FSW-1641TX/2441TX

16/24 10/100Base-TX Web Smart Switch

User Guide

FSW-1641TX   16 port 10/100Base-TX Web Smart Switch

FSW-2441TX   24 port 10/100Base-TX Web Smart Switch

Contents

1. Product Introduction

LevelOne FSW-1641TX/2441TX, 16/24 10/100Base-TX Web Smart Switch, is a multi-port Switch that can be used to build high-performance switched workgroup networks. This switch is a store-and-forward device that offers low latency for high-speed networking and allows the switch to auto-learn and store source address in a 4K-entry MAC address table. The switch is targeted at workgroup, department or backbone computing environment. The 16/24 10/100Base-TX Web Smart Switch has 16 or 24 auto-sensing 10/100Base-TX RJ-45 ports.

Key Features

- Conforms to IEEE 802.3, 802.3u and 802.3x
- 16 or 24 10/100BASE-TX Web-smart switch with default button
- IEEE802.3x Flow control:
  - ➢ Pause-frame for full duplex mode
  - ➢ Backpressure for half duplex mode
- Auto-MDIX on all ports
- N-way Auto-Negotiation
- Store-and-Forward switching architecture and no-blocking full wire speed
- Support switch back plane
  - ➢ 16 port: 3.2 Gbps
  - ➢ 24 port: 4.8 Gbps
- 4K-entry MAC address table
- Port Based priority supported
- Support PortBase VLAN
- Embedded 1.25 Mbits memory buffer
- Port Trunking supported
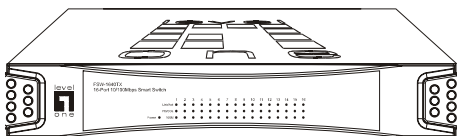- 11" desktop design and internal power

Software Features

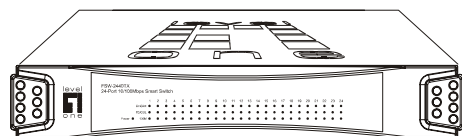| Management	Web interface management
Port configuration	Link speed, Link mode, Port disable/Enable, Port Flow control disable/Enable, Port Auto negotiation
Port Base VLAN	Port Based VLAN, VLAN entry up to 16/24 groups
Port Based Priority	System provide 2 queues for High and Low priority.
Port Trunk	Any port could be assigned to the trunking port. Per trunk group up to four members.
Firmware Update	Bootp firmware upgrade

Package Contents

Unpack the contents of the FSW-1641TX/2441TX and verify them against the checklist below.

- FSW-1641TX/2441TX Web Smart Switch
- Power Cord
- Four Rubber Feet
- User Guide
- Rack mount kit
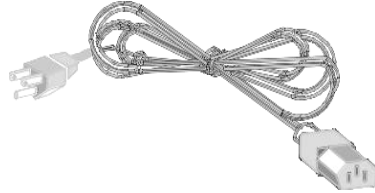

16-port 10/100Base-TX Web Smart Switch   **24-port 10/100Base-TX Web Smart Switch**

Four Rubber Feet   **Rack-mounted Kit**

Power Cord   **This User Guide**

Figure 1-2. Package Contents

Compare the contents of the Switch package with the standard checklist above. If any item is missing or damaged, please contact your local dealer for service.

Ethernet Switching Technology

Ethernet Switching Technology dramatically boosted the total bandwidth of a network, eliminated congestion problems inherent with CSMA/CD (Carrier Sense multiple access with Collision Detection) protocol, and greatly reduced unnecessary transmissions.

This revolutionized networking. First, by allowing two-way, simultaneous transmissions over the same port (Full-duplex), which essentially doubled the bandwidth. Second, by reducing the collision domain to a single switch-port, which eliminated the need for carrier sensing. Third, by using the store-and-forward technology's approach of inspecting each packet to intercept corrupt or redundant data, switching eliminated unnecessary transmission that slow the network. By employing address learning, which replaced the inefficient receiving port.

Auto-negotiation regulates the speed and duplex of each port, based on the

capability of both devices. Flow-control allows transmission from a 100Mbps node to a 10Mbps node without loss of data. Auto-negotiation and flow-control may require disablement for some networking operations involves legacy equipment. Disabling the auto-negotiation is accomplished by fixing the speed or duplex of a port.

Ethernet Switching Technology supplied higher performance at costs lower than other solutions. Wider bandwidth, no congestion, and the reduction in traffic is why switching is replacing expensive routers and inefficient hubs as the ultimate networking solution. Switching brought a whole new way of thinking to networking.

2. Hardware Description

This Section mainly describes the hardware of the FSW-1641TX/2441TX Web Smart Switch, and gives a physical and functional overview of this Module Switch.

Physical Dimension

The FSW-1641TX/2441TX Web Smart Switch's physical dimension is **266mm x 193mm x 44mm (Lx W x H)**.

Front Panel

The Front Panel of the FSW-1641TX/2441TX Web Smart Switch consists LED Indicators.
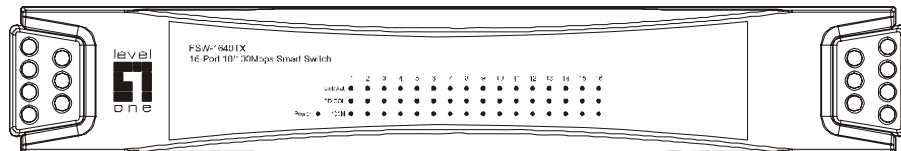

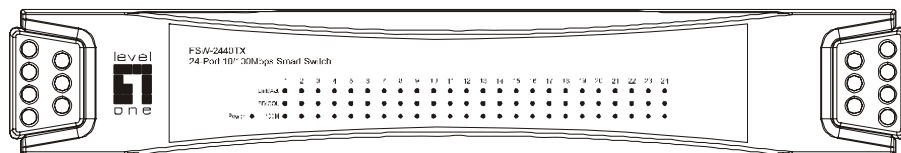Figure 2-1. The Front panel of the FSW-1641TX 16-port 10/100Base-TX Web Smart Switch

Figure 2-2. The Front panel of the FSW-2441TX 24-port 10/100Base-TX Web Smart Switch

LED Indicators

The LED Indicators gives real-time information of systematic operation status. The following table provides descriptions of LED status and their meaning.

LED	Status	Description
Power	Green	Power On
	Off	Power is not connected
100M	Green	In 100Mbps connection speed
	Off	In 10Mbps connection speed or no device connect
LNK/ACT	Green	The port is connecting with the device.
	Blinks	The port is receiving or transmitting data.
	Off	No device attached.
FDX/COL	Green	The port is operating in Full-duplex mode.
	Blinks	Collision of Packets occurs in the port.
	Off	In half-duplex mode

Table 2-1. The Description of LED Indicators

Rear Panel

The 3-pronged power plug, default button, and 16 or 24 RJ-45 Ethernet ports are located at the rear Panel of the 16/24 10/100Base-TX Web Smart Switch. The Switch will work with AC in the range 100-240V AC, 50-60Hz.

RJ-45 Ports (Auto MDI/MDIX): 16 or 24x 10/100 N-way auto-sensing for 10Base-T or 100Base-TX connections.
[In general, **MDI** means connecting to another Hub or Switch while **MDIX** means connecting to a workstation or PC. Therefore, **Auto MDI/MDIX** means that you can connect to another Switch or workstation without changing non-crossover or crossover cabling.]

Default Button: press the button that all system value will reset to default.
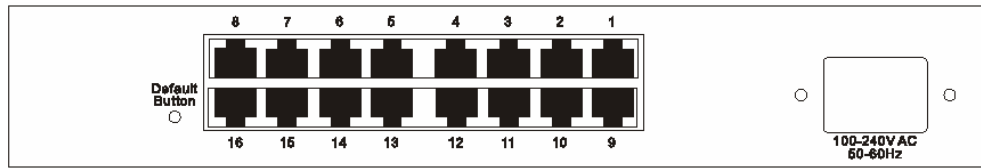

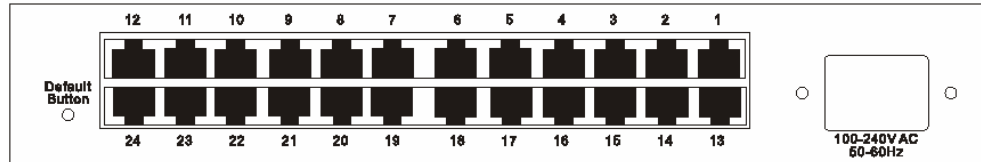Figure 2-2. The Rear Panel of FSW-1641TX Web Smart Switch

Figure 2-2. The Rear Panel of FSW-2441TX Web Smart Switch

Desktop Installation

Set the Switch on a sufficiently large flat space with a power outlet nearby. The surface where you put your Switch should be clean, smooth, level and sturdy. Make sure there is enough clearance around the Switch to allow attachment of cables, power cord and allow air circulation.

Attaching Rubber Feet

A. Make sure mounting surface on the bottom of the Switch is grease and dust free.
B. Remove adhesive backing from your Rubber Feet.
C. Apply the Rubber Feet to each corner on the bottom of the Switch. These footpads can prevent the Switch from shock/vibration.
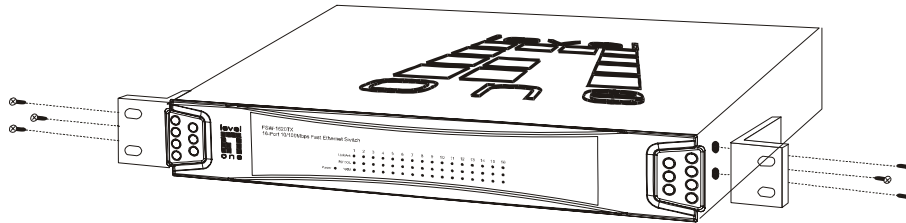
Rack-mounted Installation

The FSW-1641TX/2441TX ,16/24 10/100Base-TX Web Smart Switch, come with a rack-mounted kid and can be mounted in an EIA standard size, 19-inch
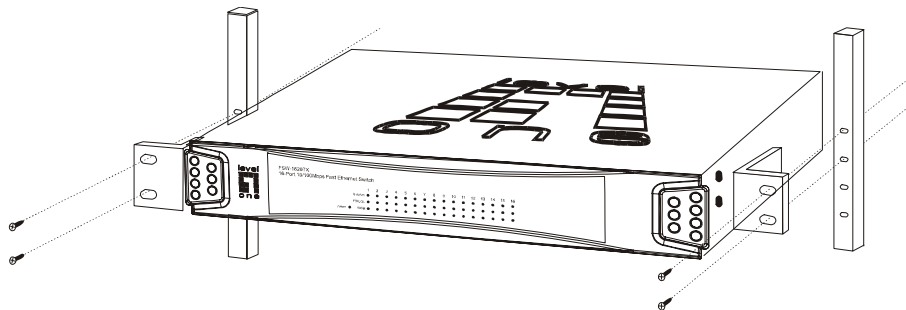
Rack. The Switch can be placed in a wiring closet with other equipment. Perform the following steps to rack mount the switch:

A.   Position one bracket to align with the holes on one side of the switch and secure it with the smaller bracket screws. Then attach the remaining bracket to the other side of the Switch.

B.   After attached mounting brackets, position the Switch in the rack by lining up the holes in the brackets with the appropriate holes on the rack. Secure the Switch to the rack with a screwdriver and the rack-mounting screws.

Note: For proper ventilation, allow about at least 4 inches (10 cm) of clearance on the front and 3.4 inches (8 cm) on the back of the Switch. This is especially important for enclosed rack installation.

Power On

Connect the power cord to the power socket on the rear panel of the Switch. The other side of power cord connects to the power outlet. The internal power

supply of the Switch works with voltage range of AC in the 100-240VAC, frequency 50~60Hz. Check the power indicator on the front panel to see if power is properly supplied.

3. Network Application

This section provides you a few samples of network topology in witch the Switch is used. In general, FSW-1641TX/2441TX Web Smart Switch is designed as a segment switch. That is, with its address table (4k MAC address) and high performance, it is ideal for interconnecting networking segments.

PC, workstations, and servers can communicate each other by directly connecting with FSW-1641TX/2441TX Web Smart Switch. The switch automatically learns nodes address, which are subsequently used to filter and forward all traffic based on the destination address.

By using Uplink port, the Switch can connect with another switch or hub to interconnect other small-switched workgroups to form a larger switched network.

Small Workgroup

The FSW-1641TX/2441TX Web Smart Switch can be used as a standalone switch to which personal computers, server, printer server, are directly connect to form small workgroup.

Segment Bridge

For enterprise networks where large data broadcasts are constantly processed, this switch is an ideal solution for department users to connect to the corporate backbone.

In the illustration below, two Ethernet switches with PCs, print server, and local server attached, are both connect to the Switch. All the devices in this network can communicate with each other through the Switch. Connecting servers to the Switch allow other users to access the data on server.

4. Web Management

This section introduces the configuration and functions of the Web-Based management.

About Web-based Management

Inside the CPU board of the switch exists an embedded HTML web site residing in flash memory. It offers advanced management features and allow users to manage the switch from anywhere on the network through a standard browser such as Microsoft Internet Explorer.

The Web-Based Management supports Internet Explorer 5.0. It is based on Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

Note: By default, IE5.0 or later version does not allow Java Applets to open sockets. The user has to explicitly modify the browser setting to enable Java Applets to use network ports.

Preparing for Web Management

The default value of FSW-1641TX/2441TX is as below:
   IP Address: **192.168.16.1**
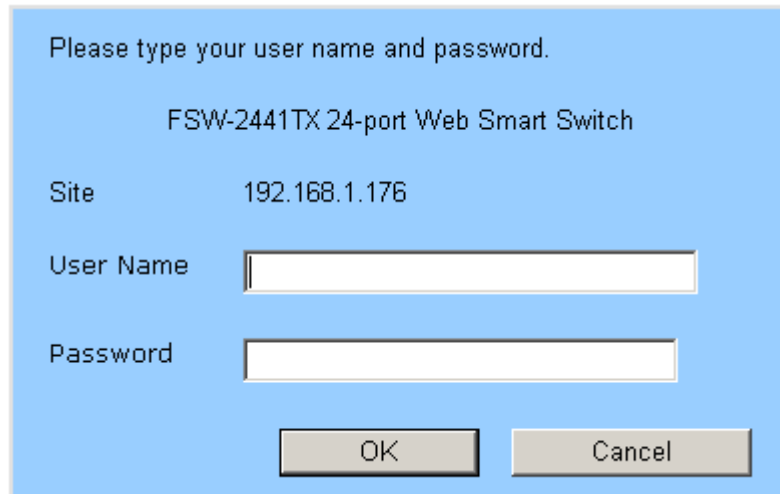   Subnet Mask: **255.255.255.0**
   Default Gateway: **192.168.16.254**
   User Name: **root**
   Password: **root**

System Login

1. Install the switch on your network.
2. Launch the Internet Explorer.
3. Type http:// and the IP address of the switch. Press "**Enter**".
4. The login screen appears.

Login Interface

5. Key in the user name and password. The default user name "**root**" and password " **root** ".
6. Click "**OK**", then the home screen of the Web-based management appears.

Home Interface

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Port Status

In Port status function, you can view all ports current status.

■ **Link Status:** green means the port active. Gray means the port inactive.

■ **Speed:** the port transmitting speed.

■ **Duplex:** the port duplex mode.

■ **Flow Control:** the port flow control status.

Port Status

Select	Port No	Link Status	Speed	Duplex	Flow Control
○	1	○	10M	half	enable
○	2	○	10M	half	enable
○	3	○	10M	half	enable
○	4	○	10M	half	enable
○	5	○	10M	half	enable
○	6	○	10M	half	enable
○	7	○	10M	half	enable
○	8	○	10M	half	enable
○	9	○	10M	half	enable
○	10	○	10M	half	enable
○	11	○	10M	half	enable
○	12	○	10M	half	enable
○	13	○	10M	half	enable
○	14	○	10M	half	enable
○	15	○	10M	half	enable
○	16	○	10M	half	enable
○	17	○	10M	half	enable
○	18	○	10M	half	enable
○	19	○	10M	half	enable
○	20	●	100M	full	enable
○	21	○	10M	half	enable
○	22	○	10M	half	enable
○	23	○	10M	half	enable
○	24	○	10M	half	enable

Counters   Cancel

Port Status interface

Select the port and click Counters button, you can see the port counter information as the following figure shown. Click Refresh button to reset

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the counters. Click [Cancel] button will bring the screen back to previous page.

Counters

Port No : 8

	Receive		Transmit
Packets Count	9434	**Packets Count**	100
Packet Length	2966335	**Packet Length**	41939
Error Count	0	**Collisions**	0

[Refresh] [Cancel]

Port Counter Information Interface

Port Configuration

You can configure speed, status, flow control, duplex mode, port base priority, port priority mapping and back pressure of each port. After configuration, click [Apply] button to apply the new configuration.

■ **Advertise 10M Half:** when auto negotiation is enabling, you can set up the port speed is "On" or "Off".

■ **Advertise 10M Full:** when auto negotiation is enabling, you can set up the port speed is "On" or "Off".

■ **Advertise 100M Half:** when auto negotiation is enabling, you can set up the port speed is "On" or "Off".

■ **Advertise 100M Full:** when auto negotiation is enabling, you can set up the port speed is "On" or "Off".

■ **Full Duplex Flow Control:** when auto negotiation is enabling, you can set up the full duplex flow control status is "On" or "Off".

■ **Auto Negotiation:** set up the auto negotiation status. "**Enable**" means the port speed is auto negotiation and detect. The port speed has four modes and can be configured at the same time. "**Disable**" means the auto negotiation is in force status. You can configure the port speed in

"**Speed**" and "**Duplex**" selection.

- **Speed:** set the port speed is 100M or 10M.

- **Duplex:** set the port duplex mode.

- **Port Priority Mapping:** set per port priority level.

- **Back Pressure Support:** enable or disable back pressure function.
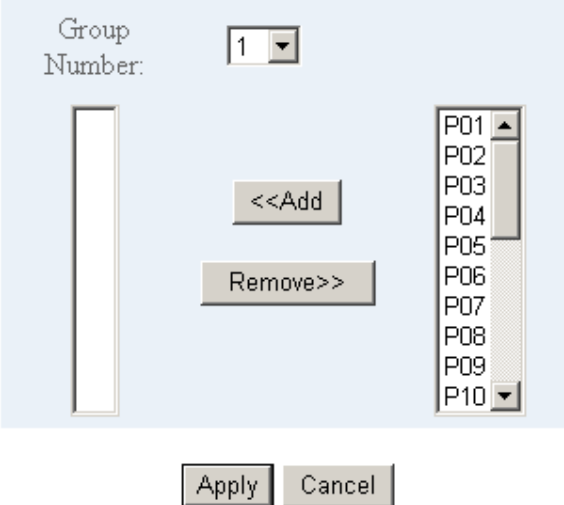
Port Configuration

Port Number: 1 ˅	Status
Advertise 10M Half	⦿ On ○ Off
Advertise 10M Full	⦿ On ○ Off
Advertise 100M Half	⦿ On ○ Off
Advertise 100M Full	⦿ On ○ Off
Full Duplex Flow Control	⦿ On ○ Off
Auto Negotiation	⦿ Enabled ○ Disabled
Speed	⦿ 100M/b ○ 10M/b
Duplex	⦿ Full ○ Half
Port Priority Mapping	⦿ High Queue ○ Low Queue
Back Pressure Support	⦿ Enabled ○ Disabled
[Apply] [Cancel]	

Port configuration interface

VLAN Setting

The system supports 16/24 VLAN groups. Select the VLAN group # and port member. Use   <<Add   button to add the VLAN group members and click

 Apply   button to complete the VLAN configuration.

VLAN Setting
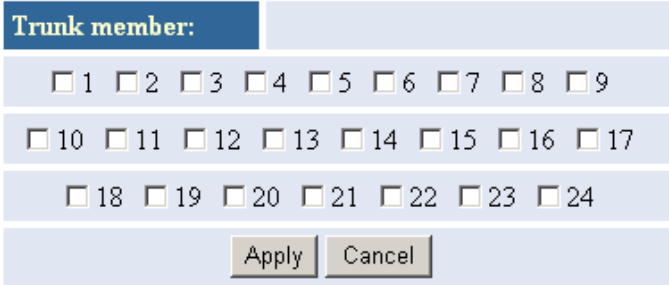

VLAN Setting Interface

Trunk Configuration

The system supports only one trunk group. The trunk group supports up to 4 port members. If the port members more than 4, it will cause the system abnormal. Mark the port number and click Apply button to apply the setting.

Trunk Configuration

Trunk member:	
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9	
☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17	
☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐ 22 ☐ 23 ☐ 24	
Apply Cancel	

Trunk Configuration interface

[Note] The trunk members must in the same VLAN group. Otherwise, the trunk function will not operate. For example: The VLAN group 1 members are

port 1, 2, 3, and 4. The trunk group members is port 1,2, 3 and 4 and port 1, 2, 3, and 4 are all in the VLAN group 1.

System Configuration

You can configure the IP, subnet mask, gateway, and firmware version that may vary with the factory firmware release period. Click Submit button to apply the new configuration.

System Configuration Interface

Firmware Update

You can update the latest firmware version.
1. Contact your vendor or visit our website at http://www.level1.com for the newest firmware.
2. Download the Bootp server utility from Internet. You may download it from this link. http://perso.wanadoo.fr/philippe.jounin/tftpd32.html#Top If this link is invalid, please search the Internet or refer to the txt file which compressed with the firmware file for another effective link.
3. Install the Bootp server utility.
4. Run the Bootp server utility and set the boot file direction to where the new

firmware is.

5. Go to the Firmware Update interface and click Update button to star

firmware loading.

6. After updated, please power off the switch and then power on the switch.

Firmware Update

After the <Update> button is pressed, please wait while update request is being
processed. After update is complete, the device will reboot automatically. You
can re-login afterwards.

Update   Cancel

Firmware Update Interface

5. Troubleshooting

This section is intended to help you solve the most common problems on the FSW-1641TX/2441TX Web Smart Switch.

Incorrect connections

The switch port can auto detect straight or crossover cable when you link switch with other Ethernet device. For the RJ-45 connector should use correct UTP or STP cable, 10/100Mbps port use 2 pairs twisted cable and Gigabit 1000T port use 4 pairs twisted cable. If the RJ-45 connector is not correct pin on right position then the link will fail. For fiber connection, please notice that fiber cable mode and fiber module should be match.

■ Faulty or loose cables

Look for loose or obviously faulty connections. If they appear to be OK, make sure the connections are snug. IF that does not correct the problem, try a different cable.

■ Non-standard cables

Non-standard and miss-wired cables may cause numerous network collisions and other network problem, and can seriously impair network performance. A category 5-cable tester is a recommended tool for every 100Base-T network installation.

■ Improper Network Topologies

It is important to make sure that you have a valid network topology. Common topology faults include excessive cable length and too many repeaters (hubs)

between end nodes. In addition, you should make sure that your network topology contains no data path loops. Between any two ends nodes, there should be only one active cabling path at any time. Data path loops will cause broadcast storms that will severely impact your network performance.

Diagnosing LED Indicators

The Switch can be easily monitored through panel indicators to assist in identifying problems, which describes common problems you may encounter and where you can find possible solutions.

IF the power indicator does turn on when the power cord is plugged in, you may have a problem with power outlet, or power cord. However, if the Switch powers off after running for a while check for loose power connections, power losses or surges at power outlet. IF you still cannot resolve the problem, contact your local dealer for assistance.

■ Cabling

RJ-45 ports: use unshielded twisted-pair (UTP) or shield twisted-pair (STP) cable for RJ-45 connections: 100Ω Category 3, 4 or 5 cable for 10Mbps connections or 100Ω Category 5 cable for 100Mbps connections. Also be sure that the length of any twisted-pair connection does not exceed 100 meters (328 feet). Gigabit port should use Cat-5 or cat-5e cable for 1000Mbps connections. The length does not exceed 100 meters. For more information please refer to Appendix section.

6. Technical Specification

This section provides the specifications of FSW-1641TX/2441TX Web Smart Switch.

Standard	IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Fast Ethernet IEEE802.3x Flow Control and Back-pressure
Protocol	CSMA/CD
Technology	Store and forward switching architecture
LED Indicators	Per port: Link/Activity, Full duplex/Collision, 100M Per unit: Power
Transfer Rate	14,880 pps Ethernet port, 148,800 pps Fast Ethernet port
Network Cable	10BASE-T: 2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-568 100-ohm (100m) 100BASE-TX: 2-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m)
Back-plane	16ports: 3.2Gbps with full wire speed 24 ports: 4.8Gbps with full wire speed

MAC address	4K Mac with Auto Learning
Memory	1.25Mbits
Power Supply	100-240 VAC, 50~60Hz, 3.3V/4A
Power Consumption	16 port: 14Watts(Maximum) 24 port: 18.5Watts(Maximum)
Operation Temp.	0℃ to 45℃ (32℉ to 113℉)
Operation Humidity	10% to 90% (Non-condensing)
Storage Temp.	-10℃ to 70℃
Dimensions	266 mm (W) x 193 mm (D) x 44 mm (H);11 inch size
EMI	FCC Class A, CE