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User Manual

PON OLT Series

PON 8510

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About This Manual

This section guides users on how to use the manual effectively. The manual contains information needed to install, configure, and operate TAINET's PON OLT Series. The summary of this manual is as follows:

Chapter 1: **Overview**

Chapter 2: **Specification**

Chapter 3: **Basic Operation**

Chapter 4: **More Advanced Configuration**

Chapter 5: **Maintenance**

Chapter 6: **Monitor**

Appendix A: **Console PIN Assignment**

Appendix B: **Command Line Mode**

Symbols Used in This Manual

3 types of symbols may be used throughout this manual. These symbols are used to advise the users when a special condition arises, such as a safety or operational hazard, or to present extra information to the users. These symbols are explained below:

Warning:

This symbol and associated text are used when death or injury to the user may result if operating instructions are not followed properly.

Caution:

This symbol and associated text are used when damages to the equipment or impact to the operation may result if operating instructions are not followed properly.

Note:

This symbol and associated text are used to provide the users with extra information that may be helpful when following the main instructions in this manual.

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CONTENT

FIGURE

TABLE

Chapter 1. Overview

1.1 Overview

“Ethernet Passive Optical Network” (hereafter called “EPON Network”) comprises an Optical Line Terminal (OLT) system using its individual OLT to interconnect with one or more specific groups of Optical Network Units (ONUs) via a corresponding number of Passive Optical Distribution Networks (ODNs) to construct a broadband point-to-multipoint access network between central office and customer premises. A Server Provider can provide the broadband triple play services by way of the EPON Network, such as high-speed Internet access, VoIP and IPTV services. The PON network diagram is as shown as Figure 1-1.

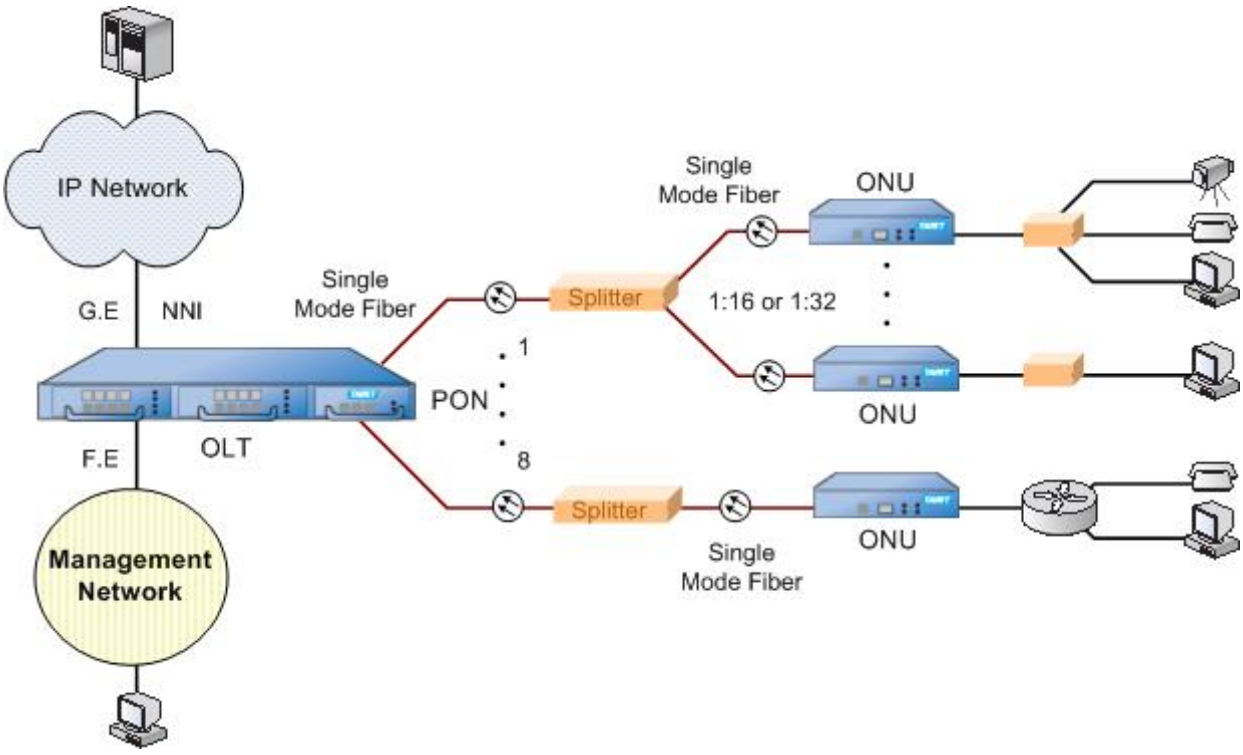


Figure 1-1 PON network structure

There are two modules can be inserted into the OLT device, each module has four PON interfaces and four NNI (Gigabit Ethernet) interfaces. The maximum capacity of OLT device is up to eight NNI interfaces and eight PON interfaces.

The NNI interface of OLT is used to uplink to core network through physical GE (Gigabit Ethernet) link. One PON interface connects OLT to splitter through an optical fiber and each splitter can be divided into 16 or 32 optical links each connected with one ONU. Subscriber's network can be connected to the UNI interface of ONU device by physical FE (Fast Ethernet) medium.

On the right side of front panel, there is a MPU module with two management ports and craft port for OLT as well as ONU devices configuring. Through the management ports (MGMT 1 or MGMT 2) on the MPU, administrator is able to configure the device by web interface mode. The pin assignment of craft port is as Appendix A .

The LEDs of front panel indicate the status as following:

Table 1-1 LEDs status indication

LED	Function
PWR (green LED)	When OLT power is on，light PWR LED
ALM (red LED)	When power or fan fail，light ALM LED
NNI (GE) interface *4	GE port for NNI link (1~4 ports)(w/LNK & ACT LED)
Management interface*2	LAN port for management (w/LNK & ACT LED)
PON Link (green LED)*4	Indicating OLT PON port link (1~4 ports)

There is an RST button on each module to reset its configurations to default values.

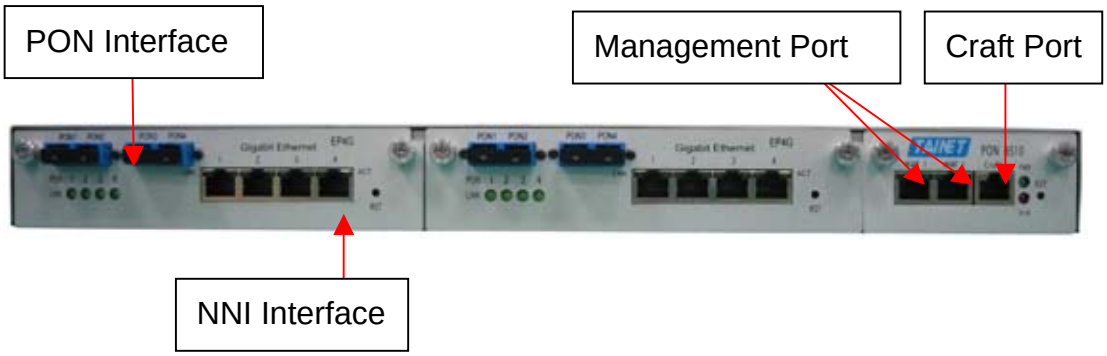


Figure 1-2 Front panel of OLT device

Figure 1-3 Rear panel of OLT device

The power requirement of OLT device is ether AC or DC.

Chapter 2. Specification

2.1 PON Interface

Table 2-1 PON interface

Item	Parameter
Transmitter Center wavelength	1490nm(1480 to 1500 nm)
Transmitter Spectrum width	Compliant with IEEE 802.3ah
Transmitter Average Launched Power	+2~+7 dBm
Receiver Center wavelength	1310nm(1260 to 1360 nm)
Receiver Minimum Sensitivity	-28dBm
Receiver Input Saturation Power (Overload)	-6.5dBm
Connector type	SC
Data rate	1.25Gbps
Transmission distance	20Km
Transmission method	Single fiber, bi-direction transmission (2-wavelength WDM)

2.2 NNI Interface

Table 2-2 NNI interface

Item	Parameter
Supported standards	Support auto-negotiation, 1000Base-T Full duplex only
Number of ports	4
Connector	RJ45
Type of cable	Cat.5e , auto MDI/MDI-X

2.3 Management Interface

Table 2-3 Management interface

Item	Parameter
Supported standards	Support auto-negotiation, 10/100 Base-T
Number of ports	2
Connector	RJ45
Type of cable	Cat.5 , auto MDI/MDI-X

2.4 Craft Interface

Table 2-4 Craft port

Item	Parameter
Supported standards	RS232C
Number of ports	1
Baud rate	38400
Connector	RJ45
Type of cable	Need RJ45 to DUB9 adapter

2.5 Feature and Specification

- Full compliance to IEEE 802.3ah (Clause 64 and Clause65)
- Complete processing and generation of MPCP control messages
- Point-to-point emulation between each ONU and OLT using LLID (logical link identifier)
- IEEE 802.1D compliance bridging
- Support of up to 8K MAC address learning table
- Configurable two QoS mode of operation : 802.1p and DSCP
- Traffic profile derived from the service level agreement (SLA) with two configurable parameters per ONU
  - Committed Information Rate (CIR)
  - Peak Information Rate (PIR)
- Support of eight priority classes
  - Strict priority (SP) or weighted round-robin (WRR) or SP+ WRR scheduling
- Intelligent Dynamic Bandwidth Allocation (DBA) algorithms
- Per-ONU based upstream traffic policing and downstream traffic shaping and policing
- Support multicast shaping feature to shape specified multicast group stream
- Support ONU remote upgrade
- Support IGMP v1/v2 protocol
- Support of up to 512 multicast group addresses
- In-band management based on Ethernet OAM frames and Ethernet frames
- Full compliance with IEEE 802.3ah OAM function
- Support per-ONU based OAM loopback
- Security management including 802.1x authentication (future)
- Support downstream traffic AES or Churning encryption (future)

2.6 Operation Environment

2.6.1 Power requirement

AC: 90~264VAC, 50/60Hz, Input (90W)

DC: -36~-72VDC, Input (92W)

2.6.2 Temperature

Operating +0℃ ~ +50℃

Storage -25℃ ~ 75℃

2.6.3 Humidity

Operating 5% ~ 95% non-condensing

Storage 0% ~ 75% non-condensing

Chapter 3. Basic Operation

Administrator can configure the device through web browser by connecting PC to the Management ports (MGMT1 or MGMT2) of device. The default IP address of device is 192.168.0.1. Administrator can modify the IP address through command line mode or web configuring mode. Please refer to Appendix B for configuring IP address through command line mode.

On web configuring mode, the default login user name and password for administrator are: **admin** and **admin**, respectively.

The connection between OLT and ONU device is shown as Figure 1-1.

NOTE: All the OLT and ONU devices must only be configured through the management port.

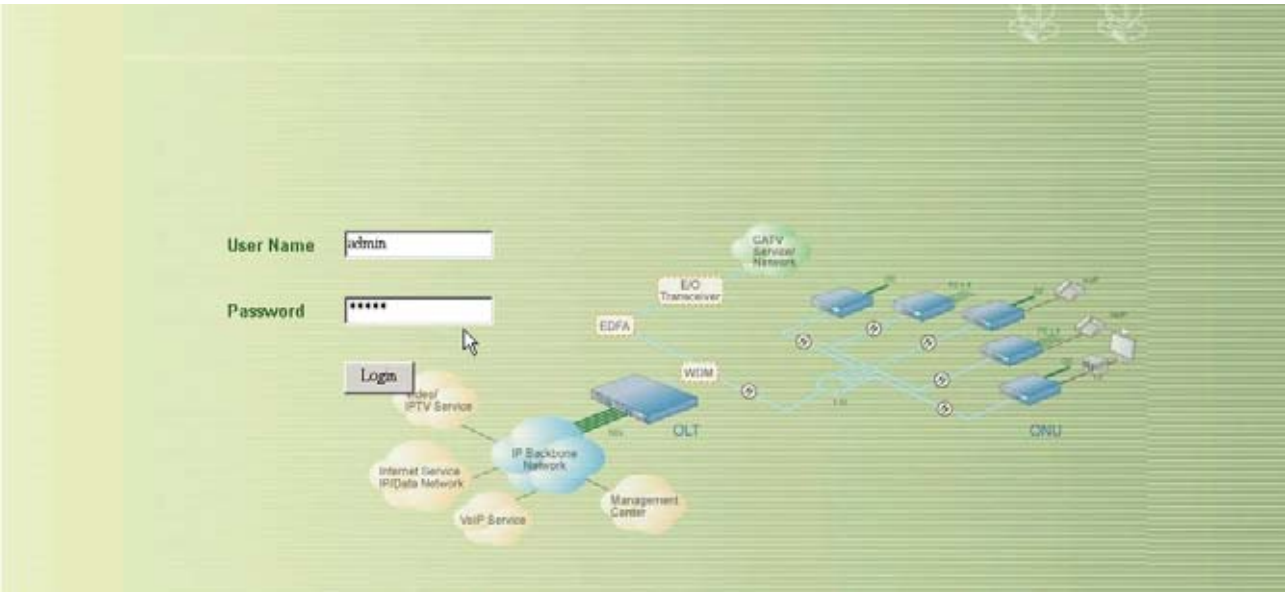


Figure 3-1 Login interface

There are three main menu pages on the web interface: **Configuration**, **Maintenance** and **Monitor**.

3.1 Configuration

3.1.1 System

3.1.1.1 General

For viewing the general information such as: software, hardware and firmware information, administrator can go to the **General** submenu.

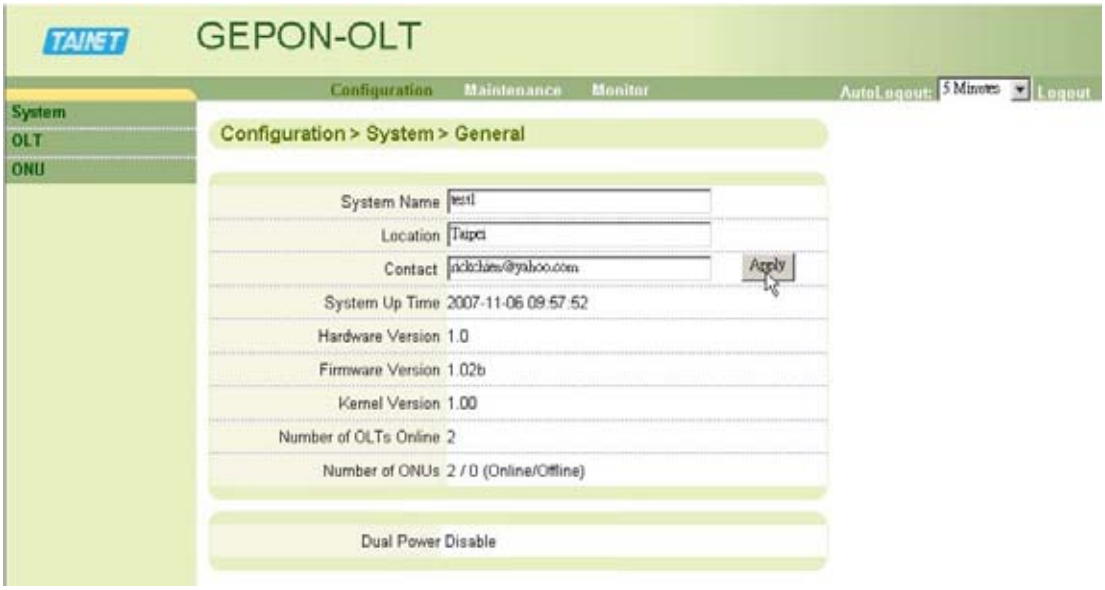


Figure 3-2 General information of system

3.1.1.2 Clock

To configure or modify the correct time and date of device, administrator can go to the **Clock** submenu. Administrator can Key in the correct information and press **Apply** button to activate it.

Figure 3-3 Clock of system

3.1.1.3 Host IP

To configure or modify the network IP of device, administrator can go to the **Host IP** submenu.

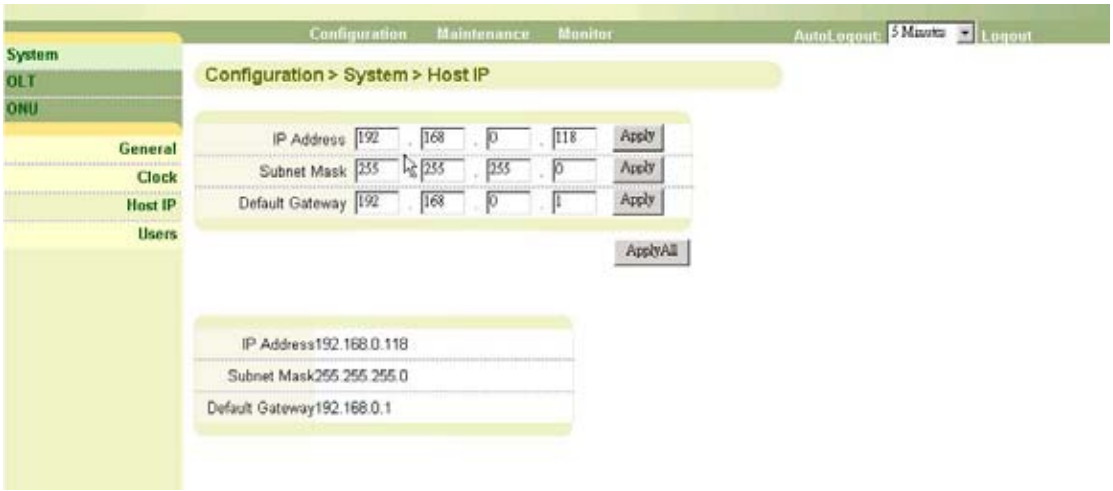


Figure 3-4 IP address of system

3.1.1.4 Users

To change the default user name and password, administrator can go to the **Users** submenu. Three roles for different logging levels can be selected. **Admin** has not only the highest authority to configure the device but also change other users' name as well as password. **Operator** has the permission as **Admin** but not include changing other users' name and password. **User** only has the permission of reading.

Figure 3-5 Users information of system

Chapter 4. More Advanced Configurations

4.1 Configuration

4.1.1 OLT

4.1.1.1 General

This submenu shows the general information of OLT module as Figure 4-1 shown:

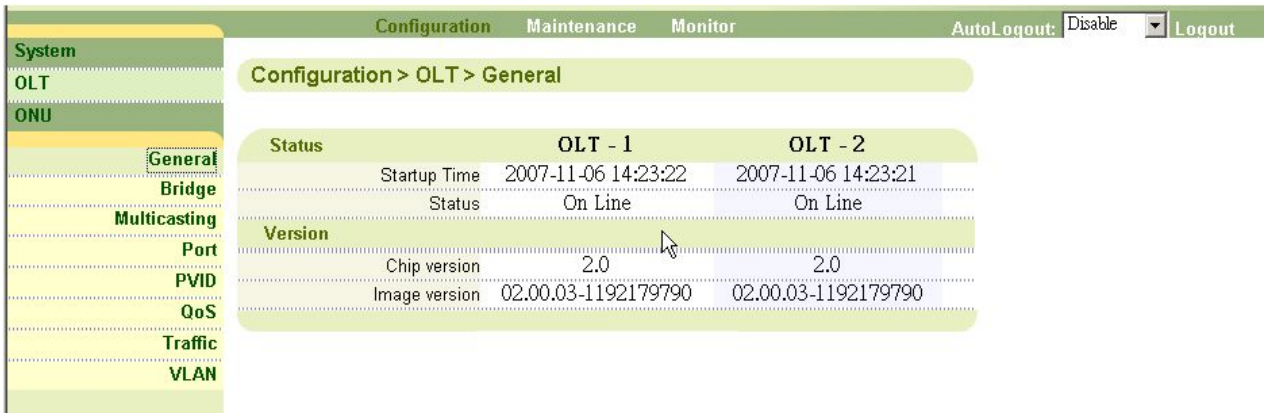


Figure 4-1 General information of OLT

4.1.1.2 Bridge

Administrator can select either OLT1 or OLT2 to configure static or dynamic FDB table. The dynamic FDB learning mode is active after enabling **Learning Enable** field and pressing **Apply** button. Administrator can manual adding one static **destination MAC** address, **VLAN ID** and **Egress Port** to the FDB table, It is active after press **Add** button.

NOTE: the range of **Aging Time** is 0~1048 seconds. The maximum entry of Static FDB is 32.

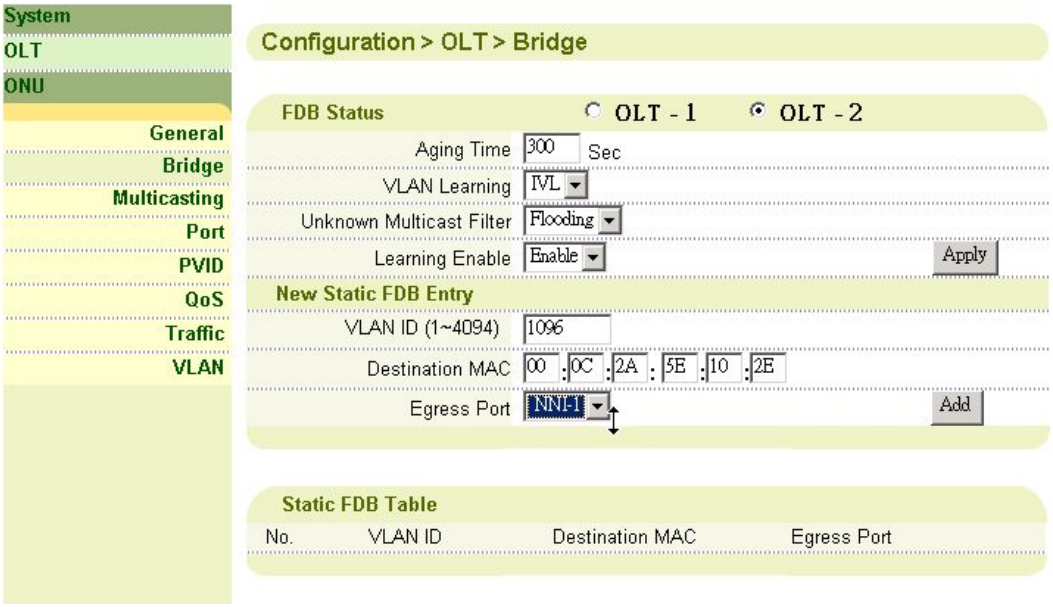


Figure 4-2 Bridge table

4.1.1.3 Multicasting

Administrator can select either OLT1 or OLT2 to configure static or dynamic Multicast mode (default is dynamic mode). Administrator also can specify one or more NNI port(s) to enable Multicast traffic on the port(s). The system supports either IGMPv1 or IGMPv2 (default is IGMPv2).

Administrator can enable the function of multicast traffic shaping by enabling **Action** and specifying any desire limit rate. It is active after pressing **Apply** button.

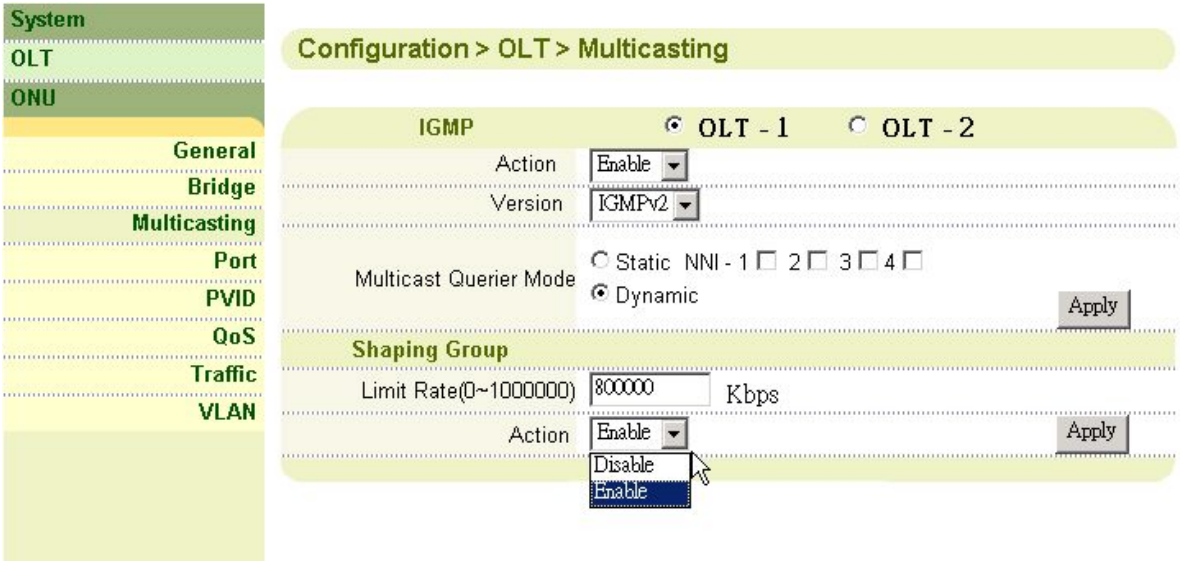


Figure 4-3 Multicasting management

4.1.1.4 Port

Administrator can force either NNI or PON port of OLT to be activated or not.

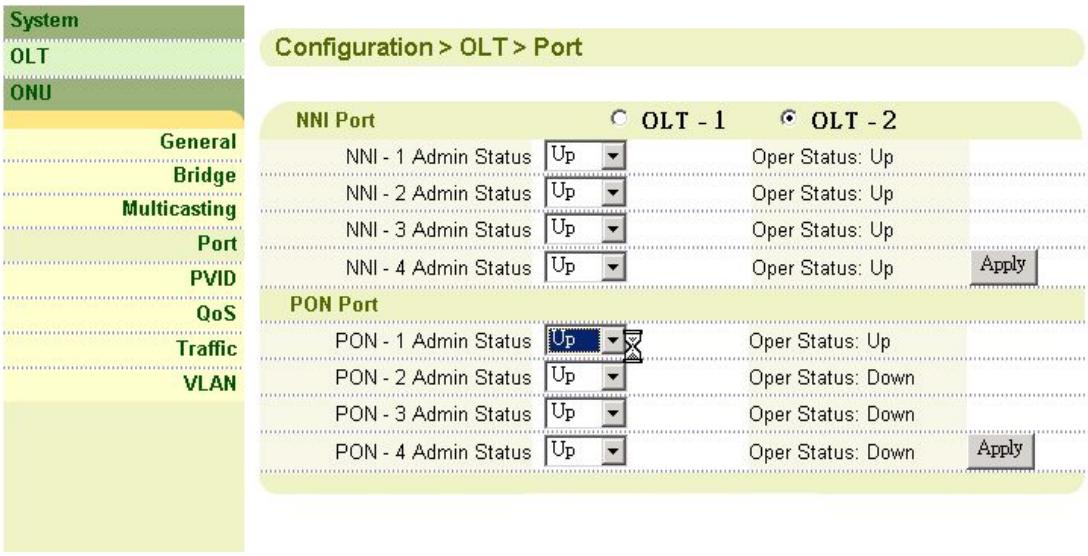


Figure 4-4 Port status of OLT module

4.1.1.5 PVID

To prevent any untagged packet from dropping by OLT, administrator can manually add VLAN ID to one or more specified NNI port(s). Any VLAN ID can not be added if it was not specified in the VLAN submenu, in advance. Please refer to the section 4.1.1.8.

NOTE: The VLAN ID administrator aim to insert must be added to VLAN submenu in advance and the range of VLAN ID is 1~4094.

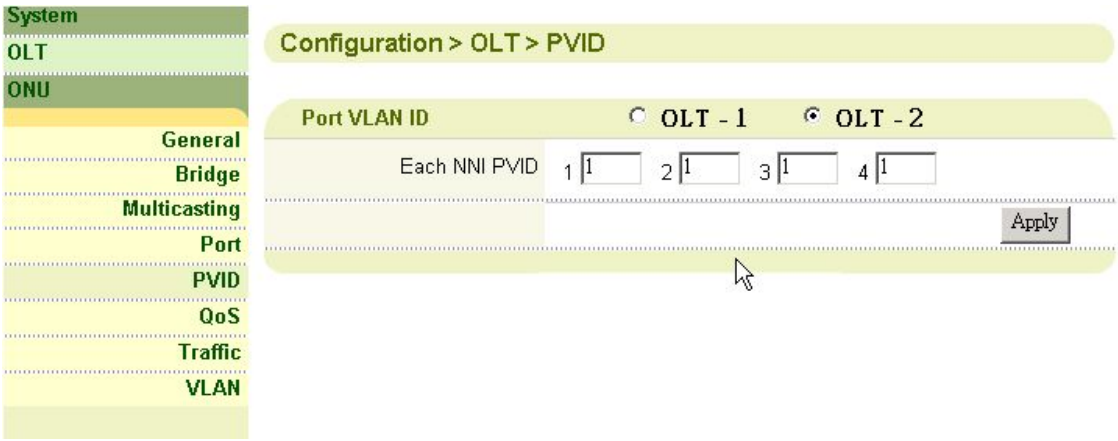


Figure 4-5 PVID information

4.1.1.6 QoS

On this submenu, administrator can select the QoS criteria mode, queue mapping, default CoS queue, default 802.1p value and the scheduling mode of frame in egress.

Administrator can select one active module to configure it by alternating OLT-1 or OLT-2. Administrator determines the QoS mode by selecting either **DSCP** or **802.1p** mode, and then press the **Apply** button.

For the QoS Mapping item, administrator can set the **DSCP** or **802.1p** to output queue mapping table. The three most significant bits of the packet's DSCP [0:2] value is used for the mapping (IP precedence) and the allowed range is 0~7. The greater number it is, the higher priority it has. Administrator can assign each priority (0 ~ 7) to the same or different queue.

Administrator can set the default **802.1p** value to a VLAN tagging packet. The default value is 0. The default **CoS** value is used for mapping a packet to an output queue when QoS mode is **802.1p** and the packet is untagged. The value of **CoS** can not be set when QoS mode was set to **DSCP** and the packet was not recognized as the IP packet. In this scenario, therefore, the value is referred to the default 802.1p value and its queue mapping.

For selecting the frame egress scheduling mode, there are three modes can be selected:

- **Strict Priority**: All top priority frames are egress a port until that priority queue is empty, and then the next lower priority queue frames are sent out.
- **WRR** (Weighted Round Robin): Weights from 1 to 255 can be selected for each of the 8 queues. The utilization of each queue is scaled to its own weight value.
- **Hierarchical mode**: queue 7 and 6 are in strict priority and remaining queues are in WRR mode.

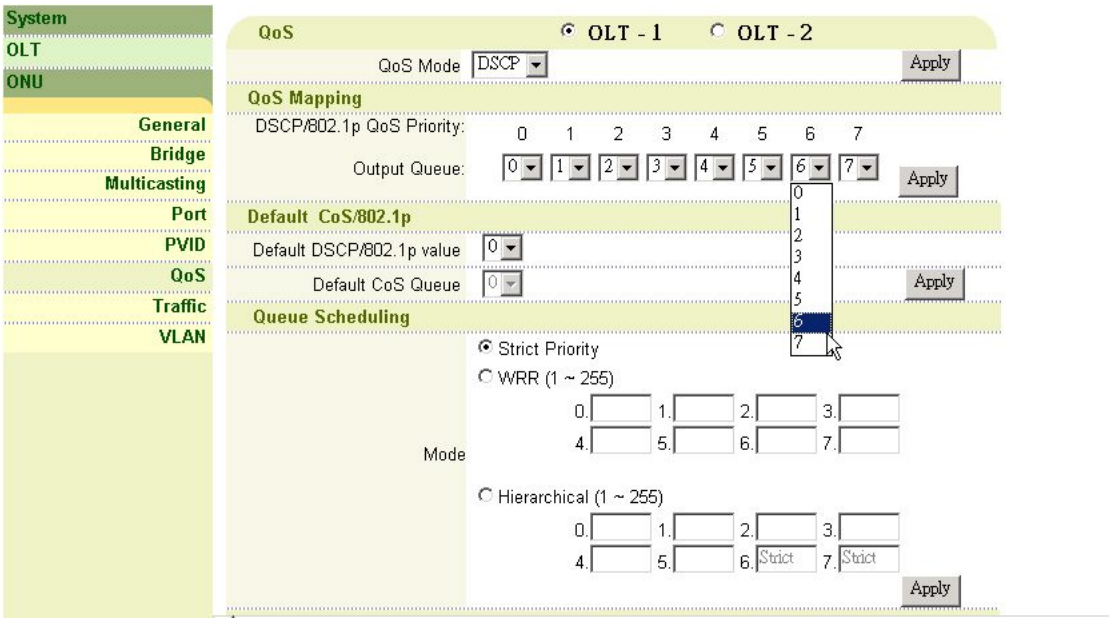


Figure 4-6 QoS configuration of OLT

4.1.1.7 Traffic

Select one OLT entity, **enable** or **disable** the Flow Control then press **Apply** button to activate or inactivate the Flow Control function. It will generate 802.3x PAUSE frame on the NNI port after enabling **Flow Control**.

In DBA mode, there are three items can be selected:

- **WorkConserv**: As long as sufficient bandwidth is available in a cycle and there are no other contending ONUs , an ONU may get as much bandwidth as its demand. In other word, the bandwidth allocated to an ONU is not upper-bounded by its PIR value.
- **NonWorkConserv**: an ONU never get more bandwidth than PIR value even if there is spare bandwidth available.
- **CBR**: the CIR value is allocated on the each registered ONU even if its demand for this cycle is less than this value.

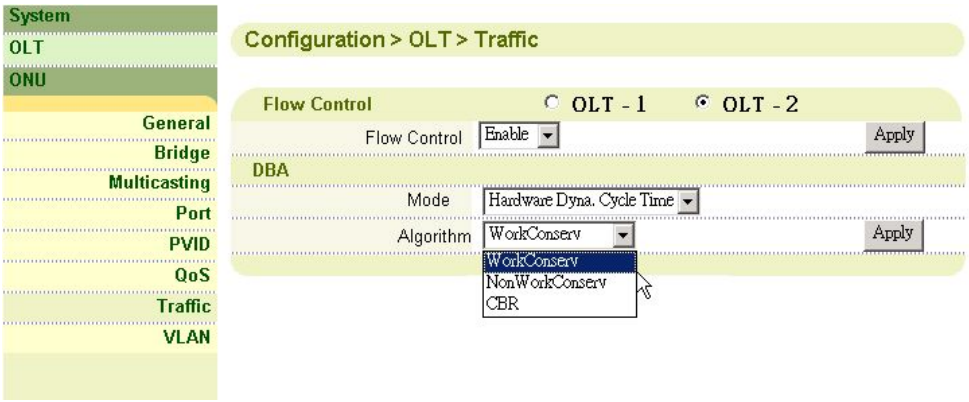


Figure 4-7 Traffic configuration of OLT

4.1.1.8 VLAN

Administrator can add one VLAN ID to the specified NNI and/or PON port(s). The packet with a VLAN ID will be forwarded to the designated port assigned with the same VLAN ID or it will be drop if OLT didn't find any matching entries in the VLAN Table. For example: administrator aim to tag one **VLAN ID**: 3000 to any packets through **NNI**-3 and **PON**-3 ports. Therefore administrator keys in *3000* on the **VLAN ID** field and check **NNI**-*3* and **PON**-*3*. Finally, press the **Add** button to make it available.

NOTE: The maximum entry of VLAN table is 512.

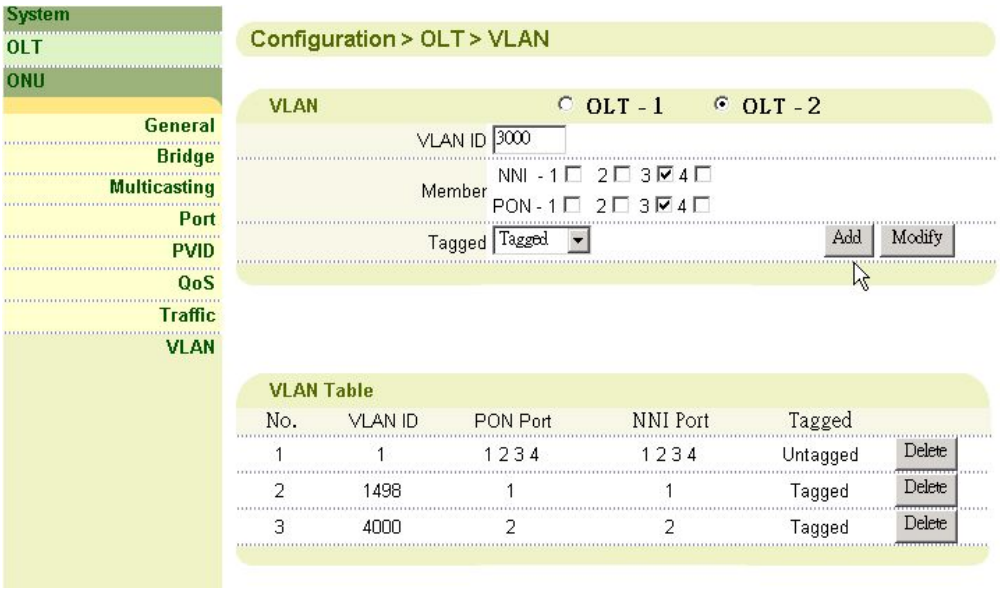


Figure 4-8 VLAN configuration of OLT

Chapter 5. Maintenance

The main purpose of this menu is to do system maintenance such as firmware upgrading, configuration saving, system reboot…etc.

5.1 System

5.1.1 Firmware Upgrade

Please connect the TFTP server to the management port through Ethernet link, first. To upgrade the firmware of system, administrator has to specify the correct IP address of TFTP server and the file name of firmware, then, press **Apply** button.

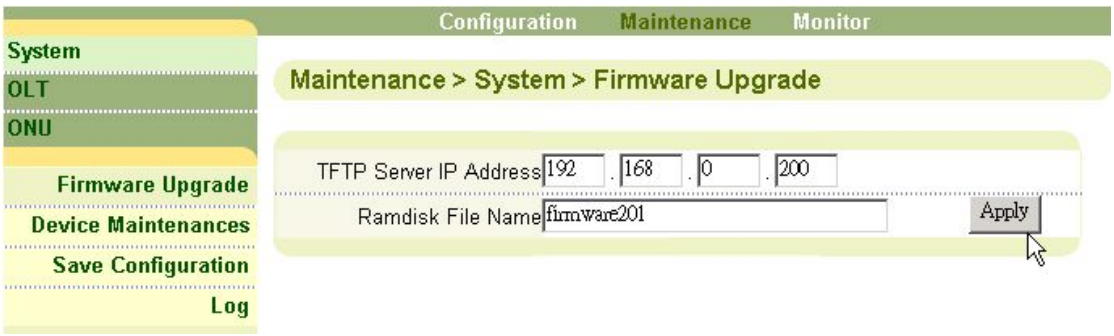


Figure 5-1 Firmware upgrade

5.1.2 Device Maintenance

Press the **Apply** button to reboot the system or restore the system to default value.

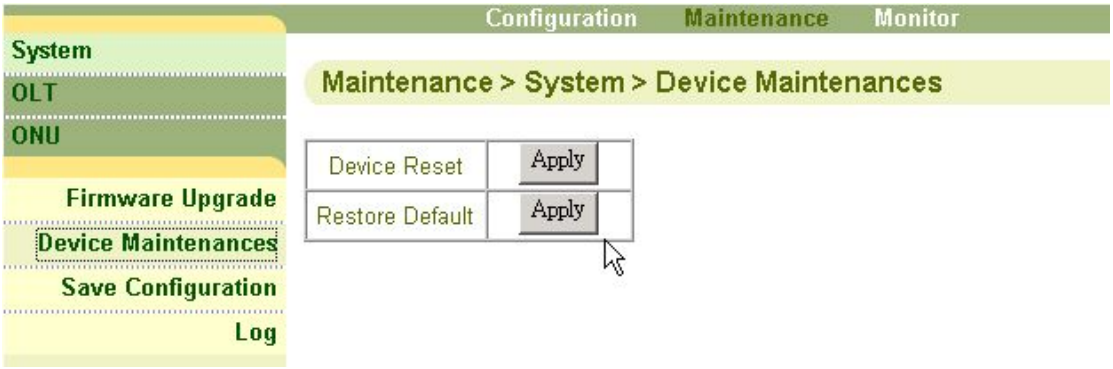


Figure 5-2 Device maintenance

5.1.3 Log

This submenu provides system log and download the log to one's PC. The system log is recorded when the **Log Enable** is set to **Enable** after pressing **Apply** button. Press the **Download** button to download the log information to administrator's PC.

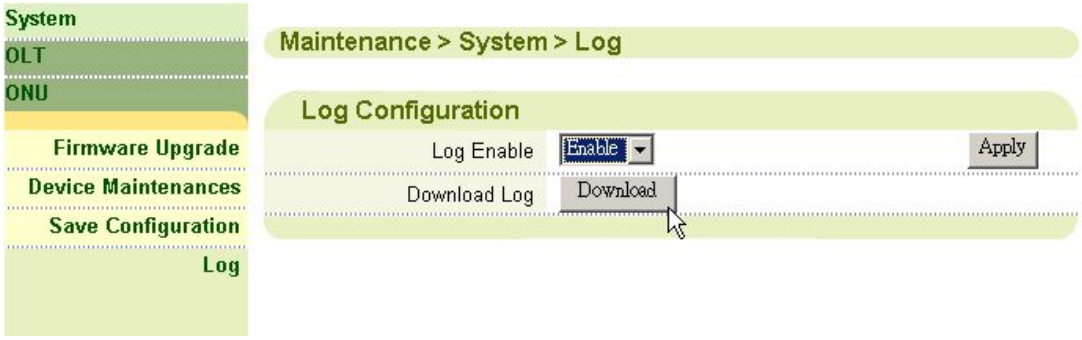


Figure 5-3 System log function

5.1.4 Save Configuration

Go to this submenu to save configuration of OLT or ONU if any value was modified.

Figure 5-4 Save configuration

5.2 OLT

5.2.1 Testing

Go to the OLT >>Testing submenu to test any ONU unit connected to the OLT entity.

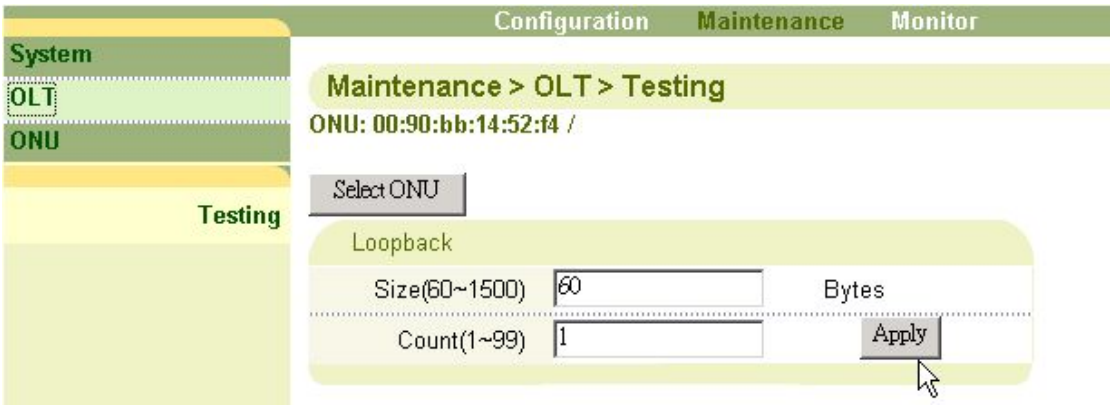


Figure 5-5 Testing

Press << **Select ONU** >> button to select one ONU entity, which will be tested. On the list of ONU units, click one ONU you aim to test (it's MAC or Name will be displayed on bold) and return to the **OLT Testing** submenu. Press **Apply** button to see the testing result. Administrator can specify the size and count number for the testing.

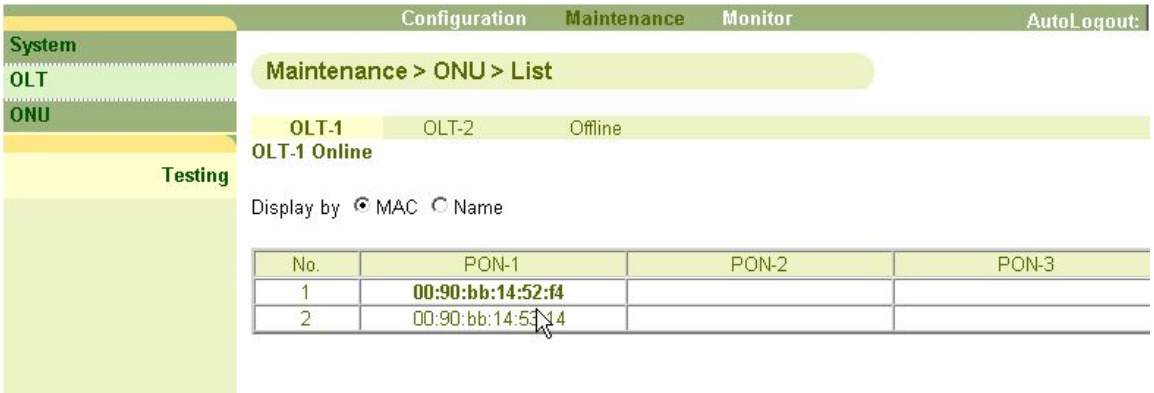


Figure 5-6 ONU selecting

The testing result will be shown as following if OLT got response from ONU unit:

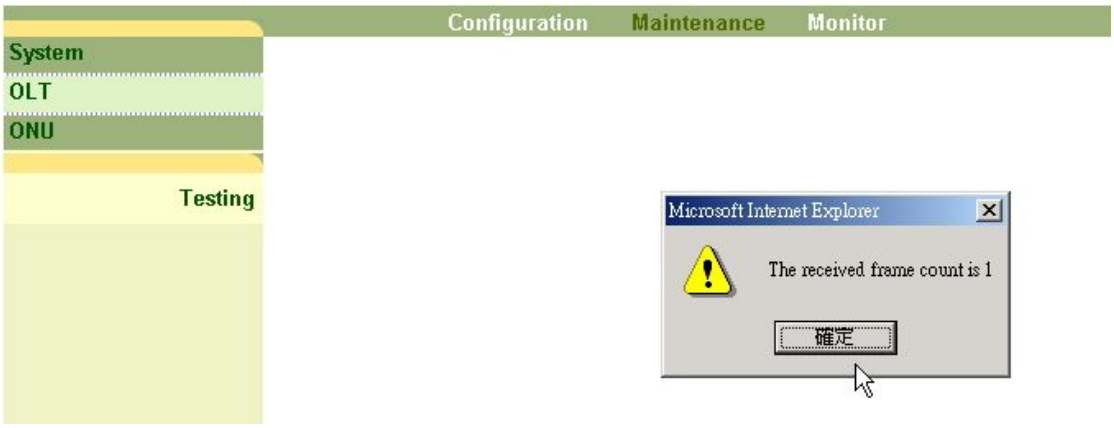
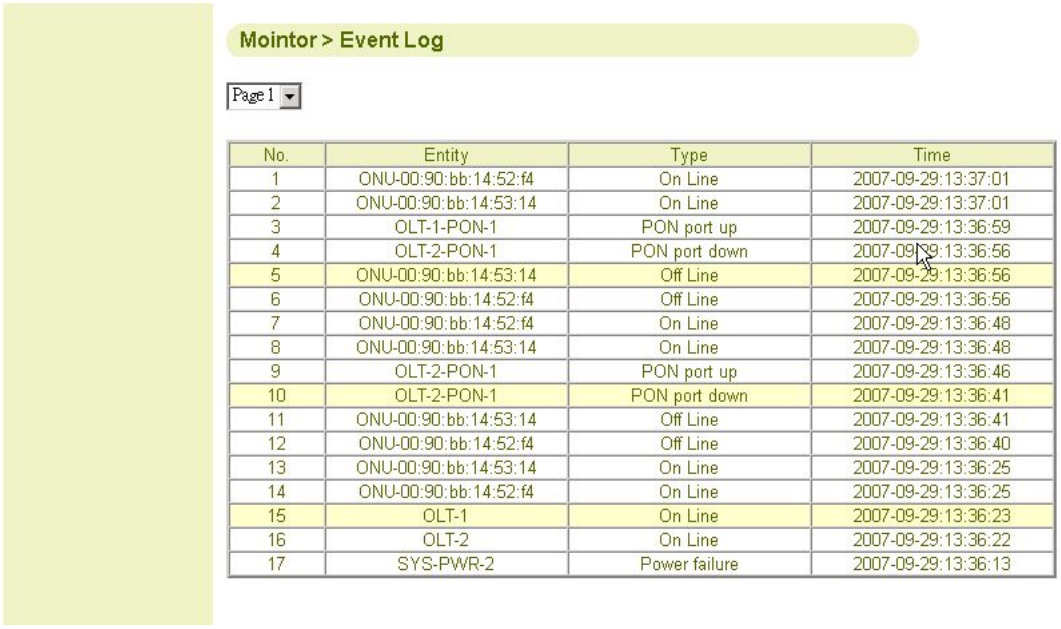


Figure 5-7 Message of testing result

Chapter 6. Monitor

Administrator can view major event logs through the **Event Log** submenu.



No.	Entity	Type	Time
1	ONU-00:90:bb:14:52:f4	On Line	2007-09-29:13:37:01
2	ONU-00:90:bb:14:53:14	On Line	2007-09-29:13:37:01
3	OLT-1-PON-1	PON port up	2007-09-29:13:36:59
4	OLT-2-PON-1	PON port down	2007-09-29:13:36:56
5	ONU-00:90:bb:14:53:14	Off Line	2007-09-29:13:36:56
6	ONU-00:90:bb:14:52:f4	Off Line	2007-09-29:13:36:56
7	ONU-00:90:bb:14:52:f4	On Line	2007-09-29:13:36:48
8	ONU-00:90:bb:14:53:14	On Line	2007-09-29:13:36:48
9	OLT-2-PON-1	PON port up	2007-09-29:13:36:46
10	OLT-2-PON-1	PON port down	2007-09-29:13:36:41
11	ONU-00:90:bb:14:53:14	Off Line	2007-09-29:13:36:41
12	ONU-00:90:bb:14:52:f4	Off Line	2007-09-29:13:36:40
13	ONU-00:90:bb:14:53:14	On Line	2007-09-29:13:36:25
14	ONU-00:90:bb:14:52:f4	On Line	2007-09-29:13:36:25
15	OLT-1	On Line	2007-09-29:13:36:23
16	OLT-2	On Line	2007-09-29:13:36:22
17	SYS-PWR-2	Power failure	2007-09-29:13:36:13

Appendix A Console Pin Assignment

RJ-45 to DB-9 pin assignment is as following:

Pin Number	Description	Note
1	NC	
2	NC	
3	RXD	DUB9 pin2 (Output)
4	GND	DUB9 pin5
5	TXD	DUB9 pin3 (Input)
6	NC	
7	NC	
8	NC	

Table A- 1 RJ-45 to DB-9 pin assignment

Appendix B Command Line Mode

Administrator can login to PON 8510 through craft port(Speed:38400, Data bit: 8, Parity: No, Stop bit: 1, Flow control: No) on the front panel to configure the device. The default user name is: **root** and password is: **admin**.

There are two items can be specified on the command line mode. The first one is to specify the network configuration. Administrator can specify the network configuration of the device before entering the mode of web setting interface.

➢ For example:

EPON login: root

Password: *****

==========

GEPON

==========

login[54]: root login on `tty'

1) Modify Network Configuration

2) Show Event Log

3) Restore to default

>1

IP Address (172.16.5.191):**192.168.0.118**

Netmask (255.255.255.0): **255.255.255.0**

Default Gateway (172.16.5.254): **192.168.0.1**

New system configuration

IP Address: 192.168.0.118

Netmask: 255.255.255.0

Default Gateway: 192.168.0.1

Apply these settings? (Y/N): **y**

Apply system configuration succeed

Save settings? (Y/N): **y**

Saving system settings ok.

Bye!

- The second item is to show event logs of the device.

1) Modify Network Configuration

2) Show Event Log

>**2**

n: last n records from now

n=**10**

Event log total 10 entries: timestamp entity type

2007-09-28:13:40:04 OLT-2-NNI-3 NNI port up

2007-09-28:13:40:04 OLT-2-NNI-4 NNI port up

2007-09-28:13:40:04 OLT-2-PON-1 PON port up

2007-09-28:13:40:04 OLT-1-NNI-1 NNI port up

2007-09-28:13:40:04 OLT-1-NNI-2 NNI port up

2007-09-28:13:40:04 OLT-1-NNI-3 NNI port up

2007-09-28:13:40:05 OLT-1-NNI-4 NNI port up

2007-09-28:13:40:06 ONU-00:90:bb:14:53:14 On Line

2007-09-28:14:26:15 SYS-FAN-1 Fan fail

2007-09-28:14:26:39 SYS-FAN-1 Fan normal

Bye!

➢ The third item is to restore configuration to default.

1) Modify Network Configuration

2) Show Event Log

3) Restore to default

>3