

CE Declaration of conformity

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

FCC Warning

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 limitations are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if no installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet from that the receiver is connected.
- Consult your local distributors or an experienced radio/TV technician for help.
- Shielded interface cables must be used in order to comply with emission limits.

Changes or modifications to the equipment, which are not approved by the party responsible for compliance, could affect the user's authority to operate the equipment.

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.

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Table of Contents

1. Unpacking Information

2. Introduction To 10/100/1000Mbps Gigabit Switch

- 2.1 General Description
- 2.2 Key Features
- 2.3 The Front Panel
 - 2.3.1 System LEDs
 - 2.3.1.1 Power LED
 - 2.3.1.2 Trunk A/B LED
 - 2.3.2 Port LEDs
 - 2.3.2.1 Speed/Link and Act LED
- 2.4 The Rear Panel
 - 2.4.1 Power Connecting
 - 2.4.2 Console Port

3. Installing And Using 10/100/1000Mbps Gigabit Switch

- 3.1 Installing the 10/100/1000Mbps Gigabit Switch
 - 3.1.1 Desktop Installation
 - 3.1.2 Rack-Mount Installation
 - 3.1.3 Installing Network Cables
 - 3.1.3.1 Station Connection with Twisted-Pair Cable
 - 3.1.3.2 Switch to Switch Connections with Twisted-Pair Cable
 - 3.1.3.3 Network Application

4. Console Program

5. Switching Operation

- 5.1 MAC Address Table & Learning
- 5.2 Filtering and Forwarding
- 5.3 Store and Forward

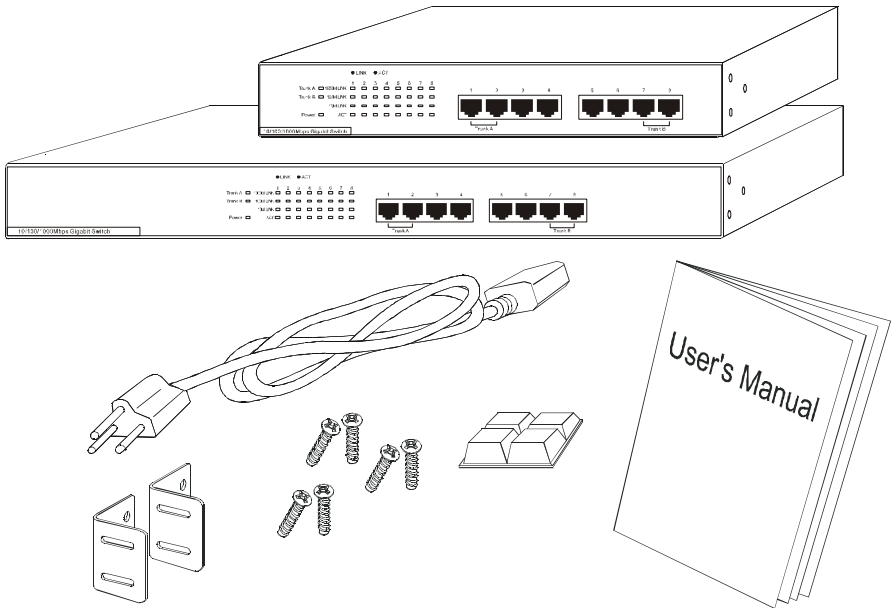
6. Product Specifications

1. Unpacking Information

Thank you for purchasing the 8-port 10/100/1000Mbps Gigabit Smart Switch. Before you start, please check all the contents of this package.

The product package should include the following:

1. One 8-port 10/100/1000Mbps Gigabit Smart Switch
2. One power cord
3. Rubber foot
4. Rack-mount brackets and screws (Optional for 11-inch model)
5. User's Manual



2. Introduction To 10/100/1000Mbps Gigabit Switch

2.1 General Description

The device is a powerful, high-performance 10/100/1000Mbps Fast Ethernet and Gigabit switch, with all 8 ports capable of 10/100/1000Mbps auto-negotiation operation (NWay), which means the switch could automatically negotiate with the connected partners on the network speed and duplex mode. Moreover, the 10/100/1000Mbps auto-sensing ability provides an easy way to migrate 10Mbps to 100Mbps or 1000Mbps networks with no pain. Compared to the shared 10Mbps, 100Mbps or 1000Mbps networks, the switch delivers a dedicated 10/100/1000Mbps connection to every attached client with no bandwidth congestion issue.

All Gigabit ports support auto-negotiation operation, auto MDI-X crossover function and Full-Duplex mode. They are ideal for micro-segmenting large networks into smaller, connected subnets for improved performance, enabling the bandwidth demanding multimedia and imaging applications. The device also provides the fat pipe to the servers or backbone connection for boosting the total system performance.

The built-in smart capabilities, VLAN, Port-Trunking, Port Config, Port Priority, Port snooping and 4-level IP priority, empowered system administrator to monitor and control the network easily.

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 can provide the operating status of individual port and whole system.

For network connection:

The switch can use the following types of cabling:

- 10BASE-T: Category 3, 4 or 5 UTP/STP
- 100BASE-TX: Category 5 UTP/STP
- 1000BASE-T: Category 5 UTP/STP

Category 5 cable is preferred to use with this product in structured wiring environments. This will ensure correct operation of all ports at 10Mbps, 100Mbps or 1000Mbps.

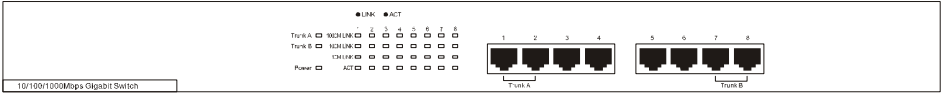
2.2 Key Features

The switch provides the following key features:

- Complies with 10BASE-T specifications of the IEEE802.3 standard.
- Complies with 100BASE-TX specifications of IEEE802.3u standard.
- Complies with 1000BASE-T specifications of IEEE802.3ab standard.
- Complies with IEEE802.3x Full Duplex operation and Flow Control
- 8 * RJ-45 ports for 10BASE-T, 100BASE-TX and 1000BASE-T connectivity.
- Supports NWay protocol for speed (10/100/1000Mbps) and duplex mode (Full/Half) auto-detection
- Supports auto MDI/MDI-X function on all ports.
- Supports Full/Half Duplex mode on 10/100Mbps speed and Full Duplex mode on 1000Mbps speed.
- Wire-speed packet filtering and forwarding rate.
- Store-and-forward architecture filters fragment & CRC error packets.
- Supports 7 groups port-base VLAN
- Supports 2 groups port-trunk
- Supports 4-level IP priority
- Supports 4-level Port priority
- Supports 8K MAC address learning table
- Supports 256KBytes buffer memory (SSRAM)
- Supports extensive LED indicators for network diagnostics
- Internal universal switching power supply (100-240 VAC / 50-60 Hz)
- FCC Class A, CE

2.3 The Front Panel

The front panel of the switch is shown as below.



The auto-negotiation feature of the switch allows each port of the device running at one of the following operation modes:

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

Each port supports auto MDI/MDI-X capability that is the port could connect either the PC or hub without any cable adjustment.

LEDs Definition

The rich diagnostic LEDs on the front-panel can provide the operating status of individual port and whole system. The following table is a summary for LEDs definition.

Type	LED	Status	Operation
System	Power	Steady Green	Power is on
		Off	Power is off
	Trunk A/B	Steady Green	Trunk mode enable
		Off	Disable
Port	1000M LINK	Steady Green	Connected as 1000Mbps
		Off	Not connected as 1000Mbps
	100M LINK	Steady Green	Connected as 100Mbps
		Off	Not connected as 100Mbps
	10M LINK	Steady Green	Connected as 10Mbps
		Off	Not connected as 10Mbps
	ACT	Blinking Green	There is traffic transverses the port
		Off	No connection

2.3.1 System LEDs

System LED indicators are located on the front panel for showing the operating status of the whole device.

2.3.1.1 Power LED

This indicator lights green when the switch is receiving power; otherwise, it is off.

2.3.1.2 Trunk A/B LED

The switch supports 2 groups port-trunk; port-1 and port-2 belong to "Trunk A", port-7 and port-8 belong to "Trunk B". This indicator lights green when the relative group is functioning.

2.3.2 Port LEDs

Port LED indicators are located on the front panel for showing the operating status of each port.

2.3.2.1 Speed/LINK and ACT LED

Every port has four LEDs (1000M LINK, 100M LINK, 10M LINK, ACT) for indicating the speed and connection status.

If the port is connected but the Speed/LINK LED (1000M/100M/10M) and Activity (ACT) LED is dark, check the following items:

1. The switch and the connected device's power are on or not
2. The port's cable is firmly seated in its connectors in the switch and in the associated device.
3. The connecting cable is good and with correct type
4. The connecting device, including any network adapter is functioning.

2.4 The Rear Panel

The rear panel of the switch is shown as below.



2.4.1 Power Connecting

For compatibility with electric service in most areas of the world, the switch's power supply automatically adjusts to line power in the range 100-240 VAC and 50-60 Hz.

Plug the female end of the power cord firmly into the receptacle on the rear panel of the switch. Plug the other end of the power cord into an electric service outlet then the power will be ready.

2.4.2 Console Port

Through the console port, it provides rich diagnostic information includes network statistics, link status and system setting. The operating mode of the console port is:

- DCE
- 9600 (Fix baud rate)
- 8 (8 Data bits)
- n (No parity checking)
- 1 (1 stop bit)
- None (None flow control)

You could use a normal RS-232 cable and connect to the console port on the device. After the connection, you could run any terminal emulation program (Hyper Terminal, Winterm, Telix, ... and so on) to enter the startup screen of the device. For all the detail software operation, please refer to “Console Program” session.

3. Installing and Using 10/100/1000Mbps Gigabit Switch

3.1 Installing The 10/100/1000Mbps Gigabit Switch

The switch does not require software configuration. Users can immediately use most of the features simply by attaching the cables and turning the power on.

3.1.1 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

3.1.2 Rack-Mount Installation

The switch may stand alone, 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 two mounting brackets and screws (Optional for 11-inch model). These are used for rack mounting the unit.

Rack Mounting the Switch

The switch should be able to fit in the 19-inch rack.

1. Disconnect all cables from the switch before continuing.
2. Place the unit 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-inch rack and secure with screws (not provided).
7. Reconnect all cables.

3.1.3 Installing Network Cables

After placing the switch on the desktop, we need to know how to connect the device to network.

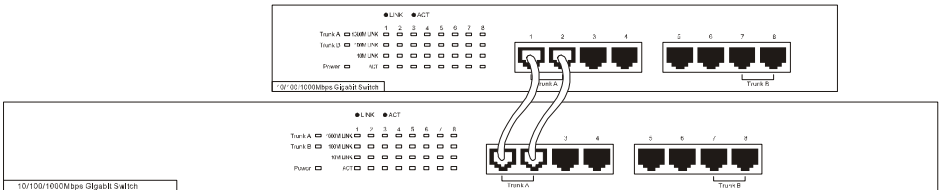
3.1.3.1 Station Connections

Connect each station to the switch by a category 5 twisted-pair cable (straight or cross-over cable). Plug one RJ-45 connector into a front-panel port of the switch, and plug the other RJ-45 connector into the station's network adapter.

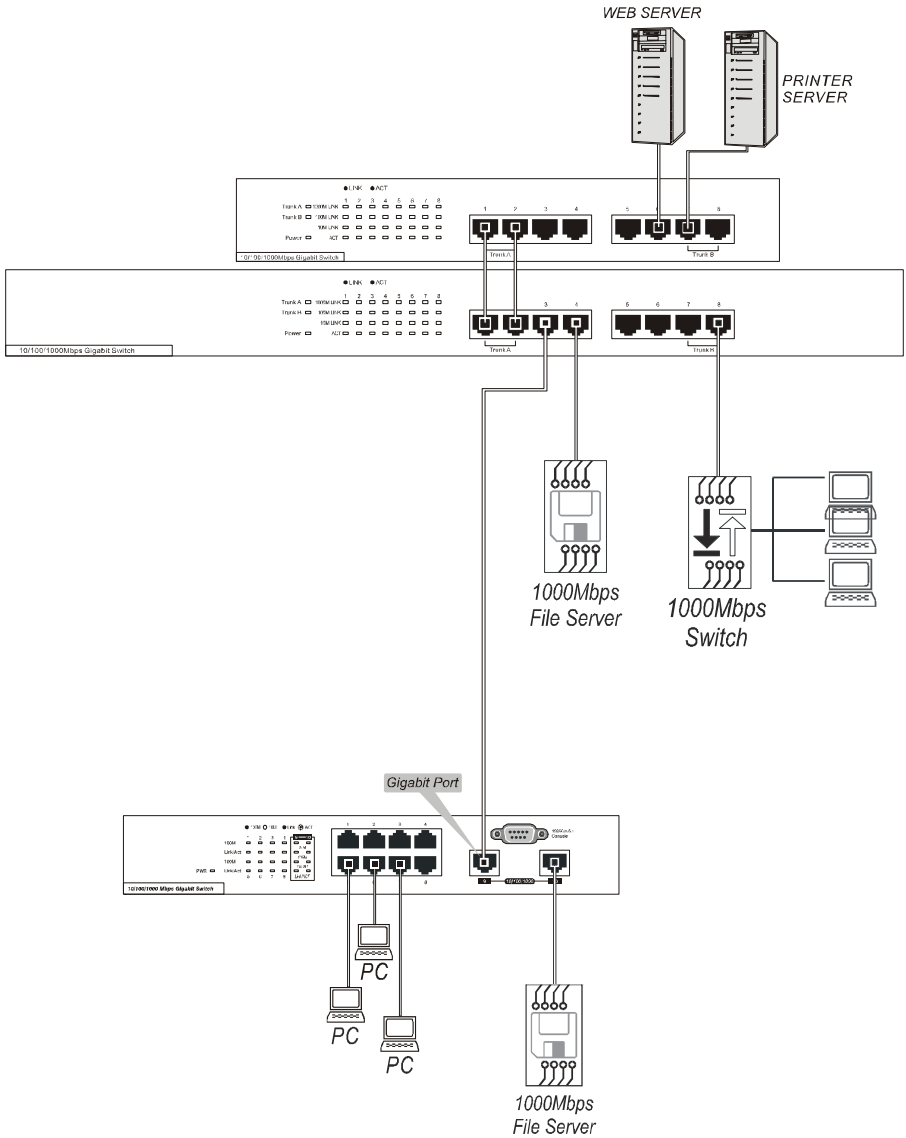
3.1.3.2 Switch-to-Switch Connections

In making a switch-to-switch connection, you could use any port to connect another switch with straight or crossover cable. As all ports support auto MDI/MDI-X function, the connection is independent of cable type and allows using a straight cable to make a switch-to-switch connection.

The switch supports 2 groups port-trunk; port-1 and port-2 belong to "Trunk A", port-7 and port-8 belong to "Trunk B". As each port-trunk group provides 4 Gigabit bandwidth on Full Duplex mode, it is ideal for establishing switch-to-switch connection.



3.1.3.3 Network Application

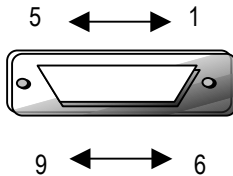


4. Console Program

Console Port

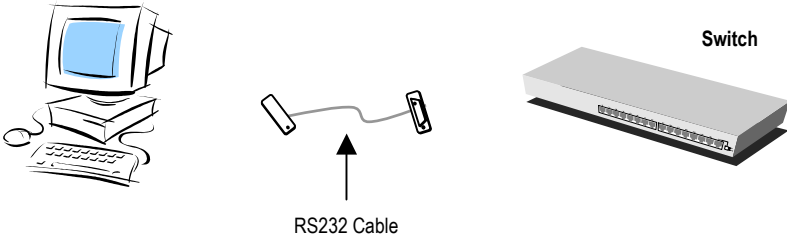
The switch provides a RS-232 console port for direct console management.

Pin	Description
1	DCD (Data Carrier Detect)
2	RX (Receive)
3	TX (Transmit)
4	DTR (Data Terminal Ready)
5	GND (Ground)
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	N/A



(RS-232 DB-9, DCE/female connector)

When connecting a terminal directly to the switch, use a serial RS-232 (straight through) cable.

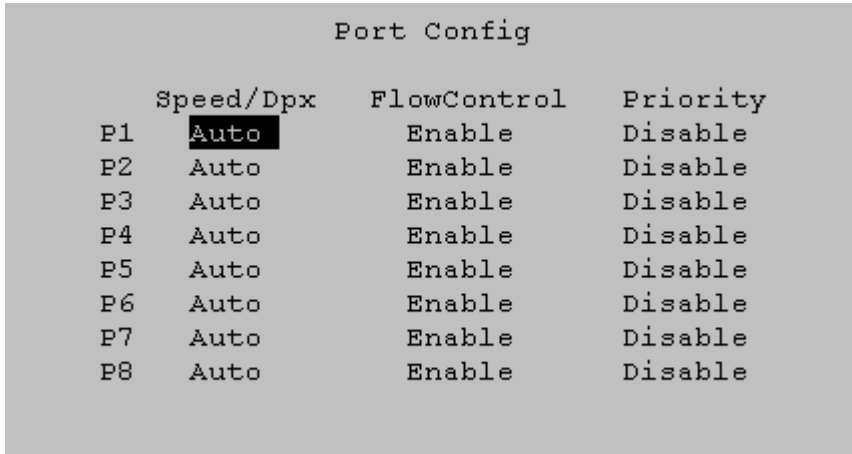


Console Management

- Provide out-of-band management via console user interface (RS-232)
- Please follow de-factor standard VT-100 terminal. Otherwise, the terminal will show disorder display.

Main menu

After system test program, Press [Ctrl] + [S] to start the first setting screen as shown as below:



```
Port Config

Speed/Dpx      FlowControl     Priority
P1      Auto          Enable         Disable
P2      Auto          Enable         Disable
P3      Auto          Enable         Disable
P4      Auto          Enable         Disable
P5      Auto          Enable         Disable
P6      Auto          Enable         Disable
P7      Auto          Enable         Disable
P8      Auto          Enable         Disable
```

This powerful 8-port Gigabit Smart Switch provides the following management function:

Function	Statement	Control Key
<1> Port Status	It is a summary of port status and configuration	[1]
<2> Port Config	You could check operating status of all ports and setup the port configuration, like speed, duplex mode, flow control and Port Priority.	[2]
<3> Mirror Config	When a port is mirroring, every packet could be monitored	[3]
<4> VLAN Config	Supports up to 7 groups port-base VLAN	[4]
<5> Trunk Config	Review and setup the port trunk function. It supports up to 2 port-trunk groups	[5]
<6> Misc Config	Including IP priority map, Aging time.	[6]
<Ctrl_W> Write Config	Save the current settings	[Ctrl+W]
<Ctrl_D> Set Default	Reset to initial state	[Ctrl+D]
<Ctrl_Q> Exit	Save and exit	[Ctrl+Q]
<TAB> Next Item	Move to next setting	[Tab]
<BACKSPACE> Back	Return to previous item	[Backspace]
<Enter> Toggle	Adjust the value of the item	[Enter]

Remark:

Before you disconnect the management console, remember to press the control key [Ctrl]+[Q], or the settings you revised will not apply.

Port Status/Configuration

The [Port Config] menu includes:

- Port speed and duplex mode setting: 10/100/1000Mbps, Full/Half duplex mode and auto-negotiation
- Flow control: enable/disable.
- Port priority: The packets in a higher port-priority (0~3) will be sent firstly. The smaller number, the lower priority.

You could change the default setting by the function key.

Port Config			
	Speed/Dpx	FlowControl	Priority
P1	Auto	Enable	Disable
P2	Auto	Enable	Disable
P3	Auto	Enable	Disable
P4	Auto	Enable	Disable
P5	Auto	Enable	Disable
P6	Auto	Enable	Disable
P7	Auto	Enable	Disable
P8	Auto	Enable	Disable

For example:

If you want to set port-1 to auto-negotiation and let flow control enable, please follow the directions listed as below:

1. Move the cursor to port-1 "**Speed/Dpx**" setting column by pressing [Tab].
2. Press [Enter] to select "**Auto**" auto-negotiation mode.
3. Then press [Tab] to "**FlowControl**" setting column.
4. Press [Enter] to select flow control "**Enable**" function.
5. Press [Tab] and [Enter] key to select the port-priority
6. Press [Backspace] to return to the previous item and continue, or press [Ctrl] + [W] to apply the setting

Mirror Config

The Smart Switch provides **Mirror Configuration** to snoop a specified port. Setup a monitored port and monitored mode, and then the packets will be duplicated to the snooping port.

```
Mirror Config

Port Mirroring: Enable
Monitored Port: 1
Snooping Port : 8
Monitored Pkts: Incoming&Outgoing
```

For Example:

1. Press [Enter] to enable the port mirroring,
2. Press [Tab] then [Enter] key to select the monitored port
3. Press [Tab] then [Enter] key to select the snooping port
4. Press [Tab] then [Enter] key to select the kinds of packets you want to snoop
5. Press [Backspace] to return to the previous item and continue, or press [Ctrl] + [W] to apply the setting

If port-1 is “**Monitored port**” and port-8 is “**Snooping Port**”, all the packets come into port-1 will be duplicated to port-8 where snooping PC allocates. Then system administrator could analyze the packets with management tools.

Remark:

Mirror and Trunk functions can not be enabled simultaneously.

VLAN Config

This 8-port Gigabit Smart Switch provides 7 port-base VLAN groups, and each VLAN groups could comprise 1-8 port.

You can select some ports into the same VLAN group by symbol “V”. If the packets come into one port, which only belongs to one VLAN group, the packets just can be forwarded to another ports of this VLAN group.

		12345678
VLAN0:	[Enable]	[----v-v-]
VLAN1:	[Enable]	[v-v-vv-v]
VLAN2:	[Enable]	[v-v---v-]
VLAN3:	[Enable]	[----vv-■]
VLAN4:	[Disable]	
VLAN5:	[Disable]	
VLAN6:	[Disable]	

For Example:

When one packet comes into port-1 or port-3, the packet could be forward to VLAN 1 and VLAN 2. It means only port-1, 3, 5, 6, 8 (VLAN1) and port-1, 3, 7 (VLAN2) will receive the packet. But when packet comes into port-8, only port-1, 3, 5, 6, 8 (VLAN1) will receive the packet. On the other hand, if one packet comes into port-2, only port-4 will receive this packet.

Trunk Config

This switch provides 2 trunk groups. Simply by press [Enter] key to enable Trunk groups. Port-1 and port-2 belong to “Trunk A”, port-7 and port-8 belongs to “Trunk B”.

```
Trunk Config

Trunk A(P1-P2) : Enable
Trunk B(P7-P8) : Disable
Balancing Method: Source&Dest addr based
```

For Example:

1. Simply by press [Enter] key to enable Trunk A or B
2. Press [Tab] key then [Enter] key to select the [Balancing Method]
3. Press [Backspace] to return to the previous item and continue, or press [Ctrl] + [W] to apply the setting

Remark:

1. According to your devices' MAC addresses, you can choose an applicable “Balancing Method” to balance your “Port Trunk” data flow.
2. Mirror and Trunk functions can not be enabled simultaneously.

Misc Config

This Misc configuration setting includes the Aging Time of learning table and priority map. There are 4 levels (300, 600, 900, 1200sec) for Aging Time, and 4 priority-level for Tos (Type of service). The main setting menu is shown as below:

```
Misc Config
Aging Time: 1200sec
IP Priority Mapping: Enable
Tos0:2 Tos1:3 Tos2:1 Tos3:0 Tos4:1 Tos5:3 Tos6:2 Tos7:0
```

For Example:

Aging Time---A MAC address will be eliminated from learning table if it keeps silent when “Aging Time” is up.

Press [Enter] key to select Aging Time

IP Priority Mapping---The smaller number the lower priority. Packets with higher priority-tag will be sent first.

1. Press [Enter] key to enable “IP Priority Mapping”
2. Press [Tab] key and [Enter] key to determine the priority-level (0~3) of every Tos (0~7)
3. When one packet carries with priority-tag which has specified a “Tos” comes into the switch, the specified “Tos” will determine what priority will it get according to the IP priority map in the switch.

Remark:

For “IP priority”, your network interface card must support Tos function and have setup Tos priority level first.

Write Config

At any time when you press **[Ctrl]+[W]**, the system will save your current settings.

Set Default

If you want the all values to back to the factory default, press **[Ctrl]+[D]** then the system will return to initial state immediately.

Save and exit

At any time when you press **[Ctrl]+[Q]**, the system will save your settings and disconnect the connectivity simultaneously.

5. Switch Operation

5.1 MAC Address Table and Learning

The switch is implemented with a MAC address table, which is composed of many entries. Each entry is used to store the address information of network nodes on the network, including MAC address, port ID, etc. The information is the most important base to do packet filtering and forwarding.

When one packet comes in from any port, the switch will learn the source address, port ID, and the other related information in address table. Therefore, the content of the MAC table will update dynamically.

5.2 Filtering and Forwarding

When one packet comes in from any port of the switch, it will check the destination address besides the source address learning. The switch will look up the address table for the destination address. If not found, this packet will be forwarded to all the other ports except the port where the packet comes in. If found, and the destination address is located at different port from this packet comes in, the packet will be forwarded to the port where this destination address is located according to the information of address table. But, if the destination address is located at the same port as this packet comes in, this packet will be filtered.

5.3 Store and Forward

Store-and-forward is one kind of packet-forwarding methodology. As a store-and-forward switch, it will store the complete packet in the internal buffer and do the complete error checking before transmitting to the network. Therefore, no error packets will disturb the network. It is the best choice when a network needs efficiency and stability.

6. Product Specifications

Standard	IEEE802.3, 10BASE-T IEEE802.3u, 100BASE-TX IEEE802.3ab, 1000BASE-T
Interface	8 * RJ-45 10/100/1000 ports (Auto MDI-X)
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 UTP/STP
Network Data Rate	Gigabit Ethernet (10/100/1000Mbps)
Transmission Mode	10Mbps Full/Half Duplex 100Mbps Full/Half Duplex 1000Mbps Full Duplex
LED indications	System Power Trunk A Trunk B Port 1000M LINK 100M LINK 10M LINK ACT
System Buffer Memory	256 KBytes
MAC Address Table	8K entries
Filtering/Forwarding Rate	10Mbps: 14,880pps/14,880pps 100Mbps: 148,800pps/148,800pps 1000Mbps 1,488,100pps/1,488,100pps
Emission	FCC Class A, CE
Operating Temperature	0° ~ 50°C (32° ~ 122°F)
Operating Humidity	10% - 90%
Power Supply	100-240 VAC, 50~60 Hz