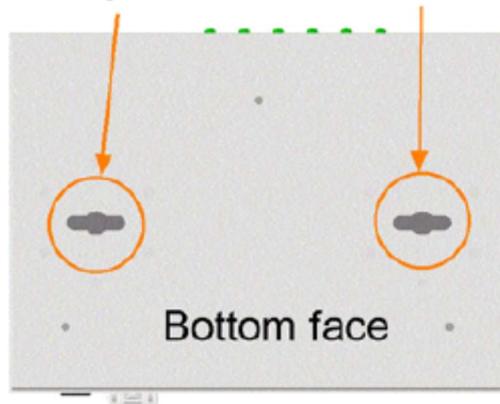
To reduce the risk of bodily injury, electrical shock, fire and damage to the product, observe the following precautions:

	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: <ul style="list-style-type: none">- 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

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

Mounting holes for wall mounting



2.4 Applying Power

Before you begin the installation, check the AC voltage of your area. The AC power adapter which is used to supply the DC power for the unit should have the AC voltage matching the commercial power voltage in your area.

The AC Power Adapter Specifications



AC input:	AC power voltage of your area - AC100V, 120V, 230V, 240V
DC output:	DC5V / DC7.5V / DC12V / DC24V
Power:	9W min.

Steps to apply the power to the product are:

1. Connect power adapter DC plug to the DC input jack located on the back of the unit before connecting to the AC outlet.
2. Connect the power adapter to the AC outlet.
3. Check Power LED indication.

Note: Before you begin the installation, check the AC voltage of your area. The AC power adapter which is used to supply the DC power for the unit should have the AC voltage matching the commercial power voltage in your area.

2.5 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 5 seconds when power up	Restore all factory default settings
Press the button and release during switch operation	Reboot the switch

2.6 Making UTP Connections

The 10/100/1000 RJ-45 copper ports supports 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 is connected, the ports can sense the receiving pair automatically and configure itself 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.

2.7 Making Fiber Connection

The dual-speed SFP slot must be installed with an SFP fiber transceiver for making fiber connection. Your switch may come with one SFP transceiver pre-installed when it is shipped.

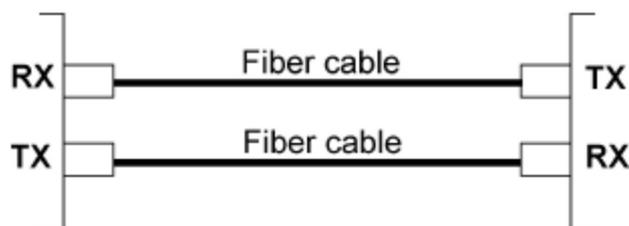
Installing SFP Fiber Transceiver

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.
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. 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) - 50/125, 62.5/125

Single mode (SMF) - 9/125

Port Speed Configuration

There are three options for configuring port speed via software for the SFP Port. The options are:

Port Mode	Description
Auto	Auto-detection for the type of the installed SFP transceiver by reading DDM data 100Mbps transceiver: Non-auto-negotiation (forced), 100Mbps, full duplex 1000Mbps transceiver: Auto-negotiation, 1000Mbps, full duplex
100 Mbps FDX	Non-auto-negotiation (forced), 100Mbps, full duplex
1 Gbps FDX	Auto-negotiation, 1000Mbps, full duplex

2.8 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.
LNK/1000M/ACT	Port link status	ON	A 1000M link is established. (No traffic)
		BLINK	Port link is up and there is traffic.
		OFF	Port link is down.
LNK/100M/ACT	Port link status	ON	A 100M link is established. (No traffic)
		BLINK	Port link is up and there is traffic.
		OFF	Port link is down.
LNK/10M/ACT	Port link status	ON	A 10M link is established. (No traffic)
		BLINK	Port link is up and there is traffic.
		OFF	Port link is down.
P6 1G	Port 6 1G link status	ON	A 1000Mbps link is established on Port 6.
		BLINK	Port 6 link is up and there is traffic.
		OFF	Port 6 link is down.
P6 100M	Port 6 100M link status	ON	A 100Mbps link is established on Port 6.
		BLINK	Port 6 link is up and there is traffic.
		OFF	Port 6 link is down.

3. Manage the Switch

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

- Making in-band management via web interface over TCP/IP network
- Making in-band management via telnet CLI 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 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 telnet

[IP Address] setting command is in IP command group.

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

Parameters:

<ip_addr>	: IP address (a.b.c.d)
<ip_mask>	: IPv4 subnet mask (a.b.c.d)
<ip_router>	: IPv4 router (a.b.c.d)
<vid>	: VLAN ID (1-4095)

[IPv6 Address] setting command is also in IP command group.

```
>IP IPv6 Setup [<ipv6_addr>] [<ipv6_prefix>] [<ipv6_router>]
```

Parameters:

<ipv6_addr>	: IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separates each field (:).
<ipv6_prefix>	: IPv6 subnet mask

<ipv6_router> : IPv6 router

[Password] setting command is also in Security/Switch/Users command group.

Security Switch Users Configuration

Security Switch Users Add <user_name> <password> <privilege_level>

Security Switch Users Delete <user_name>

Refer to “Operation manual for telnet management”.

3.3 Configuring IP Address 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:

Default username: **admin**

Default password: ↵

No password is required.

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

Web Page after a Successful Login

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

IP Configuration

	Configured	Current
DHCP Client	<input type="checkbox"/>	<input type="button" value="Renew"/>
IP Address	192.168.0.179	192.168.0.179
IP Mask	255.255.255.0	255.255.255.0
IP Router	0.0.0.0	0.0.0.0
VLAN ID	1	1
DNS Server	0.0.0.0	0.0.0.0

IP DNS Proxy Configuration

DNS Proxy

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.
DNS Server	Provide the IP address of the DNS Server in dotted decimal notation.
DNS Proxy	When DNS proxy is enabled, DUT will relay DNS requests to the current configured DNS server on DUT, and reply as a DNS resolver to the client device

on the network.

Save

Click to save the changes.

Reset

Click to undo any changes made locally and revert to previously saved values.

Renew

Click to renew DHCP. This button is only available if DHCP is enabled.

3.4 Reference Manuals for Web and Telnet Management

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

Operation manual - telnet 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 IPv6 Destination [<ipv6_addr>]
>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

Select [Configuration] -> [Security] -> [SNMP]:



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 2674 - QBridge MIB (VLAN MIB)
- RFC 2819 - RMON (Group 1, 2, 3 & 9)
- RFC 2863 - Interface Group (IF) MIB
- RFC 3411 - SNMP Management Frameworks
- RFC 3414 - User Based Security Model (USM)
- RFC 3415 - View Based Access Control Model (VACM)
- RFC 3621 - Power Ethernet MIB
- RFC 3635 - EtherLike MIB
- RFC 3636 - 802.3 Medium Attachment Units (MAUs) MIB
- RFC 4133 - Entity MIB
- RFC 4188 - Bridge MIB
- RFC 4668 - RADIUS Authentication Client MIB
- RFC 5519 - Multicast Group Membership Discovery (MGMD) MIB
- IEEE 802.1 MSTP MIB
- IEEE 802.1AB LLDP MIB

- IEEE 802.1X Port Access Entity (PAE) MIB
- TIA 1057 LLDP Media Endpoint Discovery (MED) MIB
- IEEE 802.1-Q-BRIDGE MIB
- Private SFPDDM MIB (Read DDM status of the SFP ports)
- Private reboot MIB (Remote boot over SNMP)
- Private TFTP firmware update MIB (TFTP Firmware update over SNMP)
- Private OPA function MIB (OPA configuration for the SFP ports)
- Private ALS function MIB (ALS configuration for the SFP ports)

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

3.6.1 SNMP Traps

In addition to the SNMP standard traps, the device is equipped with private OPA alarm traps.

The traps are:

- Alarm trap – SFP port TX power lower than the minimal value
- Alarm trap – SFP port TX power higher than the maximal value
- Normal trap – SFP port TX power back to normal (higher than the minimal value)
- Normal trap – SFP port TX power back to normal (lower than the maximal value)