

FHL104C
EPON OLT
User Manual

Preface

Related Documentation

| Manual Name | Explained |
|---------------------------------|---|
| 《FHL104C Command Line Reference | Introduced FHL104C OLT entry devices, systems and equipment, VLAN, port, port isolation, OLT, ONU, RSTP, Link-Aggregation, mirror, the MAC address table, QoS, ACL, IGMP, performance, alarm and pipe network module command. |

About this Document

FHL104C EPON OLT User Manual 《mainly introduces the product description, positioning, installation, operation, specific functional characteristics and configuration method, product use matters needing attention in the process of etc.. It suits for product technical support personnel and people who use the product . Above the product operation, if you have any questions, please read this manual carefully.

Conventions

The following symbol format and keyboard combination may be found in this document, they are defined as follows:

Format Conventions

| Format | Meaning |
|----------------|---|
| Bold | Command key words (Remain unchanged in the command have to input completely) |
| <i>Italic</i> | Parameters of the command (Replace this part of the command by the actual values) |
| [] | The element located in[] means this part is optional |
| (x y ...) | Means that one of the element must be selected in this part |
| [x y ...] | Means that it's a option to select one of this part |
| <x-y> | Means that the value must be inputted between x and y |
| \$ | Indicates the note annotation after this symbol |

Key Combination Conventions

| Format | Meaning |
|--------------|--|
| <words> | Means the name of a key, for example <Enter> :Tab> (Backspace> <a>) :?> indicates the key of Enter, Tab, Backspace, lowercase letters |
| <KEY1+key 2> | Means the key combination. pressing the keys meanwhile. For example <Ctrl+Alt+A> means pressing "Ctrl" "Alt"、<"A" These three key meanwhile |
| <KEY1 key2> | Means press the first key、<Release Then press the second key、 For example <Alt F> means press <Alt> KEY firstly, Released, and then press <F> KEY. |

Symbol Conventions

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



Caution, Note: Indicates a potentially hazardous situation, which if not avoided, may cause equipment damage, data loss, performance degradation, or unexpected results.



Warning: The notes followed the sign need to be given extra attention, improper operation may cause damage to the body.



Instructions: Provides additional information to emphasize or supplement important points of the main text.

Noun convention

OLT: Here means FHL104C System, including switches and other devices connected on the link port, the main exchange processing module.

PON Here means PON Protocol Processing module and PON port.

Tips

The command line input for the system need to be distinguished from the size of the write.

Abbreviations

| | |
|-------|------------------------------------|
| ACL | Access Control List |
| CDR | Call Detail Record |
| CVLAN | Customer VLAN |
| DA | Destination Address |
| DBA | Dynamic Bandwidth Allocation |
| EPON | Ethernet Passive Optical Network |
| FEC | Forward Error Correction |
| IGMP | Internet Group Management Protocol |
| LLID | Logical Link Identifier |
| LPU | Line Process Unit |
| MAC | Medium Access Control |
| OLT | Optical Line Terminal |
| ONU | Optical Network Unit |
| QoS | Quality of Service |
| RSTP | Rapid Spanning Tree Protocol |
| SA | Source Address |
| SCU | Switch Control Unit |
| SLA | Service Level Agreement |
| SNI | Service Network Interface |
| SNMP | Simple Network Management Protocol |
| RTT | Round Trip Time |
| UNI | User Network Interface |
| VLAN | Virtual Local Area Network |
| VoIP | Voice over IP |
| C&M | Classification&Marking |

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1.Description

1.1Product description

FHL104C is Shenzhen PHYHOME Electronics Co., Ltd. launched a cassette GEAPON OLT Bureau end device. The device has the advantages of small volume, light weight, convenient installation and simple maintenance, good compatibility, service without configuration, plug and play with.FHL104C provides four GEAPON port and four Cu / light combo uplink port, with a total access to 256 ONU.FHL104C follow IEEE 802.3 standards, by reference to the requirements to achieve the China Telecom EPON Technology and support 1GEAPON access business, and Shenzhen City PHYHOME Electronics Co., Ltd. of FHR series of ONU With the use of the ONU with the third party.



1.1.1 Product positioning

Product positioning is a small, easy to use, cost-effective EPON OLT equipment at office end for in high-rise buildings, small communities , low density residential areas, companies, shopping malls, hotels, office buildings and other small construction of FTTH. It can also be used to monitor, intercom and other industry applications.

1.1.2 Product features

- 19 inch standard width, 1U height
- The installation is simple and flexible, and don't need to configure.
- Provide 4 GEAPON port access
- Maximum 256 ONU access (1:64)
- The maximum 4 COMBO Gigabit uplink ports business

- Comply with 802.3 ah specification
- Fully compatible with CTC GEAPON specification
- Support 1:64 optical branching ratio (10km transmission distance)
- Maximum access distance 20Km (1:32)
- Supports three layers of Stir (CTC SPEC).
- Support FEC (which can improve the transmission distance and branching ratio)
- Supports arbitrary PON 1:1 protection (TBD)
- Support ONU out of power, broken fiber alarm
- Supports RSTP and loop back detection of ONU port
- Support ONU software exception upgrade, batch upgrade
- Supports ONU data interoperability with a PON port
- Support physical isolation of GEAPON
- Support on uplink port physical isolation
- Supported physical Port isolation of ONU
- Supports 802.1Q VLAN mode
- Support for VLAN transmission, conversion mode
- Supports QinQ VLAN mode
- Supports all kinds of multicast mode (Snooping/Proxy/CTC)
- Support end-to-end QoS service quality assurance configuration

1.1.3 Structure features

1U standard case, the size of the 440mm (W) 44mm x (H) x 170 (D)
FHL104C Front Panel View Figure 2-2



The components and functions of the front panel are described as follows:

- (1) RST: Restart button
- (2) CONSOLE: serial port, interface to meet the RS232 Standard Specification for local management
- (3) MGMT: a device with an external management network interface to meet the 100BASE-TX specification for use with a higher level management Equipment connection
- (4) PWR power indicator. When bureau terminal power on, this lantern lits
- (5) ACT: equipment running indicator
- (6) ALM: emergency warning light
- (7) PON1-PON4:4 GEAPON interface
- (8) GE1-GE4:10/100/1000BASE-TX adaptive Ethernet electrical interface,

providing the service. Access can automatically adapt to the direct network cable and cross network cable.

(9) SFP1-SFP4: 1000BASE-LX/SX Ethernet optical interface, supports 1.25Gbps single mode and multi-mode SFP optical module.

| LED | | State | Explain |
|--------------|-------------|--------------|---|
| System state | Power (red) | on | normal operation condition |
| | | off | There is no normal operation of the power system and the power system |
| Port state | ACT (green) | Twinkle | 4Hz frequency: system start state 1Hz frequency: normal working condition |
| | | Light or off | System is not working normal |
| | | on | A stable connection is established between the port and the connected device. |
| | | off | No connection or connection to the port is not normal |
| | | Twinkle | Ongoing data collection / development |

1.1.4 Index parameter

Table 5-1 device function and index parameter list

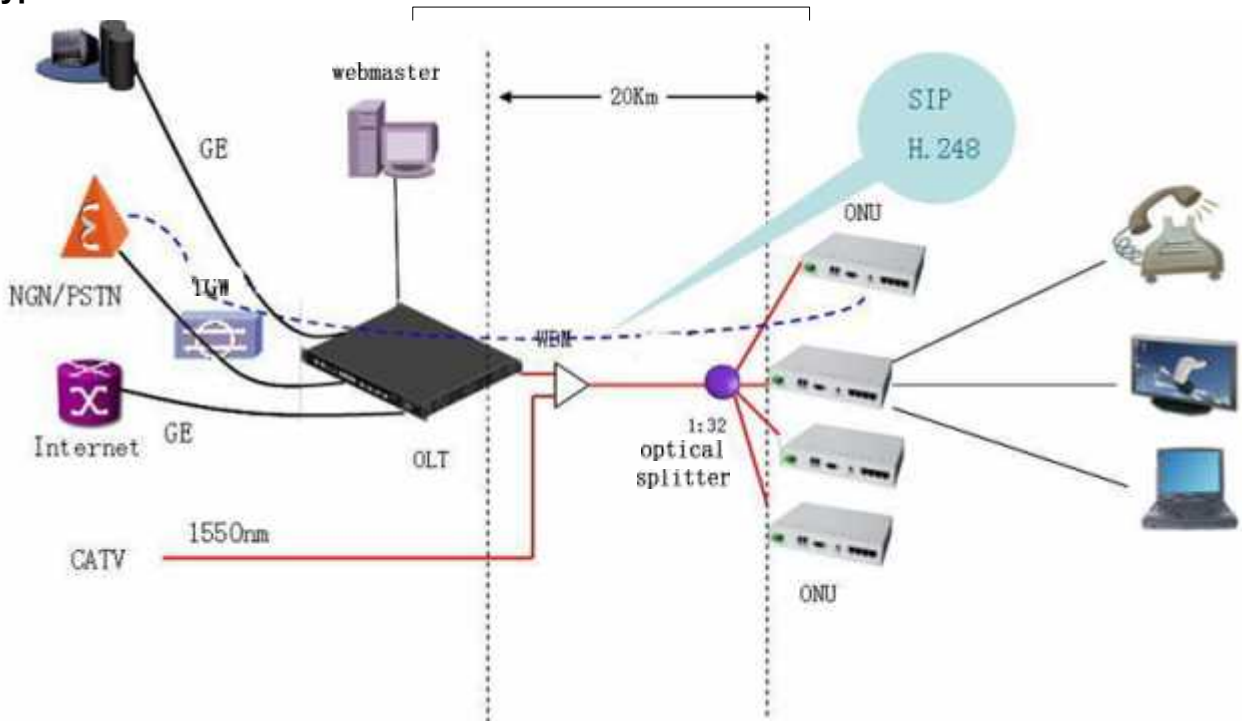
| item | | Description | |
|-----------------|----------------|---------------------|--|
| chassis | structure size | Size | 440mm (W) x 44mm (H) x 170 (D) |
| | | weight | 1000g |
| | | body frame | 19", 1U |
| AC power supply | | Input | 90V TO 264V AC |
| | | Power | 50W |
| | | Surge current | <10A TBD |
| | | fuse | 2A TBD |
| | | redundance | Not supported |
| | | Isolation impedance | > 50M ohm |
| | | earthing resistance | < 5 ohm |
| environment | | temperature | 0 to to 40 degree C (long term) -5 to 50 degree C (2 hours / day) |
| | | humidity | 10 to 90% (no condensation) |
| | | Storage temperature | -20 to 70°C |
| | | Storage humidity | 10 to 90% (no condensation) |

| item | | | Description | |
|-----------------|--|--|---|---|
| | | atmos | 86 to 106 kpa | |
| | | Dust particle size | Diameter>5μm, <3*104pcs/m3 | |
| | Refrigeration | Fan | Left fixed 2 fans, right into the wind, the left side of the wind | |
| | | Heat dissipation | | |
| | | noise | | |
| | Electromagnetic compatibility requirements | | GB 9254-1998 Class A GB/T 17618-1999 | |
| | Surge protection requirements | | YD/T 1082-2000 | |
| Panel interface | Network management I/F | Port number | 1 | |
| | | junction | RJ-45 | |
| | | protocol | 100BASE-TX/10BASE-T | |
| | | MDI/MDI-X | Auto | |
| | | | Duplex | Full/Half Auto |
| | CLI I/F | junction | RJ45(CSICO) | |
| | Other I/F | LED | Please refer to "LED display specifications" | |
| | | Uplink I/F | Port number | 4 (combo |
| | | | junction | 4 RJ45 |
| | | | junction | 4 SFP |
| | | | protocol | 10/100/1000BASE-T(RJ45) 1000BASE-X (SFP) |
| | | | MDI/MDI-X | Auto or Manual |
| | | | Duplex | Full Duplex or Auto |
| | | reset | RST(Switch) | Reset the whole system by the reset button |
| | | PON I/F | Port number | 4 |
| | | | Trunk fiber protection port | 0 |
| | | | junction | SFP socket, SC connector |
| | | | protocol | 1000BASE-PX20 IEEE802.3-2005 |
| | | | DDM with RSSI | Compliant with CTC2.1 |
| | | | emission wavelength | 1480 to 1500nm |
| | | Luminous power | +2.0 to +7dBm | |
| | | RMS | ≤ 0.44nm | |
| | | extinction ratio | ≥9dB | |
| | | Receiving wavelength) @BER<1×10-12 | 1260 to 1360nm | |

| item | | Description |
|-----------|--|--|
| | Received optical power (@BER1×10^{-12} | -28 to -6dBm |
| Other I/F | LED | Please refer to "LED display specifications" |

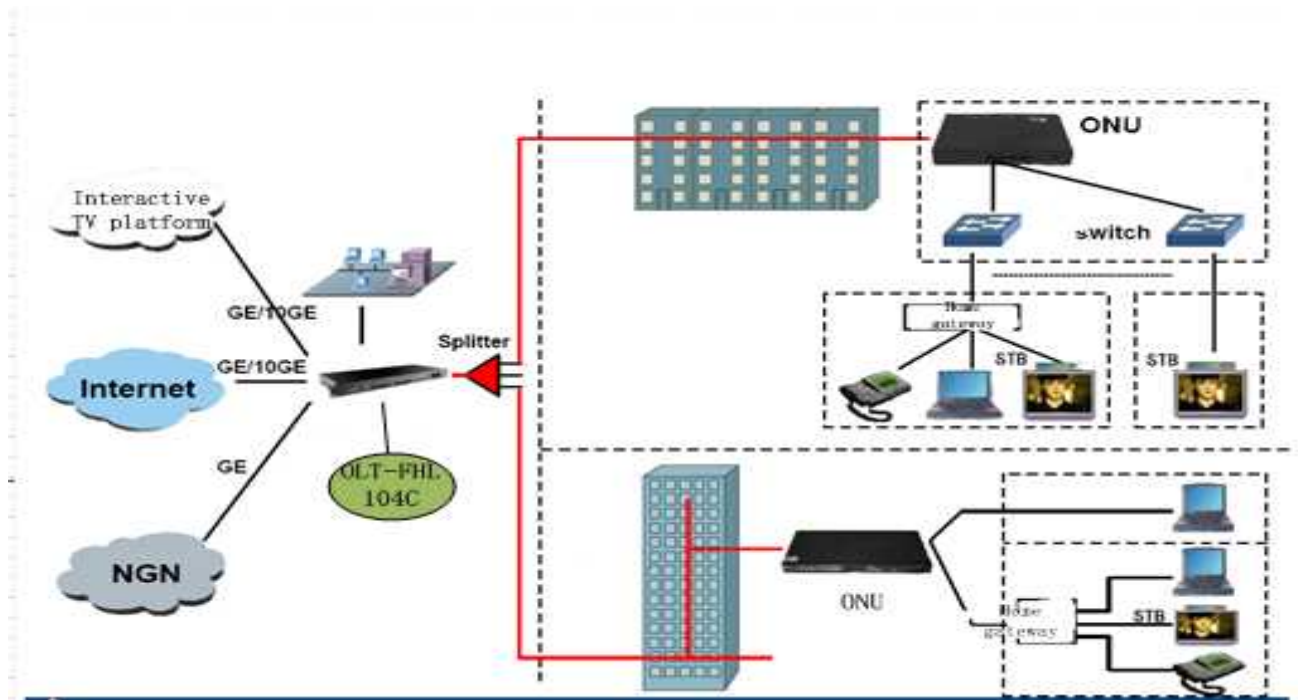
1.1.5 Typical networking

Typical multi service access network:

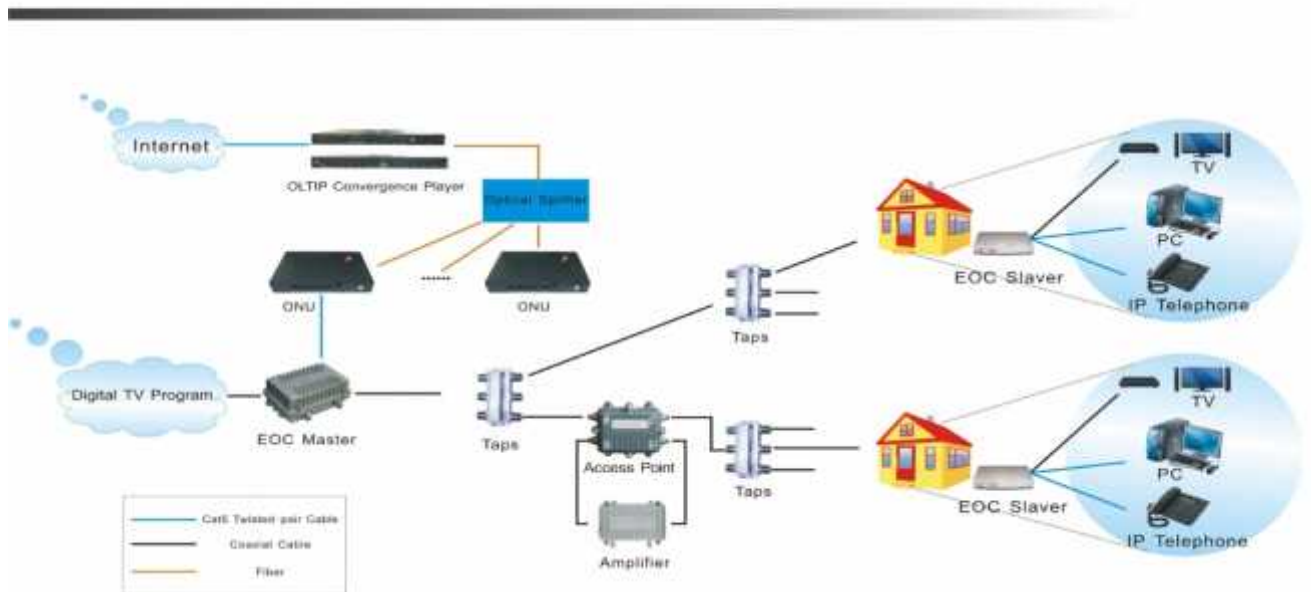


High-rise buildings, the number of single building users around 200:
 Low density cell:

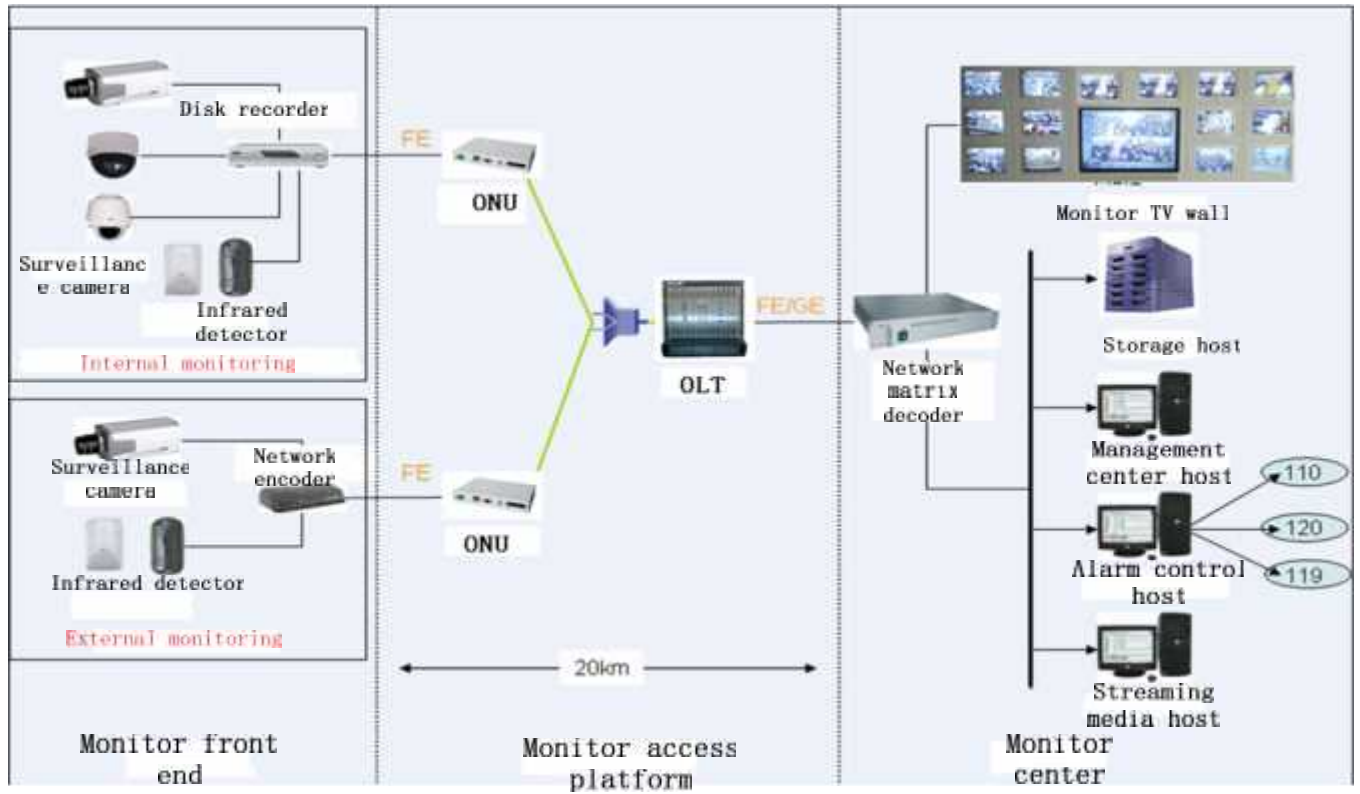
Radio and television network application EPON+LAN:



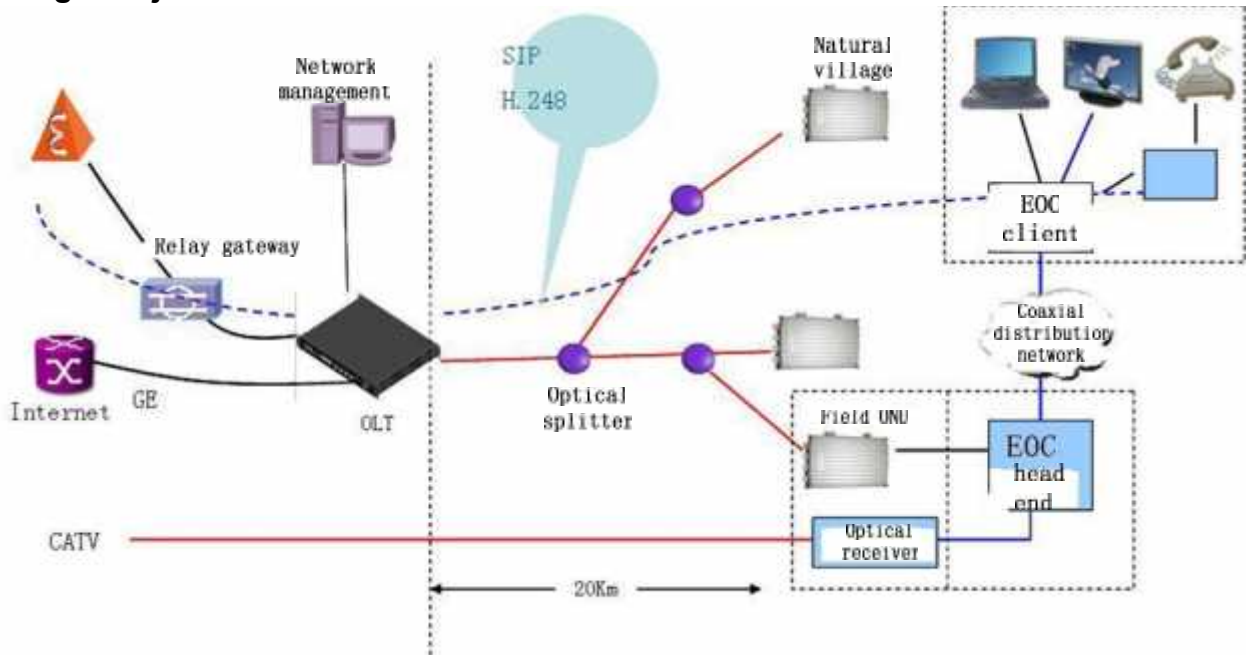
Radio and television EPON+ EOC



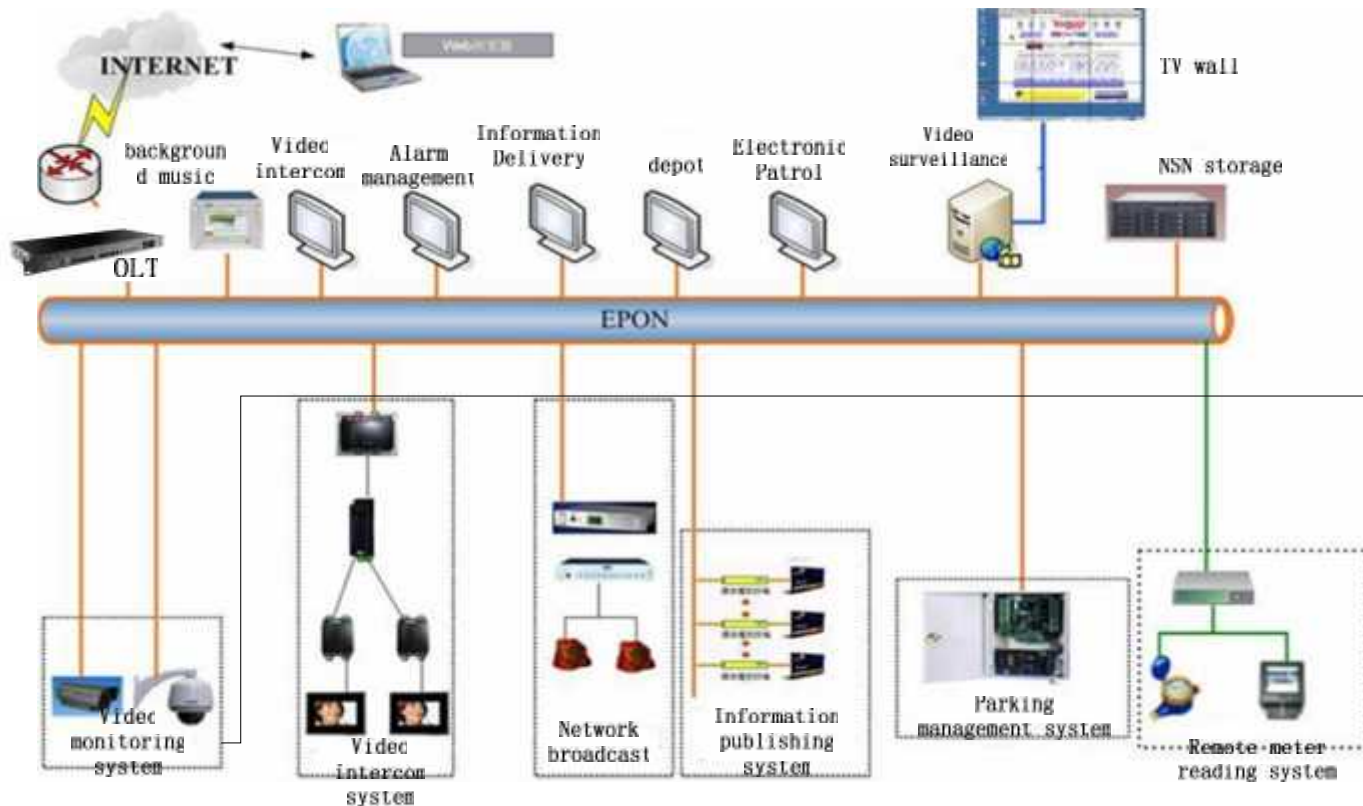
Safe city



Village Project



Smart home



1.2 functional description

1.2.1 GEPON access function

- EPON standard

Fully comply with IEEE802.3ah standards, fully compatible with China Telecom EPON equipment technical requirements V3.0.

- Maximum spectral ratio

1: 64.

- Bandwidth setting

Through the SLA setting, the bandwidth of the ONU can be configured (which can be configured with a minimum guaranteed bandwidth and maximum effort bandwidth).

- ONU management

You can add, authorize, and bind PON at the ONU port to display a list of authorized and unauthorized ONU. Remote management through ONU OLT and

its port (port isolation and port loop back detection, etc.).

- ONU isolation

By default, the ONU is physically isolated.

After the P2P mode is turned on, the ONU can communicate with each other in the same PON port.

- ONU classification function (Classification&Marking)

You can perform simple traffic classification on the ONU (based VLAN).

- security

Supports three layers of Stir (SPEC CTC).

Supports MAC address number limit, supports MAC address filtering.

Supports full protection of PON port.

1.2.2 Data service and forwarding

- VLAN function

OLT and ONU support port based VLAN, VLAN ID range: 1~4094, where 1 is reserved for VLAN ID , OLT VLAN ID number is 4094.

Support VLAN 802.1q mode, support VLAN through the transfer, conversion mode, support QinQ VLAN mode.

- MAC

OLT supports the exchange of MAC addresses, which supports the dynamic learning of the MAC address. MAC's OLT address aging time can be configured.

- Port isolation

Support physical isolation link port, support GEAPON port physical isolation.

- Dynamic bandwidth allocation (DBA)

OLT support dynamic bandwidth allocation mechanism, through to the LLID assigned SLA to implement bandwidth allocation, a minimum bandwidth allocation particles of 1MB / s, each LLID configuration can be guaranteed bandwidth, to

bandwidth and priority three parameters. An LLID of the same priority through the historical traffic statistics to ensure that service fairness and the QoS of the network through the guaranteed bandwidth to achieve.

- Priority control (QOS)

The device supports IEEE802.1p agreement marks priorities to achieve the priority of Ethernet control support end to end QoS configuration.

- Storm suppression

Support for broadcast storm suppression.

- Multicast function

Support IGMP snooping, the use of SCB way to achieve multicast, each ONU supports 32 multicast groups, OLT supports 1024 multicast groups.

OLT supports PROXY, and can be dynamically added, IGMP Proxy is able to intercept redundant report IGMP packets for the router, and can take the initiative to IGMP query group.

Support CTC.

1.2.3 Management and maintenance

- Support console port command line management, support the maintenance of network telnet management, support on the export of Telnet in management
- Support SNMP network management
- Remote upgrade

Supports remote online upgrade of OLT devices.

Support ONU remote online upgrade feature, support ONU software bulk upgrade, automatic upgrade.

- Configuration save recovery

You can save the data on the device configuration, and resume after the switch or restart.

- The backup and load of Configuration files

The OLT configuration can be backed up by the document, and then is loaded into it after edited.

- Performance statistics

Support for the uplink of statistics, PON Port Statistics, ONT statistics, ONT ETHport statistics query.

2 Installation and landing

2.1 Security issues



warning:

- When equipment installation, you must first grounding; when remove of equipment, and finally to remove ground. Equipment should be permanent connect to protection ground. Prior to operating equipment, should check the equipment of the electrical connections, to ensure that equipment has reliable grounding.
- Do not block the vents when installing, prevent the operation process of poor heat dissipation leads to failure.

Equipment operation note:

- It is forbidden to operate the equipment and cable in the thunderstorm weather.
- Naked eye are forbidden to export the optical fiber to prevent the laser beam from burning the eyes.

2.2 Login OLT

2.2.1 Thought the console port connected to the OLT device to Log in equipment

With serial port interrupt the host and OLT through the serial port of the DB9-RJ45 connection, new serial connection, serial terminal parameters are set to: baud rate 9600 , data bits 8 bits, no parity , stop bit is 1, without the flow control . Connected to equipment, terminal will be as output:

```
*****
*
* PHYHOME Software Platform (version 1.11)
*
* Copyright 2010-2015 FH-NET OPTOELECTONIC LTD.
*
*All rights reserved.
*
```

login:admin

Password:*****

Device default user name and password is :admin, admin.

After you enter the password, the terminal block is shown as follows. The user can begin to configure the FHL104C.

Host>

2.2.2 Local login via Telnet

The FHL104C management network (MGT) and PC is connected with management using a crossover cable , PC configuration static IP 192.168.0. X subnet, subnet mask 255.255.255.0.

Then start the telnet client on PC, connect to OLT.

The OLT Management net IP: 192.168.0.18.After telnet connection is successful, enter the default user name and password :admin/admin can be connected to OLT.

2.2.3 Remote login via Telnet

FHL104C support with the management of the channel, you can let the host to manage through the OLT upstream port .

The OLT device is equipped with no IP, which needs to be manually configured within the IP.

After using the serial port or MGT port to land OLT, use the following command to configure the IP:

```
Host (config) # manage-vlan 100
```

```
Host (config) # inband ip address 192.168.1.18 255.255.255.0 VLAN 100
```

```
Host (config) # interface ethernet 1/2 - --uplink port management
```

```
Host (config-ethernet-1/2) #join-vlan 100 tag
```

Then through the remote host, telnet to the OLT management IP 192.168.1.18.

Note: If you do not configure the management VLAN, the system defaults to

VLAN 1.

2.2.4 Management OLT through network management software

Before management FHL104C through the network management software, please ensure that host gateway can ping through the OLT with IP or with external IP. Then open network management software FHN108, scanning of the network, after the discovery of the equipment can be added. In the specific operation of the network, please reference 《FHN108 user's manual》.

3 Command line interface and view

3.1 Command line interface

FHL104C OLT equipment provides a series of configuration commands and command line interfaces to the user to configure and manage the EPON system:

- Command hierarchical protection, to ensure that the user is not authorized to invade FHL104C.
- Users can type in<?> at any time to get online help.
- Provide History features, you can view the historical order.
- The command line key take a search method that does not need to fully match the keyword, the user just need to enter the "sh" for the "show" command.

3.2 Command line hierarchy and command line view

OLT FHL104C's command line uses hierarchical protection to prevent unauthorized users from illegal intrusion.

Command line is divided into access level, management level 2 levels, the introduction is as follows:

- Access level: Commands for user interface language mode switch, the terminal control parameter settings, system settings, view, etc., associated with the view .
- Management level: contains the command related to the system overall and interface as well as part of the service configuration, associated with config view, ge, pon, interface, onu and other interface views and vlan and acl and other global configuration view.

The user of the login system is divided into 2 levels, respectively, with the command level, the access level of the user can use the access level commands, privileged users can use all the commands.

3.3 Command line view

Each command line view is based on different configuration requirements, there are connections and differences between them. For example, the OLT establish the connection immediatelyr entering the view after enter a user ID and password, it can only view the running status and statistics The simple function, you can type config command to enter the config view , you can type in different commands to enter the corresponding view.

Command line provides the following seven views: view, config, ge port, pon port, onu, multicast, vlan.

Into the specific operating rules of the view:

- **Enter / exit the view view:** with the OLT connection, enter the password, you can enter the view view to see the system running state, the default password is admin; input exit to disconnect the connection with the OLT.

Login:admin

Password: * * * *

Host#exit

- **Entry / exit config view:** typing configure on enable view, you can enter to config view global configuration; type exit or end retreated to the view.

Host#configure

Host (config) # exit

Host#

- **Entry / exit ge port view:** in the config view input interface ethernet (slotid/portid:1/<1-4>) can enter to uplink view Gigabit uplink port configuration; type exit retreated to config view, input end retreated to the view.
- **Entry / Exit pon view:** in config view input *int pon slotid / portid (slotid / portid: 1/<1-4>)* to proceed to the next pon view a PON port configuration; enter the

exit button to exit config view, enter end retreat to view .

```
Host (config) # interface pon 1/1
```

```
Host(config-pon-1/1)#
```

```
Host(config-pon-1/1)## exit
```

- **Entry / exit onu view:** in the config view input *int onu slotid/portid:branchid (slotid/portid:branchid:1/<1-4>: <1-64>)* can enter the onu view to configure the ONU; type exit retreat to the pon view, input end to retreat to the view.

```
Host(config) # interface onu 1/1:1
```

```
Host(config-onu-1/1:1)
```

```
Host(config-onu-1/1:1)# exit
```

- **Entry / exit VLAN view:** in the config view input *int vlan vlanid* can enter vlan view to global configure the VLAN; type exit to retreat to config view, input end retreated to the view.

```
Host (config) # int vlan 2
```

```
Host (config-vlan-2) #
```

```
Host (config-vlan-2) # exit
```

```
Host (config) #
```

- **Entry / exit multicast view:** in the config view input *multicast* can enter the multicast view to global configure the ACL; type exit to retreat to config view, input end to retreat to the view.

```
Host (config) # multicast
```

```
Host (config-multicast) #exit
```

```
Host (config) #
```

3.4 Command line feature

3.4.1 Command line help

The command line interface provides two types of online help: Complete help and partial help. The user can get the relevant information needed in the process of

the device configuration.

3.4.1.1 Complete help

- 1) In any view, type <? >, the user terminal screen displays all the commands and their simple descriptions of the view.

Host (config-vlan-2) #

cls Clear screen

description Vlan description

end End current mode and change to enable mode

exit Exit current mode and down to previous mode

help Description of the interactive help system

list Print Commands list for current mode

member Vlan member information

no Negate a command or set it to its defaults

quit Exit current mode and down to previous mode

- 2) Type a command, then connect to a <?>, if the location is the keyword, and the user terminal screen will list all key words and their simple description.

Host (config-multicast) #igmp

pre-group Set prejoin services.

proxy-ip Configure IGMP proxy services.

- 3) Type a command, then connect to a <?>, if the location is a parameter, the user terminal screen will list the related parameters.

Host (config) #interface vlan

<1-4094>Vlan id

3.4.1.2 Partial help

- 1) Type a character string, which is followed by <?>the end of the user's terminal

screen, which lists all the commands at the beginning of the string.

Host (config) # in

inband Inband interface

interface Enter ethernet configuration mode

- 2) Type a command, and then a string is followed by <?>the user's terminal screen, which lists all the key words in the beginning of the string.

Host (config) #show auth

authorized-onu Authoried ONU list

authorize-mode Authoried ONU mode

authorize-policy Authoried ONU policy mode

- 3) Type the command of a keyword in the first few letters, press the key <Tab> if to enter letters at the beginning of the keyword only, the user terminal screen will show a complete keyword; if the keyword matching with the input alphabet is not unique, the terminal screen in order to display letters matching keywords.

3.4.2 Command line history command

The command line interface provide function similar to Doskey function, the history command the user typed can be saved automatically, users can always invoke the history command line the command interface kept , and repeat. When the user input a plurality of the same command, only the first input command as a command history was ordered interface save as shown in table 3-1.

Table 3-1 access history command

| Operation | Keys or commands | result |
|------------------------------|------------------------------|--|
| Show historical commands | <i>show history</i> | Effective historical command to display user input |
| Access to a historical order | The cursor keys↑ or <Ctrl+P> | If there is an earlier historical order, then take a history order |
| To visit a historical order | Next cursor key↓or <Ctrl+N> | If there is a history of late, then take out the next historical order |

3.4.3 Command line error message

All the commands the user type in , if it pass the syntax check , it will be executed correctly , or report the error message to the user, and the common error message is shown in table 3-2.

Table 3-2 common error information table

| English error message | Cause of error |
|-----------------------|-------------------------------------|
| % Unknown command. | No command is found |
| | No keyword search |
| | Parameter type error |
| | The parameter value is out of range |
| | Too many input parameters |
| %Command incomplete. | Input command is not complete |
| %Ambiguous command. | Input command is not clear |

3.4.4 Command line editing features

Command line interface provides the basic command editing features, support for multi line editing, the maximum length of each command is 256 characters, as shown in table 3-3.

Table 3-3 edit function table

| Key | Function |
|---|--|
| Ordinary key | If the edit buffer is not full, insert the current cursor position and move the cursor to the right. |
| Back lattice Backspace | Delete a character of the position of the cursor, the cursor forward |
| Left cursor key ← or <Ctrl+B> | A character position is moved to the left |
| Right cursor key → or <Ctrl+F> | Cursor to move a character position to the right |
| the cursor key ↑ or <Ctrl+P> The cursor keys ↓ or <Ctrl+N> | Show historical commands |
| Button <Ctrl+C> | When a display information is more than a screen, provides a pause function, then the user can type Ctrl+C used to pause the display and the suspension of the command to perform. |

| | |
|---------|---|
| Tab key | After typing the incomplete key press Tab, the system will automatically execute the partial help: If the matching key word is unique, the system with the complete replacement of the original input keyword; if you enter a letter with a matching keyword is not unique, then displayed one letter matching keywords and line display; if the command word parameters do not match, the system does not make any changes, rewrapping display original input. |
|---------|---|

4.PON service description and configuration

4.1PON service Introduction

EPON sections service mainly includes ont granted registration, and ont service template configuration.FHL104C adopt authorized (also called authentication) and authorization strategy to operate legitimacy management of ont . Authorization is refers to the standard definition, through what way to uniquely identify a ont and distribution ONUID.FHL104C support for MAC address, logic ID , MAC address + logical ID three authorization. Authorization policy mainly authorized manually and automatically authorize.

In FHL104 system, ont registered and ont authorization are two different concepts. Registration is ont access after OLT, MPCP negotiation, ONUID distribution and location of a series of process. After successful registration, ONT is "has been registered, unauthorized state" in a OLT. This service can not run normally.

The authority is to authorize the ONT to have a successful ONT access, or the ONT for a pre configuration. It is the legitimacy of a ONT license.

Manual authorization means via the command line, the network management to

configure the ONT manually that has been registered or required for pre configuration for the registration.

Automatic authorization means that when the ONT is successfully registered to OLT, the system automatically completes the authorization operation without human operation.

After authorization, the ONT data will be written to the software and hardware related tables.

ONT's service template mainly has the DBA template and QINQ template.

DBA template is a service bandwidth template, which is based on the ONT configuration of a class template.

The QINQ template is a service template for FHL104C, which defines the VLAN, priorities, and ETH types of service flows.

4.2 PON configuration

4.2.1 Global parameter configuration

- Authorization mode configuration:

In config mode, enter the command:

authorize-mode can operate authorization mode switch. The default authorization mode is MAC address. If you need to change the authorization mode to Hybrid (that is, MAC address +LOID), enter the following command:

```
Host (config) # authorize-mode hybrid
```

note: authorization model and authorization policy interdependence. When the authorization strategy for automatic license, you cannot modify the licensing model.

- Authorization policy configuration:

The system default authorization policy is "automatic authorization", such as the need to modify the authorization policy for manual authorization, can enter the command:

```
Host (config) #authorize-policy manual
```

Note: the configuration of the automatic authorization policy is dependent on the authorization mode. Only when the MAC address is configured for automatic

authorization.

- View configuration results:

Config mode, enter the command

```
Host(config)# show authorize-mode
```

```
Host(config)# show authorize-policy all
```

To view the status of the authorization mode and authorization policy.

4.2.2 service template configuration

The system supports 100 DBA templates, each template is identified by the template name and template ID:

Create DBA Template command:

```
Host(config)# dba-profile 1
```

```
Host(dba-profile-1)#profile-name 10M
```

```
Host(dba-profile-1)#fir 2048 cir 5120 pir 10240
```

```
Host(dba-profile-1)#quit
```

```
Host(config)#
```

QINQ template also called service template, used to define the flow in the process of VLAN. through OLT, such as through the VLAN100 Internet flow, create a QINQ template commands:

```
Host (config) # QinQ-profile 1
```

```
Host(qinq-profile-1)#profile-name HSI_VLAN_100
```

```
Host(qinq-profile-1)#rule 1 translate cvlan 100 to 100
```

```
Host(qinq-profile-1)#quit
```

```
Host(config)#
```

A QINQ template can have a maximum of 32 rule, but the configuration of each rule can not conflict.

If the rule is the same as the operating rules, the rule will cover the previously configured rule.

If you need to remove the template, type *no qinq-profile* or *no dba-profile*.

4.2.3 VLAN Configuration

- OLT VLAN configuration

VLAN configuration contains VLAN create, delete and ETH port VLAN add, delete. uplink ETH port joint VLAN, message entering, and leave the OLT uplink port, the VLAN information carried will have corresponding processing. The uplink port VLAN support transparent transmission and stripping: message from the mouth of the uplink hair to the upstream network equipment, can be with a VLAN tag, can also be untag. And for the packets over the network uplink OLT only VLAN transparent transmission processing. Do not support VLAN add.

Create a VLAN, and add the VLAN to the uplink:

```
Host(config)# vlan 100 -----create VLAN 100
Host(config)# interface ethernet 1/1-----into the upstream port mode
Host(config-ethernet-1/1)#join-vlan 100 tag -----VLAN tag 100 to join the
upstream, and tag go out.
Host(config)# no vlan 100 -----delete VLAN
```

- ONT VLAN configuration

OLT supports the VLAN configuration of ONT under OAM, and the specific configuration method is in 4.2.7 the ONT ETH port configured.

4.2.4 Addition and removal of ONT

In manual authorization policy, after ont successful registration and need to manually ont authorization, authorization process is ont added process.ONT add implies ont attributes relative table establishment, after the completion of writes to the database, as well as the LLID bandwidth resource occupation.After ONT authorization, ont that have legitimate access uplink network permissions.ONT manual authorization can be accomplished via the command line and network management.

ONT add (authorize) command:

```
Host (config) # interface PON 1/1 - in PON mode

Host(config-pon-1/1)#authorize-onu auth-id 1 type FHR1100 mac-addr
```

00:15:20:88:89:90 -----ONT authorization

The lifting of the authorization operation also means that ONT will be removed, the ONT's resources will be released, and the service will be interrupted.

Host (config-pon-1/1) #no authorize-onu auth-id 1 ----- lift ONT authorization

4.2.5 ONT binding template

After the creation of the DBA template, it can through the template binding to ont to specific ont with the template definition of bandwidth properties. ONT binding template, the upstream bandwidth will be according to the bandwidth configuration template effect. DBA binding template, you need to specify a template name.

Host(config)# interface onu 1/1:1

Host(config-onu-1/1:1)#bind dba-profile 10M

Release DBA template binding:

Host(config-onu-1/1:1)#no bind dba-profile 10M

4.2.6 ETH ONT port configuration

OLT support through the parameters of the OAM remote configuration ONT ETH port, such as eth port open / close, auto negotiation, uplink and downlink rate limiting, ring back detection, Ethernet VLAN mode and which,.ONT configuration parameters to the ONT mode. Before the configuration to use command interface ONU 1/1:1 (PON 1 ONT ID 1) into ONT mode.

- ONT Ethernet port open, close:

Host (config-onu-1/1:1) #ethernet-port 1 disable - close ETH

Host (config-onu-1/1:1) #ethernet-port 1 enable - Open ETH

- ONT Ethernet port rate limit:

Host(config-onu-1/1:1)#ethernet-port 1 downstream-rate-limit cir 20480 pir 102400

- ONT Ethernet port VLAN configuration

ONT Ethernet port VLAN configuration support configuration VLAN mode and VLANID.

VLAN mode is commonly used in TAG mode and TRUNK mode.

```
Host(config-onu-1/1:1)#ethernet-port 1 vlan-mode tag
```

```
Host(config-onu-1/1:1)#ethernet-port 1 vlan-tag vid 10 -----vlan tag model
```

```
Host(config-onu-1/1:1)#ethernet-port 2 vlan-trunk -----vlan trunk model
```

```
Host(config-onu-1/1:1)#ethernet-port 2 vlan-trunk vid 20
```

4.2.7 ONT remote restart

Type the *reboot* command in ONT mode to restart the ONT.

```
Host(config-onu-1/1:1)# reboot
```

4.2.8 ONT multicast configuration

Support ONT multicast mode, multicast fast leave setting and multicast VLAN.

```
Host(config-onu-1/1:1)#mcast-work-mode snooping ----multicast mode is snooping
```

```
Host(config-onu-1/1:1)#mcast-leave-mode fast ----- fast leave Configuration
```

```
Host(config-onu-1/1:1)#ethernet-port 1 mcast-vlan 100 ----Configuration multicast VLAN100
```

```
Host(config-onu-1/1:1)#ethernet-port 1 mcast-vlan not-strip-vlan ----no mcast-vlan multicast VLAN
```

4.2.9 Encryption and FEC switches.

ONT encryption Configuration and FEC switches

```
Host(config-onu-1/1:1)#encrypt-ctrl
```

```
Host(config-onu-1/1:1)# fec-ctrl
```


5.QINQ service description and configuration

5.1Qinq service Introduction

FHL104C use service templates to define the service model, namely Qinq profile. In Qinq template can create up to 32 rule, each rule defines a service model. Such as VLAN transparent transmission, VLAN switch, and a VLAN tag add is Qinq business.

After binding the QINQ template to the PON port, the PON port will use the service model defined in the QINQ template.

QINQ template configuration process, each rule can not conflict. The back of the rule rule can cover the front, but the configuration of the rule will not come into effect.

5.2Qinq service configuration

Create a QINQ template that defines a QINQ service model:

```
Host(config)# qinq-profile 10
```

```
Host(qinq-profile-10)#profile-name qinq
```

```
Host(qinq-profile-10)#rule 1 add-svlan 200 cvlan 100 -----inlayer vlan
100,outlayer vlan 200
```

```
Host(config)# interface pon 1/1
```

```
Host(config-pon-1/1)#bind qinq-profile qinq -----PON port bind QINQ template
```

When the QINQ template rule is created, it can be added to the outer VLAN.

Such as the first layer after the VLAN switch, and then add the outer VLAN:

```
Host(qinq-profile-20)#rule 1 translate cvlan 5 to 10 add-svlan 100
```

For a specific range of inner VLAN, do add outer VLAN operation:

```
Host(qinq-profile-20)#rule 2 add-svlan 400 cvlan-range 40 50
```

When you add an outer VLAN, you can make a Ethernet Type and a priority of the outer VLAN, which can be copied from the inner VLAN, and also can be specified manually:

```
Host(qinq-profile-20)#rule 3 add-svlan 300 copy cvlan-cos ethertype
0x8200 cvlan-cos 7 cvlan-range 20 30
```

Customers need to be based on the actual service network planning, to configure the appropriate QINQ template.

Generally speaking, the VLAN at network side is limited, service planning is generally a type of service planning a VLAN. In order to simplify the configuration and for a small access network, VLAN user side can be consistent with the network side, do not need to configure QinQ double VLAN. Such simple configuration, easy maintenance. The side of the user can use the VLAN range 1-4095, user side of VLAN can be identical to the network side, can also be different. For the user side of VLAN at network side, QinQ configuration templates are as follows:

```
Host(config)# qinq-profile 30
```

```
Host(qinq-profile-30)#profile-name3service
```

```
Host(qinq-profile-30)# rule 1 translate cvlan 10 to 10 -----user VLAN
```

unchanged, until the uplink up to the network side, the VLAN for Internet business

Host(qinq-profile-30)# rule 2 translate cvlan 20 to 20 -----user VLAN unchanged, the uplink direct to the network side, the SWD for SIP telephone service

Host(qinq-profile-30)# rule 3 translate cvlan 30 to 30 -----user VLAN unchanged, the uplink direct to the network side, VLAN30 for IPTV video on demand services.

6. Multicast service introduction and configuration

6.1 Multicast service introduction

Multicast is a communication to multiple recipients simultaneously to transmit data, now widely used in IP video on demand service .FHL104C achieve the basic multicast service functions, including IGMP V2, IGMP Snooping, IGMP proxy, and VLAN-based Multicast.

IGMP proxy: mainly realize multicast query and multicast report function . Query is of universal group query or a specific set of queries to the user multicast, reporter is to response on the upper router query message .

IGMP Snooping: mainly realize multicast monitoring function, intact forwarding multicast packets sent by the user side. Query the specific group at the same time function.

Multicast based on VLAN: Support to verify MVLAN and process users' add and left .The system does not support multiple multicast VLAN currently ..

Multicast pre - adding features: support for a specific program to add features,

for pre - added program, the system will automatically send report packets, the program flow to the OLT upstream.

FHL104C currently only supports V1 IGMP and IGMPV2, for the time being not processed V3 IGMP packets. It does not support the multicast version number of the configuration system.

The opening of the multicast service needs to configure multicast VLAN, multicast mode, multicast upstream port and pre join the program group.

6.2 Multicast Configuration

6.2.1 Multicast VLAN configuration

Configure the multicast VLAN in multicast mode. the current system only support one multicast VLAN. After the multicast VLAN is configured, the system requires that the multicast packet is the same as the multicast VLAN with the configuration of VLAN.

```
Host(config)# multicast -----getin multicast mode
```

```
Host(config-multicast)# multicast vlan 100
```

6.2.2 Multicast mode

The current system supports IGMP snooping and IGMP proxy configuration.

```
Host(config-multicast)# multicast mode proxy
```

6.2.3 Multicast upstream port

The multicast upstream port is used to specify the entry port on the OLT:

```
Host(config-multicast)#multicast uplink-port 1/1
```

6.2.4 Multicast global parameter configuration

IGMP Proxy IP address configuration:

```
Host(config-multicast)#igmp proxy-ip 192.168.1.242
```

IGMP proxy query interval:

```
Host(config-multicast)#multicast query-interval 60
```

IGMP query response time:

```
Host(config-multicast)#multicast query-response-interval 10
```

The maximum number of IGMP queries:

```
Host(config-multicast)#multicast robust 2
```

7. Upstream port configuration

7.1 Upstream port mode

FHL104C uplink port for 4*1GE combo interface. The same port number of Ethernet and SFP optical interface cannot use at the same time . Considering the FHL104C product positioning and uplink port currently does not implement adaptive function. Uplink port on the device side also need the 1000m interface, otherwise uplink port cannot up.

The upstream port mode has two kinds : fiber and copper, physical connection mode can be switched by the command .

```
Host(config)# interface ethernet 1/1 -----into the upstream ETH port mode
```

```
Host(config-ethernet-1/1)# medium fiber -----configuration uplink port as Light port
```

```
Host(config-ethernet-1/1)#medium copper -----configure uplink port as electric port
```

7.2 The addition and removal of VLAN

Upstream VLAN supports tag and untag modes.

Tag mode indicates that the message from the upstream port will carry the VLAN information.

Untag pattern identifies the message from the upstream port when it will be stripped of VLAN information.

For the network side into the mouth of the message, VLAN information don't process.

```
Host (config-ethernet-1/1) # join-vlan 100 tag ----- VLAN 100 tag the uplink port
```

```
Host (config-ethernet-1/1) #join-vlan 200 -----VLAN untag 200 untag
```

Prior to the VLAN configuration, the VLAN has been created:

```
Host (config-ethernet-1/1) #join-vlan 300 untag
```

```
% Vlan 300 does not exist, please create it first!
```

7.3 Close and open the upstream port

Through the shutdown command, you can directly close the upstream port; no shutdown command to open the port.

```
Host(config-ethernet-1/1)# shutdown
```

```
Host(config-ethernet-1/1)#no shutdown
```

The command is not prompted after the successful execution of the system.

8.OLT storm suppression

8.1 Multicast suppression

Multicasting refers to the destination MAC address of the first byte of the lowest 1 message, the access layer equipment common multicast message multicast packets and STP protocol, routing protocol message.FHL104C can detect such message and according to the configuration inhibition, to save bandwidth, network protection role.

ETH uplink port suppression:

```
Host(config)# interface ethernet 1/1
```

```
Host(config-ethernet-1/1)# multicast-limit the limit speed is 200pps .
```

The purpose of which is to achieve the purpose of suppressing the rate of PPS. The unit is the, the upstream port is suppressed by all the multicast packets, including the multicast protocol and the multicast stream.

After the arrival of the multicast message OLT OLT will query the multicast forwarding table, if in the multicast forwarding table, the MAC address to the normal forwarding is called for known multicast, if you can not find the forwarding is known for unknown multicast. Based on multicast-limit uplink port eth is inhibition of all multicast packets.

Under the PON port can also be configured based on the suppression of unknown multicast packet:

```
Host(config)# interface pon 1/1
```

```
Host(config-pon-1/1)#unknown-multicast-limit 100
```

8.2 Unknown unicast suppression

Unicast message means lowest bit of the first byte of the the destination MAC address is not 1 and MAC address is not all f or 0 message. For unicast packets, FHL104C will lookup 2 layer forwarding table according to the message of MAC address, if we can find the out port, normal packet forward to the other side, if you can't find out port, it is identified as unknown unicast. Unknown unicast default turn broadcast processing. If there is a large number of unknown unicast packets in the network, will lead to the decrease of the network efficiency, reduce the use of bandwidth. So it is necessary to suppress unknown unicast rate.

```
Host(config)# interface ethernet 1/1
```

```
Host(config-ethernet-1/1)# unknown-unicast-limit 100
```

```
Host(config-pon-1/1)#unknown-unicast-limit
```

```
Host(config-pon-1/1)#unknown-unicast-limit 10
```

8.3 Broadcast suppression

Broadcast message refers to the destination MAC address is all f messages. The access layer equipment of broadcasting flooding will lead to reduce the service performance of the equipment, reduce the user bandwidth. Broadcast suppression can give uplink ETH port and PON port configuration.

```
Host(config)# interface ethernet 1/1
```

```
Host(config-ethernet-1/1)#broadcast-limit 200
```

```
Host(config)# interface pon 1/1
```

```
Host(config-pon-1/1)#broadcast-limit 200
```

9. ONT remote batch upgrade

9.1 ONT remote batch upgrade

HL104C supports ONT remote batch upgrade. Customers can use this feature to

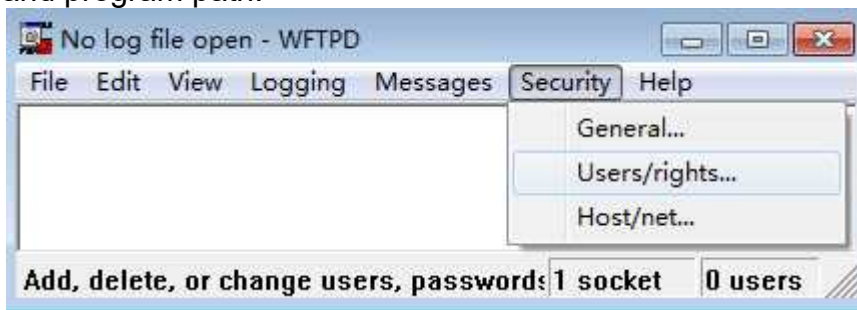
batch update version of ONT. Batch remote upgrade can solve the maintenance costs, improve the maintenance efficiency.

Batch upgrading function is realized according to the CTC criteria, for the loader to OLT and OLT loading to ONT , and program activated three step.ONT program loading of the to the OLT stage, mainly from the host via FTP download buffer to the OLT, at this time to ensure that the FTP server is configured correctly, and the main machine and OLT communications normal. In the program downloaded to ont stage, the program of ont will via the standard OAM program download, download to ont. At this time ont dropped will lead to upgrade failed. To activate the program phase of ont, under the active command, ont will restart and loading the new Upgrade of the ONT program, etc. after the new ONT program is successfully launched, the upgrade is completed.

9.2 ONT distal batch upgrade configuration

9.2.1 Upgrade preparation

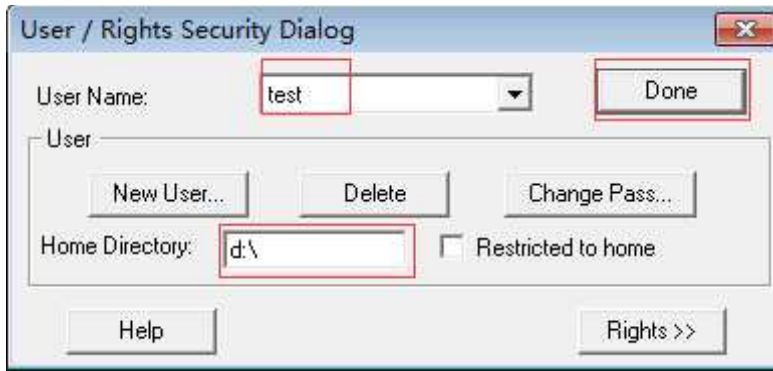
Open the FTP program wftpd32.exe, configure the FTP user name, password, and program path.



Create a new user, and configure the file path to be loaded



After the configuration is complete, click Done



the program need to upgrade should be put in the corresponding directory.

9.2.2 ONT program loading

Execute the ONT program in the config mode:

```
Host(config)# ftp download
A.B.C.D Remote ftp server ip address -----server IP address

Host(config)# ftp download 192.168.0.100
USER User name for host login -----FTP user name

Host(config)# ftp download 192.168.0.100 test test
WORD Download file name from ftp server -----FTP password

Host(config)# ftp download 192.168.0.100 test test v411c01.bin
[WORD] Write file name to local host -----to be upgraded

Host(config)# ftp download 192.168.0.100 test test v411c01.bin
```

When FTP download the program to the the OLT, and then select the ONTS need to upgrade to upgrade. Due to the different types of ont, the program is not the same, so upgrade need develop ont type. Types of input must be same with type of ont .

```
Host(config)# upgrade onu 1/1:1 dev-type FHR1100 filename tclinux.bin
1/1:1 is a list of ONT to be upgraded, or 1/1:1,2,3,1/1:1-10 or 1/1:all
```

After the batch upgrade, you can view the upgrade status of ONT:

```
Host(config)# show upg-onu-status 1/1:all
```

After the program is loaded, the program needs to be activated to complete the

upgrade.

```
Host(config)# active onu 1/1:all
```


After the activation of the ONT program, ONT will automatically restart from the new software.

9.2.3 View bulk upgrade status

At each stage of the ONT upgrade process can be viewed by the following command upgrade status:

```
Host(config)# show upg-onu-status 1/1:1 or
```

```
Host(config)# show upg-onu-status 1/1:1-10
```

 ont batch upgrading exit certain risks, such as the emergence of ont procedures for the use of incorrect, after upgrading ont of the situation can not be started; or ont the upgrade process device is powered down lead to flash data loss and ont cannot start. Before the upgrade, please be sure to ensure accuracy of ont program, the upgrade process try to choose in the use of idle period.

10. Introduction and configuration of PON port protection

10.1 PON port protection

10.2 PON port protection configuration

11. RSTP loop detection and configuration

11.1 RSTP loop detection

11.2 RSTP loop detection configuration

12. Alarm and statistics

12.1 Alarm configuration and query

In the config mode, enter the alarm to enter alarm mode. This mode support alarm configuration of open, shut off the switch, support adjustment of the alarm level, support configuration trap report switch, alarm history query support.

Close alarm function:

```
Host(config-alarm)# alarm disable
```

Open alarm function:

```
Host(config-alarm)#alarm enable
```

Generate trap when alarm:

```
Host(config-alarm)# trap enable
```

Configure an alert level for an alarm:

```
Host(config-alarm)# alarm-level alarm-id 0x60012 level 1
```

Query all historical alarm records:

```
Host(config-alarm)#show history-alarm all
```

Historical alarm record for a time period:

```
Host(config-alarm)#show history-alarm start-time 2014/06/30 end-time any
```

12.2 Statistical query

ETH uplink port statistics to check:

```
Host(config)# show statistics ethernet 1/1
```

PON statistics query:

```
Host(config)# show statistics pon 1/1
```

13. user management

13.1 User add

Users of FHL104C are divided into the root, admin and guest, root own all authority, admin hold operator management authority, guest can only query, may not modify. System has three user default, root/root admin / admin. guest/guest.

These three users can not be deleted.

Users must select a user group for admin or guest.

```
Host(config)# user test group admin password 1234--- - add test user, role for admin
```

```
Host(config)# user abcd group guest password 1234 ----- add abcd user, role for guest
```

13.2 User query

Type *show user-info* command to view all user information in Config mode ,

```
Host(config)# show user-info
```

13.3 User delete

Delete a user:

```
Host(config)# no user test
```

14. System upgrade and backup

14.1 Introduction to system upgrade

FHL104C OLT equipment support system software upgrade.FHL104C system contains the service function modules: SCU main control module and PON service module, at present two modules of the program are packaged into a file, just start serial boot command line to upgrade, or remote FTP upgrade mode upgrade. Upgrade steps is divided into three steps: first to download program files to the ramdisk and upgrade file in ramdisk to each sub module, finally restart the system can successfully upgraded software system. Note in front of the download will Shall ensure that FHL104C management channel and the FTP server is connected, you can use the ping command for diagnosis. In the download must also pay attention to check the server of FTP service is open, user name and

password are correct, the target file existence.

all the file types the specific details can be upgraded of FHL104C OLT devices are as follows:

OS file: FHL104C program file, which contains the main control unit module and service control module.

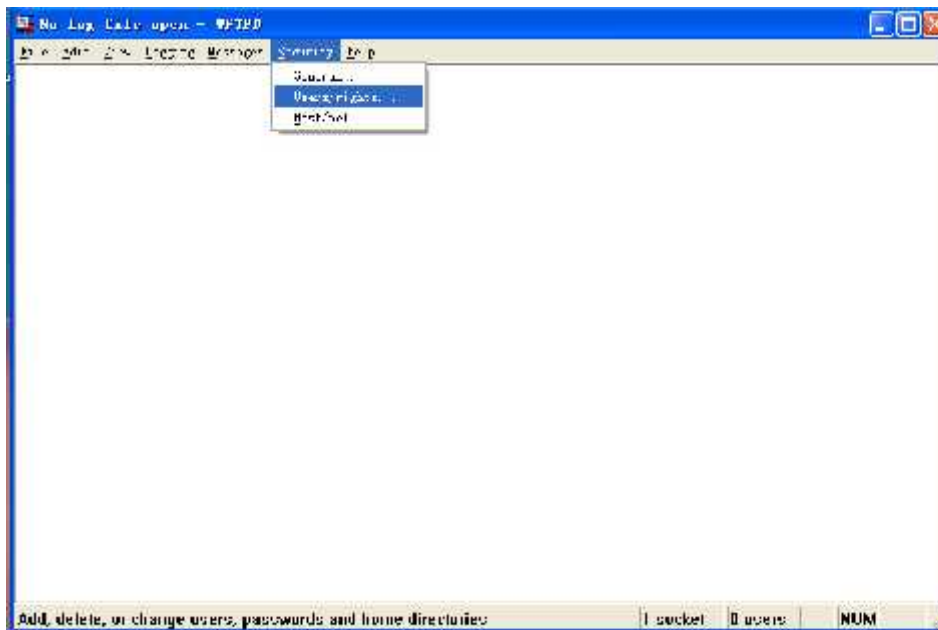
Config file: that is, the FHL104C configuration file for the text format.

BOOT file: FHL104C boot BSP driver file. In the BOOT mode to load. In general, there is no need to upgrade this file.

14.2 System upgrade

14.2.1 Environmental construction

Example to build FTP server : use wftpd32.exe as FTP server software.



FTP way to upgrade the software, in the "security" directory, select "Users/rights", the pop-up window:



"User name" enter a user name, according to the requirements of users; "home directory" to upgrade version stored in the directory, the "change password" password, with the user need. Then click "done". To this FTP server set up to complete.

14.2.2 Software upgrade

Please upgrade in the config view.

Download the upgrade file:

```
ftp download ipaddress username password filename1 [filename2]
```

ipaddress: Set ftp server ip

username: set FTP server user name

password: set FTP server password


filename1: file path and file name

filename2: file name after download to the device

update the file to the target sheet:

upgrade os file name

filename: file name after download to the device

 software upgrades please check the software version and the time before the operation, once the wrong program may upgrade

Causes the system unable to start.

Restart system:


Reboot

Upgrade APP software.

```
Host(config)# ftp download 192.168.0.198 1 1 FHL104CV100R002
```

```
Host(config)# update os FHL104CV100R002
```

```
Host(config)# reboot
```

 Description: to upgrade to boot, you need through the console port local upgrading, upgrading boot version, please contact technical support staff. To restore the factory configuration, equipment after the restart to configure according to the startup-config loading.

14.3 Configuration file backup and load

14.3.1 Configuration file backup

FHL104C configuration divided into start and run configurations two. Boot configuration is also called system startup when loading the configuration file, file name is startup.cfg, run configuration, is after the successful launch of the system, running configuration, operation users can continue to update the run configuration, and finally performs the write command, run the configure to write to the boot configuration and keep to flash. Run configuration file name for the running.cfg.FHL104C support will launch configuration, the run configuration backup to the host server. Backup before to ensure normal FTP server

configuration. OLT before the host is normal.

```
Host(config)# ftp upload 192.168.1.100 test test startup.cfg
```

14.3.2 Load profile

After the backup configuration file, users can edit the configuration file, save, and then reload it to the device. Loading a configuration file to the OLT and need to perform upgrade command to ensure that the configuration file at the next reboot to work, and then restart the system.

```
Host(config)# ftp download 192.168.1.100 test test startup.cfg
```

```
Host(config)#upgrade config startup.cfg
```

```
Host(config)# reboot
```

14.3.3 Saving configuration

In the config mode, the write command can be configured to save the current running configuration to the boot configuration, and to write to the flash.

```
Host(config)# write
```

This will save the configuration to the flash memory.

Are you sure?(y/n) [y]


Building device configuration.....

Writing config [Success]

```
Host(config)#
```

Clear the starting configuration can be clear about all the configuration, the system to restart after the factory settings.

```
Host(config)# erase startup-config
```

 Please make before erasing the data configuration configuration backup, data can not be restored once erased.

Please use this operation carefully in the current use.

15.SNMP configuration

FHL104C provides MIB interface, can be through the NMS equipment management and maintenance.

Before the OLT is managed by the gateway, the SNMP parameters are required to be configured on the OLT.

- Group name:

OLT has the default SNMP group name public and private, if the user uses the default group name, the project is not configured. Otherwise, it is configured by the following command:

```
Host(config)# snmp community abctest ro
```

```
Host(config)# snmp community testabc rw
```

- TRAP server

The Trap server needs to be configured manually, and the port is not configured by default when using 162:

```
Host(config)# snmp trap-server 192.168.1.100 v2
```