WoMaster

User Manual

Command Line Interface

DS409

Industrial 9G L2 Managed Ethernet Switch

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WoMaster

DS409 Industrial 9G L2 Managed Ethernet Switch

WoMaster Command Line Interface User Manual

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About This Manual

This user manual is intended to guide a professional installer to configure the device through Command Line Interface. It includes procedures to assist you in avoiding unforeseen problems.

NOTE:

Only qualified and trained personnel should be involved with installation, inspection, and repairs of this switch.

Disclaimer

WoMaster reserves the right to make changes to this Manual or to the product hardware at any time without notice. Information provided here is intended to be accurate and reliable. However, it might not cover all details and variations in the equipment and does not claim to provide for every possible contingency met in the process of installation, operation, or maintenance. Should further information be required or should particular problem arise which are not covered sufficiently for the user's purposes, the matter should be referred to WoMaster. Users must be aware that updates and amendments will be made from time to time to add new information and/or correct possible unintentional technical or typographical mistakes. It is the user's responsibility to determine whether there have been any such updates or amendments of the Manual. WoMaster assumes no responsibility for its use by the third parties.

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At WoMaster, you can use the online service forms to request the support. The submitted forms are stored in server for WoMaster team member to assign tasks and monitor the status of your service. Please feel free to write to help@womaster.eu if you encounter any problems.

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1. COMMAND LINE INTERFACE (CLI) INTRODUCTION

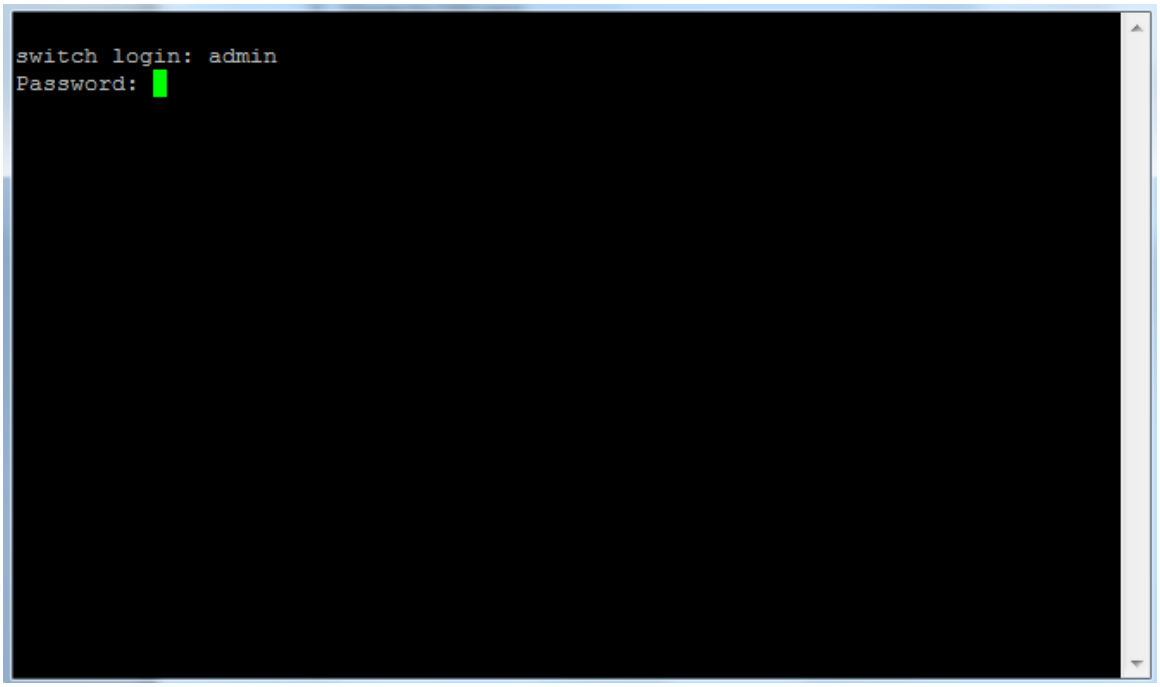
The Command Line Interface (CLI) is the user interface to the switch's embedded software system. The CLI in WoMaster switches can be accessed through either the serial console or Telnet console. The explanation for Serial and Telnet console preparation would be explained below:

1.1 PREPARATION FOR SERIAL CONSOLE

Attach RJ-45 to RS-232 DB-9 console cable to PC's COM port; connect RJ45 connector to the Console port of the WoMaster Managed Switch.

1. Go to Start -> Program -> Accessories -> Communication -> Hyper Terminal
2. Give a name to the new console connection.
3. Choose the COM name
4. Select correct serial settings. The serial settings of **Womaster Managed switches** are as below:

   Baud Rate: 115200 / Parity: None / Data Bit: 8 / Stop Bit: 1
5. After connected, switch login screen can be seen.

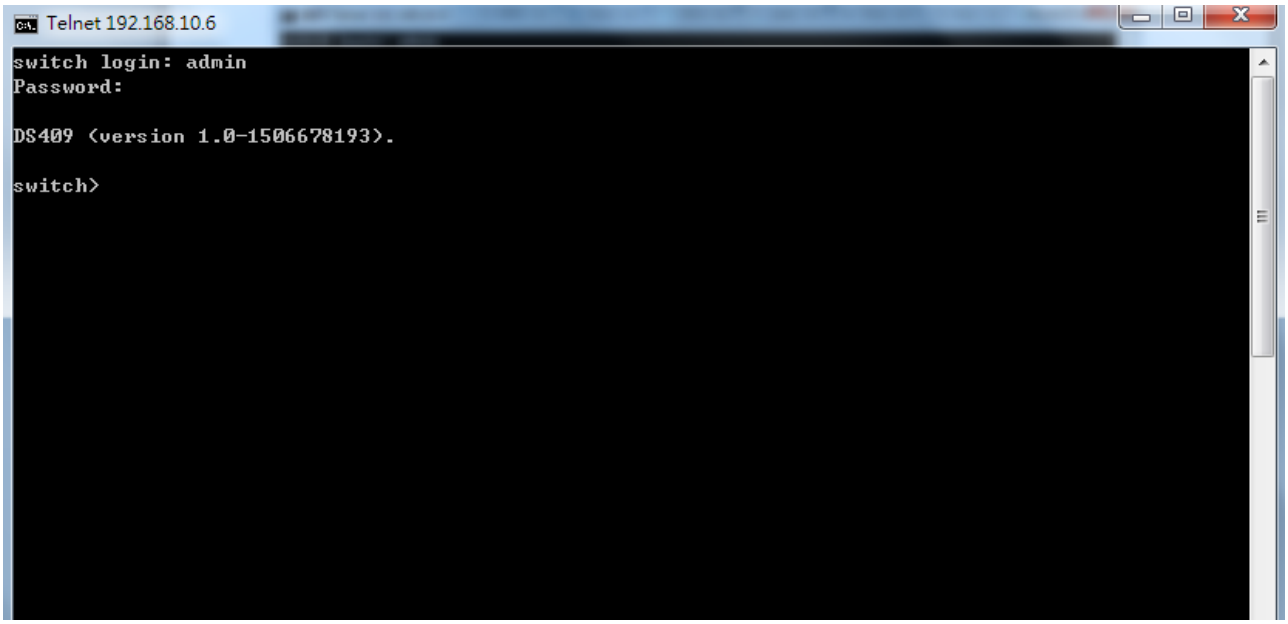


6. Login the switch. The default username: **admin**; password: **admin.**

1.2 PREPARATION FOR TELNET CONSOLE

WoMaster managed switch supports Telnet console. User can connect to the switch by Telnet and the command lines are the same as what user sees by RS232 console port. Below are the steps to open Telnet connection to the switch.

1. Start -> Run -> cmd. ->**Enter**
2. Type the **Telnet 192.168.10.1** (or the IP address of the switch). And then press **Enter**, user will directly enter the Telnet console.
3. Type the Login Name and its Password. The default Login Name and Password are **admin / admin**.



SSH (Secure Shell)

WoMaster managed SWITCH also supports SSH console. User can remotely connect to the switch by command line interface. The SSH connection can secure all the configuration commands user sent to the switch.

SSH is a client/server architecture while the switch is the SSH server. When user wants to make SSH connection with the switch, user should download the SSH client tool first.

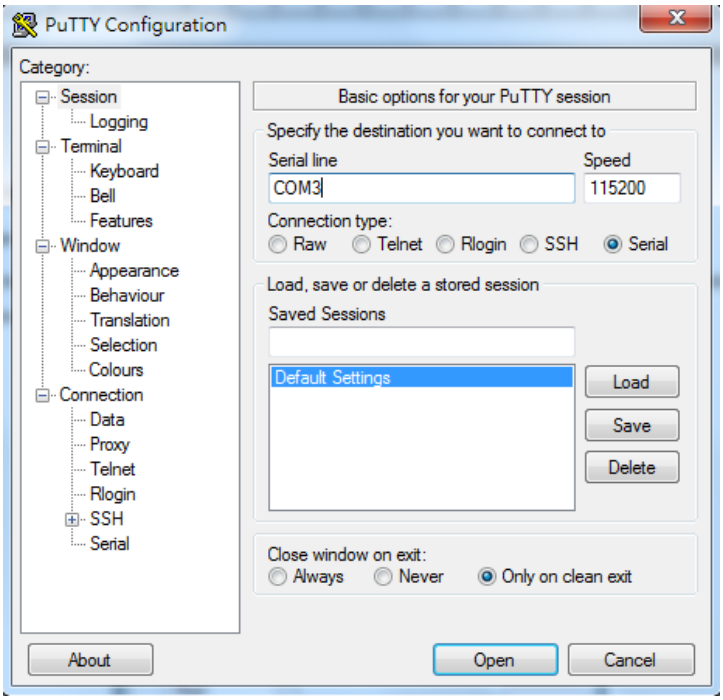
SSH Client

There are many free, sharewares, trials or charged SSH clients user can find on the internet, e.g., PuTTY is a free and popular Telnet/SSH client. We'll use this tool to demonstrate how to login by SSH. (PuTTY copyright 1997-2016 Simon Tatham).

Download PuTTY: http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

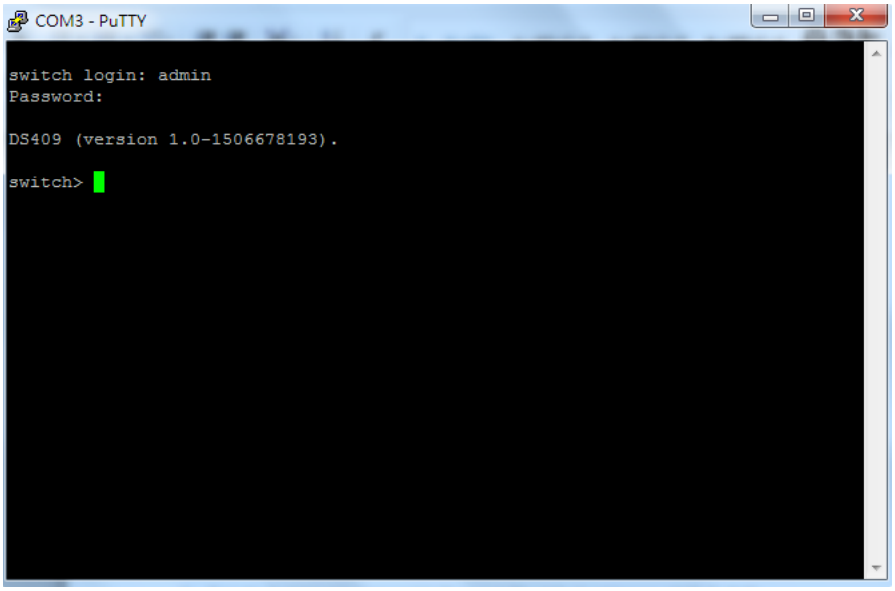
1. Open SSH Client/PuTTY

   In the **Session** configuration, choose the **Serial** protocol then enter the **Serial line** and **Speed**. For the serial line, please check the device manager to make sure the serial line name. The speed should be 115200. Then click on **Open** to start the SSH session console.



2. After it user can see the CLI command screen is pop-up

3. Type the Switch Login name and its Password. The default setting are **admin / admin**.



4. All the commands user sees in Putty are the same as the CLI commands user sees via RS232 console.

The next chapter will introduce in detail how to use command line to configure some features in the switch.

2. UNDERSTANDING ALL COMMANDS

For either type of connection, access to the command line interface is generally referred to as an EXEC session. There are some different command modes. Each command mode has its own access ability, available command lines and uses different command lines to enter and exit.

User EXEC mode: As long as user login the SWITCH by CLI. User is in the **User EXEC mode**. User can ping, telnet remote device, and show some basic information. Type **exit** to logout. Press **?** to see the command list

```
SWITCH> ?
enable          Turn on privileged mode command
exit            Exit current mode and down to previous mode
list            Print command list
ping            Send echo messages
quit            Exit current mode and down to previous mode
show            Show running system information
telnet          Open a telnet connection
traceroute      Trace route to destination
```

Privileged EXEC mode: Press enable in the **User EXEC mode**, then User can enter the **Privileged EXEC mode**. In this mode, the system allows User to view current configuration, reset default, reload SWITCH, show system information, save configuration and enter the global configuration mode. Type **exit** to leave and press **?** to see the command list.

```
SWITCH# ?
archive         Manage archive files
clear           Reset functions
clock           Configure time-of-day clock
configure       Configuration from vty interface
copy            Copy from one file to another
dir             Display a list of files
disable         Turn off privileged mode command
dot1x           IEEE 802.1x standard access security control
end             End current mode and change to enable mode
exit            Exit current mode and down to previous mode
list            Print command list
no              Negate a command or set its defaults
pager           Terminal pager
ping            Send echo messages
quit            Exit current mode and down to previous mode
reboot          Reboot system
reload          copy a default-config file to replace the current one
show            Show running system information
telnet          Open a telnet connection
traceroute      Trace route to destination
usb             USB
write           Write running configuration to memory, network, or terminal
```

Global Configuration Mode: Type configure terminal in privileged EXEC mode. Then User can enter the Global Configuration mode. In Global Configuration mode, User can configure all the features that the system provides. Type **exit** to leave and press **?** to see the command list.

The command lists of global configuration mode.

```
SWITCH(config)# ?
administrator        Administrator account setting
arp                  Set a static ARP entry
auth                 Authentication
clock                Configure time-of-day clock
default              Set a command to its defaults
dot1x                IEEE 802.1x standard access security control
end                  End current mode and change to enable mode
erps                 Ethernet Ring Protection SWITCHing (ITU-T G.8032)
ethertype            Ethertype
exit                 Exit current mode and down to previous mode
gmrp                 GMRP protocol
gvrp                 GARP VLAN Registration Protocol
hostname             Set system's network name
interface            Select an interface to configure
ip                   IP information
ipv6                 IP information
lacp                 Link Aggregation Control Protocol
list                 Print command list
lldp                 Link Layer Discovery Protocol
log                  Logging control
loop-protect         Ethernet loop protection
mac-address-table    mac address table
mirror               Port mirroring
nameserver           DNS Server
no                   Negate a command or set its defaults
ntp                  Configure NTP
ptp                  IEEE1588 PTPv2
qos                  Quality of Service (QoS)
relay                relay output type information
router               Enable a routing process
service              System service
sfp                  Small form-factor pluggable
smtp-server          SMTP server configuration
snmp-server          the SNMP server
spanning-tree        the spanning tree algorithm
trunk                Trunk group configuration
vlan                 Virtual LAN
warning-event        Warning event selection
write-config         Specify config files to write to
```

Interface Configuration: Many features are enabled for a particular interface. The Interface commands enable or modify the operation of an interface. In this mode, a physical port is set up for a specific logical connection operation. The Interface Configuration mode provides access to the router interface configuration commands.

This section has two interface configuration, **Port interface** and **VLAN interface**. For Port interface, type **interface IFNAME** in global configuration mode. Then User can enter the interface configuration mode. In this mode, User can configure port settings. In port interface, the name of Gigabit Ethernet port 1 is ge1, Gigabit Ethernet 2 is ge2, and so on. Type **exit** to leave current level and press **?** to see the command list

The command lists of the global configuration mode.

```
SWITCH(config)# interface fe1
SWITCH(config-if)# ?

acceptable          Configures the 802.1Q acceptable frame types of a port.
auto-negotiation    Enables auto-negotiation state of a given port
description         Interface specific description
dot1x               IEEE 802.1x standard access security control
duplex              Specifies the duplex mode of operation for a port
end                 End current mode and change to enable mode
exit                Exit current mode and down to previous mode
flowcontrol         Sets the flow-control value for an interface
garp                General Attribute Registration Protocol
ingress             802.1Q ingress filtering features
lacp                Link Aggregation Control Protocol
list                Print command list
loopback            Specifies the loopback mode of operation for a port
mdix                Configure mdix state of a given port
no                  Negate a command or set its defaults
qos                 Quality of Service (QoS)
quit                Exit current mode and down to previous mode
rate-limit          Rate limit configuration
sfp                 Small form-factor pluggable
shutdown            Shutdown the selected interface
spanning-tree       the spanning-tree protocol
speed               Specifies the speed of a Fast Ethernet port or a Gigabit Ethernet port.
switchport          Set switching mode characteristics
```

The second section is VLAN interface, press **interface VLAN (VLAN-ID)** in global configuration mode. User can then enter VLAN interface configuration mode. In this mode, User can configure the settings for the specific VLAN. In VLAN interface, the name of VLAN 1 is VLAN 1, VLAN 2 is VLAN 2, and so on. To leave VLAN interface mode type **exit**. Press **?** to see the available command list.

The command lists of the VLAN interface configuration mode.

```
SWITCH(config)# interface vlan 1
SWITCH(config-if)# ?
description     Interface specific description
end             End current mode and change to enable mode
exit            Exit current mode and down to previous mode
ip              Interface Internet Protocol config commands
ipv6            Interface Internet Protocol config commands
list            Print command list
no              Negate a command or set its defaults
quit            Exit current mode and down to previous mode
shutdown        Shutdown the selected interface
```

The table below presents the summary of the 5 command modes:

COMMAND MODE	MAIN FUNCTION	PROMPT
User EXEC	This is the first level of access. User can ping, telnet remote device, and show some basic information	SWITCH>
Privileged EXEC	In this mode, the system allows User to view current configuration, reset default, reload switch, show system information, save configuration…and enter global configuration mode.	SWITCH#
Global Configuration	In global configuration mode, User can configure all the features that the system provides User	SWITCH(config)#
Port Interface Configuration	In this mode, User can configure port related settings.	SWITCH(config-if)#
VLAN Interface Configuration	In this mode, User can configure settings for specific VLAN.	SWITCH(config-if)#

Here are some useful commands for User to see these available commands. Save User time in typing and avoid typing error. Press **?** to see all the available commands in this mode. It helps User to see the next command User can/should type as well.

```
SWITCH(config)# interface (?)
IFNAME          Interface's name
Vlan            Select a vlan to configure
```

(Character)? To see all the available commands starts from this character.

```
SWITCH(config)# a?
administrator   Administrator account setting
arp             Set a static ARP entry
auth            Authentication
```

The tab key helps User to input the command quicker. If there is only one available command in the next, clicking on tab key can help to finish typing soon.

```
SWITCH# co (tab) (tab)
configure copy

SWITCH(config)# ad (tab)
SWITCH(config)# administrator
```

Ctrl+C To stop executing the unfinished command.

Ctrl+S To lock the screen of the terminal. User can't input any command.

Ctrl+Q To unlock the screen which is locked by Ctrl+S.

Ctrl+Z To exit configuration mode.

Alert message when multiple users want to configure the switch. If the administrator is in configuration mode, then the Web users can't change the settings. Womaster Managed switch allows only one administrator to configure the switch at a time.

3. COMMANDS

3.1 CLI COMMANDS FOR SYSTEM CONFIGURATION

This chapter will show the CLI Command for System Features, and this chapter covers the information, User Account, Ip Setting, Date and Time and DHCP Server section. And the Show commands are used to display device settings, statistics and other information.

Feature	Command Line
SWITCH Setting	
System Name	SWITCH(config)# hostname DWORD This system's network name SWITCH(config)# hostname SWITCH SWITCH(config)#
System Location	SWITCH(config)# snmp-server location Taipei DWORD string that describes the system location information
System Contact	SWITCH(config)# snmp-server contact help@womaster.eu DWORD string that describes the system contact information
Display	SWITCH# show snmp-server name SWITCH SWITCH# show snmp-server location Taipei SWITCH# show snmp-server contact help@womaster.eu SWITCH# show version Model Name : DS310 Bootloader : 1.0.2.0 Software : 1.0-1504149050 MAC Address : 94:66:E7:9F:56:78
Admin Password	
User Name and Password	SWITCH(config)# administrator NAME PASSWORD NAME Administrator account name PASSWORD Administrator account password SWITCH(config)# administrator admin admin Administrator account name and password is unchanged

Display	SWITCH# show administrator Administrator account information name: admin password: admin
IP Configuration	
IP Address/Mask (192.168.10.8, 255.255.255.0	SWITCH(config)# int vlan 1 SWITCH(config-if)# ip address dhcp SWITCH(config-if)# ip address 192.168.10.8/24 SWITCH(config-if)# ip dhcp client SWITCH(config-if)# ip dhcp client renew SWITCH(config-if)# ipv6 address ; IPv6 configuration X:X::X:X/M IPv6 address (e.g. 3ffe:506::1/48) SWITCH(config-if)# ipv6 address 3ffe:506::1/48
Gateway	SWITCH(config)# ip route 0.0.0.0/0 192.168.10.254/24
Remove Gateway	SWITCH(config)# no ip route 0.0.0.0/0 192.168.10.254/24
Display	SWITCH# show running-config …… ! interface vlan1 ip address 192.168.10.8/24 no shutdown ! ip route 0.0.0.0/0 192.168.10.254/24 !
Time Setting	
NTP Server	SWITCH(config)# ntp peer enable disable primary secondary SWITCH(config)# ntp peer primary IPADDR SWITCH(config)# ntp peer primary 192.168.10.120
Clock Setting	SWITCH# clock set TIME hh:mm:ss Current Time MONTH <1-12> Month of the year DAY <1-31> Day of the month

	YEAR <1993-2037> Year SWITCH# clock set 11:20:30 7 21 2017 Fri Jul 21 11:20:30 2017 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London
Time Zone	SWITCH(config)# clock timezone 26 Sun Jan 1 04:13:24 2006 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London **Note:** By typing clock timezone ?, User can see the timezone list. Then choose the number of the timezone User want to select.
Daylight Saving	SWITCH(config)# **clock summer-time 4 0 2 12:00 4 0 3 12:00** **Clock summer-time**<*start week of month* ><*start weekday*> <*start month*><*start Hour:Min*><*end week of month*><*end weekday*><*end month*><*end Hour:Min*> Start week of month: 1~5 Start weekday: 0 (Sunday) ~6 (Saturday) Month: 1 (Jan) ~12 (Dec)
IEEE 1588	SWITCH(config)# ptp run preferred-clock Preferred Clock slave Run as slave
Display	SWITCH# sh ntp associations Network time protocol Status : Disabled Primary peer : N/A Secondary peer : N/A SWITCH# show clock Fri Jul 21 06:10:53 2017 (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London SWITCH# show clock timezone clock timezone (26) (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London
DHCP Server	
DHCP Server configuration	Enable DHCP Server on DP310 switch SWITCH# SWITCH# configure terminal SWITCH(config)# router dhcp SWITCH(config-dhcp)# service dhcp

	Configure DHCP network address pool SWITCH(config-dhcp)#network 50.50.50.0/4 -(network/mask) SWITCH(config-dhcp)#default-router 50.50.50.1
Lease time configure	SWITCH(config-dhcp)#lease 300 (300 sec)
DHCP Relay Agent	Enable DHCP Relay Agent SWITCH# SWITCH# configure terminal SWITCH(config)# router dhcp SWITCH(config-dhcp)# service dhcp SWITCH(config-dhcp)# ip dhcp relay information option Enable DHCP Relay policy SWITCH(config-dhcp)# ip dhcp relay information policy replace drop Relay Policy keep Drop/Keep/Replace option82 field replace
Show DHCP Relay Agent	SWITCH# show ip dhcp relay DHCP Relay Agent ON ---------- Re-forwarding policy: Replace Port Circuit-ID Hex Display -------- ---------- 1 00010001 00010001 2 00010002 00010002 3 00010003 00010003 4 00010004 00010004 5 00010005 00010005 6 00010006 00010006 7 00010007 00010007 8 00010008 00010008 9 00010009 00010009 Remote-ID: 94:66:e7:9f:09:10 9466e79f0910
Show DHCP server information	SWITCH# show ip dhcp server statistics SWITCH# show ip dhcp server statistics DHCP Server OFF

	[Address Pool 1] network:0.0.0.0/0 default-router:0.0.0.0 lease time:604800 Excluded Address List IP Address ---------- Manual Binding List (Port/IP) PortIP Address --------- ---------- Manual Binding List (IP/MAC) IP Address MAC Address ---------- ---------- Option82 Binding List IP Address Circuit-ID Remote-ID ---------- ---------- ---------- Leased Address List IP Address MAC Address Leased Time Remains ---------- ---------- ----------

3.2 CLI COMMANDS FOR PORT CONFIGURATION

This chapter provides the Port Configuration CLI Commands, all of the features is covered in this chapter

Feature	Command Line
Port Control	
Port Control – State	SWITCH(config-if)# shutdown -> Disable port state Port1 Link Change to DOWN interface fastethernet1 is shutdown now. SWITCH(config-if)# no shutdown -> Enable port state interface fastethernet1 is up now.
Port Control – Auto Negotiation	SWITCH(config)# interface fe1 SWITCH(config-if)# auto-negotiation Auto-negotiation of port 1 is enabled!
Port Control – Force Speed/Duplex	SWITCH(config-if)# speed 100 set the speed mode ok! SWITCH(config-if)# duplex full set the duplex mode ok!
Port Control – Flow Control	SWITCH(config-if)# flowcontrol on Flowcontrol on for port 1 set ok! SWITCH(config-if)# flowcontrol off Flowcontrol off for port 1 set ok!
Port Status	
Port Status	SWITCH# show interface ge1 Interface gigabitethernet1 Description : N/A Administrative Status : Enable Operating Status : Connected Duplex : Auto (Full) Speed : Auto (100) Flow Control : off Default Port VLAN ID: 1 Ingress Filtering : Disabled Acceptable Frame Type : All Port Security : Disabled Auto Negotiation : Enable Loopback Mode : None STP Status: Blocking

	Default CoS Value for untagged packets is 0. Medium mode is Copper.
Rate Control	
Rate Control – Ingress or Egress	SWITCH(config-if)# rate-limit egress Outgoing packets ingress Incoming packets ***Note: To enable rate control, User should select the Ingress or Egress rule first; then assign the packet type and bandwidth.***
Rate Control – Filter Packet Type	SWITCH(config-if)# rate-limit ingress mode all Limit all frames broadcast Limit Broadcast frames flooded-unicast Limit Broadcast, Multicast and flooded unicast frames multicast Limit Broadcast and Multicast frames SWITCH(config-if)# rate-limit ingress mode broadcast Set the ingress limit mode broadcast ok.
Rate Control - Bandwidth	SWITCH(config-if)# rate-limit ingress bandwidth <0-100> Limit in megabits per second (0 is no limit) SWITCH(config-if)# rate-limit ingress bandwidth 8 Set the ingress rate limit 8Mbps for Port 1.
Port Trunking	
LACP	SWITCH(config)# lacp group 1 ge2-3 Group 1 based on LACP (802.3ad) is enabled! Note: different speed port can’t be aggregated together.
Static Trunk	SWITCH(config)# trunk group 2 ge5-6 Trunk group 2 enable ok!
Display - LACP	SWITCH# show lacp internal LACP group 1 internal information: Port Port Admin Oper Port Port Priority Timeout Key Key State ----- --------- -------- -------- -------- ------- 2 32768 Long 2 2 0x45 3 32768 Long 3 3 0x45 LACP group 2 is inactive LACP group 3 is inactive LACP group 4 is inactive

Display - Trunk	SWITCH# show trunk group 1 FLAGS: I -> Individual P -> In channel D -> Port Down Trunk Group GroupID Protocol Ports --------+---------+----------------------------------- 1 LACP 2(D) 3(D) SWITCH# show trunk group 2 FLAGS: I -> Individual P -> In channel D -> Port Down Trunk Group GroupID Protocol Ports --------+---------+----------------------------------- 2 Static 5(D) 6(P) SWITCH#

3.3 CLI COMMANDS FOR REDUNDANCY CONFIGURATION

Feature	Command Line
Global (STP, RSTP, MSTP)	
Enable	SWITCH(config)# spanning-tree enable
Disable	SWITCH(config)# spanning-tree disable
Mode (Choose the Spanning Tree mode)	SWITCH(config)# spanning-tree mode rst the rapid spanning-tree protocol (802.1w) stp the spanning-tree prtotcol (802.1d) mst the multiple spanning-tree protocol (802.1s)
Priority	SWITCH(config)# spanning-tree priority <0-61440> valid range is 0 to 61440 in multiple of 4096 SWITCH(config)# spanning-tree priority 4096
Bridge Times	SWITCH(config)# spanning-tree bridge-times (forward Delay) (max-age) (Hello Time) SWITCH(config)# spanning-tree bridge-times 15 20 2 <4-30> the value of forward delay time in seconds This command allows you configure all the timing in one time.
Forward Time	SWITCH(config)# spanning-tree forward-time <4-30> the value of forward delay time in seconds SWITCH(config)# spanning-tree forward-time 15
Max Age	SWITCH(config)# spanning-tree max-age <6-40> the value of message maximum age time in seconds SWITCH(config)# spanning-tree max-age 20
Hello Time	SWITCH(config)# spanning-tree hello-time <1-10> the value of hello time in seconds SWITCH(config)# spanning-tree hello-time 2
Pathcost	SWITCH(config)# spanning-tree pathcost method long specifies 32-bit based values that range from 1-200,000,000 short specifies 16-bit based values that range from 1-65535
transmission-limit	SWITCH(config)# spanning-tree transmission-limit <1-10> valid range from 1-10
MSTP	
Enter the MSTP Configuration Tree	SWITCH(config)# spanning-tree mst MSTMAP the mst instance number or range configuration enter mst configuration mode forward-time the forward dleay time hello-time the hello time

	max-age the message maximum age time max-hops the maximum hops sync sync port state of exist vlan entry SWITCH(config)# spanning-tree mst configuration SWITCH(config)# spanning-tree mst configuration SWITCH(config-mst)# abort exit current mode and discard all changes end exit current mode, change to enable mode and apply all changes exit exit current mode and apply all changes instance the mst instance list Print command list name the name of mst region no Negate a command or set its defaults quit exit current mode and apply all changes revision the revision of mst region show show mst configuration
Region Configuration	Region Name: SWITCH(config-mst)# name NAME the name string SWITCH(config-mst)# name Region Revision: SWITCH(config-mst)# revision <0-65535> the value of revision SWITCH(config-mst)# revision 65535
Mapping Instance to VLAN (Ex: Mapping VLAN 2 to Instance 1)	SWITCH(config-mst)# instance <1-15> target instance number SWITCH(config-mst)# instance 1 vlan VLANMAP target vlan number(ex.10) or range(ex.1-10) SWITCH(config-mst)# instance 1 vlan 2
Display Current MST Configuration	SWITCH(config-mst)# show current Current MST configuration Name Revision Instance Vlans Mapped -------- ---------- 0 1,4-4094 1 2 2 3

	---------- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D ----------
Remove Region Name	SWITCH(config-mst)# no name name configure revision revision configure instance the mst instance SWITCH(config-mst)# no name
Remove Instance example	SWITCH(config-mst)# no instance <1-15> target instance number SWITCH(config-mst)# no instance 2
Show Pending MST Configuration	SWITCH(config-mst)# show pending Pending MST configuration Name [] (->The name is removed by no name) Revision Instance Vlans Mapped -------- ---------- 0 1,3-4094 1 2 (->Instance 2 is removed by no instance 2) ---------- Config HMAC-MD5 Digest: 0x3AB68794D602FDF43B21C0B37AC3BCA8 ----------
Apply the setting and go to the configuration mode	SWITCH(config-mst)# quit apply all mst configuration changes SWITCH(config)#
Apply the setting and go to the global mode	SWITCH(config-mst)# end apply all mst configuration changes SWITCH#
Abort the Setting and go to the configuration mode. Show Pending to see the new settings are not applied.	SWITCH(config-mst)# abort discard all mst configuration changes SWITCH(config)# spanning-tree mst configuration SWITCH(config-mst)# show pending Pending MST configuration Name (->The name is not applied after Abort settings.) Revision Instance Vlans Mapped

	-------- ---------- 0 1,4-4094 1 2 2 3(-> The instance is not applied after Abort settings.) ---------- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D ----------
Port Configuration Mode	
Port Configuration	SWITCH(config)# int ge2 SWITCH(config-if)# spanning-tree bpdufilter a secure BPDU process on edge-port interfcae bpduguard a secure response to invalid configurations(received BPDU sent by self) cost change an interafce's spanning-tree port path cost edge-port interface attached to a LAN segment that is at the end of a bridged LAN or to an end node link-type the link type for the Rapid Spanning Tree mst the multiple spanning-tree port-priority the spanning tree port priority stp-state the bridge port STP state
Port Path Cost	SWITCH(config-if)# spanning-tree cost <1-200000000> 16-bit based value range from 1-65535, 32-bit based value range from 1-200,000,000 SWITCH(config-if)# spanning-tree cost 200000
Port Priority	SWITCH(config-if)# spanning-tree port-priority <0-240> Number from 0 to 240, in multiple of 16 SWITCH(config-if)# spanning-tree port-priority 128
Link Type - Auto	SWITCH(config-if)# spanning-tree link-type auto
Link Type - P2P	SWITCH(config-if)# spanning-tree link-type point-to-point
Link Type - Share	SWITCH(config-if)# spanning-tree link-type shared
Edge Port	SWITCH(config-if)# spanning-tree edge-port
MSTP Port Configuration	SWITCH(config-if)# spanning-tree mst MSTMAP cost <1-200000000> the value of mst instance port cost SWITCH(config-if)# spanning-tree mst MSTMAP port-priority <0-240> the value of mst instance port priority in multiple of 16

Global Information	
Active Information	SWITCH# show spanning-tree active Spanning-Tree : Enabled Protocol : RSTP Root Address : 9466.e79f.0910 Priority : 32768 Root Path Cost : 0 Root Port : N/A Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address : 9466.e79f.0910 Priority : 32768 Bridge Times : max-age 20, hello-time 2, forward-delay 15 BPDU transmission-limit : 3 Port Role State Cost Prio.Nbr Type Aggregated ------ ---------- ---------- -------- ---------- ------------ ------------ ge9 Designated Forwarding 20000 128.9 P2P(RSTP) N/A
RSTP Summary	SWITCH# show spanning-tree summary Spanning-Tree : Enabled Protocol : RSTP Root Address : 9466.e79f.0910 Priority : 32768 Root Path Cost : 0 Root Port : N/A Root Times : max-age 20, hello-time 2, forward-delay 15 Bridge Address 9466.e79f.0910 Priority : 32768 Bridge Times : max-age 20, hello-time 2, forward-delay 15 BPDU transmission-limit : 3 BPDU Skewing Detection : Disabled Backbonefast : Disabled Topology Change Flag : False Topology Change Detected Flag : False Topology Change Count : 0 Last Topology Change from : 0000.0000.0000 Timers: hello 0, topology change 0 Summary of connected spanning tree ports : Port-State Summary Blocking Listening Learning Forwarding Disabled -------- --------- -------- ---------- -------- 0 0 0 1 5 Port Link-Type Summary AutoDetected PointToPoint SharedLink EdgePort ------------ ------------ ---------- -------- 6 0 0 6
Port Info	SWITCH# show spanning-tree interface ge9

	Interface gigabitethernet9 of Bridge is Enabled Port Role : Designated Port State : Forwarding Edge Port : Edge (Edge) BPDU Filter : Disabled Link Type : Auto (Point-to-point) BPDU Guard : Disabled Timers : message-age 0, forward-delay 0 BPDUs : sent 3038, received 0 TCNs : sent 0, received 0 Message Expired Count : 0 Forward Transition Count : 1 Aggregation Group: N/A Type: N/A Aggregated with : N/A Port information port id 128.9 priority 128 cost 20000 Designated root address 9466.e79f.0910 priority 32768 cost 20000 Designated bridge address 9466.e79f.0910 priority 32768 port id 128.9
MSTP Information	
MSTP Configuration	SWITCH# show spanning-tree mst configuration Current MST configuration (MSTP is Running) Name Revision Instance Vlans Mapped -------- ---------- 0 1,4-4094 1 2 2 3 ---------- Config HMAC-MD5 Digest: 0xB41829F9030A054FB74EF7A8587FF58D ----------
Display all MST Information	SWITCH# show spanning-tree mst ###### MST00 vlans mapped: 2-4094 Bridge address 9466.e79f.0910 priority 32768 (sysid 0) Root this switch for CST and IST Configured max-age 20, hello-time 2, forward-delay 15, max-hops 20 Port Role State Cost Prio.Nbr Type ---------- ---------- ---------- -------- ---------- ---------- ge1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) ge5 Designated Forwarding 100000 128.5 P2P Internal(MSTP) ge9 Designated Forwarding 20000 128.9 P2P Internal(MSTP)

	###### MST01 vlans mapped: 1 Bridge address 9466.e79f.0910 priority 32768 (sysid 1) Root this switch for MST01 Port Role State Cost Prio.Nbr Type ------ ---------- ---------- -------- ---------- ---------- ge1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) ge5 Designated Forwarding 100000 128.5 P2P Internal(MSTP) ge9 Designated Forwarding 20000 128.9 P2P Internal(MSTP)
MSTP Root Information	SWITCH# show spanning-tree mst root MST Root Root Root Cost Root Max Hello Fwd Instance Address Priority Port age dly -------- --------------- -------- ------------ ------ ----- ----- ----- MST00 9466.e79f.0910 32768 0 N/A 20 2 15 MST01 9466.e79f.0910 32768 0 N/A 20 2 15
MSTP Instance Information	SWITCH# show spanning-tree mst 1 ###### MST01 vlans mapped: 1 Bridge address 9466.e79f.0910 priority 32768 (sysid 1) Root this switch for MST01 Port Role State Cost Prio.Nbr Type ------ ---------- ---------- -------- ---------- ---------- ge1 Designated Forwarding 200000 128.1 P2P Internal(MSTP) ge5 Designated Forwarding 100000 128.5 P2P Internal(MSTP) ge9 Designated Forwarding 20000 128.9 P2P Internal(MSTP)
MSTP Port Information	SWITCH# show spanning-tree mst interface ge1 Interface gigabitethernet1 of MST00 is Enabled Port Role : Designated Port State : Forwarding Edge Port : Edge (Edge) BPDU Filter : Disabled Link Type : Auto (Point-to-point) BPDU Guard : Disabled Boundary : Internal(MSTP) BPDUs : sent 126, received 0 Instance Role State Cost Prio.Nbr Vlans mapped

	-------- ---------- ---------- -------- ---------- ---------- 0 Designated Forwarding 200000 128.1 2-4094 1 Designated Forwarding 200000 128.1 1
ERPS	
Instance	SWITCH(config)#erps <0-31> Ring identifier, valid range from 0 to 31 in decimal instance ERPS Instance SWITCH(config)# erps instance disable Disable ERPS Instance function enable Enable ERPS Instance function <0-15> ERPS Instance, valid range from 0 to 15 SWITCH(config)# erps instance 1 vlan vlan the vlan SWITCH(config)# erps instance 1 vlan 1 VLANMAP target vlan number(ex.10) or range(ex.1-10)
Display	SWITCH# show erps Ethernet Ring Protection Switching (ITU-T G.8032) Ring ID : 0 Version : v2 Ring State : Enabled Node State : Pending Node Role : Ring Node Control Channel : VLAN 2 Sub Ring without VC : False VC of Sub Ring : VLAN 1 ERPS Instance : None Ring Port 0 : ge5 is Link Up and Forwarding Ring Port 1 : ge6 is Link Up and Blocking RPL Port : Ring Port 1 Revertive Mode : Revertive Manual Switch : Forced Switch : Timers WTR Timer : period is 5 minutes, timer is not running, remains 0 ms WTB Timer : period is 5100 ms, timer is not running, remains 0 ms

	Guard Timer : period is 100 ms, timer is not running, remains 0 ms Statistics R-APS(FS) : sent 0, received 0 R-APS(SF) : sent 2, received 0 R-APS(MS) : sent 0, received 0 R-APS(NR,RB) : sent 0, received 0 R-APS(NR) : sent 2972, received 0 Node State Transition count 3 Ethernet Ring Protection Switching (ITU-T G.8032) Ring ID : 23 Version : v2 Ring State : Enabled Node State : Idle Node Role : Ring Node Control Channel : VLAN 3 Sub Ring without VC : False VC of Sub Ring : VLAN 4 ERPS Instance : None Ring Port 0 : ge1 is Link Up and Forwarding Ring Port 1 : None RPL Port : Ring Port 1 Revertive Mode : Revertive Manual Switch : Forced Switch : Timers WTR Timer : period is 5 minutes, timer is not running, remains 0 ms WTB Timer : period is 5100 ms, timer is not running, remains 0 ms Guard Timer : period is 100 ms, timer is not running, remains 0 ms Statistics R-APS(FS) : sent 0, received 0 R-APS(SF) : sent 0, received 1 R-APS(MS) : sent 0, received 0 R-APS(NR,RB) : sent 0, received 2954 R-APS(NR) : sent 5, received 23 Node State Transition count 6
Loop Protection	
loop-protect	**Ethernet loop protection** SWITCH(config)# loop-protect --- shows parameters of loop protect

	enable Enable loop protection
	disable Disable loop protection
	transmit-interval Set the transmission frequency of loop protection in seconds
	SWITCH(config)# loop-protect enable all
	Ethernet loop protection is enabled on all interfaces!
	SWITCH(config)# loop-protect transmit-interval
	<1-10> Valid range is 1~10 second(s)
	SWITCH(config)# loop-protect transmit-interval 3 →(set interval time – 3 seconds)
	SWITCH(config)# loop-protect enable ge6→ (ge1~ge9)
	Set ge6 Ethernet loop protection enabled!
	SWITCH#sh loop-protect→(show current loop-protect detected information)
	Loop protect information :
	Loop Protect Interface : ge6,ge9
	Transmit Interval(sec) : 3
	Loop Detected Interface : N/A

3.4 CLI COMMANDS FOR VLAN CONFIGURATION

This chapter provides a detailed explanation of the Virtual LAN CLI commands. The commands are divided by functionality into the following different groups:

- VLAN Port Configuration is used to set the port VLAN ID, port accept frame type, Ingress and Egress rule and display switch settings, statistics and other information.
- VLAN Configuration is used to configure and create VLAN setting, and also display the setting and some information
- GVRP Configuration Commands are used to configure the GVRP feature.
- Management VLAN is used to set the VLAN management and display some information from the management VLAN.

Feature	Command Line
VLAN Port Configuration	
VLAN Port PVID	SWITCH(config-if)# switchport trunk native vlan 2 Set port default vlan id to 2 success
Port Accept Frame Type	SWITCH(config)# inter fe1 SWITCH(config-if)# acceptable frame type all any kind of frame type is accepted! SWITCH(config-if)# acceptable frame type vlantaggedonly only vlan-tag frame is accepted!
Ingress Filtering (for fast Ethernet port 1)	SWITCH(config)# interface fe1 SWITCH(config-if)# ingress filtering enable ingress filtering enable SWITCH(config-if)# ingress filtering disable ingress filtering disable
Egress rule – Untagged (for VLAN 2)	SWITCH(config-if)# switchport access vlan 2 SWITCHport access vlan - success
Egress rule – Tagged (for VLAN 2)	SWITCH(config-if)# switchport trunk allowed vlan add 2
Display – Port Ingress Rule (PVID, Ingress Filtering, Acceptable Frame Type)	SWITCH# show interface ge1 Interface gigabitethernet1 Description : N/A Administrative Status : Enable Operating Status : Connected Duplex : Auto (Full) Speed : Auto (100) Flow Control : off

	Default Port VLAN ID: 1 Ingress Filtering : Disabled Acceptable Frame Type : All Port Security : Disabled Auto Negotiation : Enable Loopback Mode : None STP Status: Forwarding Default CoS Value for untagged packets is 0. Medium mode is Copper.
Display – Port Egress Rule (Egress rule, IP address, status)	SWITCH# show running-config …… ! interface fe1 SWITCHport access vlan 1 SWITCHport access vlan 3 SWITCHport trunk native vlan 2 ……. interface vlan1 ip address 192.168.10.8/24 no shutdown
VLAN Configuration	
Create VLAN (2)	SWITCH(config)# vlan 2 vlan 2 success SWITCH(config)# interface vlan 2 SWITCH(config-if)# *Note: In CLI configuration, User should create a VLAN interface first. Then User can start to add/remove ports. Default status of the created VLAN is unused until User add member ports to it.*
Remove VLAN	SWITCH(config)# no vlan 2 no vlan success *Note: User can only remove the VLAN when the VLAN is in unused mode.*
VLAN Name	SWITCH(config)# vlan 2 vlan 2 has exists SWITCH(config-vlan)# name v2

	SWITCH(config-vlan)# no name *Note: Use no name to change the name to default name, VLAN VID.*
VLAN description	SWITCH(config)# interface vlan 2 SWITCH(config-if)# SWITCH(config-if)# description this is the VLAN 2 SWITCH(config-if)# no description ->Delete the description.
IP address of the VLAN	SWITCH(config)# interface vlan 2 SWITCH(config-if)# SWITCH(config-if)# ip address 192.168.10.18/24 SWITCH(config-if)# no ip address 192.168.10.8/24 ->Delete the IP address
Create multiple VLANs (VLAN 5-10)	SWITCH(config)# interface vlan 5-10
Shut down VLAN	SWITCH(config)# interface vlan 2 SWITCH(config-if)# shutdown SWITCH(config-if)# no shutdown ->Turn on the VLAN
Display – VLAN table	switch# show vlan 802.1Q vlan mode: VLAN Name Status Trunk Ports Access Ports ---- ---------- ------- ---------- ---------- 1 VLAN1 Static - ge1-9 2 VLAN2 Static ge5-6 - 3 VLAN3 Static ge1 - 4 VLAN4 Static ge1,ge5-6 -
GVRP configuration	
GVRP enable/disable	SWITCH(config)# gvrp mode disable Disable GVRP feature globally on the SWITCH enable Enable GVRP feature globally on the SWITCH SWITCH(config)# gvrp mode enable Gvrp is enabled on the SWITCH!
Configure GVRP timer Join timer /Leave timer/ LeaveAll timer	SWITCH(config)# inter ge1 SWITCH(config-if)# garp timer <10-10000> SWITCH(config-if)# garp join-timer 20

	Garp join timer value is set to 20 centiseconds on port 2! Note: The unit of these timer is centisecond
Management VLAN	
Management VLAN	SWITCH(config)# int vlan 1 (Go to management VLAN) SWITCH(config-if)# no shutdown
Display	SWITCH# show running-config …. ! interface vlan1 ip address 192.168.10.17/24 ip igmp no shutdown ! ….

The section below is the CLI command for PVLAN Configuration that divided by functionality into the following different groups:

- PVLAN Configuration is used to configure and create VLAN setting, and also display the setting and some information
- PVLAN Port Configuration is used to set the port VLAN ID, port accept frame type, Ingress and Egress rule and display switch settings, statistics and other information.
- PVLAN Information Commands are used to display the information in PVLAN Configuration.

Feature	**Command Line**
Private VLAN Configuration	
Create VLAN	SWITCH(config)# vlan 2 vlan 2 success SWITCH(config-vlan)# end End current mode and change to enable mode exit Exit current mode and down to previous mode list Print command list name Assign a name to vlan no no private-vlan Configure a private VLAN
Private VLAN Type	**Go to the VLAN User want configure first.** SWITCH(config)# vlan (VID)

Choose the Types	SWITCH(config-vlan)# private-vlan community Configure the VLAN as an community private VLAN isolated Configure the VLAN as an isolated private VLAN primary
Primary Type	Configure the VLAN as a primary private VLAN SWITCH(config-vlan)# private-vlan primary
Isolated Type	<cr> SWITCH(config-vlan)# private-vlan isolated
Community Type	<cr> SWITCH(config-vlan)# private-vlan community <cr>
Private VLAN Port Configuration	
Go to the port configuration	SWITCH(config)# interface (port_number, ex: ge9) SWITCH(config-if)# SWITCHport private-vlan host-association Set the private VLAN host association mapping map primary VLAN to secondary VLAN
Private VLAN Port Type	SWITCH(config-if)# SWITCHport mode private-vlan Set private-vlan mode SWITCH(config-if)# SWITCHport mode private-vlan host Set the mode to private-vlan host promiscuous Set the mode to private-vlan promiscuous
Promiscuous Port Type	SWITCH(config-if)# SWITCHport mode private-vlan promiscuous <cr>
Host Port Type	SWITCH(config-if)# SWITCHport mode private-vlan host <cr>
Private VLAN Port Configuration	SWITCH(config)# interface ge8
PVLAN Port Type	SWITCH(config-if)# SWITCHport mode private-vlan host
Host Association primary	SWITCH(config-if)# SWITCHport private-vlan host-association

to secondary (The command is only available for host port.)	<2-4094> Primary range VLAN ID of the private VLAN port association SWITCH(config-if)# SWITCHport private-vlan host-association 2 <2-4094> Secondary range VLAN ID of the private VLAN port association SWITCH(config-if)# SWITCHport private-vlan host-association 2 3
Mapping primary to secondary VLANs (This command is only available for promiscuous port)	SWITCH(config)# interface ge9 SWITCH(config-if)# SWITCHport mode private-vlan promiscuous SWITCH(config-if)# SWITCHport private-vlan mapping 2 add 3 SWITCH(config-if)# SWITCHport private-vlan mapping 2 add 4 SWITCH(config-if)# SWITCHport private-vlan mapping 2 add 5
Private VLAN Information	
Private VLAN Information	SWITCH# show vlan private-vlan FLAGS: I -> Isolated P -> Promiscuous C -> Community Primary Secondary Type Ports ------- --------- ----------------- ---------------------- 2 3 Isolated ge9(P),ge8(I) 2 4 Community ge9(P),ge7(C) 2 5 Community ge9(P),ge6(C),ge8(I) 10 - - -
PVLAN Type	SWITCH# show vlan private-vlan type Vlan Type Ports ---- ----------------- ----------------- 2 primary ge9 3 isolated ge8 4 community ge7 5 community ge6,ge8 10 primary -
Host List	SWITCH# show vlan private-vlan port-list Ports Mode Vlan ----- ----------- ----

	1 normal - 2 normal - 3 normal - 4 normal - 5 normal - 6 host 5 7 host 4 8 host 3 9 promiscuous 2
Running Config Information Private VLAN Type Private VLAN Port Information	SWITCH# show run Building configuration... Current configuration: hostname SWITCH vlan learning independent ! vlan 1 ! vlan 2 private-vlan primary ! vlan 3 private-vlan isolated ! vlan 4 private-vlan community ! vlan 5 private-vlan community ! .... interface ge6 SWITCHport access vlan add 2,5 SWITCHport trunk native vlan 5 SWITCHport mode private-vlan host SWITCHport private-vlan host-association 2 5

	! interface ge7 SWITCHport access vlan add 2,4 SWITCHport trunk native vlan 4 SWITCHport mode private-vlan host SWITCHport private-vlan host-association 2 4 ! interface ge8 SWITCHport access vlan add 2,5 SWITCHport trunk native vlan 5 SWITCHport mode private-vlan host SWITCHport private-vlan host-association 2 3 ! interface ge9 SWITCHport access vlan add 2,5 SWITCHport trunk native vlan 2 SWITCHport mode private-vlan promiscuous SWITCHport private-vlan mapping 2 add 3-5 …… ……..

3.5 CLI COMMANDS FOR QOS CONFIGURATION

This chapter provides a detailed explanation of the QoS commands. The following commands are available.

The commands are divided into these different groups:

- Configuration Commands are used to configure features and options of the switch. For every configuration command there is a show command that will display the configuration setting.
- Show commands are used to display device settings, statistics and other information.

This chapter covered some sections such as, QoS Setting, CoS-Queue Mapping and DSCP-Queue Mapping.

Feature	Command Line
QoS Setting	
Queue Scheduling – Strict Priority	SWITCH(config)# qos queue-sched sp Strict Priority wrr Weighted Round Robin (Use an 8,4,2,1 weight) SWITCH(config)# qos queue-sched sp <cr>
Queue Scheduling - WRR	SWITCH(config)# qos queue-sched wrr
Port Setting – CoS (Default Port Priority)	SWITCH(config)# interface ge1 SWITCH(config-if)# qos cos DEFAULT-COS Assign an priority (7 highest) SWITCH(config-if)# qos cos 7 The default port CoS value is set 7 ok. ***Note: When change the port setting, User should Select the specific port first.*** ***Ex: fe1 means fast Ethernet port 1.***
Port Setting – Trust Mode- CoS Only	SWITCH(config)# interface ge1 SWITCH(config-if)# qos trust cos The port trust is set CoS only ok.
Port Setting – Trust Mode- CoS First	SWITCH(config)# interface ge1 SWITCH(config-if)# qos trust cos-first The port trust is set CoS first ok.
Port Setting – Trust Mode- DSCP Only	SWITCH(config)# interface ge1 SWITCH(config-if)# qos trust dscp The port trust is set DSCP only ok.
Port Setting – Trust Mode- DSCP First	SWITCH(config)# interface ge1 SWITCH(config-if)# qos trust dscp-first The port trust is set DSCP first ok.
Display – Queue	SWITCH# show qos queue-sched

Scheduling	QoS queue scheduling scheme : Weighted Round Robin (Use an 8,4,2,1 weight)
Display – Port Setting - Trust Mode	SWITCH# show qos trust QoS Port Trust Mode : Port Trust Mode -----+------------ 1 COS only 2 COS only 3 COS only 4 COS only 5 COS only 6 COS only 7 COS only 8 COS only 9 COS only
Display – Port Setting – CoS (Port Default Priority)	SWITCH# show qos port-cos Port Default Cos : Port CoS -----+---- 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9 0
CoS-Queue Mapping	
Format	SWITCH(config)# qos cos-map PRIORITY Assign an priority (7 highest) SWITCH(config)# qos cos-map 1 QUEUE Assign an queue (0-3) ***Note: Format: qos cos-map priority_value queue_value***
Map CoS 0 to Queue 1	SWITCH(config)# qos cos-map 0 1 The CoS to queue mapping is set ok.
Map CoS 1 to Queue 0	SWITCH(config)# qos cos-map 1 0 The CoS to queue mapping is set ok.

Map CoS 2 to Queue 0	SWITCH(config)# qos cos-map 2 0 The CoS to queue mapping is set ok.
Map CoS 3 to Queue 1	SWITCH(config)# qos cos-map 3 1 The CoS to queue mapping is set ok.
Map CoS 4 to Queue 2	SWITCH(config)# qos cos-map 4 2 The CoS to queue mapping is set ok.
Map CoS 5 to Queue 2	SWITCH(config)# qos cos-map 5 2 The CoS to queue mapping is set ok.
Map CoS 6 to Queue 3	SWITCH(config)# qos cos-map 6 3 The CoS to queue mapping is set ok.
Map CoS 7 to Queue 3	SWITCH(config)# qos cos-map 7 3 The CoS to queue mapping is set ok.
Display – CoS-Queue mapping	SWITCH# sh qos cos-map CoS to Queue Mapping : CoS Queue ---- + ------ 0 1 1 0 2 0 3 1 4 2 5 2 6 3 7 3
DSCP-Queue Mapping	
Format	SWITCH(config)# qos dscp-map PRIORITY Assign an priority (63 highest) SWITCH(config)# qos dscp-map 0 QUEUE Assign an queue (0-3) ***Format: qos dscp-map priority_value queue_value***
Map DSCP 0 to Queue 1	SWITCH(config)# qos dscp-map 0 1 The TOS/DSCP to queue mapping is set ok.
Display – DSCO-Queue mapping	SWITCH# show qos dscp-map DSCP to Queue Mapping : (dscp = d1 d2) d2| 0 1 2 3 4 5 6 7 8 9

	d1 | -----+---------- 0 | 1 1 1 1 1 1 1 1 0 0 1 | 0 0 0 0 0 0 0 0 0 0 2 | 0 0 0 0 1 1 1 1 1 1 3 | 1 1 2 2 2 2 2 2 2 2 4 | 2 2 2 2 2 2 2 2 3 3 5 | 3 3 3 3 3 3 3 3 3 3 6 | 3 3 3 3

3.6 CLI COMMANDS FOR MULTICAST FILTERING CONFIGURATION

IGMP Snooping is used to monitor IGMP messages between host and routers, and process these IGMP messages. IGMP Snooping make switch be able to track all network group members which are physically connected with switch that running between host and multicast routers to manage the member relationships. This chapter will cover the Multicast features CLI Command about configure and display the settings.

Feature	Command Line
IGMP Snooping	
IGMP Snooping - Global	SWITCH(config)# ip igmp snooping IGMP snooping is enabled globally. Please specify on which vlans IGMP snooping enables
IGMP Snooping - VLAN	SWITCH(config)# ip igmp snooping vlan VLANLIST allowed vlan list all all existed vlan SWITCH(config)# ip igmp snooping vlan 1-2 IGMP snooping is enabled on vlan 1 IGMP snooping is enabled on vlan 2
Disable IGMP Snooping - Global	SWITCH(config)# no ip igmp snoopin IGMP snooping is disabled globally ok.
Disable IGMP Snooping - VLAN	SWITCH(config)# no ip igmp snooping vlan 3 IGMP snooping is disabled on VLAN 3.
Display – IGMP Snooping Setting	SWITCH# show ip igmp interface vlan1 enabled: Yes version: IGMPv2 query-interval; 125s query-max-response-time: 10s SWITCH# show ip igmp snooping IGMP snooping is globally enabled Static Router Port: N/A Vlan1 is IGMP snooping enabled immediate-leave is enabled last-member-query-interval is 500 centiseconds source-only-learning is disabled Vlan2 is IGMP snooping disabled

	immediate-leave is disabled last-member-query-interval is 100 centiseconds source-only-learning is disabled Vlan3 is IGMP snooping disabled immediate-leave is disabled last-member-query-interval is 100 centiseconds source-only-learning is disabled Vlan4 is IGMP snooping disabled immediate-leave is disabled last-member-query-interval is 100 centiseconds source-only-learning is disabled
Display – IGMP Table	SWITCH# show ip igmp snooping multicast all VLAN IP Address Type Ports ---- --------------- ------- ------------------------ 1 224.0.0.251 IGMP ge9, 1 224.0.0.252 IGMP ge9, 1 239.255.255.250 IGMP ge9,
IGMP Query	
IGMP Query V1	SWITCH(config)# int vlan 1 (Go to management VLAN) SWITCH(config-if)# ip igmp v1
IGMP Query V2	SWITCH(config)# int vlan 1 (Go to management VLAN) SWITCH(config-if)# ip igmp
IGMP Query version	SWITCH(config-if)# ip igmp version 1 SWITCH(config-if)# ip igmp version 2
Disable	SWITCH(config)# int vlan 1 SWITCH(config-if)# no ip igmp
Display	SWITCH# sh ip igmp interface vlan1 enabled: Yes version: IGMPv2 query-interval: 125s query-max-response-time: 10s SWITCH# show running-config …. ! interface vlan1

	ip address 192.168.10.17/24 ip igmp no shutdown ! …….
Filtering Mode	
Enable Force filtering	SWITCH(config)# mac-address-table multicast filtering flood flood to all ports discard discard vlan Virtual LAN SWITCH(config)# mac-address-table multicast filtering discard vlan all Set VLAN all multicast filtering to discard mode.

3.7 CLI COMMANDS FOR SNMP CONFIGURATION

SNMP is the most widely used network management protocol in TCP/IP that offers a method for monitoring and managing computer network. For this reason, SNMP has been widely used and became de facto standard of network management. SNMPv2c provides several advantages over SNMPv1. SNMPv2c have expanded data types of 64-bit counter. It calls for improved efficiency and performance by introducing the GETBULK operation. Confirmed event notification is sought by the introduction of the Inform operator. Enhanced error handling approach, improved sets, and a fine tuned Data Definition Language are some of the advantages of SNMPv2c over the SNMPv1.
This chapter covers SNMP Community and SNMP Trap section. Through this function of reading or writing community name, the access control of the device is realized and the communication security is enhanced because the device will only accept the message with a qualified community name. Show commands are used to display device settings and other information.

Feature	**Command Line**
SNMP Community	
Read Only Community	SWITCH(config)# snmp-server community public ro community string add ok
Read Write Community	SWITCH(config)# snmp-server community private rw community string add ok
SNMP Trap	
Enable Trap	SWITCH(config)# snmp-server enable trap Set SNMP trap enable ok.
SNMP Trap Server IP without specific community name	SWITCH(config)# snmp-server host 192.168.10.33 SNMP trap host add OK, total host number = 1.
SNMP Trap Server IP with version 1 and community	SWITCH(config)# snmp-server host 192.168.10.33 version 1 private SNMP trap host add OK.con t ***Note: private is the community name, version 1 is the SNMP version***
SNMP Trap Server IP with version 2 and community	SWITCH(config)# snmp-server host 192.168.10.33 version 2 private SNMP trap host add OK.
Disable SNMP Trap	SWITCH(config)# no snmp-server enable trap Set SNMP trap disable ok.
Display	SWITCH# sh snmp-server trap SNMP trap: Enabled SNMP trap community: public

	SWITCH# show running-config ..... snmp-server community public ro snmp-server community private rw snmp-server enable trap snmp-server host 192.168.10.33 version 2 admin snmp-server host 192.168.10.33 version 1 admin .....

3.8 CLI COMMANDS FOR SECURITY CONFIGURATION

This chapter covers the Security configuration setting by CLI Command.

Feature	Command Line
Port Security	
Add MAC	SWITCH(config)# mac-address-table static 9466.e79f.06d9 vlan 1 interface ge2 mac-address-table unicast static set ok!
Port Security	SWITCH(config)# interface fe1 SWITCH(config-if)# SWITCHport port-security Disables new MAC addresses learning and aging activities! ***Note: Rule: Add the static MAC, VLAN and Port binding first, then enable the port security to stop new MAC learning.***
Disable Port Security	SWITCH(config-if)# no SWITCHport port-security Enable new MAC addresses learning and aging activities!
Display	SWITCH# show mac-address-table static Destination Address Address Type Vlan Destination Port ---------- ---------- ------- ---------- 9466.e79f.06d9 Static 1 ge2
IP Security	
IP Security	SWITCH(config)# ip security Set ip security enable ok. SWITCH(config)# ip security host 192.168.10.33 Add ip security host 192.168.10.33 ok.
Display	SWITCH# show ip security ip security is enabled ip security host: 192.168.10.33
802.1x	
enable disable	SWITCH(config)# dot1x system-auth-control SWITCH(config)# SWITCH(config)# no dot1x system-auth-control SWITCH(config)#
authentic-method	SWITCH(config)# dot1x authentic-method local Use the local username database for authentication

	radius Use the Remote Authentication Dial-In User Service (RADIUS) servers for authentication SWITCH(config)# dot1x authentic-method radius SWITCH(config)#
radius server-ip	SWITCH(config)# dot1x radius SWITCH(config)# dot1x radius server-ip 192.168.10.120key 1234 RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP : 192.168.10.120 RADIUS Server Key : 1234 RADIUS Server Port : 1812 RADIUS Accounting Port : 1813 SWITCH(config)#
radius server-ip	SWITCH(config)# dot1x radius SWITCH(config)# dot1x radius server-ip 192.168.10.120key 1234 RADIUS Server Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) RADIUS Server IP : 192.168.10.120 RADIUS Server Key : 1234 RADIUS Server Port : 1812 RADIUS Accounting Port : 1813 SWITCH(config)#
radius secondary-server-ip	SWITCH(config)# dot1x radius secondary-server-ip 192.168.10.250 key 5678 Port number NOT given. (default=1812) RADIUS Accounting Port number NOT given. (default=1813) Secondary RADIUS Server IP : 192.168.10.250 Secondary RADIUS Server Key : 5678 Secondary RADIUS Server Port : 1812 Secondary RADIUS Accounting Port : 1813
User name/password for authentication	SWITCH(config)# dot1x username ……passwd ….. vlan 1

3.9 CLI COMMANDS FOR WARNING CONFIGURATION

This chapter is about the Warning Configuration by using CLI Command. Womaster Switch supports device alarm and related alarm report, alarm enable/disable, and alarm searching. It assures that the alarm will be reported to the customer timely and accurately

Feature	Command Line
Relay Output	
Relay Output	SWITCH(config)# relay 1 di DI state dry dry output ping ping failure port port link failure power power failure ring ring failure ***Note: Select Relay 1 or 2 first, then select the event types.***
DI State	SWITCH(config)# relay 1 di <1-2> DI number SWITCH(config)# relay 1 di 1 high high is abnormal low low is abnormal SWITCH(config)# relay 1 di 1 high
Dry Output	SWITCH(config)# relay 1 dry <0-4294967295> turn on period in second SWITCH(config)# relay 1 dry 5 <0-4294967295> turn off period in second SWITCH(config)# relay 1 dry 5 5
Ping Failure	SWITCH(config)# relay 1 ping 192.168.10.33 <cr> reset reset a device SWITCH(config)# relay 1 ping 192.168.10.33 reset <1-65535> reset time SWITCH(config)# relay 1 ping 192.168.10.33 reset 60 <0-65535> hold time to retry SWITCH(config)# relay 1 ping 192.168.10.33 reset 60 60
Port Link Failure	SWITCH(config)# relay 1 port PORTLIST port list

	SWITCH(config)# relay 1 port ge1-5
Power Failure	SWITCH(config)# relay 1 power <1-2> power id SWITCH(config)# relay 1 power 1 SWITCH(config)# relay 1 power 2
Ring Failure	SWITCH(config)# relay 1 ring
Disable Relay	SWITCH(config)# no relay <1-2> relay id SWITCH(config)# no relay 1 *(Relay_ID: 1 or 2)* <cr>
Display	SWITCH# show relay 1 Relay 1 Event : Power : Disabled Port Link : Disabled Ring : Enabled Ping : Disabled Ping Reset : Disabled Dry Output : Disabled DI : Disabled
Event Selection	
Event Selection	SWITCH(config)# warning-event coldstart Switch cold start event warmstart Switch warm start event linkdown Switch link down event linkup Switch link up event authentication Authentication failure event di Switch di event loop-protect Switch loop protection event power Switch power failure event relay-output Switch relay output event ring Switch ring event sfp Switch SFP event time-sync Switch time synchronize event
Ex: Cold Start event	SWITCH(config)# warning-event coldstart Set cold start event enable ok.
Ex: Link Up event	SWITCH(config)# warning-event linkup [IFNAME] Interface name, ex: ge1 or ge8

	SWITCH(config)# warning-event linkup ge5 Set ge5 link up event enable ok.
Display	SWITCH# show warning-event Warning Event: Cold Start: Disabled Warm Start: Disabled Authentication Failure: Disabled Link Down: Disabled Link Up: Disabled Power Failure: Disabled Ring: Disabled Relay Output: Disabled Time Synchronize Failure: Disabled SFP: Disabled DI: Disabled Loop Protection: Disabled
Syslog Setting	
Local Mode	SWITCH(config)# log syslog local
Server Mode	SWITCH(config)# log syslog remote 192.168.10.33
Both	SWITCH(config)# log syslog local SWITCH(config)# log syslog remote 192.168.10.33
Disable	SWITCH(config)# no log syslog local
Email Alert	
SMTP Enable	SWITCH(config)# smtp-server enable email-alert SMTP Email Alert set enable ok.
Sender mail	SWITCH(config)# smtp-server server 192.168.10.100 ACCOUNT SMTP server mail account, ex: help@womaster.eu SWITCH(config)# smtp-server server 192.168.10.100 help@womaster.eu SMTP Email Alert set Server: 192.168.10.100, Account: info@womaster.eu ok.
Receiver mail	SWITCH(config)# smtp-server receipt 1 help@womaster.eu SMTP Email Alert set receipt 1: help@womaster.eu ok.
Authentication with username and password	SWITCH(config)# smtp-server authentication username admin password admin SMTP Email Alert set authentication Username: admin, Password: admin ***Note: User can assign string to username and password.***

Disable SMTP	SWITCH(config)# no smtp-server enable email-alert SMTP Email Alert set disable ok.
Disable Authentication	SWITCH(config)# no smtp-server authentication SMTP Email Alert set Authentication disable ok.
Display	SWITCH# sh smtp-server SMTP Email Alert is Enabled Server: 192.168.10.100, Account: help@womaster.eu Authentication: Enabled Username: admin, Password: admin SMTP Email Alert Receipt: Receipt 1: help@womaster.eu Receipt 2: Receipt 3: Receipt 4:

3.10 CLI COMMANDS FOR DIAGNOSTICS CONFIGURATION

This chapter is about Diagnostics feature, the features that include in Diagnostics are LLDP, MAC Address Table, Port Statistics, Port Mirroring, Event Log, and Ping.

Feature	Command Line
LLDP	
Enable LLDP	SWITCH(config)# lldp holdtime Specify the holdtime of LLDP in seconds <10-255> Valid range is 10~255 run Enable LLDP timer Set the transmission frequency of LLDP in seconds <5-254> Valid range is 5~254
MAC Address Table	
Aging Time	SWITCH(config)# mac-address-table aging-time 350 mac-address-table aging-time set ok! TIMEVALUE aging time in seconds, the range is 15 to 3825 seconds *Note: 350 is the new ageing timeout value.*
Add Static Unicast MAC address	SWITCH(config)# mac-address-table static 9466.e79f.06d9 vlan 1 interface ge7 mac-address-table ucast static set ok! ***Note: rule: mac-address-table static MAC_address VLAN VID interface interface_name***
Add Multicast MAC address	SWITCH(config)# mac-address-table multicast 9466.e700.00e7 vlan 1 interface ge6-7 Adds an entry in the multicast table ok! MACADDR destination mac address xxxx.xxxx.xxxx (multicast) to add to the address table ***Note: rule: mac-address-table multicast MAC_address VLAN VID interface_list interface_name/range*** SWITCH(config)# mac-address-table multicast filtering filtering filtering of unknown multicast addresses flood flood to all ports discard discard vlan Virtual LAN
Show MAC Address Table	SWITCH# show mac-address-table

– All types	***** UNICAST MAC ADDRESS ***** Destination Address Address Type Vlan Destination Port ---------- ---------- ------- ---------- 000f.b079.ca3b Dynamic 1 ge4 9466.e79f.06d9 Dynamic 1 ge7 9466.e700.00e7 Static 1 ge7 9466.e75f.05b9 Static 1 ge7 9466.e79d.0069 Management 1 ***** MULTICAST MAC ADDRESS ***** Vlan Mac Address COS Status Ports ---- ---------- ---- ------- ---------- 1 9466.e79d.0069 0 ge6 1 9466.e79f.06d9 0 ge4,ge6
Show MAC Address Table – Dynamic Learnt MAC addresses	SWITCH# show mac-address-table dynamic Destination Address Address Type Vlan Destination Port ---------- ---------- ------- ---------- 9466.e700.00e7 Dynamic 1 ge4 9466.e79f.06d9 Dynamic 1 ge7
Show MAC Address Table – Multicast MAC addresses	SWITCH# show mac-address-table multicast Vlan Mac Address COS Status Ports ---- ---------- ---- ------- ---------- 1 9466.e700.00e7 0 ge6-7 1 9466.e79f.06d9 0 ge4,ge6-7
Show MAC Address Table – Static MAC addresses	SWITCH# show mac-address-table static Destination Address Address Type Vlan Destination Port ---------- ---------- ------- ---------- 9466.e700.00e7 Static 1 ge7 9466.e75f.05b9 Static 1 ge7
Show Aging timeout time	SWITCH# show mac-address-table aging-time the mac-address-table aging-time is 345 sec.
Port Statistics	
Port Statistics	SWITCH# show rmon statistics ge6 Interface gigabitethernet6 is enable connected, which has Inbound: Good Octets: 160210, Bad Octets: 0 Unicast: 0, Broadcast: 0, Multicast: 2268

	Pause: 0, Undersize: 0, Fragments: 0 Oversize: 0, Jabbers: 0, Disacrds: 0 Filtered: 7, RxError: 0, FCSError: 0 Outbound: Good Octets: 199742 Unicast: 0, Broadcast: 0, Multicast: 2851 Pause: 0, Deferred: 0, Collisions: 0 SingleCollision: 0, MultipleCollision: 0 ExcessiveCollision: 0, LateCollision: 0 Filtered: 691, FCSError: 0 Number of frames received and transmitted with a length(in octets) of: 64: 0, 65to127: 5119, 128to255: 0 256to511: 0, 512to1023: 0, 1024toMaxSize: 0
Port Mirroring	
Enable Port Mirror	SWITCH(config)# mirror en Mirror set enable ok.
Disable Port Mirror	SWITCH(config)# mirror disable Mirror set disable ok.
Select Source Port	SWITCH(config)# mirror source ge1-2 both Received and transmitted traffic rx Received traffic tx Transmitted traffic SWITCH(config)# mirror source ge1-2 both Mirror source ge1-2 both set ok. ***Note: Select source port list and TX/RX/Both mode.***
Select Destination Port	SWITCH(config)# mirror destination ge6 both Mirror destination ge6 both set ok
Display	SWITCH# show mirror Mirror Status : Enabled Ingress Monitor Destination Port : ge6 Egress Monitor Destination Port : ge6 Ingress Source Ports :ge1,ge2, Egress Source Ports :ge1,ge2,
Event Log	
Display	SWITCH# show event-log Jan 1 00:06:56 switch Event: Link 2 Down. Jan 1 00:06:57 switch Event: Link 2 Up.

	Jan 1 00:06:59 switch Event: Link 1 Down. Jan 1 00:07:00 switch Event: Link 1 Up.
Ping	
Ping IP	SWITCH# ping 192.168.10.4 PING 192.168.10.4 (192.168.10.4): 56 data bytes 64 bytes from 192.168.10.4: seq=0 ttl=64 time=5.6 ms 64 bytes from 192.168.10.4: seq=1 ttl=64 time=0.8 ms 64 bytes from 192.168.10.4: seq=2 ttl=64 time=1.0 ms 64 bytes from 192.168.10.4: seq=3 ttl=64 time=1.0 ms 64 bytes from 192.168.10.4: seq=4 ttl=64 time=0.8 ms --- 192.168.10.4 ping statistics --- 5 packets transmitted, 5 packets received, 0% packet loss round-trip min/avg/max = 0.8/1.8/5.6 ms

3.11 CLI COMMANDS FOR BACKUP RESTORE

This chapter provides a detailed explanation of the Backup and Restore the configuration by using CLI commands.

Feature	Command Line
Backup Startup Configuration file	SWITCH# copy startup-config tftp: 192.168.10.33/default.conf Writing Configuration [OK] ***Note**: 192.168.10.33 is the TFTP server's IP and default.conf is name of the configuration file. User environment may use different IP addresses or different file name. Please type target TFTP server IP or file name in this command.*
Restore Configuration	SWITCH# copy tftp: /default.conf startup-config
Show Startup Configuration	SWITCH# show startup-config
Show Running Configuration	SWITCH# show running-config

3.12 CLI COMMANDS FOR FIRMWARE UPGRADE

This chapter covers the CLI Command for upgrading the switch firmware.

Feature	Command line
Firmware Upgrade	SWITCH# archive download-sw /overwrite tftp "ip address" "firmwarefile".bin→ **binary code file name** Firmware upgrading, don't turn off the SWITCH! Tftping file "firmwarefile".bin→ **binary code file name**

	Firmware upgrading .... Firmware upgrade success!! Rebooting.....

3.13 CLI COMMANDS FOR RESET

This chapter is about CLI command to reset to factory default configuration.

Feature	Command Line
Factory Default	SWITCH# reload default-config file Reload OK! SWITCH# reboot

3.14 CLI COMMANDS FOR SAVE & LOAD

This chapter is cover two function from the switch, Save and Load the configuration CLI command.

Feature	Command Line
Save	SWITCH# write Building Configuration… --- save configuration [OK]
Load	SWITCH# copy running-config startup-config --- load configuration Building Configuration... [OK]

3.15 CLI COMMANDS FOR LOGOUT

This chapter is about the CLI Command for log out from the switch CLI interface.

Feature	Command Line
Logout	SWITCH> exit SWITCH# exit SWITCH login: admin Password:

3.16 CLI COMMANDS FOR REBOOT

This chapter is about restart the device using CLI Command.

Feature	Command Line
Reboot	SWITCH# reboot