EKI-6538

8-port 10/100 Mbps
Industrial Smart Ethernet Switch

User Manual

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows and MS-DOS are registered trademarks of

Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

Part No. 2003653800 1st Edition

Printed in Taiwan June 2006

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: 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.

Technical Support and Assistance

Step 1. Visit the Advantech web site at **www.advantech.com/support** where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User's Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:

a. The power cord or plug is damaged.

b. Liquid has penetrated into the equipment.

c. The equipment has been exposed to moisture.

d. The equipment does not work well, or you cannot get it to work according to the user's manual.

e. The equipment has been dropped and damaged.

f. The equipment has obvious signs of breakage.

15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW

-10° C (14° F) OR ABOVE 70° C (158° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

CHAPTER 1

Introduction

Sections include:

- Features
- Feature Summary
- Specifications
- Packing List
- Ordering Information
- Safety Precaution

Chapter 1 Introduction

1.1 Features

Equipped with 8 x 10/100Base-TX Fast Ethernet ports with RJ-45 connectors, Advantech's EKI-6538 Industrial Smart Ethernet Switch represents a cost-effective solution for customers to implement Ethernet packet switching with easy fine-tuning of network performance and security. Able to operate in the harshest of environments, EKI-6538 offers wide dual power input (10~48 V_{DC}), wide operating temperatures (0 ~ 60° C), a rugged mechanical design, and multiple mounting methods. EKI-6538 runs smarter than other unmanaged switches in network management: VLAN, QoS, Port Mirroring, and Port Trunk.

VLANs for Enhanced Security & Performance

EKI-6538 supports IEEE 802.1Q tagged VLAN standard to improve security and bandwidth utilization by limiting the broadcast domains and confining intra-group traffic within their segments. It also helps you to break up the limitation of physical connections.

Quality of Service Support

The QoS function support ensures your important data is delivered consistently and predictably. EKI-6538 supports Layer 2 - 802.1p Priority Queue control to prioritize network packets. Classification of user data priorities can be based on a Priority Queue data packets.

Port Mirroring

The network administrator can use this function as a diagnostic tool or debugging feature, especially when fending off an attack. EKI-6538 assists you to keep close track of switch performance and alter it if necessary. Port mirroring can be managed locally or remotely. The administrator places a protocol analyzer on the port receiving the mirrored data to monitor each segment separately. The analyzer captures and evaluates the data without affecting the client on the original port.

Port Trunks for Aggregated Bandwidths

The network administrator can use port mirroring as a diagnostic tool or debugging feature, especially when fending off an attack. EKI-6538 assists you to keep close track of switch performance and alter it if necessary. To expand the network, you can use EKI-6538's port trunks function to combine ports together to create multi-link load sharing, aggregated bandwidths to a server or a network backbone.

Easy Diagnosis & LED indicators

EKI-6538 provides a quick and easy way of troubleshooting by using the push button and LED indicator. You can easily determine which port has failed, the link condition, transmission rate, and power status when diagnosing problems in the field. Complex configuration and test equipment is not needed because the specially designed front panel interface helps you quickly conform whether or not a port has failed by using the push button and "FAULT" LED indicator.

1.2 Feature Summary

- Provides 8 x 10/100 Mbps Ethernet ports with RJ-45 connector
- Provides push button for port diagnostic
- Supports web browser for configuration
- Supports RS-232 console for basic factory setting
- Supports IEEE 802.1Q tagged VLAN
- Supports IEEE 802.1p QoS for traffic classification and prioritization
- Supports ports aggregation, aggregated ports auto failed over and load balance per trunk
- Supports port mirroring for traffic monitoring
- Provides port configuration for auto-negotiation setting of speed/flow control
- Supports MDI/MDI-X auto crossover
- Supports ingress/egress rate control per port and broadcast storm protection
- Supports MAC-based security per port
- Supports traffic statistic monitor per port
- Embedded with the memory buffer, supports store-and-forward transmission
- Supports dual +10 ~ 48 V_{DC} power input
- Provides surge protection (EFT) 3000 V_{DC} for power line
- Provides ESD protection 4000 V_{DC} for Ethernet ports
- Supports operating temperature: 0 ~ 60° C
- Provides flexible mounting options: DIN rail, panel

1.3 Specifications

Communications

Compatibility	IEEE 802.3, 802.3u, 802.3x, 802.1p, 802.1Q
LAN	10/100Base-TX
I/O Type	2 Digital Input: Logic Level 0 : close to GND Logic Level 1 : open 2 Digital Output: Open collector to 30V, 200mA (Max.load)
Transmission Distance	100 m
Transmission Speed	Up to 100 Mbps

Interface

Connectors	8 x RJ-45 (Ethernet) 5-pin removable screw terminal (DI/DO)
LED Indicators	Power, P-Fail, Fault, Link, 10/100 Mbps
Console	RS-232 (RJ-48)

Network Management

Diagnostics	Push button for port diagnostic Port Mirroring Real-time traffic statistic
VLAN	IEEE 802.1Q tagged VLAN Port-based VLAN
Configuration	Web browser & RS-232 console management Speed/duplex auto-negotiation
Security	MAC-based security per port
Traffic Control	IEEE 802.1p QoS IEEE 802.3ad Link Aggregation Rate limit and storm control IEEE 802.3x flow control

Power

Power Connectors	7-pin removable screw terminal
Power Consumption	Max. 7 W
Power Input	2 x Unregulated +10 ~ 48 V_{DC}
Fault Output	Present

Mechanism

Dimensions (WxHxD)	46 x 162 x 126 mm
Enclosure	IP30, ABS+PC with solid mounting kits
Mounting	DIN35 rail, Wall

Protection

ESD Protection	4,000 V_{DC} (Ethernet)
Surge Protection (EFT)	3000 V_{DC} (Power)
Power Reversal Prt.	Present
Overload Current Protection	4A/125V

Certifications

Safety	UL 60950-1, CAN/CSA-C22.2 No.60950
EMC	U.S.A.: FCC Part 15 CISPR 22 EU: EN55011, EN55022 Class A, EN61000-3-2/3, EN55024 IEC61000-4-2/3/4/5/6/8/11
Ingress Protection	IP30

Environment

Operating Humidity	20 ~ 95% (non-condensing)
Operating Temperature	0 ~ 60° C (32 ~ 140° F)
Storage Humidity	0 ~ 95% (non-condensing)
Storage Temperature	-10 ~ 70° C (14 ~ 158° F)
MTBF	230,000 hrs

1.4 Packing List

- 1 x EKI-6538 Smart Ethernet Switch
- 1 x INET CD-ROM
- 1 x Panel mounting bracket
- 1 x 1m RJ-48 to female DB9 cable for console

1.5 Ordering Information

EKI-6538 8-port Industrial 10/100Mbps Smart Ethernet Switch

1.6 Safety Precaution

Attention! *If DC voltage is supplied by an external circuit, please use a protection device on the power supply input.*

CHAPTER 2

Installation

Sections include:

- Overview
- LED Indicators
- Dimensions
- Mounting
- Network Connection
- Power Connection
- Digital Input and Output
- RS-232 Connection

Chapter 2 Installation

In this chapter, you will be given an overview of the EKI-6538 hardware installation procedures.

2.1 Overview

1. 10/100 Mbps T(X) Port
2. 10/100 Mbps LED Indicator (Green)
3. Link Status LED Indicator (Yellow)
4. Power Status LED Indicator (Red)
5. Model Name
6. Power Fail LED Indicator (Red)
7. Link Port Fail LED Indicator (Red)
8. Link Port Diagnose Push Button
9. 7-pin Terminal Block for P1, P2, Relay and Grounding
10. 5-pin Terminal Block for 2-ch DI/DO
11. Heat Dissipation Hole
12. DIN Rail Install Mechanism
13. Product Information Label
14. Grounding Spring
15. RS-232 Console

Figure 2.1: Overview of EKI-6538

2.2 LED Indicators

There are few LEDs display the power status and network status located on the front panel of EKI-6538, each of them has its own specific meaning as below table.

Table 2.1: EKI-6538 LED Definition

LED	Color	Description	
P1	Red	On	Power input 1 is active
		Off	Power input 1 is inactive
P2	Red	On	Power input 2 is active
		Off	Power input 2 is inactive
P-Fail	Red	On	Power input 1 or 2 is inactive
		Off	Power input 1 and 2 are inactive
FAULT	Red	On	Link ports fail
		Off	Link ports are normal
LINK (Port 1~8)	Yellow	On	Connecting to network
		Flash	Data is transmitting/receiving
		Off	Not connect to network
10/100 (Port 1~ 8)	Green	On	Link to 100 Mbps network
		Off	Link to 10 Mbps network

2.3 Dimensions

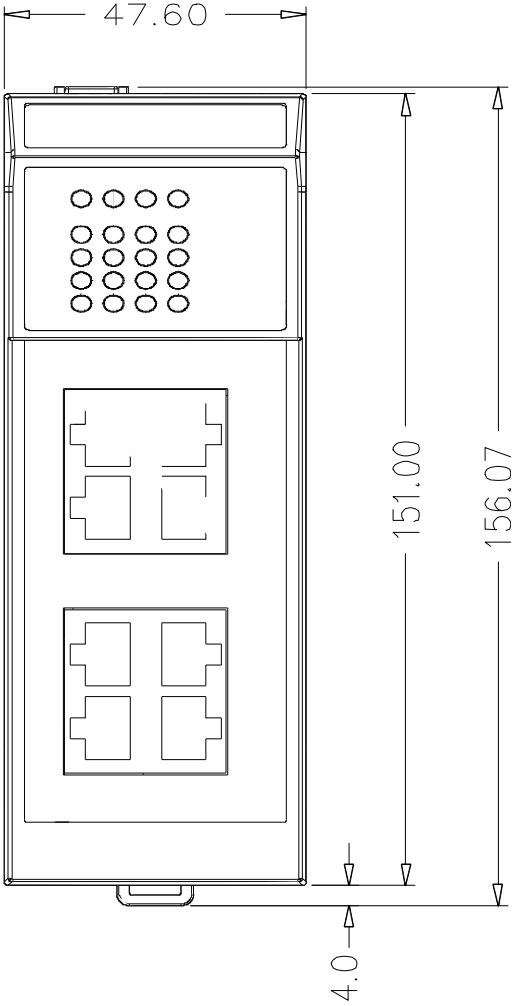

Figure 2.2: Front View of EKI-6538

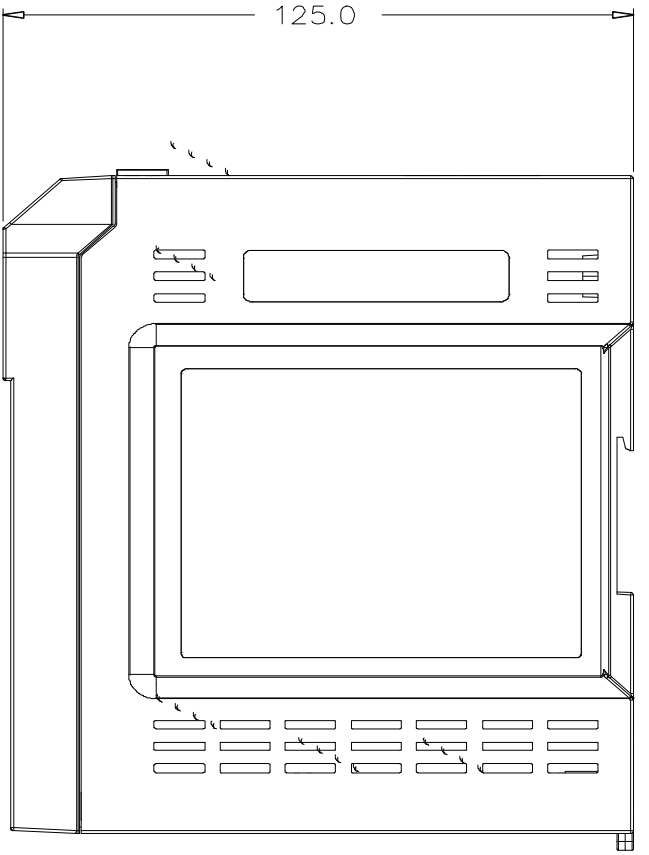

Figure 2.3: Side View of EKI-6538

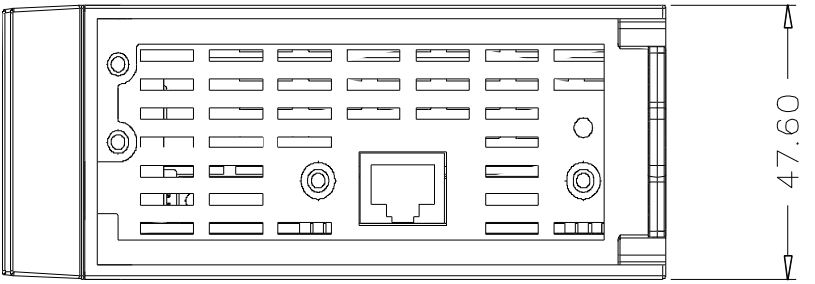

Figure 2.4: Bottom View of EKI-6538

2.4 Mounting

EKI-6538 supports two different mounting methods : Panel & DIN Rail.

2.4.1 Panel Mounting

EKI-6538 can be wall mounted by using the included metal mounting kit.

First, use the screws included in the package to combine the EKI-6538 and metal mounting kit.

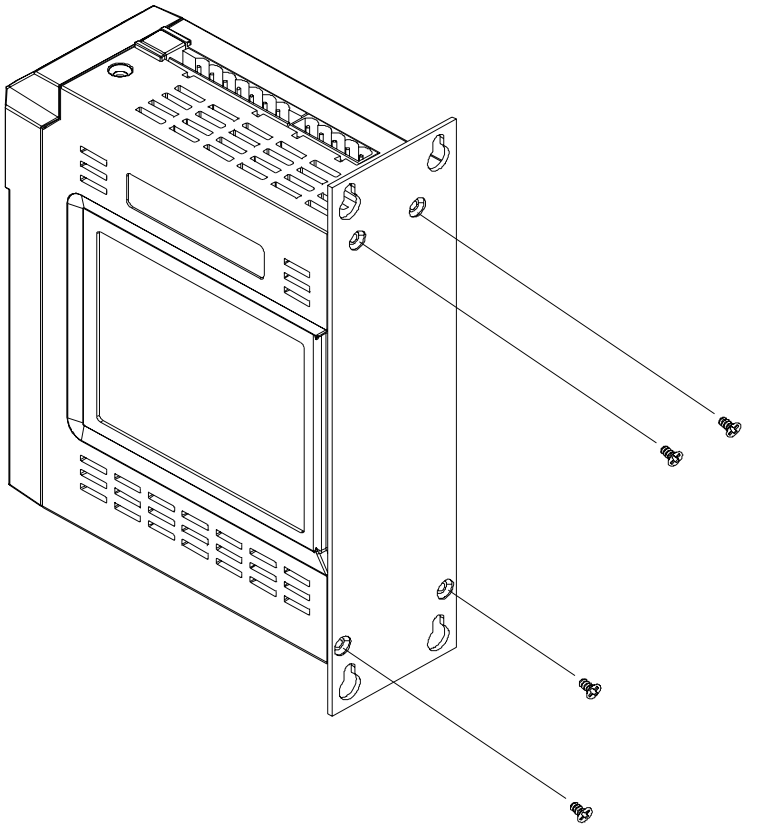

Figure 2.5: Combine the Metal Mounting Kit

Then, screw the whole device to the wall.

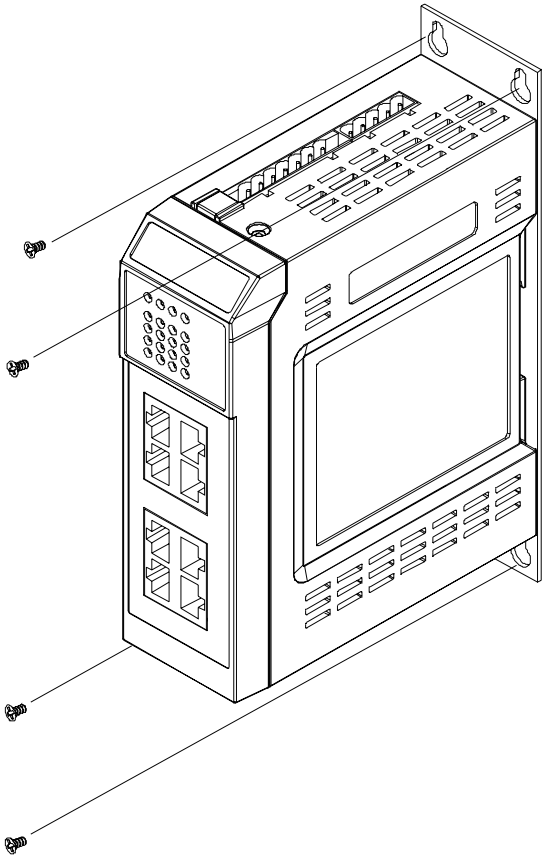

Figure 2.6: Attach EKI-6538 to the Wall

2.4.2 DIN Rail Mounting

You can also mount EKI-6538 on a standard DIN Rail by below steps.

First, pull down the kit in the back of EKI-6538

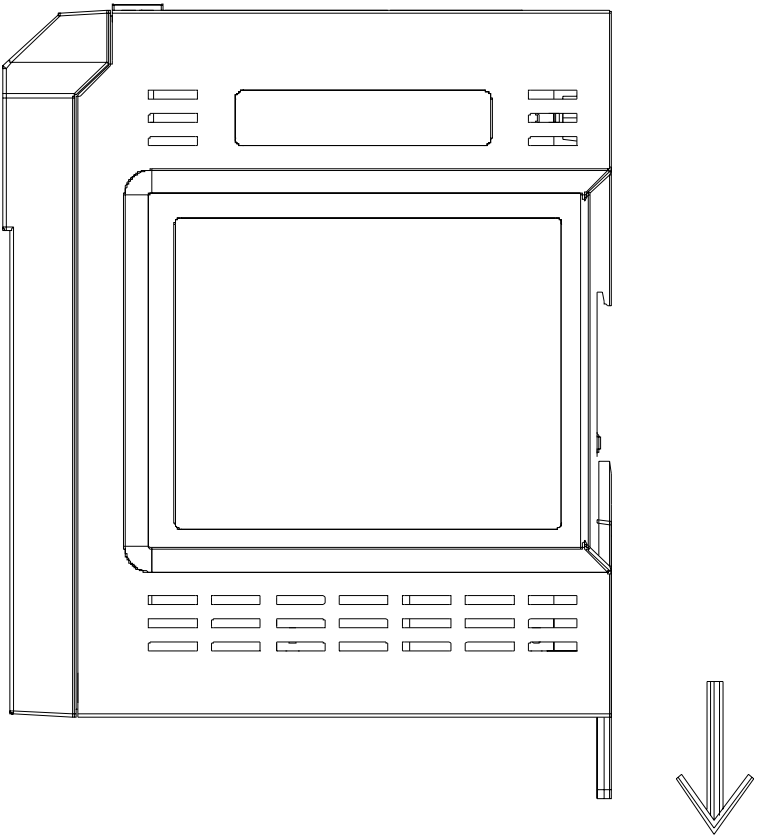

Figure 2.7: Installation to DIN Rail Step 1

Then, hang the EKI-6538 to the DIN Rail with angle of inclination.

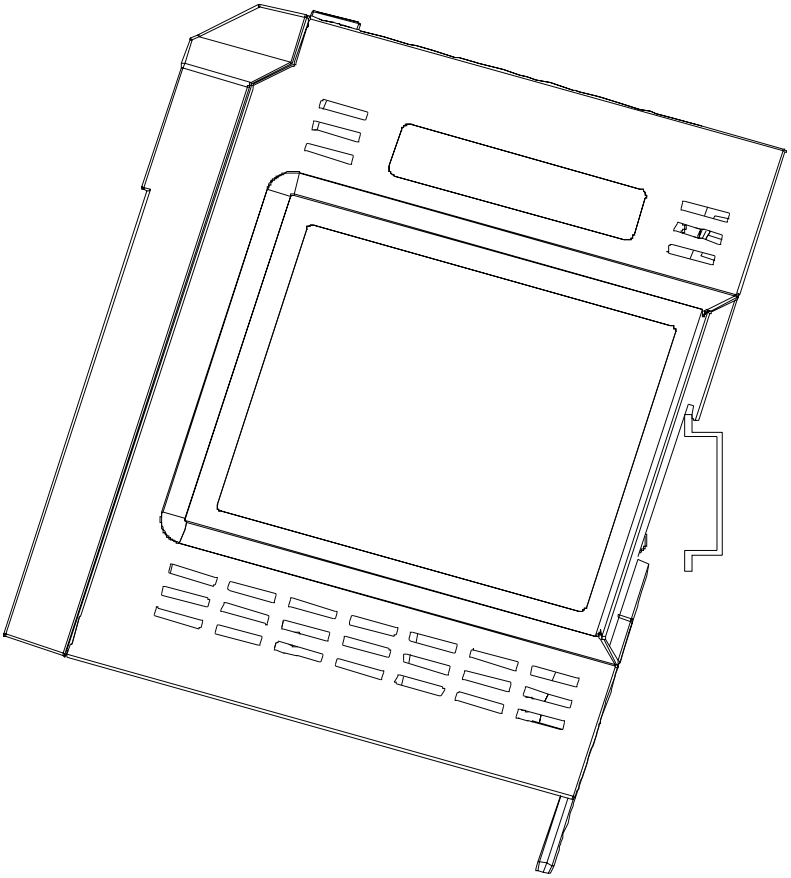

Figure 2.8: Installation to DIN Rail Step 2

Put the EKI-6538 at a right angle with the Din Rail. The grounding spring in the back should be flush with the aluminum rail. Then pull up the kit to wedge the EKI-6538 firmly into place.

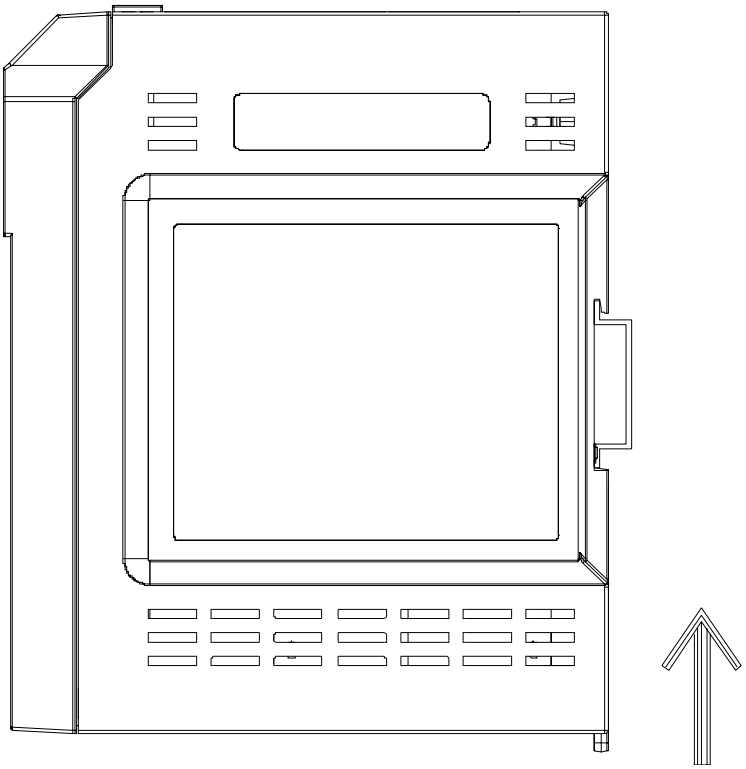

Figure 2.9: Installation to DIN Rail Step 3

2.5 Network Connection

EKI-6538 has 8 x RJ-45 ports that support connection to 10 Mbps Ethernet, or 100 Mbps Fast Ethernet, and half or full duplex operation. EKI-6538 can be connected to other hubs or switches through a twisted-pair straight through the cable or a crossover cable up to 100m long. The connection can be made from any port of the EKI-6538 (MDI-X) to another hub or switch either MDI-Z or uplink MDI port.

EKI-6538 supports auto crossover to make networking more easy and flexible. You can connect any RJ-45 (MDI-X) station port on the switch to any device such as a switch, bridge or a router.

2.6 Power Connection

EKI-6538 supports dual +10 ~ 48 V_{DC} power inputs and power-fail relay output.

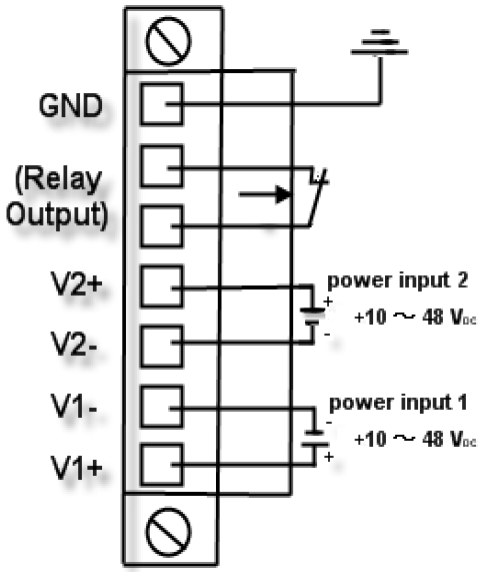

Figure 2.10: Pin Assignment of the Power Connector

You can connect an alarm indicator, buzzer or other signaling equipment through EKI-6538's relay output. The relay opens if power input 1 or power input 2 fails.

2.7 Digital Input and Output

There are two sets of digital input/outputs that the EKI-6538 supports. The default DO status equals to the relative DI status (DI0=DO0, DI1=DO1). Below you can find the top view for the pin assignment of the DI/O terminal block.

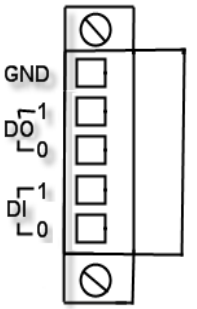

Figure 2.11: Digital I/O Pin Assignment

Note: Grounding and wire routing can help you to limit the effects of noise due to electromagnetic interference (EMI). Connect the ground screw to the grounding surface while you wire the power connection and Digital I/O.

2.8 RS-232 Connection

EKI-6538 has one RS-232 console port located on the bottom. Use the included RJ-48 to female DB9 cable to connect EKI-6538's console port to your PC's COM port, then you can use the standard Windows terminal program to configure EKI-6538 via the console port in the field.

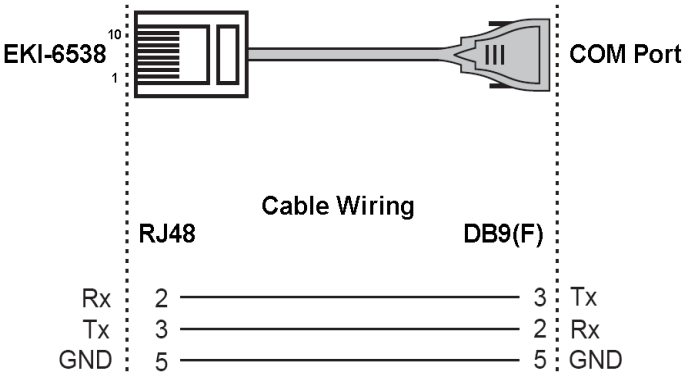

Figure 2.12: RJ-48 (10-pin) to DB9 (F) Cable

CHAPTER 3

Configuration

Sections include:

- RS-232 Console
- Web Browser
- Self Diagnosis

Chapter 3 Configuration

The EKI-6538 can be confiigured in two ways: via RS-232 Console or a web browser.

3.1 RS-232 Console

EKI-6538's RS-232 console is designed for field-site rapidly configure, only provide below functions--networking configuration (IP Address, Subnet Mask, Default Gateway), password setting, system restart and back to factory default setting.

Use the included accessory RJ-48 to female DB9 cable to connect EKI-6538 and your host PC.

From the Windows desktop, click:

Start /Programs/Accessories/Communications/HyperTerminal to open Hyper Terminal program.

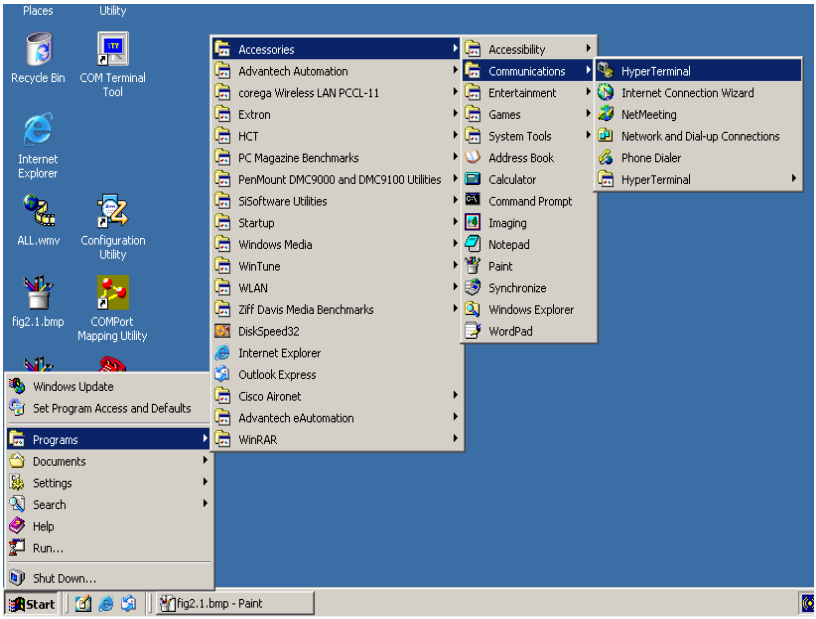

Figure 3.1: Open Hyper Terminal

Select the appropriate COM port, and set the parameter as Fig.3.2 (**115200** for **Baud Rate, 8** for **Data Bits, None** for **Parity, 1** for **Stop Bits,** and **None** for **Flow Control**)

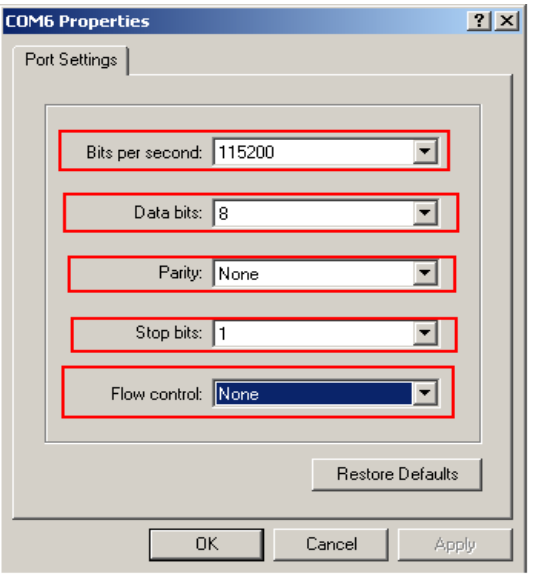

Figure 3.2: COM Port Properties Setting

Press **Enter** for login screen. (If you can not find the login screen, press **Enter** one more time) The default User Name and password are both "**admin**". Key-in the user name and password to enter the main menu.

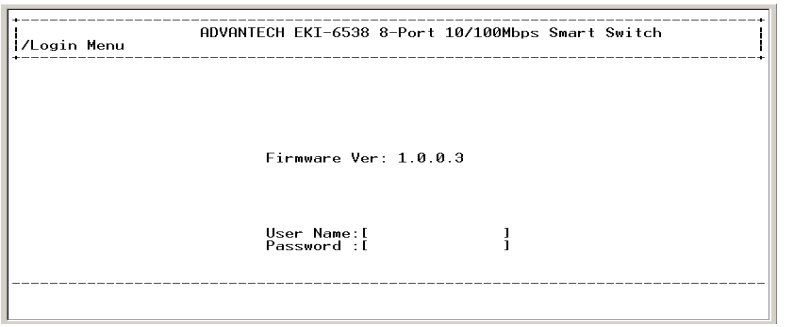

Figure 3.3: Login Screen: RS-232 Configuration

There are four options found in the main menu, just key-in the number in front of the options to enter the function, and you can press **Esc** to back the previous menu.

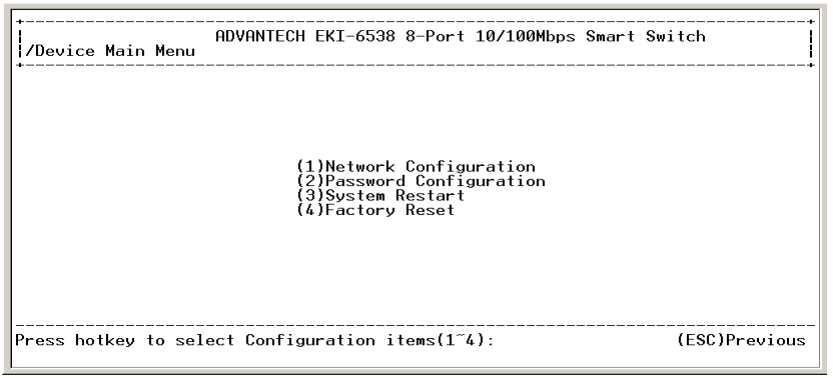

Figure 3.4: RS-232 Console Configuration

3.1.1 Networking Configuration

You can configure the basic networking setting here. Just key-in the number in front of the options then enter the networking setting.

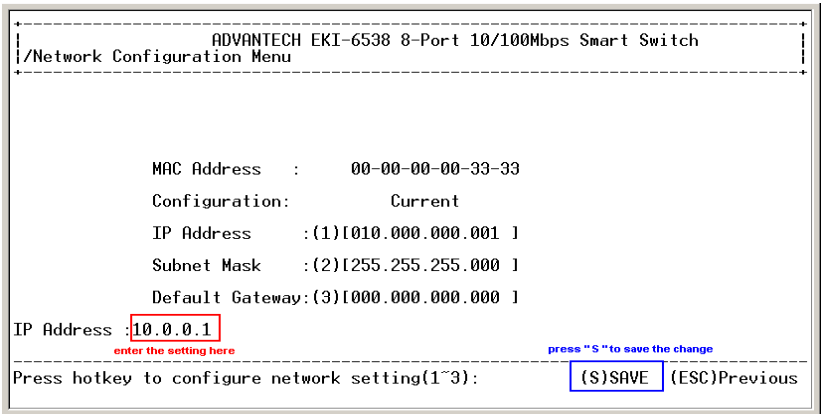

Figure 3.5: Network Configuration of RS-232

Warning *After pressing **Enter**, you will find the networking setting in the screen has been changed, but you still have to press "**S**" to save your changes before escaping this screen.*

Warning *The wrong message will show while you set "**0**" for the first segment of the subnet mask and default gateway (**000.xxx.xxx.xxx**). The default setting has no such limitation.*

3.1.2 Password Configuration

In the password configuration, you need to key-in the old password, new password and confirm the new password to finish the password change process. An error message will be shown if you want to save before you finish the whole process.

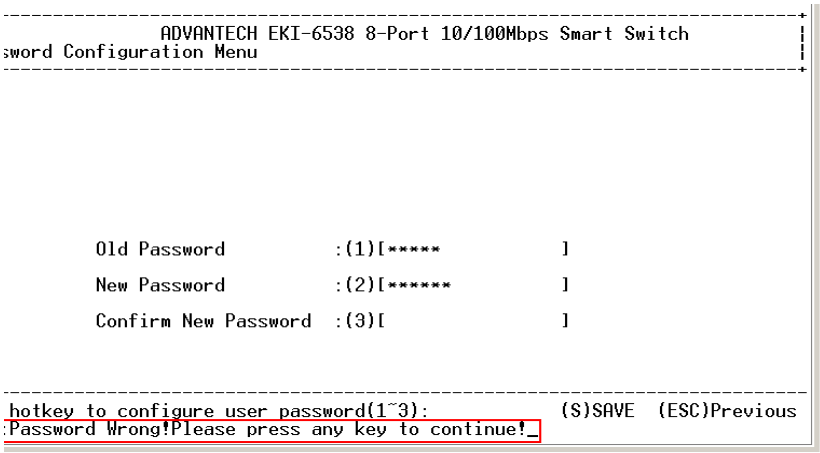

Figure 3.6: Error Message in Password Configuration

3.1.3 System Restart

Here you can restart the system via this function. The screen will jump to the login screen when you press " **1** " to agree to restart EKI-6538.

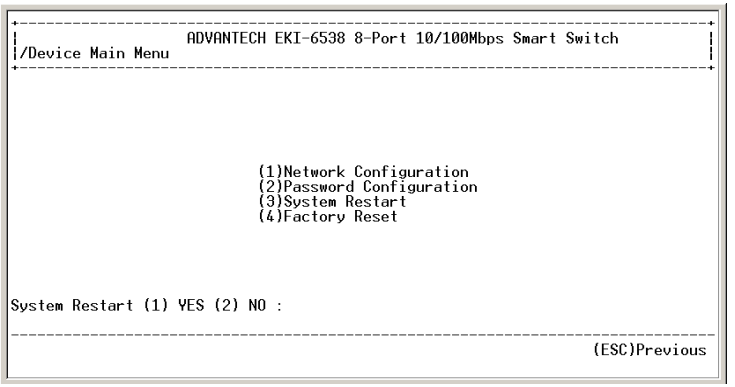

Figure 3.7: Restart EKI-6538

3.1.4 Factory Reset

If you forget your setting or the setting becomes disorderly, this function can make one or all settings go back to the default.

Choose the item you want to go back to default setting, your configuration will be updated in the table above, remember to press " **E** " to execute your configuration before you leave this screen.

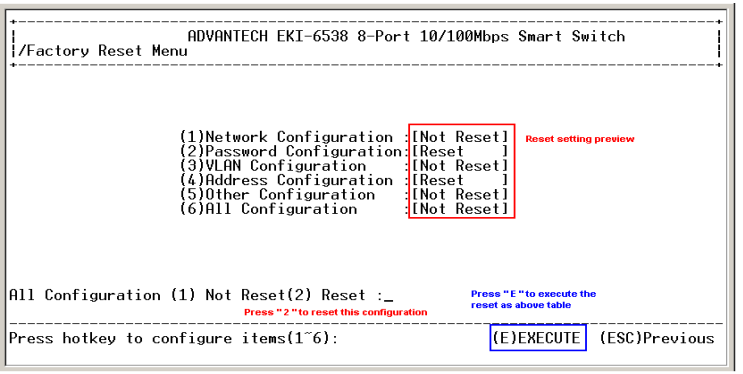

Figure 3.8: Default Setting via 232 Configuration

3.2 Web Browser

EKI-6538 provides a convenient configure way via web browser, you can follow below step to access EKI-6538.

EKI-6538's default IP is **10.0.0.1**, make sure your host PC and EKI-6538 are on the same logical sub-network.

Warning *Your host PC should be in the same VLAN setting with EKI-6538, or the management will not be configured.*

Connect EKI-6538 to the Ethernet, then your host PC could configure it via Ethernet. Or you can directly connect EKI-6538 to your host PC with a straight-through or cross over Ethernet cable.

Open Internet Explorer and type EKI-6538's IP in the Address field, then press Enter to open the web login page.

Figure 3.9: EKI-6538 Web Login Page

Default user name and password are both **admin**, fill in the username and password then press **OK** to enter the configuration. You can change the password in the system setting.

In the Overview page, you can find the overview and the brief description of the functions EKI-6538 provided. Click the "+" symbol to unroll the hiding hyperlink, and click the hyperlink to open the function page you want to configure.

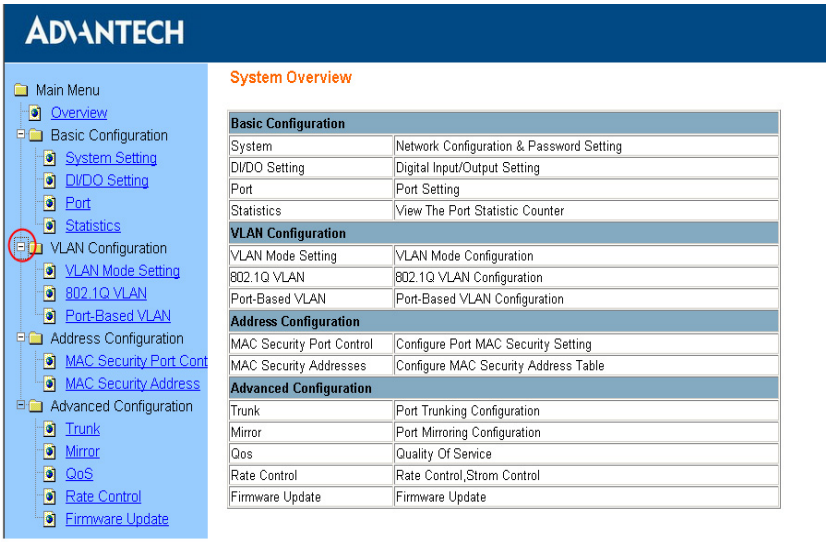

Figure 3.10: Function Overview Page

3.2.1 Basic Configuration

System Settings

In this page, you can find the current firmware version and the MAC address of EKI-6538. You can also make configuration for the network, password and ARL aging time. Remember to press the "Apply" button to save your cofigure.

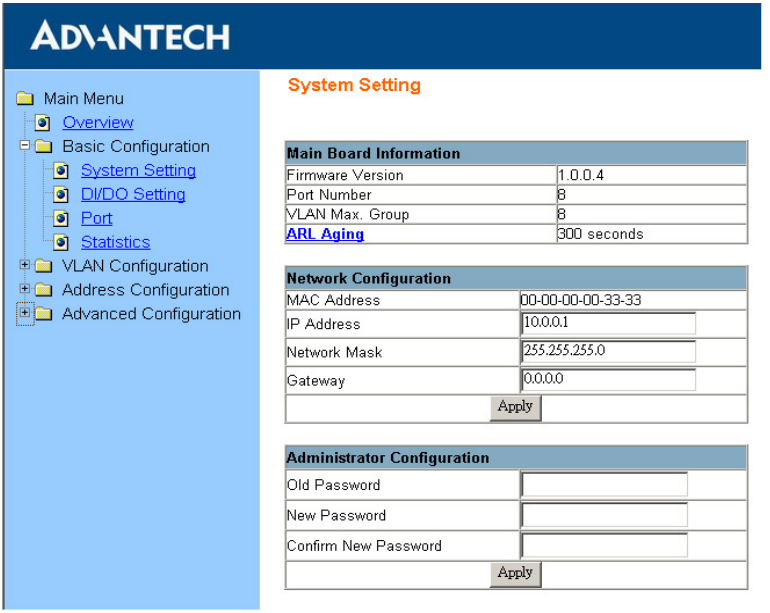

Figure 3.11: System Setting

ARL aging time (0~ 1048575)

Aging time is counted from the last time that the switch saw the MAC address. The default value is 300 seconds. That means if EKI-6538 doesn't receive the packet from the specific MAC address for 300 seconds, this MAC address will be removed from ARL table. EKI-6538 will broadcast the following packets from this MAC address, learn and record the behavior again until rebuild it into ARL table.

If you disable the ARL aging function, EKI-6538 will not record or remember any MAC address while its MAC address table capacity is full. Packets coming from the MAC address outside the existed MAC address table would be broadcast to all ports.

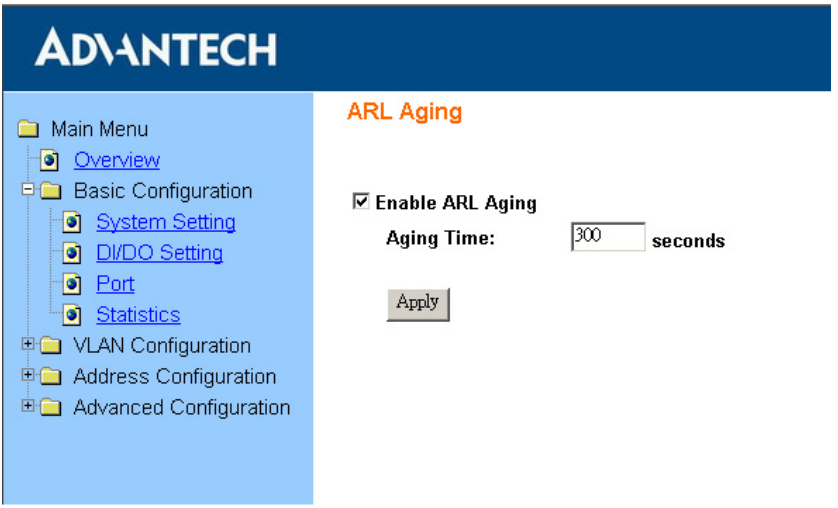

Figure 3.12: ARL Aging Time Setting

DI/DO Setting

By simply setting up a web-based configuration, you can manage the connection between two digital inputs and two digital outputs that are built into EKI-6538. These are invaluable when integrating field indicators or alarm devices that will respond to messages according to individual user's configured setting.

The DI/O default setting of EKI-6538 is ----

DI0=DO0=**HIGH**; DI1=DO1=**HIGH.**

The number with blue boldface character means the current DI/O status (1=HIGH, 0=LOW), you can press the **Refresh** button to update it.

DO can be decided by both DI or assigned HIGH/LOW directly. Choose the status in the pull down list for your prefer setting.

Make a checkmark in the **Invert DO** column, then click **Apply** to invert the DO status.

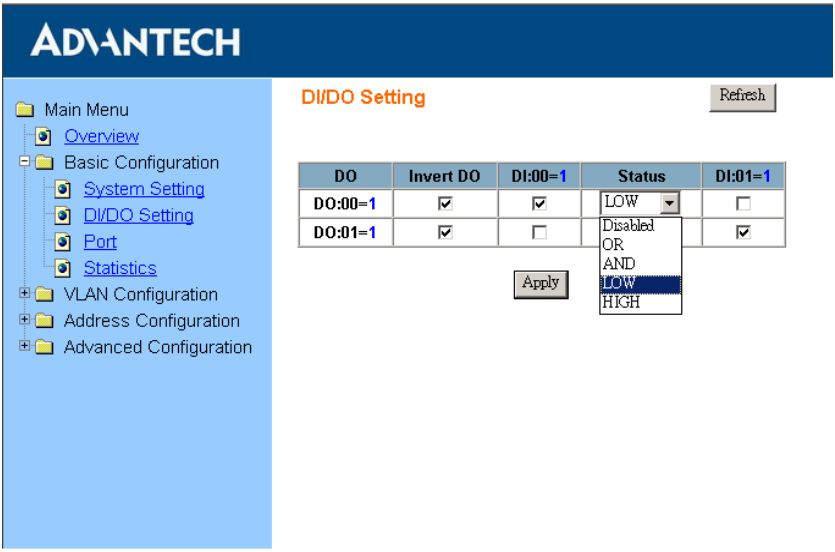

Figure 3.13: DI/DO Setting

Port Status

Here you can find the current status of each port, includes link status, speed, duplex, flow control and each port's VLAN ID. Press "**Refresh**" button to update latest status.

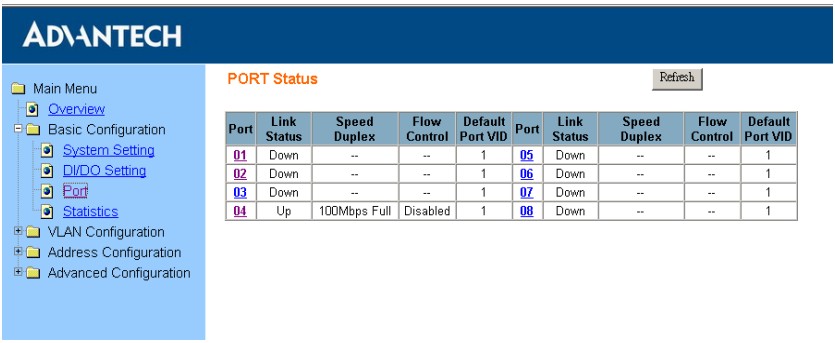

Figure 3.14: Port Status

Click on the number to configure the port. Press "**Apply**" to save you configuration before leave this page.

Admin

Enable: Transmit and receive packets

Disable: Reject packets transmission and reception

Auto Negotiation

Enable: Speed and Duplex are auto-negotiated by the connecting devices

Disable: Speed and Duplex must be set by manual.

Speed Duplex

Set the same speed/duplex in the network area, or the communication may have problems.

Flow Control

Enable: When the flow is over loading, system would send out a frame to suspend the data transmission. That will control the flow effectively without packet loss

Disable: No flow control and might cause packet loss while over loading.

Default Priority

Set up the priority of the packet from this port (0~7)

Default Port VID

Add 802.1Q VLAN tag to the ingress packet without 802.1Q VLAN tag. If the packet ingress to this port without default VLAN tag, EKI-6538 will add the VID tag to this packet as you set here.

This tag not only include the 802.1Q VLAN ID, the priority information were included also.

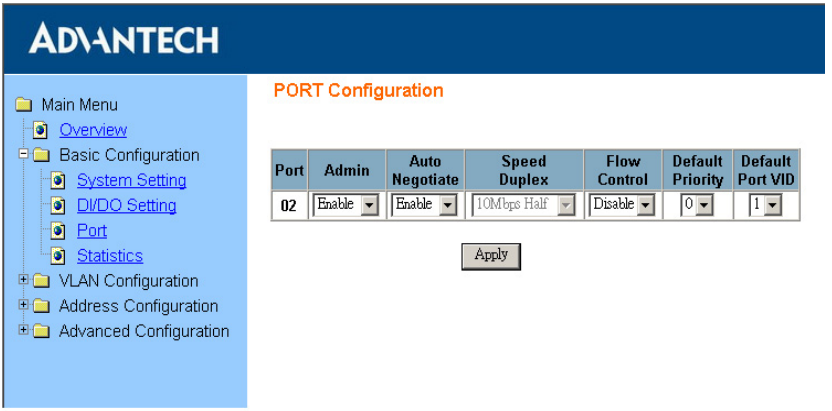

Figure 3.15: Port Configuration

Port Statistics

Overview the packets transmission and reception statistics of EKI-6538. It would not update automatically. Click "**Refresh**" to show current counter, or Click "**Clear Counter**" to clear all counter to zero.

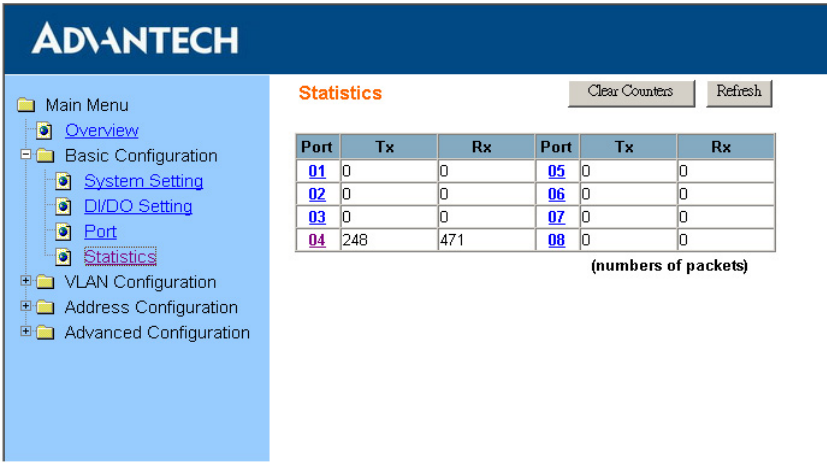

Figure 3.16: Port Statistics Overview

For detail statistics of each port, just click the number of the port you want to understand.

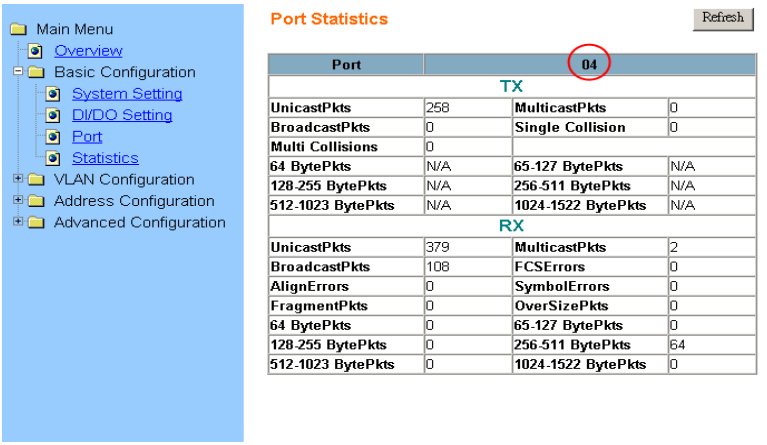

Figure 3.17: Detail Statistics of Specific Port

3.2.2 VLAN Configuration

Virtual Local Area Network (VLAN) is a group of devices on one or more LANs that are configured so that they can communicate as if they were attached to the same wire, when in fact they are located on a number of different LAN segments. Because VLANs are based on logical instead of physical connections, it is very flexible for user/host management, bandwidth allocation and resource optimization. **Packets can not be transmitted and received in different VLAN.** EKI-6538 provides two different VLAN modes for network management.

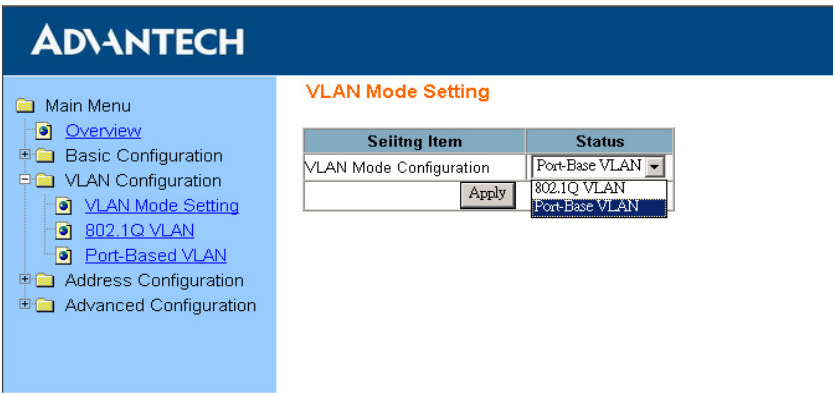

Figure 3.18: VLAN Mode Setting

Port-based VLAN

If you set the VLAN mode to Port-based VLAN, each physical switch port is configured with an access list specifying membership in a set of VLANs.

You could find the status in the Port-based VLAN configuration page show "**Enable**". The default VLAN ID for each port is "**1**".

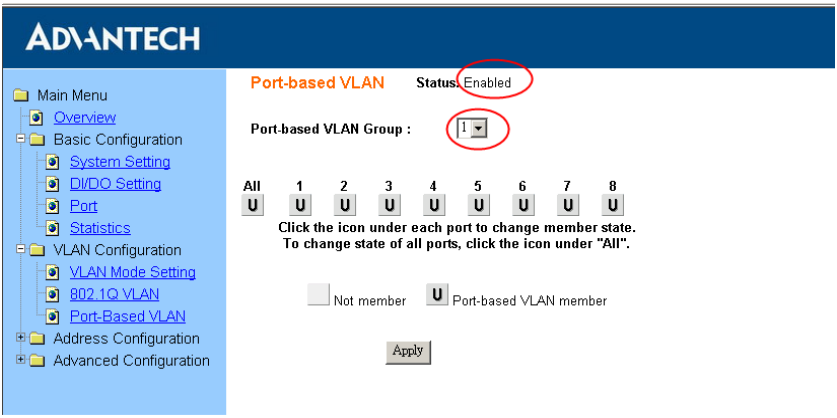

Figure 3.19: Default Port-based VLAN Setting Screen

To configure the port-based VLAN, you have to choose the VLAN ID from the pull down menu first. Second, choose the port member for this VLAN ID via click the icon under the port number. Finally, don't forget to click **Apply** to finish your setting for this VLAN ID.

Fig 3.20 shows port 2 and port 3 belongs to the same VLAN group — VID= 2.

Warning : The default VID=1 should be removed or changed first while you want to configure port-based VLAN by your option. If you didn't remove or change it, default VID=1 would allow packets transmitted and received between all ports, and your optional configuration would be ineffective.

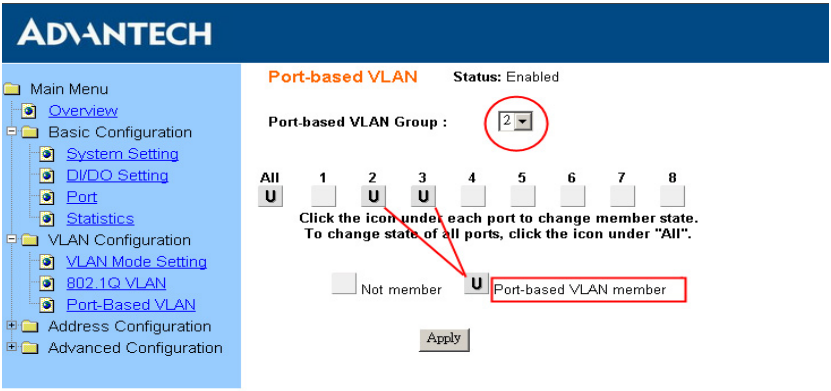

Figure 3.20: Port-based VLAN Setting

IEEE 802.1Q VLAN

The IEEE 802.1Q specification establishes a standard method for tagging Ethernet frames with VLAN membership information. If you want to set VLAN as IEEE 802.1Q standard, change the VLAN mode to configuration to 802.1Q VLAN first.

In the IEEE 802.1Q VLAN configuration page, confirm the status shows "**Enable**", then start to configure the 802.1Q VLAN setting in the same way as port-based VLAN setting.

EX:

VLAN ID 1: Port 1(T), Port 2 (T), Port 7(U), Port 8(U)

VLAN ID 2: Port 3(U), Port 7(T)

While packets egress, EKI-6538 will check the packets' VID and the egress port's VID setting.

For the example setting, packets with tag VID 2 could not egress from port 1,2,4,5,6,8 since the ports' VID are not 2; Packets with tag VID 1 could only egress from port 1,2,7,8. Meanwhile, packets without default VID would be tagged as VID 1 while they egress from Port 1,2, and would be added tag VID 2 while egress from Port 7.

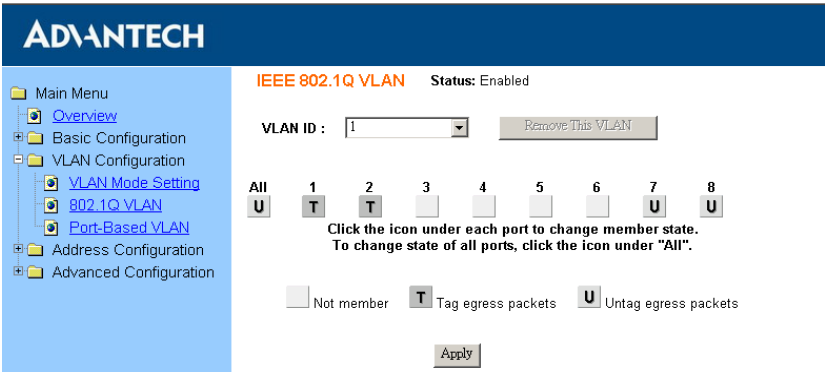

Figure 3.21: IEEE 802.1Q VLAN Setting

Warning *A. Default VLAN ID (1) couldn't be removed.*

B. The port your PC connecting can not be set as "Tag" or "Not member".

3.2.3 Address Configuration

Enable the port security function, the port with "**Enable**" status would only allow the packets from the MAC address in the "MAC Security Address Table" to ingress EKI-6538.

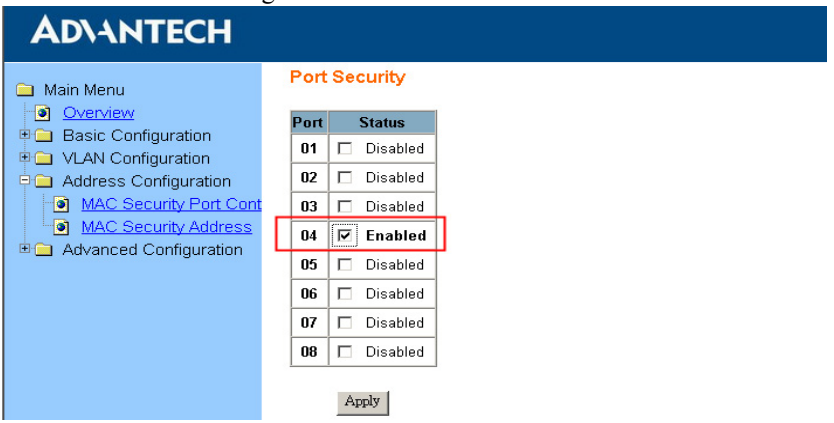

Figure 3.22: Port Security Configure

Users can input static MAC address for corresponding port to the table as Fig 3.23. Each port has its independent "MAC Security Address Table", and the maximum MAC number of each table is 4.

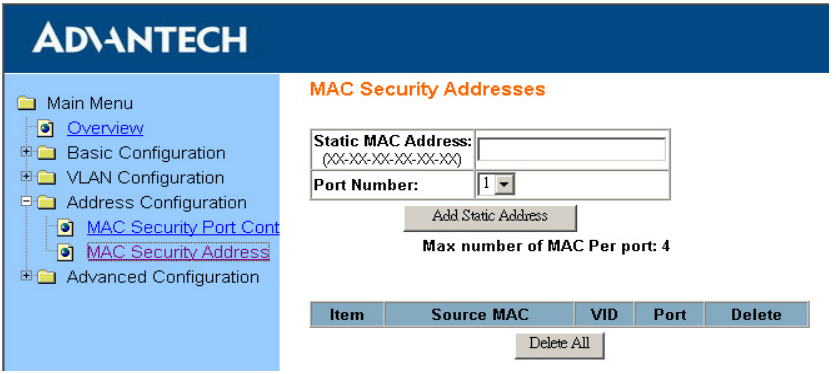

Figure 3.23: Setup the MAC Security Address Table

3.2.4 Port Trunk

Port trunk allows multiple links to be bundled together and act as a single physical link for increased throughput. It provides load balancing, and redundancy of links in a switched inter-network. (For example Fig 3.24):

Set switch A port 6 and port 8 as same trunk 1 with 100Mbps, and set switch B port 6 and port 8 as trunk 2 with 100Mbps, connect port 6 and port 8 of both switches, then the speed of the trunk would be doubled as 200Mbps.

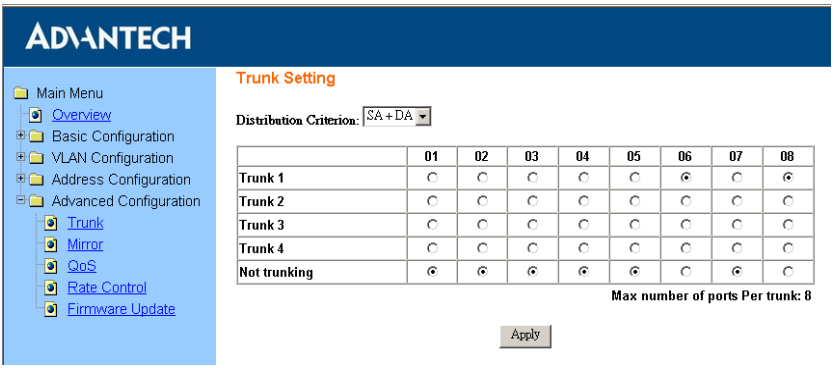

Figure 3.24: Port Trunk Setting

- SA: Source Address
- DA: Destination Address

3.2.5 Port Mirroring

Port mirroring allows one port of the switch to monitor the traffic transmitted/received by the other port of the switch. The network administrator with a protocol analyzer is allowed to capture packets from mirror port to evaluate and monitor without affecting the operation of clients on the original port.

Enable the mirror function then start to setup the mirroring.

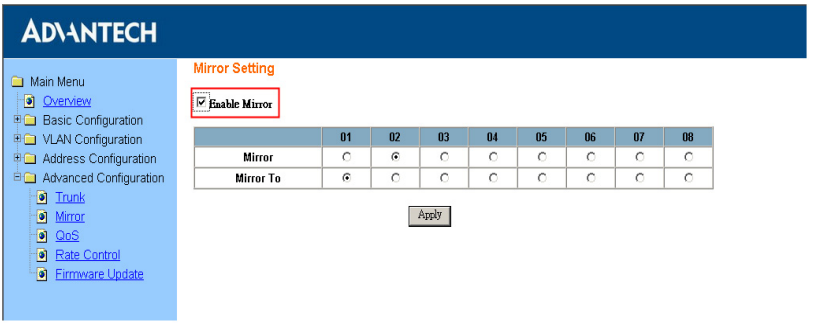

Figure 3.25: Port Mirror Setting

3.2.6 QoS (Quality of Service)

Quality of Service ensures critical data is delivered consistently and predictably. EKI-6538 supports Layer 2 802.1p priority queue control to prioritize network packets depending on customer's needs. The feature of QoS is useful in improving determinism.

Fig 3.26 shows the EKI-6538 QoS configuration page. Setting the corresponding table of the packet default priority (0~7) and the switch Queue(0~3). As WRR mode rule, each Queue will transmit packets as the weight number (1~31) in turn.

Warning *Default Weight of Queue (0,1,2,3) = 1,2,4,8, Higher priority queue weight cannot be smaller than a lower one.*

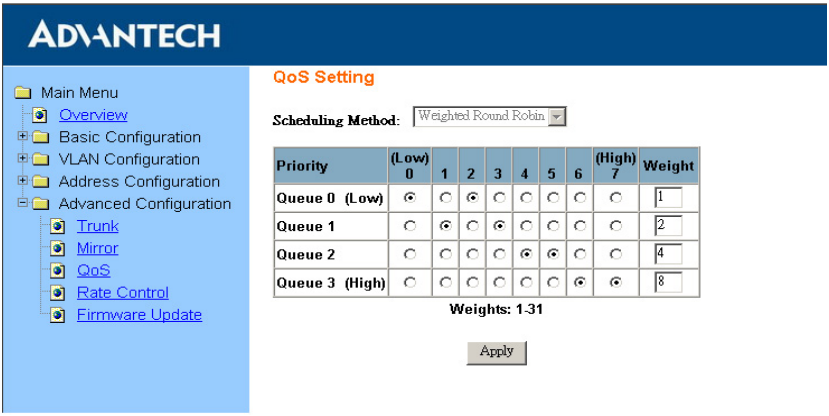

Figure 3.26: QoS Setting

3.2.7 Bandwidth Administration

Network broadcast storms or malfunctioning network devices will generate unexpected, large packets which can block network traffic. EKI-6538 provides rate control to configure the ingress/egress rate of unicast/multicast/broadcast packets in parts and limit the bandwidth of each individual port to prevent unexpected network traffic.

The rate control page shows current rate limitation of each port, click on the port number to enter specific port setting and storm control setting.

Ingress rate: The limitation of input rate.

Egress rate: The limitation of output rate.

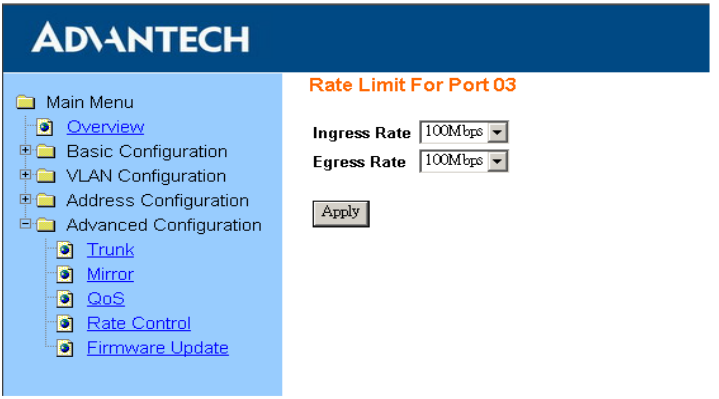

Figure 3.27: Rate Limitation Setting

Storm Control: Choose what kind of storm you want to control, and set the storm ratio of the packets. Storm means broadcast, multicast, or unknown unicast.

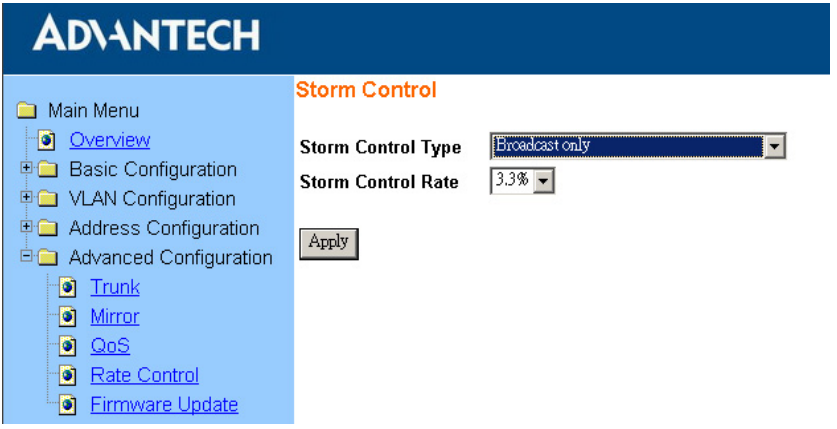

Figure 3.28: Storm Control Setting Page

3.2.8 Firmware Upgrade

Following the below step to upgrade EKI-6538 firmware.

1. Download the firmware from ADVANTECH website.
2. Connect EKI-6538 and press "**YES**" to start firmware upgrade.
3. Fill in the path to getting the firmware you want to upgrade.
4. Press the "**Upgrade**" button to process the upgrade.

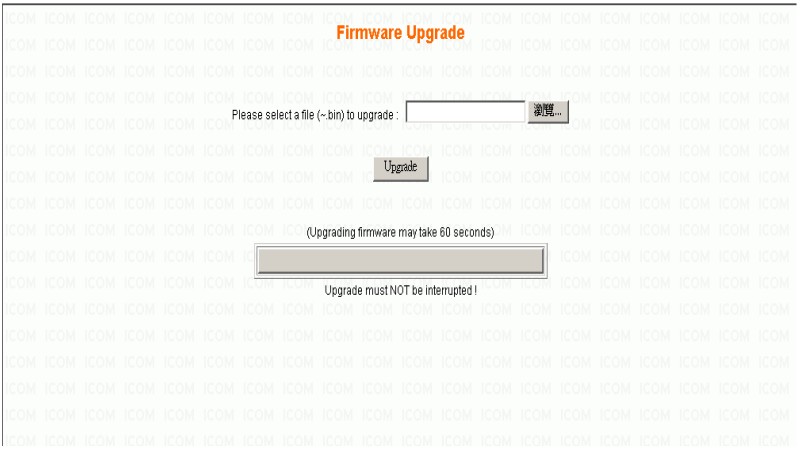

Figure 3.29: Firmware Upgrade

Warning *If broken, the upgrade process may cause damage to the the EKI-6538 module. Contact Advantech for repair support*

3.3 Self Diagnosis

EKI-6538 comes with a self-diagnosis button (on the top of EKI-6538) and front-viewable LEDs for field troubleshooting. Without the need for extra tools, you can recognize the hardware status of the Ethernet port instantly through one single button.

If you find the link status or the LED indicator status is abnormal, you can use the self-diagnosis button for self-diagnosing. Press the button while EKI-6538 is working for few seconds (1~3 sec) until the LEDs turn off temporary. The LEDs will be shining when the self-diagnosis is going. After few seconds, the LEDs will back to normal status and the FAULT LED will be lit if one of the linked ports fail. User can easily determine if the abnormal problem caused from EKI-6538.

Figure 3.30: Self-Diagnosis