



SWH-2109

7 x 10/100Base-TX to 2 x 100Base-FX
Managed Converter Switch

Network Management

User's Guide

Ver : 1.4

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- Increase the separation between the equipment and receiver.
- Connect the equipment into a different outlet from that the receiver is connected.
- Consult your local distributors or an experienced radio/TV technician for help.
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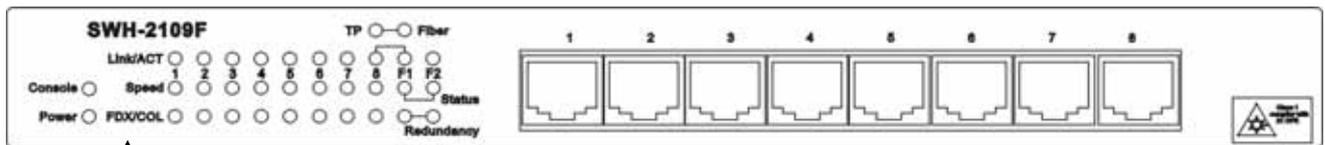
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1. INTRODUCTION

Thank you for using the 7x10/100TX plus 2x100FX managed converter switch. The built-in management module allows user to configure this managed converter switch and monitor the operation status locally or thru network remotely.

1.1 Management Options



LED

Fig. 1 Front Panel

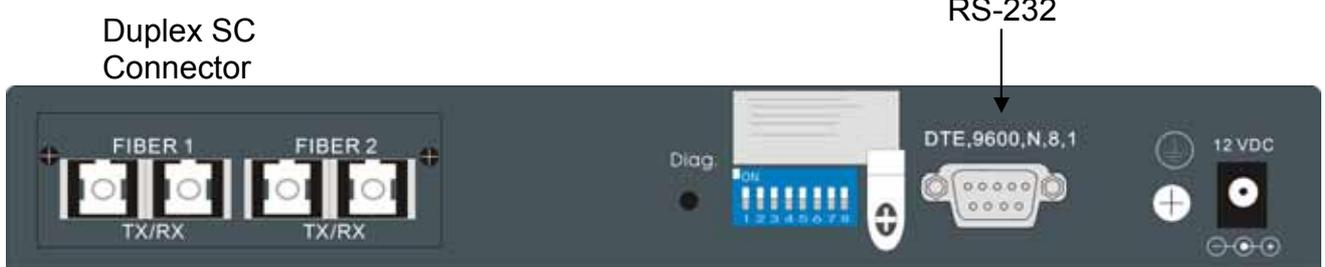


Fig. 2 Back Panel

Management switch are available options are listed below:

- Local Console Management
- Telnet Management
- SNMP Management

Local Console Management

Local Console Management is done through the RS-232 DB-9 console port located at the front of the converter switch. Direct RS-232 cable connection between the PC and the converter switch is required for this type of management.

Telnet Management

Telnet is done through the network. Once the converter switch is on the network with proper configuration, you can use Telnet to log in and monitor the status remotely.

SNMP Management

SNMP is also done over the network. Besides standard MIB (Management Information Bases), an additional private MIB is also provided for SNMP-based network management system to compile & control.

1.2 Management Software & Interfaces

Following list the choices of management software and interfaces:

- Converter switch Console Program
- SNMP-based management software

Console Program

The converter switch has a built-in, menu-driven interface called the Console Program that you can use to:

- Configure the system
- Monitor the status
- Reset the system

You can use this Console Program as your only management system. However, other network management option – SNMP based management system is also available.

You can access the text-mode Console Program locally by connecting a VT100 terminal - or a workstation running VT100 emulation software - to the converter switch RS-232 DB-9 console port directly. Or, you can use Telnet to login and access the Console Program through network connection remotely.

SNMP Management Systems

You can use standard SNMP based network management system to manage the converter switch through the network remotely.

When you use a SNMP based network management system, the converter switch becomes one of the managed devices (network elements) in that system. The converter switch management module contains an SNMP agent that will respond to the requests from the SNMP based network management system. These requests, which you can control, can vary from getting system information to setting the device attribute values.

The converter switch private MIB is provided for installation into your SNMP based network management system.

1.3 Management Preparations

After you have decided how to manage your converter switch, you need to make the cable connection, determine the converter switch IP address and, in some cases, install MIB shipped with your converter switch.

Connecting the converter switch

It is extremely important that cables have the correct pin arrangement and that the proper cables be used when connecting converter switch to another switches, hubs, workstations, etc.

100Base-FX Fiber Port

2x100Base-FX Fiber port is located at the front of the converter switch. This port is primarily used for up-link connection and will always operate at 100M/Full Duplex mode. Duplex SC or WDM Simplex SC types of connectors are available. Use proper multimode or single-mode optical fiber to connect this port with other Fast Ethernet Fiber port.

10/100Base-TX RJ-45 Ports

7x10/100Base-TX RJ-45 ports are also located at the front of the converter switch. These RJ-45 ports allow user to connect their traditional copper based Ethernet/Fast Ethernet devices into network. All these ports support auto-negotiation and MDI/MDIX auto-crossover, i.e. either crossover or straight through CAT-5 cable may be used.

RS-232 DB-9 Port

The RS-232 DB-9 port is located at the front of the converter switch. This DB-9 port is used for local, out-of-band management. Since this DB-9 port of the converter switch is DTE, a null modem is also required to connect the converter switch and the PC. By connecting this DB-9 port, user can configure & check the converter switch even the network is down.

IP Addresses

IP addresses have the format n.n.n.n, for example 168.168.1.100.

IP addresses are made up of two parts:

- The first part (168.168 in the example) refers as network address identifies the network on which the device resides. Network addresses are assigned by three allocation organizations. Depending on your location, each allocation organization assigns a globally unique network number to each network that wishes to connect to the Internet.
- The second part (8.100 in the example) identifies the device within the network. Assigning unique device numbers is your responsibility. If you are unsure of the IP

addresses allocated to you, consult the allocation organization from which your IP addresses were obtained.

Remember that no two devices on a network can have the same address. If you connect to the outside, you must change all the arbitrary IP addresses to comply with those you have been allocated by the allocation organization. If you do not do this, your outside communications will not operate.

A subnet mask is a filtering system for IP addresses. It allows you to further subdivide your network. You must use the proper subnet mask for proper operation of a network with subnets defined.

MIB for Network Management Systems

Private MIB (Management Information Bases) is provided for managing the converter switch through the SNMP based network management system. You must install the private MIB into your SNMP based network management system first.

The MIB file is shipped together with the converter switch. The file name extension is ".mib", which SNMP based compiler can read.

2. CONSOLE PROGRAM

This chapter describes how to use your converter switch Console Program, specifically in:

- Local Console Management (out-of-band)
- Telnet Management (in-band)
- Configuring the system
- Resetting the system

The interface and options are the same with Local Console and Telnet Management. The difference is the type of connection and the port that is used to manage the converter switch.

2.1 Local Console Management

Local Console Management is always done through the RS-232 DB-9 port and requires a direct connection between the converter switch and a PC. This type of management is very useful especially when the network is down and the converter switch cannot be reached by any other means.

You also need to use the Local Console Management to setup the converter switch network configuration for the first time. You can setup the IP address and change the default configuration to desired setting to enable Telnet or SNMP services.

Follow these steps to begin a management session using Local Console Management:

1. Attach the serial cable the RS-232 DB-9 port located at the front of the converter switch with a null modem.
2. Attach the other end to the serial port of a PC or workstation.
3. Run a terminal emulation program using the following settings:

- | | |
|-----------------------|------------------------|
| • Emulation | VT-100/ANSI compatible |
| • BPS | 9600 |
| • Data bits | 8 |
| • Parity | None |
| • Stop bits | 1 |
| • Flow Control | None |
| • Enable | Terminal keys |

4. Press Enter to reach the Main menu.

2.2 Remote Console Management - Telnet

You can manage the converter switch via Telnet session. However, you must first assign a unique IP address to the converter switch before doing so. Use the Local Console to log into the converter switch and set up the IP address for the first time.

Follow these steps to manage the converter switch through Telnet session:

1. Use Local Console to set up the assigned IP parameters of the converter switch,
 - IP address
 - Subnet Mask
 - Default gateway IP address, if required
2. Run Telnet.
3. Log into the converter switch to reach the Main menu.

Limitations

When using Telnet, keep the following in mind:

- Only two active Telnet sessions can access the converter switch at one time.

2.3 Console Program Overview

Once you gain the access, a Login Console appear as following,

```
FS-0900 Version 0.99.02G                                0 day 00:17:46
Login Menu
-----
UserName : [admin ██████████]
Password : [██████████]
```

Enter the user name and password then press ENTER to login to the Console Program main menu,

```
FS-0900 Version 0.99.02G                                0 day 00:21:04
Main Menu
-----
1. System Information
2. User Authentication
3. Network Management
4. Switch Management
5. Switch Monitor
6. System Utility
7. Save Configuration
8. Reset System
9. Logout

0. Help
```

Press Tab or ↑ or ↓ or Number directly to select.

- 1. System Information:** Name the converter switch, specify the location and check the current version information.
- 2. User Authentication:** View the registered user list. Add a new user or remove an existing user.

3. **Network Management:** Set up or view the IP address and related information of the converter switch required for network management application.
4. **Switch Management:** Setup switch/port configuration, VLAN configuration and other functions.
5. **Switch Monitor:** View the operation status and traffic statistics of the ports.
6. **System Utility:** Ping, Firmware Upgrade, Load Factory Setting, ...etc.
7. **Save Configuration:** Save all change to the system.
8. **Reset System:** Reset converter switch.
9. **Logout:** Logout from the console program.
0. **Help:** List the console operation keys.

2.4 Navigating the Console Program Screens

To do this...	Use this key...
Highlight an option in menu.	Tab and ↑ or ↓ or press number directly
Select a highlighted option.	Enter
Pull Down Menu in a choice field.	Spacebar
Select within Pull Down Menu in a choice field.	↑ or ↓
Toggle between available options in a choice field.	Spacebar
Move to the next entry field or command.	Tab
Move one line up to the previous field. ~	<-
Move one line down to the next field.	->
Exit current screen	ESC

Field Types

A typical console program screen contains several types of fields, as shown in below figure.

```

FS-0900 Version 0.99.02G 1 - 0 day 00:12:13
Device Community
-----
Current/Total/Max Agents 5 - 1/ 1/10
Account State : 
Community : 4 [public ]
Description : [Default Account ]
IP Security : 3 <Disabled>
IP Address : 0.0.0.0
SNMP Level : 2 - [Read and Write ]

OK Cancel Help

OK: Ctrl-S Cancel: Ctrl-C Help: Ctrl-Z
  
```

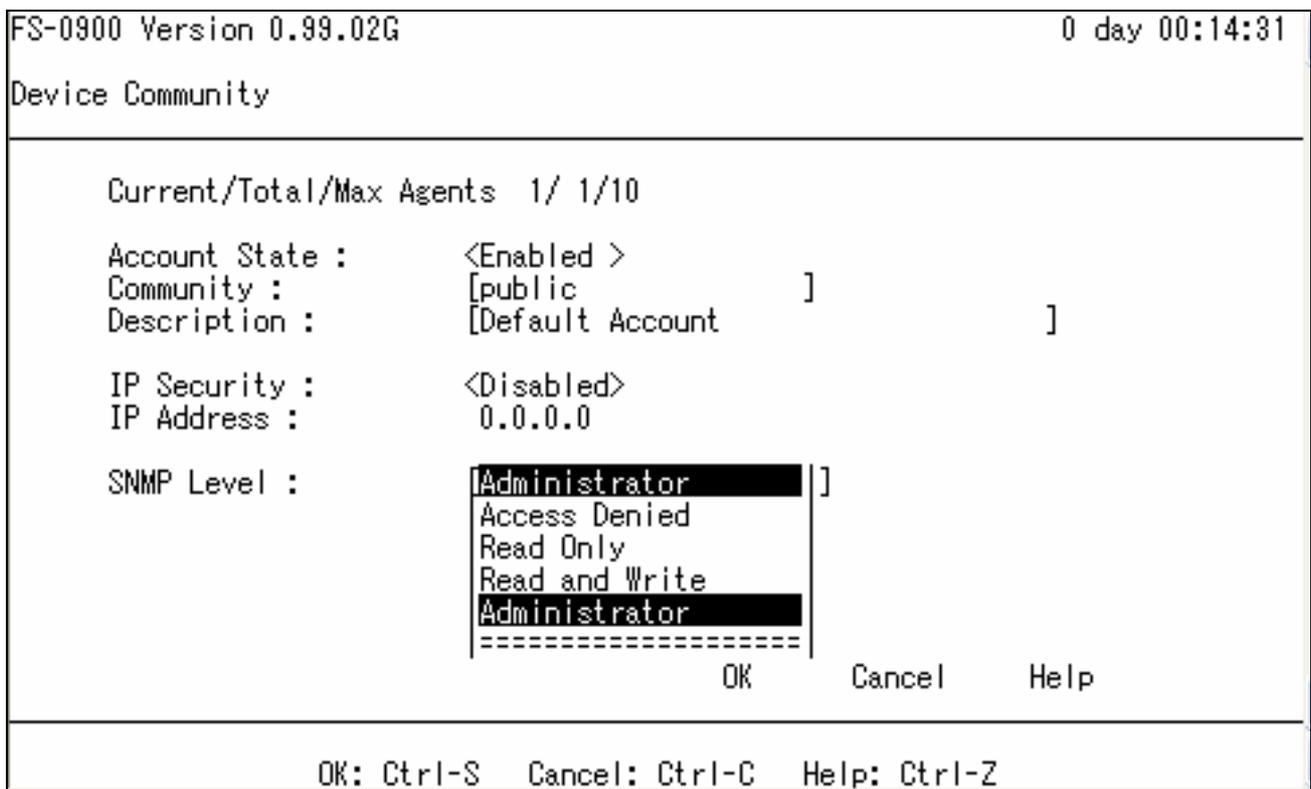
1. Timer: X day XX:XX:XX

Timer is view-only, shows how long the switch has been up since it was turned on or reset.

2. Pull Down Menu: [XXXX]

Pull down menu is used if there are more than 2 selections, for example: **Port Number**

Press Spacebar will display the pull down menu as below.



Use ↑ or ↓ move to desired selection and then press Spacebar to select.

3. Toggle Option: < XXXX >

A Toggle option contains 2 selections, for example: **Account State**

Press Spacebar to select between < Enable > & < Disabled >

4. Editing Field: [XXXX]

Options may be edited directly, for example: **Community**

Use Backspace to delete default setting and enter new content directly.

5. View Only Field: XXXX

No options available and is view only,

For example: Current number of each registered user.

6. OK

Press OK to accept change and quit the current menu.

7. Cancel

Press Cancel to skip the change and quit the current menu.

8. Help

Press Help to view On-Line help as below,

```
FS-0900 Version 0.99.02G                                0 day 00:35:27
Help Page

Ctrl-Z           : Invoke Help Page
Ctrl-R           : Refresh Screen

TAB              : Go to Next Control
Ctrl-Q           : Go to Previous Control
Arrow Right --> : Go to Next Control
Arrow Left  <--  : Go to Previous Control

ENTER            : Click or Confirm Input
SPACE            : Select or Change Value
ESC/Ctrl-C      : Exit to Previous Page

Ctrl-N (New)    : Create a New Item
Ctrl-E (Edit)   : Edit Current Item
Ctrl-D (Delete) : Delete Current Item

< Press ESC To Leave This Page >
```

```
FS-0900 Version 0.99.02G                                0 day 00:38:20
Main Menu

1. System Information
2. User Authentication
3. Network Management
4. Switch Management
5. Switch Monitor
6. System Utilities
7. Save Configuration
8. Reset System
9. Logout

0. Help

Save All Changes to Flash?
OK  Cancel
```

This pop up message alerts user that the configuration change will take effect after reset. However, before perform System Reset, user must save the configuration change first.

2.5 System Information

Select **System Information** in the Console Program Main menu, following screen appears.

```
SWH-2109 Version 0.99.05                                0 day 00:00:14
System Information
-----
Company Name      : [CONNECTION TECHNOLOGY SYSTEMS INC.]
System Object ID  : .1.3.6.1.4.1.9304.100.2109
System Contact    : [info@ctsystem.com]
System Name       : [Managed 9 Ports 100M Switch]
System Location   : [18F-6, No.79, Sec.1, Hsin Tai Wu Rd., Hsichih, Taiwan ]

Model Name       : SWH-2109
Firmware Version : 0.99.05
1000M Port Number : 0
100M Port Number : 9
FIBER 1 Type     : SC      100Mbps 2KM
FIBER 1 Wavelength: Tx/Rx 1310nm/1310nm
FIBER 2 Type     : SC      100Mbps 2KM
FIBER 2 Wavelength: Tx/Rx 1310nm/1310nm

Boot ROM Version : A09
OS Version       : 2.0
UI Version       : 1.0
CPU Version      : A02
M/B Version      : A1
Serial Number    : 0000000000001
Date Code       : 20041011

OK      Cancel      Help

-----
OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
```

Company Name: Enter a company name for this converter switch, up to 55 alphanumeric characters.

System Object ID: View only field, predefined System OID.

System Contact: Enter contact information for this converter switch, up to 55 alphanumeric characters.

System Name: Enter a unique name for this converter switch, up to 55 alphanumeric characters. Use a descriptive name to identify the converter switch in relation to your network, for example "Backbone 1". This name is mainly used for reference purpose only.

System Location: Enter a brief description of the converter switch location, up to 55 alphanumeric characters. Like the name, the location is for reference only, for example "13th Floor".

Model Name: View only field shows the product model name.

Firmware Version: View only field shows the product firmware version.

ROM size <KB>: View only field shows the product ROM size.

FLASH size <KB>: View only field shows the product FLASH size.

RAM size <KB>: View only field shows the product RAM size.

Fiber Port: View only field shows the fiber port number and fiber port perimeters.

- 1310 fiber transceiver operation wavelength (nm)
- SC fiber transceiver connector type
- 2KM fiber transceiver operation length

TP Port: View only field shows the total TP port number.

Boot ROM Version: View only field shows the Boot ROM version.

OS Version View only field shows the OS version.

UI Version View only field shows the User Interface program version.

CPU Version View only field shows the CPU version.

M/B Version View only field shows the Main board version.

2.6 User Authentication

To prevent any un-authorized operation, only registered users are allowed to operate the converter switch. Any user wants to operate the converter switch need to register into the user list first.

To view or change current registered users, select **2. User Authentication** from the main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:40:40
User Authentication

-----
User Name      Description
-----
admin          Default Account
-----

New
Edit
Delete
Help

-----
New: Ctrl-N   Edit: Ctrl-E   Delete: Ctrl-D   Help: Ctrl-Z
```

Up to 10 Users maybe set.

Press **New** to add a new user.

Press **Edit** to view the current user setting.

Use **Delete** to remove a registered user.

Following screen appears,

```
FS-0900 Version 0.99.02G                                0 day 00:42:07
User Authentication

Current/Total/Max Users  1/ 1/10

Account State :      Enabled
User Name :         admin
Password :         [*****]
Retype Password:    [****]
Description :      [Default Account]

IP Security :      <Disabled>
IP Address :       0.0.0.0

Console Level :     Administrator

                                OK      Cancel      Help
```

```

FS-0900 Version 0.99.02G                                0 day 00:03:24
User Authentication

Current/Total/Max Users  1/ 1/10

Account State :      Enabled
User Name :        admin
Password :          [*****]
Retype Password:    [*****]
Description :      [Default Account                ]

IP Security :      <Disabled>
IP Address :       0.0.0.0

Console Level :    Administrator

                                OK      Cancel  Help

OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z

```

Current/Total/Max Users: View only field. Specify:

Current: Current registered user number.

Total: Total registered user number.

Max Users: Maximum available registered user number, default 10.

Account State: Press Spacebar to Enable or Disable this User Account.

User Name: Specified the authorized user login name, up to 20 alphanumeric characters.

Password: Enter desired user password, up to 20 alphanumeric characters.

Retype Password: Enter password again for double check.

Description: Enter a unique description for the User, up to 35 alphanumeric characters. This is mainly for reference purpose only.

IP Security: Press Spacebar to Enable or Disable the IP security function.

If Enable, user may access the converter switch only through the management station which has exact IP address specified in below IP address field.

If Disable, user may access the converter switch through any station.

IP Address: Specify the IP address used for IP Security function.

Console Level: Use ↑ or ↓ to select desired privilege for the console operation

Available operation privileges,

Administrator Full access right include maintain user account & system information, load factory setting, etc.

- Read & Write** Full access right but cannot modify user account & system information, cannot load factory setting
- Read Only** Allow to view only.
- Access Denied** Complete forbid to access.

NOTICE:

To prevent un-caution operation, a user cannot Delete, Modify User Name or Enable/Disable account states.

2.7 Network Management

In order to enable network management of the converter switch, proper network configuration is required. To do this, select option **Network Management** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:00:20
Network Management Menu
-----
1. Network Configuration
2. System Service Configuration
3. RS232/Telnet/Console Configuration
4. Time Server Configuration
5. Device Community
6. Trap Destination
7. Trap Configuration

0. Help
```

- 1. Network Configuration:** Setup the required IP configuration of the converter switch.
- 2. System Service Management:** Enable or Disable the specified network services.
- 3. RS232/Telnet/Console Configuration:** View the RS-232 port setting, specified Telnet & Console services.
- 4. Device Community:** View the registered SNMP community name list. Add a new community name or remove an existing community name.
- 5. Trap Destination:** View the registered SNMP trap destination list. Add a new trap destination or remove an existing trap destination.
- 6. Trap Configuration:** View the converter switch trap configuration. Enable or disable a specified trap.

2.7.1 Network Configuration

Select option **Network Configuration** from the Network Management menu, following screen appears.

FS-0900 Version 0.99.02G		0 day 00:02:25	
Network Configuration			
MAC Address :	00-06-19-FB-21-09		
Configuration Type :	<Manual>	Current State	
IP Address :	[192.168.0.1]	192.168.0.1	
Subnet Mask :	[255.255.255.0]	255.255.255.0	
Gateway :	[0.0.0.0]	0.0.0.0	
OK Cancel Help			
OK: Ctrl-S Cancel: Ctrl-C Help: Ctrl-Z			

MAC Address: This view-only field shows the unique and permanent MAC address assigned to the converter switch. You cannot change the converter switch MAC address.

Configuration Type: Press Spacebar to select using "DHCP" or "Manual". If select "DHCP" and a DHCP server also available on the network, the converter switch will automatic get the IP address from the DHCP server. If select the "**Manual**" mode, user need to specify the IP address, Subnet Mask & Gateway.

IP Address: Enter the unique IP address of this converter switch. You can use the default IP address or specify a new one if there is address duplication or the address does not match your network.

Subnet Mask: Specify the subnet mask to use with the converter switch IP address. The default subnet mask values for the three Internet address classes are as follows:

- Class A: 255.0.0.0
- Class B: 255.255.0.0
- Class C: 255.255.255.0

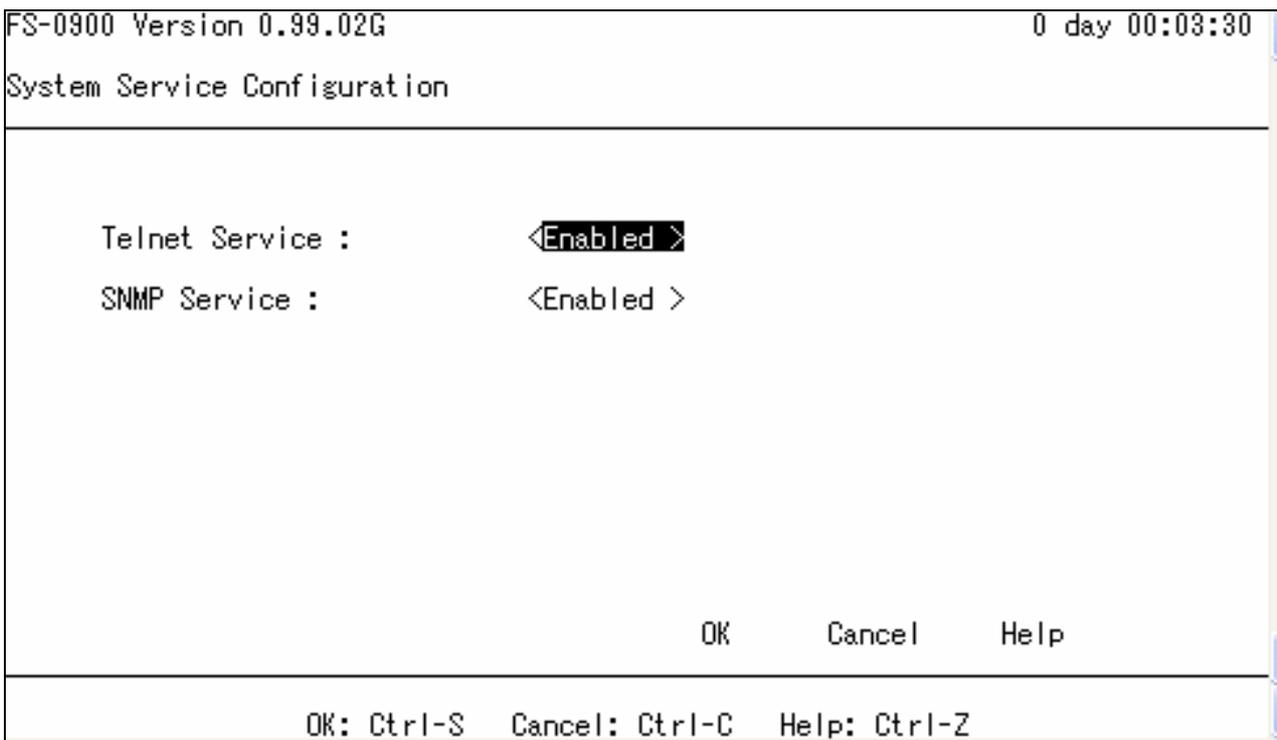
Gateway: Specify the IP address of a gateway or a router, which is responsible for the delivery of the IP packets sent by the converter switch. This address is required if the converter switch and the network management station are on different networks or subnets.

The default value of this parameter is 0.0.0.0, which means no gateway exists and the network management station and converter switch are on the same network.

Current State: This view only field shows currently assigned (by DHCP or manual) IP address, Subnet Mask & Gateway of the converter switch.

2.7.2 System Service Management

Select option **System Service Management** from the Network Management menu, following screen appears.



```
FS-0900 Version 0.99.02G                                0 day 00:03:30
System Service Configuration

Telnet Service :      <Enabled >
SNMP Service :       <Enabled >

                                OK      Cancel      Help

OK: Ctrl-S   Cancel: Ctrl-C   Help: Ctrl-Z
```

Telnet Service: Press Spacebar to Enable or Disable the Telnet service.

SNMP Service: Press Spacebar to Enable or Disable the SNMP service.

2.7.3 RS232/Telnet/Console Configuration

Select option **RS232/Telnet/Console Configuration** from the Network Management menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:05:03
RS232/Telnet/Console Configuration

Baud Rate :                9600    bps
Stop Bits  :                1
Parity Check :             None
Word Length :              8
Flow Control :            None

Telnet Port :             [23] (23 or Over 1024)
System Time Out:         [300] secs

                                OK      Cancel   Help

                                OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
```

Baud Rate: 9600 bps, RS-232 setting, view only field.

Stop Bits: 1, RS-232 setting, view only field.

Parity Check: None, RS-232 setting, view only field.

Word Length: 8, RS-232 setting, view only field.

Flow Control: None, RS-232 setting, view only field.

Telnet Port: Specified the desired TCP port number for the Telnet console. Default TCP port number of the Telnet is 23.

System Time Out: Specified the desired times that the converter switch will wait before cut off an inactive console/telnet connection.

Specified "0" mean never cut off an inactive connection.

2.7.4 Device Community

Select option **Device Community** from the Network Management menu, following screen appears.

```

FS-0900 Version 0.99.02G                                0 day 00:05:52
Device Community

Community      Description
-----
public        Default Account

New
Edit
Delete
Help

New: Ctrl-N  Edit: Ctrl-E  Delete: Ctrl-D  Help: Ctrl-Z
  
```

Up to 10 Device Community maybe set.

Use **Delete** to remove a registered community.

Press **New** to add a new community.

Press **Edit** to view the current community setting.

Following screen appears,

```

FS-0900 Version 0.99.02G                                0 day 00:06:51
Device Community

Current/Total/Max Agents  1/ 1/10

Account State :      <Enabled>
Community :      [public          ]
Description :      [Default Account ]

IP Security :      <Disabled>
IP Address :      0.0.0.0

SNMP Level :      [Read and Write ]

OK      Cancel      Help

OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
  
```

Current/Total/Max Agents: View only field. Specify:

Current: Current registered community number.
Total: Total registered community user number.
Max Users: Maximum available registered community number, default 10.

Account State: Press Spacebar to Enable or Disable this Community Account.

Community: Specified the authorized SNMP community name, up to 20 alphanumeric characters.

Description: Enter a unique description for this community name, up to 35 alphanumeric characters. This is mainly for reference purpose only.

IP Security: Press Spacebar to Enable or Disable the IP security function.

If Enable, Community may access the converter switch only through the management station, which has exact IP address specified in below IP address field.

If Disabled, Community may access the converter switch through any management station.

IP Address: Specify the IP address used for IP Security function.

SNMP Level: Use ↑ or ↓ to select desired privilege for the SNMP operation

NOTICE:

If the community browses the converter switch without proper access right, the converter switch will respond empty. For example, if a community only had Read & Write privilege then it cannot browse converter switch User table.

2.7.5 Trap Destination

Select option **Trap destination** from the Network Management menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:07:50
Trap Destination
-----
  Index  State      Destination      Community
  -----  -----
  1      <Disabled> [0.0.0.0      ]
  2      <Disabled> [0.0.0.0      ]
  3      <Disabled> [0.0.0.0      ]
  4      <Disabled> [0.0.0.0      ]
  5      <Disabled> [0.0.0.0      ]
  6      <Disabled> [0.0.0.0      ]
  7      <Disabled> [0.0.0.0      ]
  8      <Disabled> [0.0.0.0      ]
  9      <Disabled> [0.0.0.0      ]
  10     <Disabled> [0.0.0.0      ]

                                     OK      Cancel      Help

-----
                        OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
```

State: Enable or Disable to send Trap to the specified destination.

Destination: Enter the specified IP address of the network management system that will receive the trap.

Community: Enter the community name of the network management system.

2.7.6 Trap Configuration

Select option **Trap Configuration** from the Network Management menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:08:36
Trap Configuration

Cold Start Trap :                                     <Enabled >
Warm Start Trap :                                     <Enabled >
Authentication Failure Trap :                         <Enabled >
Port Link Up/Down Trap :                             <Enabled >
System Power Down Trap :                             <Enabled >
( 1st Destination Only )

                                                    OK      Cancel  Help

OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
```

Cold Start Trap: Enable or Disable the converter switch to send Cold Start trap after power on.

Warm Start Trap: Enable or Disable the converter switch to send Warm Start trap after system reset.

Authentication Failure Trap: Enable or Disable the converter switch to send Authentication Failure trap after any unauthorized login attempt.

Port Link Up/Down Trap: Enable or Disable the converter switch to send port link up/link down trap.

System Power Down Trap: It use to send trap notice destination while SWH 2109 power down.

2.8 Switch Management

In order to manage the converter switch and setup required switching function, select option **Switch Management** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:09:28
Switch Management Menu
-----
1. Switch Configuration
2. Priority and Rate Limit Configuration
3. Port Configuration
4. VLAN Configuration

0. Help
```

1. **Switch Configuration:** Setup acceptable frame size and address learning, etc.
2. **Priority and Rate Limit Configuration:** Enable/Disable Port priority and setup Port Rate limit, etc.
3. **Port Configuration:** Enable/Disable port speed, flow control, etc.
4. **VLAN Configuration:** Set up VLAN mode and VLAN configuration

2.8.1 Switch Configuration

Select option **Switch Configuration** from the Switch Management menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:11:07
Switch Configuration

Maximum Frame Size :          <1522>
Address Learning :           <Enabled >
MAC Address Aging Time :     [300 ]Secs

Fiber Port Redundancy :      Restart           Current
                             <Disabled>        Disabled

Port 8 Media Type :          <Copper>          Copper

                                OK      Cancel   Help

                                OK: Ctrl-S   Cancel: Ctrl-C   Help: Ctrl-Z
```

Maximum Frame Size: Press Spacebar to toggle 1522 and 1536 two ranges.

Address Learning: Enable is default to learn MAC addresses in RAM, otherwise disable option would stop learn MAC address.

MAC Address Aging Time: Between 0-4080 seconds.

Fiber Port Redundancy: SWH 2109 has two Fiber ports can set up redundancy each other. Use spacebar choice enable/disable in Restart position. If specify enable then the Port 8 Media Type Copper would vanish. After save configuration into flash then reset system, Fiber Port Redundancy will take effective. In Restart position display Enabled afterward.

Port 8 Media Type: Port 8 can set Copper or Fiber mode. It is up to Fiber Port Redundancy setting. If Fiber Port Redundancy set Enable then this option would vanish, otherwise it would set Copper.

2.8.2 Priority and Rate limit Configuration

Select option **Priority and Rate limit Configuration** from the Switch Management menu, following screen appears.

```

FS-0900 Version 0.99.15C                                     0 day 00:05:17
Priority and Rate Limit Configuration

Priority Mode : [Default]
Schedule Mode : <Weight(8:4:2:1)>  Q4:Q3:Q2:Q1

Port      1      2      3      4      5      6      7      8      9
Priority  [Q4] [Q3] [Q2] [Q1] [Q4] [Q4] [Q1] [Q1] [Q1]

IP TOS Priority Map : [TOS(0) |] [Q1]
Tag Priority Map : [0] [Q1]

Ingress Rate Limit Mode : <All Frames > [FrameBits/Sec |]
Port      1      2      3      4      5      6      7      8      9
Ingress  [8M |][8M |][8M |][8M |][4M |][128K][256K][Off][Off |]
Actual Ingress 64M 32M 16M 8M 32M 1M 256K Off Off
Egress [8M |][4M |][2M |][1M |][512K][256K][128K][Off][Off |]

Actual Ingress = Ingress x Port Priority  OK      Cancel      Help

OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z

```

Priority Mode: Use spacebar to select Default, IP, TAG, IP+Tag, Tag+IP modes.

Default mode: default value which Schedule mode is Weight (8:4:2:1) and port priority set Q1, where Weight (8:4:2:1) mean Q4:Q3:Q2:Q1 4 kinds of frames type quantity occupied bandwidth ratio is 8:4:2:1 when frames passing over switch based on IP TOS Priority MAP and Tag Priority Map.

IP defined as below.

TAG use 802.1Q tag value as frame passing in switch priority. IP+TAG mean IP TOS priority has higher precedence while work with TAG Priority. TAG+IP are vice versa.

Schedule Mode: Use spacebar select Weight (8:4:2:1) and strict modes.

Strict mode means send most high priority packets first. Ex: Q4 is highest precedence.

Port Priority: Use spacebar select Q1, Q2, Q3, Q4. The four queues priority depend upon priority and schedule mode combination.

IP TOS Priority Map: Use spacebar to select TOS (0)...TOS (12) modes. The Type of Service (TOS) field is an 8-bit field. It is located in the IP packet and used by a device to indicate the precedence or priority of a given frame. The second field is up to first field use which TOS with what kind of queue.

Tag Priority Map: Use spacebar to select 0,1,2,3 tag values as priority level. The second field is up to first field use which TAG with what kind of queue.

Ingress Rate Limit Mode: There are two options, first field is All Frames and Broadcast. It could be toggle by space bar, All Frames mean limit all of frames pass. Broadcast mean only broadcast frame will be limited. Second field, FrameBits and TotalBits as well as TotalBits+IFG could be toggle by space bar. FrameBits mean a frame without packet preamble byte, TotalBits mean a complete frames, it longer than Framebits. TotalBits+IFG mean TotalBits add Inter Frame Gap. It is longer than TotalBits. This field provides rate limit more selectable options.

Port Ingress: Four modes using spacebar to select off, 128k, 256k, 512k, 1M, 2M, 4M up to 8MB. This parts also work with port priority, if port ingress choose 512k and port priority choose Q4, according ratio the Ingress values in not only 512k but also 2M. If port priority choose Q2 them Ingress would be 1M.

Port Engress: Four modes using spacebar to select off, 128k, 256k, 512k, 1M, 2M, 4M up to 8MB. This is rate limit function depend on various speeds according selection. Port Engress in rate limitation is not similar to Ingress.

2.8.3 Port Configuration

```
FS-0900 Version 0.99.02G                                0 day 02:44:00
Port Configuration
-----
Port Number :      [All]                                Current State
Port State  :      <Enabled >                          Media Type  :
Port Type   :      <Auto-Negotiation>                   Port State  :
Port Speed  :                                             Link State  :
Duplex     :                                             Speed (Mbps):
Flow Control :      <Disabled>                          Duplex      :
                                                    Flow Control:

Port State
D:Disabled B/L:Blocking/Listening L:Learning F:Forwarding
                        OK      Cancel      Help

-----
OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
```

Port Number: Using spacebar to select All, port 1, port 2, and port 3.

Port State: Enable or disable current port state.

Port Type: Press Spacebar to choice Auto-Negotiation, manual,10M bps and Half

Flow Control: Press spacebar to select Enabled/Disabled.

2.8.4 VLAN Configuration

A Virtual Local Area Network (VLAN) is a network topology configured according to a logical scheme rather than the physical layout. VLAN can be used to combine any collection of LAN segments into a group that appears as a single LAN. VLAN also logically segment the network into different broadcast domains. All broadcast, multicast, and unknown packets entering the Switch on a particular VLAN will only be forwarded to the stations or ports that are members of that VLAN.

VLAN can enhance performance by conserving bandwidth, and improve security by limiting traffic to specific domains. A VLAN is a collection of end nodes grouped by logic instead of physical location. End nodes that frequently communicate with each other are assigned to the same VLAN, regardless of where they are physically on the network. Another benefit of VLAN is that you can change the network topology without physically moving stations or changing cable connections. Stations can be 'moved' to another VLAN and thus communicate with its members and share its resources, simply by changing the port VLAN settings from one VLAN to another VLAN. This allows VLAN to accommodate network moves, changes and additions with the utmost flexibility.

The converter switch supported 2 types of VLAN:

- Port Based
- 802.1Q Tag Base

Select option **VLAN Configuration** from the Switch Management menu, following screen appears.

```
FS-0900 Version 0.99.15C                                0 day 00:03:23
Static VLAN Configuration Overview

VLAN Mode
[Port Based VLAN | ]

Configure VLAN

                                OK      Cancel   Help

OK: Ctrl-S   Cancel: Ctrl-C   Help: Ctrl-Z
```

VLAN Mode: Using spacebar to select Port Based VLAN or IEEE 802.1Q Tag VLAN mode what you want to approach.

Configure VLAN: Set up VLAN name, ports, etc.

2.8.4.1 Port Based VLAN Configuration

Port-based VLAN can effectively segment one network into several Broadcast Domains, Broadcast/Multicast and unknown packets will be limited to within the VLAN. Port Based VLAN is uncomplicated and fairly rigid in implementation, it is best used for network administrators who wish to quickly and easily setup VLAN in order to isolate the effect of broadcast packets on their network

```
FS-0900 Version 0.99.02G                                0 day 03:35:54
Configure Port Based VLAN

VLAN Name          1      8 9          CPU
-----
Default VLAN      VVVVVVVV V    V
New
Edit
Delete
Help

Press P or N to scroll list box to previous or next page.

New: Ctrl-N  Edit: Ctrl-E  Delete: Ctrl-D  Help: Ctrl-Z
```

Press **New** to add a new VLAN entity.

Press **Edit** to view the current VLAN setting.

Use **Delete** to remove a VLAN entity.

Following screen appears, if you choice Port Based VLAN mode

```
FS-0900 Version 0.99.02G                                0 day 03:44:39
Configure Port Based VLAN

VLAN Name : [Default_VLAN ]

VLAN Members :
1      8 9      CPU
VVVVVVV V      V
```

OK Cancel Help

OK: Ctrl-S Cancel: Ctrl-C Help: Ctrl-Z

VLAN Name: Use default name or specify a VLAN name.

VLAN Members: Moving cursor to VLAN member mark with V to denote which port belong to VLAN.

2.8.4.2 802.1Q VLAN Concept

Port Based VLAN is simple to implement and use, but it cannot deploy cross switches VLAN. The 802.1Q protocol was developed in order to provide the solution. By tagging VLAN membership information to Ethernet frames, the IEEE 802.1Q can help a network administrator to break up large switched networks into smaller segments so that broadcast and multicast traffic won't grab too much of the available bandwidth, as well as providing a higher level of security between segments of internal networks.

The 802.1Q frame format is shown below,

PRE	SFD	DA	SA	TCI	P	C	VID	T/L	Payload	FCS
PRE	Preamble									
SFD	Start Frame Delimiter									
DA	Destination Address									
SA	Source Address									
TCI	Tag Control Info									
P	Priority									
C	Canonical Indicator									
VID	VLAN Identifier									
T/L	Type/Length Field									
Payload										
FCS	Frame Check Sequence									

Important VLAN Concepts for Configuration

There are two key components to understanding:

- The Default Port VLAN ID (**PVID**), which specifies the VLAN to which the switch will assign **unlabeled** traffic from that port;
- The VLAN ID (**VID**), which specify the set of VLAN from which a given port is allowed to receive, and to which allowed to send **labeled** packets.

Both variables can be assigned to a switch port, but there are important differences between them. An administrator can only assign one PVID to each switch port (since the 802.1Q protocol assigns any single packet to just one VLAN). The PVID defines the default VLAN ID tag that a switch will add to un-tagged frames it receives on that port (ingress traffic).

On the other hand, a port can be defined as a member of multiple VLAN (multiple VID). These VID constitute an access list for the port. The access list can be used to filter tagged ingress traffic (the switch will drop a packet tagged as belonging in one VLAN if the port on which it was received is not a member of that VLAN). The switch also consults the access list to filter packets it sends to that port (egress traffic). Packets will not be forwarded out the port if they unless they belong to one of the VLAN in which the port is a member. The differences between **Ingress** and **Egress** configurations can provide network segmentation while still allowing resources to be shared across more than one VLAN.

Important VLAN Definitions

Ingress

The point at which a frame is received on a switch and the switching decisions must be made. The switch examines the VID (if present) in the received frames header and decides whether and where to forward the frame. If the received frame is untagged, the switch will tag the frame with the PVID for the port on which it was received. It will then use traditional Ethernet bridging algorithms to determine the port to which the packet should be forwarded.

Next it checks to see if each destination port is on the same VLAN as the PVID and can thus transmit the frame. If the destination port is a member of the VLAN used by the ingress port, the frame will be forwarded. If the received frame is tagged with VLAN information, the switch checks its address table to see whether the destination port is a member of the same VLAN. Assuming both ports are members of the tagged VLAN, the frame will be forwarded.

Ingress Filtering

The process of checking an incoming frame and comparing its VID to the ingress port VLAN memberships is known as Ingress Filtering.

On the switch, it can be either *Enable* or *disabled* on a port-by-port basis.

1. An **untagged** frame is received, the **ingress** port **PVID** is applied to the frame.
2. If a **tagged** frame is received, the **VID** in the frame tag is used.

If Ingress Filtering is *Enable* and, the switch will first determine,

1. If the **ingress** port itself is a member of the frame VLAN and can thus receive the frame.
2. If the **ingress** port is not a member of the frame VLAN, the frame is dropped.
3. If it is a member of that VLAN, the switch then checks its address table to see whether the destination port is a member of the same VLAN. Assuming both ports are members of that VLAN, the frame will be forwarded.

Administrators should take care to make sure that each port **PVID** is setup, or incoming frames may be dropped if **Ingress Filtering** is *Enable*. If **Ingress Filtering** is *disabled*, it will not compare the incoming frame **VID** against the **ingress** port VLAN membership; it will only check its address table to see whether the destination VLAN exists.

1. If the VLAN is unknown, it will be dropped.
2. If the VLAN and the destination MAC address are known, the frame will be forwarded.
3. If the VLAN is known and the destination MAC address is unknown, the frame will be flooded to all ports in the VLAN.

Egress

The point at which frames are being transmitted out of a switch and tagging decisions must be made. When an administrator configures each port VLAN membership (allows egress for a specific VLAN), another configuration option is whether to transmit tagged or untagged frames on that port.

1. If an egress port is connected to an 802.1Q-compliant switch or end system, tagging should be Enable so the other device can utilize the VLAN and priority tags.
2. If an egress port is connected to a non-compliant switch or end-station, the tags should be stripped off and the frame transmitted untagged so that the receiving device can read the normal Ethernet frame.

Tagging

Every port on an 802.1Q compliant switch can be configured as *tagging* or *untagging*.

Ports with tagging Enable will put the VID number, priority and other VLAN information into the header of all packets that flow into and out of it. If a packet has previously been tagged, the port will not alter the packet, thus keeping the VLAN information intact. The VLAN information in the tag can then be used by other 802.1Q compliant devices on the network to make packet forwarding decisions.

Untagging

Ports with untagging Enable will strip the 802.1Q tag from all packets that flow into and out of those ports. If the packet doesn't have an 802.1Q VLAN tag, the port will not alter the packet. Thus, all packets received by and forwarded by an untagging port will have no 802.1Q VLAN information. (Remember that the PVID is only used internally within the switch). Untagging is used to send packets from an 802.1Q-compliant network device to a non-compliant network device.

2.8.4.3 802.1Q VLAN configuration

```

FS-0900 Version 0.99.02G                                0 day 03:47:07
Configure IEEE 802.1Q Tag VLAN

-----
VLAN Name          VID  1      8 9          CPU
-----
Default            1  FFFFFFFF F          V
-----

New
Edit
Delete
Help

Press P or N to scroll list box to previous or next page.

New: Ctrl-N  Edit: Ctrl-E  Delete: Ctrl-D  Help: Ctrl-Z

```

Press **New** to add a new VLAN entity.

Press **Edit** to view the current VLAN setting.

Use **Delete** to remove a VLAN entity.

Following screen appears, if you choice IEEE 802.1Q Tag VALN mode.

```

FS-0900 Version 0.99.02G                                0 day 04:17:47
Configure IEEE 802.1Q Tag VLAN

VLAN ID :  [1] [ ] (1-4094)
VLAN Name : [Default      ]

VLAN Members :

1      8 9      CPU
FFFFFFFFFF F      V

F:Fowrard(Unmodified)  -:Blocked  U:Untagged  T:Tagged

OK      Cancel      Help

OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z

```

VLAN ID: From 1 to 4094, specify a VLAN ID

VLAN Name: Use default name or specify a VLAN name.

VLAN Members: Moving cursor to VLAN member mark with V to denote which port belong to VLAN.

And, the following screen appears, if you choice IEEE 802.1Q Tag VLAN mode

2.8.4.4 Configuration Default Port VLAN ID

There are 4 modes to select for 802.1q Tag VLAN Mode:

```

FS-0900 Version 0.99.15G                                0 day 00:00:46
Configure Default Port VLAN ID

802.1q Tag VLAN Mode : [Disabled]
Default Port VLAN ID : [Disabled]
1 2 3 4 | Check | 6 7 8 9 CPU
[1 ] [1 ] [1 ] [1 ] | Secure | [1 ] [1 ] [1 ] [1 ] 1
|-----|
Default Egress Mode :
[F] [F] [F] [F] [F] [F] [F] [F] [F]
Default Ingress Mode :
[F] [F] [F] [F] [F] [F] [F] [F] [F]

F:Foward(Unmodified) U:Untagged T:Tagged D:Double Tagged
                                OK Cancel Help

                                OK: Ctrl-S Cancel: Ctrl-C Help: Ctrl-Z
  
```

Disabled: It ignores all setting below and Tagged packet. This setting depends on Port Based VLAN.

Fallback: If receive a packet without Tag, the packet follows up the setting of **Tagging**. If receive a Tagged packet, the packet follows up the previous setting of VLAN table.
When VLAN table exists, the packet will follow up the VLAN table. If not, the packet broadcasts and follows up Port Based VLAN.

Check: If receive a packet without Tag, the packet follows up the setting of **Tagging**. If receive a Tagged packet, the packet follows up the previous setting of VLAN table.
When VLAN table exists, the packet will follow up the VLAN table. If not, the packet drops.

Secure: The function is the same with **Check**. Additionally, if the packet from Ingress port does not belong to one of VLAN table, the packet drops.

```

FS-0900 Version 0.99.15G                                0 day 00:01:56
Configure Default Port VLAN ID

802.1q Tag VLAN Mode : [Secure |]

Default Port VLAN ID :
1      2      3      4      5      6      7      8      9      CPU
[1 ] [1 ] [1 ] [1 ] [1 ] [1 ] [1 ] [1 ] [1 ] [1 ]

Default Egress Mode :
[F] [F] [D] [U] [F] [F] [F] [F] [F]

Default Ingress Mode :
[F] [F] [D] [F] [F] [F] [F] [F] [F]

F:Foward(Unmodified)  U:Untagged  T:Tagged  D:Double Tagged

                                OK      Cancel      Help

OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z

```

Default Port VLAN ID (PVID): 1 ~ 4094 setting

Default Egress Mode:

- F:** When VLAN table dose not exist or VLAN mode is disabled, the Egress packet will be unmodified forwarded.
- U:** When VLAN table dose not exist or VLAN mode is disabled, the Egress packet will be untagged.
- T:** When VLAN table dose not exist or VLAN mode is disabled, the Egress packet will be tagged with Ingress PVID.
- D:** Force to add one tag with Ingress PVID on Egress packet.

Default Ingress mode:

- F:** The packet from Ingress will be unmodified forwarded.
- D:** The packet will be untagged. If the packet is with Double Tagged, the packet will be untagged one of tags.

2.9 Switch Monitor

Switch monitor allow user to monitor the real time operation status of the converter switch. User may monitor the port link up status or traffic counters for maintenance or diagnostic purpose. Select option **Switch Monitor** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:18:51
Switch Monitor Menu
-----
1. Switch Port State
2. Port Traffic Statistics
3. Port Packet Error Statistics
4. Port Packet Analysis Statistics
5. Mac Address Table

0. Help
```

1. **Switch Port State:** View current port media type, port state, etc.
2. **Port Traffic Statistics:** View port Receive/Send Byte Frames, utilization, etc.
3. **Port Packet Error Statistics:** View the traffic condition of ports, CRC, fragment, Jabber, etc.
4. **Port Packet Analysis Statistics:** Count ports RX/TX Frames in different length, unicast number, etc.
5. **Mac Address Table:** List current MAC address learned by SWH 2109

2.9.1 Switch Port State

In order to view the real time port status of the switch, select **Switch Port State** from the Switch Monitor menu, following screen appears,

```
FS-0900 Version 0.99.02G                                0 day 06:41:41
Switch Port State

Port Number |      1      2      3      4      5      6      7      8      9
-----|-----
Media Type  | TX   TX   TX   TX   TX   TX   TX   FX   FX
Port State  | F    F    F    F    F    F    F    D    D
Link State  |
Speed (Mbps)|
Duplex      |
Flow Control|

Port State
      D:Disabled  B/L:Blocking/Listening  L:Learning  F:Forwarding

< Press ESC to Leave This Page >
```

Port Number: The number of the port.

Media Type: The media type of the port; could be TP or Fiber.

Link State: The current link status of the port, could be Up or Down.

Speed (Mbps): The current operation speed of the port, could be 10 or 100.

Duplex: The current operation Duplex mode of the port, could be Full or Half.

2.9.2 Port Traffic Statistics

In order to view the real time port traffic statistics status of the switch, select **Port Traffic Statistics** from the Switch Monitor menu, following screen appears

```
FS-0900 Version 0.99.02G                                0 day 06:46:48
Port Traffic Statistics
```

Counter Name	Rates	Events
Bytes Received		
Frames Received		
Utilization		
Bytes Sent		
Frames Sent		
Utilization		
Total Bytes		
Total Utilization		

Port Number **1** 2 3 4 5 6 7 8 9

Press **C** to clear counters of CURRENT port.
Press **A** to clear counters of ALL ports.

Bytes Received: Total bytes received from current port.

Frames Received: Total frames received from current port.

Utilization: real port traffic ratio to current port total bandwidth.

Bytes Sent: Total bytes sent from current port.

Frames Sent: Total frames sent from current port.

Total Bytes: Total bytes of receive and send from current port.

Total Utilization: real traffic of received and sent to current port total bandwidth.

2.9.3 Port Packet Error Statistics

Port Packet Error Statistics Mode Counters allow viewing the port error history of the converter switch, Event Mode counters are calculated since the last time that counter was reset or cleared. Select **Port packet Error Statistics** from the Switch Monitor menu, following screen appears,

Use <- & -> arrow keys select the port to view.

```

FS-0900 Version 0.99.02G                                0 day 07:30:30
Port Packet Error Statistics
-----|-----|-----
Counter Name      |          Rates          |          Events          |
-----|-----|-----
RX CRC Error      |          0              |          0              |
RX Fragments      |          0              |          0              |
RX Filtered Frames|          0              |          0              |
RX Alignment Error|          0              |          0              |
RX Undersize Frames|          0              |          0              |
RX Oversize Frames|          0              |          0              |
RX Jabbers        |          0              |          0              |
RX Dropped Frames |          0              |          0              |
TX Dropped Frames |          0              |          0              |
Tx Late Collision  |          0              |          0              |
Tx Deferred        |          0              |          0              |
Tx Total Collision |          0              |          0              |
-----|-----|-----
Port Number      █ 1 2 3 4 5 6 7 8 9
-----|-----|-----
Press C to clear counters of CURRENT port.
Press A to clear counters of ALL ports.
  
```

Ctrl-A: Press Ctrl-A will clear all port's counter values back to zero.

RX CRC Errors: The number of packets received by a port that have a length (excluding framing bits but including FCS) between 64 and 1522 bytes inclusive, and have a bad FCS with an integral number of bytes.

RX Fragments: Total frames received which were less than 64 bytes or frames without SFD and are less than 64 bytes in length.

RX Symbol Error: The total number of times a valid length packet was received at a port and at least one invalid data symbol which was detected. Counter only increments once per carrier event and does not increment on detection of collision during the carrier event.

RX Alignment Errors: The number of packets received by a port that have a length (excluding framing bits but including FCS) between 64 and 1522 bytes, inclusive, and have a bad FCS with a non-integral number of bytes.

RX Undersized Frames: Total frames received shorter than 64 bytes.

RX Oversized Frames: Total frames received longer than maximum frame size.

RX Jabbers: Total frames received had both Oversize & CRC error.

RX Dropped frames: Total received frames dropped due to resources shortage.

TX Dropped frames: Total frames not transmitted due to resources shortage.

TX Late Collisions: Total late collision detected.

TX Deferred: Deferred frames occurred after 512 bits time.

TX Total Collisions: Total frames collision detected.

2.9.4 Port Analysis Statistics

Port Analysis Statistics Mode Counters allow viewing the port analysis history of the converter switch, Event Mode counters are calculated since the last time that counter was reset or cleared. Select Port analysis Statistics from the Switch Monitor menu, following screen appears,

```

FS-0900 Version 0.99.02G                                0 day 07:32:59
Port Packet Analysis Statistics

```

Counter Name	Rates	Events
RX Frames 64 Bytes	0	0
RX Frames 65-127 Bytes	0	0
RX Frames 128-255 Bytes	0	0
RX Frames 256-511 Bytes	0	0
RX Frames 512-1023 Bytes	0	0
RX Frames 1024-MAX Bytes	0	0
RX Unicast Frames	0	0
RX Multicast Frames	0	0
Rx Broadcast Frames	0	0
TX Unicast Frames	0	0
TX Multicast Frames	0	0
TX Broadcast Frames	0	0

Port Number **1** 2 3 4 5 6 7 8 9

Press **C** to clear counters of CURRENT port.
Press **A** to clear counters of ALL ports.

- RX frames (64):** Total 64 bytes packets received.
- RX Frames (65 - 127):** Total 65 - 127 bytes frames received.
- RX frames (128 - 255):** Total 128 - 255 bytes frames received.
- RX frames (256 - 512):** Total 256 - 512 bytes frames received.
- RX frames (512 - 1023):** Total 512 - 1023 bytes frames received.
- RX frames (1024 - Max):** Total 1024 - Maximum Frame size packets received.
- RX Unicast Frames:** Total unicast frames received
- RX Broadcast Frames:** Total Good Broadcast frames received.
- RX Multicast frames:** Total Good Multicast frames received.
- TX Unicast Frames:** Total unicast frames sent.
- TX Broadcast Frames:** Total Good Broadcast packets sent.
- TX Multicast frames:** Total Good Multicast packets sent.

2.9.5 MAC address table

MAC address table display MAC addresses learned since reset system and MAC address learning enable.

```
FS-0900 Version 0.99.15C                                0 day 00:07:03
MAC Address Table
[Page 64 |] [All |] Total : 1024      Updating MAC Address Table...
1009 FC:35:9E:85:79:B1 Port 1
1010 FC:5B:29:88:C1:E7 Port 1
1011 FC:61:0E:8F:BF:20 Port 1
1012 FC:85:7A:93:D5:D7 Port 1
1013 FC:97:5E:91:83:73 Port 1
1014 FC:C6:A3:9B:ED:2F Port 1
1015 FC:C9:55:9A:1C:19 Port 1
1016 FE:1A:21:C2:A1:E6 Port 1
1017 FE:77:4D:CF:61:0B Port 1
1018 FE:7F:49:CE:69:8F Port 1
1019 FE:A9:C6:D4:6E:E3 Port 1
1020 FE:AA:DB:D4:0E:5E Port 1
1021 FE:C7:74:D9:D6:10 Port 1
1022 FE:DA:F7:DA:7B:F3 Port 1
1023 FE:DE:D8:DA:FA:3C Port 1
1024 FE:FC:F0:DE:9D:14 Port 1

Update Table: U   Clear Table: C   Help: Ctrl-Z
```

```
FS-0900 Version 0.99.15C                                0 day 00:07:40
MAC Address Table
[Page 64 |] [All |] Total : 1024
1009 FC:35: |All | Port 1
1010 FC:5B: |Port 1 | Port 1
1011 FC:61: |Port 2 | Port 1
1012 FC:85: |Port 3 | Port 1
1013 FC:97: |Port 4 | Port 1
1014 FC:C6: |Port 5 | Port 1
1015 FC:C9: |Port 6 | Port 1
1016 FE:1A: |Port 7 | Port 1
1017 FE:77: |Port 8 | Port 1
1018 FE:7F: |Port 9 | Port 1
1019 FE:A9: |CPU | Port 1
1020 FE:AA: |-----| Port 1
1021 FE:C7:74:D9:D6:10 Port 1
1022 FE:DA:F7:DA:7B:F3 Port 1
1023 FE:DE:D8:DA:FA:3C Port 1
1024 FE:FC:F0:DE:9D:14 Port 1

Update Table: U   Clear Table: C   Help: Ctrl-Z
```

Above table mean MAC addresses learn from each port of the switch.

Press “**U**” to Update Table

Press “**C**” to Clear Table

2.10 System Utility

System Utility allow user easy to operate and maintain the system. Select option **System Utility** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:20:49
System Utility Menu

1. Ping
2. Event Log
3. Update Firmware
4. Load Factory Settings
5. Load Factory Settings Except Network Configuration

0. Help
```

```
10/100 Managed Converter Switch Version 0.99.09        0 day 22:26:54
System Utility Menu

1. Ping
2. Update Firmware
3. Load Factory Setting
4. Load Factory Setting Except Network Configuration

0. Help
```

- 1. Ping:** Ping allow user to ping a specified network device.
- 2. Update Firmware:** Allow user to update the latest firmware, save current configuration, or restore previous configuration to the converter switch.
- 3. Load Factory Setting:** Load Factory Setting will return the configuration of the converter switch to the factory default settings. The IP and Gateway addresses will also return to the factory default.

- 4. Load Factory Setting Except Network Configuration:** Select this will also return the configuration of the converter switch to the factory default settings. However, this will not return the IP and Gateway addresses to the factory default.

2.10.1 Ping

Ping refer to ICMP Echo Request, a device receive the Ping request will respond with an ICMP Echo Reply. The converter switch built in Ping function allow network administrator easily identify the network connection.

Select **Ping** from the System Utility menu, following screen appears,

```
FS-0900 Version 0.99.02G                                0 day 00:25:19
Ping
-----
IP Address      Size      Repeat      Time Out      Ping
[127.0.0.1]    [32 ] Bytes [4 ] Times    [1 ] Secs
Ping server 127.0.0.1 with 32 bytes of data:
32 bytes reply from 127.0.0.1: icmp_seq= 0, time=0ms
32 bytes reply from 127.0.0.1: icmp_seq= 1, time=0ms
32 bytes reply from 127.0.0.1: icmp_seq= 2, time=0ms
32 bytes reply from 127.0.0.1: icmp_seq= 3, time=0ms
Press Ctrl-P to stop pinging.
                                OK      Cancel  Help
-----
OK: Ctrl-S  Cancel: Ctrl-C  Help: Ctrl-Z
```

IP Address: Enter the desired IP address that the converter switch will Ping.

Size: Enter the desired length of the Ping packets.

Repeat: Enter the total times of Ping will issued.

Time Out: Enter the desired time out value of Ping.

After finish configuration, select **Ping** then press **Enter** to start the Ping process.

2.10.2 Event Log

Event log keep track of user login, logout timestamp, Select **Event Log** from the System Utility menu, following screen appears

FS-0900 Version 0.99.02G		0 day 00:14:45	
Event Log			
Type	Time	Description	
233	I	0 day 06:51:47	User from rs232 time out.
234	W	0 day 07:29:23	User from rs232 login failed.
235	I	0 day 07:29:26	User from rs232 login succeeded.
236	I	0 day 07:42:59	User from rs232 time out.
237	I	0 day 00:00:05	System cold start.
238	W	0 day 00:03:08	User from rs232 login failed.
239	W	0 day 00:03:09	User from rs232 login failed.
240	I	0 day 00:03:13	User from rs232 login succeeded.
241	I	0 day 00:08:20	User from rs232 time out.
242	I	0 day 00:14:33	User from rs232 login succeeded.

Page Up Page_Down Clear

E: error W: warning I: information
Press **F2** for more properties.

2.10.3 Update Firmware

The converter switch has built-in both TFTP and FTP clients. User may save or restore their configuration and update their Firmware on line. Select **Update Firmware** from the System Utility menu, following screen appears,

```
FS-0900 Version 0.99.04G                                0 day 00:05:16
Update Firmware

Protocol :      <FTP>
File Type :    <Configuration>

Server Address : [127.0.0.1      ]
User Name   :   [anonymous      ]
Password    :   [***            ]

File Location : [config.rom      ]

                Get   Put   Stop   Update

Transmitting Progress 0%

                                OK   Cancel   Help

OK: Ctrl-S   Cancel: Ctrl-C   Help: Ctrl-Z
```

Protocol: Press Space Bar to select preferred protocol - FTP or TFTP.

File Type: Press Space Bar to select the file to process - Firmware or Configuration.

Server Address: Enter the specified IP address of the File Server.

User Name: Enter the specified User Name for Log In the File Server.

Password: Enter the specified Password for Log In the File Server.

File Location: Enter the specified path & file name within the File Server.

Select **Get** then press **Enter** to start the download process - receive file from the server.
A Transmitting Progress will display during transfer.
A complete message will pop up to advise the user.

Select **Put** then press **Enter** to start the upload process - transmit file to the server.
A Transmitting Progress will display during transfer.
A complete message will pop up to advise the user.

Select **Stop** then press **Enter** to abort current operation.

Select **Update** then press **Enter** to instruct the converter switch update existing firmware / configuration to the newest received firmware/configuration. After an Update Success message pop up, the switch will need to reset to take change effect.

2.10.4 Load Factory Setting

Load Factory Setting will return all the configuration of the converter switch to the factory default settings include the IP and Gateway address. Load Factory Setting is useful when network administrator like to re-configure the system.

A system reset is required to put all changes effect after Load Factory Setting.

Select **Load Factory Setting** from the System Utility menu, following screen appears,



To load Factory Setting, select OK then press **Enter**.

2.10.5 Load Factory Setting Except Network Configuration

Load Factory Setting Except Network Configuration will return all the configuration of the converter switch to the factory default settings. However, IP and Gateway addresses will not return to the factory default.

Load Factory Setting Except Network Configuration is extremely useful when a network administrator need to re-configure the system "REMOTELY". Because traditional Factory Reset will bring network setting back to default and lost all network connection.

Select **Load Factory Setting Except Network Configuration** from the System Utility menu, following screen appears,

To load Factory Setting Except Network Configuration, select OK then press **Enter**.

2.11 Save Configuration

In order to save configuration setting permanently, user need to save configuration first before reset the converter switch. Select **Save Configuration** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:28:15
Main Menu
-----
1. System Information
2. User Authentication
3. Network Management
4. Switch Management
5. Switch Monito
6. System Utilit
7. Save Configur
8. Reset System
9. Logout

0. Help

Save All Changes to Flash?
OK  Cancel
```

To save the Configuration, select OK then press **Enter**.

2.12 Reset System

After configuration change, reset system to take change effect. Select **Reset System** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:28:53
Main Menu
-----
1. System Information
2. User Authentication
3. Network Management
4. Switch Management
5. Switch Monitor
6. System Utility
7. Save Configuration
8. Reset System
9. Logout

0. Help

All Changes Not Saved Will be Lost
Reset System?
OK      Cancel
```

To perform System Reset, Select OK then press **Enter**.

2.13 Logout

Console Logout will stop current RS-232 or Telnet connection between the system and the PC. To perform Logout, select option **Logout** from the Console main menu, following screen appears.

```
FS-0900 Version 0.99.02G                                0 day 00:29:34
Main Menu
-----
1. System Information
2. User Authentication
3. Network Management
4. Switch Management
5. Switch Monitor
6. System Utilities
7. Save Configuration
8. Reset System
9. Logout
0. Help

Logout System ?
OK  Cancel
```

To logout, select **OK** then press **ENTER**.

3. SNMP NETWORK MANAGEMENT

The Simple Network Management Protocol (SNMP) is an application-layer protocol that facilitates the exchange of management information between network devices. It is part of the TCP/IP protocol suite. SNMP enables network administrators to manage network performance, find and solve network problems, and plan for network growth.

SNMP consists following key components,

Managed device is a network node that contains SNMP agent. Managed devices collect and store management information and make this information available to NMS using SNMP. Managed device can be switches/Hub, ...,etc.

MIB (Management Information Base) define the complete manageable entries of the managed device. These MIB entries can be either read-only or read-write. For example, the System Version is read-only variables. The Port State Enable or Disable is a read-write variable and a network administrator can not only read but also set its value remotely.

SNMP Agent is a management module resides in the managed device that responds to the SNMP Manager request.

SNMP Manager/NMS executes applications that monitor and control managed devices. NMS provide the bulk of the processing and memory resources required for the complete network management. SNMP Manager often composed by desktop computer/work station and software program such like HP OpenView.

Totally 4 types of operations are used between SNMP Agent & Manager to change the MIB information. These 4 operations all use the UDP/IP protocol to exchange packets.

GET: This command is used by an SNMP Manager to monitor managed devices. The SNMP Manager examines different variables that are maintained by managed devices.

GET Next: This command provides traversal operation and is used by the SNMP Manager to sequentially gather information in variable tables, such as a routing table.

SET: This command is used by an SNMP Manager to control managed devices. The NMS changes the values of variables stored within managed devices.

Trap: Trap is used by the managed device to asynchronously report a specified event to the SNMP Manager. When certain types of events occur, a managed device will send a trap to alert the SNMP Manager.

The system built-in management module also supports SNMP management. User must install the MIB file before using the SNMP based network management system. The MIB file is on a diskette that accompanies the system. The file name extension is .mib, which SNMP based compiler can read.

Please refer to the appropriate documentation for instructions on installing the system private MIB.