KTI
NETWORKS

Installation Guide

Web Smart Managed
10/100 Fast Ethernet Switches
with VLAN Support

KS-115FM-V
KS-117FM-V

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TRADEMARKS

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This device complies with Class A Part 15 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 the interference that may cause.

CISPR A COMPLIANCE:

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 $C\,E$ 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.
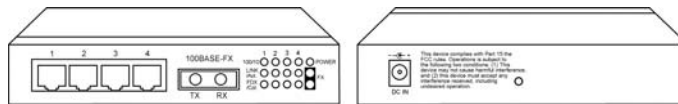
Table of Contents

1. Introduction

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

KS-115FM-V 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-V series
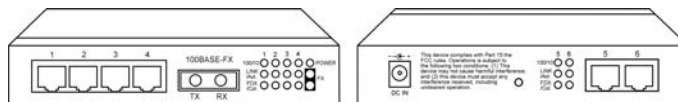
- Six 10/100BASE-TX auto-negotiation TP switched ports
- One 100BASE-FX Fiber switch port
- Web-based device management support
- Compact Fast Ethernet switch

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 VLAN function
  - IEEE 802.1Q VLAN 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
  - VLAN configuration
  - Security check for management login
  - Restore factory default settings
  - Remote boot
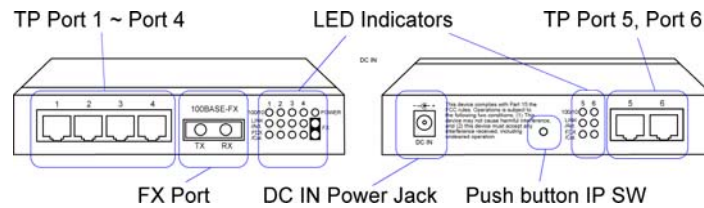
- Comprehensive LED indicators

1.2 Specifications

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

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
VLAN mode **VLAN groups** **Port PVID** **Port Tag Mode**	1. Port-based VLAN 2. 802.1Q VLAN (Tag-based) 16 groups (Group 0 ~ 15) Full 12-bit VID, per port setting Tag/Untag mode, per port setting
Environment	Temperature 0ºC to 40ºC Relative humidity 10% to 90% non-condensing (* The operating temperature range of the bundled power adapter may differ from the temperature range of the main device.)
Dimensions	144 mm x 100 mm x 26 mm (WxDxH) 5.67 x 3.94 x 1.02 inch
DC IN Jack	D6.3mm— ——(●)—— +D2.0mm
Operating voltage	+5 ~ +12VDC (+/-5%)
Power	Consumption 5W max. @+5V (KS-115FM) 5.5W max. @+5V (KS-117FM)

1.3 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
VLAN	VLAN mode selection: Port-based, 802.1Q (Tag-based)
Port-based VLAN	16 VLAN groups Member ports setting for each group PVID (12-bit VLAN ID value) setting for each port
802.1Q VLAN	16 VLAN groups Member ports setting for each group PVID (12-bit VLAN ID value) setting for each port Tag/Untag mode setting for each port
Restore Default	Restore factory default settings Refer to Appendix for factory default settings
Reboot	In-band remote boot the switch

1.4 FX Port Optical Specifications

Duplex Fiber Series

Model	Port	Fiber	Wavelength	Tx Power	Rx Sensitivity
-VT	ST	MMF	1310nm	-20 ~ -14dBm	-32dBm
-VC	SC	MMF	1310nm	-20 ~ -14dBm	-31dBm
-VEC	SC	MMF	1310nm	-20 ~ -14dBm	-31dBm
-VJM	MT-RJ	MMF	1310nm	-19 ~ -14dBm	-31dBm
-VVM	VF-45	MMF	1310nm	-20 ~ -14dBm	-31dBm
-VSA2	SC	SMF	1310nm	-15 ~ -8dBm	-31dBm
-VSL2	SC	SMF	1310nm	-15 ~ -8dBm	-32dBm
-VSL3	SC	SMF	1310nm	-15 ~ -8dBm	-34dBm
-VSL4	SC	SMF	1310nm	-5 ~ 0dBm	-34dBm
-VSL6	SC	SMF	1310nm	-5 ~ 0dBm	-35dBm
-VSL7	SC	SMF	1310nm	-3 ~ +3dBm	-37dBm
-VSL9	SC	SMF	1310nm	0 ~ +5dBm	-37dBm
-VSL10	SC	SMF	1550nm	-3 ~ +3dBm	-37dBm
-VSL12	SC	SMF	1550nm	0 ~ +5dBm	-37dBm

Single Fiber Bi-Di WDM Series

Model	Port	Fiber	Wavelength	Tx Power	Rx Sensitivity
-VW3515	SC	SMF	Tx 1310nm Rx 1550nm	-14 ~ -8dBm	-31dBm
-VW5315	SC	SMF	Tx 1550nm Rx 1310nm	-14 ~ -8dBm	-31dBm
-VW3540	SC	SMF	Tx 1310nm Rx 1550nm	-8 ~ 0dBm	-34dBm
-VW5340	SC	SMF	Tx 1550nm Rx 1310nm	-8 ~ 0dBm	-34dBm

Single Mode CWDM Series

Model	Port	Fiber	Wavelength	Tx Power	Rx Sensitivity
-VCxxW40	SC	SMF	Tx 1xx0nm Rx 1100-1650nm	-5 ~ 0dBm	-35dBm
-VCxxW80	SC	SMF	Tx 1xx0nm Rx 1100-1650nm	0 ~ +5dBm	-37dBm

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:
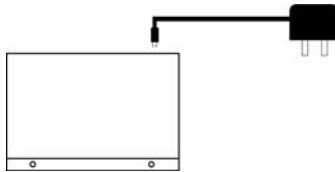
- AC input power: AC power voltage of your area
- DC output power: Rating options: +5V 2.0A, +7.5V 1A
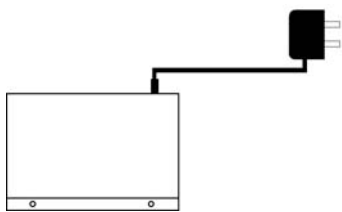- DC plug type: − ⎯⎯◉⎯⎯ +

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 VLAN Function

The switches support two VLAN modes. One is Port-based VLAN and the other is 802.1Q VLAN.

The following configuration are supported:

1. VLAN Mode : Port-based mode or 802.1Q mode

2. VLAN mapping table setup : member ports setup for each group

3. Per port PVID setup : PVID setting, Tag mode setting

Port-based VLAN Mode

1. This mode supports 16 VLAN groups, Group 0 ~ Group 15.

2. Packet forwarding is performed only among the member ports in same group.

3. Every packet, tagged or untagged, is forwarded from input port to output port transparently without any packet modification.

4. Per port PVID setting is used for index to VLAN Group table. When a packet is received, the associated PVID setting of the input port is used to map to one VLAN group in VLAN group table. The mapping index is retrieved from the least 4 bits (bit 3~0) of the PVID value.

5. Tag mode settings are preset with untagged mode for all ports and not changeable in Port-based VLAN mode.

6. VLAN tag in every input tagged packet is ignored.

Note:

To provide more flexibility for LAN administrator in performing web management task, the internal MNG port which connects to the built-in Http server is disclosed for PVID configuration. The MNG port is also configured as the member port for all VLAN groups and untag port permanently.

802.1Q VLAN Mode

1. This mode supports 16 VLAN groups, Group 0 ~ Group 15.

2. When an untagged packet is received, the associated PVID setting of the input port is used to map to one VLAN group in VLAN group table. The mapping index is retrieved from the least 4 bits (bit 3~0) of the PVID value.

3. When a tagged packet is received, the VLAN ID value of the received packet is used to map to one VLAN group in VLAN group table. The mapping index is retrieved from the least 4 bits (bit 3~0) of the VLAN ID value.

4. Packet forwarding is performed only among the member ports in same group. If the input port of the received packet is not the member port of the mapped group, the packet will be dropped.

5. For outbound, Tag mode of the output port is applied as follows:

   Received untagged packet output to:
   Tag port :   The packet is inserted with PVID of the input port as VLAN ID and new CRC.
   Untag port : The packet is forwarded with no change.

   Received tagged packet output to:
   Tag port :   The packet is forwarded with no change.
   Untag port : The VID of the packet is removed and forwarded with new CRC.

Note:
When VLAN mode is set from 802.1Q mode to Port-based mode, all ports are set to Untag ports automatically.

Summary of VLAN Group Lookup (Group Mapping Index)

Input Packet Type	Port-based VLAN Mode	802.1Q VLAN Mode
Untagged packet	PVID bit3-0 of input port	PVID bit3-0 of input port
Tagged packet	PVID bit3-0 of input port	VID bit3-0 of the packet

Factory Default Settings

VLAN Mode	Port-based mode
VLAN Group 0	MNG port only (No user port)
VLAN Group 1	All user ports and MNG port
VLAN Group 2~15	No user port (MNG port only)
PVID	1 for all ports and MNG port
Tag Mode	Untagged for all ports and MNG port

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 and other settings 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. Refer to section 1.4 for the model definition and optical specifications.

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

RX —— Fiber cable —— TX

TX —— Fiber cable —— RX
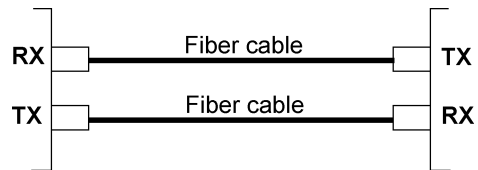
2.9 LED Indications

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.
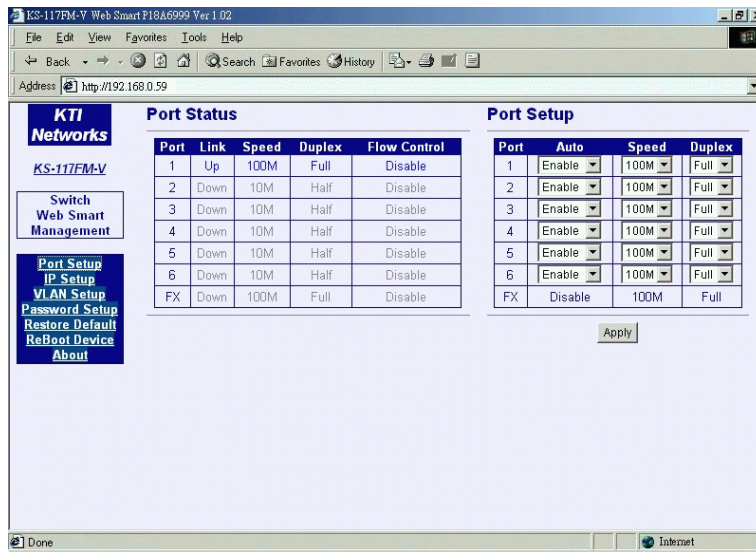
URL : http://xxx.xxx.xxx.xxx/

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:
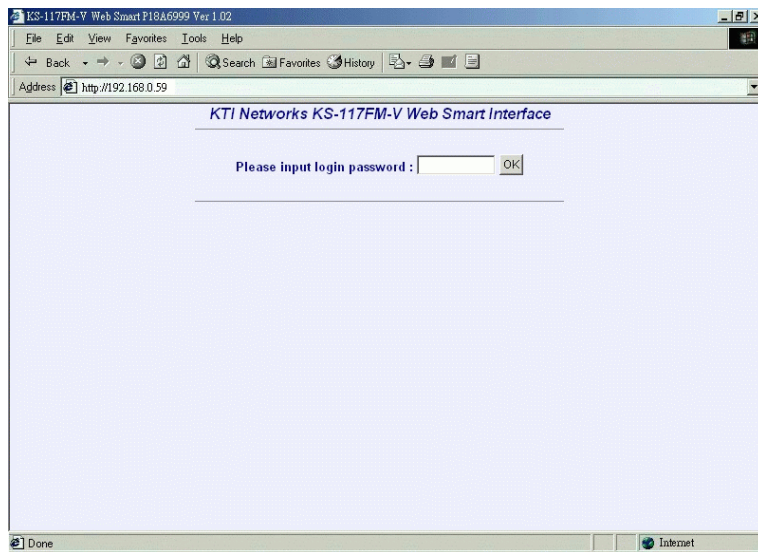
Enter your password and click [OK] to login into the switch. The switch comes with factory default password : 123.

The web page is shown as follows when a successful login is performed:

KS-117FM-V Web Smart P18A6999 Ver 1.02

File Edit View Favorites Tools Help

Back → Search Favorites History

Address http://192.168.0.59

KTI Networks

KS-117FM-V

Switch
Web Smart
Management

Port Setup
IP Setup
VLAN Setup
Password Setup
Restore Default
ReBoot Device
About

Port Status

Port	Link	Speed	Duplex	Flow Control
1	Up	100M	Full	Disable
2	Down	10M	Half	Disable
3	Down	10M	Half	Disable
4	Down	10M	Half	Disable
5	Down	10M	Half	Disable
6	Down	10M	Half	Disable
FX	Down	100M	Full	Disable

Port Setup

Port	Auto	Speed	Duplex
1	Enable	100M	Full
2	Enable	100M	Full
3	Enable	100M	Full
4	Enable	100M	Full
5	Enable	100M	Full
6	Enable	100M	Full
FX	Disable	100M	Full

Apply

Done   Internet

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
[**VLAN Setup**]   : setup VLAN 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

3.2 Port Setup

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

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
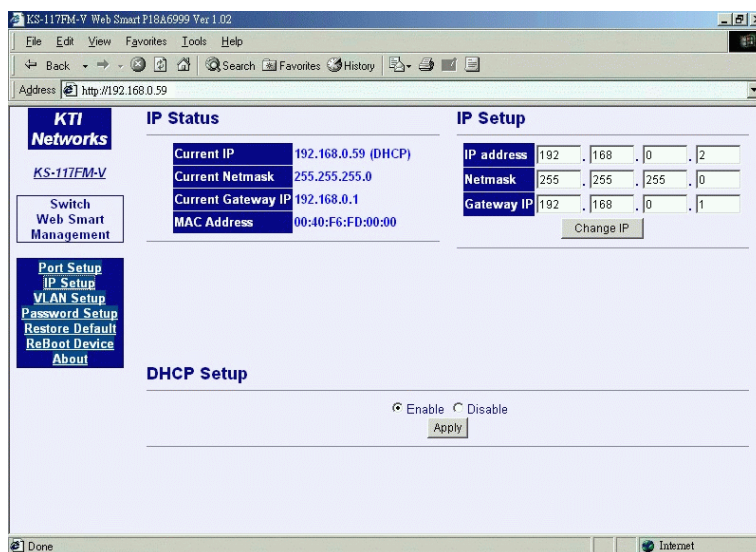
This page includes the following functions:

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 VLAN Setup
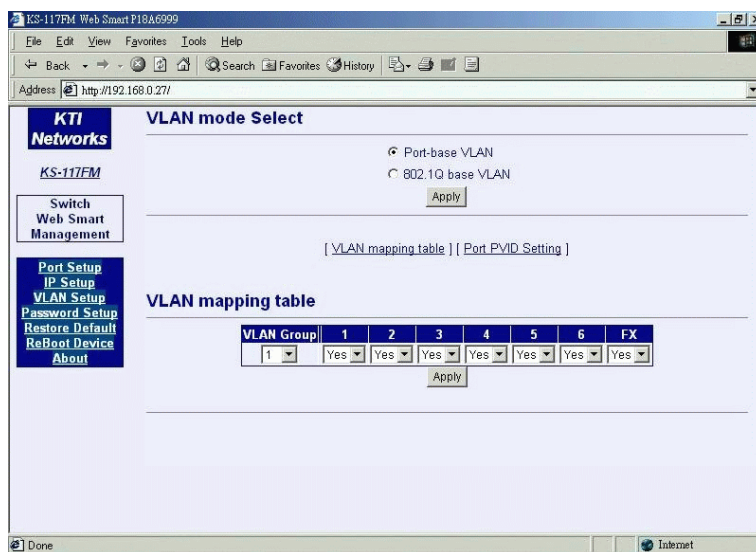
VLAN Mode Select

Port-based VLAN :   Port-based VLAN

802.1Q base VLAN : IEEE 802.1Q Tag-based VLAN

Click [**Apply**] to make change effective immediately.

Note:

1. Both modes use same group member port settings and Port PVID settings. When selecting Port-based VLAN, all ports are set to Untag ports automatically.

2. Under Port-based VLAN mode, all packets are forwarded transparently with no packet modification.

3.4.1 Port-based VLAN

Click [VLAN Mapping Table]
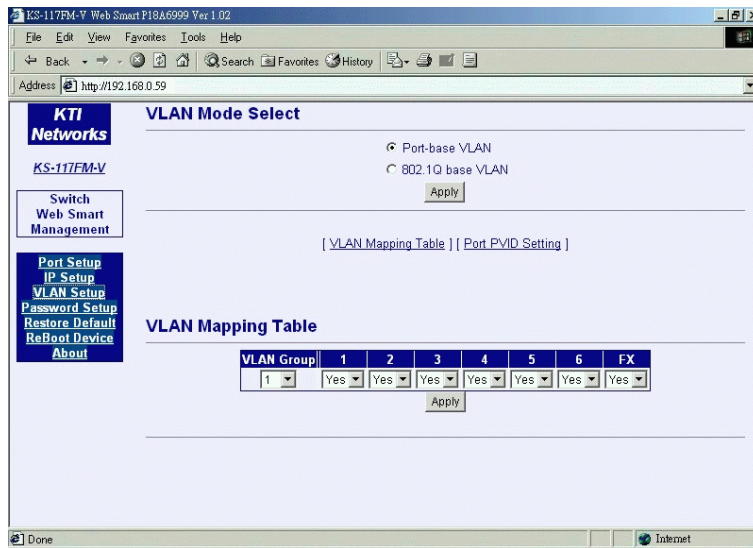
This page is used to setup member ports for each VLAN group. Total of 16 VLAN groups are supported.
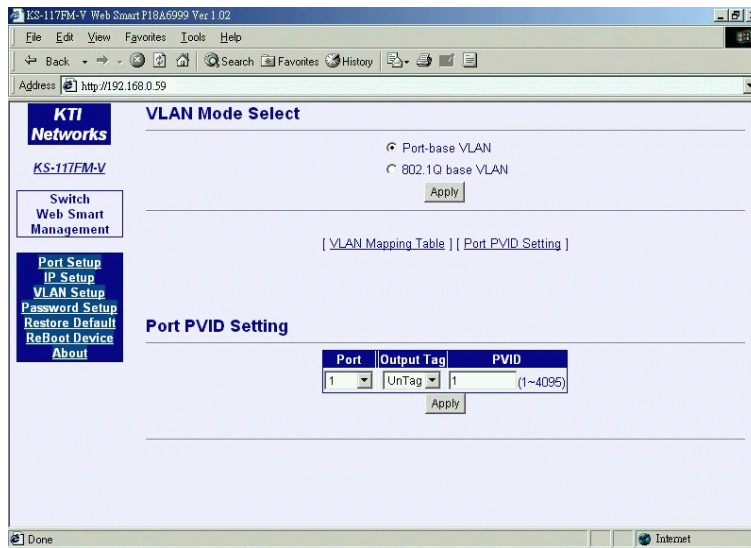
The steps to configure the member ports are:

1. Select Group number : 0 ~ 15.

2. Set [**Yes**] on the selected port to include it into the member port list.

Note:
One port can belong to more than one VLAN groups. VLAN group table mapping index is based on the least four bits (bit 3 ~ bit 0) of the PVID of the input port.

Click [Port PVID Setting]

This page is used to setup PVID and Tag mode for each port as follows:

PVID : The setting value is used for VLAN group lookup index. When a packet is received, the least four bits (bit 3~bit 0) of the PVID setting of the input port is used as the index mapping to one VLAN group. The mapped group is used for packet forwarding operation. The valid value range is 1 ~ 4095.

Refer to section 2.4 for more information about the MNG port.

Tag Mode : Tag mode setting of each port is preset to Untag mode automatically and they are not changeable under Port-based VLAN mode.

## 3.4.2 802.1Q VLAN

Click [VLAN Mapping Table]
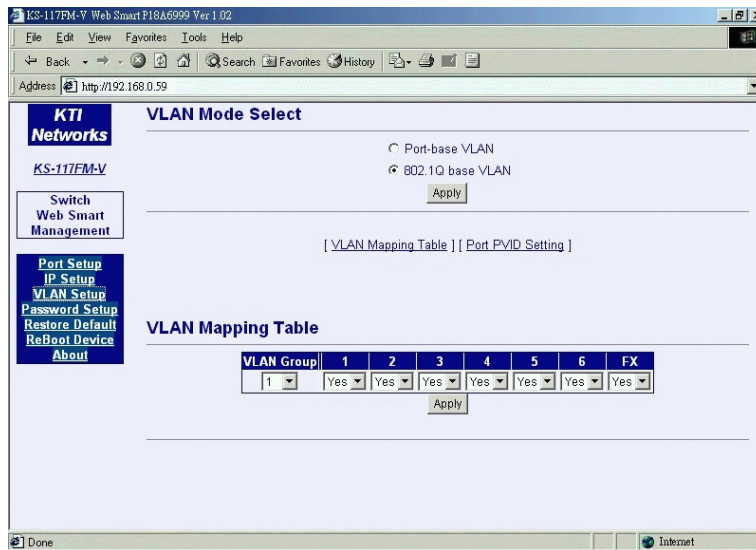
This page is used to setup member ports for each VLAN group. Total of 16 VLAN groups are supported. Actually, the table are shared by Port-based VLAN mode and 802.1Q VLAN mode.

The steps to configure the member ports are:

1. Select Group number : 0 ~ 15.

2. Set [**Yes**] on the selected port to include it into the member port list.

802.1Q VLAN group mapping is dependent on the received packet type:
Untagged packet - Use the least four bits of PVID value of the input port
Tagged packet - Use the least four bits of the VID value of the packet

---

Click [Port PVID Setting]
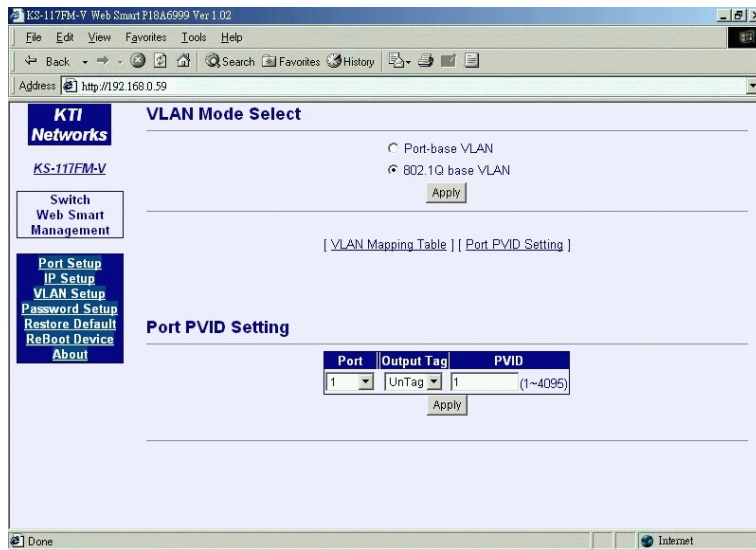
This page is used to setup PVID and Tag mode for each port as follows:

PVID : The valid value range is 1 ~ 4095. The setting value is used for the following purposes:

1. It is used as VLAN group lookup index when an untagged packet is received. The least four bits (bit 3~bit 0) of the PVID setting of the input port is used for mapping to one VLAN group.

2. It is used to be inserted into the packet as VID when an untagged packet is received and forwarded to a Tag port.

Tag Mode : Setting for each port to be Tag port or Untag port for out-bound.

Tag port - All output packets are tagged.
Untag port - All output packets are untagged.

Depending on the received packet type, the rules are applied as follows:

Received untagged packet output to:
Tag port :   The packet is inserted with PVID of the input port
                    as VLAN ID and new CRC.
Untag port :   The packet is forwarded with no change.

Received tagged packet output to:
Tag port :   The packet is forwarded with no change.
Untag port :   The VID of the packet is removed and forwarded
                    with new CRC.

Note:

1. When VLAN mode is switched from 802.1Q mode to Port-based mode, the Tag mode settings for all ports are preset to Untag automatically.

2. When VLAN mode is changed, current group member ports settings and per port PVID settings are applied to new VLAN mode.
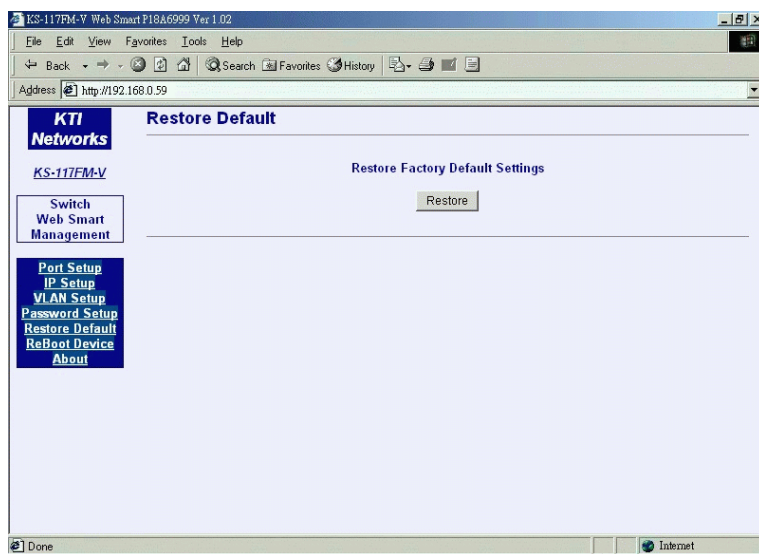
.5 Password Setup
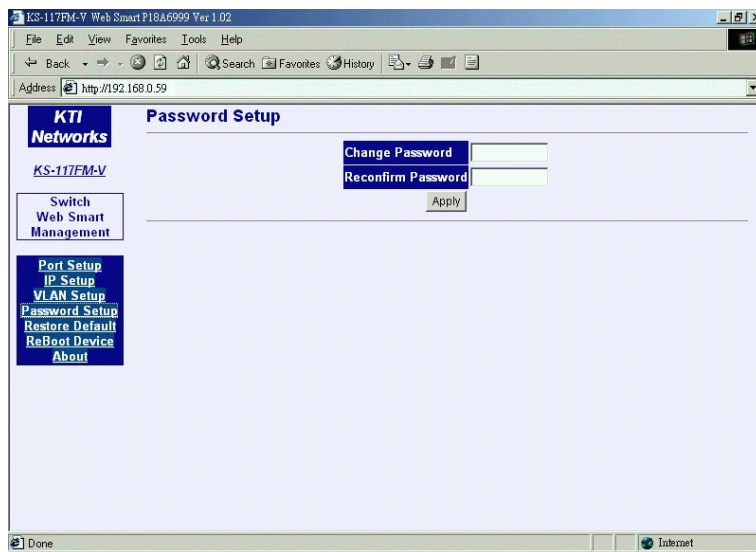
Password is used for checking authority for accessing the switch. To change password setting, enter your new password and reconfirm the input again.
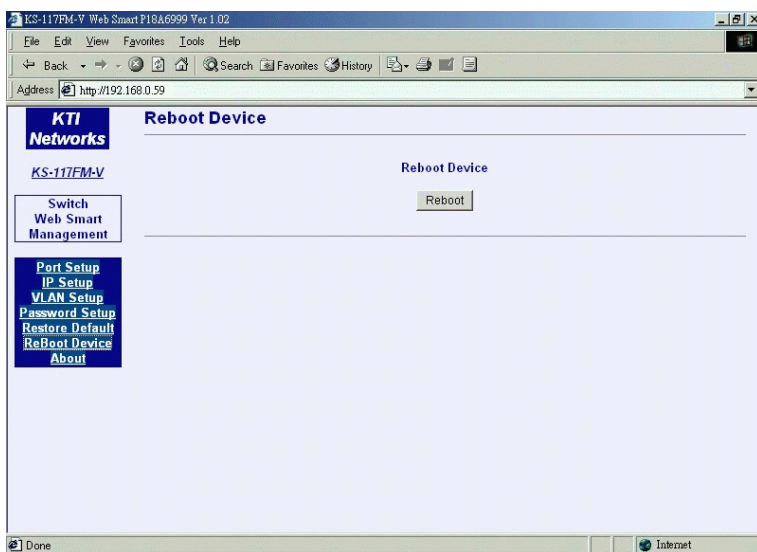
Click [**Apply**] to apply the new password immediately.
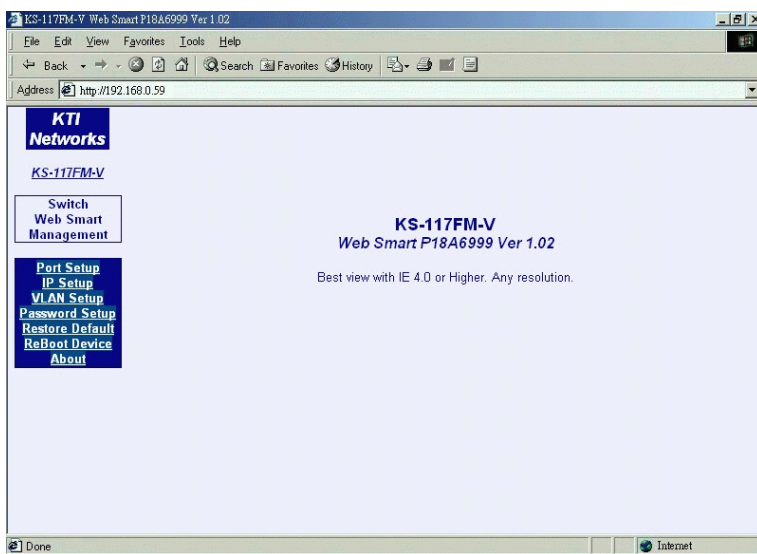
3.6 Restore Default

This command is used to restore all settings back to factory default values. Click [**Restore**] 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 page 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)
VLAN mode	Port-based VLAN enabled
	802.1Q VLAN disabled
VLAN group table	Group 0 - MNG port only
	Group 1 - all user ports and MNG port
	Group 2~15 - MNG port only
Port PVID	1 for all ports
Tag mode	Untag for all ports

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
VLAN Mode	Immediately and permanently
VLAN mapping table	Immediately and permanently
Port PVID setup	Immediately and permanently
Port Tag mode Setup	Immediately and permanently