



DIGISOL



**DG-GO4200 Series
GEPON OLT
CLI USER MANUAL**

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As our products undergo continuous development the specifications are subject to change without prior notice.

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Safety

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacturer must therefore be allowed at all times to ensure the safe use of the equipment

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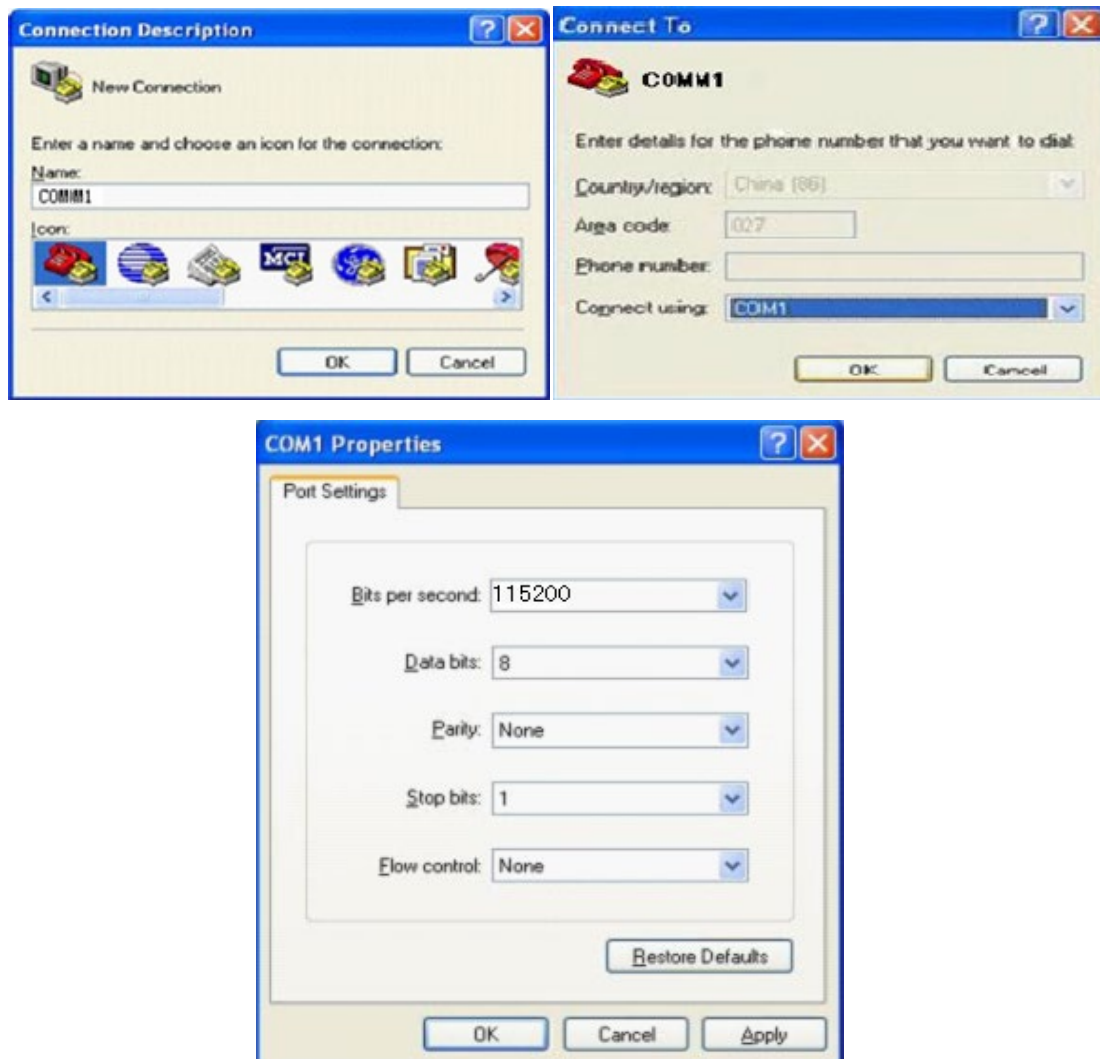
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1. Access to OLT

GEAPON OLT including 2/4/8 pon ports, total 3 models. You can access to OLT by CLI via console cable or telnet. This chapter introduces how to access to OLT CLI via console cable.

1. Connect PC to OLT console port by console cable.
 2. Run hypertextual terminal or other simulation tools such as secureCRT and Putty in PC. Set parameters as follows.
 - ✧ Baudrate: **115200**
- Data bits: **8**
- ✧ Parity: **none**
 - ✧ Stop bits: **1**
 - ✧ Follow control: **none**



COM port properties

After turned on the power, there is boot information printing. After startup, press enter and input username and password to login.

Notice:

The default username and password of CLI both are admin. For example,

Login: admin

Password: admin

epon-olt> enable

Password: admin

epon-olt#

Input commands to configure or check device's status. Input "?" any time you need help.

This document will introduce each command Begin at next chapter.

2. Command Line Interface

2.1 Abstract

GEAPON OLT provides command line interface for configuration and management. The following is its specialities.

- Configure from console port.
- Input “?” any time you need help.
- Provide network test command, such as ping, for diagnosing connection.
- Provide FTP service for uploading and downloading files.
- Provide Doskey analogous function, you can execute a history command.
- Support ambiguous keywords searching, you just need to input unconflict keywords and press “tab” or “?”.

2.2 CLI configuration mode

GEAPON OLT provides three configuration modes.

- Privileged mode
- Global configuration mode
- Interface configuration mode

The following table shows specialities, commands to enter and prompts.

CLI mode	Specialty	Prompt	Command to enter	Command to exit
Privileged mode	Show configurations and execute system commands	epon-olt#		exit
Global configuration mode	Configure system parameters	epon-olt(config)#	configure terminal	exit
Interface configuration mode	Configure interface parameters	epon-olt(config-if)#	interface <i>{interface_type slot/port}</i>	exit

2.3 CLI specialities

2.3.1 Online help

GEAPON OLT CLI provides the following online help:

- Completely help
- Partly help

You can get some help information of CLI with the help above.

(1) Input “?” to get all commands and illustrations at any configuration mode.

```
epon-olt(config)#
access-list      Add an access list entry.
banner          Set banner string
clean           Display system information.
copy            Copy configuration
debug          System debugging functions.
enable         Modify enable password parameters
enable-password Set your enable password.
end            Exit current mode and down to previous mode
erase          Erase info from flash.
exec           exec system cmd
exit          Exit current mode and down to previous mode
fan           Specify olt fan management.
gateway       system manage gateway.
help          Description of the interactive help system
hostname      Set system's network name
igmp          Global IP configuration subcommands
interface     Select an interface to configure.
ip            IP information
ipmc          Global IP configuration subcommands
isolate       the isolate configuration information.Set switchport characteristics.
l3            set ecmp dip reg
line          Configure a terminal line
list          Print command list
log           Logging control
login-password Reset your login password.
mac           Configure the MAC address table.
mc            pim add ipmc group
monitor       Configure SPAN monitoring.
no            Negate a command or set its default.
password      Assign the terminal connection password
pim           pim add ipmc group
ping          ping command
profile       Select profile to configure.
queue-scheduler Configure egress queueing policy.
quit          Exit current mode and down to previous mode
reboot        Reboot the switch.
save          Display system information.
service       Set up miscellaneous service
set           Specify set command.
```

show	Show running system information.
snmp-server	Snmp server config
spanning-tree	Config STPD information.
storm-control	Specify the storm control.
switch	switch to shell
tftp	Specify tftp download.
time	Specify system time configuration.
upgrade	Specify upgrade system.
upload	Upload file for software or user config.
user	Manage System's users.
vlan	Vlan commands.
write	Write running configuration to memory, network, or terminal

- (2) Input “?” behind a command, it will display all key words and illustrations when this site should be a key word.

```
epon-olt(config)# interface
```

aux	aux interface.
gigabitethernet	Gigabitethernet IEEE 802.3.
gigabitethernet	GigabitEthernet IEEE 802.3z.
tengigabitethernet	Ten GigabitEthernet interface.
vlan	Config vlan information.

- (3) Input “?” behind a command, it will display description of parameters when this site should be a parameter.

```
epon-olt(config)# access-list
```

<0-999>	IP standard access list.
<1000-1999>	IP extended access list.
<2000-2999>	L2 packet header access list.
<3000-3999>	User define field access list.
<4000-4999>	Vlan translation access list.
<5000-5999>	Port business access list.
<6000-6999>	Port quality of service access list.
<7000-7999>	Port Ipmc Vlan translation of service access list.

- (4) Input a character string end with “?”, it will display all key words that Begin at this character string.

```
epon-olt(config)# e
```

enable	Modify enable password parameters
enable-password	Set your enable password.
end	End current mode and change to enable mode.
erase	Erase info from flash.
exit	Exit current mode and down to previous mode

- (5) Input a command and a character string end with “?”, it will display all key words Begin at this character string.

```
epon-olt(config)# show ver
```

version	show version command.
---------	-----------------------

- (6) Input a character string end with “Tab”, it will display completely key words that Begin at

this character string when it is unique.

2.3.2 Display specialities

GEPON OLT CLI provides the following display specialities. There is a pause when the information displays a whole screen at a time. Users have two ways to choose.

Operation	function
Input <Ctrl+C>	Stop displaying and executing.
Input any key	Continue displaying next screen

2.3.3 History commands

CLI provides Doskey analogous function. It can save history commands that executed before. Users can use direction key to invoke history command. The device can save at most ten commands.

Operation	action	result
Display history commands	history	Display all history commands.
Visit previous command	Up direction key “ ↑ ” or <Ctrl+P>	Display previous command if there is early history command.
Visit next command	Down direction key “ ↓ ” or <Ctrl+N>	Display next command if there is later history command.

2.3.4 Error messages

Every command will be executed if it passes syntax check. Otherwise it will come out error message. The following table shows some frequent errors.

Error messages	Reasons
Unknown command	No this command
	No this key word
	Parameter type error
	Parameter out of range
Command incomplete	Command is not complete
Too many parameters	Too many parameters
Ambiguous command	Command is ambiguous

2.3.5 Edit specialities

CLI provides basic edit function. Every command supports maxum 256 characters. The following table shows how to edit.

operation	function
Generally input	Insert character at cursor position and move cursor to right if edit buffer has enough space.
Backspace key	Delete the character in front of cursor.
Left direction key ← or <Ctrl+B>	Cursor moves one character position towards the left.

Right direction key → or <Ctrl+F>	Cursor moves one character position towards the right.
Up direction key ↑ or <Ctrl+P> Down direction key ↓ or <Ctrl+N>	Display history command.
Tab key	Input incomplete key words end with Tab key, CLI will provide partly help. If it is unique, the key word which matches what you input will be used and display in another row. If it should be parameter, or the key word is mismatched or matched but not unique, CLI will use what you input and display in another row.

3. Port Configuration

3.1 Port configuration

Port configuration mainly includes:

- enter port configuration mode
- enable or disable port
- configure port duplex mode
- configure port speed
- configure port VLAN mode
- configure port VLAN
- configure port PVID
- configure port flow control
- configure port broadcast suppression
- configure port multicast suppression
- configure port unknown unicast suppression
- configure port isolation
- configure port loopback
- configure port loopback detection

3.1.1 Enter port configure mode

Begin at privileged configuration mode, input the following commands to enter port configuration mode.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {interface_type slot/port}	Enter interface configuration mode.

3.1.2 Enable /Disable port

You can use these commands to enable or disable port. The ports are enabled by default. If you want a port not to transfer data, you can shutdown it.

Begin at privileged configuration mode, enable or disable ports as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {interface_type slot/port}	Enter interface configuration mode.
Step 3a	no shutdown	Enable port

Step 3b	shutdown	Disable port.
Step 4	exit	Exit to gloable configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.3 Configure port description

This command is used to configure port description. There is no description by default. Begin at privileged configuration mode, configure port description as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	description <i><string></i>	Configure port description.
Step 3b	no description	Delete description.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.4 Configure port duplex mode

Duplex includes full duplex and half duplex. When it works at full duplex, port can transmit and receive data at the same time; when it works at half duplex, port can only transmit or receive data at the same time. The duplex is auto by default.

Begin at privileged configuration mode, configure port duplex mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	duplex { auto full half }	Configure port duplex mode.
Step 3b	no duplex	Reset duplex mode to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type}</i>	Show interface configurations.

	<i>slot/port}</i>	
Step6	write	Save configurations.

3.1.5 Configure port speed

When port speed mode is auto, the actual speed of port is determined by the automated negotiation result with opposite port. The speed is auto by default.

Begin at privileged configuration mode, configure port speed as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	speed { 10 100 1000 auto }	Configure port speed.
Step 3b	no speed	Reset port speed to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.6 Configure port rate limitation

Begin at privileged configuration mode, configure port rate limitation as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	line-rate {ingress egress} bps <i>value</i>	Configure port rate limitation. Value range: 64-1000000, it should be integral multiple of 64kbps.
Step 3b	no line-rate {ingress egress}	Delete port rate limitation configurations.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step6	write	Save configurations.

3.1.7 Configure port VLAN mode

Each port has three VLAN mode, access, trunk and hybrid.

Access mode is usually used for port that connects with PC or other terminals, only one VLAN can be set up. Trunk mode is usually used for port that connects with switch; one or more VLAN can be set up. Hybrid mode can be used for port that connects with PC or switch. Default VLAN mode is hybrid.

Begin at privileged configuration mode, configure port VLAN mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	switchport mode { access trunk hybrid}	Configure port VLAN mode.
Step 3b	no switchport mode	Reset VLAN mode to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

Notice:

All VLAN configurations will lose when you change port VLAN mode.

3.1.8 Configure hybrid port VLAN

Hybrid port can belong to several VLAN. It can be used to connect with switch or router, and also terminal host.

Begin at privileged configuration mode, configure hybrid port VLAN as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	switchport hybrid vlan <i>vlan_id</i> {tagged untagged}	Add specific VLAN to hybrid port.
Step 3b	switchport hybrid transparent	Set port VLAN mode as transparent. OLT will add 1~4094 VLAN to the port. This operation will take about 3 minutes.
Step 3c	no switchport hybrid vlan <i>vlan_id</i>	Remove VLAN from port.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type</i>	Show interface configurations.

	<i>slot/port</i> }	
Step 6	write	Save configurations.

Notice:

You must configure PVID for the port that if it is configured untagged mode. PVID is the same as VLAN ID. Please refer to 3.1.10.

3.1.9 Configure trunk port VLAN

Trunk mode port can belong to several VLAN. It is usually used to connect with switches routers.

Begin at privileged configuration mode, configure trunk port VLAN as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration
Step 3a	switchport trunk vlan <i>vlan_id</i>	Add specific VLAN to trunk port. VLAN mode is tagged.
Step 3b	no switchport trunk vlan <i>vlan_id</i>	Remove VLAN from port.
Step 5	exit	Exit to global configuration mode.
Step 6	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 7	write	Save configurations.

Notice:

If PVID of trunk mode port is the same as VLAN ID, the VLAN will add to the port as untagged mode.

3.1.10 Configure port PVID

Only under hybrid mode and trunk mode can set up PVID.

Begin at privileged configuration mode. Configure port PVID as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	switchport {hybrid trunk} pvid <i>vlan</i> <i>vlan_id</i>	Configure hybrid mode or trunk mode port PVID.
Step 3b	no switchport {hybrid trunk} pvid	Reset hybrid or trunk port PVID to default.
Step 4	exit	Exit to global configuration

		mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.11 Configure access port VLAN

Only one untagged mode VLAN can be set to access port. Port's PVID is the same as VLAN ID.

Begin at privileged configuration mode, configure access port VLAN as the table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	switchport access vlan <i>vlan_id</i>	Configure access port VLAN.
Step 3b	no switchport access vlan	Reset access port VLAN to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.12 Configure port flow control

Begin at privileged configuration mode, configure port flow control as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	flowcontrol on	Enable flow control function.
Step 3b	no flowcontrol	Disable flow control function.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.13 Configure port broadcast suppression

Begin at privileged configuration mode, configure port broadcast suppression as the following table shows.

	Command	Function
--	----------------	-----------------

Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	storm-control broadcast pps <i>value</i>	Configure broadcast suppression. Value range: 64-1000000, it should be integral multiple of 64kbps.
Step 3b	no storm-control broadcast	Remove broadcast suppression.
Step 4	exit	Exit global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.14 Configure port multicast suppression

Begin at privileged configuration mode, configure port multicast suppression as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	storm-control multicast pps <i>value</i>	Configure multicast suppression. Value range: 64-1000000, it should be integral multiple of 64kbps.
Step 3b	no storm-control multicast	Remove multicast suppression.
Step 4	exit	Exit global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.15 Configure port unknown unicast suppression

Begin at privileged configuration mode, configure port unknown unicast suppression as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	storm-control unicast pps <i>value</i>	Configure unknown unicast suppression. Value range: 64-1000000, it should be integral multiple of 64kbps.
Step 3b	no storm-control unicast	Remove unknown unicast suppression.
Step 4	exit	Exit global configuration mode.
Step 5	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 6	write	Save configurations.

3.1.16 Configure port isolation

With this function, customers can add ports to a same isolation group so that these ports can be isolated among L2 and L3 steams. This will improve security of network and provide flexible networking scheme.

Begin at privileged configuration mode, configure port isolation as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	switchport isolate	Add port to isolation group.
Step 3b	no switchport isolate	Remove port from isolation group.
Step 4	exit	Exit to global configuration mode.
Step 5a	show interface <i>{interface_type slot/port}</i>	Show interface configurations.
Step 5b	show isolate port	Show isolation group.
Step 6	write	Save configurations.

3.1.17 Configure port loopback

Begin at privileged configuration mode, configure port loopback as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3	loopback [internal external outside]	Internal means cpu inner

		loopback. External means cpu outer loopback. Outside means external data loopback.
Step 4	exit	Exit to global configuration mode.

Notice:

When testing port loopback function, please disable port loopback detection. Please refer to 3.1.18.

3.1.18 Configure port loopback detection

Begin at privileged configuration mode, configure port loopback detection as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	loopback detect enable	Enable port loopback detection.
Step 2b	no loopback detect	Disable port loopback detection.
Step 3	show loopback detect	Show port loopback detection status.
Step 4	exit	Exit to global configuration mode.

3.1.19 Configure port jumboframe

Begin at privileged configuration mode, configure jumboframe that the port can pass as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {interface_type slot/port}	Enter interface configuration mode.
Step 3a	jumboframe enable	Enable jumboframe transmission. By default, switch chipset supports transmitting maximum 1536 bytes frame; PON chipset supports transmitting maximum 2047 bytes frame.
Step 3b	no jumboframe	Disable jumboframe transmission.
Step 4	exit	Exit to global configuration mode.

3.1.20 Show port statistics

Begin at privileged configuration mode, show port statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3	show statistics	Show port statistics.
Step 4	exit	Exit to global configuration mode.

3.1.21 Clean port statistics

Begin at privileged configuration mode, clean port statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show interface <i>{interface_type slot/port}</i>	Show port statistics.
Step 3	clean statistics	Clean port statistics.

3.1.22 Show interface configurations

Operation	Command
Show interface configurations.	Show interface <i>{interface_type slot/port}</i>

In the system, interface gigabitethernet 0/1~0/x stands for uplink port 1~x. Interface epon0/1~0/x stands for EPON port 1~x.

For example, display configurations of uplink port 5.

```
epon-olt(config)# show interface gigabitethernet 0/5
```

Interface gigabitEthernet0/5's information.

GigabitEthernet0/5 current state : Down

Hardware Type is Gigabit Ethernet, Hardware address is 0:0:0:0:0:0

The Maximum Transmit Unit is 1500

Media type is twisted pair, loopback not set

Port hardware type is 1000Base-TX

Link speed type: autonegotiation, Link duplex type: autonegotiation

Current link state: Down

Current autonegotiation mode: enable

Current link speed: 1000Mbps, Current link mode: half-duplex

Flow Control: disable MDIX Mode: force

The Maximum Frame Length is 1536

Broadcast storm control: 512 fps

Multicast storm control: disable

```
Unknow unicast storm control: 512 fps
Ingress line rate control: no limit
Egress line rate control: no limit
mac address learn state : enable, no limit
Port priority: 0
PVID: 1
Port combo mode: null
Isolate member : yes
Port link-type: hybrid
Untagged VLAN ID: 1
Tagged VLAN ID : 100
Last 300 seconds input: 0 packets 0 bytes
Last 300 seconds output: 0 packets 0 bytes
Input(total): 1113473691 packets, 4081075466 bytes
0 broadcasts, 1113473687 multicasts
Input(normal): 1113473691 packets, 4081075466 bytes
0 broadcasts, 1113473687 multicasts, 0 pauses
Input: 0 input errors, 0 runts, 0 giants, 0 throttles, 4 CRC
0 overruns, 0 aborts, 0 ignored, 0 parity errors
Output(total): 4371 packets, 351860 bytes
1280 broadcasts, 3091 multicasts, 0 pauses
Output(normal): 4371 packets, 351860 bytes
1280 broadcasts, 3091 multicasts, 0 pauses
Output: 0 output errors, 0 underruns, 0 buffer failures
0 aborts, 0 deferred, 0 collisions, 0 late collisions
0 lost carrier, 0 no carrier
```

3.2 Example

Configure VLAN and broadcast suppression of trunk mode port.

1. Requirement

Uplink port 1 of OLT connects to switch, port mode is trunk. It can pass through VLAN 20 and VLAN 100, add VLAN tag 123 to untagged streams. Rate of broadcast streams is 64bps.

2. Framework



3. Steps

(1) Enter interface configuration mode.

```
epon-olt(config)# interface gigabitethernet 0/1
```

```
epon-olt(config-if-ge0/1) #
```

(2) Configure port mode and add VLAN

```
epon-olt(config-if-ge0/1) # switchport mode trunk
```

```
epon-olt(config-if-ge0/1) # switchport trunk vlan 20
```

```
epon-olt(config-if-ge0/1) # switchport trunk vlan 100
```

PS. The VLAN must be added first. Please refer to 4.1.1.

(3) Configure port PVID

```
epon-olt(config-if-ge0/1) # switchport trunk pvid vlan 123
```

(4) Configure port broadcast suppression

```
epon-olt(config-if-ge0/1) # storm-control broadcast bps 64
```

4. Port Aggregation Configuration

4.1 Introduction

Port aggregation is that several ports constitute an aggregation group so that it can share responsibility for traffic load in each port. When one link is broken down, the traffic will switch to another automatically to ensure traffic is unblocked. It seems that the aggregation group is the same as a port.

In an aggregation group, member ports must have the same speed, the same duplex mode and the same basic configurations. Basic configurations contain:

- (1) STP configurations such as STP status, link properties (e.g. p2p port), priority, cost, message format, loopdetect status, edge port or not.
- (2) QoS configurations such as rate limiting, priority mark, 802.1p priority, congestion avoidance.
- (3) VLAN configurations such as VLAN ID, PVID.
- (4) Port link type such as trunk mode, hybrid mode and access mode.
- (5) GVRP configurations such as switch status, registration type, timer value.

4.2 Port Aggregation Configuration

4.2.1 Create static aggregation group

At most 4 groups can be created. You can add 4 member ports altogether in every group and at most 4 ports will come into being aggregation at the same time.

Every group is defined as a channel group; the commands are centre on channel group.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	channel-group <1-4> mode static	Create static aggregation group.
Step 2b	no channel-group <1-4>	Delete static aggregation group.
Step 3	show channel-group summary	Show static aggregation group configuration.

4.2.2 Configure load balancing policy of aggregation group

Configuring load balancing policy includes source MAC, destination MAC, both source and destination MAC, source IP, destination IP, both source and destination IP. Default load balancing policy is based on source MAC.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	channel-group <1-4> load-balance {smac dmac sdmac sip dip sdip}	Specify which link is used to transmit traffic in aggregation group.
Step 3	show channel-group summary	Show aggregation configurations.

4.2.3 Configure member port of aggregation group

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {interface_type slot/port}	Enter interface configuration mode.
Step 3a	channel-group <1-4>	Add current port to specific channel group.
Step 3b	no channel-group <1-4>	Delete current port from specific channel group.
Step 4	exit	Exit global configuration mode.
Step 5	show channel-group summary	Show aggregation group configurations.

5. VLAN Configuration

5.1 VLAN configuration

VLAN configuration mainly contains:

- Create/delete VLAN
- Configure/delete VLAN description
- Configure/delete IP address and mask of VLAN

5.1.1 Create/Delete VLAN

Begin at privileged configuration mode, create or delete VLAN as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	vlan <i>vlan_id</i>	Create VLAN or enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.
Step 2b	no vlan <i>vlan_id</i>	Delete specific VLAN.
Step 3	exit	Exit to global configuration mode.
Step 4a	show vlan [<i>vlan_id/all</i>]	Show VLAN configurations. Choosing all means display all existed VLAN. And choosing <i>vlan_id</i> means display information of specific VLAN.
Step 4b	show vlan	Show information of all existed VLAN.
Step 5	write	Save configurations.

5.1.2 Configure/delete VLAN description

Begin at privileged configuration mode, configure or delete VLAN description as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface vlan <i>vlan_id</i>	Create VLAN or enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.

Step 3a	description <i>string</i>	Configure VLAN description.
Step 3b	no description	Delete VLAN description.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface vlan <i>vlan_id</i>	Show VLAN interface information.
Step 6	write	Save configurations.

Notice:

By default, VLAN description is VLAN ID, such as “vlan 1”.

5.1.3 Configure/delete IP address and mask of VLAN

Begin at privileged configuration mode, configure or delete IP address and mask of VLAN as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	interface vlan <i>vlan_id</i>	Enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.
Step 3a	ip address <i><A.B.C.D> net-mask</i>	Configure IP address and mask of VLAN.
Step 3b	no ip address <i><A.B.C.D></i>	Delete IP address and mask of VLAN.
Step 4	exit	Exit to global configuration mode.
Step 5	show interface vlan <i>vlan_id</i>	Show VLAN information.
Step 6	write	Save configurations.

5.2 Show VLAN information

Input the following commands to Show VLAN information and port members.

Operation	Command
Show VLAN information	show interface vlan
Show VLAN port members	show interface vlan <i>vlan-id</i>

Example:

```
Show VLAN 100 port members
epon-olt(config)# show in vlan 100
Vlan ID      : 100
```

Name : vlan100
Mac address : 00:90:4c:06:a5:73
Tagged Ports : ge0/4 ge0/5
 epon0/1
Untagged Ports : ge0/8

6. VLAN Translation/QinQ

6.1 Configure VLAN translation/QinQ

Begin at privileged configuration mode, configure VLAN translation/QinQ as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	dot1q-tunnel vlan-mapping <i>ori_vlan</i> <i>{any ori_vlan_pri}</i> <i>tra_vlani</i> <i>{any tra_vlan_pri}</i> {db-tag one-tag}	Configure VLAN translation/QinQ. db-tag means QinQ. one-tag means translation.
Step 3b	no dot1q-tunnel vlan-mapping <i>ori_vlan tra_vlanid</i>	Delete VLAN translation/QinQ.
Step 4	exit	Exit to global configuration mode.
Step 5	show vlan vlan-mapping interface <i>{interface_type slot/port}</i>	Show VLAN translation/QinQ configurations.
Step 6	write	Save configurations.

6.2 Example

(1)VLAN translation function

Configure GE1 VLAN translation function, CVLAN is 100, priority is 1, and translated VLAN is 200, priority is 2.

```
epon-olt(config)# interface gigabitethernet 0/1
epon-olt(config-if)#switchport hybrid vlan 100 tagged
epon-olt(config-if)#switchport hybrid vlan 200 tagged
epon-olt(config-if)# dot1q-tunnel vlan-mapping 100 1 200 2 one-tagged
epon-olt(config)#show vlan vlan-mapping interface gigabitethernet 0/1
```

(2)QinQ function

Configure GE2 QinQ function, CVLAN is 300, priority is 3, and SVLAN is 400, priority is 4.

```
epon-olt(config)# interface gigabitethernet 0/2
epon-olt(config-if)#switchport hybrid vlan 300 tagged
epon-olt(config-if)#switchport hybrid vlan 400 tagged
epon-olt(config-if)# dot1q-tunnel vlan-mapping 300 3 400 4 db-tagged
epon-olt(config)#show vlan vlan-mapping interface gigabitethernet 0/2
```

7. MAC Address Configuration

7.1 Overview

In order to forward messages rapidly, a device need to maintain its MAC address table. MAC address table contains MAC addresses that connect with the device, ports, VLAN, type and aging status. Dynamic MAC addresses in the table are learnt by device. The process of learning is that: if port A receives a message, device will analyze the source MAC address (SrcMAC), and think of messages whose destination MAC address is SrcMAC can be forwarded to port A. If SrcMAC has been in the table, device will update it; if not, device will add this new address to the table.

For the messages whose destination MAC address can be found in MAC address table, they are forwarded by hardware. Otherwise, they flood to all ports. When flooded messages arrive to its destination, the destination device will respond. The device will add new MAC to the table. Then, messages with this destination MAC will be forwarded via the new table. However, when messages still can't find its destination by flood, device will discard them and tell sender destination is unreachable.

7.2 Configure MAC address

MAC address management includes:

- Configure MAC address table
- Configure MAC address aging time

7.2.1 Configure MAC address table

You can add static MAC address entries, delete MAC address entries or clean MAC address table.

Begin at privileged configuration mode, configure MAC address table as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	mac address-table static vlan <i>vlan_id</i> xxxx:xxxx:xxxx interface <i>interface_type</i> <i>slot/port</i>	Add static MAC address entry.
Step 2b	no mac address-table vlan <i>vlan_id</i> xxxx:xxxx:xxxx	Delete MAC address entry.
Step 2c	mac address-table clean	Clean MAC address table.

Step 3	show mac address-table	Show MAC address table.
Step 4	write	Save configurations.

7.2.2 Configure MAC address aging time

There is aging time in device. If device doesn't receive any message from other devices in aging time, it will delete the MAC address from MAC table. But for static MAC in the table, aging time is not effective.

Begin at privileged configuration mode, configure MAC address aging time as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	mac address-table agingtime <i>value</i>	Configure MAC address aging time, range is 10-1000000s. 0s means don't aging. Default is 300s.
Step 3	show mac address-table agingtime	Show aging time.
Step 4	write	Save configurations.

7.2.3 Clean MAC address table

Begin at privileged configuration mode, clean MAC address table as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	mac address-table clean	Clean MAC address table.

7.2.4 Configure maximum learnt MAC entries of port

Begin at privileged configuration mode, configure maximum learnt MAC entries of port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3	mac-address mac-limit <0-16384>	0 means no limitation.
Step 4	exit	Exit to global configuration mode.

7.3 Show MAC address table

7.3.1 Show MAC address table

Begin at privileged configuration mode, show MAC address table as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	show mac address-table interface <i>{interface_type slot/port}</i>	Show MAC address table based on Ethernet port.
Step 2b	show mac address-table vlan <i>vlan_id</i>	Show MAC address table based on VLAN ID.
Step 2c	show mac address-table	Show whole MAC address table.
Step 2d	interface <i>{interface_type slot/port}</i>	Enter the PON port
Step 3	show pon mac-address-table	Show pon port MAC address table

7.3.2 Show MAC address aging time

Begin at privileged configuration mode, show MAC address aging time as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show mac address-table agingtime	Show MAC address aging time.

8. Configure Port Mirroring

Port mirroring is to copy one or more ports' traffic to specific port. It is usually used for network traffic analysis and diagnosis.

The device supports 4 mirroring sessions.

8.1 Configure mirroring destination port

Begin at privileged configuration mode, configure mirroring destination port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	monitor session <i>session_number</i> destination interface <i>interface_type</i> <i>interface_num</i>	Configure mirroring destination port. Session number is 1~4.
Step 3	show monitor session all	Show mirroring configurations.
Step 4	write	Save configurations.

8.2 Configure mirroring source port

Mirroring source port is the port we want to monitor. Data that pass through the port will be copied to mirroring destination port.

Begin at privileged configuration mode, configure mirroring source port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	monitor session <i>session_number</i> source interface <i>interface_type</i> <i>start_interface_num</i> [- <i>end_interface_num</i>] {both rx tx}	Configure mirroring source port. session_number is 1-4. Both means received data and transmitted data. rx means received data. tx means transmitted data.
Step 3	show monitor session all	Show mirroring configurations.
Step 4	write	Save configurations.

8.3 Delete port mirroring

Begin at privileged configuration mode, delete port mirroring as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	no monitor session <i>session_number</i> {[destination source] interface <i>interface_type slot/port</i>}	Delete port mirroring. <i>session_number</i> is 1-4
Step 3	show monitor session all	Show mirroring configurations.

Example:

Mirror data from epon 0/1 to uplink port 1.

```
epon-olt(config)# monitor session 1 destination interface gigabitethernet 0/1
```

```
epon-olt(config)# monitor session 1 source interface epon 0/1 both
```


9. IGMP Configuration

9.1 IGMP Snooping

9.1.1 Enable/disable IGMP Snooping

IGMP snooping is disabled by default. You should enable by the following command. Begin at privileged configuration mode, enable/disable IGMP snooping as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	ip igmp snooping enable	Enable IGMP Snooping.
Step 2b	no ip igmp snooping	Disable IGMP snooping.
Step 3	show ip igmp snooping configuration	Show IGMP snooping configurations.
Step 4	write	Save configurations.

9.1.2 Configure multicast data forwarding mode

Begin at privileged configuration mode, configure multicast data forwarding mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	ip igmp snooping forward vlan <i>vlan-id</i> mode { flood forward strict-forward }	Configure multicast data forwarding mode.
Step 3	write	Save configurations.

9.1.3 Configure port multicast VLAN

After add VLAN to the port, you should also configure multicast VLAN for multicast service. Begin at privileged configuration mode, configure port multicast VLAN as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {<i>interface_type slot/port</i>}	Enter interface configuration

		mode.
Step 3a	ip igmp snooping user-vlan <i>vlan_id</i> group-vlan <i>vlan_id</i> { tagged untagged }	Configure port multicast VLAN. VLAN range is 1-4094.
Step 3b	no ip igmp snooping group-vlan <i>vlan_id</i>	Delete port multicast VLAN.
Step 4	exit	Exit to global configuration mode.
Step 5	show ip igmp snooping user-vlan	Show multicast VLAN.
Step 6	write	Save configurations.

9.1.4 Configure multicast router port

Multicast router port is used to forward IGMP messages. Usually, uplink port is configured as multicast router port.

Begin at privileged configuration mode, configure multicast router port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	ip igmp snooping mrouter vlan <i>vlan-id</i> interface {<i>interface_type slot/port</i>}	Configure multicast router port.
Step 2b	no ip igmp snooping mrouter vlan <i>vlan-id</i> interface {<i>interface_type slot/port</i>}	Delete multicast router port.
Step 3	show ip igmp-snooping mrouter vlan all	Show multicast router mode configuration.
Step 4	write	Save configurations.

9.1.5 Configure static multicast

Begin at privileged configuration mode, configure static multicast as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	ip igmp snooping static vlan <i>vlan-id</i> <<i>A.B.C.D</i>> interface <i>interface-id</i>	Configure static multicast.
Step 2b	no ip igmp snooping static vlan <i>vlan-id</i> <<i>A.B.C.D</i>> interface {<i>interface_type</i> <i>slot/port</i>}	Delete static multicast.
Step 3	show ip igmp-snooping configuration	Show IGMP configurations.
Step 4	write	Save configurations.

9.1.6 Configure fast leave

Begin at privileged configuration mode, configure fast leave as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	ip igmp snooping immediate-leave	Enable fast leave.
Step 3b	no ip igmp snooping immediate-leave	Disable fast leave.
Step 4	exit	Exit to global configuration mode.
Step 5	show ip igmp snooping port information	Show port IGMP information.
Step 6	write	Save configurations.

9.1.7 Configure multicast group limit

Begin at privileged configuration mode, configure multicast group limitation as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	ip igmp snooping limit <0-1024>	Configure port multicast group limitation.
Step 3b	no ip igmp snooping limit	Reset multicast group limitation to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show ip igmp snooping port information	Show port multicast information.
Step 6	write	Save configurations.

9.1.8 Configure parameters of special query

Begin at privileged configuration mode, configure parameters of specific query as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	ip igmp snooping	Configure specific query count.

	lastmember-querycount <1-255>	Default is 2.
Step 2b	ip igmp snooping lastmember-queryinterval <1-255>	Configure specific query interval. Default is 1s.
Step 2c	ip igmp snooping lastmember-queryresponse <1-255>	Configure specific query response time. Default is 1s.
Step 3	show ip igmp snooping configuration	Show IGMP configurations.
Step 4	write	Save configurations.

9.1.9 Configure parameters of general query

Begin at privileged configuration mode, configure parameters of general query as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	ip igmp snooping general-query-packet <enable disable>	Enable or disable general query function. Default is disable.
Step 2b	ip igmp snooping general-query-time <10-255>	Configure general query interval. Default is 126s.
Step 3	show ip igmp snooping configuration	Show IGMP configurations.
Step 4	write	Save configurations.

9.1.10 Configure source IP of query

Begin at privileged configuration mode, configure source IP of query message as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	ip igmp snooping member-query source-ip <A.B.C.D>	Configure source IP of query message. Default is 1.1.1.1.
Step 3	show ip igmp snooping configuration	Show IGMP configurations.
Step 4	write	Save configurations.

9.1.11 Configure multicast member aging time

If the port doesn't receive any report message from member in aging time, device will delete this port from group members.

Begin at privileged configuration mode, configure muticast member aging time as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	ip igmp snooping host-aging-time <i>value</i>	Configure multicast port member aging time. Value range is 10-3600s, default is 260s.
Step 3	show ip igmp snooping configuration	Show IGMP configurations.
Step 4	write	Save configurations.

9.1.12 Show multicast group information

If there is member join a group, you can use the following commands to show multicast group information.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	show ip igmp snooping vlan [<i>vlan-id</i> all]	Show multicast group information.
Step 2b	show ip igmp snooping statistic	Show multicast statistic.

9.2 Example

This example introduces how to configure IGMP snooping function, including multicast VLAN, multicast router port and ONU LAN port, etc.

1. Requirement

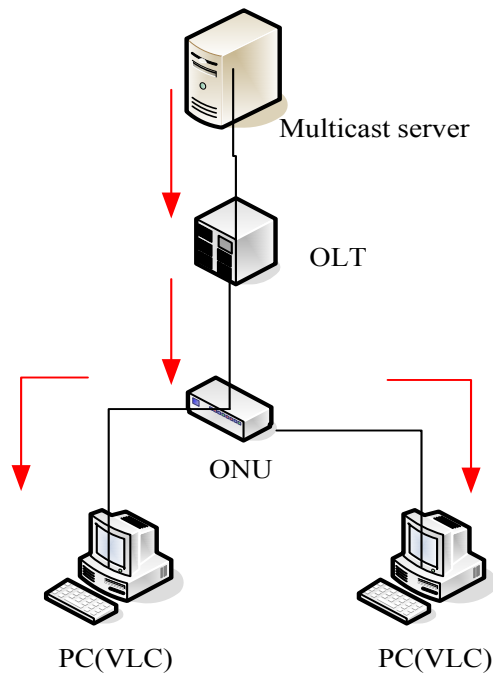
In order to achieve multicast function, you should enable IGMP Snooping, configure multicast VLAN, multicast router port, and so on. The requirement contains:
multicast is VLAN 100.

Multicast server connects to uplink port 1.

ONU connects to PON 1.

Client, such as a PC, connects to ONU LAN 1.

2. Framework



3. Steps

(1) create VLAN

```
epon-olt(config)# vlan 100
epon-olt(config-vlan-100)# exit
```

(2) configure uplink port

```
epon-olt(config)# interface g 0/1
epon-olt(config-if-ge0/1)# switchport hybrid vlan 100 tagged
epon-olt(config-if-ge0/1)# exit
```

(3) configure PON port

```
epon-olt(config)# inter epon 0/1
epon-olt(config-pon-0/1)# switchport hybrid vlan 100 tagged
epon-olt(config-pon-0/1)# ip igmp snooping user-vlan 100 group-vlan 100 tagged
epon-olt(config-pon-0/1)# exit
```

(4) enable IGMP snooping

```
epon-olt(config)# ip igmp snooping enable
```

(5) configure multicast router port

```
epon-olt(config)# ip igmp snooping mrouter vlan 100 interface g 0/1
```

(6) configure ONU LAN port

```
epon-olt(config)# inter epon 0/1
epon-olt(config-pon-0/1)# onu 1 ctc eth 1 vlan mode tag
epon-olt(config-pon-0/1)# onu 1 ctc eth 1 vlan pvid 100 pri 0
epon-olt(config-pon-0/1)# onu 1 ctc eth 1 mc_vlan add 100
epon-olt(config-pon-0/1)# onu 1 ctc eth 1 mc_tagstrip enable
```

10.ACL Configuration

10.1 Overview

In order to filter data packages, network equipments need to setup a series of rules for identifying what need to be filtered. Only matched with the rules the data packages can be filtered. ACL can achieve this function. Matched conditions of ACL rules can be source address, destination address, Ethernet type, VLAN, protocol port, and so on.

These ACL rules also can be used in other situations, such as classification of stream in QoS. An ACL rule may contain one or several sub-rules, which have different matched conditions.

This device supports the following types of ACL.

- IP Standard ACL.
- IP Extended ACL.
- ACL based on MAC address
- ACL based on port binding.
- ACL based on QoS.

Limitation of each ACL rule:

ACL type	ACL index	Maxium rules
IP Standard ACL	0-999	1000
IP Extended ACL	1000-1999	1000
ACL based on MAC address	2000-2999	1000
ACL based on port binding	5000-5999	1000
ACL based on QoS	6000-6999	1000

10.2 ACL confiuration

ACL configuration mainly includes:

- IP Standard ACL.
- IP Extended ACL.
- ACL based on MAC address
- ACL based on port binding.
- ACL based on QoS.
- ACL rule apply to port.

10.2.1 IP standard ACL

Begin at privileged configuration mode, configure IP standard ACL as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	access-list <i>access-list-number</i>	Enter ACL configuration mode. <i>access-list-number</i> is ACL index. range:0-999.
Step 3	subset ip (permit deny) <A.B.C.D> [<i>net-mask</i>] subset ip (permit deny) host <A.B.C.D> subset ip [permit deny] any	Configure ACL rule. <A.B.C.D>: define based on source IP address and mask ACL rule. Host : define based on single IP address ACL rule. Any : define based on any source IP address ACL rule.
Step 4	exit	Exit to global configuration mode.
Step 5	show access-list [<i>access-list-number</i> all]	Show ACL configurations.
Step 6	write	Save configurations.

10.2.2 IP extended ACL

Begin at privileged configuration mode, configure IP extended ACL as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	access-list <i>access-list-number</i>	Enter ACL configuration mode. <i>access-list-number</i> is ACL index. range:1000-1999.
Step 3	subset protocol {deny permit} <i>protocol</i> { <A.B.C.D> <i>net-mask</i> {<A.B.C.D> <i>net-mask</i> host <A.B.C.D> any }[match { <i>dscp priority</i> precedence <i>priority</i> tos priority }] [set { <i>dscp priority</i> precedence priority tos priority }]	Configure IP extended ACL rule. Parameter <i>protocol</i> should be icmp, igmp, igmp, ip, ospf, pim, tcp, or udp, etc. it also can be replaced by protocol code 0~255.
Step 4	exit	Exit global configuration mode.
Step 5	show access-list [<i>access-list-number</i> all]	Show ACL configurations.
Step 6	write	Save configurations.

10.2.3 ACL based on MAC address

Begin at privileged configuration mode, configure ACL based on MAC address as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	access-list <i>access-list-number</i>	Enter ACL configuration mode. <i>access-list-number</i> is ACL index. range:2000-2999.
Step 3	subset ethernet [permit deny] [source] <xx:xx:xx:xx:xx:xx> <xx:xx:xx:xx:xx:xx> {[dest] <xx:xx:xx:xx:xx:xx> <xx:xx:xx:xx:xx:xx>*1 {[vlan] <1-4094>*1 {[cos] <0-7>*1 {[ethernet-type] <XXXX> <XXXX>	Configure IP extended ACL rule.
Step 4	exit	Exit to global configuration mode.
Step 5	show access-list [<i>access-list-number</i> all]	Show ACL configurations.
Step 6	write	Save configurations.

10.2.4 ACL based on port binding

This type of ACL includes the other types.

Begin at privileged configuration mode, configure ACL based on port binding as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	access-list <i>access-list-number</i>	Enter ACL configuration mode. <i>access-list-number</i> is ACL index. range:5000-5999;
Step 3	subset port-business [permit deny] {src-ip dest-ip protocol tos-dscp src-mac dest-mac vlan cos ethernet-type src-port dest-port}	Permit:Permit data stream which match the rule passing through. Deny:Do not permit data stream which match the rule passing through. src-ip : source IP address dest-ip:destination IP address protocol:IP protocol type tos-dscp:IP priority src-mac:source MAC address dest-mac:destination MAC address vlan:VLAN IAD cos:802.1p priority ethernet-type:ethernet type src-port:Layer 4 source port dest-port:Layer 4 destination port
Step 4	exit	Exit to global configuration mode.
Step 5	show access-list <i>access-list-number</i>	Show ACL configurations.

Step 6	write	Save configurations.
---------------	--------------	----------------------

10.2.5 ACL based on QoS

Begin at privileged configuration mode, configure ACL based on QoS as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	access-list <i>access-list-number</i>	Enter ACL configuration mode. <i>access-list-number</i> is ACL index. range:6000-6999.
Step 3a	subset qos <0-8> <0-7> <1-12>	<0-8>: output priority <0-7>: output queue <1-12>: rule priority
Step 3b	subset qos {src-ip dest-ip protocol tos-dscp src-mac dest-mac vlan cos ethernet-type src-port dest-port}	src-ip : source IP address dest-ip: destination IP address protocol: IP protocol type tos-dscp: IP priority src-mac: source MAC address dest-mac: destination MAC address vlan: VLAN ID cos:802.1p priority ethernet-type: Ethernet type src-port:Layer 4 source port dest-port:Layer 4 destination port
Step 3c	no access-list <i>access-list-number</i>	Deleting ACL rule. Only the ACL that have not been applied can be deleted.
Step 4	exit	Exit to global configuration mode.
Step 5	show access-list <i>access-list-number</i>	Show ACL configurations.
Step 6	write	Save configurations.

10.2.6 ACL rule apply to port

Begin at privileged configuration mode, apply ACL rule to port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {<i>interface_type</i> slot/port}	Enter interface configuration mode.
Step 3a	ip access-group <i>access-list-number</i> in	Apply ACL rule to port.

Step 3b	no ip access-group <i>access-list-number</i> in	Delete ACL rule from port.
Step 4	exit	Exit to global configuration mode.
Step 5	show access-list <i>access-list-number</i>	Show ACL configurations.
Step 6	write	Save configurations.

10.3 Example

(1) Deny specific IP address packets passing through

PON1 denies packets which source IP is 192.168.100.10 passing through.

```
epon-olt(config)# access-list 5000
epon-olt(config-bsn-acl-5000)# subset port-business deny src-ip 192.168.100.10
255.255.255.255
epon-olt(config-bsn-acl-5000)# exit
epon-olt(config)# interface epon 0/1
epon-olt(config-pon-0/1)# ip access-group 5000 in
```

(2) Permit specific MAC address packets passing through

PON1 permits IP packets which source MAC is b8:97:5a:72:37:8d passing through.

```
epon-olt(config)#access-list 2000
epon-olt(config-eth-acl-2000)# subset ethernet deny ethernet-type 0800 ffff
epon-olt(config-eth-acl-2000)#exit
epon-olt(config)# access-list 2001
epon-olt(config-eth-acl-2001)# subset ethernet permit source b8:97:5a:72:37:8d
ff:ff:ff:ff:ff:ff
epon-olt(config-eth-acl-2001) # exit
epon-olt(config)# interface epon 0/1
epon-olt(config-pon-0/1)# ip access-group 2000 in
epon-olt(config-pon-0/1)# ip access-group 2001 in
epon-olt(config-pon-0/1)#exit
```

11.QoS Configuration

11.1 Configure queue scheduling mode

Queue scheduling mode contains strict priority, weighted round robin and hybrid mode. This device supports 8 queues altogether.

Begin at privileged configuration mode, configure queue scheduling mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	queue-scheduler strict-priority	Configure strict priority scheduling mode.
Step 2b	queue-scheduler wrr [queue0 queue1 queue2 queue3 queue4 queue5 queue6 queue7]	Configure weighted round robin scheduling mode. <i>Queue</i> x is weight of queue x, range is 1-127. By default, weights of queue 0~7 are 1, 1, 2, 2, 4, 4, 8, 8.
Step 2c	queue-scheduler sp-wrr [queue0 queue1 queue2 queue3 queue4 queue5 queue6 queue7]	Configure hybrid scheduling mode. <i>Queue</i> x is weight of queue x, range is 0-127. If it is set to be 0, the queue is strict priority queue. By default, weights of queue 0~7 are 1, 1, 2, 2, 4, 4, 8, 8.
Step 3	show queue-scheduler	Show queue scheduling configurations.
Step 4	write	Save configurations.

11.2 Configure queue mapping

Begin at privileged configuration mode, configure queue mapping as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	queue-scheduler tc <i>priority</i> queue <i>queue</i>	Configure mapping relation between queues and priority. By default, priority 0~7 maps to queue 0~7 respectively.
Step 3	show queue-scheduler priority mapping	Show queue mapping.
Step 4	write	Save configurations.

12.STP Configuration

12.1 STP default settings

STP default settings:

Speciality	Default value
Enable status	STP disabled
Bridge priority	32768
STP port priority	128
STP port cost	10-Gigabit Ethernet :2 Gigabit Ethernet :4 Fast Ethernet :19 Ethernet :100
Hello time	2s
Forward delay time	15s
Maxmum aging time	20s
Mode	RSTP

12.2 Cofigure STP

STP configurations mainly contain:

- Enable device's STP function.
- Enable port's STP function.
- Configure STP mode.
- Configure bridge priority of device.
- Configure forward delay of device.
- Configure hello time of device.
- Configure max age of designated device.
- Configure priority of designated port.
- Configure path cost of designated port.

12.2.1 Enable device's STP function

Begin at privileged configuration mode, enable device's STP function as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	spanning-tree on	Enable device's STP function. By default, STP function is disabled.

Step 2b	no spanning-tree	Disable device's STP function.
Step 3	show spanning-tree	Show STP configurations.
Step 4	write	Save configurations.

12.2.2 Enable port STP

In order to work flexibly, you can disable some specific ports' STP function.

Begin at privileged configuration mode, enable port's STP function as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface {interface_type slot/port}	Enter interface configuration mode.
Step 3a	spanning-tree on	Enable port's STP function.
Step 3b	no spanning-tree on	Disable port's STP function.
Step 4	exit	Exit to global configuration mode.
Step 5	show spanning-tree interface {interface_type slot/port}	Show port's STP configurations.
Step 6	write	Save configurations.

12.2.3 Configure spanning tree mode

This device supports STP and RSTP. By default, it runs RSTP. You can choose RTP manually.

Begin at privileged configuration mode, configure spanning tree mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	spanning-tree mode [rstp stp]	Configure spanning tree mode. It runs RSTP by default.
Step 3	show spanning-tree	Show STP configurations.
Step 4	write	Save configurations.

12.2.4 Configure bridge priority

Device's bridge priority decides if it will be selected as root of spanning tree.

Begin at privileged configuration mode, configure device's bridge priority as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	spanning-tree priority <i>bridge-priority</i>	Configure device's bridge priority. Priority range is 0~65535, default is 32768.
Step 3	show spanning-tree	Show STP configurations.
Step 4	write	Save configurations.

12.2.5 Configure forward delay

Network will recompute spanning tree when there is link down in network. Construction of spanning tree will be changed too. But the new STP PDU can't go the rounds of network. In this case, a temporary loop will come out if the new root port and designated port forward data immediately. So, STP adopts state transition mechanism. Before re-forwarding data, root port and designated port will undergo an intermediate state. After forward delay time out in the intermediate state, the new STP PDU have gone the rounds of network, then root port and designated port begin to forward data.

Begin at privileged configuration mode, configure device's forward delay as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	spanning-tree forward-time <i>seconds</i>	Configure device's forward delay. bridge-priority range is 4~30, default is 15.
Step 3	show spanning-tree	Show STP configurations.
Step 4	write	Save configurations.

Forward Delay has something to do with that how big the network is. Generally, the bigger the network, the longer forward delay should be configured. If forward delay is too small, there may be temporary redundant path; while it is too big, network will take more time to resume connectivity. We suggest using default value if you have no idea about this.

Notice:

Hello time, forward delay and maximum age are time parameters of root device. These three parameters should meet the following formula, otherwise, the network will not stable.

$$2 \times (\text{forward-delay} - 1) \geq \text{maximum-age} \geq 2 \times (\text{hello} + 1)$$

The unit of "1" in formula is second.

12.2.6 Configure hello time

Network Bridge will send hello message to other surrounding network bridge at regular

intervals for verifying link connectivity. A suitable hello time can ensure a device find link failure in time and not occupy more network resource. If hello time is too big, device will be in mistake for link failure when loss packets. Then network device recomputes spanning tree. While if too small, network device sends repeated STP PDU frequently. This will increase device's load and waste network resource.

Begin at privileged configuration mode, configure device's hello time as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	spanning-tree hellotime <i>seconds</i>	Configure device's hello time. Hello time range is 1~10, default is 2.
Step 3	show spanning-tree	Show STP configurations.
Step 4	write	Save configurations.

12.2.7 Configure max age time

Max age time is maximum life time of configuration message. When message age is bigger than maximum age, configuration message will be discarded.

Begin at privileged configuration mode, configure maximum age as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	spanning-tree max-age <i>seconds</i>	Configure maximum age of device. max age range is 6-40, default is 20.
Step 3	show spanning-tree	Show STP configurations.
Step 4	write	Save configurations.

12.2.8 Configure priority of designated port

Port priority decides whether it can be selected as root port or not. On equal conditions, the higher priority port will be selected as root port. Generally, the priority value is smaller, the port has higher priority. If all ports' priority value are the same, their priority decided by their port index.

Begin at privileged configuration mode, configure priority of designated port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3	spanning-tree port-priority <i>priority</i>	Configure priority of designated port. priority range is 1-255, default is 128.
Step 4	exit	Exit to global configuration mode.
Step 5	show spanning-tree interface <i>{interface_type slot/port}</i>	Show port STP configurations.
Step 6	write	Save configurations.

12.2.9 Configure path cost of designated port

Path Cost is related to the speed of the link connected to the port. On the STP switch, a port can be configured with different path costs.

Begin at privileged configuration mode, configure path cost of designated port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3	spanning-tree cost <i>value</i>	Configure path cost of designated port. Path cost range is 1-65535, default is auto.
Step 4	exit	Exit to global configuration mode.
Step 5	show spanning-tree interface <i>{interface_type slot/port}</i>	Show port STP configurations.
Step 6	write	Save configurations.

12.2.10 Configure edge port

The port which connects with terminal host is Edge Port. In process of spanning tree recomputation, edge port can transfer to forwarding status directly so that it can reduce transfer time. Because RSTP can't detect whether the port is edge port or not, if the port doesn't connect with switch, you'd better configure it as edge port. But when the port connects with a switch, RSTP can detect and configure it as non-edge port. By default, all ports are configured as non-edged port.

Begin at privileged configuration mode, configure edge port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	spanning-tree operedge	Configure port as an edge port.
Step 3b	no spanning-tree operedge	Reset spanning tree port to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show spanning-tree interface <i>{interface_type slot/port}</i>	Show port STP configurations.
Step 6	write	Save configurations.

12.2.11 Configure point to point mode

Point to point mode is usually the link which connects with switches. For the ports connected with the point-to-point link, upon some port role conditions met, they can transit to forwarding state fast through transmitting synchronization packet, thereby reducing the unnecessary forwarding delay.

Begin at privileged configuration mode, configure port to connect with point to point link as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>{interface_type slot/port}</i>	Enter interface configuration mode.
Step 3a	spanning-tree point-to-point	Configure a port as point to point port. By default, all ports are configured as point to point ports.
Step 3b	no spanning-tree point-to-point	Not to configure a port as point to point port.
Step 4	exit	Exit to global configuration mode.
Step 5	show spanning-tree interface <i>{interface_type slot/port}</i>	Show port STP configurations.
Step 6	write	Save configurations.

12.3 Show STP information

After configuring, use the following commands to show STP information.

Command	Function
show spanning-tree	Show STP configurations and

	running status.
show spanning-tree interface <i>{interface_type slot/port}</i>	Show STP configurations and running status of a port.

13.Static Route Configuration

Static route is usually used in a simple network. This device supports maximum 512 static route rules.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	ip route <i>A.B.C.D A.B.C.D A.B.C.D</i>	Add static route rule.
Step 2b	ip route <i>A.B.C.D/M A.B.C.D</i>	Add static route rule.
Step 3a	no ip route <i>A.B.C.D A.B.C.D A.B.C.D</i>	Delete static route rule.
Step 3b	no ip route <i>A.B.C.D/M A.B.C.D</i>	Delete static route rule.
Step 4	show ip route	Show route rules.

14. OLT Management Configuration

14.1 Configure outband management

Port AUX is outband management port. So its IP is outband management IP.

14.1.1 Enter AUX port configuration mode

Begin at privileged configuration mode, enter interface configuration mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface aux	Enter AUX interface.

14.1.2 Configure outband management IP address and mask

Begin at privileged configuration mode, configure outband management IP address and mask as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	interface aux	Enter AUX interface.
Step 3a	ip address <A.B.C.D> net-mask	Configure IP address and mask of AUX port.
Step 3b	no aux ip address	Reset outband management IP to default.
Step 4	exit	Exit to global configuration mode.
Step 5	show aux ip address	Show outband management IP.
Step 6	write	Save configurations.

14.1.3 Show AUX port information

Begin at privileged configuration mode, show AUX port information as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show interface aux	Show AUX port information.

14.2 Configure inband management

This device provides inband management which can be managed from uplink port.

Begin at privileged configuration mode, configure inband management IP address and mask as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	vlan <i>vlan_id</i>	Create VLAN.
Step 3	exit	Exit to global configuration mode.
Step 4	interface vlan <i>vlan_id</i>	Enter VLAN interface configuration mode. <i>vlan_id</i> range is 1 – 4094.
Step 5a	ip address <A.B.C.D> net-mask	Configure IP address and mask.
Step 5b	no ip address <A.B.C.D>	Delete IP address and mask.
Step 6	exit	Exit to global configuration mode.
Step 7	show interface vlan <i>vlan_id</i>	Show VLAN information.
Step 8	write	Save configurations.

14.3 Configure management gateway

When OLT management IP and management server are not in the same network segment, it needs to configure a gateway.

Begin at privileged configuration mode, configure management gateway as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	gateway <A.B.C.D>	Configure management gateway. The gateway must be the same network segment with outband or inband management IP.
Step 3	no gateway	Delete management gateway.

Step 4	show gateway	Show management gateway configuration.
Step 5	write	Save configurations.

15.DHCP Management Configuration

15.1 Configure DHCP server

Now, larger and larger number of IP address are needed to allocate .DHP (Dynamic Host configuration Protocol) is created to solve this problem .It concludes DHCP Server and DHCP Client.Requested by client, IP address are allocated by the server.Configure DHCP Server as the following table show:

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2a	dhcp-server [enable disable]	Disable the DHCP server function
Step 2b	dhcp-server dns1 dns2 dns3 wins] <A.B.C.D>	Configure DHCP's DNS and WINS Server
Step 2c	dhcp-server startip A.B.C.D endip A.B.C.D	Configure DHCP IP address pool
Step 2d	dhcp-server subnet A.B.C.D	Configure DHCP mask
Step 2e	dhcp-server gateway A.B.C.D	Configure DHCP gateway
Step 2f	dhcp-server interface vlan <1-4095>	Add the VLAN to the DHCP Server (If want DHCP server successful, need to configure the vlan interface IP address)
Step 2g	dhcp-server leasetime leasetime	Configure IP address leasetime
Step 3a	show dhcp-server	Show DHCP server configuration
Step 3d	show dhcp-server lease	Show DHCP Server allocate IP address
Step 4	copy running-config startup-config	Save the configuration

15.2 Configure DHCP relay

Because the DHCP receiving need to broadcast ,so the server and the client should be in the same network.The DHCP relay can save this issue effective. Configure DHCP relay as the following table show:

- 1.Single DHCP relay configuration:

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	interface vlan <i>vlan_id</i>	Add VLAN and enter VLAN interface configuration <i>vlan_id</i> (1–4094);
Step 3	dhcp relay A.B.C.D	Configure the DHP relay server IP address ,and enable the DHCP relay
Step 3b	no dhcp relay A.B.C.D	Delete DHCP relay
Step 4	exit	Exit to global configuration mode
Step 5	show dhcp-relay configure	Show the DHCP relay configuration.
Step 6	copy running-config startup-config	Save the configuration

2.、 Multiple DHCP relay configuration:

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	dhcp-server group <groupname>	Add a DHCP server group, and enter group configuration mode.
Step 3a	dhcp-server A.B.C.D	Add the DHCP server to the group.
Step 3b	no dhcp-server A.B.C.D	Delete DHCP server
Step 4	exit	Exit to the global configuration mode
Step 5	interface vlan <i>vlan_id</i>	Add a VLAN and enter to VLAN interface configuration <i>vlan_id</i> (1–4094);
Step 6a	dhcp relay server-select <groupname>	Select DHCP server group .
Step 6b	no dhcp relay server-select <groupname>	Delete the DHCP server group.
Step 7	exit	Exit to global configuration mode
Step 8	show dhcp-relay configure	Sow DHCP relay configuration.
Step 9	copy running-config startup-config	Save the configuration.

15.3 Configure DHCP Snooping

To prevent the DHCP message attacking and protect you network to get a useful IP address. DHCP Snooping is used for do that. Configure DHCP Snooping as the following table show:

A. DHCP Snooping enable/disable

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	dhcp-snooping (enable disable)	Enable/disable DHCP Snooping. (DHCP Snooping enable, can not open dhcp server and dhcp relay)
Step 3a	dhcp-snooping vlan <1-4095> ...	Configure DHCP Snooping vlan list
Step 3b	no dhcp-snooping vlan <1-4095>...	Delete DHCP Snooping vlan list
Step 4	exit	Exit to global configuration mode.
Step 5	show dhcp-snooping configuration	Show DHCP Snooping configuration.
Step 6	copy running-config startup-config	Save configuration.

B. Configure DHCP Snooping option82

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	dhcp-snooping information option (enable disable)	Enable/disable DHCP Snooping option82.
Step 3	dhcp-snooping information strategy (drop keep replese)	Deal with the message with option82, drop、keep and replace.
Step 4	exit	Exit to global configuration mode.
Step 5	show dhcp-snooping configuration	Show DHCP Snooping configuration.
Step 6	copy running-config startup-config	Save configuration.

C. Configure DHCP Snooping binding list

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	dhcp-snooping binding	Add the static DHCP binding list.

	HHHH:HHHH:HHHH vlan <1-4095> A.B.C.D interface {interface_type slot/port} lease <60-1000000>	
	no dhcp-snooping binding HHHH:HHHH:HHHH	Delete MAC binding list.
	no dhcp-snooping binding (all static dynamic)	Delete DHCP binding list.can delete all、static、dynamic .
Step 3	dhcp-snooping binding delete-time <1-3600>	Configure the biding list aging time and delete time.
Step 4	exit	Exit to global configuration mode
Step 5	show dhcp-snooping configuration	Show DHCP Snooping configuration.
Step 6	copy running-config startup-config	Save configuration.

D.Configure DHCP Snooping port

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	interface {interface_type slot/port}	Enter the interface configuration
Step 3a	dhcp-snooping (trust untrust)	Configure the trust/untrust port. All the port are untrust in default.
Step 3b	dhcp-snooping information circuit-id string <string>	Configure the option82的circuit-id value.
Step 3c	no dhcp-snooping information circuit-id string <string>	Delete the option82 circuit-id value , and load default.
Step 3d	dhcp-snooping information remote-id string <string>	Configure option82remote-id value.
Step 3e	no dhcp-snooping information remote-idstring <string>	Delete option82 remote-id value, load default value.
Step 3f	dhcp-snooping limit rate <0-4096>	Configure the port max speed of receiving the DHCP packet. It doesn't limit by default.
Step 3e	no dhcp-snooping limit rate	No limit speed.
Step 4	exit	Exit to the global configuration

		mode
Step 5a	dhcp-snooping errdisable recovery (enable disable)	Configure whether the port get down when the DHCP packetreceiving speed larger then the limit speed .The default is disable.
Step 5b	dhcp-snooping errdisable recovery interval <3-3600>	Configure the time when the port recovery after getting down
Step 6	show dhcp-snooping configuration	Show DHCP Snooping configuration.
Step 7	copy running-config startup-config	Save configuration.

16.PON Management Configuration

16.1 Enable/Disable PON

Begin at privileged configuration mode, enable or disable PON port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	pon {enable disable}	Enable or disable PON optical transceiver.
Step 4	show pon info	Show PON information.

16.2 PON downstream encryption

EPON system transmits data with broadcast mode. So hacker can get other customer's information easily. In order to improve security, system can encrypt the data by encryption algorithm. This OLT supports triple churning encryption function for downstream.

Every LLID has its own key for triple churning encryption function. Churning needs OLT to request updating key. Then OLT accomplishes triple churning with 3 bytes key which ONU provides. It will churn all the data frames and OAM frames. By default, PON downstream encryption is disabled.

Begin at privileged configuration mode, enable PON downstream encryption as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	pon encryption triple-churning key_timer <774-786426>	Enable PON downstream encryption.
Step 3b	no pon encryption	Disable PON downstream encryption.
Step 4	show pon encryption	Show pon encryption configuration.

16.3 Configure maximum RTT

The main purpose of configuring maximum RTT is to make sure ONU which are in different distances with OLT can register successful. Different ONU has different physical distance with OLT. This will make message round-trip time changes in microsecond. In this case, if there is no enough time slot and messages which come from different ONU may arrive at OLT at the same time, confliction will turn up.

In order to avoid the confliction, EPON system adopt time label to measure distance, which is based on EPON system time label sync, by calculating difference value between received time label and local clock counter time label. RTT can adjust ONU transmit delay and reduce send window interval so that it can improve upstream channel usage.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	pon max-rtt <2000-32000>	Configure maximum RTT
Step 3b	pon max-rtt default	Reset RTT to default. Default value is 14500.
Step 4	Show pon info	Show current RTT configuration.

16.4 PON ONU laser detect

Enable to detect whether a onu is laser on in a PON port.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	pon laser-always-on detect	Enable PON port laser detection

16.5 Show PON port statistics

Begin at privileged configuration mode, show PON port statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.

Step 3	show pon statistics	Show PON port statistics.
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16.6 Show optical module parameters and alarms

Optical module parameters contain transmit optical power, receive optical power, temperature, voltage and bias current. These 5 parameters decide whether the optical module can work normal or not. Any of them is abnormal may cause ONU deregister or lose packets.

Begin at privileged configuration mode, show PON port optical module parameters as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	show pon optical transceiver	Show pon optical parameters.

17. ONU Management Configuration

17.1 ONU basic configuration

17.1.1 Configure ONU authentication mode

By default, it is disabled for ONU MAC checking mechanism. All ONU can register freely. You can use command **onu auth-mode mac** to enable ONU MAC checking mechanism when MPCP registering.

Use command **onu auth-mode loid** to enable ONU LOID authentication mode. After registered, OLT will request ONU LOID for authentication.

Use command **onu auth-mode hybrid** to enable hybrid authentication mode. In this mode, OLT will authenticate ONU by MAC address firstly, if failed, authenticate ONU by LOID.

Use command **show onu auth-info** to show active ONU information, includes ONU ID, LLID, ONU status, MAC address, OAM status, distance, last register time, last deregister time, deregister reason, online time and so on.

Use command **show onu auto-find** to show inactive ONU information, includes LLID, MAC address, ONU status, last register time, last deregister time, offline time, and so on.

Begin at privileged configuration mode, configure ONU authentication mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu auth-mode {disable mac loid hybrid}	Configure ONU authentication mode.
Step 4	show onu auth-mode	Show ONU authentication mode.
Step 5	show onu auth-info	Show authenticated ONU.
Step 6	show onu auto-find	Show registered but not authenticated ONU.

17.1.2 Remove authorized ONU

Begin at privileged configuration mode, remove authorized ONU as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	no onu auth onuid <onuid>	Remove authorized ONU.

17.1.3 Deregister or reset ONU

Deregistering ONU only makes ONU off line, but not delete and unauthorized it.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	{deregister reset} onu auth onuid <onuid>	Deregister or reset specific ONU.
Step 3b	{deregister reset} onu auth all	Deregister or reset all ONUs.

17.1.4 Configure ONU authorization MAC list

When ONU authorization mode is MAC_auth, you must configure MAC list. Begin at privileged configuration mode, configure MAC list as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	onu mac-auth {add del} <XX:XX:XX:XX:XX:XX>	Add or delete MAC white list.
Step 3b	onu black-mac-auth {add del} <XX:XX:XX:XX:XX:XX>	Add or delete MAC black list.
Step 3c	onu {mac-auth black-mac-auth} clean	Clean MAC white list or black list.
Step 4	show onu mac-auth	Show ONU MAC white list.
Step 5	show onu black-mac-auth	Show ONU MAC black list.

17.1.5 Configure ONU authorization LOID list

When ONU authorization mode is LOID_auth, you must configure LOID list. Begin at privileged configuration mode, configure LOID list as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu loid-auth {add del} <loid> [<password>]*1	Add or delete LOID list.

Step 4	onu loid-auth clean	Clean LOID list.
Step 5	show onu loid-auth	Show onu LOID list.

17.1.6 Measure ONU distance

Use the following commands to measure authorized ONU distance.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	show onu <i><onuid></i> rtt	Measure ONU distance.

17.1.7 Configure ONU description string

Begin at privileged configuration mode, configure ONU description string as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> description <i><string></i>	Add description string to ONU.
Step 4	show onu <i><onuid></i> description	Show ONU description.

17.1.8 Configure ONU downstream encryption

When enable ONU downstream encryption, you should also enable PON downstream encryption at the same time. In another word, it's not effective if only enable ONU downstream encryption. By default, ONU downstream encryption is disabled.

Begin at privileged configuration mode, enable ONU downstream encryption as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> encryption {enable disable}	Enable/Disable ONU downstream encryption.
Step 4	show onu <i><onuid></i> encryption	Show onu downstream encryption.

17.1.9 Configure ONU upstream bandwidth

You can configure upstream bandwidth for authorized ONU. Begin at privileged configuration

mode, configure ONU upstream bandwidth as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	onu <onuid> upstream fir <0-950000> cir <1-950000> pir <512-1000000> weight <1-20>	Configure ONU upstream bandwidth. When fir is 0, it means no fixed bandwidth. Fir, cir and pir should satisfy this condition: FIR<=CIR<=PIR.
Step 3b	no onu <onuid> upstream	Delete ONU upstream bandwidth configuration.
Step 4	show onu <onuid> upstream	Show onu upstream bandwidth.

17.1.10 Configure ONU downstream bandwidth

You can configure downstream bandwidth for authorized ONU. Begin at privileged configuration mode, configure ONU downstream bandwidth as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	onu <onuid> downstream pir <0-1000000> weight <1-16>	Configure ONU downstream bandwidth.
Step 3b	no onu <onuid> downstream	Delete ONU downstream bandwidth configuration.
Step 4	show onu <onuid> downstream	Show onu downstream bandwidth.

17.1.11 Configure ONU MAC limit

Limite the ONU MAC address

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <1-65535> [mac-limit] <0-16383>	Set the onu mac limit
Step 4	Show onu <1-65535>[mac-limit]	Show the MAC limit count

17.1.12 Show ONU status

Can show the time of onu register, deregister and running

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	show onu status <all>	Show ONU status

17.1.13 Show ONU statistics

Begin at privileged configuration mode, show ONU statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	show onu < 1-65535> statistics	Show ONU statistics.

17.2 ONU global configuration

17.2.1 Show ONU information

All ONU information can be showed in PON interface configuration mode. Input this command **interface epon *slot/port*** to enter PON interface mode.

Command	Function
show onu < <i>onuid</i> > ctc onu_info	Display ONU basic information.
show onu < <i>onuid</i> > ctc ctc_info	Display CTC OAM version which ONU supports.
show onu < <i>onuid</i> > ctc onu_sn	Display ONU vendor ID, version and PON MAC.
show onu < <i>onuid</i> > ctc fw_ver	Display PON firmware version.
show onu < <i>onuid</i> > ctc chip_id	Display PON chipset model.
show onu < <i>onuid</i> > ctc cap_1	Display ONU main specifications; include port number, port type, upstream queue number, maximum upstream port queue number, downstream queue number, maximum downstream port queue number and backup battery.
show onu < <i>onuid</i> > ctc opm_diag	Display ONU optical transceiver main parameters and diagnosis.

show onu <onuid> ctc cap_2	Display ONU main specifications; include multi LLID, protection type, slot number, port type and number, backup battery.
show onu <onuid> ctc cap_3	Display ONU IPv6 capability and transceiver power force shutdown.
show onu <onuid> ctc fast_leave_ability	Display ONU multicast fast leave capability.
show onu <onuid> ctc fec_ability	Display ONU FEC capability.
show onu <onuid> ctc power_saving_cap	Display ONU energy-saving capability and wake up mechanism.

17.2.2 Update ONU image

Only authorized ONU can be updated by this way. Begin at privileged configuration mode, configure ONU LOID authentication mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	upgrade onu image <filename> <A.B.C.D>	Configure ONU firmware name and TFTP server.
Step 3	upgrade onu select pon <pon_num> {<onuid_list>}*8	Select ONU. ONU ID format is 1-2.
Step 4	upgrade onu start	Download ONU firmware and save in memory, and then update ONU.

Notice:

1. DO NOT turn power off when updating. After finishing update, OLT will inform ONU if updated successfully and reset ONU with the new firmware.
2. After ONU updated and restarted, OLT will send commit command to confirm the new version.
3. Please delete the firmware and upgrade settings by command **upgrade onu stop**.
4. Display ONU upgrade progress by command **show upgrade onu status**.
5. Display ONU upgrade settings by command **show upgrade onu info**.
6. Stop upgrading ONU by command **upgrade onu stop**.

17.2.3 Auto upgrade ONU

Add the ONU upgrade list, system will check the match ONU, upgrade the match ONU automatic. Only can create one list in the same time.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	auto-upgrade <force> <onu> vendor <string> model <string> swversion <string> image <filename> <A.B.C.D>	Configure ONU firmware vendor id, model id, swversion, file name and TFTP server.

Notice:

1. When the ONU come online, the OLT will upgade the ONU automatically.
2. DO NOT turn power off when updating. After finishing update, OLT will inform ONU if updated successfully and reset ONU with the new firmware.
3. Display ONU upgrade progress by command **show upgrade onu status**.
5. Display ONU upgrade settings by command **show auto-upgrade info**.
6. Delete the auto upgrade list: **no auto-upgrade onu vendor**< string >**model**< string >

17.2.4 Configure ONU management IP

Begin at privileged configuration mode, configure ONU management IP as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc mgmt ip <A.B.C.D> mask <A.B.C.D> [gw <A.B.C.D>]*1 [cvlan <1-4095>]*1 [svlan <1-4095>]*1 [pri <0-7>]*1	Configure ONU management IP.
Step 4	show onu <onuid> ctc mgmt	Show ONU management IP.

17.2.5 Configure ONU SNMP

Begin at privileged configuration mode, configure ONU SNMP parameters as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc mdu_snmp v2 host <A.B.C.D> trap-port <1-65535> snmp-port <1-65535> name <string> [com_rd <string>]*1 [com_wr <string>]*1	Configure MDU SNMP parameters.
Step 4	show onu <onuid> ctc mdu_snmp	Show MDU SNMP configurations.

17.2.6 Confiure ONU multi LLID

Begin at privileged configuration mode, configure ONU multi LLID as the following table shows.

Command	Function
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Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc multi_llid <0-8>	Configure number of ONU LLID. 0: return to S-LLID mode. 1~8: number of LLID.

17.2.7 Configure ONU primary PON interface

Begin at privileged configuration mode, configure ONU primary PON interface as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc active_pon <0-8>	Configure ONU primary PON interface.
Step 4	show onu <onuid> ctc active_pon	Show ONU primary PON interface.

17.2.8 Configure ONU FEC function

Begin at privileged configuration mode, configure ONU FEC function as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc fec_mode {enable disable}	Enable/Disable ONU FEC function.
Step 4	show onu <onuid> ctc fec_mode	Show ONU FEC function configuration.

17.2.9 Configure optical link protection

In optical link protection system, ONU should hold register status in holdover time.

Begin at privileged configuration mode, configure optical link protection as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration

		mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc holdover <0-65535>	Configure optical link protection. value 0 means protection is disabled.
Step 4	show onu <onuid> ctc holdover	Show onu optical link protection configuration.

17.2.10 Configure ONU SLA function

Begin at privileged configuration mode, configure ONU SLA function as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc sla disable	Disable ONU SLA function.
Step 4a	onu <onuid> ctc sla enable sp_basic	Enable ONU SLA function.
Step 4b	onu <onuid> ctc sla enable {wrr sp_wrr} {queue <1-8> fix_packet_size <0-1900> fix_bandwidth <0-1024> guaranteed-bandwidth <1-1024> best_effort_bandwidth <1-1024> weight <0-100>}*8	Enable SLA function and configure weight of each queue.
Step 5	show onu <onuid> ctc sla	Show ONU SLA configurations.

17.2.11 Configure ONU multicast mode

Begin at privileged configuration mode, configure ONU multicast mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc mc_switch {snooping control}	Snooping: enable IGMP/MLD Snooping protocol for multicast member management. Control: enable CTC

		controllable multicast protocol for member management.
Step 4	show onu <onuid> ctc mc_switch	Show ONU multicast mode configuration.

17.2.12 Configure ONU fast leave function

Begin at privileged configuration mode, configure ONU fast leave function as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc fast_leave {enable disable}	Enable or disable ONU fast leave function.
Step 4	show onu <onuid> ctc fast_leave	Show onu fast leave configuration.

17.2.13 Restart ONU

Begin at privileged configuration mode, restart ONU as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc reset	Restart ONU.

17.2.14 Configure ONU power saving mode

Begin at privileged configuration mode, configure ONU power saving mode as the following table shows.

	Command	Function
Step 1	configure terminal	Enter gloable configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <1-65535> ctc power_saving_cfg early_wakeup [enable disable] sleep_duration_max <0-65535>	Enable: enable early wake up mechanism. Disable: disable early wake up mechanism. <0-65535>: maximum refresh time of power saving

		mechanism, unit is TQ.
Step 4	show onu <onuid> ctc power_saving_cfg	Show ONU power saving configurations.

17.2.15 Configure ONU sleep duration and wake up duration

Begin at privileged configuration mode, configure ONU sleep duration and wake up duration as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc sleep_ctrl sleep_duration <0-65535> wake_duration <0-65535> sleep_flag [off on change] sleep_mode [none tx_sleep_only tx_and_rx_sleep]	sleep_flag: Off means ONU out of power saving status. On means ONU is in power saving status. Change means change ONU power saving mode, sleep duration and wake up duration. sleep_mode: tx_sleep_only means transmitter's sleep mode. tx_and_rx_sleep means transmitter and receiver's sleep mode.
Step 4	show onu <onuid> ctc sleep_ctrl	Show ONU power saving mode, sleep duration and wake up duration.

17.2.16 Configure ONU optical link protection mechanism

Begin at privileged configuration mode, configure ONU optical link protection mechanism as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc pon_protect los_optical <0-65535> los_mpcp <0-65535>	los_optical: Confirmation time of invalid optical link by checking optical signal. Default value is 2 ms. los_mpcp: Confirmation time of

		invalid optical link by checking MPCP messages. Default value is 55 ms.
Step 4	show onu <onuid> ctc pon_protect	Show optical link protection mechanism configurations.

17.2.17 Configure ONU PON power supply control

Begin at privileged configuration mode, configure ONU PON power supply control as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc laser action <0-65535> pon_mac <xx:xx:xx:xx:xx:xx> transmitter [major standby both]	Action: value 0 means turn on transmitter power again. Value 1-65534 means power supply turn-off time. Value 65535 means turn off power supply forever. Major:operation to current major optical module. Standby:operation to current standby optical module. Both:operation to major and standby optical module.

17.2.18 Configure ONU MAC aging time

Begin at privileged configuration mode, configure ONU MAC aging time as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc agetime <0-65535>	Configure ONU MAC aging time. Value 0 means disable MAC aging. Value <1-65535> means MAC aging time. Unit: second.

17.2.19 Configure ONU PON port performance statistics

Configure ONU PON port performance statistics and period. Begin at privileged configuration mode, configure ONU PON port performance statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc pon monitor_status {enable disable} <0-65535>	Configure ONU PON port performance statistics and period. Period unit is second.
Step 4	show onu <onuid> ctc pon monitor_status	Show ONU PON port performance statistics configurations.

17.2.20 Clear/show ONU PON port statistics

Begin at privileged configuration mode, clear or show ONU PON port performance statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc pon monitor_current	Clear ONU PON port statistic.0
Step 4a	show onu <onuid> ctc pon monitor_current	Show ONU PON port current statistics.
Step 4b	show onu <onuid> ctc pon monitor_histor0y	Show ONU PON port previous period statistics.

17.3 ONU port configuration

17.3.1 Show onu port information

All ONU port information can be showed in PON interface configuration mode. Input this command **interface epon *slot/port*** to enter PON interface mode.

The information contains port type, link status, port administration status, flow control, speed, duplex and storm control. There may be some differences between different ONU.

show onu <onuid> ctc eth <port-num> port_info	Show ONU port information.
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show onu <onuid> ctc eth <port-num> linkstate	Show ONU port link status.
show onu <onuid> ctc eth <port-num> phy_info	Show ONU port administration information.
show onu <onuid> ctc eth <port-num> autoneg_local_cap	Show ONU port AutoNeg Advertised Technology Ability.
show onu <onuid> ctc eth <port-num> autoneg_adv_cap	Show ONU port AutoNeg Local Technology Ability.

17.3.2 Enable/Disable ONU port

Begin at privileged configuration mode, enable or disable ONU port as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc eth <port-num> phy_ctrl [enable disable]	Enable or disable ONU port.
Step 4	show onu <onuid> ctc eth <port-num> phy_state	Show ONU port administration state.

17.3.3 Configure ONU port autonegotiation

Begin at privileged configuration mode, configure ONU port autonegotiation as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc eth <port-num> autoneg [enable disable]	Enable or disable ONU port autonegotiation.
Step 4	show onu <onuid> ctc eth <port-num> autoneg	Show ONU port autonegotiation state.

17.3.4 Configure ONU port re-autonegotiation

Begin at privileged configuration mode, configure ONU port re-autonegotiation as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> autonegrestart	Force ONU port restart negotiation.

17.3.5 Configure ONU port upstream policy

Begin at privileged configuration mode, configure ONU port upstream policy as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> policy cir <i><1-1048576></i> [cbs] <i><1-10240></i> [ebs] <i><1-10240></i>	Configure ONU port upstream policy.
Step 4	onu <i><onuid></i> ctc eth <i><port-num></i> policy default	Delete ONU port upstream policy.
Step 5	show onu <i><onuid></i> ctc eth <i><port-num></i> policy	Show ONU port upstream policy configuration.

17.3.6 Configure ONU port downstream rate limit

Begin at privileged configuration mode, configure ONU port downstream rate limit as the following table shows.

	command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> rate_limit cir <i><1-1048576></i> [pir] <i><1-1048576></i>	Configure ONU port downstream rate limit.
Step 4	onu <i><onuid></i> ctc eth <i><port-num></i> rate_limit default	Delete ONU port downstream rate limit.
Step 5	show onu <i><onuid></i> ctc eth <i><port-num></i> rate_limit	Show ONU port downstream policy configuration.

17.3.7 Configure ONU port flow control

Begin at privileged configuration mode, configure ONU port flow control as the following table shows.

Command	Function
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Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> flow_control [enable disable]	Enable or disable ONU port flow control.
Step 4	show onu <i><onuid></i> ctc eth <i><port-num></i> flow_control	Show ONU port flow control configuration.

17.3.8 Configure ONU port loopback detection

Begin at privileged configuration mode, configure ONU port loopback detection as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> loopdetect [enable disable]	Enable or disable ONU port loopback detection.
Step 4	show onu <i><onuid></i> ctc eth <i><port-num></i> loopdetect	Show ONU port loopback detection configuration.

17.3.9 Configure ONU loop port auto-shutdown

When enabled this function, the port will shutdown if there is a loopback.

Begin at privileged configuration mode, configure ONU loop port auto-shutdown as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> loop [enable disable]	Enable: when it detects a loopback, the port will shutdown. Disable: when it detects a loopback, the port will not shutdown.

17.3.10 Configure ONU port VLAN mode.

There are five VLAN modes, transparent, tag, translation, trunk and aggregation.

Begin at privileged configuration mode, configure ONU port VLAN mode as the following table shows.

	Command	function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc eth <port-num> vlan mode [transparent tag translation aggregation trunk]	Configure port VLAN mode.

17.3.11 Configure ONU port PVID

Only tag mode, translation mode, trunk mode and aggregation mode need to configure PVID.

Begin at privileged configuration mode, configure ONU port PVID as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc eth <port-num> vlan pvid <pvid> pri <pri>	Pvid range: 1-4095 Pri range: 0-7.

17.3.12 Configure ONU port VLAN translation entries

Begin at privileged configuration mode, configure ONU port VLAN translation entries as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc eth <port-num> vlan translation [set add del] {<old-vid> to <new-vid>}*8	Configure VLAN translation entries. old-vid: also called CVLAN. new-vid: also called SVLAN.

17.3.13 Configure ONU port VLAN trunk entries

Begin at privileged configuration mode, configure ONU port VLAN trunk entries as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration

		mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> vlan trunk [set add del] {<i><vid></i>}*8	Configure VLAN trunk entries.

17.3.14 Configure ONU port VLAN aggregation entries

Begin at privileged configuration mode, configure ONU port VLAN aggregation entries as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <i><onuid></i> ctc eth <i><port-num></i> vlan aggregation <i>dst_vlan <new-vid></i> <i>agg_vlan {<old-vid>}</i>*8	Configure VLAN aggregation entries. old-vid: also called CVLAN. new-vid: also called SVLAN.

17.3.15 Show ONU port VLAN configurations

Begin at privileged configuration mode, show ONU port VLAN configurations as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	show onu <i><onuid></i> ctc eth <i><port-num></i> vlan	Show ONU port VLAN configurations.

17.3.16 Configure ONU port QoS function

QoS function includes data stream classification and mark. Customers can mark different streams by priority according to different rules.

This OLT supports these matchable conditions: VLAN ID, Ethernet type, priority, IP type, ToS, IP Precedence, layer 4 port, IP address, MAC address, and so on.

Begin at privileged configuration mode, configure ONU port QoS function as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface

		configuration mode.
Step 3 a	onu <onuid> ctc eth <port-num> class add precedence <1-8> priority <0-7> [dst-mac {equal unequal} <XX:XX:XX:XX:XX:XX>]*1 [src-mac {equal unequal} <XX:XX:XX:XX:XX:XX>]*1 [vlan {equal unequal} <1-4094>]*1 [cos {equal unequal} <0-7>]*1 [ether-type {equal unequal} <XXXX>]*1 [src-ip {equal unequal} <A.B.C.D>]*1 [dest-ip {equal unequal} <A.B.C.D>]*1 [protocol {equal unequal} <0-255>]*1 [tos-dscp {equal unequal} <0-255>]*1 [src-port {equal unequal} <0-65535>]*1 [dest-port {equal unequal} <0-65535>]*1	Configure port classification and mark rule.
Step 3 b	onu <onuid> ctc eth <port-num> class del precedence <1-8>	Delete port classification and mark configurations.
Step 3 c	onu <onuid> ctc eth <port-num> class clean	Clear all port classification and mark configurations.
Step 4	show onu <onuid> ctc eth <port-num> class	Show port classification and mark configurations.

17.3.17 Configure ONU port multicast VLAN

Begin at privileged configuration mode, configure ONU port multicast VLAN as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3a	onu <onuid> ctc eth <port-num> mc_vlan {add del} {<1-4095>}*8	Add or delete port multicast VLAN.
Step 3b	onu <onuid> ctc eth <port-num> mc_vlan clean	Clear port multicast VLAN.
Step 4	show onu <onuid> ctc eth <port-num> mc_vlan	Show port multicast VLAN configurations.

17.3.18 Configure ONU port maximum multicast groups

Begin at privileged configuration mode, configure ONU port maximum multicast groups as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc eth <port-num> mc_maxgrp <0-4096>	Configure ONU maximum multicast gourps.
Step 4	show onu <onuid> ctc eth <port-num> mc_maxgrp	Show ONU maximum multicast gourps.

17.3.19 Configure ONU port multicast VLAN strip

Begin at privileged configuration mode, configure ONU port multicast VLAN strip as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	onu <onuid> ctc eth <port-num> mc_tagstrip {enable disable}	Enable: strip VLAN tag of multicast streams and query message. Disable: don't strip VLAN tag of multicast streams and query message.
Step 3b	onu <onuid> ctc eth <port-num> mc_tagstrip iptv set {<1-4095> to <1-4095>}*8	Modify multicast customer VLAN and query message VLAN to IPTV VLAN.
Step 4	show onu <onuid> ctc eth <port-num> mc_tagstrip	Show ONU port multicast VLAN strip configurations.

17.3.20 Configure ONU port statistics

Begin at privileged configuration mode, configure ONU port data packets performance statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3	onu <1-65535> ctc eth <port-num> monitor_status [enable disable] <0-65535>	Configure performance statistics. Value <0-65535> is statistics

		period. Unit is second.
Step 4	show onu <onuid> ctc eth <port-num> monitor_status	Show ONU port performance statistics state and period.

17.3.21 Clear/Show ONU port statistics

Begin at privileged configuration mode, clear or show ONU port statistics as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <1-65535> ctc eth <port-num> monitor_current	Clear ONU port statistics.
Step 4	show onu <onuid> ctc eth <port-num> monitor_current	Show ONU port current period statistics.
Step 5	show onu <onuid> ctc eth <port-num> monitor_history	Show ONU port previous period statistics.

17.4 ONU remote voice configuration

17.4.1 Show basic information

All the onu voice information query are in this node: **interface epon slot/port**

Show the current voice module support voice protocol and number of the POTS, etc.

show onu <onuid> ctc iad_info	Show the current voice module support voice protocol and ,number of the POTS
show onu <onuid> ctc iad_status	Show running state of IAD in H. 248 protocol
show onu <onuid> ctc pots <1-255> pots_status	Show the state of POTS

17.4.2 Configure global parameters

These commands are used to configure network of VoIP voice. This is must configure parameters.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3a	onu <onuid> ctc voip_global_param	Configure voice IP address

	ip_mode static ipaddr <A.B.C.D> netmask <A.B.C.D> gateway <A.B.C.D>	mode is static
Step 3b	onu <onuid> ctc voip_global_param ip_mode dhcp	Configure voice IP address mode is DHCP
Step 3c	onu <onuid> ctc voip_global_param ip_mode pppoe mode {auto chap pap} username <string> password <string>	Configure voice IP address mode is PPPOE
Step 4	onu <onuid> ctc voip_global_param vlan_mode {transparent tag vlan_stacking} cvlan <0-4095> svlan <0-4095> priority <0-7>	Configure voice VLAN mode , if only cvlan ,set the svlan is 0
Step 5	show onu <onuid> ctc voip_global_param	Show onu VoIP global parameters

17.4.3 Enable/disable POTS port

These commands are used to enable or disable POTS port.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3	onu <onuid> ctc pots <1-255> port_manage {enable disable}	Enable or disable POTS port.
Step 4	show onu <onuid> ctc pots <1-255> port_manage	Show POTS port administration status.

17.4.4 Configure H.248 protocol

These commands are used to configure parameters of H.248 protocol. This is must configure parameters

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3a	onu <onuid> ctc h248_param_config reg_mode ip_addr	Configure H. 248 registration mode is IP.
Step 3b	onu <onuid> ctc h248_param_config reg_mode {realm_name device_name} mid	Configure H. 248 registration mode is realm.

	<i><string></i>	
Step 4	onu <onuid> ctc h248_param_config heartbeat mode {disable h248} cycle <1-65535> count <1-65535>	Configure onu heartbeat parameters.
Step 5	onu <onuid> ctc h248_param_config mg_port <1-65535> mgc_ip <A.B.C.D> mgc_port <1-65535> [bak_mgc_ip <A.B.C.D> bak_mgc_port <1-65535>]*1	Configure MGC and back up MGC informations.
Step 6	show onu <onuid> ctc h248_param_config	Show onu VoIP parameters of H.248

17.4.5 Configure POTS UserTID information(H.248)

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> ctc pots <1-255> h248_user_tid <name>	Configure POTS UserTID information
Step 4	show onu <onuid> ctc pots <1-255> h248_user_tid	Show POTS UserTID information

17.4.6 Configure RTP TID information(H.248)

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> ctc h248_rtp_tid number <0-255> prefix <string> digit_begin <0-4294967295> <0-4294967295> mode {align unaligned} digit_length <0-255>	Configure RTP TID parameters
Step 4	show onu <onuid> ctc h248_rtp_tid	RTP TID parameters

17.4.7 Configure SIP protocol

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface

		configuration mode.
Step 3	onu <onuid> ctc sip_param_config heartbeat switch {enable disable} cycle <1-65535> count <1-65535> {reg_interval <0-65535>}*1	Configure onu heartbeat parameters
Step 4	onu <onuid> ctc sip_param_config mg_port <1-65535> out_bound_serv ip <A.B.C.D> port <1-65535>	Configure MG port and outbound server IP address and port
Step 5	onu <onuid> ctc sip_param_config proxy_serv ip <A.B.C.D> port <1-65535> [bak_ip <A.B.C.D> bak_port <1-65535>]*1	Configure proxy server or back up proxy server IP address and port,
Step 6	onu <onuid> ctc sip_param_config reg_serv ip <A.B.C.D> port <1-65535> [bak_ip <A.B.C.D> bak_port <1-65535>]*1	Configure MG port and outbound server IP address and port
Step 7	show onu <onuid> ctc sip_param_config	Show ONU sip parameters

17.4.8 Configure SIP account parameters of POTS

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> ctc pots <1-255> sip_user_config account <account> name <name> pwd <password>	Configure SIP user information of POTS port
Step 4	show onu <onuid> ctc pots <1-255> sip_user_config	Show SIP user information

17.4.9 Configure fax mode

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> ctc fax_modem_config voice_t38 {enable disable} control {negotiation auto_vbd}	Configure fax mode and the way of negotiation

Step 4	show onu <onuid> ctc fax_modem_config	Show fax service parameter information
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17.4.10 VoIP module operation

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> ctc iad_oper {reregister deregister reset}	Reregister: onu re-registration Deregister: onu logout Reset: reset VoIP module

17.4.11 Configure SIP digitmap

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> ctc sip_digit_map num <0-255> <0-255> <mapstr>	Configure SIP digitmap

17.5 ONU remote alarm information

All onu alarm used this template configuration,

17.5.1 Show onu alarm information

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	show onu <onuid> ctc alarm_cfg onu {equipment_alarm power_alarm battery_missing battery_failure battery_volt_low physical_intrusion onu_self_test_failure onu_temp_high_alarm onu_temp_low_alarm iad_connection_failure pon_if_switch sleep_status_update}	Show ONU alarm status.

Step 4	show onu <onuid> ctc alarm_thr onu {battery_volt_low onu_temp_high_alarm onu_temp_low_alarm}	Show ONU alarm threshold.
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17.5.2 Show onu pon alarm information

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	show onu <onuid> ctc {alarm_cfg alarm_thr} pon {rx_power_high_alarm rx_power_low_alarm tx_power_high_alarm tx_power_low_alarm tx_bias_high_alarm tx_bias_low_alarm vcc_high_alarm vcc_low_alarm temp_high_alarm temp_low_alarm rx_power_high_warning rx_power_low_warning tx_power_high_warning tx_power_low_warning tx_bias_high_warning tx_bias_low_warning vcc_high_warning vcc_low_warning temp_high_warning temp_low_warning}	Show pon optical power, temperature, voltage, current alarm status and threshold alarm_cfg:onu alarm status alarm_thr:onu alarm threshold
Step 4	show onu <onuid> ctc {alarm_cfg alarm_thr} pon {downstream_drop_events_alarm upstream_drop_events_alarm downstream_crcerror_frames_alarm upstream_crcerror_frames_alarm downstream_undersize_frames_alarm upstream_undersize_frames_alarm downstream_oversize_frames_alarm upstream_oversize_frames_alarm downstream_fragments_alarm upstream_fragments_alarm downstream_jabbers_alarm upstream_jabbers_alarm downstream_discards_alarm upstream_discards_alarm}	Show the pon port statistical alarm status and threshold alarm_cfg:onu alarm status alarm_thr:onu alarm threshold

<pre> downstream_errors_alarm upstream_errors_alarm downstream_drop_events_warning upstream_drop_events_warning downstream_crcerror_frames_warning upstream_crcerror_frames_warning downstream_undersize_frames_warning upstream_undersize_frames_warning downstream_oversize_frames_warning upstream_oversize_frames_warning downstream_fragments_warning upstream_fragments_warning downstream_jabbers_warning upstream_jabbers_warning downstream_discards_warning upstream_discards_warning downstream_errors_warning upstream_errors_warning} </pre>	
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17.5.3 Show onu port alarm information

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	show onu <onuid> ctc alarm_cfg eth <1-255> {eth_port_auto_neg_failure eth_port_los eth_port_failure eth_port_loopback eth_port_congestion}	Query port alarm status alarm_cfg:onu alarm status
Step 4	show onu <onuid> ctc {alarm_cfg alarm_thr} eth <1-255> {downstream_drop_events_alarm upstream_drop_events_alarm downstream_crcerror_frames_alarm upstream_crcerror_frames_alarm downstream_undersize_frames_alarm upstream_undersize_frames_alarm downstream_oversize_frames_alarm 	Show the LAN port statistical alarm status and threshold alarm_cfg:onu alarm status alarm_thr:onu alarm threshold

<pre> upstream_oversize_frames_alarm downstream_fragments_alarm upstre am_fragments_alarm downstream_jabbers_alarm upstream _jabbers_alarm downstream_discards_alarm upstrea m_discards_alarm downstream_errors_alarm upstream_ errors_alarm status_change_times_alarm downstream_drop_events_warning upstream_drop_events_warning downstream_crcerror_frames_warnin g upstream_crcerror_frames_warning downstream_undersize_frames_warni ng upstream_undersize_frames_warni ng downstream_oversize_frames_warnin g upstream_oversize_frames_warning downstream_fragments_warning upstream_fragments_warning downstream_jabbers_warning upstream_jabbers_warning downstream_discards_warning upstream_discards_warning downstream_errors_warning upstream_errors_warning status_change_times_warning} </pre>	
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17.5.4 Show onu pots alarm information

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	show onu <1-65535> ctc alarm_cfg pots <1-64> pots_port_failure	Show pots alarm status

17.5.5 Show onu E1 alarm information

Command	Function
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Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	show onu <onuid> ctc alarm_cfg e1 <1-16> [e1_port_failure e1_timing_unlock e1_los]	Show E1 alarm status

17.6 ONU remote private oam configuration

17.6.1 Show ONU version of software|hardware

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	show onu <onuid> pri onu_ver	Show ONUversion of software hardware

17.6.2 Show ONU light and port status

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	show onu <onuid> pri onu_status	Show onu light and port status

17.6.3 Configure MAC address aging time

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri age_time <0-630>	Configure the MAC address aging time

Step 4	show onu <onuid> ctc pri age_time	Show the MAC address aging time
---------------	--	---------------------------------

17.6.4 Port max MAC addresses

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri eth <1-255> mac_limit <0-65535>	Limit the port number of MAC addresses learning
Step 4	show onu <onuid> pri eth <1-255> mac_limit	Show the port number of MAC addresses learning

17.6.5 Show port MAC address table

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	show onu <onuid> pri eth <1-255> port_mac	Show port MAC address table

17.6.6 Port isolate enable|disable

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri port_isolate [enable disable]	Configure the port isolate enable disable
Step 4	show onu <onuid> pri port_isolate	Show the status of pore isolate

17.6.7 Configure port negotiation mode

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri eth <1-255> mode_control	Configure port negotiation mode

	<i>[10hd 10fd 100hd 100fd 1000hd 1000fd 10000fd]</i>	
Step 4	show onu <onuid> pri eth <1-255> mode_control	Show the port configuration negotiation mode

17.6.8 Show the port actually negotiation mode

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 4	show onu <onuid> pri eth <1-255> mode_status	Show the port actually negotiation mode

17.6.9 Show port statistics

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	show onu <onuid> pri eth <1-255> ethernet_stat	Show the port statistics of data packet

17.6.10 Configure port storm-control

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri eth <1-255> pkg_suppress broddcast <0-1024000> multicast <0-1024000> unknown <0-1024000>	Configure port broadcast, multicast and unicast unknown storm suppression
Step 4	show onu <onuid> pri eth <1-255> pkg_suppress	Show lan port storm suppression

17.6.11 WiFi configuration

	Command	Function
Step 1	configure terminal	Enter global configuration

		mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3a	onu <i><onuid></i> pri wifi_switch disable	disable WiFi
Step 3b	onu <i><onuid></i> pri wifi_switch enable {FCC ETSI} <i><0-1></i> {80211b 80211g 80211bg 80211n 80211bgn} <i><0-20></i>	Enable WiFi ETSI:European standard FCC:American standard <i><0-1></i> : 0 means automatically choose the channel number <i><0-20 ></i> : transmission power, 0 to 20 DBM
Step 4	Show onu <i><onuid></i> pri wifi_switch	

17.6.12SSID basic configuration

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3a	onu <i><onuid></i> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} {enable disable}	Enable / disable SSID
Step 3b	onu <i><onuid></i> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} name <i><string></i> hide {enable disable} auth_mode {open shared wepauto wpapsk wpa wpa2psk wpa2 wpa/wpa2 wpapsk/wpa2psk wpa2psk wai} encrypt_type {none wep tkip aes tkipaes wpi}	Name string: ssid string hide [enable disable],enable:hide,disable: Don't hide auth_mode:WLAN authentication mode encrypt_type:WLAN encryption type
Step 3c	onu <i><onuid></i> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} wpa shared_key <i><string></i> rekey_interval <i><0-4194303></i>	Shared_key: WPA Shared key, when authentication mode for WPAPSK or WPA2PSK, this configuration is effective. Rekey_interval: WPA key update interval
Step 3d	onu <i><onuid></i> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} radius serverip type {ipv4 ipv6 ipv4z ipv6z dns} len <i><1-255></i> ip <i><string></i> prefixlen <i><0-255></i>	Type: Type of the RADIUS server IP address Len: the RADIUS server IP address length, authentication for WPA, connected,

	port <0-65535> key <string>	WPA/connected effectively Ip: the RADIUS server Ip address, authentication for WPA, connected, WPA/connected effectively Prefixlen: the RADIUS server address prefix length Port: the RADIUS server Port Key: the RADIUS server password
Step 3e	onu <onuid> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} wep encryptionlevel {40 104} keyindex <1-4> key1 <string> key2 <string> key3 <string> key4 <string>	Encryptionlevel: WEP key length Keyindex: key index, when encryption mode to WEP, this field is valid. key1-4:WEP keys 1-4
Step 3f	onu <onuid> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} wapi type {ipv4 ipv6} serverip <ipstring> port <1-65535>	Type:Type of wapi Serverip:wapi ip address Port:wapi port
Step 3g	onu <onuid> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3} commit	Submit all configuration
Step 4	show onu <onuid> pri {wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3}	show ssid configuration

17.6.13Configure WAN connection

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3a	onu <1-65535> pri wan_conn index <1-8> delete	Delete WAN connection
Step 3b	onu <1-65535> pri wan_conn add bridge [internet other]	Add bridge mode connection
Step 3c	onu <1-65535> pri wan_conn add route [internet multicast tr069 tr069_internet tr069_voip voip_internet tr069_voip_internet other] {nat [enable disable]}*1	Add route mode connection
Step 3d	onu <1-65535> pri wan_conn index <1-8> bridge [internet other]	Configure bridge mode connection

Step 3e	onu <1-65535> pri wan_conn index <1-8> route <i>[internet multicast tr069 tr069_internet tr069_voip voip_internet tr069_voip_internet other] {nat [enable disable]}*1</i>	Configure route mode connection
Step 3f	onu <1-65535> pri wan_conn index <1-8> dhcp	Configure WAN connection way to obtain the address is DHCP mode
Step 3g	onu <1-65535> pri wan_conn index <1-8> static ip <A.B.C.D> mask <A.B.C.D> gw <A.B.C.D> dns master <A.B.C.D> slave <A.B.C.D>	Configure WAN connection way to obtain the address is static mode
Step 3h	onu <1-65535> pri wan_conn index <1-8> pppoe proxy [enable disable] user <name> pwd <password> server <name> mode [auto payload]	Configure WAN connection way to obtain the address is PPPoE mode
Step 3i	onu <1-65535> pri wan_conn index <1-8> vlan [tag transparent] <1-4085> {<0-7>}*1	Configure vlan mode
Step 3j	onu <1-65535> pri wan_conn index <1-8> tranlation vlan <1-4085> {<0-7>}*1	Configure VLAN tranlation
Step 3k	onu <1-65535> pri wan_conn index <1-8> qinq tpid <1-65534> vlan <1-4085> {[cos] <0-7>}*1	Configure VLAN QinQ
Step 3l	onu <1-65535> pri wan_conn index <1-8> [vlan tranlation qinq] disable	Disable vlan/tranlation/ qinq function
Step 3m	onu <1-65535> pri wan_conn commit	Submit wan connection configuration
Step 4	Show onu <1-65535> pri wifi_switch	Show wan connection configuration

17.6.14 Configure IGMP enable|disable

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri igmp_admin [enable disable]	Configure IGMP enable disable
Step 4	show onu <onuid> pri igmp_admin	Show IGMP status

17.6.15 Configure CATV management

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri catv_status <i>[enable disable]</i>	Configure CATV management
Step 4	show onu <onuid> pri catv_status	Show the CATV management status

17.6.16 Configure CTC OAM ignore

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri ctcoam_skip <i>[enable disable]</i>	Configure CTC OAM ignore
Step 4	show onu <onuid> pri ctcoam_skip	Show CTC OAM ignore status

17.6.17 Configure reset to default

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri factory_reset	Reset to default

17.6.18 Configure clean the MAC table

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri mac_clean	Configure clean the MAC table

17.6.19 Save the ONU configuration

	Command	Function
Step 1	configure terminal	Enter global configuration

		mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	onu <onuid> pri save_config	Save the ONU configuration

17.7 Show/Remove onu configuration

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 3	show onu running-config	Show the onu running configuration of this PON port

Use the “no” command to remove the corresponding configuration. But it will take effect next time the ONU registered. When ONU has bound a template and the settings you will remove exist in it, the template will take effect.

Begin at privileged configuration mode, remove ONU configurations as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon <i>slot/port</i>	Enter PON interface configuration mode.
Step 3a	no onu <onuid> {upstream downstream}	Remove ONU upstream or downstream bandwidth configuration.
Step 3b	no onu <onuid> ctc {sla holdover mgmt mdu_snmp active_pon mc_switch fast_leave fec_mode voip_global_par am h248_param_config h248_rtp_tid sip_param_config fax_modem_config sip_digit_map power_saving_cfg pon_protect agetime multi_llid sleep_ ctrl}	Remove ONU global configurations.
Step 3c	no onu <onuid> ctc eth {<1-255> all} {flow_control policy rate_limit loopde tect disableloop monitor_status monitor_current vlan class mc_vlan 	Remove ONU LAN configuration.

	mc_tagstrip mc_maxgrp phy_ctrl autoneg pvid}	
Step 3d	no onu <onuid> ctc pots {<1-255> all} {h248_user_tid sip_user_config port_manage}	Remove ONU POTS configurations.
Step 3e	no onu <onuid> pri {age_time wifi_switch wifi_ssid0 wifi_ssid1 wifi_ssid2 wifi_ssid3 wan_conn}	Remove ONU private OAM configured parameters.
Step 3f	no onu <onuid> pri eth <1-255> {pkg_suppress mac_limit}	Remove ONU private OAM configured LAN parameters.

17.8 ONU template management

17.8.1 Summary of the ONU template

Template under “config” node, the operation steps are as follows:

1. Create a template
profile [dba|srv|voip|alarm] add {<1-32767>}*1
2. Through profile_id into the corresponding template node
profile [dba|srv|voip|alarm] id <1-32767>
3. Modify the template parameters
modify ...
4. Exit template node
exit
5. Binding template to an onu equipment
Interface epon slot/port
onu <1-65535> profile [dba|srv|voip|alarm] id <0-32767>
6. Query onu equipment binding template
Interface epon slot/port
Show onu <1-65535> profile_id
7. query template configuration information
show profile [dba|srv|voip|alarm] id <1-32767>
query template binding the onu
show profile [dba|srv|voip|alarm] id <1-32767> bind

17.8.2 DBA bandwidth template configuration

The default system will have an id 0 dba template, this template parameters cannot be modified, all onu when create the default binding in the template. Each ONU must bind a dba template.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	profile dba add {<1-32767>}*1	Create a DBA template
Step 3	profile dba id <1-32767>	Enter the DBA template node
Step 4	modify fir <0-950000> cir <1-950000> pir <512-1000000> weight <1-20>	When fir value is 0, said can not fixed bandwidth; Otherwise the three parameters to satisfy the following conditions:FIR<=CIR<=PIR.
Step 5	commit	Commit the template configuration
Step 6	exit	Exit template node
Step 7	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 8	onu <onuid> profile dba id <1-32767>	Binding the dba template to set corresponding onu
Step 9	show onu <onuid> profile_id	Query the onu binding template accordingly
Step 10	exit	Exit the pon interface node
Step 11	show profile dba id <0-32767>	Show template configuration
Step 12	show profile dba id <0-32767> bind	Show onu bindings in the template
Step 13	no profile dba id <1-32767>	Delete the dba template

17.8.3 Services(SRV) template configuration

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	profile srv add {<1-32767>}*1	Create the SRV template
Step 3	profile srv id <1-32767>	Enter the SRV template node
Step 4	modify lan_count <0-255>	Configure lan port quantity of template
Step 5	commit	Commit the template configuration
Step 6	exit	Exit template node
Step 7	interface epon <i>slot/port</i>	Enter the pon interface configuration mode.
Step 8	onu <onuid> profile srv id <1-32767>	Binding the SRV template to set correspondin
Step 9	show onu <onuid> profile_id	Query the onu binding template accordingly
Step 10	exit	Exit the pon interface node
Step 11	show profile srv id <0-32767>	Show template configuration

Step 12	show profile srv id <0-32767> bind	Show onu bindings in the template
Step 13	no profile srv id <1-32767>	Delete the srv template

The SRV template has the following configuration:

1.Lan port number(s)

modify [lan_count] <0-255>

2.Multicast fast leave

modify ctc fast_leave [enable|disable]

3.FEC

modify ctc fec_mode [enable|disable]

4.Multicast mode

modify ctc [mc_switch] [snooping|control]

5.Onu llid number(s)

modify ctc [multi_llid] <0-8>

6.Pon number(s)

modify ctc [active_pon] <0-8>

7.Optical link protectio

modify ctc [holdover] <0-65535>

8.Onu management IP address

modify ctc [mgmt] ip <A.B.C.D> mask <A.B.C.D> {[gw] <A.B.C.D>}*1 {[cvlan] <1-4095>}*1 {[svlan] <1-4095>}*1 {[pri] <0-7>}*1

9. Onu SNMP parameters

modify ctc [mdu_snmp] v2 host <A.B.C.D> trap-port <1-65535> snmp-port <1-65535> name <string> {[com_rd] <string>}*1 {[com_wr] <string>}*1

10.Onu SLA management

modify ctc [sla] [disable]
 modify ctc [sla] [enable] [sp_basic]
 modify ctc [sla] [enable] [wrr|sp_wrr] {queue <1-8> fix_packet_size <0-1900> fix_bandwidth <0-1024> guaranteed-bandwidth <1-1024> best_effort_bandwidth <1-1024> weight <0-100>}*8

11. Onu port flow control

modify ctc eth <1-255> [pause] [enable|disable]

12.Onu port loop detection

modify ctc eth <1-255> [loopdetect] [enable|disable]

13. Onu port multicast vlan strip

modify ctc eth <1-255> [mc_tagstrip] [enable|disable]
 modify ctc eth <1-255> [mc_tagstrip] [iptv] set {<1-4095> to <1-4095>}*4

14.Onu port phy

modify ctc eth <1-255> [phy_ctrl] [enable|disable]

15.Onu port adaptive

modify ctc eth <1-255> [autoneg] [enable|disable]

16.Onu port maximum number of multicast groups

modify ctc eth <1-255> [mc_maxgrp] <0-4096>

17. Onu port ingress ratelimit

```
modify ctc eth <1-255> [policy] cir <1-1048576> [cbs] <1-10240> [ebs] <1-10240>
modify ctc eth <1-255> [policy] default
```

18. Onu port egress ratelimit

```
modify ctc eth <1-255> [rate_limit] cir <1-1048576> [pir] <1-1048576>
modify ctc eth <1-255> [rate_limit] default
```

19. Onu port vlan mode

```
modify ctc eth <1-255> [vlan] [mode] [transparent |tag |translation |aggregation |trunk]
modify ctc eth <1-255> [vlan] [default] <1-4095> {tpid <xxxx>}*1
modify ctc eth <1-255> [vlan] [translation] [set|add|del] {<1-4095> to <1-4095>}*8
modify ctc eth <1-255> [vlan] [trunk] [set|add|del] {<1-4095>}*8
modify ctc eth <1-255> [vlan] [aggregation] dst_vlan <1-4095> agg_vlan
<1-4095>*8
```

20. Onu port multicast vlan

```
modify ctc eth <1-255> [mc_vlan] [add|del] {<1-4095>}*8
modify ctc eth <1-255> [mc_vlan] [clean]
```

21. Onu port classification&marking

```
modify ctc eth <1-255> [class] [add] precedence <1-8> priority <0-7> {[dst-mac]
[equal|unequal] <xx:xx:xx:xx:xx:xx>*1 {[src-mac] [equal|unequal]
<xx:xx:xx:xx:xx:xx>*1 {[vlan] [equal|unequal] <1-4094>}*1 {[cos] [equal|unequal]
<0-7>}*1 {[ether-type] [equal|unequal] <XXXX>}*1 {[src-ip] [equal|unequal]
<A.B.C.D>}*1 {[dest-ip] [equal|unequal] <A.B.C.D>}*1 {[protocol] [equal|unequal]
<0-255>}*1 {[tos-dscp] [equal|unequal] <0-255>}*1 {[src-port] [equal|unequal]
<0-65535>}*1 {[dest-port] [equal|unequal] <0-65535>}*1
modify ctc eth <1-255> [class] [clean]
modify ctc eth <1-255> [class] [del] precedence <1-8>
```

22. Onu wan connection(for HGU private)

```
modify pri [wan_conn] [add] [bridge] [internet|other]
modify pri [wan_conn] [add] [route][internet|multicast|tr069|tr069_internet|tr069_voip|
voip_internet|tr069_voip_internet|other] {nat [enable|disable]}*1
modify pri [wan_conn] [commit]
modify pri [wan_conn] [index] <1-8> [bridge] [internet|other]
modify pri [wan_conn] [index] <1-8> [delete]
modify pri [wan_conn] [index] <1-8> [dhcp]
modify pri [wan_conn] [index] <1-8> [pppoe] proxy [enable|disable] user <name>
pwd <password> server <name> mode [auto|payload]
modify pri [wan_conn] [index] <1-8> [qinq] [tpid] <1-65534> vlan <1-4085> {[cos]
<0-7>}*1
modify pri [wan_conn] [index] <1-8> [route] [internet|multicast|tr069|
tr069_internet|tr069_voip|voip_internet|tr069_voip_internet|other] {nat [enable|disable]}*1
modify pri [wan_conn] [index] <1-8> [static] ip <A.B.C.D> mask <A.B.C.D> gw
<A.B.C.D> dns master <A.B.C.D> slave <A.B.C.D>
modify pri [wan_conn] [index] <1-8> [translation] [vlan] <1-4085> {<0-7>}*1
modify pri [wan_conn] [index] <1-8> [vlan] [tag|transparent] <1-4085> {<0-7>}*1
```


modify pri [wan_conn] [index] <1-8> [vlan|translation|qinq] [disable]

23. Onu WiFi service(for HGU private)

modify pri [wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3] [name] <string> hide
[enable|disable] auth_mode

[open|shared|wepauto|wpapsk|wpa|wpa2psk|wpa2|wpa/wpa2|wpapsk/wpa2psk|waipsk|wai]
encrypt_type [none|wep|tkip|aes|tkipaes|wpi]

modify pri [wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3] [radius] serverip type
[ipv4|ipv6|ipv4z|ipv6z|dns] len [1-255] ip <string> prefixlen <0-255> port <0-65535> key
<string>

modify pri [wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3] [wapi] type [ipv4|ipv6]
serverip <ipstring> port [1-65535]

modify pri [wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3] [wep] encryptionlevel
[40|104] keyindex <1-4> key1 <string> key2 <string> key3 <string> key4 <string>

modify pri [wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3] [wpa] shared_key <string>
rekey_interval <0-4194303>

modify pri [wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3] [commit|enable|disable]

modify pri [wifi_switch] [disable]

modify pri [wifi_switch] [enable] [FCC|ETSI] <0-1>
[80211b|80211g|80211bg|80211n|80211bgn] <0-20>

24. Onu mac address aging time(private)

modify pri [age_time] <0-630>

25. Onu port max mac addresses (private)

modify pri eth <1-255> [mac_limit] <0-65535>

26. Onu port storm-control(private)

modify pri eth <1-255> [pkg_suppress] broadcast <0-1024000> multicast <0-1024000>
unknown <0-1024000>

27. Onu mac address aging time

modify ctc [agetime] <0-65535>

28. Onu optical link protection mechanism

modify ctc [pon_protect] los_optical <0-65535> los_mpcp <0-65535>

29. Onu energy saving mode

modify ctc [power_saving_cfg] early_wakeup [enable|disable] sleep_duration_max
<0-65535>

modify ctc [sleep_ctrl] sleep_duration <0-65535> wake_duration <0-65535> sleep_flag
[off|on|change] sleep_mode [none|tx_sleep_only|tx_and_rx_sleep]

30. Onu port loop

modify ctc eth <1-255> disableloop [enable|disable]

31. Onu port statistics

modify ctc eth [<1-255>] [monitor_status] [enable|disable] <0-65535>

32. Onu port statistics clear

modify ctc eth [<1-255>] [monitor_current]

33. Remove configuration

no ctc [lan_count|fast_leave|fec_mode|sla|holdover|mgmt|mdu_snmp|active_pon|
mc_switch|power_saving_cfg | pon_protect|agetime|multi_llid|sleep_ctrl]

```

no ctc eth<1-255>[pause|loopdetect|disableloop|monitor_status|monitor_current|
mc_tagstrip |phy_ctrl|autoneg|policy|rate_limit|vlan|class|mc_vlan|mc_maxgrp]
no pri [age_time|wifi_switch|wifi_ssid0|wifi_ssid1|wifi_ssid2|wifi_ssid3|wan_conn]
no pri eth <1-255> [pkg_suppress|mac_limit]

```

VoIP template configuration

By default, there is an empty template, ID is 0, which you can't modify anything. When ONU is bound this empty template, all the parameters should be configured by specific command.

When ONU is configured by template and independent command at the same time, the independent command configured settings are effective.

	Command	Function
Step 1	configure terminal	Enter global configuration mode..
Step 2	profile voip add {<1-32767>}*1	Create the VoIP template
Step 3	profile voip id <1-32767>	Enter the VoIP template node
Step 4	modify pots_count <0-255>	Configure lan port quantity of template
Step 5	commit	Commit the template configuration
Step 6	exit	Exit template node
Step 7	interface epon slot/port	Enter the pon interface configuration mode.
Step 8	onu <onuid> profile voip id <1-32767>	Binding the VoIP template to set correspondin
Step 9	show onu <onuid> profile_id	Query the onu binding template accordingly
Step 10	exit	Exit the pon interface node
Step 11	show profile voip id <0-32767>	Show template configuration
Step 12	show profile voip id <0-32767> bind	Show onu bindings in the template
Step 13	no profile voip id <1-32767>	Delete the VoIP template

VOIP template has the following configuration:

1.Onu pots port number(s)

```
modify [pots_count] <0-255>
```

2.Onu voice global parameters

```
modify ctc [voip_global_param] [ip_mode] [static] ipaddr <A.B.C.D> netmask
<A.B.C.D> gateway <A.B.C.D>
```

```
modify ctc [voip_global_param] [ip_mode] [dhcp]
```

```
modify ctc [voip_global_param] [ip_mode] [pppoe] mode [auto|chap|pap] username
<string> password <string>
```

```
modify ctc [voip_global_param] [vlan_mode] [transparent|tag|vlan_stacking] cvlan
<0-4095> svlan <0-4095> priority <0-7>
```

3.Onu H. 248 protocol parameters

```

modify ctc [h248_param_config] [mg_port] <1-65535> mgc_ip <A.B.C.D> mgc_port
<1-65535> {bak_mgc_ip <A.B.C.D> bak_mgc_port <1-65535>}*1
modify ctc [h248_param_config] [heartbeat] mode [disable|h248] cycle <1-65535>
count <1-65535>
modify ctc [h248_param_config] [reg_mode] [ip_addr]
modify ctc [h248_param_config] [reg_mode] [realm_name|device_name] mid
<string>

```

4.Onu H. 248 RTP TID parameters

```

modify ctc [h248_rtp_tid] number <0-255> prefix <string> digit_begin
<0-4294967295> <0-4294967295> mode [align|unalign] digit_length <0-255>

```

5.Onu SIP parameters

```

modify ctc [sip_param_config] [mg_port] <1-65535> out_bound_serv ip <A.B.C.D>
port <1-65535>
modify ctc [sip_param_config] [proxy_serv] ip <A.B.C.D> port <1-65535> {bak_ip
<A.B.C.D> bak_port <1-65535>}*1
modify ctc [sip_param_config] [reg_serv] ip <A.B.C.D> port <1-65535> {bak_ip
<A.B.C.D> bak_port <1-65535>}*1
modify ctc [sip_param_config] [heartbeat] switch [enable|disable] cycle <1-65535>
count <1-65535> {reg_interval <0-65535>}*1

```

6.Onu FAX parameters

```

modify ctc [fax_modem_config] voice_t38 [enable|disable] control
[negotiation|auto_vbd]

```

7.Onu SIP digitmap

```

modify ctc [sip_digit_map] num <0-255> <0-255> <mapstr>

```

8.Onu POTS port userTID information

```

modify ctc pots <1-255> [h248_user_tid] <name>

```

9.Onu POTS port user account information

```

modify ctc pots <1-255> [sip_user_config] account <account> name <name> pwd
<password>

```

10.Remove configuration instructions

```

no ctc [voip_global_param|h248_param_config|h248_rtp_tid|sip_param_config]
fax_modem_config|sip_digit_map]
no ctc pots <1-255> [h248_user_tid|sip_user_config]

```

17.8.4 Alarm threshold template configuration

Alarm threshold only can be configured by template. Begin at privileged configuration mode, configure alarm threshold template as the following table shows.

	command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	profile alarm add {<1-32767>}*1	Create the alarm template

Step 3	profile alarm id <1-32767>	Enter the alarm template node
Step 4	modify ...	Configure alarm threshold template.
Step 5	commit	Commit the template configuration
Step 6	exit	Exit template node
Step 7	interface epon slot/port	Enter the pon interface configuration mode.
Step 8	onu <onuid> profile alarm id <1-32767>	Binding the alarm template to set corresponding.
Step 9	show onu <onuid> profile_id	Query the onu binding template accordingly
Step 10	exit	Exit the pon interface node
Step 11	show profile alarm id <0-32767>	Show template configuration
Step 12	show profile alarm id <0-32767> bind	Show onu bindings in the template
Step 13	no profile alarm id <1-32767>	Delete the alarm template

Alarm template has the following configuration:

1. Disable onu alarm

```
modify ctc [onu] [equipment_alarm |power_alarm |battery_missing |battery_failure
|battery_volt_low |physical_intrusion |onu_self_test_failure |onu_temp_high_alarm
|onu_temp_low_alarm |iad_connection_failure |pon_if_switch| sleep_status_update]
[disable]
```

2. Enable onu alarm

```
modify ctc [onu] [equipment_alarm |power_alarm |battery_missing |battery_failure
|physical_intrusion |onu_self_test_failure |iad_connection_failure |pon_if_switch] [enable]
```

3. Enable & Clear onu temperature alarm

```
modify ctc [onu] [onu_temp_high_alarm|onu_temp_low_alarm] [enable] <alarm> <clear>
```

4. Enable onu voltage alarm

```
modify ctc [onu] [battery_volt_low] [enable] <0-65535> <0-65535>
```

5. Disable pon alarm

```
modify ctc [pon] [rx_power_high_alarm |rx_power_low_alarm |tx_power_high_alarm
|tx_power_low_alarm |tx_bias_high_alarm |tx_bias_low_alarm |vcc_high_alarm
|vcc_low_alarm |temp_high_alarm |temp_low_alarm |rx_power_high_warning
|rx_power_low_warning |tx_power_high_warning |tx_power_low_warning
|tx_bias_high_warning |tx_bias_low_warning |vcc_high_warning |vcc_low_warning
|temp_high_warning |temp_low_warning] [disable]
```

6. Enable pon voltage alarm

```
modify ctc [pon] [vcc_high_alarm |vcc_low_alarm |vcc_high_warning |vcc_low_warning]
[enable] <0-65535> <0-65535>
```

7. Enable pon current alarm

```
modify ctc [pon] [tx_bias_high_alarm |tx_bias_low_alarm |tx_bias_high_warning
```

```
|tx_bias_low_warning] [enable] <0-65535> <0-65535>
```

8.Enable pon tx &rx power alarm

```
modify ctc [pon] [rx_power_high_alarm |rx_power_low_alarm |tx_power_high_alarm  
|tx_power_low_alarm |rx_power_high_warning |rx_power_low_warning  
|tx_power_high_warning |tx_power_low_warning] [enable] <0-65535> <0-65535>
```

9.Enable pon temperature alarm

```
modify ctc [pon] [temp_high_alarm |temp_low_alarm |temp_high_warning  
|temp_low_warning] [enable] <alarm> <clear>
```

10.Enable/Disable pon statistics alarm

```
modify ctc [pon] [downstream_drop_events_alarm|upstream_drop_events_alarm|  
downstream_crcerror_frames_alarm|downstream_undersize_frames_alarm|upstream_unders  
ize_frames_alarm| downstream_oversize_frames_alarm  
|upstream_oversize_frames_alarm |downstream_fragments_alarm|  
downstream_jabbers_alarm |downstream_collisions_alarm |  
downstream_discard_frames_alarm |upstream_discard_frames_alarm |  
downstream_error_frames_alarm|  
downstream_drop_events_warning|upstream_drop_events_warning |  
downstream_crcerror_frames_warning|downstream_undersize_frames_warning  
|upstream_undersize_frames_warning | downstream_oversize_frames_warning  
|upstream_oversize_frames_warning|downstream_fragments_warning|  
downstream_jabbers_warning|downstream_collisions_warning|  
downstream_discard_frames_warning|upstream_discard_frames_warning|  
downstream_error_frames_warning] {[disable]} [enable] <0-65535>}
```

12.Enable/Disable onu port alarm

```
modify ctc [eth] <1-255> [eth_port_auto_neg_failure |eth_port_los |eth_port_failure  
|eth_port_loopback |eth_port_congestion] [enable|disable]
```

13.Enable/Disable onu port statistics alarm

```
modify ctc [eth] <1-255> [downstream_drop_events_alarm|upstream_drop_events_alarm|  
downstream_crcerror_frames_alarm|downstream_undersize_frames_alarm|upstream_unders  
ize_frames_alarm| downstream_oversize_frames_alarm |upstream_oversize_frames_alarm  
|downstream_fragments_alarm| downstream_jabbers_alarm|downstream_collisions_alarm|  
downstream_discard_frames_alarm|upstream_discard_frames_alarm|  
downstream_error_frames_alarm|status_change_times_alarm  
downstream_drop_events_warning|upstream_drop_events_warning|  
downstream_crcerror_frames_warning|downstream_undersize_frames_warning|upstream_u  
ndersize_frames_warning|downstream_oversize_frames_warning  
|upstream_oversize_frames_warning|downstream_fragments_warning|downstream_jabbers  
_warning|downstream_collisions_warning|downstream_discard_frames_warning  
|upstream_discard_frames_warning| downstream_error_frames_warning  
|status_change_times_warning] { [disable]} [enable] <0-65535>}
```

14.Enable/Disable pots alarm

```
modify ctc [pots] <1-64> [pots_port_failure] [enable|disable]
```

15.Enable/Disable el alarm

```
modify ctc [e1] <1-16> [e1_port_failure |e1_timing_unlock |e1_los] [enable|disable]
```

16.Remove configuration instructions

(1)Remove onu alarm configuration

```
no ctc [onu] [equipment_alarm|power_alarm|battery_missing  
|battery_failure|battery_volt_low|physical_intrusion|onu_self_test_failure  
|onu_temp_high_alarm|onu_temp_low_alarm|iad_connection_failure|pon_if_switch|  
sleep_status_update]
```

(2)Removal pon alarm configuration

```
no ctc [pon] [rx_power_high_alarm|rx_power_low_alarm|tx_power_high_alarm  
|tx_power_low_alarm|tx_bias_high_alarm|tx_bias_low_alarm|vcc_high_alarm  
|vcc_low_alarm|temp_high_alarm|temp_low_alarm|rx_power_high_warning  
|rx_power_low_warning|tx_power_high_warning|tx_power_low_warning  
|tx_bias_high_warning|tx_bias_low_warning|vcc_high_warning|vcc_low_warning  
|temp_high_warning|temp_low_warning]  
no ctc [pon] [downstream_drop_events_alarm|upstream_drop_events_alarm|  
downstream_crcerror_frames_alarm|downstream_undersize_frames_alarm|upstream_unders  
ize_frames_alarm|downstream_oversize_frames_alarm  
|upstream_oversize_frames_alarm|downstream_fragments_alarm|  
downstream_jabbers_alarm|downstream_collisions_alarm|  
downstream_discard_frames_alarm|upstream_discard_frames_alarm|  
downstream_error_frames_alarm|downstream_drop_events_warning  
|upstream_drop_events_warning|downstream_crcerror_frames_warning  
|downstream_undersize_frames_warning|upstream_undersize_frames_warning|  
downstream_oversize_frames_warning|upstream_oversize_frames_warning|downstream_fr  
agments_warning|downstream_jabbers_warning|downstream_collisions_warning|  
downstream_discard_frames_warning|upstream_discard_frames_warning|  
downstream_error_frames_warning]
```

(3)Remove port alarm configuration

```
no ctc [eth] <1-255> [eth_port_auto_neg_failure|eth_port_los|eth_port_failure  
|eth_port_loopback|eth_port_congestion]  
no ctc [eth] <1-255> [downstream_drop_events_alarm|upstream_drop_events_alarm|  
downstream_crcerror_frames_alarm|downstream_undersize_frames_alarm|upstream_unders  
ize_frames_alarm|downstream_oversize_frames_alarm  
|upstream_oversize_frames_alarm|downstream_fragments_alarm|  
downstream_jabbers_alarm|downstream_collisions_alarm|  
downstream_discard_frames_alarm|upstream_discard_frames_alarm|  
downstream_error_frames_alarm|status_change_times_alarm|  
downstream_drop_events_warning|upstream_drop_events_warning|  
downstream_crcerror_frames_warning|downstream_undersize_frames_warning|upstream_u  
ndersize_frames_warning|downstream_oversize_frames_warning  
|upstream_oversize_frames_warning|downstream_fragments_warning|  
downstream_jabbers_warning|downstream_collisions_warning|  
downstream_discard_frames_warning|upstream_discard_frames_warning|  
downstream_error_frames_warning|status_change_times_warning]
```

(4)Remove pots port alarm configuration

no etc [pots] <1-64> [pots_port_failure]
 (5)Remove E1 port the alarm configuration
 no etc [e1] <1-16> [e1_port_failure|e1_timing_unlock|e1_los]

17.8.4 Auto bind template in PON port

ONU register to OLT, user can set the template auto bind in the PON port.

	Command	Function
Step 1	configure terminal	Enter global configuration mode..
Step 2	interface epon slot/port	Enter the pon interface configuration mode.
	Onu <auto-bind> profile [dba srv voip alarm] id <0-32767>	Config the template auto bind to set corresponding.
Step 3a	show <onu> <auto-bind> profile_id	Show auto bind template.

17.8.5 Show/Remove ONU template configuration

	Command	Function
Step 1	configure terminal	Enter global configuration mode..
Step 2	no profile {dba srv voip alarm} id <1-32767>	Delete the template
Step 3a	show profile {dba srv voip alarm} all{id <0-65535> }	Show template configuration.
Step 3b	show profile {dba srv voip alarm} id <0-65535> bind	Show the template id binding onu

18. System Management

18.1 Configuration file management

18.1.1 Save configurations

After modified the configurations, you should save them so that these configurations can take effect next time it restarts. Use the following commands to save configurations.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	write	Save configurations.

18.1.2 Erase configurations

If you need to reset to factory default, you can use the following commands to erase all configurations. After erased, the device will reboot automatically.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	erase startup-config	Erase all configurations.

18.1.3 Show startup configurations

Use the following command to display the configurations you have saved.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show startup-config	显示已保存的配置

18.1.4 Show running configurations

Use the following commands to display running configurations. These running configurations may not be saved in flash.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show running-config	Show running configurations.

18.1.5 Upload/download configuration file

Use the following commands to upload configuration file to PC and download configuration file to device.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	debug mode	Enter debug node
Step 3a	upload tftp configuration <i><filename></i> <i><A.B.C.D></i>	filename is Upgrade file A.B.C.D is TFTP server IP
Step 3b	download tftp configuration <i><filename></i> <i><A.B.C.D></i>	filename is Upgrade file A.B.C.D is TFTP server IP

18.2 Check the system information

18.2.1 Check system running information

Use the following commands to view system information.

Command	Function
show sys arp	Show ARP table
show sys cpu	Show CPU information
show sys cpu-usage	Show CPU usage rate
show sys mem	Show system memory
show sys ps	Show system process
show top	Show CPU utilization
show task	Showthread name

18.2.2 Check version information

Use the following commands to check version information which includes hardware version, software version, software created time and so on.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show version	Show version information.

18.2.3 Check system running time

Use the following command to show system running time after turned power on.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	show sys running-time	Show system running time.

18.3 System basic configurations

18.3.1 Configure system name

Use the following command to modify system name. This modification will take effect immediately. You will see it in command prompt prefix.

Begin at privileged configuration mode, configure system name as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	hostname <name>	Configure system name. It must start with alphabet.
Step 3	hostname default	恢复默认系统名

18.3.2 Configure terminal display attribute

This command is used to configure display line number when access by console port or telnet.

Begin at privileged configuration mode, configure terminal display attribute as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	terminal length value	Configure display line number. Value range is 0-512.

18.3.3 Configure terminal time-out value

Use the following commands to configure terminal time-out value. Default value is 10 minutes.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	line vty	Enter line node
Step 3a	exec-timeout <min> [<second>]	Set the command-line timeout
Step 3b	no exec-timeout	Set the command-line timeout to default
Step 4	show exec-timeout	Show the command-line timeout

18.4 System basic operations

18.4.1 Upgrade system

Use the following command to upgrade the equipment.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2b	download tftp image <filename> <A.B.C.D>	Update firmware with header.

18.4.2 Network connectivity test

Use **ping** command to check network connectivity.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	ping [-s <packet size>] <A.B.C.D>	<i>Packet size</i> is test packet length, unit is byte.

18.4.3 Reboot system

Use the following command to reboot system.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	reboot	Reboot system.

18.4.4 Telnet

You can telnet to system via outband or inband management IP. The default outband management IP is 192.168.8.100.

Command	Function
telnet 192.168.100	Telnet to application layer of system. Login name and password both are admin .
telnet 192.168.100 2223	Telnet to kernel of system. Login name is default .
epon-olt(config)#switch	Telnet to kernel of system. Login name is default .

18.4.5 Configure RTC system time

Use the following command to configure RTC system time.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	time set year <2000-2099> month <1-12> day <1-31> hour <0-23> minute <0-59> second <0-59>	Configure the RTC clock
Step 3	show time	Show the system time

18.4.6 Fan control

Use the following command to control fan running attribute.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	fan temperature <20-80>	Configure Temperature of the fan
Step 3	fan mode [open close auto]	Configure the fan open mode
Step 4	show fan	Show the fan configuration and current equipment temperature

18.5 OAM debug information

18.5.1 Enable/disable OAM debug information

Use the following commands to enable or disable OAM debug information.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	debug mode	Enter debug mode
Step 3	config level view {recv_pkt recv_from_onu_pkt recv_from_cs8022_pkt send_pkt send_to_onu_pkt send_to_cs8022_pkt oam_pkt oam_time} {on off}	On off :Open or close packet printing recv_pkt:The received packets recv_from_onu_pkt:receive packets from the onu recv_from_cs8022_pkt:Receive packets from cs8022 send_pkt: Sent out oam packets send_to_onu_pkt: Packets sent to the onu send_to_cs8022_pkt: Packets sent to the cs800 oam_pkt:packets send and receive to ONU

18.5.2 Enable/disable CPU debug information

Use the following commands to enable or disable CPU debug information.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	debug mode	Enter debug node.
Step 3	system debug {rx tx} {on off}	On off : enable or disable CPU debug. Rx: CPU receives packets. Tx: CPU transmits packets.

18.5.3 Enable/disable each function module debug information

Use the following commands to enable or disable function module debug information.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	debug mode	Enter debug node.
Step 3	system debug {acl timer port mac vlan vt igmp cfp qos} {on off}	On off : enable or disable function module debug information.

19 User Management

19.1 User privilege

There are two privileges for user, administrator user and normal user.

Normal user is a read-only user, only can view system information but not user information, configurations. Administrator user can view all information and configure all parameters.

19.2 Default user

By default, there is a administrator user **admin**, and password is **admin** too. Default user can't be deleted, modified, but you can modify its password.

19.3 Add user account

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	user add <i>user-name</i> login-password <i>login-password</i>	Add new user account.
Step 3	user role <i>user-name</i> {admin normal enable-password <i>enable-password</i>}	Specify user role. New user is a normal privilege user.

19.4 Show user account list

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	user list	Show user account list.

19.5 Delete user account

	Command	Function
Step 1	configure terminal	Enter global configuration mode.

Step 2	user delete <i>username</i>	Delete user account.
---------------	------------------------------------	----------------------

19.6 Modify password

Every user can modify its own password while administrator user can modify other users' password. Modify password as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	user login-password <i>user-name</i> <CR> Input new login password for user abc please. New Password: Confirm Password:	Configure user's login password.
Step 3	user enable-password <i>user-name</i> <CR> Input new enable password for user abc please. New Password: Confirm Password:	Configure user's configuration mode password.

20 SNMP Configuration

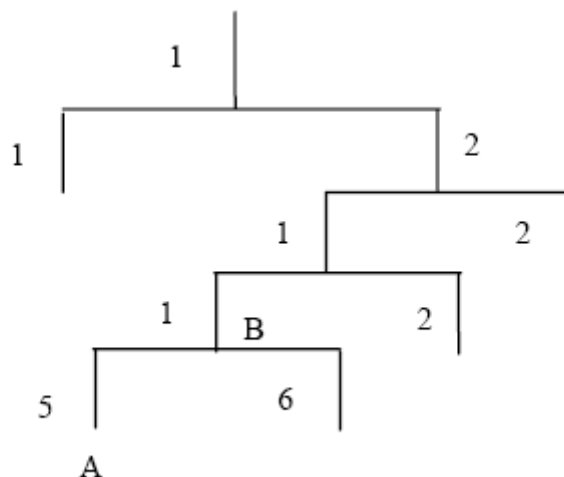
20.1 SNMP introduction

SNMP (Simple Network Management Protocol) is an extensive network management protocol at the moment. It is an industrial standard which is adopted and come into use for transmitting management information between two devices. Network administrator can search information, modify information, troubleshoot, diagnose fault, plan capacity and generate reports. SNMP adopts polling mechanism and provides basic functions, especially fits small, fast and low cost conditions. It is based on transport layer protocol UDP.

There are two parts of SNMP, NMS (Network Management Station) and agent. NMS is a station that runs client program, and agent is a server program that runs in device. NMS can send GetRequest, GetNextRequest and SetRequest messages to agent. Then agent will execute read or write command and respond to NMS. Agent also sends trap messages to NMS when device is abnormal.

20.2 SNMP version and MIB

In order to mark device's management variable uniquely, SNMP identifies management object by hierarchical structure name scheme. The set of objects is like a tree, which the node stands for management object, shown as the following picture.



MIB(Management Information Base), a set of device's variable definition, is used to describe the tree's hierarchical structure. For the management object B in above picture, we can use a string of numbers {1.2.1.1} to describe it uniquely. This string of numbers is Object Identifier.

GEAPON OLT series OLT support SNMP V1, V2C and V3. Common MIB shows in the following table.

MIB attribute	MIB content	Refer to
Public MIB	MIB II based on TCP/IP	RFC1213
	RMON MIB	RFC2819
	Ethernet MIB	RFC2665
Private MIB	VLAN MIB	
	Device management	
	Interface management	

20.3 Configure SNMP

20.3.1 Configure community

Begin at privileged configuration mode, configure community as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	snmp-server community <word> [ro rw]	Configure SNMP community strings;
Step 3	show snmp-server community	Show the SNMP community configuration
Step 4	exit	From the global configuration mode to return to the privileged user configuration mode
Step 5	write	Save the configuration

20.3.2 Configure Trap the target host address

Use the following command to configure or remove the Trap messages of the target host IP address. Begin at privileged configuration mode, Configure Trap the target host address as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2a	snmp-server host <A.B.C.D >{udp-port <1-65535>}*1 {version [1 2c]}*1 {community <WORD>}*1	Configure the Trap the target host address. Configure the community string value
Step 2b	no snmp-server host < A.B.C.D > version 1 2c 3 community	Delete trap target host address.
Step 3a	snmp-server enable traps snmp	Enable SNMP traps function

Step 3b	no snmp-server enable traps snmp	Delete SNMP traps function
Step 4	show snmp-server targetaddress	Check the SNMP trap configuration
Step 5	write	Save the configuration

20.3.3 Configure Administrator ID and contact method

Begin at privileged configuration mode, Configure administrator ID and contact method as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode.
Step 2	snmp-server contact <line>	Configure contact string value
Step 3	show snmp-server contact	Check the SNMP contact configuration.
Step 4	write	Save the configuration.

20.3.4 Configure Ethernet switch location information

Begin at privileged configuration mode, Configure Ethernet switch location information as the following table shows.

	Command	Function
Step 1	config terminal	Enter global configuration mode
Step 2	snmp-server location <line>	Configure location string value
Step 3	show snmp-server location	Check the SNMP location configuration.
Step 4	write	Save the configuration.

21 Alarm and Event Management

21.1 Alarm and event introduction

If you enable alarm report, it will trigger alarm events when system occurred error or did some important operations. The alarm information will be save in a buffer, you can execute some commands such as show syslog to display. All the alarms can be sent to specific servier.

Alarms include fault alarm and recovery alarm. Fault alarm will not disappear until the fault is repaired and the alarm is cleared.

Events include running envents and security events, are notifications which generate and inform administrators under a normal condition. The difference between event and alarm is that event generates under a normal condition while alarm generates under an abnormal condition.

Command “show alarm-event information” is used to show description, level, type and class of all alarms and events.

21.2 Alarm management

Alarm severity level includes critical, major, minor and warning. Corresponding level in system log are alerts, critical, major and warnings. Alarm type includes device alarm, communication alarm and disposing alarm.

Device alarm contains low temperature, high temperature, CPU usage, memory usage, fan, PON, optical power and so on.

- Communication alarm contains port up/down, loopback, PON deregister, PON register failed, PON los, ONU deregister, illegal ONU register, ONU authorized failed, ONU MAC conflication, ONU LOID conflication, ONU link los, ONU dying gasp, ONU link fault, ONU link events, ONU extended OAM notification and so on.
- Dispoing alarm contains upgrade failed, upload configuration file failed, download configuration file failed and so on.

21.2.1 System alarms

System alarms show the performance and security of system. The following table shows the system alarm list.

System alarm	Reason	Default
temp-high	Device temperature higher than threshold.	disable
temp-low	Device temperature lower than threshold.	disable

cpu-usage-high	CPU usage higher than threshold.	disable
mem-usage-high	Memory usage higher than threshold.	disable
fan	Fan switch.	disable
download-file-failed	Download file failed	enable
upload-file-failed	Upload file failed.	enable
upgrade-file-failed	Upgrade firmware failed.	enable
port-updown	Port link up and link down.	enable
port-loopback	Port loopback.	disable

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	alarm {temp-high temp-low cpu-usage-high mem-usage-high} disable	Disable system alarm report.
Step 2b	alarm {temp-high temp-low cpu-usage-high mem-usage-high} enable <alarm-value> <clear-value>	Enable system alarm report and configure system alarm threshold. alarm-value: alarm threshold. clear-value: clear threshold.
Step 2c	alarm {fan port-updown port-loopback register-failed deregister}{enable disable}	Enable or disable system alarm report.
Step 3	show alarm configuration	Show system alarm configurations.

21.2.2 PON alarms

Get rid of the issue caused by PON port or fiber by monitoring PON alarms, ensure PON works well. The following table shows PON alarm list.

PON alarm	Reason	Default
pon-txpower-high	PON port transmitting power higher than threshold.	enable
pon-txpower-low	PON port transmitting power lower than threshold.	enable

pon-txbias-high	PON port bias current higher than threshold.	enable
pon-txbias-low	PON port bias current lower than threshold.	enable
pon-vcc-high	PON port voltage higher than threshold.	enable
pon-vcc-low	PON port voltage lower than threshold.	enable
pon-temp-high	PON port temperature higher than threshold.	enable
pon-temp-low	PON port temperature lower than threshold.	enable
pon-los	Fiber unconnected or link fault.	enable
deregister	PON deregister.	disable
register-failed	PON register failed.	enable

Configure global PON alarm as the following table shows.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	alarm {pon-register-failed pon-deregister} {enable disable}	Enable or disable PON alarm report.
Step 2a	alarm {pon-txpower-high pon-txpower-low pon-txbias-high pon-txbias-low pon-vcc-high pon-vcc-low pon-temp-high pon-temp-low pon-los} {enable disable}	Enable or disable PON port alarm report.
Step 3	show alarm configuration	Show alarm configurations.

Configure PON port alarm as the following table shows. Before this, you must enable global PON alarm. By default, global PON alarm is enabled, the alarms will be record in system log.

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface epon slot/port	Enter PON interface configuration mode.
Step 3a	alarm pon optical {tx_power_high tx_power_low tx_bias_high tx_bias_l ow vcc_high vcc_low temp_high temp_low} disable	Disable PON port alarm report.
Step 3b	alarm pon optica {tx_power_high 	Enable PON port alarm report

	tx_power_low tx_bias_high tx_bias_low vcc_high vcc_low temp_high temp_low} enable <i><alarm-value> <clear-value></i>	and configure alarm parameters. alarm-value: alarm threshold. clear-value: clear threshold.
Step 4	show alarm pon optical configuration	Show PON port alarm configurations.

ONU alarms

ONU alarms also can help administrator to get rid of some ONU fault. The following table shows ONU alarm list.

ONU alarm	Reason	Default
onu-deregister	ONU deregister	enable
onu-link-lost	ONU fiber unconnected or link fault.	disable
onu-illegal-register	Illegal ONU register.	enable
onu-auth-failed	ONU LOID authorized failed in auto authorization mode or failed caused by packets loss.	enable
onu-mac-conflict	Current PON port exist MAC conflict with authorized ONU in the system.	enable
onu-loid-conflict	Current PON port exist LOID conflict with authorized ONU in the system.	enable
onu-critical-event	ONU critical link event.	enable
onu-dying-gasp	ONU power down.	enable
onu-link-fault	ONU link fault.	enable
onu-link-event	ONU link event	disable
onu-event-notific	ONU extended OAM notification	enable

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	alarm {onu-deregister onu-link-lost onu-illegal-register onu-auth-failed onu-mac-conflict onu-loid-conflict onu-critical-event onu-dying-gasp onu-link-fault onu-link-event onu-event-notific} {enable disable}	Enable or disable ONU alarm report.
Step 3	show alarm configuration	Show system alarm

	configurations.
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21.3 Event management

Event severity level includes critical, major, minor and warning. Corresponding level in system log are alerts, critical, major, warnings. Event type includes device event, communication event and disposing event.

- Device event contains device reboot, PON event and so on.
- Communication event contains PON register, PON los recovery, ONU register, ONU find, ONU authorized successful, ONU deregister successful and so on.
- Disposing event contains save configuration event, erase configuration event, download configuration file successful, upload configuration file successful, ungrade successful and so on.

21.3.1 System events

System events are mainly used to monitor performance and security of system, ensure system works well.

System event	Reason	Default
reset	Device reset.	disable
config-save	Save configuration.	enable
config-erase	Erase configuration.	enable
download-file-success	Download file successful.	enable
upload-file-success	Upload file successful.	enable
upgrade-file-success	Upgrade firmware successful.	enable

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	event reset {enable disable}	Enable or disable system event report.
Step 3	show event configuration	Show system event configurations.

21.3.2 PON events

Get rid of the issue caused by PON port or fiber by monitoring PON events, ensure PON works well. The following table shows PON event list.

PON event	Reason	Default
pon-register	PON register.	disable

pon-los-recovery	PON los recovery.	enable
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	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	event {pon-register pon-los-recovery} {enable disable}	Enable or disable PON event report.
Step 3	show event configuration	Show system event configurations.

21.3.3 ONU events

ONU events also can help administrator to get rid of some ONU fault. The following table shows ONU event list.

ONU event	Reason	Default
onu-register	ONU register.	enable
onu-link-discover	ONU discover.	disable
onu-auth-success	OLT authorizes ONU successful.	enable
onu-deauth-success	OLT deauthorizes ONU successful.	disable

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2b	event {onu-register onu-link-discover onu-auth-success onu-deauth-success} {enable disable}	Enable or disable ONU event report.
Step 3	show event configuration	Show system event configuration.

22 OAM Interactive Information Management

OAM interactive information records whole process of ONU register, OAM discovery and CTC management. Complete log information can help administrator to know ONU register status and find out abnormal information. The log information come from all running module of EPON system.

Log of main functions are: monitoring equipment running status, tracking some applications provide abundant and valuable information. Can help us to fault location, troubleshooting and network security management.

22.1 Configure log output level of modules

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	debug mode	Enter debug node
Step 3	config level print {all osal timer interrupt cpuload malloc init aal app cli sc oam hello dba pkt_header pkt_content event l2ftp pkt system others ess ess_vlan}<0-7>	Configure modules log output level
Step 4	display level print {all osal timer interrupt cpuload malloc init aal app cli sc oam hello dba pkt_header pkt_content event l2ftp pkt system others ess ess_vlan}	Show modules log output level

22.2 Configure log store level of modules

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	debug mode	Enter debug node
Step 3	config level log {all osal timer interrupt cpuload malloc init aal app cli sc oam hello dba pkt_header pkt_content event l2ftp pkt system others ess ess_vlan}<0-7>	Configure modules log memory store level
Step 4	display level log {all osal timer interrupt cpuload malloc init aal app cli sc oam hello dba pkt_header pkt_content event l2ftp pkt system others ess ess_vlan}	Show modules log memory store level

Step 5a	display log {all osal timer interrupt cpuload malloc init aal app cli sc oam hello dba pkt_header pkt_content event l2ftp pkt system others ess ess_vlan}	Display module stored in the memory of the log information
Step 5b	display log level <0-7>	Display log information stored in the memory module at all levels
Step 5c	display log {latest oldest} <1-1024>	Display log information
Step 6a	delete log {all osal timer interrupt cpuload malloc init aal app cli sc oam hello dba pkt_header pkt_content event l2ftp pkt system others ess ess_vlan}	Delete all modules are stored in the memory of the log information
Step 6b	delete log level <0-7>	Delete all the log information stored in the memory module at all levels

23 System Log

23.1 System log introduction

System log is mainly used to record running condition and user operant behavior of the whole system. It is helpful for administrator to know and monitor system working condition, record abnormal information. System log comes from all the running module of system. Log system gather, manage, save and display the information. It can be shown in the device when you need to debug or check system status, and also can be sent to a server for long-term running status and operation tracking.

23.1.1 Log type

System log has five types:

- **Abnormal information log**
Abnormal information log mainly records the abnormal phenomenon of each module, such as abnormal response, inside state machine error, key process execute error and so on.
- **Alarm log**
Alarm log mainly records the information from alarm module. Critical alarm, major alarm, minor alarm and warning are corresponding with alerts, critical, major, warnings log level respectively.
- **Event log**
Event log mainly records the information from event module. Critical event, major event, minor event and warning are corresponding with alerts, critical, major, warnings log level respectively.
- **Operation log**
Operation log mainly records the informations from CLI and SNMP.
- **Debug log**
Debug log mainly records the information from networking debugging, such as received IGMP messages, RSTP BPDU messages, state machine skip and so on.

23.1.2 System log level

Syslog information level reference:

Log level	Log contrast
7:emergencies	Abnormal log
6:alerts	Alarm/event log(urgent) Abnormal log
5:critical	Alarm/event log(major) Abnormal log
4:major	Alarm/event log(minor)

	Abnormal log
3:warnings	Alarm/event log(warning) Abnormal log
2:notifications	Operation log
1:informational	Operation log
0:debugging	Debug log

23.2 Configure system log

23.2.1 Show system log

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	Show syslog [level {debug info notice warning major critical alert emerg}]	Show all system log or log of specific level.

23.2.2 Clear system log

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	Clear syslog [level {debug info notice warning major critical alert emerg}]	Clear all system log or log of specific level.

23.2.3 Configure system log server

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2a	syslog server ip <A.B.C.D> port <1-65535>	Configure system log server IP and port.
Step 2b	no syslog server	Delete system log server configuration.
Step 3	show syslog server	Show system log server configuration.

23.2.4 Configure save level of system log

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	syslog flash level {debug info notice warning major critical alert emerg}	System log will be saved to flash if it is higher than you set.

Step 3	show syslog flash level	Show system log level in flash.
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23.2.5 Save system log to flash

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	save syslog flash	Save system log to flash.

23.2.6 Clear system log in flash

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	clear syslog flash	Clear system log in flash.

23.2.7 Upload system log

	Command	Function
Step 1	configure terminal	Enter global configuration mode.
Step 2	upload tftp syslog <filename> <A.B.C.D>	Upload system log to local host byTFTP.