KTI
NETWORKS

Installation Guide

Web Smart Managed
10/100 Fast Ethernet Switches

KS-115FM
KS-117FM

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This device complies with EMC directive of the European Community and meets or exceeds the following technical standard.

EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment. This device complies with CISPR Class A.

WARNING: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

CE NOTICE

Marking by the symbol $\big(\;\in$ indicates compliance of this equipment to the EMC directive of the European Community. Such marking is indicative that this equipment meets or exceeds the following technical standards:

EN 55022: Limits and Methods of Measurement of Radio Interference characteristics of Information Technology Equipment.

EN 50082/1:Generic Immunity Standard -Part 1: Domestic Commercial and Light Industry.

EN 60555-2: Disturbances in supply systems caused by household appliances and similar electrical equipment - Part 2: Harmonics.
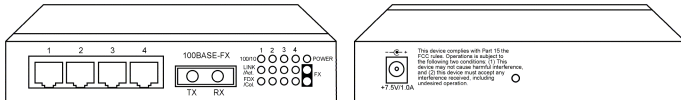
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1. Introduction

This guide describes the specifications and installation instructions for the following two managed 10/100 switch series:

KS-115FM series

- Four 10/100BASE-TX auto-negotiation TP switched ports
- One 100BASE-FX Fiber switch port
- Web-based device management support
- Compact Fast Ethernet switch

KS-117FM series
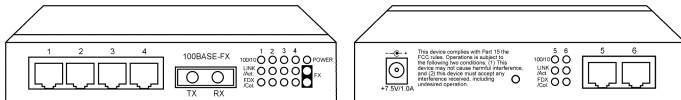
- Six 10/100BASE-TX auto-negotiation TP switched ports
- One 100BASE-FX Fiber switch port
- Web-based device management support
- Compact Fast Ethernet switch

1.1 Features

- The 10/100BASE-TX switched ports support:
    - Auto speed sensing for 100Mbps or 10Mbps connection
    - Auto configuration for connected auto-negotiation devices
    - Full-duplex or half-duplex operation
    - Port configuration can be changed via web management interface
- The 100BASE-FX switched port supports:
    - 100Mbps full duplex connection
    - Variety of fiber connectors such as ST, SC, MT-RJ, LC and VF-45
    - Multimode and single mode fiber cables (model dependent)
- Provide the following switch functions:
    - Self learning for active MAC addresses up to 2K entries
    - Store and forward switching that only good packets are forwarded
    - Forwarding and filtering at full wire speed
    - Flow control for traffic congestion
    - Broadcast packet storm protection
    - Port-based priority QoS function
    - IP-based DS-TOS QoS function
    - IEEE802.1p tagged priority QoS function
- Provide the following management functions:
    - Web-base interface for easy management
    - DHCP support for IP configuration
    - Static IP configuration if DHCP is not available
    - Port status and configuration
    - QoS configuration
    - Security check for management login
    - Restore factory default settings
    - Remote boot
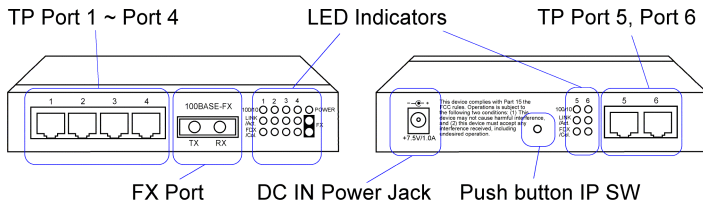- Comprehensive LED indicators

1.2 Specifications

TP Port 1 ~ Port 4   LED Indicators   TP Port 5, Port 6

FX Port   DC IN Power Jack   Push button IP SW

Figure : Major Components on Panels (Ex. KS-117FM)

KS-115FM P1-P4	Port 1 ~ Port 4 Twisted-pair switched ports (TP ports)
KS-117FM P1-P6	Port 1 ~ Port 6 Twisted-pair switched ports (TP ports)
TP Port	IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX std. Shielded RJ-45 jacks with Auto MDI-X detection Auto-negotiation capable Speed for 10Mbps or 100Mbps Full-duplex or half-duplex support
FX Port	IEEE 802.3u 100BASE-FX compliant Fixed 100Mbps Full-duplex operation
Flow control	IEEE 802.3x pause packet for full duplex operation Back pressure for half duplex operation
Cables	10BASE-T Cat. 3, 4, 5 or higher (100 meters max.)
	100BASE-TX Cat. 5, 5e or higher (100 meters max.) 100BASE-FX multimode or single mode fiber cable
LED indicators	Power status TP ports : Speed, Link/Activity, Duplex/Collision status FX port : Link/Activity, Duplex/Collision status
Filtering rate	14,880 pps for Ethernet (10BASE-T) 148,800 pps for Fast Ethernet (100BASE-TX)
Forwarding rate	14,880 pps for Ethernet (10BASE-T) 148,800 pps for Fast Ethernet (100BASE-TX)

Filtering address	Multicast/Broadcast/Unicast address
MAC address	2K entries
Aging time	300 seconds
Priority levels	2 outgoing priority queues (Ratio: High/Low = 4/1)
QoS mode	1. IP DS-TOS (First) and 802.1p (Second) 2. Port-base priority method
Environment	Temperature 0ºC to 40ºC Relative humidity 10% to 90% non-condensing
Dimensions	144 mm x 100 mm x 26 mm (WxDxH) 5.67 x 3.94 x 1.02 inch
DC IN Power	Rating +7.5V min. 1A
DC IN Jack	D6.3mm— ——● —— +D2.0mm
Operating voltage	+6.5 ~ +12.5VDC (Device DC Input)
Power	Consumption 7W max. (with power adapter)

1.3 FX Port Optical Specifications

Model Ext.	Connector	Wavelength	Tx optical power	Rx sensitivity
-T	MM[1] ST	1310nm	-20 ~ -14dBm	-31dBm
-C	MM SC	1310nm	-20 ~ -14dBm	-31dBm
-JM	MM MT-RJ	1310nm	-20 ~ -14dBm	-31dBm
-VM	MM VF-45	1310nm	-20 ~ -14dBm	-31dBm
-L	MM LC	1310nm	-19 ~ -14dBm	-34dBm
-SA2	SM[2] SC	1310nm	-15 ~ - 8dBm	-31dBm

*1 : Multimode fiber
*2 : Single Mode fiber

1.4 Management Specifications

Interface	In-band web browser for IE4.0 and Netscape4.x Ping command, ARP command
Protocols	IPv4, ARP, ICMP, UDP, TCP, DHCP client, Http server
IP Setting	DHCP dynamic IP mode (default mode) Static IP mode (default : 192.168.0.2)
DHCP	DHCP client ID = Device modelname + MAC address
Security	Login password checking Password setting (default : 123)
Port Monitoring	All ports : port status monitoring Link, Speed, Duplex, Flow control status
Port Control	Per TP port configuration settings Auto-negotiation function : enable, disable Speed : 100M, 10M Duplex : full, half
QoS	QoS mode selection IP-TOS / 802.1p (VLAN tagged) mode Port-base mode
IP-TOS	IP-TOS precedence value priority for IP packets : 8 values Per value setting : high, low
802.1p	Tag priority value for VLAN tagged packets : 8 values Per value setting : high, low
Port-base Priority	Port priority Per port setting : high, low
Restore Default	Restore factory default settings Refer to Appendix for factory default settings
Reboot	In-band remote boot the switch

2. Installing the Switches

2.1 Unpacking

Check to see that you have everything before you start the installation.

- Installation guide
- The switch unit
- Rubber magnet stand
- One AC power adapter for the unit

2.2 Supply the Power

Checking AC Power

Before you begin the installation, check the AC voltage of your area. The AC power adapter which is used to supply the DC power for the unit should have the AC voltage matching the commercial power voltage in your area. The specifications of the AC power adapter are:
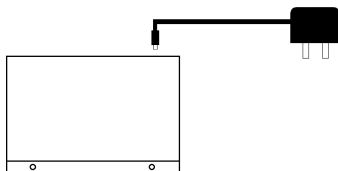
- AC input power: AC power voltage of your area
- DC output power: Rating +7.5V VDC min. 1.0A
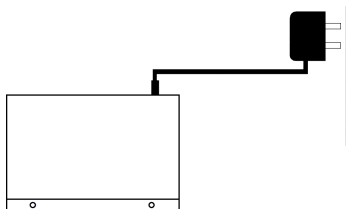- DC plug type:

DC IN Jack

The DC power jack for the AC power adapter is located on the rear of the switch. Refer to section 1.2 drawing.

Installing the Switch

1. Install the switch with the AC power adapter provided.

2. Connect the power adapter cable to the switch before connecting the adapter to the AC outlet.

2.3 Port Configuration

The switches provide port configuration function through the management interface. The setting options are shown as follows:

Port Type	TP PORTS	FX PORT
Auto-negotiation	Enable/Disable	Not allowed
Speed options	100M / 10M	Not allowed (fixed 100M)
Duplex options	Full / Half	Not allowed (fixed Full)

When auto-negotiation is enabled, the speed and duplex settings become the port highest ability used for auto-negotiation process. The final configurations used with the connected device may be different from the settings after negotiation between two devices. As auto-negotiation is disabled, the speed and duplex settings are the forced operating configuration for the connection.

The real time port status for each port connection can be monitored through the management interface. The status are:

Link	Physical link status
Speed	Connection speed used
Duplex	Duplex mode used
Flow Control	Flow control status after negotiation

2.4 QoS Function

Forwarding Priority

Every output port is equipped with two transmission priority queues. The high priority queue stores the high priority packets to be forwarded and low priority queue stores the low priority packets.

Each receiving packet is determined and classified into one of two priority levels, high priority and low priority upon reception. The determination is based on the device QoS operating mode setting.

QoS Operating Modes

The switches provide a user selection of the following two QoS (Quality of Service) operating modes:

1. IP DS-TOS and 802.1p Mode

This mode is called Packet Priority mode. The packet priority is dependent to the content of each receiving packet. The decision method is described as follows and applied to all input ports:

Step 1. If the receiving packet is an IPv4 packet, the switch will check the value of Precedence field (Bit 0~2) of TOS (Type of Service field) in IP header. By this value, the packet is classified as high priority or low priority according to device IP-TOS priority setup table.

TOS Precedence Value	Priority Options	Factory Default
0	High / Low	Low
1	High / Low	Low
2	High / Low	Low
3	High / Low	Low
4	High / Low	High
5	High / Low	High
6	High / Low	High
7	High / Low	High

Step2. If the receiving packet is not an IP, but an 802.1Q VLAN tagged packet, the device will check the 3-bit User Priority value in TCI (Tag Control Information) field of packet tag data. By this value, the packet is classified as high priority or low priority according to device 802.1p priority setup table.

Tag Priority Value	Priority Options	Factory Default
0	High / Low	Low
1	High / Low	Low
2	High / Low	Low
3	High / Low	Low
4	High / Low	High
5	High / Low	High
6	High / Low	High
7	High / Low	High

Step 3. If the receiving packet is an non-IP and untagged packet, the device will classify the packet based on Port-base mode. Refer to Port-base QoS mode for more information.

2. Port-Base Mode

This mode called port priority mode. The priority level of a receiving packet is determined by the configured priority of the input port where the packet is received and the content of the packet is ignored. Each port must be pre-configured with a priority level as follows:

Port Number	Priority Options	Factory Default
P 1	High / Low	Low
P 2	High / Low	Low
P 3	High / Low	Low
P 4	High / Low	Low
P 5	High / Low	Low
P 6	High / Low	Low
FX	High / Low	Low

QoS Management

Refer to Chapter 3 for more details about the following management objects:

> 1. QoS Operating mode setting
> 2. IP DS-TOS priority table setup
> 3. 802.1p tag priority table setup
> 4. Port-base priority setup

2.5 DHCP and IP Configuration

Each switch must be designated an IP address before it can be managed from web browser. Basically, the switches provide two methods for IP configuration:

1. **DHCP mode**

   The switch requests a dynamic IP address from the first discovered DHCP server in the network when boot up. In general, the assigned IP can be monitored in the client list on the DHCP server. The model name and MAC address of the switch is referred as the DHCP client ID. If no DHCP server is discovered after a retry period for about 40 seconds, the pre-configured static IP is used automatically.

2. **Static IP mode**

   One pre-configured IP address is used when DHCP mode is disabled or when DHCP mode is enabled and no DHCP server is available. The static IP can be configured through management interface. Each switch comes with one identical factory default IP upon device reception.

It is important to record the MAC address and location where it is installed for each switch. It would help in tracing the IP and device mapping.

2.6 Push Button IP SW

One push button IP SW located on rear panel is used to disable DHCP mode and restore static IP back to factory default value. It is useful when you do not recall your static IP setting and DHCP solution is not available.

To make the function work, push the SW and keep for at least 5 seconds when the switch is powered on to be boot up.

2.7 Making UTP Connections

TP Port Configuration

Use management function to set the required TP port configuration. It is recommended to set the highest ability for the TP ports as follows:

> Auto-negotiation = enabled
> Speed = 100M
> Duplex = Full

This is appropriate to support connection to almost every Ethernet devices including those which are not auto-negotiation capable.

Cables

Depending on the connection speed, use the appropriate UTP cables for the connections as follows:

Speed	Cables used	Distance
100M	Cat. 5, 5e, or higher grade	100 meters
10M	Cat. 3, 4, 5, 5e, or higher grade	100 meters

Auto-MDI-X Function

An Auto-MDI-X function will automatically detect if a crossover is required and make the swap of Tx pair and Rx pair internally. With this function, straight-through cable can be used for any connection. MDI to MDI-X connection rule is not necessary anymore. In the switches, all TP ports are equipped with this function. You can use just straight-through type of cables for all your connections.

2.8 Making Fiber Connection

For different fiber connections, several alternative models can be selected for different fiber connections as follows:

Model Ext.	Connector	Cable	Max. Distance[*]	
-T	ST	MM	2	Km
-C	SC	MM	2	Km
-JM	MT-RJ	MM	2	Km
-VM	VF-45	MM	2	Km
-L	LC	MM	2	Km
-SA2	SC	SM	20	Km

*: The maximum distance connecting to a full duplex device

The recommended multimode fiber is 62.5/125㎜ and 9/125㎜ for single mode fiber. The following figure illustrates a connection example between two SC fiber ports:
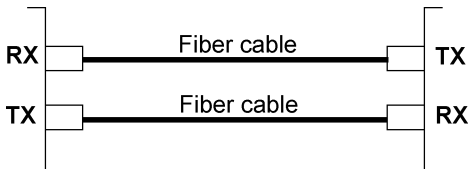
2.9 LED Indications

Functions

POWER :   indicates the status of the power supplied to the switch.
100/10 :   indicates the connection speed between the TP port
            and the associated connected device.
LINK/Act. : indicates the port link and activity status
FDX/Col. : indicates the duplex mode and collision occurrences

The following table lists the LED states and the indications:

LED	State	Indication
POWER	OFF	No power is supplied to the device.
POWER	ON	Power is supplied to the device.
100/10	OFF	10Mbps is used.
100/10	ON	100Mbps is used.
LINK/Act.	OFF	No active cable link
LINK/Act.	ON	An active link is established.
LINK/Act.	Blink	Tx/Rx activities
FDX/Col	ON	Full duplex is used.
FDX/Col	OFF	Half duplex is used.
FDX/Col	Blink	Half duplex and collision occurrences

3. Web Management

3.1 Web Browser

The system features an http server which can serve the management requests coming from any web browser software over internet or intranet network.

Web Browser
Compatible web browser software with JAVA support
Microsoft Internet Explorer 4.0 or later
Netscape Communicator 4.x or later

Start connection
Before the switch can be managed from a web browser software, the switch IP address is required. Consult your LAN administrator if it is not available. Start your browser software and enter the IP address of the switch to which you want to connect. The IP address is used as URL for the browser software to search the device.

<div align="center">URL : http://xxx.xxx.xxx.xxx/</div>

Factory default IP address : 192.168.0.2

When browser software connects to the switch unit successfully, a Login screen is provided for you to login to the device as follows:
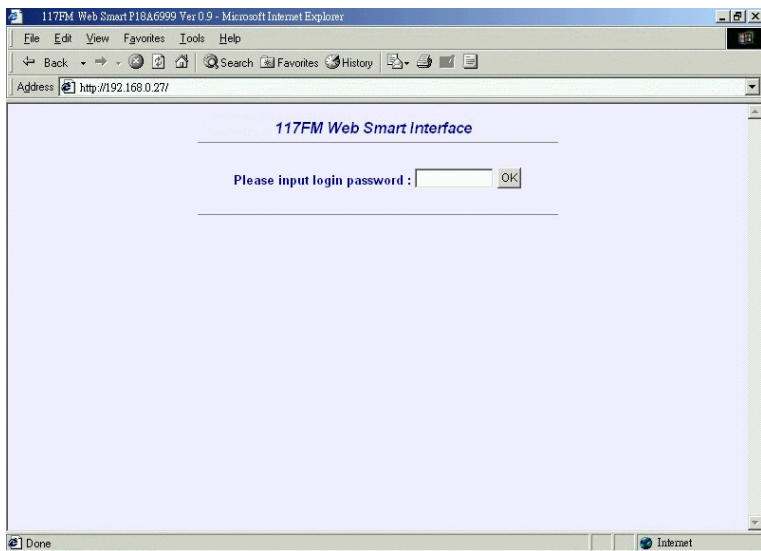
Enter your password and click [OK] to login into the switch. The switch comes with factory default password : 123.

The web page is shown as follows when a successful login is performed:
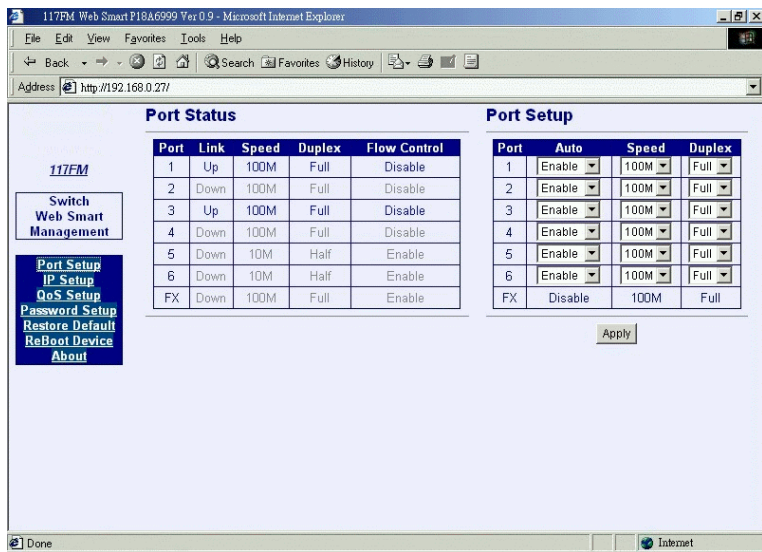
The left side shows the switch model and menu list. The list includes :

[Port Setup]	: shows port status and port configuration setup
[IP Setup]	: setup IP mode and related settings
[QoS Setup]	: setup QoS related settings
[Password Setup]	: change password
[Restore Default]	: restore factory default settings for the switch
[ReBoot Device]	: remote boot the switch
[About]	: shows management software information

The middle part shows all port status of the connected switch.
The right side shows port configuration setup page.

3.2 Port Setup

Port Status

Port Status page displays the current port status. The status are:

Port	Port number (FX : FX port)
Link	Port link status, Up = link up, Down = link down
Speed	Port speed, 100M = 100Mbps, 10M = 10Mbps
Duplex	Duplex mode used, Full = full-duplex, Half = half-duplex
Flow Control	Flow control status, enabled, disabled

Note: The switch is featured with flow control enabled for all ports. However, the flow control may be disabled after auto negotiation with the connected device, if the connected device does not have flow control ability.

Port Setup

This page is used to set the port configuration for each port. As auto-negotiation function is enabled, speed and duplex settings specify the highest port ability for negotiation process between the switch and the auto-negotiation capable link partner. When auto-negotiation function is disabled, speed and duplex settings specify the forced port configuration for the connection. Setup options are:

Auto-negotiation	Enabled, disabled
Speed	100M = 100Mbps, 10M = 10Mbps
Duplex	Full = full-duplex, Half = half-duplex

It is recommended to set auto-negotiation enabled in most of cases and set it disabled only when connecting to an auto-negotiation incapable full-duplex device.

[**Apply**]   Click to make the setup effective immediately

3.3 IP Setup
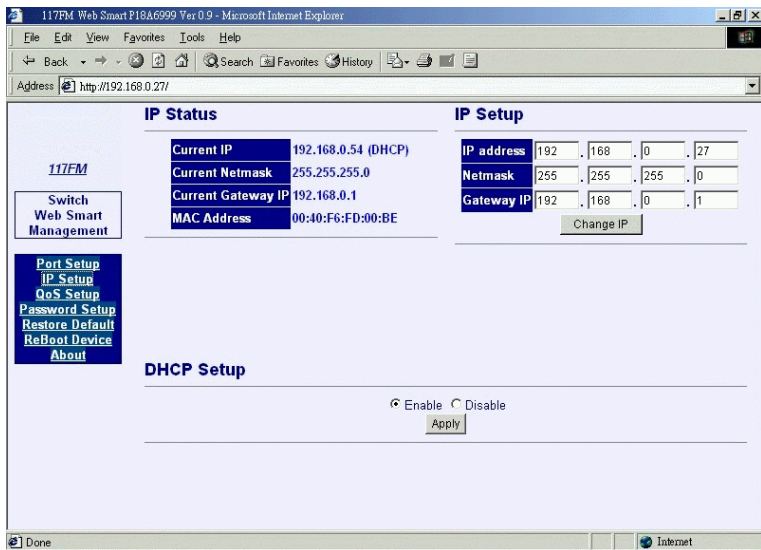

This page includes the following functions:

IP Status   Display information of current IP used
If the current IP address is labeled (DHCP), it means the
IP is assigned by DHCP server.

IP Setup   Set static IP address to be used when DHCP is disabled
or when no DHCP server is available.

DHCP Setup   Enable to get and use dynamic IP address assigned by
DHCP server. Disable to use Static IP setting.

Any change or click [Apply] do not affect current management connec-
tion. They will be effective for next bootup.

3.4 QoS Setup
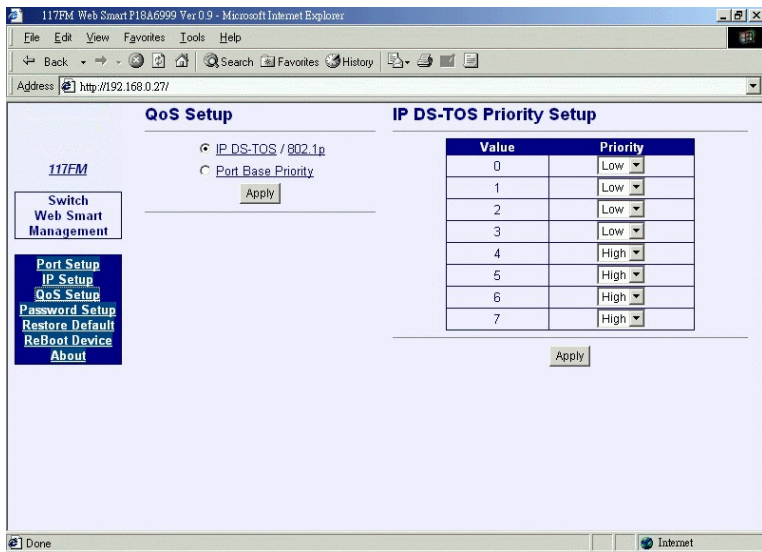
QoS Setup

This page sets QoS mode to be used. The functions are as follows:

Mode selected	Packet priority decision steps
IP DS-TOS / 802.1p	1. Check Precedence value for IP packets
	2. Check priority value of VLAN tagged packets
	3. Use Port Base priority for non IP and untagged packets
Port Base Priority	Ignore packet content and use port priority as packet priority

Click [Apply] to make change effective immediately.

3.4.1 IP DS-TOS Setup

This page pre-configures <Precedence value vs. Priority> mapping table for priority decision making used for IP packets. Each IP packet carries one precedence value embedded in its IP header. The packet priority is determined based on the mapping table upon it is received. Refer to section 2.4 for more information.

3.4.2 802.1p Setup

This page pre-configures <Tag priority value vs. Priority> mapping table for priority decision making used for VLAN tagged packets. Each tagged packet carries one priority value embedded in its tag data. The packet priority is determined based on the mapping table upon it is received. Refer to section 2.4 for more information.
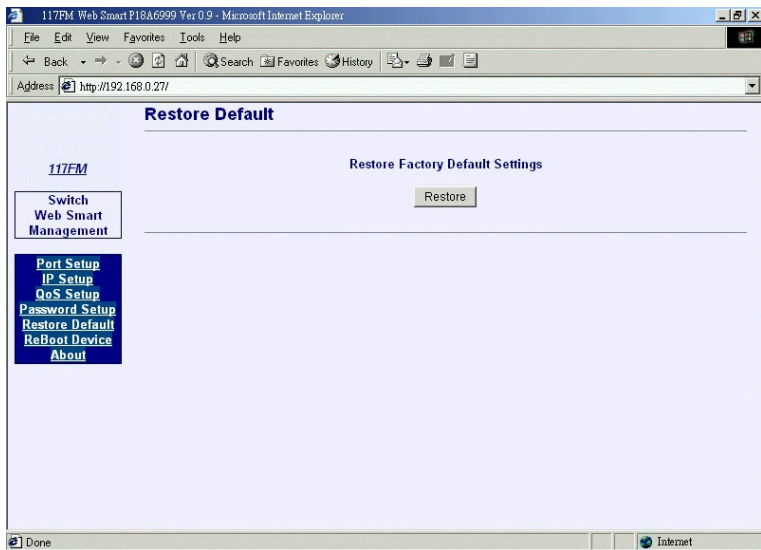
3.5 Password Setup
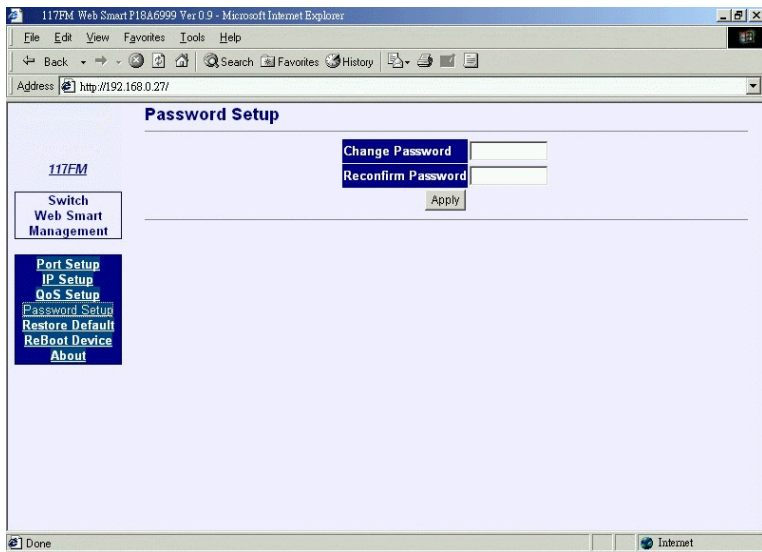
Password is used for checking authority for accessing the switch. To change password setting, enter your new password and reconfirm the input again.
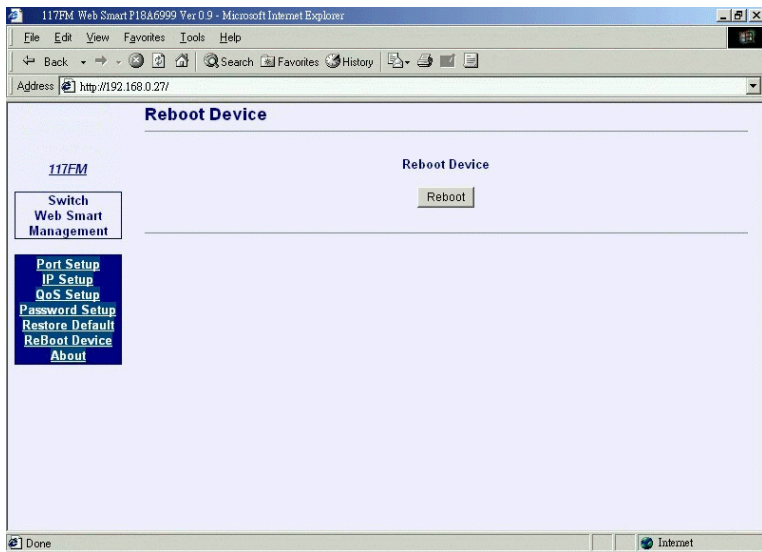
Click [Apply] to apply the new password immediately.

3.6 Restore Default

This command is used to restore all settings back to factory default values. Click [Restote] to apply immediately. Refer to Appendix for factory default values.

3.7 ReBoot Device

The command is used to reboot the switch remotely over the network. Normally, it is used after IP settings are changed.

3.8 About

About shows switch model name and software version.

Appendix: Factory Default Values

Settings	Factory Default Values
DHCP mode	Enabled
Static IP address	192.168.0.2
Netmask	255.255.255.0
Default gateway IP	192.168.0.1
Login password	123
TP ports	Auto-negotiation enabled
TP port speed	100M (the highest ability)
TP port duplex	Full duplex (the highest ability)
QoS mode	IP DS-TOS / 802.1p enabled
	Port base disabled
IP DS-TOS priority	Precedence values 0 ~ 3 : Low priority
	Precedence values 4 ~ 7 : High priority
802.1p priority	Priority values 0 ~ 3 : Low priority
	Priority values 4 ~ 7 : High priority
Port base priority	All ports : Low priority

Appendix: Effective Time of Setting Changes

Settings	Effective Time of Changes
DHCP Mode	Next boot and permanently
Static IP Setup	Next boot and permanently
Password Setup	Immediately and permanently
TP Ports Setup	Immediately and permanently
QoS Mode	Immediately and permanently
IP DS-TOS Setup	Immediately and permanently
802.1p Priority Setup	Immediately and permanently
Port Base Priority Setup	Immediately and permanently