Multiple SFP Fiber Port Switch for Long-Reach Network

This switch is ideal for all long-reach network customers, such as enterprises, telecoms, campuses and service providers as it comes with advanced management functions, and 16 100/1000Mbps dual speed SFP Fiber ports and 8 10/100/1000Mbps TP ports with a rugged case. It is capable of providing non-blocking switch fabric and wire-speed throughput of as high as 48Gbps without any packet loss and CRC error. Thus, it is certainly a must for those who want to further upgrade their existing network infrastructures to a level where bandwidth demands can be met. Furthermore, it adopts user-friendly “Front Access” design for easy wiring and maintenance of the switch when placed in the cabinet.

Flexibility and Extension Solution

The 16 mini-GBIC slots built in the switch support dual speed as it features 100BASE-FX and 1000BASE-SX/LX SFP (Small Form-factor Pluggable) fiber-optic modules. The administrator can flexibly choose the suitable SFP transceiver when considering transmission distance and speed. The distance can be extended from 550 meters to 2km for multi-mode fiber, and up to 10/20/30/40/70/120 kilometers for single-mode fiber or WDM fiber. This switch is well suited for applications within the enterprise data centers and distributions.

Intelligent SFP Diagnosis Mechanism

This switch supports SFP-DDM (Digital Diagnostic Monitor) function that greatly helps network administrator to easily monitor real-time parameters of the SFP, such as optical output power, optical input power, temperature, laser bias current, and transceiver supply voltage.

![Digital Diagnostic Monitor (DDM)](image-url)
AC and DC Redundant Power to Ensure Continuous Operation
This switch is equipped with one 100~240V AC power supply unit and one additional 36~60V DC power supply unit for redundant power supply installation. A redundant power system is also provided to enhance the reliability with either AC or DC power supply unit. The redundant power system is specifically designed to handle the demands of high-tech facilities requiring the highest power integrity. Furthermore, with the 36~60V DC power supply implemented, the This switch can be applied as the telecom level device.

Effective Alarm Alert for Better Protection
This switch supports a Fault Alarm feature which can alert the users when there is something wrong with the switches. With this ideal feature, the users would not have to waste time to find where the problem is. It will help to save time and human resource.

Digital Input and Digital Output for External Alarm
This switch helps the network administrators efficiently manage the unexpected network situations by providing Digital Input and Digital Output for external alarm device on the front panel. The Digital Input can be used to detect and log the status of the external devices such as door intrusion detector. The Digital Output could be used to send alarm whenever the switch has port link-down or power failure.

IPv6 / IPv4 Dual Stack
Supporting both IPv6 and IPv4 protocols, the switch helps data centers, campuses, telecoms, and more to experience the IPv6 era with the lowest investment as its network facilities need not to be replaced or overhauled if the IPv6 FTTx edge network is set up.
Layer 3 IPv4 and IPv6 VLAN Routing for Secure and Flexible Management

This switch not only provides ultra high transmission performance, and excellent layer 2 and layer 4 technologies, but also layer 3 IPv4/IPv6 VLAN routing feature which allows to crossover different VLANs and different IP addresses for the purpose of having a highly-secured, flexibly-managed and simple networking application.

Robust Layer 2 Features

This switch can be programmed for advanced switch management functions such as dynamic port link aggregation, Q-in-Q VLAN, private VLAN, Multiple Spanning Tree Protocol (MSTP), Layer 2 to Layer 4 QoS, bandwidth control and IGMP/MLD Snooping. Via the link aggregation of supporting ports, the switch allows the operation of a high-speed trunk to combine with multiple fiber ports and supports fail-over as well.

Powerful Security

This switch offers a comprehensive layer 2 to layer 4 Access Control List (ACL) for enforcing security to the edge. It can be used to restrict network access by denying packets based on source and destination IP address, TCP/UDP ports or defined typical network applications. Its protection mechanism also comprises 802.1X Port-based and MAC-based user and device authentication. With the private VLAN function, communication between edge ports can be prevented to ensure user privacy. The switch also provides DHCP Snooping, IP Source Guard and Dynamic ARP Inspection functions to prevent IP snooping from attack and discard ARP packets with invalid MAC address. The network administrators can now construct highly-secured corporate networks with considerably less time and effort than before.

Excellent Traffic Control

This switch is loaded with powerful traffic management and QoS features to enhance connection services by telecoms and ISPs. The QoS features include wire-speed Layer 4 traffic classifiers and bandwidth limit that are particular useful for multi-tenant unit, multi-business unit, Telco, or network service provider’s applications. It also empowers the enterprises to take full advantage of the limited network resources and guarantees the best performance in VoIP and video conferencing transmission.

Efficient and Secure Management

With built-in Web-based management interface, the switch L2+ Managed Switch offers an easy-to-use, platform-independent management and configuration facility which includes Console, Web and SNMP management interfaces. The SNMP can be managed via any management software based on the standard of SNMP protocol. For reducing product learning time, it offers Cisco-like command via Telnet or console port and customer does not need to learn new console command. Moreover, it also offers secure remote management by supporting SSH, SSL and SNMP v3 connections which encrypt the packet content at each session.
Applications

Optimized Design for Metropolitan Area Network

By means of improving the technology of Optical Fiber Ethernet with highly-flexible, highly-extendable and easy-to-install features, the switch offers up to 1Gbps data exchange speed via Optical Fiber interface and an extended transmission distance of up to 120km. The unit is the ideal solution for service providers, such as ISPs and telecoms, to build Metropolitan Area Network (MAN) based on the fiber technology and the WAN Internet Service.

Metropolitan Area Network Application

Excellent Solution to Core / Department Switch

This switch is an excellent choice of core layer switch for a Gigabit network. With 24 Gigabit ports, it is able to connect up to 24 edge switches in the Ethernet environment. Moreover, it also provides 48 Gigabit per second switch fabric and high bandwidth for backbone connection.
Enhanced Protection via Digital Input and Digital Output

This switch features digital input and digital output functions that greatly help the administrator efficiently react to the emergency events. The digital input can be set up to indicate urgent events and send the messages or alarm to the network system once an unusual event is detected by an external device such as door or window open detector. The digital output function can define the immediate response such as port failure or power failure to the related urgent events.

**Digital Input**

- **Security OK!!**
  - Enclosure
  - Door Detector (Door Closed)

- **Alarm Warning**
  - Enclosure
  - Door Detector (Door Open)

- **Alarm Messaging**
  - Mail
  - System Log
  - SNMP TRAP

**Digital Output**

- **AC Power Failure**
- **DC Power Failure**

- **RJ45 Cable Link Down**
- **Fiber Cable Link Down**
**Product Features**

- **Physical Port**
  - 16 100/1000BASE-X mini-GBIC/SFP slots
  - 8 10/100/1000BASE-T RJ45 copper ports
  - RJ45 to RS232 DB9 console interface for basic management and setup

- **Hardware Conformance**
  - 36 to 60V DC, redundant power with polarity reverse protect function
  - 0 to 60 degrees C operating temperature
  - 19-inch rack-mountable
  - Relay alarm for port breakdown, power failure
  - Two built-in thermal fans

- **Layer 2 Features**
  - Prevents packet loss with back pressure (half-duplex) and IEEE 802.3x pause frame flow control (full-duplex)
  - High performance of Store-and-Forward architecture, and runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
  - Storm control support
    - Broadcast / Unicast / Unknown unicast
  - Supports **VLAN**
    - IEEE 802.1Q tagged VLAN
    - Up to 255 VLANs groups, out of 4095 VLAN IDs
    - Provider Bridging (VLAN Q-in-Q) support (IEEE 802.1ad)
    - Private VLAN Edge (PVE)
    - Protocol-based VLAN
    - MAC-based VLAN
    - IP subnet-based VLAN
    - Voice VLAN
  - Supports **Spanning Tree Protocol**
    - STP, IEEE 802.1D Spanning Tree Protocol
    - RSTP, IEEE 802.1w Rapid Spanning Tree Protocol
    - MSTP, IEEE 802.1s Multiple Spanning Tree Protocol, spanning tree by VLAN
    - BPDU Guard
  - Supports **Link Aggregation**
    - 802.3ad Link Aggregation Control Protocol (LACP)
    - Cisco ether-channel (static trunk)
    - Maximum 24 trunk groups, with 8 ports for each trunk
    - Up to 16Gbps bandwidth (full duplex mode)
  - Provides port mirror (many-to-1)
  - Port mirroring monitors the incoming or outgoing traffic on a particular port
  - Loop protection to avoid broadcast loops
Layer 3 IP Routing Features

- Supports 128 VLAN interfaces maximum
- Supports maximum 32 static routes and route summarization

Quality of Service

- Ingress shaper and egress rate limit per port bandwidth control
- 8 priority queues on all switch ports
- Traffic classification
  - IEEE 802.1p CoS
  - ToS / DSCP / IP Precedence of IPv4/IPv6 packets
  - IP TCP/UDP port number
  - Typical network application
- Strict priority and Weighted Round Robin (WRR) CoS policies
- Traffic-policing policies on the switch port
- DSCP remarking

Multicast

- Supports IGMP snooping v1, v2 and v3
- Supports MLD snooping v1 and v2
- Querier mode support
- IGMP snooping port filtering
- MLD snooping port filtering
- MVR (Multicast VLAN Registration)

Security

- Authentication
  - IEEE 802.1x port-based / MAC-based network access authentication
  - IEEE 802.1x authentication with guest VLAN
  - Built-in RADIUS client to cooperate with the RADIUS servers
  - RADIUS / TACACS+ users access authentication
- Access Control List
  - IP-based Access Control List (ACL)
  - MAC-based Access Control List (ACL)
- Source MAC / IP address binding
- DHCP Snooping to filter distrusted DHCP messages
- Dynamic ARP Inspection discards ARP packets with invalid MAC address to IP address binding
- IP Source Guard prevents IP spoofing attacks
- IP address access management to prevent unauthorized intruder
Management
- IPv4 and IPv6 dual stack management
- Switch Management Interfaces
  - Console / Telnet command line interface
  - Web switch management
  - SNMP v1, v2c, and v3 switch management
  - SSH / SSL secure access
- IPv6 address / NTP management
- Built-in Trivial File Transfer Protocol (TFTP) client
- BOOTP and DHCP for IP address assignment
- System Maintenance
  - Firmware upload / download via HTTP / TFTP
  - Reset button for system reboot or reset to factory default
  - Dual images
- DHCP relay and option 82
- User privilege levels control
- NTP (Network Time Protocol)
- Link Layer Discovery Protocol (LLDP) and LLDP-MED
- Network diagnostic
  - SFP-DDM (Digital Diagnostic Monitor)
  - Cable diagnostic technology provides the mechanism to detect and report potential cabling issues
  - ICMPv6 / ICMPv4 remote ping
- SMTP / Syslog remote alarm
- Four RMON groups (history, statistics, alarms and events)
- SNMP trap for interface link up and link down notification
- System Log
- PLANET Smart Discovery Utility for deploy management

Redundant Power System
- 100~240V AC / 36~60V DC dual power redundancy
- Active-active redundant power failure protection
- Backup of catastrophic power failure on one supply
- Fault tolerance and resilience

Digital Input / Digital Output
- 2 Digital Input (DI)
- 2 Digital Output (DO)
- Integrates sensors into auto alarm system
- Transfers alarm to IP network via email and SNMP trap
## Product Specifications

<table>
<thead>
<tr>
<th>Product</th>
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<tbody>
<tr>
<td><strong>Hardware Specifications</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Hardware Version</strong></td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Copper Ports</strong></td>
<td>8 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports</td>
</tr>
<tr>
<td><strong>SFP/mini-GBIC Slots</strong></td>
<td>16 100/1000BASE-X SFP interfaces Compatible with 100BASE-FX SFP transceiver</td>
</tr>
<tr>
<td><strong>Console</strong></td>
<td>1 x RS232-to-RJ45 serial port (115200, 8, N, 1)</td>
</tr>
<tr>
<td><strong>Switch Architecture</strong></td>
<td>Store-and-Forward</td>
</tr>
<tr>
<td><strong>Switch Fabric</strong></td>
<td>48Gbps</td>
</tr>
<tr>
<td><strong>Throughput</strong></td>
<td>35.6Mpps@64Bytes</td>
</tr>
<tr>
<td><strong>Address Table</strong></td>
<td>16K entries, automatic source address learning and ageing</td>
</tr>
<tr>
<td><strong>Shared Data Buffer</strong></td>
<td>16M bits</td>
</tr>
<tr>
<td><strong>Flow Control</strong></td>
<td>IEEE 802.3x pause frame for full-duplex Back pressure for half-duplex</td>
</tr>
<tr>
<td><strong>Jumbo Frame</strong></td>
<td>10K bytes</td>
</tr>
<tr>
<td><strong>Reset Button</strong></td>
<td>&lt; 5 sec: System reboot</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 sec: Factory default</td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H)</strong></td>
<td>440 x 200 x 44.5 mm, 1U height</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>3kg</td>
</tr>
</tbody>
</table>

### LED

- **System:** PWR (Green), DC1 (Green), DC2 (Green), Fault (Red)
- **10/100/1000T RJ45 Combo Interfaces** (Port 1 to Port 8):
  - 1000Mbps LNK/ACT (Green)
  - 10/100Mbps LNK/ACT (Orange)
- **100/1000Mbps SFP Interfaces** (Port 9 to Port 24):
  - 1000Mbps LNK/ACT (Green)
  - 100Mbps LNK/ACT (Orange)

### Power Consumption

- Max. 38 Watts/130 BTU (AC input)
- Max. 37.8 Watts/129 BTU (DC input)

### Power Requirements – AC

- AC 100~240V, 50/60Hz 0.75A

### Power Requirements – DC

- 48V DC @ 1.1A, Range: 36V ~ 60V DC

### DI/DO

- 2 Digital Input (DI):
  - Level 0: -24~2.1V
  - Level 1: 2.1~24V
  - Max. input current: 10mA
- 2 Digital Output (DO): Open collector to 24VDC, 100mA

### ESD Protection

- 6KV DC

### Fan

- 2 x smart fan

### Layer 2 Management Functions

#### Port Configuration

- Port disable / enable
- Auto-negotiation 10/100/1000Mbps full and half duplex mode selection
- Flow control disable / enable

#### Port Status

- Display each port’s speed duplex mode, link status, flow control status, auto-negotiation status, trunk status

#### Port Mirroring

- TX / RX / Both
- Many-to-1 monitor
| VLAN | 802.1Q tagged based VLAN  
Private VLAN  
MAC-based VLAN  
Protocol-based VLAN  
Voice VLAN  
IP Subnet-based VLAN  
MVR (Multicast VLAN registration)  
Up to 255 VLAN groups, out of 4095 VLAN IDs |
|---|---|
| Link Aggregation | IEEE 802.3ad LACP / static trunk  
24 groups of 8-port trunk supported |
| Spanning Tree Protocol | STP, IEEE 802.1D Spanning Tree Protocol  
RSTP, IEEE 802.1w Rapid Spanning Tree Protocol  
MSTP, IEEE 802.1s Multiple Spanning Tree Protocol |
| QoS | Traffic classification based, Strict priority and WRR  
8-level priority for switching:  
- Port Number  
- 802.1p priority  
- 802.1Q VLAN tag  
- DSCP/ToS field in IP packet |
| IGMP Snooping | IGMP (v1 / v2 / v3) Snooping, up to 255 multicast groups  
IGMP Querier mode support |
| MLD Snooping | MLD (v1 / v2) Snooping, up to 255 multicast groups  
MLD Querier mode support |
| Access Control List | IP-based ACL / MAC-based ACL  
Up to 256 entries |
| Bandwidth Control | Per port bandwidth control  
Ingress: 100Kbps~1000Mbps  
Egress: 100Kbps~1000Mbps |
| Layer 3 Functions | Max. 128 VLAN interfaces |
| IP Interfaces | Max. 32 routing entries |
| Routing Table | IPv4 hardware static routing  
IPv6 hardware static routing |
| Routing Protocols | IPv4 hardware static routing  
IPv6 hardware static routing |
| Management | Basic Management Interfaces  
Console / Telnet / Web browser / SNMP v1, v2c |
| Secure Management Interfaces | SSH, SSL, SNMPv3 |
| SNMP MIBs | RFC 1213 MIB-II  
RFC 1493 Bridge MIB  
RFC 1643 Ethernet MIB  
RFC 2863 Interface MIB  
RFC 2665 Ether-Like MIB  
RFC 2819 RMON MIB (Group 1, 2, 3 and 9)  
RFC 2737 Entity MIB |
| Standards Conformance | RFC 2618 RADIUS Client MIB  
RFC 2863 IF-MIB  
RFC 2933 IGMP-STD-MIB  
RFC 3411 SNMP-Frameworks-MIB  
RFC 4292 IP Forward MIB  
RFC 4293 IP MIB  
RFC 4836 MAU-MIB  
IEEE 802.1X PAE  
LLDP |
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<tr>
<th>Regulation Compliance</th>
<th>FCC Part 15 Class A, CE</th>
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<tr>
<td>Standards Compliance</td>
<td>IEEE 802.3 10BASE-T</td>
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<tr>
<td></td>
<td>IEEE 802.3u 100BASE-TX/100BASE-FX</td>
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<td></td>
<td>IEEE 802.3z Gigabit SX/LX</td>
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<td></td>
<td>IEEE 802.3ab Gigabit 1000T</td>
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<tr>
<td></td>
<td>IEEE 802.3x flow control and back pressure</td>
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<tr>
<td></td>
<td>IEEE 802.3ad port trunk with LACP</td>
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<tr>
<td></td>
<td>IEEE 802.1D Spanning Tree Protocol</td>
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<td>IEEE 802.1w Rapid Spanning Tree Protocol</td>
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<td>IEEE 802.1s Multiple Spanning Tree Protocol</td>
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<td>IEEE 802.1p Class of Service</td>
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<td>IEEE 802.1Q VLAN tagging</td>
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<td>IEEE 802.1X Port Authentication Network Control</td>
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<td>IEEE 802.1ab LLDP</td>
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<td></td>
<td>RFC 768 UDP</td>
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<td>RFC 793 TFTP</td>
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<td>RFC 791 IP</td>
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<td>RFC 792 ICMP</td>
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<tr>
<td></td>
<td>RFC 2068 HTTP</td>
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<tr>
<td></td>
<td>RFC 1112 IGMP version 1</td>
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<td>RFC 2236 IGMP version 2</td>
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<td>RFC 3376 IGMP version 3</td>
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<tr>
<td></td>
<td>RFC 2710 MLD version 1</td>
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<td></td>
<td>RFC 3810 MLD version 2</td>
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<td><strong>Storage</strong></td>
</tr>
<tr>
<td>Temperature:</td>
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<tr>
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