Thank you for choosing our products.

Preface

Revision History

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision date</th>
<th>Revision Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>V 1.1</td>
<td>15/10/2015</td>
<td>First edition</td>
</tr>
<tr>
<td>V1.2</td>
<td>12/12/2015</td>
<td>Content updates</td>
</tr>
</tbody>
</table>

The element management system is an integrated broadband access management platform, which can perform the effective and unified management of multiple types of broadband access equipment developed.

This manual mainly introduces the installation and basic configuration of the EPON OLT’s element management system. It aims to help users in understanding the equipment’s technologies, functions and practical application capacity and to provide technical support for the users.
Intended Readers

This manual is intended for the following readers:

- Commissioning engineers
- Operation and maintenance engineers

To utilize this manual, these prerequisite skills are necessary:

- Access network technology
- EPON principles
- Ethernet switch technology
- Computer network technology

Symbol Conventions

The symbols that may be found in this document are defined as follows.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Warning" /></td>
<td>Notice</td>
<td>Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.</td>
</tr>
<tr>
<td><img src="image" alt="Notice" /></td>
<td>Warning</td>
<td>Indicates a hazard with a medium or low level of risk, which if not avoided, could result in minor or moderate injury.</td>
</tr>
<tr>
<td><img src="image" alt="Note" /></td>
<td>Note</td>
<td>Provides additional information to emphasize or supplement important points of the main text.</td>
</tr>
</tbody>
</table>
# List of Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUX</td>
<td>Auxiliary</td>
</tr>
<tr>
<td>CATV</td>
<td>Cable Television</td>
</tr>
<tr>
<td>CFI</td>
<td>Canonical Format Indicator</td>
</tr>
<tr>
<td>CIR</td>
<td>Committed Information Rate</td>
</tr>
<tr>
<td>CLI</td>
<td>Command Line Interface</td>
</tr>
<tr>
<td>CoS</td>
<td>Class of Service</td>
</tr>
<tr>
<td>CVLAN</td>
<td>Customer VLAN</td>
</tr>
<tr>
<td>DA</td>
<td>Destination Address</td>
</tr>
<tr>
<td>DBA</td>
<td>Dynamic Bandwidth Allocation</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>EMS</td>
<td>Element Management System</td>
</tr>
<tr>
<td>EPON</td>
<td>Ethernet Passive Optical Network</td>
</tr>
<tr>
<td>FE</td>
<td>Fast Ethernet</td>
</tr>
<tr>
<td>FEC</td>
<td>Forward Error Correction</td>
</tr>
<tr>
<td>FIR</td>
<td>Fixed Information Rate</td>
</tr>
<tr>
<td>GE</td>
<td>Gigabit Ethernet</td>
</tr>
<tr>
<td>HGU</td>
<td>Home Gateway Unit</td>
</tr>
<tr>
<td>IAD</td>
<td>Integrated Access Device</td>
</tr>
<tr>
<td>IGMP</td>
<td>Internet Group Management Protocol</td>
</tr>
<tr>
<td>IMS</td>
<td>IP Multimedia Subsystem</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>IPTV</td>
<td>Internet Protocol Television</td>
</tr>
<tr>
<td>LOID</td>
<td>Logical ONU Identifier</td>
</tr>
<tr>
<td>LoS</td>
<td>Loss of Signal</td>
</tr>
<tr>
<td>MAC</td>
<td>Medium Access Control</td>
</tr>
<tr>
<td>MDU</td>
<td>Multi-Dwelling Unit</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>MIB</td>
<td>Management Information Base</td>
</tr>
<tr>
<td>MPCP</td>
<td>Multi-point control protocol</td>
</tr>
<tr>
<td>OAM</td>
<td>Operation, Administration &amp; Maintenance</td>
</tr>
<tr>
<td>ODN</td>
<td>Optical Distribution Network</td>
</tr>
<tr>
<td>OLT</td>
<td>Optical Line Terminal</td>
</tr>
<tr>
<td>OMA</td>
<td>Optical Modulation Amplitude</td>
</tr>
<tr>
<td>ONT</td>
<td>Optical Network Terminal</td>
</tr>
<tr>
<td>ONU</td>
<td>Optical Network Unit</td>
</tr>
<tr>
<td>PIR</td>
<td>Peak Information Rate</td>
</tr>
<tr>
<td>PON</td>
<td>Passive Optical Network</td>
</tr>
<tr>
<td>POTS</td>
<td>Plain Old Telephone Service</td>
</tr>
<tr>
<td>PPPoE</td>
<td>Point-to-Point Protocol over Ethernet</td>
</tr>
<tr>
<td>QoS</td>
<td>Quality of Service</td>
</tr>
<tr>
<td>SFU</td>
<td>Single Family Unit</td>
</tr>
<tr>
<td>SIP</td>
<td>Session Initiation Protocol</td>
</tr>
<tr>
<td>SN</td>
<td>Serial Number</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
</tr>
<tr>
<td>SP</td>
<td>Strict Priority</td>
</tr>
<tr>
<td>SVLAN</td>
<td>Service VLAN</td>
</tr>
<tr>
<td>UCT</td>
<td>Un-condition transition</td>
</tr>
<tr>
<td>UDP</td>
<td>User Datagram Protocol</td>
</tr>
<tr>
<td>UNI</td>
<td>User Network Interface</td>
</tr>
<tr>
<td>VLAN</td>
<td>Virtual Local Area Network</td>
</tr>
<tr>
<td>VoIP</td>
<td>Voice over IP</td>
</tr>
<tr>
<td>WLAN</td>
<td>Wireless Local Area Network</td>
</tr>
<tr>
<td>WRR</td>
<td>Weighted Round Robin</td>
</tr>
</tbody>
</table>
# Contents

Chapter 1 System Description..................................................................................... 9  
  1.1 Interface Types ................................................................................................... 9  
  1.2 Working Mode.................................................................................................. 10  
  1.3 Configuration Requirements ..................................................................... 10  
  1.4 EMS Installation Files.................................................................................... 11  
Chapter 2 EMS Installation........................................................................................ 12  
  2.1 Installation Of The Server ........................................................................... 13  
  2.2 Installation Of The Client ............................................................................. 16  
Chapter 3 EMS Quick Start......................................................................................... 20  
  3.1 Preparatory Work ........................................................................................... 20  
  3.2 Starting Sequence ........................................................................................... 21  
  3.3 Add OLT Device ............................................................................................... 22  
Chapter 4 EMS Frame Introduction ....................................................................... 27  
  4.1 Main Frame Overview ................................................................................... 27  
Chapter 5 System Management............................................................................... 30  
  5.1 Lock Client ......................................................................................................... 30  
  5.2 Modify Password ............................................................................................. 30  
  5.3 Db Backup And Restore ............................................................................... 31  
  5.4 Exit System ........................................................................................................ 32  
Chapter 6 OLT Management...................................................................................... 33  
  6.1 OLT System Configuration ........................................................................... 33  
    6.1.1 System Upgrade .................................................................................... 33  
    6.1.2 System Restart ....................................................................................... 34  
    6.1.3 OLT basic information ........................................................................ 36
6.1.4 Maintenance Management ............................................................... 37
6.1.5 Configure Aux Port ................................................................. 43
6.1.6 ONU Authentication ................................................................. 45
6.1.7 Delete OLT Device ................................................................. 48

6.2 Ports Configuration ........................................................................ 49
6.2.1 Uplink ports Configuration .................................................... 49
6.2.2 PON Ports Configuration ......................................................... 51

6.3 Port VLAN Configuration ............................................................ 53
6.3.1 VLAN Configuration ................................................................. 53
6.3.2 VLAN IP Configuration ............................................................. 56
6.3.3 VLAN QINQ Configuration ...................................................... 57

6.4 OLT IGMP Configuration .............................................................. 59
6.4.1 IGMP Router Port ................................................................. 60
6.4.2 Port Configuration ................................................................. 60
6.4.3 IGMP User VLAN Configuration .......................................... 61
6.4.4 Static Group Table ................................................................. 62

Chapter 7 ONU Management ............................................................... 64
7.1 ONU System Configuration .......................................................... 64
7.1.1 Show ONU Information .......................................................... 64
7.1.2 Show ONU's port Information ............................................... 65
7.1.3 ONU Rename ........................................................................ 67
7.1.4 Reregister ONU ................................................................. 68
7.1.5 Reset ONU ........................................................................ 68
7.1.6 Unauthorized ONU .............................................................. 69
7.1.7 Change ONU Status .............................................................. 70

7.2 ONU Port Configuration ................................................................. 71
7.2.1 Port Basic Configuration ................................................................. 71
7.2.2 Port Rate Limit .............................................................................. 73
7.2.3 Port VLAN Configuration ............................................................. 75
7.2.4 Port IGMP configuration ............................................................... 83

Chapter 8 Service Configuration .......................................................... 86

8.1 Network Topology ........................................................................... 86
8.2 Service Configuration ..................................................................... 86

8.2.1 OLT Configuration ...................................................................... 86
8.2.2 ONU Configuration ..................................................................... 93
Chapter 1 System Description

1.1 Interface Types

EPON OLT provides various types of network interface, service interface and maintenance interface to adapt to different networking environments. All the interfaces could comply with the relevant telecommunications standards.

Table 1-1 lists all OLT interface types.

<table>
<thead>
<tr>
<th>Type</th>
<th>Interface</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PON interface</td>
<td>PON optical interface</td>
<td>The point-to-multipoint architecture and the passive fiber transmission mode are used. The downstream rate and upstream rate can reach up to 1.25 Gbps.</td>
</tr>
<tr>
<td>Uplink interface</td>
<td>GE optical interface</td>
<td>Optical interfaces use SFP transceiver, including single-mode module and multi-mode module.</td>
</tr>
<tr>
<td></td>
<td>10 GE optical interface</td>
<td>Optical interfaces use SFP+ transceiver. Uses optical fiber to uplink to Ethernet.</td>
</tr>
<tr>
<td></td>
<td>GE Copper interface</td>
<td>It can direct connection RJ45 copper cable to uplink to Ethernet.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Console port</td>
<td>It is used for local maintenance.</td>
</tr>
</tbody>
</table>
### Interface Types

<table>
<thead>
<tr>
<th>Interface</th>
<th>AUX port</th>
<th>It is used for remote maintenance.</th>
</tr>
</thead>
</table>

### Table 1-1 Interface types

### 1.2 Working Mode

At present, the EMS uses the Client-Server working mode. When the network maintenance engineers are far from both the access equipment and the network element management system server, this Client-Server working mode can be used for access the server via the client for achieving the purpose of managing the equipment. In this case, the client and the server can be installed on one computer, or respectively on two computers. When both the client and server are installed on a computer, this is also called a stand-alone mode.

![Figure 1-1 Working mode](image)

### 1.3 Configuration Requirements

The requirements of the hardware configuration for the EMS’s Server depend on the network scale.

### Requirements of hardware configuration on the Server

<table>
<thead>
<tr>
<th>CPU Frequency above 2GHz</th>
<th>Memory 2GB or above</th>
<th>DISK 20GB disk space</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2GB</td>
<td></td>
<td>Windows 2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows XP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows 8</td>
</tr>
</tbody>
</table>

![Table 1-2 Server configuration](image)
Requirements of hardware configuration on the Client

<table>
<thead>
<tr>
<th>CPU</th>
<th>Memory</th>
<th>DISK</th>
<th>Video Card</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency above 2GHz</td>
<td>1GB</td>
<td>10GB disk space</td>
<td>65000 color resolving capability 1024*768 and above</td>
<td>Windows2008 Windows XP Windows 7 Windows 8</td>
</tr>
<tr>
<td>Or above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1-3 Client configuration

1.4 EMS Installation Files

The installation file contains two files:
EMS-client.exe and EMS-server.exe

Figure 1-4 Installation file
Chapter 2 EMS Installation

This chapter describes the procedure for EMS installation.

Installation Flow Diagrams

- Start
- Confirming the installation files and hardware configuration. (see Section 1.3 and 1.4)
- Installing the Server (see Section 2.1)
- Installing the Client (see Section 2.2)
- End

Figure 2-1 Installation procedure
2.1 Installation Of The Server

Double-click to make the Language dialog box appear,

![Language dialog box](image)

Figure 2-2 Language dialog box

Select “English” and click OK.

![Installation introduction](image)

Figure 2-3 Installation introduction

Click “Next” to proceed.
Select **I accept the terms of the License Agreement** and click "**Next**" to proceed.

Set the installation path and click "**Next**" to proceed.
Figure 2-6 Software installation

Click “Install” to start installing the server.

Figure 2-7 Software installation

Click “Next” to proceed.
Click “Close” to complete the installation.

2.2 Installation Of The Client

Double-click  to make the Language dialog box appear,

Select **English** and click **OK**.
Figure 2-10 Installation introduction
Click “Next” to proceed.

Figure 2-11 Accept the software agreement
Select I accept the terms of the License Agreement and click “Next” to proceed
Figure 2-12 Installation path

Set the installation path and click “Next” to proceed.

Figure 2-13 Software installation

Click “Install” to start installing the server
Figure 2-14 Software installation
Click “Next” to proceed.

Figure 2-15 Installation complete
Click “Close” to complete the installation.
Chapter 3 EMS Quick Start

This chapter describes the procedure for starting the EMS quickly. It mainly includes the following contents:

◆ Ensure smooth network to OLT
◆ Starting sequence
◆ Add device
◆ Synchronous OLT configuration.

3.1 Preparatory Work

1. Connect to the OLT’s AUX port with server PC.

![Connection diagram](image)

Figure 3-1 Connection diagram

2. Configure the server PC IP address

The OLT default management IP is 192.168.8.100

Please set your server PC IP is 192.168.8.X (e.g. 192.168.8.200)
3.2 Starting Sequence

1. Starting server
   Double-click to start the EMS server.

2. Click Start button and wait a moment, you can see the button changed to “Stop”. This indicates that the installation is successful.

3. After the server complete, start the client.
   Double-click to start the EMS server.

4. Login
   Input the username and the password of the EMS, and the IP address of server to login. Then click Login. The default username and the password are both root.
3.3 Add OLT Device

1. At primary topological diagram, right-click any of the blanks to enter a menu, and select "Add Device".
2. In the pop-up window, input the management IP of OLT, the OLT default IP is 192.168.8.100.

⚠️ Select Read community is public, and write community is private.
Figure 3-5 Select community parameters

If there is no option in a list, please add new community parameters.

Figure 3-6 Add community parameters
3. After adding device, there will be a device icon in the topological diagram.

![Figure 3-7 Device icon in the topological diagram](image)

4. Sync device ensure device configuration consistent with EMS configuration.

![Figure 3-8 Sync device](image)
5. At this point, you manage OLT successfully.

Figure 3-8 Manage OLT successfully
Chapter 4 EMS Frame Introduction

This chapter describes the main interface of the OLT’s EMS. It mainly includes the following contents:

- Main interface
- Main menu
- Main toolbar
- Rolling log output bar
- Status bar

4.1 Main Frame Overview

After successfully login, enter the main frame interface of EMS. The main interface is composed by "Title bar", "Menu bar", "Toolbar", "The topological navigation tree", "Topology", "The current alarm event" and "Rolling log bar" etc. The bottom of the interface is composed by "Status bar", "Alarm light" and "Alarm sound switch".
As shown in Figure 4-1, main frame contain following several parts:

1. **Main menu**
The main menu includes: System, Device management, Alarm, Performance and Security parts.

2. **Topological navigation tree**
The tree is Domain -> Device (OLT) -> Group (splitter) -> Device (ONU). Through the tree, manager can add, delete and manage the node. Click the OLT or ONU node, can operate the device.

3. **Topological map**
The Topological map is the main area of EMS. In the blank, Click the right mouse button, manager can add an OLT device, change layout, show name, etc. For convenience of managing, manager can move device icons to appropriate locations.

When an OLT device is added to the map, EMS will auto synchronization ONUs which connect to the OLT device. Now, in the map, manager can operate the OLT and ONU device.
4. Current alarm event

This window located on the bottom of the main frame, including Alarm Log and Operation Log page.
Alarm log page shows and records the real time alarm information, including alarm object, occur time and alarm content.
Operation log page shows and records the manager’s operation records, in order to trace back when needed.

5. Search and Shortcut bar
Toolbar includes: search box. You can search or locate a network element by the keywords (IP, MAC address or name) in the search box.

6. Status bar
The status bar includes state information, alarm light and alarm sound switch.
Chapter 5 System Management

This chapter describes the system management function of EMS. It mainly includes the following contents:

- Lock client
- Modify password
- Database Backup and restore
- Polling switch configuration
- Exit

5.1 Lock Client

When administrator need to leave the client computer but not wants to shut the client program, he/she can lock the client.

1. Click "System (F)"->"Lock Client" to enter client dialog.

   ![System Lock dialog]
   
   **Figure 5-1 System lock dialog**

2. Upon the client is locked, others cannot use it. The current user can enter password to use again when he/she comes back to the client.

5.2 Modify Password

Modify current user password

1. Click "System (F)"->"Modify Password", enter modify password dialog.
2. Input old password and the new password in the password box, click "OK".

3. The new password will take effect in the next login.

### 5.3 Database Backup And Restore

User can backup and restore database by using "Db Backup and Restore" menu

1. Click "System (F)"->"Db Backup and Restore", enter Db Backup and Restore dialog.
2. The system will automatically generate a file name for you. Of course, you can also set a file name for the backup as you like. For example, set a backup file named "db_backup_201512150943.sql", and then click "Backup". This backup file will be displayed in the restore dialog.

3. If want to restore database. You can click "Restore" button. The system is needed to reboot to make the restoration into effect.

5.4 Exit System

Exit the element management system.

1. Click "System">"Exit", enter exit dialog..

2. Click "Yes" to exit.
Chapter 6 OLT Management

This chapter describes the OLT management function of EMS.

6.1 OLT System Configuration

6.1.1 System Upgrade

The upgrade operation is used for upgrading the specified object, including upgrading the software of OLT (UBOOT or Kernel).

Before upgrading you are required to start the FFTP server, and put the upgrade files into the corresponding folder.

After the FTP server settings, you can carry out system software and ONU software upgrade.

1. Right click OLT, select "Control Command" -> "Upgrade system software" to enter Upgrade system software interface.

Figure 6-1 Location of system upgrade
2. Click the "download file type "drop-down list, choose the file type.

![Figure 6-2 System upgrade dialog](image.png)

3. Input TFTP server IP in TFTP server IP box.
4. In the "File Name" text box input upgrade file name, the file name is not more than twenty characters.
5. Click "Upgrade" button and upgrade firmware.

   After the completion of the upgrade, you must reboot the OLT device, the new upgrade file will take effect when the OLT device reboot.

6.1.2 System Restart

Restart the whole OLT device. This command will cause all services
interruption, be careful execution.

1. Right click OLT, select "Maintenance Management">" Restart" to enter restart the device interface.

![Figure 6-3 Location of system restart]

2. It will enter dialog box, chick "Yes".

![Figure 6-4 Restart operating dialog]
6.1.3 OLT Basic Information

The device management console is the entrance of basic information and configuration. It can be used for manage and control device, including basic information and basic operation of the EMS. Select one OLT, click right-menu "Device Detail", to enter device detail interface.

![Figure 6-5 Location of device detail](image_url)
6.1.4 Maintenance Management

6.1.4.1 Save System Configuration

When configuration is completed, you need to do "Save Device Configuration" operation. The current configuration will be written to the device Flash.

1. Right click OLT, select "Maintenance Management"->"Save Device Configuration" to enter “save device configuration” interface.
2. Enter dialog, click "Yes", save the current device configuration.

3. The current configuration will be saved to the OLT's Flash.

6.1.4.2 Restore Factory Settings

This operation is used for clear the all of the current configuration information of device stored in OLT’s FLASH. It makes the system restore to
factory default configuration.

1. Right click OLT, select "Maintenance Management">"Clear Flash", enter dialog box, as below.

   ![Figure 6-9 Location of clear flash configuration](image1)

   Figure 6-9 Location of clear flash configuration

2. Click "Yes" to perform the clear FLASH operation, the device will automatically restart.

   ![Figure 6-10 Clear flash operating dialog](image2)

   Figure 6-10 Clear flash operating dialog

6.1.4.3 Import Configuration

This operation is used for download configuration files from the TFTP server
to the Flash of OLT.

1. Right click OLT, select "Maintenance Management"->"Import Configuration" to enter"Import configuration files" interface.

   ![](image)

   **Figure 6-11 Location of import configuration**

2. Input FTP server IP in FTP server IP box.
3. In the "File Name" text box input configuration file name, the file name is not more than twenty characters.

4. Click "Import Configuration File", as below.

5. If you need to run the imported configuration, it is required to restart the device.

6.1.4.4 Export Configuration

Backup the current configuration of device. Upload the configuration file
from the flash to the TFTP server.

1. Right click OLT, select "Maintenance Management" > "Export configuration" to enter "Export configuration files" interface.

   ![Figure 6-13 Location of export configuration](image)

2. Input TFTP server IP in TFTP server IP box.
3. In the "File Name" text box input configuration file name, the file name should be no more than twenty characters.

4. Click "Export Configuration File", as below.

6.1.5 Configure Aux Port

This operation is used for configure AUX port of OLT.

1. Right click OLT, select "Maintenance Management" > "configure AUX Port" to enter "configure AUX port" interface.
2. In the text box input configuration IP address and mask.
6.1.6 ONU Authentication

6.1.6.1 ONU Authorized Mode

1. Select one OLT, click right-menu "Device Detail", to enter device detail interface.

   ![Device Detail Interface](image)

   **Figure 6-17 Location of ONU authorized mode**

2. Configure authorized strategy

   Authorized Strategy include: MAC, LOID, MAC+LOID and NONE.
6.1.6.2 MAC White List

Use MAC-based authentication function to manage the access of ONUs in PON port, the ONUs in the white list can pass through the authentication. Premise condition is the ONU authentication mode is based on MAC address based mode or mixed mode.

1. Add new MAC address: click the add button, fill in the number you need to add.
3. Click on the "Apply" apply to the device.

6.1.6.3 Black White List

Use MAC-based authentication function to manage the access of ONUs in PON port, the ONUs in the black list can’t pass through the authentication. Premise condition is the ONU authentication mode is based on MAC address based mode or mixed mode.

1. Add new MAC address: click the add button, fill in the number you need to add.
3. Click on the "Apply" apply to the device.

6.1.7 Delete OLT Device

Delete needless OLT device in topology map.

1. Select OLT device which you want to delete, right click "Delete Devices".
2. Click "OK", the OLT device will be deleted.
6.2 Ports Configuration

6.2.1 Uplink Ports Configuration

This operation is used for configure related functions and characteristic parameters of uplink port, which is mainly used for set Ethernet parameters, flow control, storm inhibition of the uplink port. Such as: auto negotiation, rate, duplex mode, etc.

1. Right click OLT, select "Configuration">"Port Configuration">"Uplink Port Configuration" to enter port list interface.

2. Select one port, modify the basic information.
Figure 6-23 Uplink ports configuration

- **State**: It is used for activate or inactivate port. Only when the port enable, can continue to configure the subsequent parameters. The default is "Enable".

- **Port type**: GE port has two types, which are Fiber and Copper.

- **Auto negotiation**: It is used for enable or disable auto negotiation of the uplink port. The default is “Enable”. After enable, Uplink port will negotiate with the connected port to reach the largest possible transmission rate. "Speed" and "duplex" are not configurable when auto negotiation function is enabled.

- **Speed**: Configure uplink ports speed. There are four options: 10Mbps, 100Mbps, 1000Mbps and 10Gbps. This parameter is configurable only when auto negotiation disabled.
- **Duplex**: Configure port working mode as duplex or half duplex. This parameter is configurable only when auto negotiation disabled. The default is "duplex".

<table>
<thead>
<tr>
<th>Flow Control</th>
<th>Ingress Rate(Kbps)</th>
<th>Egress Rate(Kbps)</th>
<th>PVID</th>
<th>Isolate</th>
<th>BC Storm Rate(Kbps)</th>
<th>MC Storm Rate(Kbps)</th>
<th>UC Storm Rate(Kbps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disable</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Enable</td>
<td>512</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td>Disable</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Enable</td>
<td>512</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td>Disable</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Enable</td>
<td>512</td>
<td>512</td>
<td>512</td>
</tr>
<tr>
<td>Disable</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Enable</td>
<td>512</td>
<td>512</td>
<td>512</td>
</tr>
</tbody>
</table>

**Figure 6-24 Uplink ports advanced configuration**

- **Flow control**: Used for enable or disable the flow control function of uplink port to control congestion. The default is "disable".
- **Ingress Rate**: Configure port ingress rate.
- **Egress Rate**: Configure port egress rate.
- **PVID**: Configure port default VLAN ID.
- **Isolate**: Port isolate with each other
- **BC Storm**: Broadcast storm inhibition
- **MC Storm**: Multicast storm inhibition
- **UC Storm**: Unknown unicast storm inhibition

3 Click "Apply", apply to the device.

### 6.2.2 PON Ports Configuration

This function is used to configure related functions and characteristic parameters of PON port, which is mainly used for set parameters, flow control, storm inhibition of the uplink port, such as: auto negotiation, rate, duplex mode, etc.

1 Right click OLT, select "Configuration">"Port Configuration">"PON Port Configuration" to enter port list interface.
States: It is used for activate or inactivate port. Only when the port enable, can continue to configure the subsequent parameters. The default is "Enable".
Flow control: Used for enable or disable the flow control function of uplink port to control congestion. The default is "disable".

Ingress Rate: Configure port ingress rate.

Egress Rate: Configure port egress rate.

BC Storm: Broadcast storm inhibition

MC Storm: Multicast storm inhibition

UC Storm: Unknown unicast storm inhibition

PVID: Configure port default VLAN ID.

Isolate: Port isolate with each other

2 Click "Apply", apply to the device.

6.3 Port VLAN Configuration

6.3.1 VLAN Configuration

OLT equipment switch engine is fully compliant with the IEEE802.1Q VLAN standard and has following main features.

Support Port-based VLAN and IEEE802.1Q VLAN;

Support full 4K VLAN group, VID range 1~4095;

All switch ports, including uplink ports and downlink ports support VLAN partition;

VLAN 1 is the system reserved VLAN, it includes all switch ports, all ports is UNTAG mode;

6.3.1.1 Show VLAN Table

1 Right click OLT, select "Configuration"->"VLAN Configuration"->"VLAN Configuration" to enter port list interface.
Figure 6-27 Location of VLAN configuration

Figure 6-28 VLAN configuration
6.3.1.2 Add a New VLAN

1. Set the VLAN ID;

2. Choose the port members to be assigned to this VLAN group in Ports list;
3. Click “Commit” button to create the new VLAN group;

6.3.1.3 Delete VLAN

1. Select the VLAN group entry to be deleted in VLAN table;
2. Click Delete button to delete the selected VLAN;
6.3.2 VLAN IP Configuration

The uplink ports can be used as in-band management interface. In order to assure the information security of in-band management, OLT equipment isolate network management information with user data by tagging different management VLAN and service VLAN separately, and set the management VLAN priority to be the highest.
6.3.3 VLAN QINQ Configuration

The uplink ports can be used QinQ function.
1. Right click OLT, select "Configuration"->"QinQ Configuration" to enter QinQ configuration interface.
**CVLAN:** Customer VLAN.

**SVLAN:** Server VLAN
6.4 OLT IGMP Configuration

Configure multicast global parameters.

1. Right click OLT, select "Configuration"->"IGMP Configuration" to enter the IGMP interface.

2. You can modify IGMP mode, proxy IP and IGMP VLAN.

IGMP mode includes snooping and disable.

- **Snooping**: IGMP snooping is the process of listening to Internet Group Management Protocol (IGMP) network traffic. The feature allows a network switch to "listen in" on the IGMP conversation between hosts and routers. By listening to these conversations the switch maintains a map of which devices need which IP multicast streams. Multicasts may be filtered from the ports which do not
need them and thus controls which ports receive specific multicast traffic.

- **Disable**: When choose disable mode, OLT is working in transparent mode.

### 6.4.1 IGMP Router Port

The uplink ports can be used add IGMP router VLAN.

![Figure 6-35 IGMP router configuration](image)

**Figure 6-35 IGMP router configuration**

### 6.4.2 Port Configuration

This operation is used for set the maximum number of multicast groups, port mode and fast leave mode.
6.4.3 IGMP User VLAN Configuration

This operation is used for add IGMP VLAN. If users VLAN and group VLAN are the same, please set the same VLAN ID.
6.4.4 Static Group Table

This operation is used for Binding multicast IP address and VLAN ID.
Figure 6-38 IGMP static group table
Chapter 7 ONU Management

This chapter mainly introduces the ONU management function of EMS

7.1 ONU System Configuration

7.1.1 Show ONU Information

ONU detail interface is used for manage and control ONU.

1. Right click OLT, select "Configuration"->"ONU Global Configuration" to enter ONU info interface.
7.1.2 Show ONU’s Port Information

ONU detail interface is used for manage and control ONU. It mainly includes ONU basic info, ONU user info and ONU port list.

1. Right click ONU, select "ONU Detail" to enter ONU detail interface.
2. Click ONU Port List in turn to view basic information of selected ONU.
7.1.3 ONU Rename

This operation is used for set or modify ONU’s name.

1. Right click ONU, select "NE Rename" to enter rename interface.

![Figure 7-5 Location of ONU rename](image)

2. Enter a new label and click "OK" to complete setup.

![Figure 7-6 ONU rename configuration](image)

3. In the domain logic topology graph and in the "ONU Details" menu, and in the left side tree, the ONU’s EMS name has become the new name.

![Figure 7-7 show ONU new name](image)
7.1.4 Reregister ONU

This operation is used for force ONU to re-register.

1. Right click ONU, select "Maintenance Management" -> "Reregister ONU" to enter re-register ONU interface.

![Figure 7-8 Location of ONU reregister](image)

2. When ONU reregister successful, rolling log bar will display the prompt message.

7.1.5 Reset ONU

This operation is used for reset ONU. After reboot, the ONU will register again.

⚠️ The operation will cause ONU's user service interruption, take care operation.

1. Right click ONU, select "Maintenance Management" -> "Reset ONU", enter dialog box, click "Yes" will carry out the ONU reset action.
2. Some log will display the prompt message when the ONU reset successfully

7.1.6 Unauthorized ONU

This operation is used for un-authorized ONU.

⚠️ If you do this operation, the ONU will delete the registration information.

1. Right click ONU, select "Maintenance Management "->"Unauthorized ONU" to unauthorized ONU.
2. The results of un-authorization will be real-time displayed in the message box.

### 7.1.7 Change ONU Status

This operation is used for set the ONU status to online.

Right click ONU, select "Maintenance Management " -> Linkup ONU "to let the ONU status change to online.
7.2 ONU Port Configuration

7.2.1 Port Basic Configuration

This operation is used for configure related functions and characteristic parameters of ONU port, which is mainly used for set Ethernet parameters, flow control, auto negotiation, Loop detection etc.

1. Right click ONU, select "Configuration"->"ONU Port Configuration"->"General Configuration" to enter port parameters list interface.
2 Select one port, modify the basic information.
   ✷ **Enable Port**: Used for enable or disable port
   ✷ **Port Auto-negotiation**: It is used for enable or disable auto
negotiation of the uplink port. After enable, the port will negotiate with the connected port to reach the largest possible transmission rate.

- **Force Auto-negotiation**: Force port auto-negotiation again
- **Flow control**: Used for enable or disable the flow control function of uplink port to control congestion. The default is "disable".
- **Loop Detection**: Used for enable or disable port loop detection function
- **Disable Loop Port**: Disable the port of Loop port

3. Click "Save Configuration", apply to the ONU device.

### 7.2.2 Port Rate Limit

This operation is used for configure ONU upstream bandwidth limit, downstream bandwidth limit.

1. Right click ONU, select "Configuration">"ONU Port Configuration">"General Configuration" to enter port bandwidth limit interface.

![Figure 7-15 Location of ONU port rate limit configuration](image)
2 Select one port, modify the port bandwidth.

![General Config](image)

**Figure 7-16 ONU port rate limit configuration**

- **Upstream Limit**: ONU port upstream bandwidth limit
  - **CIR**: Committed Information Rate
  - **CBS**: Committed Burst Size
  - **EBS**: Excess Burst Size

- **Downstream Limit**: ONU port downstream bandwidth limit
  - **CIR**: Committed Information Rate
  - **PIR**: Peak Information Rate

3 Click "Save Configuration", apply to the ONU device.
7.2.3 Port VLAN Configuration

This operation is used for configure ONU port VLAN mode. ONU supports five port VLAN modes: Transparent mode, Tag mode, Trunk mode, Translate mode, Aggregation mode.

Right click ONU, select "Configuration">"ONU Port Configuration">" VLAN Configuration" to enter port VLAN configuration interface.

![Figure 7-17 Location of ONU port VLAN configuration](image)

7.2.3.1 Transparent Mode

In this mode, upstream or downstream Ethernet packet will get through this port directly.

1. Select transparent mode.
2 Click "Save", apply to the ONU device.

7.2.3.2 Tag Mode

The method of an ONU port under tag mode process an Ethernet packet is shown in Table 7-1:

<table>
<thead>
<tr>
<th>Direction</th>
<th>VLAN tag</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>Yes</td>
<td>Discard this packet</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Add default VLAN Tag to this packet</td>
</tr>
<tr>
<td>Downstream</td>
<td>Yes</td>
<td>If the VID is not equal to default VLAN ID, discard this packet. Otherwise strip the VLAN Tag of this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Discard this packet</td>
</tr>
</tbody>
</table>

Table 7-1 VLAN tag mode operation

1. Select tag mode, and click the "save" button.
2. Set the PVID and the VLAN priority  
**PVID**: default VLAN ID

3. Click "Save", apply to the ONU device.

### 7.2.3.3 Trunk Mode

Trunk mode allows the port forward multiple VLANs at the same time.

The method of an ONU port under trunk mode process an Ethernet packet is shown in Table 7-2:

<table>
<thead>
<tr>
<th>Direction</th>
<th>VLAN tag</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>Yes</td>
<td>If the packet’s VID exist in the VLAN Trunk allow list or equal to the port default VLAN ID, forward this packet, otherwise discard this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Add default VLAN Tag to this packet and forward this packet.</td>
</tr>
<tr>
<td>Downstream</td>
<td>Yes</td>
<td>If the packet’s VID equal to the port default VID, strip the VLAN Tag of this packet and forward this packet. If the packet’s VID not equal to the port default VID but exist in the VLAN Trunk allow list, forward this packet. If the packet’s VID not equal to the port default VID and not exist in the VLAN Trunk allow list, discard this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Discard this packet</td>
</tr>
</tbody>
</table>

*Table 7-2 VLAN trunk mode operation*

1. Select Trunk mode, and click the “save” button.
2. Click “Add” button and add a new VLAN ID.

3. Click "Apply ", apply to the ONU device.
7.2.3.4 Translation Mode

Translation mode allows the port overwrites VLAN tag.

The method of an ONU port under translation mode process an Ethernet packet is shown in table 7-3:

<table>
<thead>
<tr>
<th>Direction</th>
<th>VLAN tag</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>Yes</td>
<td>If the VID of a packet equal to the CVLAN ID of a certain translation entry, overwrite the packet’s VID with this entry’s SVLAN ID and forward this packet; If the VID of a packet is not equal to any translation entry’s CVLAN ID, discard this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Add default VLAN Tag to this packet and forward this packet.</td>
</tr>
<tr>
<td>Downstream</td>
<td>Yes</td>
<td>If the VID of a packet equal to the SVLAN ID of a certain translation entry, overwrite the packet’s VID with this entry’s CVLAN ID and forward this packet; If the VID of a packet is not equal to any translation entry’s SVLAN ID, discard this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Discard this packet</td>
</tr>
</tbody>
</table>

Table 7-3 VLAN translation mode operation

1. Select translation mode and click the “save” button.
2. Click “Add” button and add a new VLAN translation rule.

3. Click "Apply", apply to the ONU device.
7.2.3.5 Aggregation Mode

Aggregation mode allows multi VLAN of port can overwrites VLAN tag.

The method of an ONU port under aggregation mode process an Ethernet packet is shown in Table 7-4:

<table>
<thead>
<tr>
<th>Direction</th>
<th>VLAN tag</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>Yes</td>
<td>If the VID of a packet equal to the CVLAN ID of a certain translation entry, overwrite the packet’s VID with this entry’s SVLAN ID and forward this packet; If the VID of a packet is not equal to any translation entry’s CVLAN ID, discard this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Add default VLAN Tag to this packet and forward this packet.</td>
</tr>
<tr>
<td>Downstream</td>
<td>Yes</td>
<td>If the VID of a packet equal to the SVLAN ID of a certain translation entry, overwrite the packet’s VID with this entry’s CVLAN ID and forward this packet; If the VID of a packet is not equal to any translation entry’s SVLAN ID, discard this packet.</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Discard this packet</td>
</tr>
</tbody>
</table>

Table 7-4 VLAN aggregation mode operation

1. Select aggregation mode and click the “save” button.
2. Click “Add” button and add a new VLAN aggregation rule.

3. Click "Apply", apply to the ONU device.
7.2.4 Port IGMP Configuration

This operation is used for configure ONU port IGMP parameter.

Right click ONU, select "Configuration">"ONU Port Configuration">"IGMP Configuration" to enter port IGMP configuration interface.
Figure 7-27 ONU port IGMP configuration

- **Maximum number of IGMP groups**: used for configure how many multicast groups this ONU port can join in.

- **IGMP VLAN configuration**: set multicast VLAN for the port

Set the port multicast VLAN mode
The method of an ONU port under mode process a multicast packet is show in Table 7-5:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>strip</td>
<td>Multicast stream sent this port does not contain a multicast VLAN Tag.</td>
</tr>
<tr>
<td>No strip</td>
<td>Multicast stream sent this port still contains a multicast VLAN Tag.</td>
</tr>
<tr>
<td>Translate</td>
<td>Multicast stream sent this port the group VLAN change to user VLAN.</td>
</tr>
</tbody>
</table>

Table 7-5 VLAN mode operation
Chapter 8 Service Configuration

This chapter mainly introduces how to configure the service using the EMS.

8.1 Network Topology

For example:

OLT is **8 PON OLT**, Configuration of three services, configuration as shown.

![Three services network topology](image)

Figure 8-1 Three services network topology

If your product is **2 PON OLT** or **4 PON OLT**, please refer to the following configuration

8.2 Service Configuration

8.2.1 OLT Configuration

1. Create services VLAN, binding Uplink ports and PON ports.
Right click OLT, select "Configuration">"VLAN Configuration">"VLAN Configuration" to enter port list interface.

Create VLAN 100, binding 8 GE Copper and 8 PON port.

Figure 8-2 Location of VLAN configuration
In the same way, create VLAN 200 and VLAN 300.
Figure 8-4 VLAN 200 binding port
Figure 8-5 VLAN 300 binding port

Please click the “refresh” button, confirm the VLAN configuration.
2. OLT IGMP configuration.

Right click OLT, select "Configuration"->"IGMP Configuration" to enter the IGMP interface.
Please click “Refresh” button to read the latest configuration, and enable IGMP snooping mode.

![Figure 8-8 Show OLT IGMP configuration]

Set OLT multicast VLAN and binding GE Copper port and PON port. Click "User VlanCfg" button to enter IGMP VLAN configuration interface.
Click “Add” button and add a new VLAN.

8.2.2 ONU Configuration

1. ONU port VLAN configuration
Right click ONU, select "Configuration"->"ONU Port Configuration"->" VLAN Configuration" to enter port VLAN configuration interface.
Figure 8-11 port VLAN configuration

**Internet service:** ONU LAN port 1/3/4  
**IPTV service:** ONU LAN port 2

Port configuration is as follows:

Figure 8-12 Port 1 VLAN configuration

Figure 8-13 Port 2 VLAN configuration
2. **ONU port IGMP configuration**

Right click ONU, select "Configuration">"ONU Port Configuration">"IGMP Configuration" to enter port IGMP configuration interface.

Select port 2 from ports list.
Click “Add” button, add a new IGMP VLAN 200.
Click “Port IGMP VLAN”, set the port multicast VLAN mode.

Figure 8-19 Port multicast VLAN mode

In this case, the configuration of the services completed.
End of the document.

Thank you