V1600D Series OLT
CLI USER MANUAL

Version V1.2

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Content

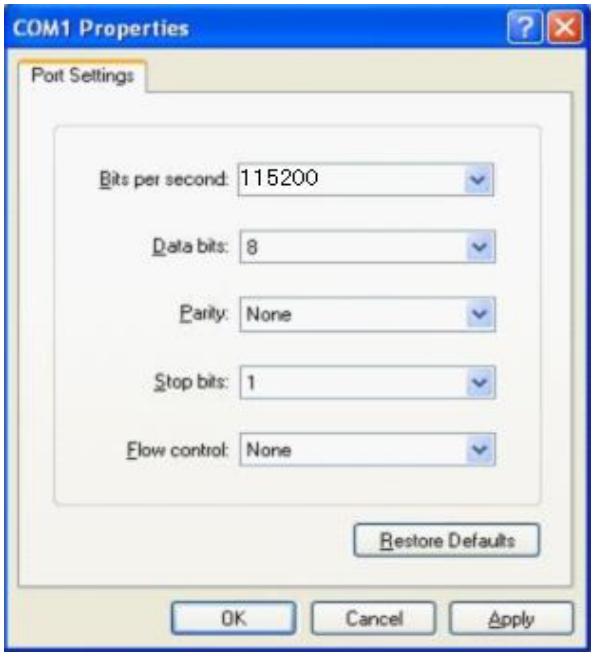
1. Access to OLT

V1600D series OLT includs V1600D2/4/8, total 3 models. You can access to OLT by CLI via console cable or telnet. This charpter introduces how to access to OLT CLI via console cable.

1. Connect PC to OLT console port by console cable.
2. Run hypeterminal 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 truned 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

V1600D> enable

Password: admin

V1600D#

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

This document will introduce each command Begin at next charpter.

2. Command Line Interface

2.1 Abstract

1600D 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

1600D provides three configuration modes.

- Privileged mode
- Global configuration mode
- Interface configuration mode

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

CLI mode	**Specialty**	**Prompt**	**Command to enter**	**Command to exit**
Privileged mode	Show configurations and execute system commands	V1600D#		**exit**
Global configuration mode	Configure system parameters	V1600D(config)#	**configure terminal**	**exit**
Interface configuration mode	Configure interface parameters	V1600D(config-if)#	**interface** *{interface_type slot/port}*	**exit**

2.3 CLI specialities

2.3.1 Online help

1600D 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.

V1600D(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.

```
V1600D(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.

```
V1600D(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.

```
V1600D(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 sring.

```
V1600D(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

1600D 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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**description** <*string*>	Configure port description.
Step 3b	**no description**	Delete description.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type*	Show interface configurations.

	slot/port}	
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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**line-rate {ingress | egress} bps** *value*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**switchport hybrid vlan** *vlan_id* **{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** *vlan_id*	Remove VLAN from port.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface** *{interface_type*	Show interface configurations.

	slot/port}	
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** *{interface_type slot/port}*	Enter interface configuration
Step 3a	**switchport trunk vlan** *vlan_id*	Add specific VLAN to trunk port. VLAN mode is tagged.
Step 3b	**no switchport trunk vlan** *vlan_id*	Remove VLAN from port.
Step 5	**exit**	Exit to global configuration mode.
Step 6	**show interface** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**switchport {hybrid|trunk} pvid vlan** *vlan_id*	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** *{interface_type slot/port}*	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 thable shows.

	Command	**Function**
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**interface** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**switchport access vlan** *vlan_id*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**storm-control broadcast pps** *value*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**storm-control multicast pps** *value*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**storm-control unicast pps** *value*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Show port statistics.
Step 3	**clean statistics**	Clean port statistics.

3.1.22 Show interface configurations

Operation	Command
Show interface configurations.	**Show interface** *{interface_type slot/port}*

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.

```
V1600D(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 suppresstion 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.
V1600D(config)# interface gigabitethernet 0/1
V1600D(config-if-ge0/1) #
(2)configure port mode and add VLAN
V1600D(config-if-ge0/1) # switchport mode trunk
V1600D(config-if-ge0/1) # switchport trunk vlan 20
V1600D(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
V1600D(config-if-ge0/1) # switchport trunk pvid vlan 123
(4)configure port broadcast suppression
V1600D(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 gourp 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** *vlan_id*	Create VLAN or enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.
Step 2b	**no vlan** *vlan_id*	Delete specific VLAN.
Step 3	**exit**	Exit to global configuration mode.
Step 4a	**show vlan** [*vlan_id*/**all**]	Show VLAN configurations. Choosing **all** means display all existed VLAN. And choosing *vlan_id* 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** *vlan_id*	Create VLAN or enter VLAN infterface configuration mode. VLAN ID range is from 1 to 4094.

Step 3a	**description** *string*	Configure VLAN description.
Step 3b	**no description**	Delete VLAN description.
Step 4	**exit**	Exit to bloble configuration mode.
Step 5	**show interface vlan** *vlan_id*	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** *vlan_id*	Enter VLAN interface configuration mode. VLAN ID range is from 1 to 4094.
Step 3a	**ip address** *<A.B.C.D> net-mask*	Configure IP address and mask of VLAN.
Step 3b	**no ip address** *<A.B.C.D>*	Delete IP address and mask of VLAN.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show interface vlan** *vlan_id*	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** *vlan-id*

Example:
Show VLAN 100 port members
V1600D(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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**dot1q-tunnel vlan-maping** *ori_vlan* **{any|** *ori_vlan_pri***}** *tra_vlani* **{any|tra_vlan_pri} {db-tag|one-tag}**	Configure VLAN translation/QinQ. db-tag means QinQ. one-tag means translation.
Step 3b	**no dot1q-tunnel vlan-maping** *ori_vlan tra_vlanid*	Delete VLAN translation/QinQ.
Step 4	**exit**	Exit to global configuration mode.
Step 5	**show vlan vlan-maping interface** *{interface_type slot/port}*	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.
V1600D(config)# interface gigabitethernet 0/1
V1600D(config-if)#switchport hybrid vlan 100 tagged
V1600D(config-if)#switchport hybrid vlan 200 tagged
V1600D(config-if)# dot1q-tunnel vlan-mapping 100 1 200 2 one-tagged
V1600D(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.
V1600D(config)# interface gigabitethernet 0/2
V1600D(config-if)#switchport hybrid vlan 300 tagged
V1600D(config-if)#switchport hybrid vlan 400 tagged
V1600D(config-if)# dot1q-tunnel vlan-mapping 300 3 400 4 db-tagged
V1600D(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 proccess 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** *vlan_id xxxx:xxxx:xxxx* **interface** *interface_type slot/port*	Add static MAC address entry.
Step 2b	**no mac address-table vlan** *vlan_id 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** *value*	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 enties 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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Show MAC address table basedon Ethernet port.
Step 2b	**show mac address-table vlan** *vlan_id*	Show MAC address table based on VLAN ID.
Step 2c	**show mac address-table**	Show whole 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** *session_number* **destination interface** *interface_type interface_num*	Confire 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** *session_number* **source interface** *interface_type start_interface_num* [- *end_interface_num*] {**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** *session_number* **{[destination | source] interface** *interface_type slot/port***}**	Delete port mirroring. session_number is 1-4
Step 3	**show monitor session all**	Show mirroring configurations.

Example:

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

V1600D(config)# monitor session 1 destination interface gigabitethernet 0/1

V1600D(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** *vlan-id* **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** *{interface_type slot/port}*	Enter interface configuration

		mode.
Step 3a	**ip igmp snooping user-vlan vlan_id group-vlan vlan_id { tagged | untagged }**	Configure port multicast VLAN. VLAN range is 1-4094.
Step 3b	**no ip igmp snooping group-vlan** *vlan_id*	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** *vlan-id* **interface** *{interface_type slot/port}*	Configure multicast router port.
Step 2b	**no ip igmp snooping mrouter vlan** *vlan-id* **interface** *{interface_type slot/port}*	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** *vlan-id <A.B.C.D>* **interface** *interface-id*	Configure static multicast.
Step 2b	**no ip igmp snooping static vlan** *vlan-id <A.B.C.D>* **interface** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *value*	Configure multicast port member aging time. Value range is 10-3600s, defaultis260s.
Step 3	**show ip igmp snooping configuration**	Show IGMP configurations.
Step 4	**write**	Save configurations.

9.1.12 Show multicast gourp 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** *[vlan-id* | **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:

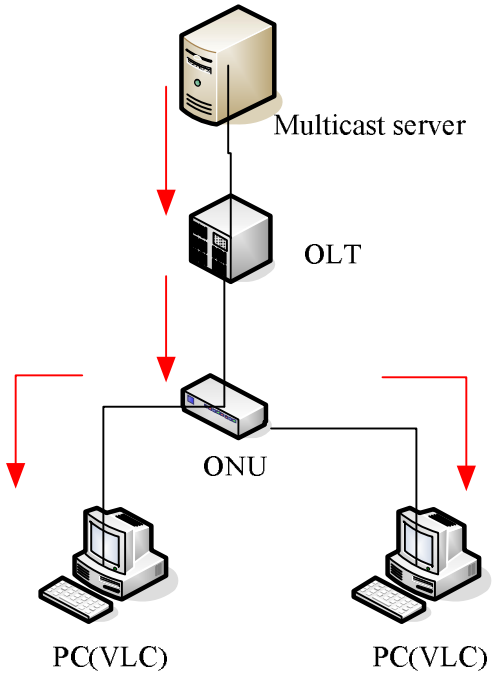
multicast is VLAN 100.

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

V1600D(config)# vlan 100

V1600D(config-vlan-100)# exit

(2) configure uplink port

V1600D(config)# interface g 0/1

V1600D(config-if-ge0/1)# switchport hybrid vlan 100 tagged

V1600D(config-if-ge0/1)# exit

(3) configure PON port

V1600D(config)# inter epon 0/1

V1600D(config-pon-0/1)# switchport hybrid vlan 100 tagged

V1600D(config-pon-0/1)# ip igmp snooping user-vlan 100 group-vlan 100 tagged

V1600D(config-pon-0/1)# exit

(4) enable IGMP snooping

V1600D(config)# ip igmp snooping enable

(5) configure multicast router port

V1600D(config)# ip igmp snooping mrouter vlan 100 interface g 0/1

(6) configure ONU LAN port

V1600D(config)# inter epon 0/1

V1600D(config-pon-0/1)# onu 1 ctc eth 1 vlan mode tag

V1600D(config-pon-0/1)# onu 1 ctc eth 1 vlan pvid 100 pri 0

V1600D(config-pon-0/1)# onu 1 ctc eth 1 mc_vlan add 100

V1600D(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** *access-list-number*	Enter ACL configuration mode. *access-list-number* is ACL index. range:0-999.
Step 3	**subset ip (permit|deny)** *<A.B.C.D>* [*net-mask*] **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** [*access-list-number* | **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 configration mode.
Step 2	**access-list** *access-list-number*	Enter ACL configuration mode. *access-list-number* is ACL index. range:1000-1999.
Step 3	**subset protocol** {**deny** | **permit**} *protocol* { *<A.B.C.D> net-mask* {*<A.B.C.D> net-mask* | **host** *<A.B.C.D>* | **any** }[**match** {**dscp** *priority*| **precedence** *priority* | **tos** *priority*}] [**set** {**dscp** *priority*| **precedence** *priority* | **tos** *priority*}]	Configure IP extended ACL rule. Parameter *protocol* should be icmp, igmp, igrp, 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** [*access-list-number* | **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** *access-list-number*	Enter ACL configuration mode. *access-list-number* 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** [*access-list-number* | **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** *access-list-number*	Enter ACL configuration mode. *access-list-number* 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** *access-list-number*	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** *access-list-number*	Enter ACL configuration mode. *access-list-number* 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** *access-list-number*	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** *access-list-number*	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 globle configuration mode.
Step 2	**interface** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3a	**ip access-group** *access-list-number* **in**	Apply ACL rule to port.

Step 3b	**no ip access-group** *access-list-number* **in**	Delete ACL rule from port.
Step 4	**exit**	Exit to glogbal configuration mode.
Step 5	**show access-list** *access-list-number*	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.

```
V1600D(config)# access-list 5000
V1600D(config-bsn-acl-5000)# subset port-business deny src-ip 192.168.100.10 255.255.255.255
V1600D(config-bsn-acl-5000)# exit
V1600D(config)# interface epon 0/1
V1600D(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.

```
V1600D(config)#access-list 2000
V1600D(config-eth-acl-2000)# subset ethernet deny  ethernet-type 0800 ffff
V1600D(config-eth-acl-2000)#exit
V1600D(config)# access-list 2001
V1600D(config-eth-acl-2001)# subset ethernet permit source b8:97:5a:72:37:8d ff:ff:ff:ff:ff:ff
V1600D(config-eth-acl-2001) # exit
V1600D(config)# interface epon 0/1
V1600D(config-pon-0/1)# ip access-group 2000 in
V1600D(config-pon-0/1)# ip access-group 2001 in
V1600D(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. *Queue*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. *Queue*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** *priority* **queue** *queue*	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 prority as the following table shows.

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**spanning-tree priority** *bridge-priority*	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** *seconds*	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 × (forward-delay －1) >= maximum-agemaximum-age >= 2 × (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** *seconds*	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 biger 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** *seconds*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3	**spanning-tree port-priority** *priority*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	Enter interface configuration mode.
Step 3	**spanning-tree cost** *value*	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** *{interface_type slot/port}*	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 derectly 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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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** *{interface_type slot/port}*	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 *{interface_type slot/port}*	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** *A.B.C.D A.B.C.D A.B.C.D*	Add static route rule.
Step 2b	**ip route** *A.B.C.D/M A.B.C.D*	Add static route rule.
Step 3a	**no ip route** *A.B.C.D A.B.C.D A.B.C.D*	Delete static route rule.
Setp 3b	**no ip route** *A.B.C.D/M A.B.C.D*	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** *vlan_id*	Create VLAN.
Step 3	**exit**	Exit to global configuration mode.
Step 4	**interface vlan** *vlan_id*	Enter VLAN interface configuration mode. *vlan_id* 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** *vlan_id*	Show VLAN information.
Step 8	**write**	Save configurations.

14.3 Confgure manangement 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** *vlan_id*	Add VLAN and enter VLAN interface configuration *vlan_id(*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** *vlan_id*	Add a VLAN and enter to VLAN interface configuration *vlan_id(*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 Snoopin.（DHCP Snooping enable，can not open dhcp server and dhcp relay）
Step 3a	**dhcp-snooping vlan <1-4095> …**	Configure DHCP Snooping vlan list
Step3b	**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|replease）**	Deil 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

16.1Enable/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** *slot/port*	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** *slot/port*	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** *slot/port*	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 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** *slot/port*	Enter PON interface configuration mode.
Step 3	**show pon statistics**	Show PON port statistics.

16.5 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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	Enter PON interface configuration mode.
Step 3	**show onu** <*onuid*> **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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **description** <*string*>	Add description string to ONU.
Step 4	**show onu** <*onuid*> **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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **encryption {enable|disable}**	Enable/Disable ONU downstream encryption.
Step 4	**show onu** <*onuid*> **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** *slot/port*	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** *slot/port*	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 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** *slot/port*	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 < *onuid* > **ctc onu_info**	Display ONU basic information.
show onu < *onuid* > **ctc ctc_info**	Display CTC OAM version which ONU supports.
show onu <*onuid*> **ctc onu_sn**	Display ONU vendor ID, version and PON MAC.
show onu <*onuid*> **ctc fw_ver**	Display PON firmware version.
show onu <*onuid*> **ctc chip_id**	Display PON chipset model.
show onu <*onuid*> **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 <*onuid*> **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 enegy-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 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.

17.2.4 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.

17.2.5 Confiure ONU multi LLID

Begin at privileged configuration mode, configure ONU multi LLID 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 multi_llid** <*0-8*>	Configure number of ONU LLID. 0: return to S-LLID mode. 1～8: number of LLID.

17.2.6 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** *slot/port*	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.

17.2.7 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** *slot/port*	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.

17.2.8 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** *slot/port*	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.

17.2.9 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** *slot/port*	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_bandwith** <*0-1024*> **guaranteed-bandwidth** <*1-1024*> **best_effort_bandwith** <*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.

17.2.10 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** *slot/port*	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.

17.2.11 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.

17.2.12 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.

17.2.13 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.

17.2.14 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.

17.2.15 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. Defualt 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.

17.2.16 Confiure 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.

17.2.17 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.

17.2.18 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** *slot/port*	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.

17.2.19 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** *slot/port*	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.
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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **policy cir** <*1-1048576*> [**cbs**] <*1-10240*> [**ebs**] <*1-10240*>	Configure ONU port upstream policy.
Step 4	**onu** <*onuid*> **ctc eth** <*port-num*> **policy default**	Delete ONU port upstream policy.
Step 5	**show onu** <*onuid*> **ctc eth** <*port-num*> **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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **rate_limit cir** <1-1048576> [**pir**] <1-1048576>	Configure ONU port downstream rate limit.
Step 4	**onu** <*onuid*> **ctc eth** <*port-num*> **rate_limit default**	Delete ONU port downstream rate limit.
Step 5	**show onu** <*onuid*> **ctc eth** <*port-num*> **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
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*> **flow_control [enable|disable]**	Enable or disable ONU port flow control.
Step 4	**show onu** <*onuid*> **ctc eth** <*port-num*> **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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **loopdetect [enable|disable]**	Enable or disable ONU port loopback detection.
Step 4	**show onu** <*onuid*> **ctc eth** <*port-num*> **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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **vlan trunk** [**set**|**add**|**del**] *{<vid>}*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** *slot/port*	Enter PON interface configuration mode.
Step 3	**onu** <*onuid*> **ctc eth** <*port-num*> **vlan aggregation dst_vlan** <*new-vid*> **agg_vlan** *{<old-vid>}*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** *slot/port*	Enter PON interface configuration mode.
Step 3	**show onu** <*onuid*> **ctc eth** <*port-num*> **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** *slot/port*	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*>	Show port multicast VLAN

mc_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** *slot/port*	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** *slot/port*	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** *slot/port*	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 ip_mode static ipaddr** <*A.B.C.D*> **netmask** <*A.B.C.D*> **gateway** <*A.B.C.D*>	Configure voice IP address mode is static
Step 3b	**onu** <*onuid*> **ctc voip_global_param ip_mode dhcp**	Configure voice IP address mode is DHPC
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 administion status.

17.4.4 Configure H.248protocol

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** <*string*>	Configure H. 248 registration mode is realm.
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|unalign} 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 porxy 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

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|**	Show ONU alarm status.

	onu_self_test_failure| onu_temp_high_alarm| onu_temp_low_alarm| iad_connection_failure|pon_if_switch| sleep_status_update}	
Step 4	**show onu** *<onuid>* **ctc alarm_thr onu {battery_volt_low|onu_temp_high_alarm|onu_temp_low_alarm}**	Show ONU alarm threshold.

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|**	Show the pon port statistical alarm status and threshold alarm_cfg:onu alarm status alarm_thr:onu alarm threshold

upstream_fragments_alarm| downstream_jabbers_alarm| upstream_jabbers_alarm| downstream_discards_alarm| upstream_discards_alarm| downstream_errors_alarm| upstream_errors_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_warn ing| 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}	

17.5.3 Show onu port 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 eth** *<1-255>* **{eth_port_auto_neg_failure| eth_port_los|eth_port_failure| eth_port_loopback|eth_port_congesti on}**	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|**	Show the LAN port statistical alarm status and threshold alarm_cfg:onu alarm status alarm_thr:onu alarm threshold

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| downstream_errors_alarm|upstream_errors_alarm| status_change_times_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| status_change_times_warning}	

17.5.4 Show onu pots 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** *<1-65535>* **ctc alarm_cfg**	Show pots alarm status

pots <*1-64*> **pots_port_failure**	

17.5.5 Show onu E1 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 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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *[10hd|10fd|100hd|100fd|1000hd|1000fd|10000fd]*	Configure port negotiation mode
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*>	Show lan port storm

pkg_suppress	suppression

17.6.11 WiFi configuration

	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*> **pri wifi_switch disable**	disable WiFi
Step 3b	**onu** <*onuid*> **pri wifi_switch enable {FCC|ETSI}** <*0-1*> **{80211b|80211g| 80211bg| 80211n| 80211bgn}** <*0-20*>	Enable WiFi ETSI:European standard FCC:American standard <0-1>: 0 means automatically choose the channel number < 0-20 > : transmission power, 0 to 20 DBM
Step 4	**Show onu** <*onuid*> **pri wifi_switch**	

17.6.12 SSID basic configuration

	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*> **pri {wifi_ssid0|wifi_ssid1|wifi_ssid2| wifi_ssid3} {enable|disable}**	Enable / disable SSID
Step 3b	**onu** <*onuid*> **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}**	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** <*onuid*> **pri {wifi_ssid0|wifi_ssid1| wifi_ssid2|wifi_ssid3} wpa shared_key** <*string*> **rekey_interval** <*0-4194303*>	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** *<onuid>* **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>*	Type: Type of the RADIUS server IP address Len: the RADIUS server IP address length, authentication for WPA, connected, 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

17.6.13 Configure 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**	Add route mode connection

	*[internet|multicast|tr069|tr069_internet|tr069_voip|voip_internet|tr069_voip_internet|other] {nat [enable|disable]}*1*	
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** *[internet|multicast|tr069|tr069_internet|tr069_voip|voip_internet|tr069_voip_internet|other] {nat [enable|disable]}*1*	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** *slot/port*	Enter the pon interface configuration mode.
Step 3	**onu** *<onuid>* **pri catv_status** *[enable|disable]*	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** *slot/port*	Enter the pon interface configuration mode.
Step 3	**onu** *<onuid>* **pri ctcoam_skip** *[enable|disable]*	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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	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** *slot/port*	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_**	Remove ONU global configurations.

	ctrl}	
Step 3c	**no onu** *<onuid>* **ctc eth {***<1-255>***|all} {flow_control|policy|rate_limit|loopdetect|disableloop|monitor_status| monitor_current|vlan|class|mc_vlan| mc_tagstrip|mc_maxgrp|phy_ctrl| autoneg|pvid}**	Remove ONU LAN configuration.
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** *slot/port*	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** *slot/port*	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_bandwith <0-1024> guaranteed-bandwidth <1-1024> best_effort_bandwith <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> [tranlation] [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|tranlation|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] broddcast <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]

17.8.4Alarm 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.Enabld 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.Enabld 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 ctc [pots] <1-64> [pots_port_failure]

(5)Remove E1 port the alarm configuration

no ctc [e1] <1-16> [e1_port_failure|e1_timing_unlock|e1_los]

17.8.4 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 same 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** *<filename>* *<A.B.C.D>*	filename is Upgrade file A.B.C.D is TFTP server IP
Step 3b	**download tftp configuration** *<filename>* *<A.B.C.D>*	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 attribure as the followingtable 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 2	**debug mode**	Enter debug node
Step 3a	**download tftp** *[bld|kernel|rootfs]* *<filename>* *<A.B.C.D>*	Bld: upgrade the uboot Kernel: upgrade the Kernel Rootfs: upgrade file system filename is Upgrade file A.B.C.D is TFTP server IP
Step 3b	**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** *<packetsize>*] *<A.B.C.D>*	*Packetsize* 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 telent 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 passwork both are **admin**.
telnet 192.168.100 2223	Telnet to kernel of system. Login name is **default**.
V1600D(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 node
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** *user-name* **login-password** *login-password*	Add new user account.
Step 3	**user role** *user-name* **{admin | normal enable-password** *enable-password***}**	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** *username*	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** *user-name* <CR> Input new login password for user abc please. New Password: Confirm Password:	Configure user's login password.
Step 3	**user enable-password** *user-name* <CR> Input new enable password for user abc please. New Password: Confirm Password:	Configure user's configuration mode password.

20 SNMP Configuration

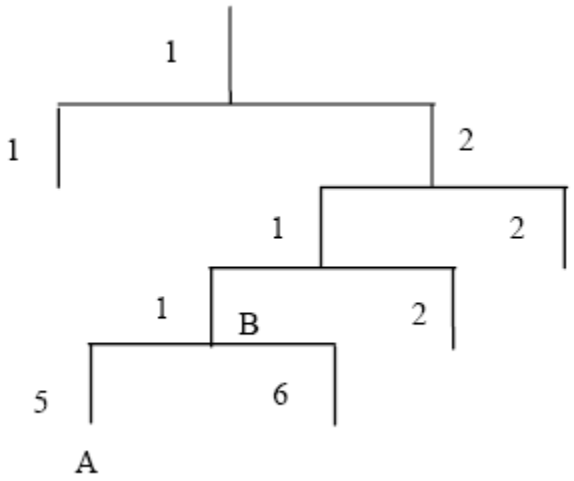
20.1 SNMP introduction

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 resports. 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.

1600D 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 mwthod 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 occured 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 secury 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_low| 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 *<alarm-value> <clear-value>*	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.

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 diposing 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 performation 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

	Command	Function
Step 1	**configure terminal**	Enter global configuration mode.
Step 2	**event {pon-register|pon-los-recovery} {enable|disable}**	Enble 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 Manangement

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 deivce 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.

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.