FCC Certifications

This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

CE Mark Warning

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class A for ITE, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Company has an on-going policy of upgrading its products and it may be possible that information in this document is not up-to-date. Please check with your local distributors for the latest information. No part of this document can be copied or reproduced in any form without written consent from the company.

Trademarks:
All trade names and trademarks are the properties of their respective companies.

Table of Content

Unpacking Information

Thank you for purchasing the 16-port Gigabit Web Smart Switch. Before you start, please check all the contents of this package.

The product package should include the following:

1. One 16-port Gigabit Web Smart Switch

2. One power cord

3. Rubber foot and screws

4. Rack-mount brackets

5. One RS-232 Cable (Optional)

6. User's Manual
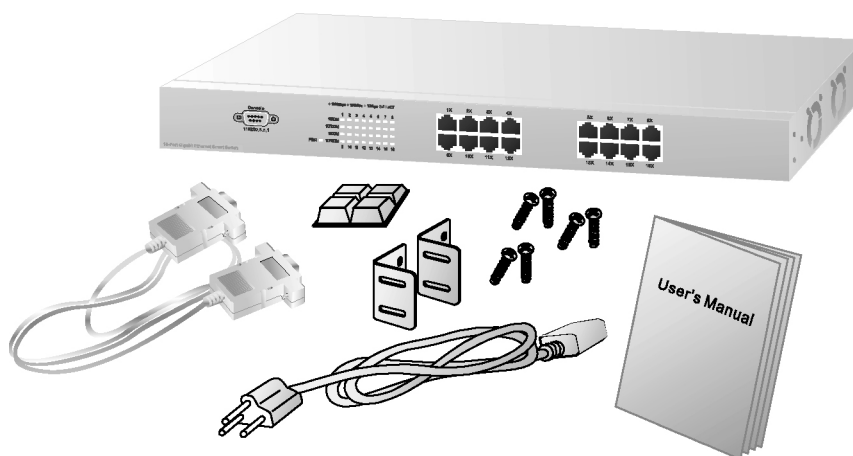
1. Introduction to 16-port Gigabit Web Smart Switch

1.1 General Description

The device is a 16-port 10/100/1000Mbps Ethernet Web Smart Switch.

Compare to the traditional 10/100Mbps Ethernet, the switch delivers a dedicated Gigabit connection to every attached client with no congestion issue. The gigabit ports also provide the fat pipe to the server or backbone connectivity for boosting the total system performance. Moreover, the NWay auto-negotiation operation automatically negotiates with the connected partners on the network speed and duplex mode; that provides an easy way to integrate 10/100/1000Mbps networks with no pain. It is ideal for micro-segmenting large networks into smaller, connected subnets for improved performance, enabling the bandwidth demanding multimedia and imaging applications.

Out of the ordinary dumb switches, the 16-port Gigabit Web Smart Switch embedded advanced management capability; that the device can be managed through console port or web-based UI. This is much useful for system manager to monitor and control the system efficiently.

Store-and-forward switching mode promises the low latency plus eliminates all the network errors, including runt and CRC error packets. To work under full-duplex mode, transmission and reception of the frames can occur simultaneously without causing collisions as well as double the network bandwidth.

The switch is plug-n-play without any software to configure and also fully compliant with all kinds of network protocols. Moreover, the rich diagnostic LEDs on the front-panel provide the operating status of individual port and whole system.

1.2 Key Features

- 16 fixed 10/100/1000Mbps Gigabit Ethernet ports for easy network connecting application.
- Provide Auto-discovery Function for easy Network management.
- Provide 4K MAC address entries and 16 groups VLAN table
- Support up to 8 ports and 8 groups port aggregation.
- Support QoS for better Network management.
- Support full duplex flow control and half duplex back pressure
- Store-and-forward forwarding scheme
- Error packet filtering
- Supports 272K buffer Memory
- Support local Console port or Web-based UI for configuration
- Internal switching power supply (100-240Vac/50-60Hz)

1.3 The Front Panel

The front panel of the switch is shown as below
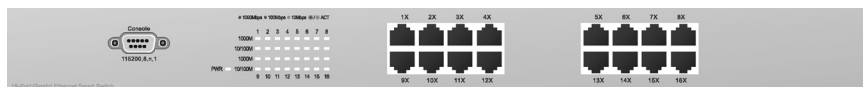
Port Operation

There are 16 * 1000Mbps RJ-45 (copper) ports on the front panel.
The auto-negotiation feature of the switch allows each port of the device running at one of the following operation modes:

Speed	Duplex Mode
10Mbps	Full Duplex
	Half Duplex
100Mbps	Full Duplex
	Half Duplex
1000Mbps	Full Duplex

All ports supports MDI/MDI-X **auto crossover** capability that is the port can connect either the PC or hub without crossover cable adjustment.

Wiring for 10/100/1000Mbps (Copper)

Following are the summaries of cabling required:

Media	Speed	Wiring
10/100/1000Mbps copper	*10Mbps*	Category 3,4,5 UTP/STP
	100Mbps	Category 5 UTP/STP
	1000Mbps	Category 5,5e UTP/STP

LEDs Definition

The rich diagnostic LEDs on the front panel can provide the operating status of individual port and whole system.
Power LED
This indicator lights green when the switch is receiving power; otherwise, it is off.
Port LEDs
Every RJ-45 port on the front panel relevant two LEDs (10/100M; 1000Mbps) for indicating the connection speed and activity status.
Port LED summary table

LEDs	Status	Statement
10/100M	Steady /Blinking Amber	Connected as 10Mbps/Active
	Steady/Blinking green	Connected as 100Mbps/Active
1000M	Steady/Blinking green	Connected as 1000Mbps/Active

If the port is connected but the Port LED is dark, check the following items:

- · The switch and the connected device's power are on or not.
- · The connecting cable is good and with correct type
- · The cable is firmly seated in its connectors in the switch and in the associated device
- · The connecting device, including any network adapter is well installed and functioning

1.4 The Rear Panel

The rear panel of the switch is shown as below

2. Installing 16 Gigabit Web Smart Switch

This switch can be placed directly on your desktop, or mounted in a rack. Users can immediately use most of the features simply by attaching the cables and turning the power on.

2.1 Desktop Installation

For desktop installation, the switch needs to put on a clean, flat desk or table close to a power outlet. Plug in all network cables and the power cord, then the system is ready.

Before installing the switch, you must ensure:
1.   It is accessible and cables can be connected easily
2.   Cabling is away from:
   ＊Sources of electrical noise such as radios, transmitters and broadband amplifiers
   ＊Power lines and fluorescent lighting fixtures.
3.   Keep water or moisture off
4.   Airflow around the unit and through the vents in the side of the case is great for heat radiation (company recommend that you provide a minimum of 25 mm clearance)

To prolong the operational life of your units:
1.   Never stack unit more than eight sets high if freestanding
2.   Do not place objects on top of any unit or stack
3.   Do not obstruct any vents at the sides of the case

2.2 Rack-mount Installation

The switch may standalone, or may be mounted in a standard 19-inch equipment rack. Rack mounting produces an orderly installation when you have a number of related network devices. The switch is supplied with rack mounting brackets and screws. These are used for rack mounting the unit.

Rack Mounting the Switch in the 19-inch rack:

1.   Disconnect all cables from the switch before continuing.
2.   Place the unit the right way up on a hard, flat surface with the front facing toward you.
3.   Locate a mounting bracket over the mounting holes on one side of the unit.
4.   Insert the screws and fully tighten with a suitable screwdriver.

5.   Repeat the two previous steps for the other side of the unit.
6.   Insert the unit into the 19" rack and secure with suitable screws (not provided).
7.   Reconnect all cables.

## 2.3 Installing Network Cables

Station Connections

Reference to the wiring statement of the previous section; connect each station to the switch with correct type of cables.

Switch-to-Switch Connections

In making a switch-to-switch connection, use every port to connect another switch or backbone is strongly recommended. The Gigabit ports provide the fat pipe to the server or backbone connectivity for boosting the total system performance. Reference to the wiring statement of the previous section; connect each station to the switch with correct type of cables.

Furthermore, as the switch supports Port Aggregation (Port Trunk) capability and up to 8 groups, it is also great to build up switch-to-switch connectivity.

2.4 Network Application
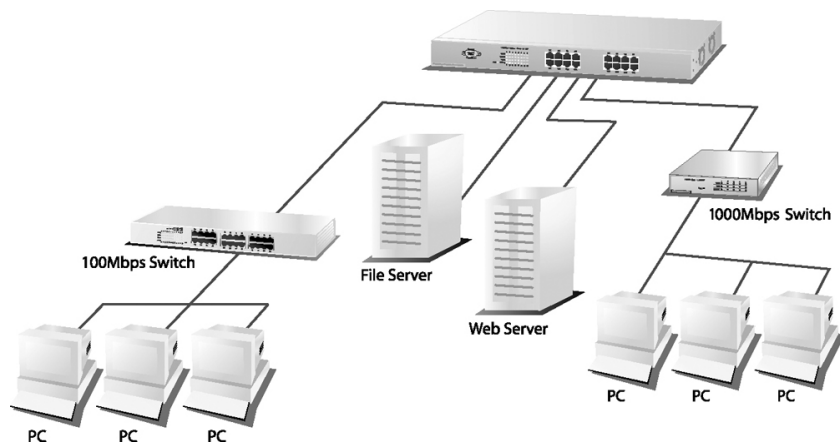
3. Functional Description

3.1 PHY Monitoring and Port Mode Set-up

It is a major task of the software to continuously monitor the PHYs in order to set up the switch ports according to whether the link is down or up and in the latter case what the current speed, duplex mode and pause capabilities are.
PHYs are being polled every 100 ms.

3.2 Flow Control

In the 16-port switch flow control (back pressure) is also supported in half duplex. Flow control can be enabled or disabled on a per-port basis from the command line interface.
If flow control is enabled for a port the associated PHY will be set to advertise support of "Symmetric Pause", but not "Asymmetric Pause". If the station connected to the port also supports "Symmetric Pause", flow control will be enabled on the switch port.

3.3 Ageing

To prevent that an automatically learned MAC address of a station that has been detached will remain in the MAC address table permanently, the ageing function in the switch is activated on a regular basis. The period for doing the ageing function is determined by the ageing time parameter. The ageing time parameter can be set from the command line interface. Default value is 300 seconds. Setting the ageing time parameter to 0 disables the ageing function.

3.4 VLAN

Port-based VLAN can be defined statically. GVRP (Generic/Group VLAN Registration Protocol) is not supported.
A maximum of 16 VLANs can be stored in EEPROM.

3.5 Link Aggregation

Link aggregation groups (or channels) can be defined statically. LACP (Link Aggregation Control Protocol) is not supported.
Maximum number of aggregation groups is 8.
The software will automatically detect that a link has gone down and then reassign packet distribution on the other links in the group.

3.6 Quality of Service

Various classifications and prioritizations are supported in order to enable Quality of Service for real time applications such as VoIP (Voice over IP).

4. Management guide

This section instructs you how to enter and set up the configurations, which can be accessed by RS-232 serial port (out-of-band) on the rear panel or by Telnet session / Internet Browser over the network (in-band).

.

Factory Default value:

IP： *192.168.1.1*
Subnet Mask： *255.255.255.0*
Default Gateway： *192.168.1.254*

4.1 Access the Switch

Console Port (Out-of-band) connection
The operating mode of the console port is:

- DCE
- 115200 (Fix baud rate)
- n (No parity checking)
- 8 (8 Data bits)
- 1 (1 stop bit)
- None (No flow control)

After attaching a RS-232 cable (Straight-through) to the serial port of a PC running a terminal emulation program, press **"Enter"** key then login screen appears. Enter your username and password to login the management console.

Note：

The management functions of console program are exactly the same with web-based management interface but in text mode.
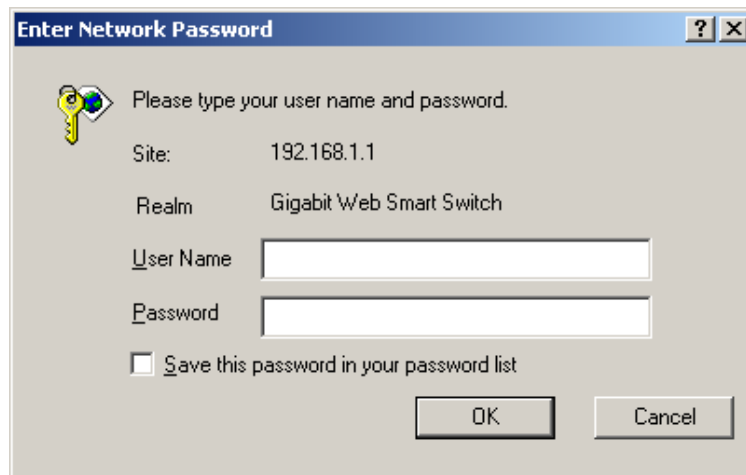
Attention： **1.** The factory default value of UserName and Password is **"admin"**
2. System configurations via the Console Port only will be allowed by the way of master device

In-Band Connections (Web Browser / Telnet)

      To manage the switch through in-band access, you should configure the

management station with an IP address and subnet mask compatible with your

switch.

  1. Running your Web Browser and enter the IP address "192.168.1.1" as the URL in
the "address" field.

  2. Key in the User name and password to pass the authentication. The factory
default value of User Name and Password is "**admin**".

  3. After authentication procedure, the home page shows up.

4.2 Home Page

On the Home page, you can select the configuration by clicking the menu tabs located on the upside of the UI.

It includes,

- System
- Ports
- VLANS
- Aggregation
- QoS
- Mirror
- Statistics
- Discovery

To restore the **default** Values of switch, Click the "**Default**" Button. If you want to **reboot** the switch, click the "**Reboot**" Button. To check the connection status of each port from 1 to 16, take a look at the port monitor. When the port shows **green**, it connected. Otherwise it's **dark**. To know the detail statistics of one port, click on it and the window will show.

4.2.1 System

To set up the system configurations such as login value, time-out value and enabling the VLAN Management.

Items	Functions
Mac Address	The Mac Address of the switch
S/W Version	To check up the Software Version, see this.
H/W Version	The Hardware version
Inactivity Timeout (Secs)	Set the console inactivity timeout in seconds. The value zero disables timeout. Timeout value in seconds, 0, 60-10000.
System Name	Name of the Switch
IP Address	Set up the IP of Switch
Subnet Mask	Set up the Subnet mask of Switch
Gateway	Set up the Gateway of Switch
Name	The Login name (default admin)
Password	The Login password (default admin)

To save the configuration of the system, click "**apply**" to save

Note.
After you change the IP address, the switch will reboot itself. You may click the new address to link the New IP with your Browser.
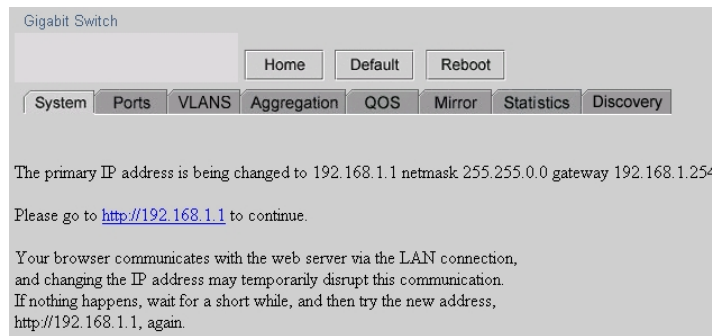
4.2.2 Ports

On the page, you can view the Port status, set up the Speed mode and enable the FDX flow control.

Port Configuration

Port	Link	Mode	FDX Flow Control
1	Down	Auto Speed ▼	☐
2	Down	Auto Speed ▼	☐
3	Down	Auto Speed ▼	☐
4	Down	Auto Speed ▼	☐
5	100 FDX	Auto Speed ▼	☐
6	Down	Auto Speed ▼	☐

Items	Functions
Link	To show the status of each port. When it's red, it means the connection is down. Otherwise, it's green.
Mode	Choose the Speed mode of port 10/100/1000, Half/Full. To disable the port, choose "Disable". If you set to auto speed, it will be auto-negotiation.
FDX Flow Control	To Enable the FDX Flow control, click the check box.

To save the configuration of the system, click "apply" to save. To see the latest status of port, click refresh button.

4.2.3 VLANS
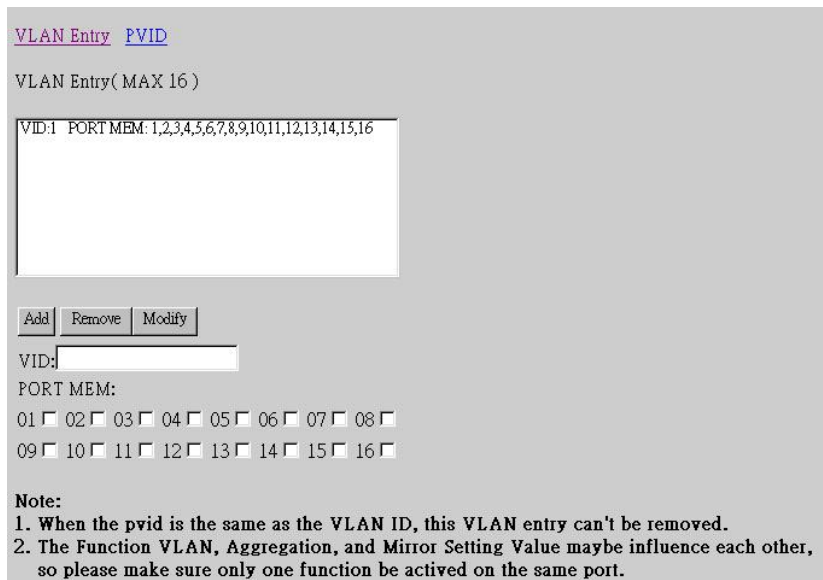
VLANS Configuration is for dividing the LAN into subnet groups for better network management. The benefit is that the user can move one client to another subnet group without actually moving the machine. There are 16 groups to set up.

- To add new VLAN Entry,
    1. Select the ports by clicking the check box.
    2. Enter the VLAN ID number for the entry
    3. Click "Add" to add it in the table.
    4. Don't forget to click the "Apply" to save the setting.

- To remove the entry,
    Select the entry you want to remove, click "Remove" to delete it.
- To modify the entry,
    Select the entry you want to change and set up the new configurations.
    After the changes are made, Click "Modify" to save.

> **Caution:** Because Setting in VLAN, Port aggregation, and Mirror are correlative, make sure that the setting won't influence others. Don't active more than one function for one port.

VLAN Entry PVID

VLAN Entry(MAX 16)

VID:1 PORT MEM: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16

Add | Remove | Modify

VID: [   ]

PORT MEM:
01 ☐ 02 ☐ 03 ☐ 04 ☐ 05 ☐ 06 ☐ 07 ☐ 08 ☐
09 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐

Note:
1. When the pvid is the same as the VLAN ID, this VLAN entry can't be removed.
2. The Function VLAN, Aggregation, and Mirror Setting Value maybe influence each other, so please make sure only one function be activated on the same port.

PVID

When the VLAN-enabled switch receives a tagged packet, the packet will be sent to the port's default VLAN according to the PVID (port VLAN ID) of the receiving port.

Items	Functions
Port	Port Number 1~16
PVID	Port VLAN ID
Aware	To enable the PVID checking and inserting of one port, select "AWARE"
Only Tagged	Block the untagged frame.
Apply	Don't forget to Click "Apply" to save the changes you made.

VLAN Entry PVID

AWARE:
Set or show the VLAN awareness mode for the port. VLAN aware ports will look the VLAN tag from received frames and insert the tag in transmitted frames. VLAN unaware ports will not look the tag from received frames or insert the tag in transmitted frames.
Only Tagged:
Accept only tagged frame from this port.

PORT	PVID	AWARE	Only Tagged
1	1	☐	☐
2	1	☐	☐
3	1	☐	☐
4	1	☐	☐
5	1	☐	☐

4.2.4 Aggregation/Trunking Configuration

To set up the Port trunk groups, put the ports number into the same Aggregation group line. There are eight groups to choose. Don't forget to click the "Apply" to save the setting. The maximum number of ports for one group is 8.
There three aggregation modes for you to setup, SMAC (Source MAC), DMAC (Destination MAC), and XOR.

4.2.5 Qos

There is one mode of Quality of Service to choose, Custom TOS.

4.2.5.1 Custom ToS

To improve the network performance by applying the TOS, set up the priority of eight groups of precedence bits on this page. There are two types to choose, high or Low.

Items	Functions
Port	To select the switch port, from 1 to 16
Priority	Select the priority of TOS group

This the type of Precedence

111 - Network Control
110 - Internetwork Control
101 - CRITIC/ECP
100 - Flash Override
011 - Flash
010 - Immediate
001 - Priority
000 - Routine

Quality of Service (QoS) TOS Configuration

TCP/IP TOS Priorities

Port	Bit 0	Bit 1	Bit 2	Priority
Port 1	0	0	0	High
	0	0	1	High
	0	1	0	High
	0	1	1	High
	1	0	0	High
	1	0	1	High
	1	1	0	High
	1	1	1	High

Apply   Refresh

4.2.6 Mirror

Port mirror is used to mirror traffic from source port to a target port for analysis. Only 2 ports can be monitored (mirrored) simultaneously to 1 Monitor port (target port). (Note that the target port must be in the same VLAN as the source port)

Mirror Port Configuration

Moniter Port [Port 1 ▼]

Source Ports

☐ Port1 ☐ Port2 ☐ Port3 ☐ Port4 ☐ Port5 ☐ Port6
☐ Port7 ☐ Port8 ☐ Port9 ☐ Port10 ☐ Port11 ☐ Port12
☐ Port13 ☐ Port14 ☐ Port15 ☐ Port16

[Apply] [Refresh]

Note: The Function VLAN, Aggregation, and Mirror Setting Value maybe influence each other, so please make sure only one function be actived on the same port.

Items	Functions
Monitor Port	Select the switch port, from 1 to 24 to be the target port to collect traffic info
Source Ports	To select the mirror ports, Click the check box of the port.

Don't forget to click "Apply' button to save the configuration.

4.2.7 Statistics

To check the status of port traffic, click statistic tab. You can click "**Clear**" button to erase all records or click "**Refresh**" to show the latest status.

Statistics Overview for all ports

[Clear] [Refresh]

Port	Tx Bytes	Rx Bytes	Tx Frames	Rx Frames	Tx Errors	Rx Errors
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

4.2.8 Discovery

When you install several our 16port and 24port gigabit web-smart switches, the discovery management tool helps you to search and access those switches on the LAN easily. Therefore you can access any switch on your LAN without memorizing those IP addresses. You can only find switches with the IP Address compatible with the one you access.

Note. The Maximum number of Address list is 16 for each mode.

Auto Mode
1. Click the "Auto search" button to find the switches.
2. The IP address of Switch list will appear.
3. Click the one you want to access.

Discovery

Auto Search | Apply
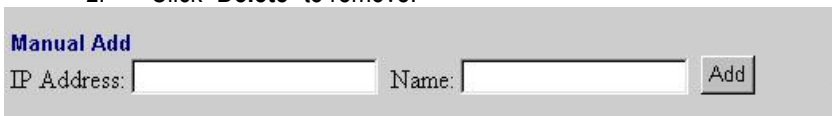
| 1 | 10.10.10.149 | giga-switch |

Manual Mode
ADD
1. Enter the **IP address** and **Name** in the text box
2. Click "**Add**" to add the new address on the table
Remove
1. Click the check box of the one you want to remove
2. Click "**Delete**" to remove.

Manual Add
IP Address: [   ]   Name: [   ]   Add

4.2.9 Default

To restore to default values,
1. Click the default button on the Howe page
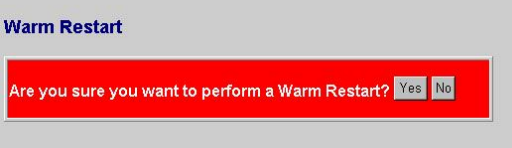2. Click "Yes" to enact. Don't power off the switch while it's work.

4.2.10 Reboot

To reboot the switch,
1. Click the Reboot button on the Howe page
2. Click "Yes" to enact. Don't power off the switch while it's work.

6. Product Specifications

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3x full-duplex operation and flow control IEEE802.3ab 1000BASE-T IEEE802.1Q VLAN interoperability IEEE802.1p Traffic prioritization
Interface	16 * 10/100/1000Mbps auto MDI/MDI-X RJ-45 switching ports 1 * RS-232 Console port
Cable Connections	RJ-45 (10BASE-T): Category 3,4,5 UTP/STP RJ-45 (100BASE-TX): Category 5 UTP/STP RJ-45 (1000BASE-T): Category 5,5e or enhanced UTP/STP
Network Data Rate	10/100/1000Mbps Auto-negotiation
Transmission Mode	10/100Mbps Full-duplex, Half-duplex 1000Mbps Full-duplex

LED indications	System
	    Power
	RJ-45 Port
	    10/100M; 1000M link/act

Memory	4K MAC entries 272K Buffer Memory
Emission	FCC Class A, CE
Operating Temperature	$0^0 \sim 50^0C$ ($32^0 \sim 122^0F$)
Operating Humidity	10% - 90%
Power Supply	Internal power supply 5V 8A 100-240V/ 50-60H