AN5116-06B

Optical Line Terminal Equipment

Component Replacement

Version: C

Code: MN000000071

FiberHome Telecommunication Technologies Co., Ltd.

April 2012

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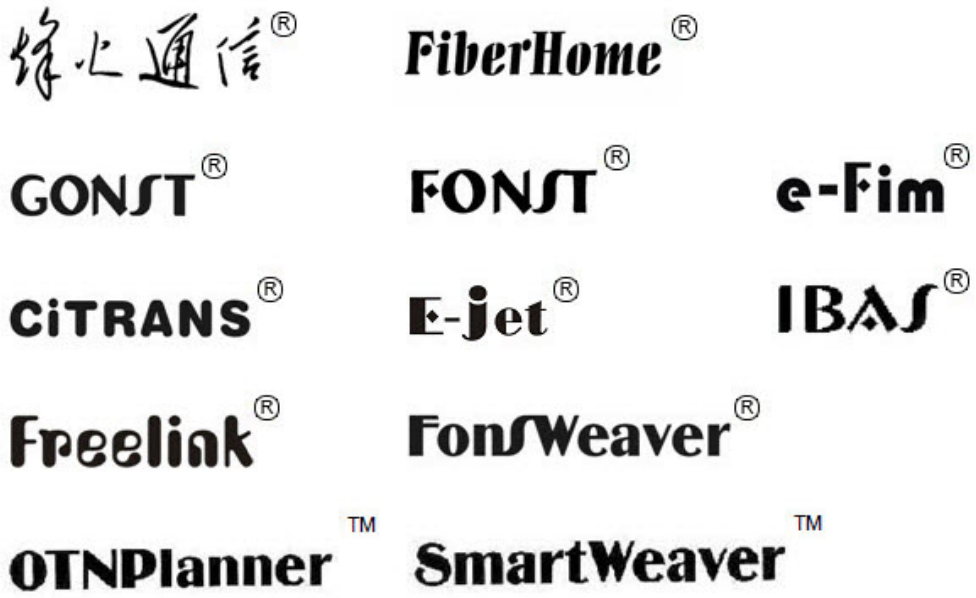

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Preface

Related Documentation

Document	Description
AN5116-06B Optical Line Terminal Equipment Documentation Guide	Introduces the retrieval method, contents, releasing, reading approach, and suggestion feedback method for the complete manual set for the AN5116-06B.
AN5116-06B Optical Line Terminal Equipment Product Description	Introduces the AN5116-06B's network location, functional features, hardware structure, FTTx application model, equipment configuration, network management system and technical specifications. It is the foundation of the complete manual set. Other manuals extend and enrich the concepts introduced in the Product Description.
AN5116-06B Optical Line Terminal Equipment Feature Description	Introduces the key features supported by the AN5116-06B, including GPON / EPON access, GPON / EPON terminal management, VLAN, multicast, voice and safety; and introduces these functions in details in terms of definition, characteristic, specification, principle description, references and so on.
AN5116-06B Optical Line Terminal Equipment Hardware Description	Introduces the appearance, structure, functions, technical specifications, and usage method for the AN5116-06B's cabinet, PDP, subrack, cards, cables and wires, facilitating users' mastery of the hardware features of the equipment.
AN5116-06B Optical Line Terminal Equipment Installation Guide	Introduces the overall installation and verifying procedure from unpacking inspection to power-on examination after the equipment is delivered on site,and provides reference information (e.g. safety principles and wiring scheme of a variety of interfaces) to guide users to install the equipment.
AN5116-06B Optical Line Terminal Equipment EPON Configuration Guide	Introduces the method for configuring the EPON services supported by the AN5116-06B via ANM2000 Network Management System, such as basic configuration, voice service configuration, data service configuration, multicast service configuration, and software upgrading configuration, to guide users on start-up for various services and software upgrading.

Document	Description
AN5116-06B Optical Line Terminal Equipment GPON Configuration Guide	Introduces the method for configuring the GPON services supported by the AN5116-06B via ANM2000 Network Management System, such as basic configuration, voice service configuration, data service configuration, multicast service configuration, and software upgrading configuration, to guide users on start-up for various services and software upgrading.
AN5116-06B Optical Line Terminal Equipment GUI Reference	Introduces the shortcut menu for every card of the AN5116-06B inside ANM2000 Network Management System, including the function, parameter explanation, precautions and configuration example of every command in the shortcut menu of each card, to help users master the operation of the AN5116-06B inside ANM2000.
AN5116-06B Optical Line Terminal Equipment Component Replacement	Introduces the operation procedures of replacing the AN5116-06B's components, including preparations, precautions, early operations, operation process and subsequent operations, so as to guide users with the component replacement on the hardware.
AN5116-06B Optical Line Terminal Equipment Routine Maintenance	Introduces the daily, weekly, monthly, quarterly and annual routine maintenance operations of the AN5116-06B. Users are able to eliminate the potential risks in the equipment operation process as early as possible via implementing the routine maintenance.
AN5116-06B Optical Line Terminal Equipment Alarm and Event Reference	Introduces the AN5116-06B's alarm / event information, including alarm / event names, alarm / event levels, possible reasons, effects on the system, and processing procedure, to guide users on effective alarm / event processing.
AN5116-06B Optical Line Terminal Equipment Troubleshooting Guide	Introduces the fault processing principles and methods of fault diagnosis and locating for the AN5116-06B. Also discusses the typical fault cases of various EPON / GPON services. If the trouble is too complicated to process, users can refer to FiberHome for technical support according to the instructions in this document.

Version

Version	Description
A	Initial version. This manual corresponds to V1.0 of the AN5116-06B.
B	Replaces AN5116-06B Optical Line Terminal Equipment Daily Operation Guide, and the sections on the routine maintenance in Version A of AN5116-06B Optical Line Terminal Equipment Daily Operation Guide are edited into an independent manual. This manual corresponds to V2.0 of the AN5116-06B.
C	This manual corresponds to EPON V3.1 and GPON V3.1 of the AN5116-06B. The EC8B card, GC8B card and XG2B card are added to this manual compared with Version B of AN5116-06B Optical Line Terminal Equipment Component Replacement.

Intended Readers

This manual is intended for the following readers:

- Planning and designing engineers
- Commissioning engineers
- Operation and maintenance engineers

To utilize this manual, these prerequisite skills are necessary:

- EPON technology
- GPON technology
- Multicast technology
- NGN voice technology
- Ethernet switch technology
- Computer network technology

Conventions

Terminology Conventions

Terminology	Convention
AN5116-06B	AN5116-06B Optical Line Terminal Equipment
EC4B	4×EPON-C Interface Card (type B)
EC8B	8×EPON-C Interface Card (type B)
GC4B	4×GPON-C Interface Card (type B)
GC8B	8×GPON-C Interface Card (type B)
XG2B	2×10G EPON-C Interface Card (type B)
C155A	4×GE + 1×10GE Optical Interface Uplink Card (CES Mode)
CE1B	32×E1 Optical Interface Card (CES mode) (type B)
PUBA	Public Card (type A)
HSWA	Core Switch Card (EPON) (card No.: 2.115.334)
	Core Switch Card (type A) (card No.: 2.115.331)
HU1A	4×GE + 1×10GE Optical Interface Uplink Card
HU2A	2×GE + 2×10GE Optical Interface Uplink Card
GU6F	6×GE Optical Interface Uplink Card

Symbol Conventions

Symbol	Convention	Description
	Note	Important features or operation guide.
	Caution	Possible injury to persons or systems, or cause traffic interruption or loss.
	Warning	May cause severe bodily injuries.

Contents

Figures

Tables

1 Overview

This chapter describes the purpose, principles, general flow and requirements for the operators regarding the replacement of various system components of the AN5116-06B. It includes the following sections:

- ☑ Safety Precautions
- ☑ Component Replacement Purpose
- ☑ Requirements for the Operators
- ☑ Component Replacement Principles
- ☑ Component Replacement Flow

1.1 Safety Precautions

When implementing routine maintenance, users should know the operation precautions of the equipment. This helps to guarantee the safety of people and equipment.

The safety precautions include:

- Identifying safety and warning signs
- ESD protection measure
- Safety guidelines for plugging and unplugging the card
- Safety guidelines for the optical fiber and interface
- Electrical safety precautions
- Operation safety rules for the ANM2000

1.1.1 Identifying Safety and Warning Signs

The operators should know the meanings of the safety and warning signs on the AN5116-06B. Table 1-1 lists the meanings and positions of the labels.

Table 1-1 Identifying safety and warning signs

Sign	Meaning	Location
	The ESD protection sign. This sign reminds the operators to wear an ESD protection wrist strap, so as to avoid damage to the equipment caused by electrostatic discharge.	See Figure 1-1.
	The subrack earth ground sign. This sign marks the location of the subrack earth ground pole.	
	The laser class sign. This sign marks the optical source class of the optical interface on a card. The operators must prevent the optical source from entering eyes directly to avoid bodily harm.	Located on the panels of the cards with optical interfaces.

Table 1-1 Identifying safety and warning signs (Continued)

Sign	Meaning	Location
	The warning sign for periodical cleaning of the anti-dust screen. This sign reminds the operators to clean the anti-dust screen periodically.	Located on the panel of the subrack' anti-dust screen.
	The fan unit safety alarm sign. This sign reminds the operators not to touch the running fan blades.	Located on the fan unit panel.

The following uses the subrack as an example to introduce the locations of the ESD protection sign and the subrack earth ground sign.

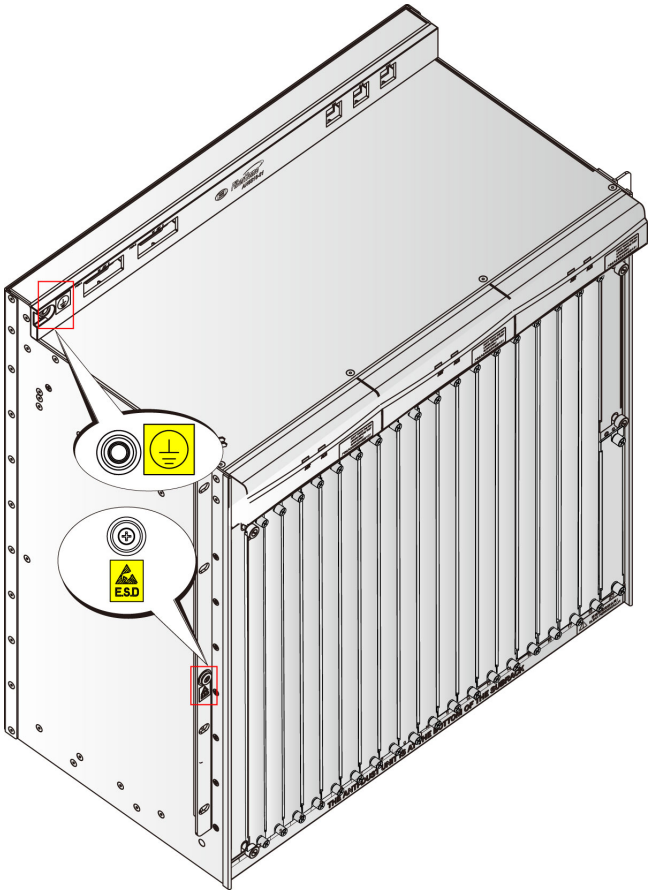


Figure 1-1 Positions of the ESD protection earth ground fastener and the subrack earth ground pole

1.1.2 ESD Protection Measure

The electrostatic discharge can damage electrostatic-sensitive components on the cards and subracks; therefore, you must wear the ESD protection wrist strap or take other measures before touching any equipment, card, or IC (Integrated Circuit) chip. Use the ESD protection bags to store and transport cards.

The ESD protection wrist strap is an accessory of the equipment. Put one end of the strap around the wrist and make sure that the metal fastener of the ESD protection wrist strap is in good contact with the skin and the other end is correctly connected to the ESD protection earth ground fastener on the cabinet, as shown in Figure 1-2.

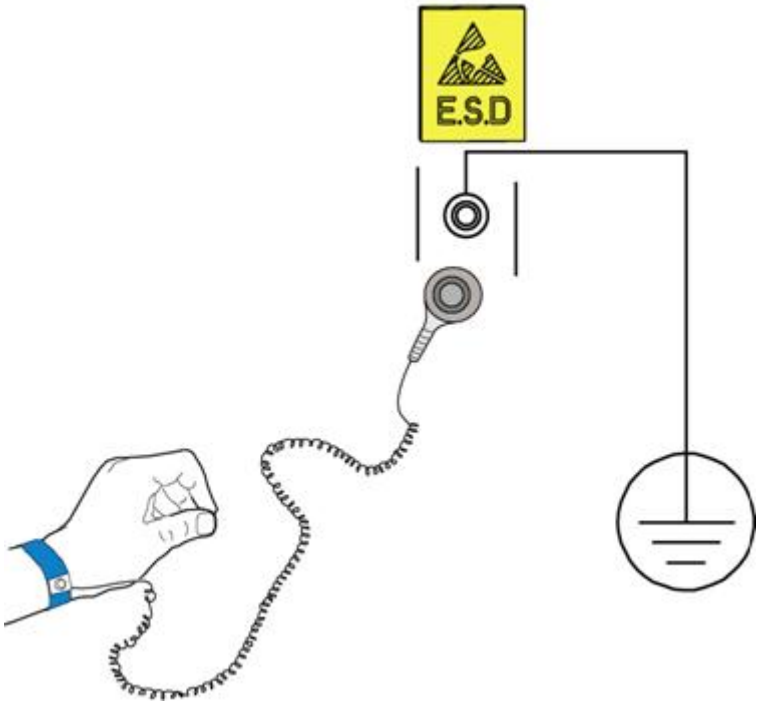


Figure 1-2 Wearing the ESD protection wrist strap

1.1.3 Safety Precautions for Plugging and Unplugging a Card

- Before plugging or unplugging a card, wear the ESD protection gloves or the ESD protection wrist strap and keep both hands dry and clean.
- Do not touch the circuitry, components, or wiring trough when handling the cards.

- Before plugging the card, you should confirm:
  - The corresponding slot is available.
  - The cables or optical fibers are not connected with the card.
  - The insertion direction of the card is correct. Do not insert the card in the opposite direction. The insertion direction of the card is shown in Figure 1-3.
- Pay attention to the following precautions when plugging the card.
  - Use care when plugging the card to avoid distorting pins on the backplane.
  - Slide the card gently along the slide rails. Prevent the circuit components of the card from contacting each other, to avoid shorting or scratching. Install the card following Figure 1-3.
- Before unplugging the card, confirm that the card is not carrying services. Unplugging the card with services may cause service interruption.

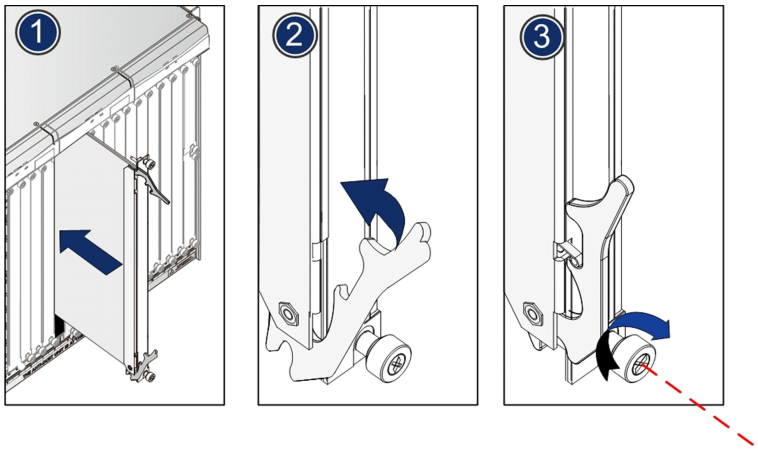


Figure 1-3 Installing a card

1.1.4 Safety Guidelines for the Optical Fiber and Interface

Incorrect operation on optical fiber and fiber connector may do harm to the maintenance engineers. This section introduces the safety precautions in connecting fibers and cleaning the optical fiber connectors.

Using the dedicated fiber puller

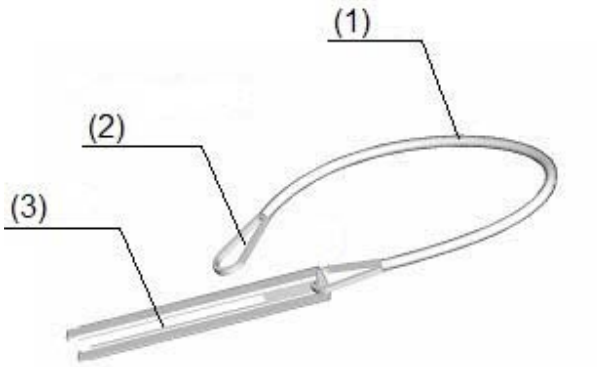
The optical fibers are easily damaged if they are plugged or unplugged with bare hands. The operators should use the dedicated fiber puller to avoid damage to optical fiber and fiber connector caused by rough handling.

Caution:

A dedicated fiber puller is required for plugging and unplugging fibers.

The fiber puller, an accessory of the AN5116–06B, looks like a nipper and has a spring cord, as shown in Figure 1-4.

The fiber puller is secured on the cabinet with a spring cord before delivery. By clipping the fiber connector with the special fiber puller, you can plug or unplug the fiber very conveniently.



(1) Spring cord

(2) Buckling into the mounting hole on the vertical mounting flange

(3) Fiber puller

Figure 1-4 The dedicated fiber puller

Protecting the optical modules against high optical power

If the pigtail fiber’s output optical power is unknown, please do not insert it into the card’s optical interface directly. Protect the optical module against high optical power by loosely inserting the fiber into the interface without connecting them, or adding an attenuator.

Connecting optical fibers

- Check the optical power before connecting the optical fibers; only if the optical power meets the requirement can the fibers be connected. The equipment optical power parameters are shown in AN5116-06B Optical Line Terminal Equipment Product Description.
- Before connecting optical fibers, check whether the optical fiber connector matches the optical interface. If not, use an optical fiber adapter to connect them.

Protecting eyes

Looking directly into the optical output interface or the end of the pigtail fiber connected with the output interface will do harm to the eyes. Never get close to or look directly at the optical interface or optical fiber connector.

Avoiding overbending the fiber

The optical power may be affected if the fiber is bent or pressed with excessive force. The bend radius should be no less than 38 mm.

Protecting optical interfaces and connectors

- Cover the optical interfaces and optical connectors of the pigtail fibers that are not in use with anti-dust caps. This can avoid eye injuries caused by a direct and unintentional look into the optical interfaces or optical connectors, and prevent dust from entering the optical interfaces or contaminating the optical connectors.
- Cover the optical interfaces of the replaced cards with anti-dust caps to keep the optical interfaces clean.

Cleaning the optical interfaces and fiber connectors

Use dedicated cleaning tools and materials to clean optical interfaces and fiber connectors.

The following lists some common cleaning tools for operation engineers.

- Dedicated cleaning solvent (the first choice is the isoamyl alcohol and the second choice is the propyl alcohol)

- Non-woven lens tissue
- Dedicated compressed air
- Cotton swab (cotton for medical purposes or other long-staple cotton)
- Dedicated connector cleaner

1.1.5 Electrical Safety Precautions

This section introduces the operation precautions when implementing routine maintenance so as to avoid the electrical accident such as shorting and bad grounding.

Shorting

- When shorting occurs, the excessive current surge may damage the equipment and leave potential safety risks.
- During operation, avoid metal fillings, water and other conductive materials into the live equipment so as to prevent damage to electrical apparatus and components caused by shorting.
- Avoid shorting caused by incorrect cable connections.
- Avoid shorting caused by small animals entering the live equipment.

Grounding

- Confirm that the protection earth ground bar in the equipment room is grounded properly.
- Confirm that the equipment is grounded properly.

Power supply

- Before removing the power cable, confirm that the power supply is disconnected.
- Never expose the power cable. The unnecessary uninsulated parts should be completely covered with an insulating tape.
- When the operation conditions permit, first disconnect the power supply, and then conduct other operations.

1.1.6 Operation Safety Rules for the ANM2000

The safety precautions for the ANM2000 are as follows:

- The network management computer should be placed away from direct sunlight, electromagnetic interference, heat source, humidity and dust, and with at least 8cm distance from other objects in order to keep good ventilation.
- Use UPS power supply to avoid loss of network management data caused by accidental power failure.
- The computer case, UPS power supply and switch (or hub) should be connected to the protection earth ground.
- To shut down the network management computer, first exit the operation system normally and then shut off the power supply.
- Do not exit the network management system when it is working normally. Exiting the network management system does not interrupt traffic in the network, but precludes centralized control of the networked equipment.
- The network management computer cannot be used for purposes other than network management. Use of unidentified memory devices should be prohibited so as to avoid computer viruses.
- Do not delete any file in the network management system randomly or copy any irrelevant file into the network management computer.
- Do not visit Internet via the network management computer. Doing so may increase data flow in the net card and hence affects normal network management data transmission or results in other accidents.

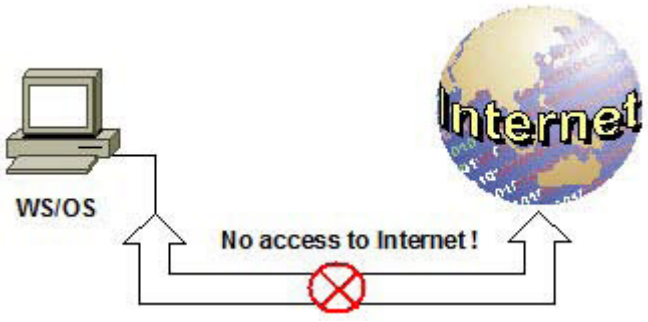


Figure 1-5 No access to Internet

- Do not perform service configuration or expansion during service busy hours via the network management system.
- Do not modify the network management computer's protocol settings, computer name or LAN settings. Doing so may result in abnormal operation of network management system

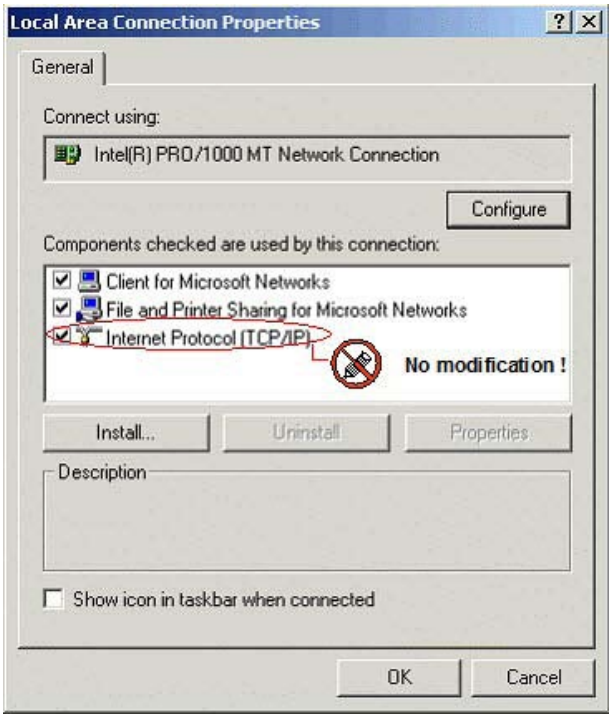


Figure 1-6 Do not modify protocol settings (1)

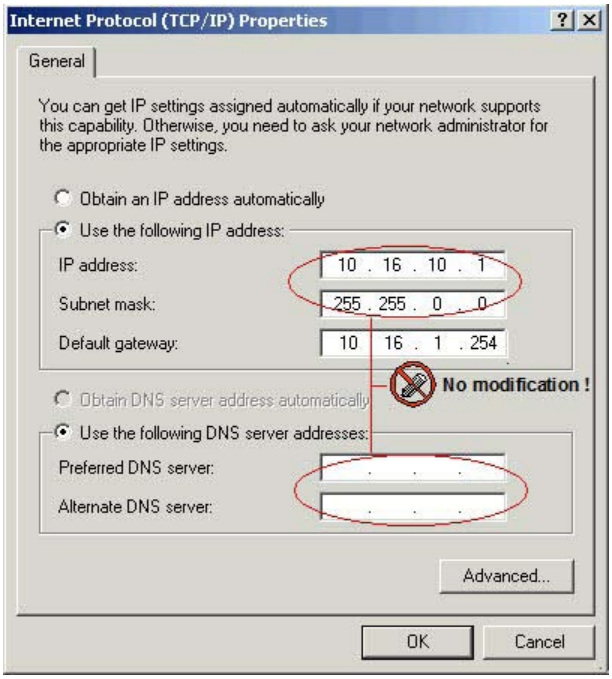


Figure 1-7 Do not modify protocol settings (2)

Figure 1-8 Do not modify computer name

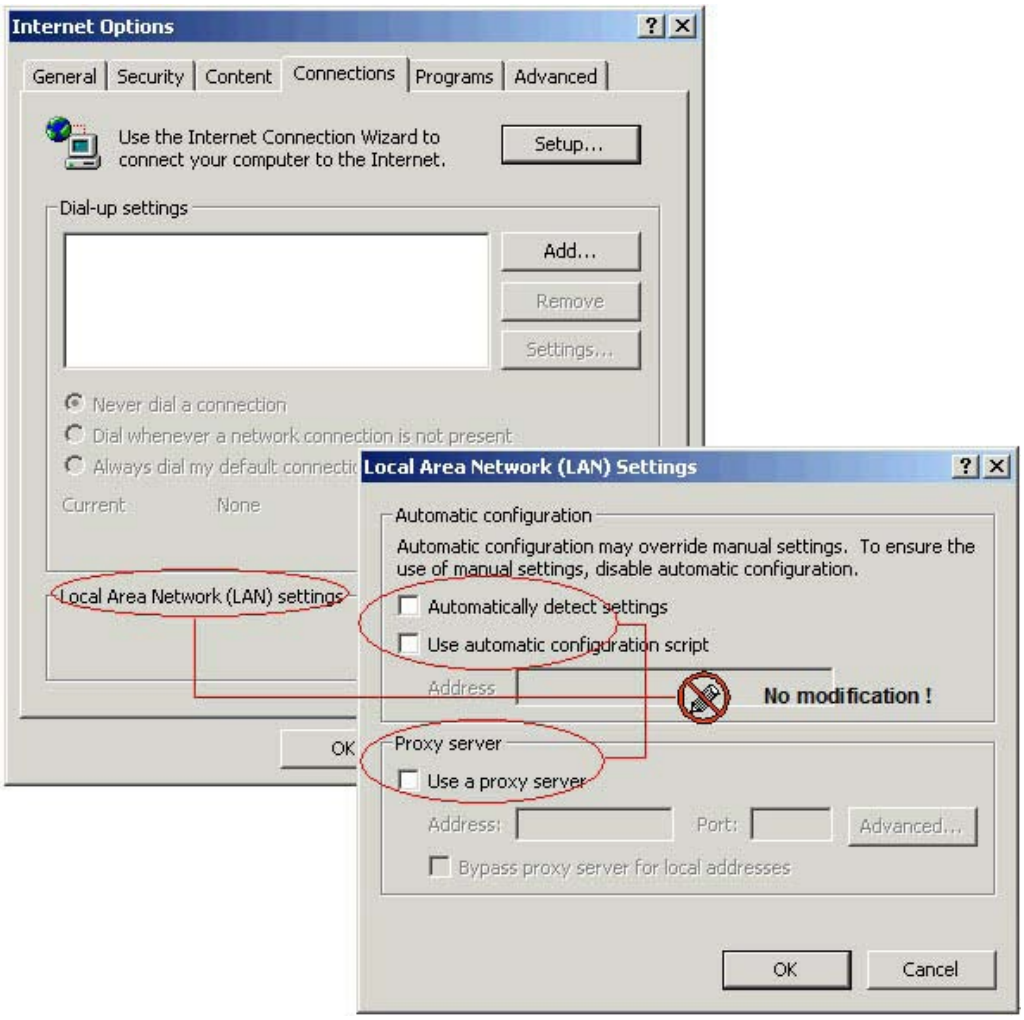


Figure 1-9 Do not modify LAN settings

1.2 Component Replacement Purpose

The component replacement operation refers to a sequence of removal and reinstallation steps done to specific components by maintenance personnel. These procedures ensure safety and minimize the impact on services.

There are two circumstances where component replacement might be required.

- Component maintenance: When a component fails and affects the normal operation of the equipment, replacing this component is required.

- Hardware upgrade: When a hardware component needs to be upgraded to support new functions, replacing this component is required.

1.3 Requirements for the Operators

- Only after strict training, understanding all safety precautions and mastering correct operation methods should operators carry out replacement operations.
- Operators must be familiar with the general commands of the CLI management system and the ANM2000.
- Operators must be familiar with the operation and use of common replacement tools and test instruments, such as the ESD protection wrist strap, the cross screwdriver, the flat screwdriver, the diagonal pliers, the multimeter, and the network cable tester.
- In the replacement process, the operator must be in strict accordance with the operation procedures and requirements.
- In the replacement process, the operator should immediately report any fault or error conditions which may cause a safety problem.

1.4 Component Replacement Principles

- Before beginning the replacement, confirm that there are spare parts on the site.
- Before beginning the replacement, check whether the risk that may arise from this operation can be controlled or not. The component replacement operation can be done only when such risks can be controlled. Before upgrading the hardware, prepare a return scheme first.
- The replacement operation should only be performed when the influence on the service can be minimized. If protection measures are possible, carry out the replacement operation after protection measures have been taken.
- ESD protection measures should be taken during the replacement process.
- In the process of storing and transporting spare parts, dedicated ESD protection bags or boxes should be used.

- Replaced components should be properly dealt with. Record the symptom of the fault on the replaced component tag, return the component for repair or apply for discard permission promptly.

1.5 Component Replacement Flow

The general flow of the component replacement operation is shown in Figure 1-10.

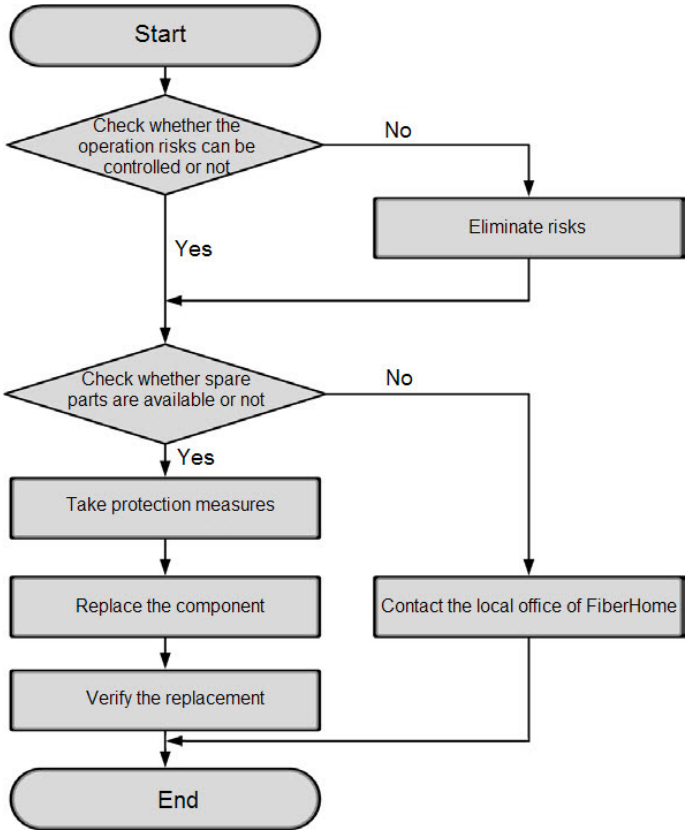


Figure 1-10 The general flow of the component replacement operation

The detailed flow of the component replacement operation is as follows:

1. Check whether the operation risks can be controlled or not: When performing troubleshooting and regular repair of the equipment, users need to evaluate the practicability of this operation. The component replacement operation has a certain degree of risk, so users need to evaluate its practicability thoroughly before performing this operation. The component replacement operation can be done only when the risk can be controlled.

Note:

The component replacement operation must be performed by engineers with adequate experience. The maintenance engineers should have the following basic skills: understand the AN5116-06B hardware and functions; understand the basic flow and operations of the component replacement.

2. Confirm that there are spare parts on site: Before the replacement operations, users need to confirm that there are spare parts with the correct versions in the storeroom. If there are no spare parts that can be used for the replacement in the storeroom, please contact the local FiberHome office promptly.
3. Prepare needed tools. The tools commonly used for the component replacement include:
   - The ESD protection wrist strap or ESD protection glove
   - The ESD protection bag
   - The cross screwdriver
   - The flat screwdriver
   - The diagonal pliers
   - The wire and cable labels
   - The box dedicated for wires and cables
   - The corrugated duct
   - The wire binder
   - The network cable tester
   - The multimeter
   - The optical power meter
   - The optical module puller
   - The ladder

4. Take protection measures. The component replacement operation has a certain degree of risk. Users can lower this risk by taking certain technical measures, so as to minimize the impact to the system. The measures that can be taken in the replacement process include active / standby switching, saving backup files, PON port protection, port isolation, etc.
5. Replace the component. After preparing the spare parts & relevant tools and taking protection measures, users can replace the component following the respective replacement guide.
6. Verify the replacement. After completing the component replacement, users need to check the running status of the new component and confirm that its working status is normal, and that its data configuration is the same as the planned data. For the verification operations after the replacement, users can see the descriptions of the subsequent operations in the replacement guide of various components; the replacement operation is concluded only after the verification operations of the new component have been completed.

2 Replacing a PDP

When a PDP fails or when the power supply capacity of a PDP cannot meet the demands of new devices in the subrack, it is necessary to replace the PDP.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- A cross screwdriver
- A flat screwdriver
- A multimeter
- A ladder

Precautions

- Replacing the PDP may cause the service interruption of all devices in the cabinet.
- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- Before replacing the PDP, be sure to disconnect the external DC -48 V power supply input of the PDP.
- When replacing the PDP, pay attention to electrical safety. For example, exposed metal of the power cables and terminals should be wrapped with the insulating tape.
- When replacing the PDP, be sure to slowly pull out and push in the PDP horizontally to avoid contact with the cabinet or the subrack.
- When replacing the PDP, be sure to prevent an electrical shorting arising from metal objects falling upon the PDP or the PDP contacting with other metal objects.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side

Note:

If a PDP fails to supply power for the subrack, go to step 3) directly.

1) Log into the CLI network management system and enter the configuration mode, as shown in the following figure.

```
Login: GEPON
Password:GEPON
User>en
Password:GEPON
Admin#
```

2) In the Admin # directory, save the current configuration in the Flash memory of the core switch card using the save command.

3) Record the location and wiring mode of the cabinet power cables, the subrack power cable and the subrack alarm cables. Reconnect the cabinet power cables, the subrack power cables and the subrack alarm cables in accordance with this record after the replacement of the PDP.

4) Check whether the cable labels are intact and clear. If they are damaged or not clear, attach new ones to the cables.

5) Confirm that the new PDP is identical with the PDP to be replaced and can meet the new demand for power supply capacity.

Component	Hardware Code
PDP	3.000.068

6) Be sure that the surface of the new PDP is clean and no component is missing or damaged.

- Operations on the network management side

Note:

If a PDP fails to supply power for the subrack, it is not necessary to carry out any operations on the network management side.

1) Log into the ANM2000.
2) Right-click the active core switch card, select the **System Control→Save Config To Flash** in the shortcut menu, to save the current configuration into the Flash memory of the core switch card.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Turn off all branch power switches on the PDP to be replaced.
3. Turn off all main power switches on the PDP to be replaced.
4. Turn off the air-break switch corresponding to this PDP on the head of row cabinet.
5. Loosen the screws on the main power supply connectors using a flat screwdriver by rotating counterclockwise, and then pull out the cabinet power cables and earth ground cables.
6. Loosen the screws on the branch power connector block, and pull out the pin terminals of the subrack power cables and earth ground cables.
7. Support the bottom of the PDP to be replaced, and loosen the screws on the mounting ears of PDP using a cross screwdriver by rotating counterclockwise.
8. Pull the PDP to be replaced out of the cabinet slowly and smoothly, and properly deal with the replaced unit.
9. Support the bottom of the new PDP and push it into the cabinet slowly and smoothly.
10. Align the holes of the PDP mounting ears with the floating nut on the vertical mounting flanges of the cabinet, insert and tighten the screws using a cross screwdriver by rotating clockwise to secure the PDP.

11. Insert the pin terminals of the subrack power cable, and tighten the screws on the branch power connector block.
12. Insert the cabinet power cables into the main power supply connector posts in turn, and tighten the screws using a flat screwdriver by rotating clockwise.
13. Turn on the air-break switch corresponding to this PDP on the head of row cabinet.
14. Use a multimeter to measure whether the voltage values between the main power supply connectors “-48V_A” and “0V_A”; “-48V_B” and “0V_B” are within -38 V to -57 V. If the voltage values are normal, turn on all main power switches on the new PDP.
15. Use a multimeter to measure whether the voltage value between the branch power supply connector posts “-48V” and “0V” is within -38 V to -57 V. If the voltage value is normal, turn on all branch power switches on the new PDP.

Subsequent operations

1. Check whether all subracks in the cabinet are normally powered.
2. Check whether the working indicator LEDs “ACT” on the fan unit and the cards are normally illuminated.

3 Replacing a Subrack

When a subrack fails, it needs to be replaced.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- ESD protection bags
- A cross screwdriver

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- Replacing the subrack may cause service interruptions.
- It is prohibited to replace a live subrack.
- When replacing the subrack, be sure to slowly pull it out or push it in along the right and left slide rails to prevent the subrack from coming into contact with the cabinet or other components.
- When replacing the subrack, be sure to prevent an electrical shorting arising from metal objects falling upon the subrack or the subrack contacting with other metal objects.
- When replacing the subrack, use caution as sharp corners or edges of the subrack can injure your hands.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side

Note:

If the subrack fails to work, go to step 3 directly.

1) Log into the CLI network management system and enter the configuration mode, as shown below.

```
Login: GEPON
Password:GEPON
User>en
Password:GEPON
Admin#
```

2) In the Admin # directory, save the current configuration into the Flash memory of the core switch card using the save command.

3) Confirm that the new subrack is identical with the subrack to be replaced.

Component	Hardware Code
Subrack	3.061.101

4) Record the locations of all cards in the subrack to be replaced. Relocate the cards in accordance with this record after the replacement.

5) Record the locations of all cables connected to the subrack to be replaced. Reconnect the cables in accordance with this record after the replacement.

6) Check whether the cable labels are intact and clear. If they are damaged or not clear, attach new ones to the cables.

◆ Operations on the network management side

Note:

If the subrack fails to work, it is not necessary to carry out any operations on the network management side.

1) Log into the ANM2000.

2) Right-click the active core switch card, select the **System Control→Save Config To Flash** in the shortcut menu, to save the current configuration into the Flash memory of the core switch card.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Turn off the branch power switch on the PDP corresponding to the subrack to be replaced.
3. Carefully remove all cables connected to the subrack. See Replacing a Cable for the detailed operations.
4. Remove the fan units in the subrack carefully, and then place them into the ESD protection bags. The removing method of the fan unit is shown in Replacing a Fan Unit.
5. Be careful to pull out all cards in the subrack, and put them into the ESD protection bags. See Replacing a Card for the detailed operations.
6. Loosen the screws securing the subrack using a cross screwdriver by rotating counterclockwise, remove the screws from the floating nut, and properly retain them.
7. Support the bottom of the subrack and then slowly draw it out from the cabinet.
8. Mark the removed subrack, record the symptom, and prepare for repair.
9. Place a new subrack onto the corresponding slide rails from the front of the cabinet, support the bottom of the subrack, and slowly push it into the proper position.

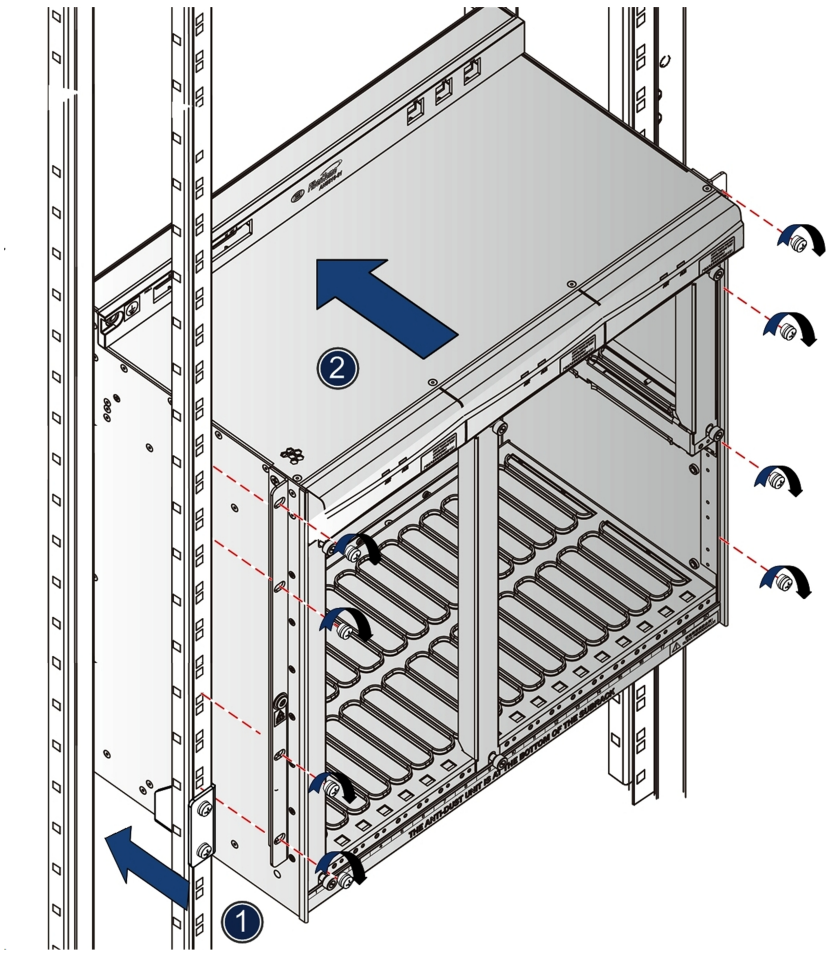


Figure 3-1 Installing the subrack into the 19-inch cabinet

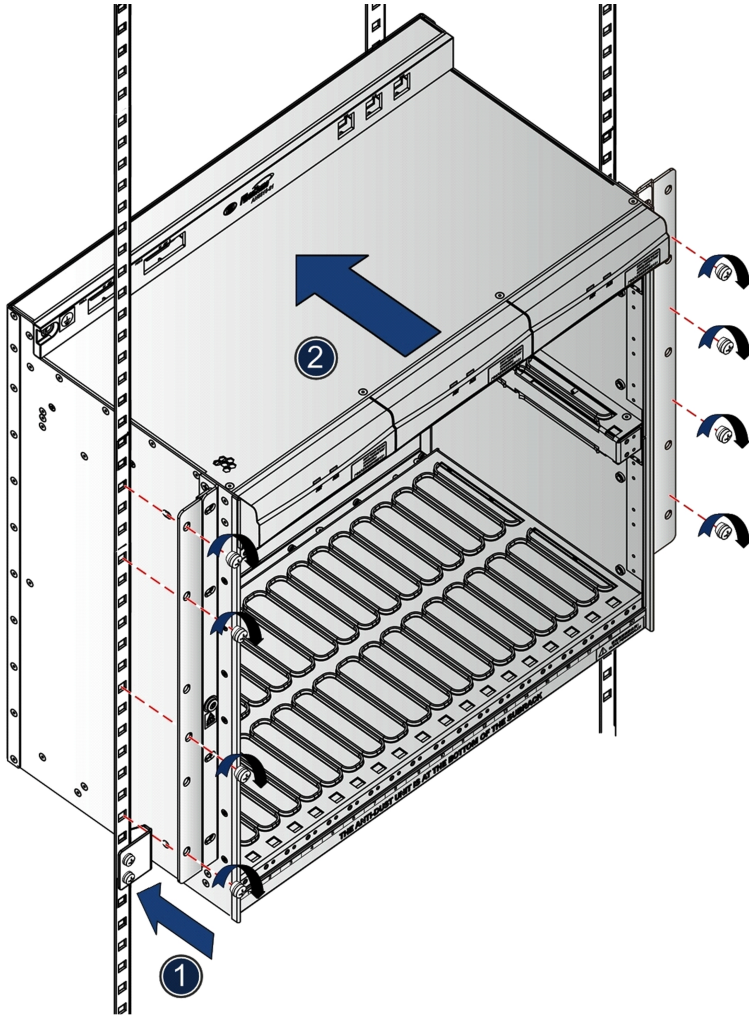


Figure 3-2 Installing the subrack into the 21-inch cabinet

10. Align the holes of the subrack mounting ears with the floating nut on the vertical mounting flanges of the cabinet, insert and tighten the screws using a cross screwdriver by rotating clockwise to secure the subrack.
11. Connect the subrack power cables in accordance with the record.
12. Turn on the branch power switch on the PDP corresponding to the replaced subrack.
13. Firmly grip the panel, insert the fan unit horizontally, and observe whether the fan unit is running normally. If normal, its ACT indicator LED will be illuminated.
14. Insert other cards in turn in accordance with the record. See Replacing a Card for the detailed operations.

15. Connect the cables in turn in accordance with the record. See Replacing a Cable for the detailed operations.

Subsequent operations

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side
  1) Observe whether the indicator LED status of each card is normal.
  2) In the Admin\device# directory, view whether each card is working normally and whether it has established communication with the core switch card using the show slot command.
  3) Confirm that the service has recovered.
- Operations on the network management side
  1) View whether the indicator of each card in the network management system is normal. A green indicator indicates that the card is working normally.
  2) Right-click each card, and select **Get Information** in the shortcut menu to view whether the work status of each card is normal.

Note:

The operations mentioned in step 2 are not applicable to the core switch card and the uplink cards.

  3) Refresh the list of alarms and performance parameters, view and confirm that there are no additional alarms or abnormal performance data.

4 Replacing a Card

Introduces the operations of replacing a card.

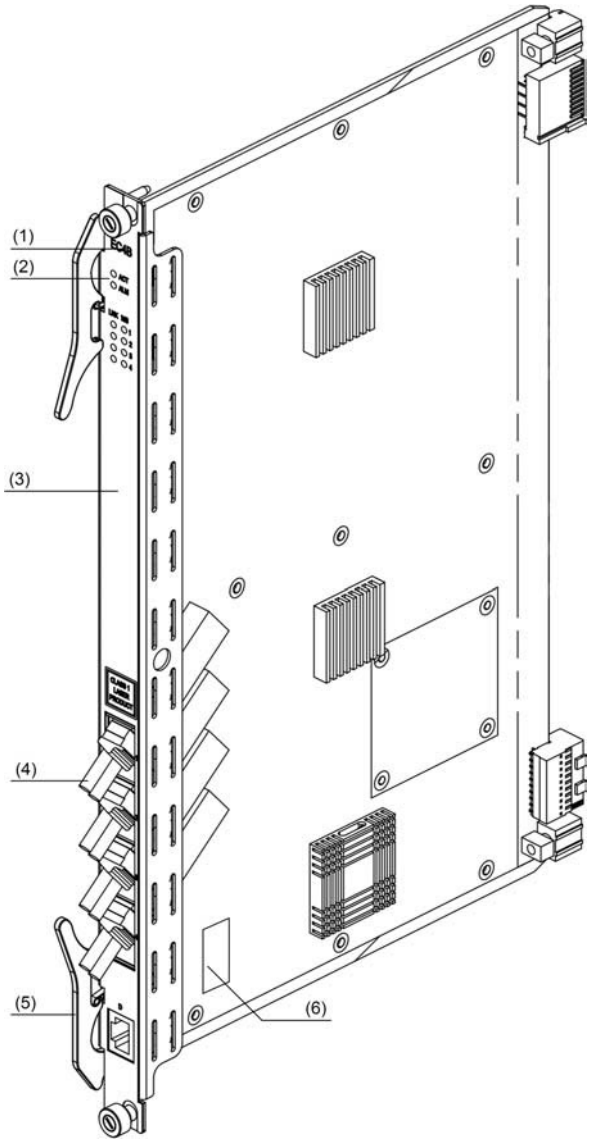
- Card Structure
- Replacing a Core Switch Card
- Replacing an Uplink Card
- Replacing a Service Interface Card
- Replacing a Public Card

4.1 Card Structure

Introduces the structure of each card.

The card structures can be divided into two types according to the panel's height.

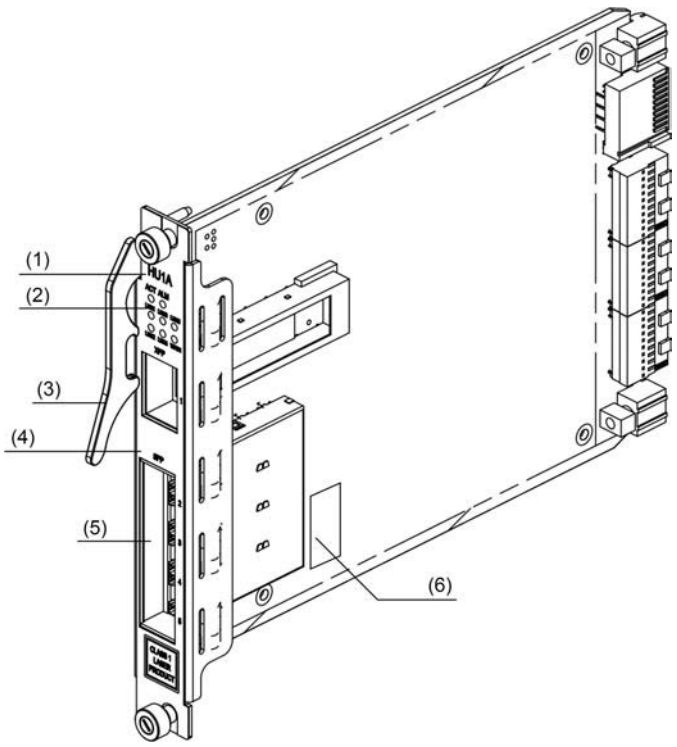
- The card height is 366mm, as shown in Figure 4-1 using the EC4B card as the example.
- The card height is 182mm, as shown in Figure 4-2 using the HU1A card as the example.



(1) Card name (2) LED indicator (3) Card panel

(4) Interface (5) Latch (6) Card No.

Figure 4-1 The EC4B card structure



(1) Card name	(2) LED indicator	(3) Latch
(4) Card panel	(5) Interface	(6) Card No.

Figure 4-2 The HU1A card structure

Note:

The card code is indicated in the label attached to the PCB panel.

4.2 Replacing a Core Switch Card

Replacement is required when a core switch card fails or needs to be upgraded.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Card labels
- An ESD protection bag

- A cross screwdriver

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- If the equipment is provided with two core switch cards for redundancy, users should first execute the active-to-standby switching command to switch the services from the active core switch card to the standby one. If the equipment is provided with only one core switch card, to avoid complete service interruption, it is recommended to insert the new core switch card into the standby slot before the replacement. When the active and the standby cards are synchronized, execute the active-to-standby switching command first and then remove the card.
- If it is necessary to switch over the active and standby core switch cards, it is recommended to accomplish the switchover through the active-to-standby switching command via the network management system.
- When replacing a card, be sure to prevent an electrical shorting arising from metal objects falling on the card or contacting with other objects.
- When inserting a card, be sure to align it with the slide rails. Sliding a card along the slide rails enables the card to be accurately connected with the backplane.
- Excessive use of force is extremely undesirable during card installation and removal.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side

Note:

If the core switch card fails to work, go to step 6 directly.

1) Log into the CLI network management system and enter the configuration mode, as shown below.

```
Login: GEPON
Password:GEPON
User>en
Password:GEPON
Admin#
```

2) In the Admin # directory, save the current configuration into the Flash memory of the core switch card using the save command.

3) In the FTP server, successfully run the FTP SERVER (for example, WFTPD.EXE) program, correctly input the user name, password and the path to store the backup configuration files and system software.

4) In the Admin# directory, use the upload ftp config <A.B.C.D> <username> <password> <filename> command to back up the current configuration file to the FTP server.

5) In the Admin# directory, use the upload ftp system <A.B.C.D> <username> <password> <filename> command to back up the system software to the FTP server.

6) Confirm the hardware version of the new card, and ensure that the new one matches the card to be replaced.

Component	Hardware Code
HSWA	2.115.334, corresponding to an EPON access system
	2.115.331, corresponding to a GPON access system

7) Make sure that the surface of the new card is clean and no component is missing or damaged.

◆ Operations on the network management side

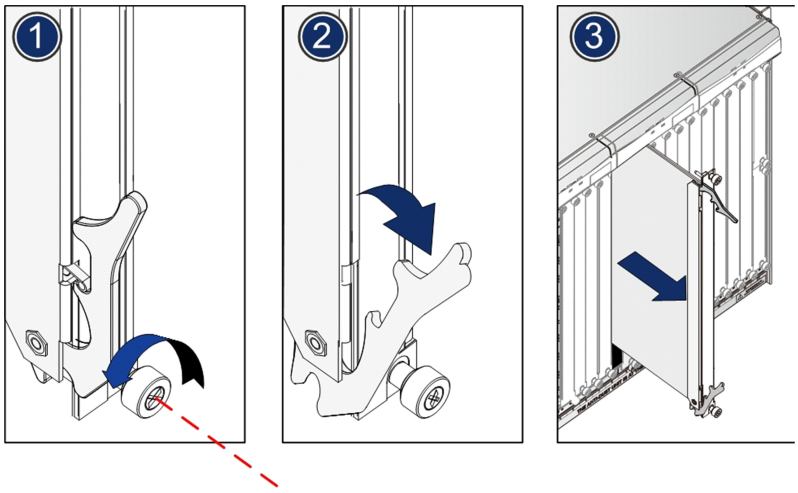
Note:

If the core switch card fails to work, it is not necessary to carry out any operations on the network management side.

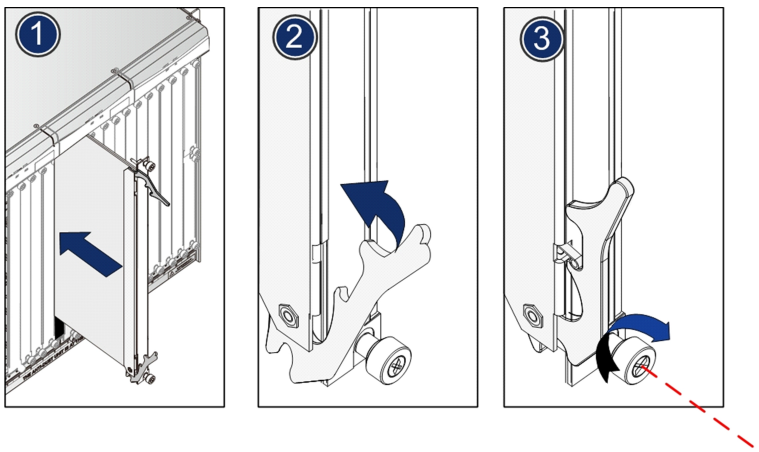
1) Log into the ANM2000.
2) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view and record the hardware version and software version and ensure they are compatible before and after the replacement.
3) Right-click the active core switch card, select the **System Control→Save Config To Flash** in the shortcut menu, to save the current configuration into the Flash memory of the core switch card.
4) In the FTP server, successfully run the FTP SERVER (for example, WFTPD.EXE) program, correctly input the user name, password and the path to store the backup configuration files and system software.
5) Right-click the active core switch card and select **System Maintenance→Export Config** in the shortcut menu to back up the current configuration file to the FTP server.
6) Right-click the active core switch card and select **System Maintenance→Backup Software** in the shortcut menu to back up the system software to the FTP server.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Loosen the captive screws on the card, as shown in ① of the following figure.
3. Open and extend the card's latches in the direction shown in ② of the following figure to make the card away from the subrack backplane socket.
4. Pull out the card along the slide rails slowly and smoothly, as shown in ③ of the following figure.



5. Attach a label to the removed card, and put the card into the ESD protection bag. Record the symptom, and prepare for repair.
6. Take a new card, open the latches and align the upper and lower edges of the card with the slide rails of the slot (with the component side facing right). Then slowly push the card into the subrack along the slide rails, as shown in ① of the following figure.
7. Close and secure the card's latches as indicated in ② of the following figure.
8. Tighten the captive screws on the card, as shown in ③ of the following figure.



Subsequent operations

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side
  1) Observe whether the indicator LED of the new core switch card is normally blinking.
  2) In the Admin\device# directory, view whether the new card is in the normal working condition by the show slot command.
  3) In the FTP server, successfully run the FTP SERVER (for example, WFTPD.EXE) program, correctly input the user name, password and the path to store the backup configuration files and system software.
  4) In the Admin# directory, use the download ftp config <A.B.C.D> <username> <password> <filename> command to download the original configuration file from the FTP server to the new core switch card.
  5) In the Admin# directory, use the download ftp system <A.B.C.D> <username> <password> <filename> command to download the original system software from the FTP server to the new core switch card.
  6) To set the new core switch card to the active status, after the active and standby cards are synchronized, enter the Admin\device# directory and use the force switch command. When the MS indicator LED changes from dim to bright, it indicates that the switchover between the active and standby cards has been completed successfully.
  7) Confirm that the service has recovered.
- Operations on the network management side
  1) View whether the indicator of the new card on the network management system is normal. A green indicator indicates that the card is working normally.

2) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view whether the hardware version and software version of the new core switch card is correct.

3) In the FTP server, successfully run the FTP SERVER (for example, WFTPD.EXE) program, correctly input the user name, password and the path to store the backup configuration files and system software.

4) Right-click the active core switch card and select **System Maintenance→Import Config** in the shortcut menu to download the original configuration file from the FTP server to the new core switch card.

5) Right-click the active core switch card and select **System Maintenance→Upgrade Software** in the shortcut menu to download the original system software from the FTP server to the new core switch card.

6) To set the new core switch card to the active status, after the active and standby cards are synchronized, right-click the active core switch card and select **System Control→Force Switch** in the shortcut menu. When the MS indicator in the card view changes into green, it indicates that the switchover between the active and standby card has been completed successfully.

7) Confirm that the service has recovered.

4.3 Replacing an Uplink Card

Replacement is required when an uplink card fails or needs to be upgraded.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Card labels
- An ESD protection bag
- A cross screwdriver

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.

- If the uplink card is protected with standby cards, the service will not be interrupted when replacing one of the uplink cards. If there is only one uplink card or two cards are not provided with the active and standby protection, replacing the uplink card may cause the service carried by the card to be interrupted.
- When replacing the card, be sure to prevent an electrical shorting arising from a metal object falling on the card or contacting with other metal objects.
- When inserting a card, be sure to align it with the slide rails. Sliding a card along the slide rails enables the card to be accurately connected with the backplane.
- Excessive use of force is extremely undesirable during card installation and removal.

Prerequisite

- Operations on the equipment side
  1) Record the locations of all cables connected to the card to be replaced. Reconnect the cables in accordance with this record after the replacement.
  2) Check whether the cable labels are intact and clear. If they are damaged or not clear, attach new ones to the cables.
  3) Confirm the hardware version of the new card, and ensure that the new one matches the card to be replaced.

Component	Hardware Code
HU1A	2.170.846
HU2A	2.170.854
GU6F	2.170.855

  4) Be sure that the surface of the new card is clean and no component is missing or damaged.
- Operations on the network management side

Note:

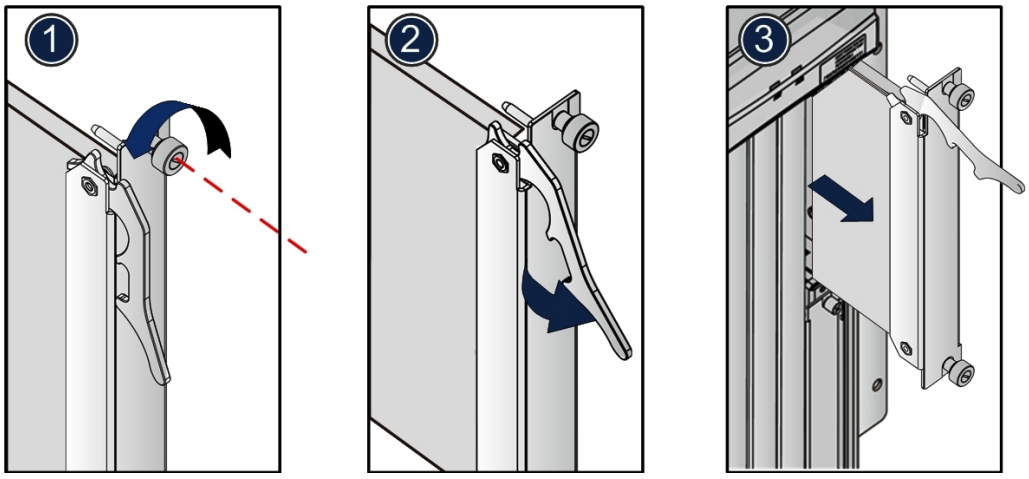
If the card to be replaced fails to work, it is not necessary to carry out any operations on the network management side.

1) Log into the ANM2000.

2) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view and record the hardware version and software version of the card to be replaced and ensure they are compatible before and after the replacement.

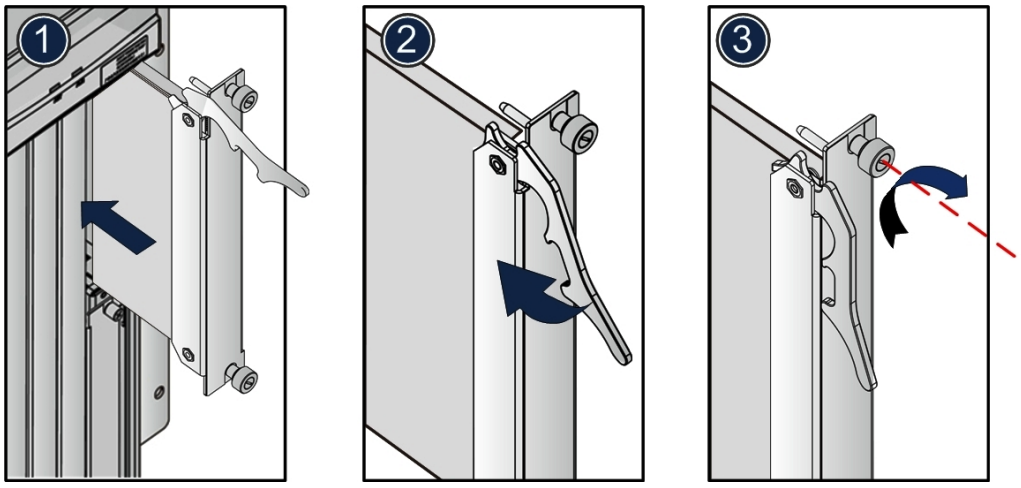
Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Carefully remove all cables on the card to be replaced. See Replacing a Cable for the detailed operations.
3. Loosen the captive screws on the card, as shown in ① of the following figure.
4. Open and extend the card's latches in the direction shown in ② of the following figure to make the card away from the subrack backplane socket.
5. Pull out the card along the slide rails slowly and smoothly, as shown in ③ of the following figure.



6. Attach a label to the removed card, and put the card into the ESD protection bag. Record the symptom, and prepare for repair.
7. Take a new card, open the latches and align the upper and lower edges of the card with the slide rails of the slot (with the component side facing right). Then slowly push the card into the subrack along the slide rails, as shown in ① of the following figure.

8. Close and secure the card's latches as indicated in ② of the following figure.
9. Tighten the captive screws on the card, as shown in ③ of the following figure.



10. Connect the cables in turn in accordance with the record. See Replacing a Cable for the detailed operations.

Subsequent operations

- Operations on the equipment side
  1) Observe the status of the indicator LED on the new card. If its ACT is illuminated, it indicates that the card is normally powered up.
  2) In the Admin\device# directory, view whether each card is working normally and whether it has established communication with the core switch card using the show slot command.
  3) Confirm that the service has recovered.
- Operations on the network management side
  1) View whether the indicator of the new card on the network management system is normal. A green indicator indicates that the card is working normally.
  2) Right-click the new card, and select **Status Query** in the shortcut menu to view whether the working status of each card is normal.
  3) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view whether the hardware version and software version of the new card is correct.

4) Confirm that the service has recovered.

4.4 Replacing a Service Interface Card

Replacement is required when a service interface card fails or needs to be upgraded.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Card labels
- An ESD protection bag
- A cross screwdriver

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- Replacing a service interface card may cause the service carried by this card to be interrupted.
- When replacing the card, be sure to prevent an electrical shorting arising from a metal object falling on the card or contacting with other metal objects.
- When inserting a card, be sure to align it with the slide rails. Sliding a card along the slide rails enables the card to be accurately connected with the backplane.
- Excessive use of force is extremely undesirable during card installation and removal.

Prerequisite

- Operations on the equipment side
  1) Record the locations of all cables connected to the card to be replaced. Reconnect the cables in accordance with this record after the replacement.
  2) Check whether the cable labels are intact and clear. If they are damaged or not clear, attach new ones to the cables.

3) Confirm the hardware version of the new card, and ensure that the new one matches the card to be replaced.

Component	Hardware Code
EC4B	2.119.318
EC84B	2.119.354
GC4B	2.119.348
GC8B	2.200.012
C155A	2.170.821

4) Make sure that the surface of the new card is clean and no component is missing or damaged.

◆ Operations on the network management side

Note:

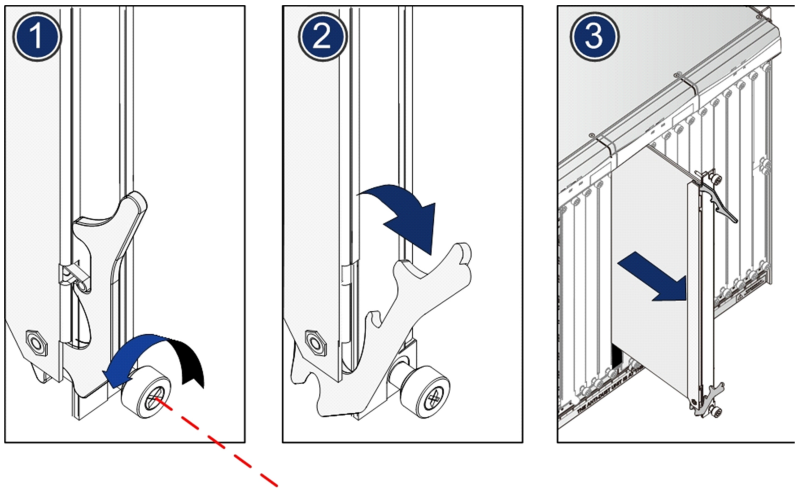
If the card to be replaced fails to work, it is not necessary to carry out any operations on the network management side.

1) Log into the ANM2000.

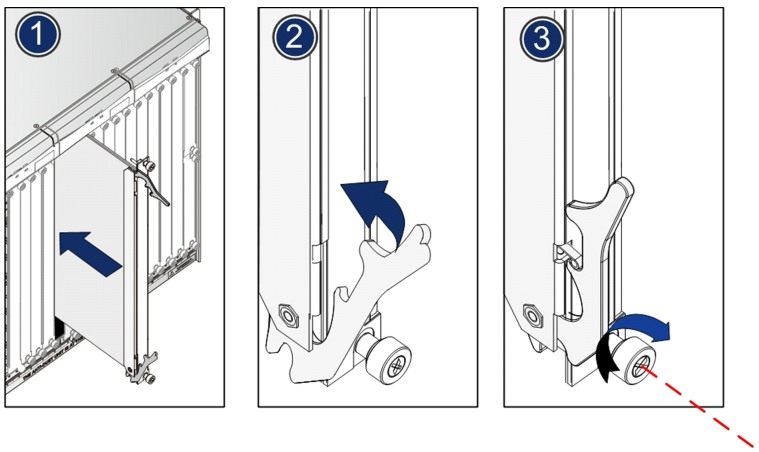
2) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view and record the hardware version and software version of the card to be replaced and ensure they are compatible before and after the replacement.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Carefully remove all cables on the card to be replaced. See Replacing a Cable for the detailed operations.
3. Loosen the captive screws on the card, as shown in ① of the following figure.
4. Open and extend the card's latches in the direction shown in ② of the following figure to make the card away from the subrack backplane socket.
5. Pull out the card along the slide rails slowly and smoothly, as shown in ③ of the following figure.



6. Attach a label to the removed card, and put the card into the ESD protection bag. Record the symptom, and prepare for repair.
7. Take a new card, open the latches and align the upper and lower edges of the card with the slide rails of the slot (with the component side facing right). Then slowly push the card into the subrack along the slide rails, as shown in ① of the following figure.
8. Close and secure the card's latches as indicated in ② of the following figure.
9. Tighten the captive screws on the card, as shown in ③ of the following figure.



10. Connect the cables in turn in accordance with the record. See Replacing a Cable for the detailed operations.

Subsequent operations

- Operations on the equipment side
  1) Observe the status of the indicator LED on the new card. If its ACT is illuminated, it indicates that the card is normally powered up.
  2) In the Admin\device# directory, view whether each card is working normally and whether it has established communication with the core switch card using the show slot command.
  3) Confirm that the service has recovered.
- Operations on the network management side
  1) View whether the indicator of the new card on the network management system is normal. A green indicator indicates that the card is working normally.
  2) Right-click the new card and select **Status Query** in the shortcut menu to view whether the working status of the card is normal.
  3) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view whether the hardware version and software version of the new card is correct.
  4) Confirm that the service has recovered.

4.5 Replacing a Public Card

Replacement is required when a public card fails or needs to be upgraded.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Card labels
- An ESD protection bag
- A cross screwdriver

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.

- Replacing a public card may cause the service carried by this card to be interrupted.
- When replacing the card, be sure to prevent an electrical shorting arising from a metal object falling on the card or contacting with other metal objects.
- When inserting a card, be sure to align it with the slide rails. Sliding a card along the slide rails enables the card to be accurately connected with the backplane.
- Excessive use of force is extremely undesirable during card installation and removal.

Prerequisite

- Operations on the equipment side

  1) Record the locations of all cables connected to the card to be replaced. Reconnect the cables in accordance with this record after the replacement.
  2) Check whether the cable labels are intact and clear. If they are damaged or not clear, attach new ones to the cables.
  3) Confirm the hardware version of the new card, and ensure that the new one matches the card to be replaced.

Component	Hardware Code
PUBA	2.167.177

  4) Make sure that the surface of the new card is clean and no component is missing or damaged.

- Operations on the network management side

Note:

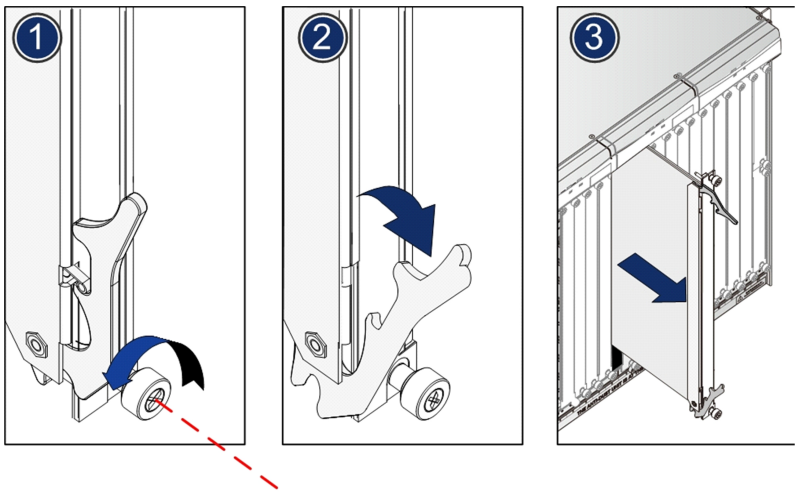
If the card to be replaced fails to work, it is not necessary to carry out any operations on the network management side.

1) Log into the ANM2000.

2) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view and record the hardware version and software version of the card to be replaced and ensure they are compatible before and after the replacement.

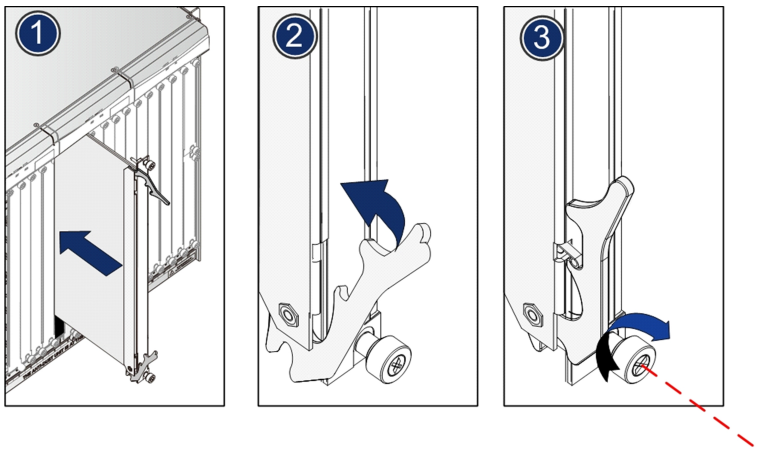
Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Carefully remove all cables on the card to be replaced. See Replacing a Cable for the detailed operations.
3. Loosen the captive screws on the card, as shown in ① of the following figure.
4. Open and extend the card's latches in the direction shown in ② of the following figure to make the card away from the subrack backplane socket.
5. Pull out the card along the slide rails slowly and smoothly, as shown in ③ of the following figure.



6. Attach a label to the removed card, and put the card into the ESD protection bag. Record the symptom, and prepare for repair.
7. Take a new card, open the latches and align the upper and lower edges of the card with the slide rails of the slot (with the component side facing right). Then slowly push the card into the subrack along the slide rails, as shown in ① of the following figure.
8. Close and secure the card's latches as indicated in ② of the following figure.

9. Tighten the captive screws on the card, as shown in ③ of the following figure.



10. Connect the cables in turn in accordance with the record. See Replacing a Cable for the detailed operations.

Subsequent operations

- Operations on the equipment side
  1) Observe the status of the indicator LED on the new card. If its ACT is illuminated, it indicates that the card is normally powered up.
  2) In the Admin\device# directory, view whether each card is working normally and whether it has established communication with the core switch card using the show slot command.
  3) Confirm that the service has recovered.
- Operations on the network management side
  1) View whether the indicator of the new card on the network management system is normal. A green indicator indicates that the card is working normally.
  2) Right-click the new card and select **Status Query** in the shortcut menu to view whether the working status of the card is normal.
  3) Right-click the active core switch card and select **Get Information→Card Version** in the shortcut menu, to view whether the hardware version and software version of the new card is correct.
  4) Confirm that the service has recovered.

5 Replacing a Fan Unit

When a fan unit runs abnormally or needs cleaning, users should replace it.

 Caution:

Do not touch the fan with hands or other objects when the fan is rotating.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- ESD protection bags

Precautions

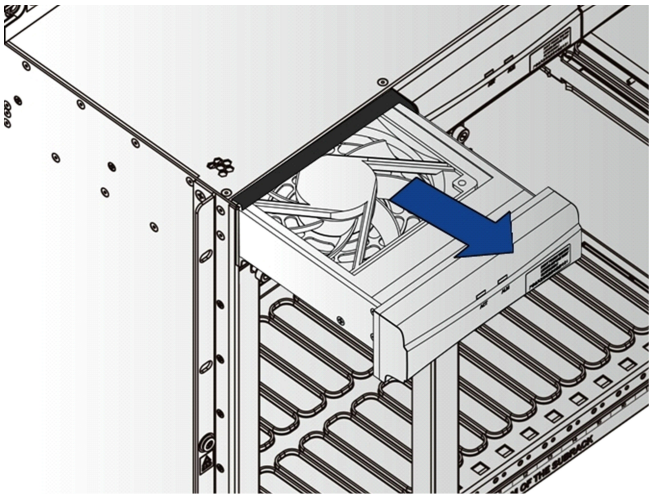
- When inserting the fan unit, align it with the slide rails and push it in along the slide rails to make it connect with the backplane properly.
- Excessive use of force is extremely undesirable during fan unit installation and removal.

Prerequisite

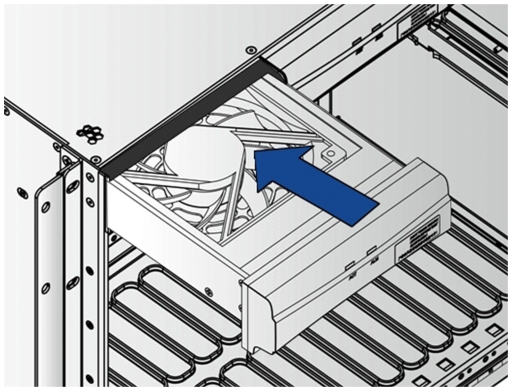
Before removing the running fan, prepare a spare fan for the replacement, so as to ensure that the new fan can be installed as soon as the original fan is removed.

Procedure

1. Wear the ESD protection wrist strap and ensure that the plug is securely connected to the ESD protection earth ground fastener.
2. Hold the fan and press the fan’s bottom snap-in latch.
3. Draw the fan partially out with a stable force so that the fan is removed from the subrack.
4. After the fan stops rotating, draw it out completely. See the figure below.



5. Put the replaced fan into the ESD protection bag.
6. Wear the ESD protection wrist strap and ensure that the plug is securely connected to the ESD protection earth ground fastener. Hold the new fan, and press the fan unit’s bottom snap-in latch, as shown in ① of .
7. Align the slide rails of the fan unit with the subrack's slide rail grooves. Push the new fan lightly into the corresponding slot along the slide rails on the subrack, as shown in the figure below.



8. After the new fan is pushed into the proper position, release the latch, and the fan will be locked into the subrack automatically.

Subsequent operations

1. Observe the indicator LEDs on the fan unit panel. When the fan works normally, the ACT indicator LED should be ON.

2. Check whether the new fan unit rotates normally without any abnormal sound. If any abnormal sound is heard, the fan may be blocked or loosened; please deal with this condition promptly.

6 Replacing a Cable

This chapter describes the operations necessary to replace an AN5116-06B cable.

- Replacing a Power Cable
- Replacing a Protection Earth Ground Cable
- Replacing a Subrack Alarm Cable
- Replacing a Fiber Jumper
- Replacing a Network Cable
- Replacing a Dry Contact Cable

6.1 Replacing a Power Cable

Introduces the method of replacing a power cable.

6.1.1 Replacing a Cabinet Power Cable

Replacement is required when the cabinet power cable fails. There are five cables in total; two -48 V power cables, two power earth ground cables and one protection earth ground cable. Operations for replacing the five cables are the same.

Cable appearance

-48V power cable

Power earth ground cable

Protection earth ground

Figure 6-1 The cabinet power cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- A flat screwdriver
- Diagonal pliers
- Cable labels
- A dedicated cable box

- A multimeter

Precautions

- Insertion or removal of a live cabinet power cable is prohibited.
- DC line terminals and other unnecessary bare wire should be wrapped with the insulating tape to fully insulate them.
- When removing a cabinet power cable, do not pull other cables.
- When rearranging the cabinet power cables, comply with the arrangement requirements and avoid intertwining the cables.

Prerequisite

1. Record the type of cabinet power cables to ensure that the type of new cables matches the ones to be replaced.

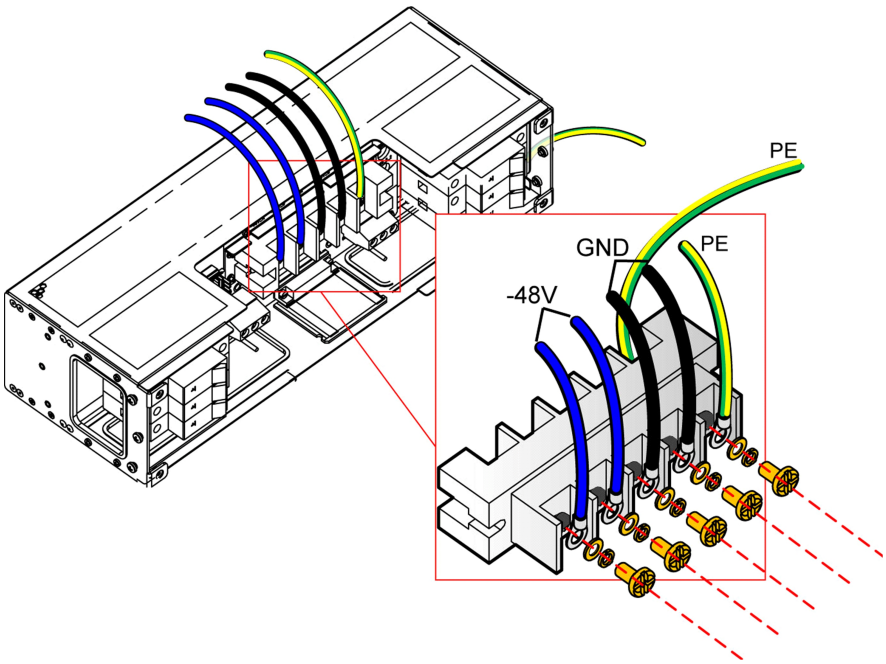
Component	Color	Hardware Code
-48 V power cable	Blue	408000076 / 408000021
Power earth ground cable	Black	408000075 / 408000020
Protection earth ground cable	Yellow - / green	408000041 / 408000019

2. Record the locations and cabling modes on both ends of the cabinet power cables to be replaced.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Turn off the main switch on the PDP corresponding to the cabinet power cable.
3. Arrange the new cable in accordance with the cabling mode of the cabinet power cable to be replaced.
4. Cut the wire binders which bind the cabinet power cables using the diagonal pliers, and remove the wire binders.
5. Loosen the screws on the power connectors of the PDP connecting to the cabinet power cables to be replaced using a flat screwdriver by rotating counterclockwise, and then pull out the cabinet power cables to be replaced.

6. Disconnect the cabinet power cables to be replaced from the head of row cabinet.
7. Remove the replaced cabinet power cables, attach the labels, record the fault symptom, and then put them into the dedicated cable box.
8. Insert the new cabinet power cables into the original power connectors, and tighten the screws on the power connectors using a flat screwdriver by rotating clockwise.



9. Connect the new cabinet power cables with the head of row cabinet in the original mode.
10. Make new labels according to the labels of the original cabinet power cables.
11. Attach the labels to the new cabinet power cables.
12. Bind the new cabinet power cables with the wire binders.
13. Turn on the main switch on the PDP corresponding to the cabinet power cable.

Subsequent operations

Use a multimeter to measure whether the voltage values of the power connectors connecting with the cabinet power cables are normal. If normal, it shows that the replacement is successful.

6.1.2 Replacing a Subrack Power Cable

Replacement is required when the subrack power cable fails. In general, the equipment provides redundant power rails. When the subrack power cable fails, it will not influence the normal power supply.

Cable appearance

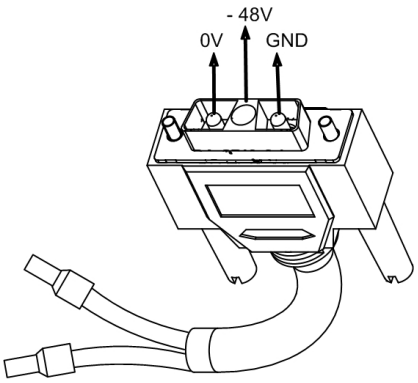


Figure 6-2 The subrack power cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- A flat screwdriver
- Diagonal pliers
- Wire binders
- A dedicated cable box
- Cable labels
- A multimeter

Precautions

- Insertion or removal of a live subrack power cable is prohibited.
- DC line terminals and other unnecessary bare wires should be wrapped with the insulating tape to fully insulate them.
- When removing a subrack power cable, do not pull other cables.

- When rearranging the subrack power cables, comply with the arrangement requirements and avoid intertwining the cables.

Prerequisite

1. Record the type of subrack power cables to ensure that the type of the new cables matches the ones to be replaced.

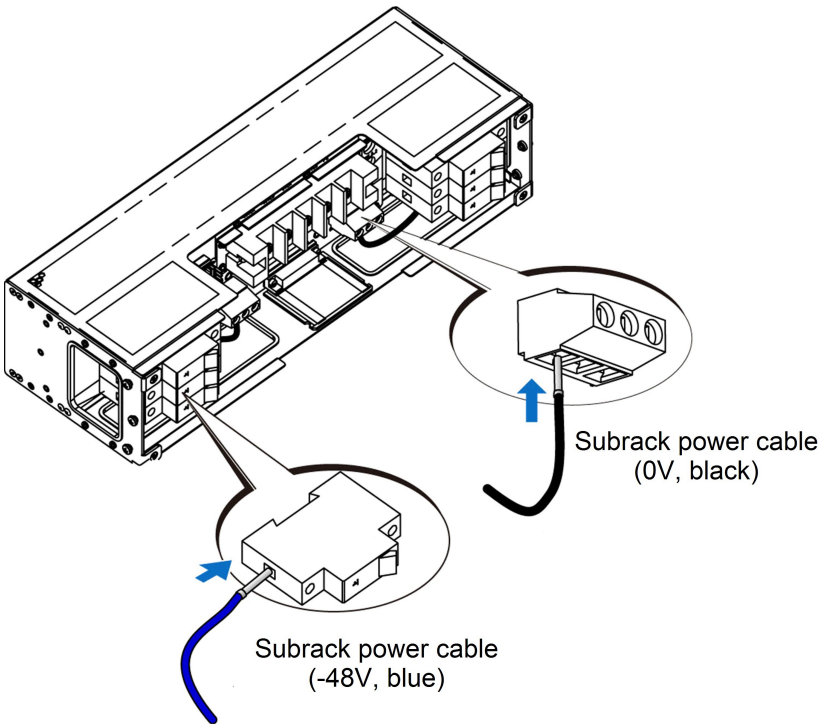
Component	Hardware Code
Subrack power cable	3.696.229

2. Record the locations and cabling modes on both ends of the subrack power cables to be replaced.

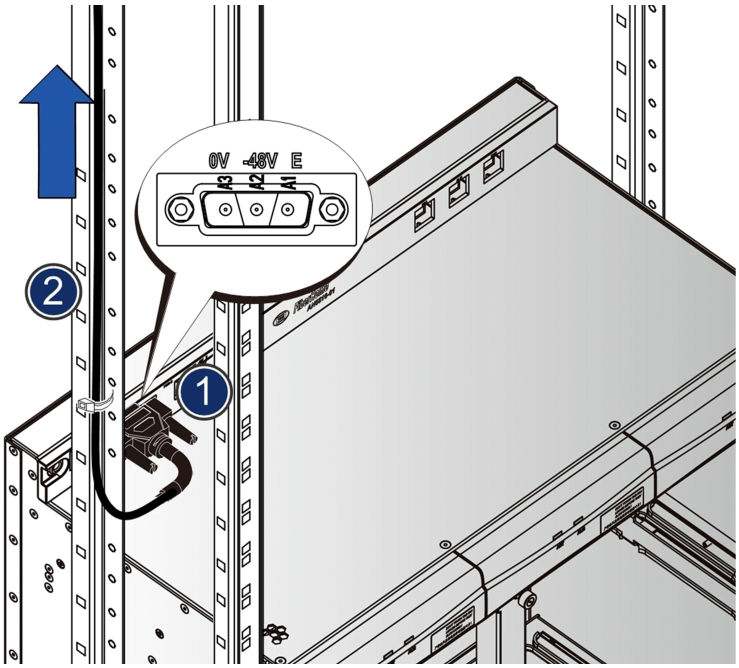
Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Turn off the branch power switch on the PDP corresponding to the subrack power cable.
3. Arrange the new subrack power cables in the cabling mode of the original ones, as shown in the following figure.
4. Cut the wire binders which bind the subrack power cables using the diagonal pliers, and remove the wire binders.
5. Loosen the screws on the D-type connectors of the subrack power cables to be replaced using a flat screwdriver by rotating counterclockwise, and then pull out the D-type connectors of the subrack power cables to be replaced.
6. Loosen the screws on the PDP branch power supply module connecting with the subrack power cable to be replaced using a flat screwdriver by rotating counterclockwise, and then withdraw the two cores of blue and black respectively.
7. Remove the replaced subrack power cables, attach the labels, record the fault symptom, and then put them into the dedicated cable box.

8. Insert the blue and black cable cores of the new subrack power cable into the original sub-power supply module respectively, and then tighten the screws on the sub-power supply module using a flat screwdriver by rotating clockwise.



9. Turn on the branch power switch on the PDP corresponding to the subrack power cable, and use a multimeter to measure whether the voltage of the D-type connector of the new subrack power cable is normal (measure the voltage between the A1 / A3 terminal and the A2 terminal of the D-type connector).
10. If the voltage is normal, disconnect the branch power switch on the PDP corresponding to the subrack power cable.
11. Insert the D-type connector of the new subrack power cable into the subrack power interface, and tighten the screws on both ends of the connector using a flat screwdriver by rotating clockwise.



12. Make new labels according to the labels of the original subrack power cables.
13. Attach the labels to the new subrack power cables.
14. Bind the new subrack power cables with the wire binders.
15. Turn on the branch power switch on the PDP corresponding to the subrack power cable.

Subsequent operations

Use a multimeter to measure whether the voltage values of the power connectors connecting with the subrack power cables are normal. If normal, it shows that the replacement is successful.

6.2 Replacing a Protection Earth Ground Cable

Introduces the method of replacing a protection earth ground cable.

6.2.1 Replacing a Cabinet Protection Earth Ground Cable

Replacement is required when the cabinet protection earth ground cable fails.

Cable appearance

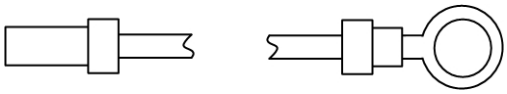


Figure 6-3 The cabinet protection earth ground cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- A cross screwdriver
- A multimeter
- A dedicated cable box

Precautions

- Pay attention to electrical safety when replacing the cabinet protection earth ground cable, refer to Safety Precautions.
- When removing a cabinet protection earth ground cable, be sure not to pull other cables to prevent interruption of other services.
- When rearranging the cabinet protection earth ground cable, comply with the arrangement requirements and avoid intertwining the cables.

Prerequisite

1. Record the type of cabinet protection earth ground cables to ensure that the type of new cables matches the ones to be replaced.

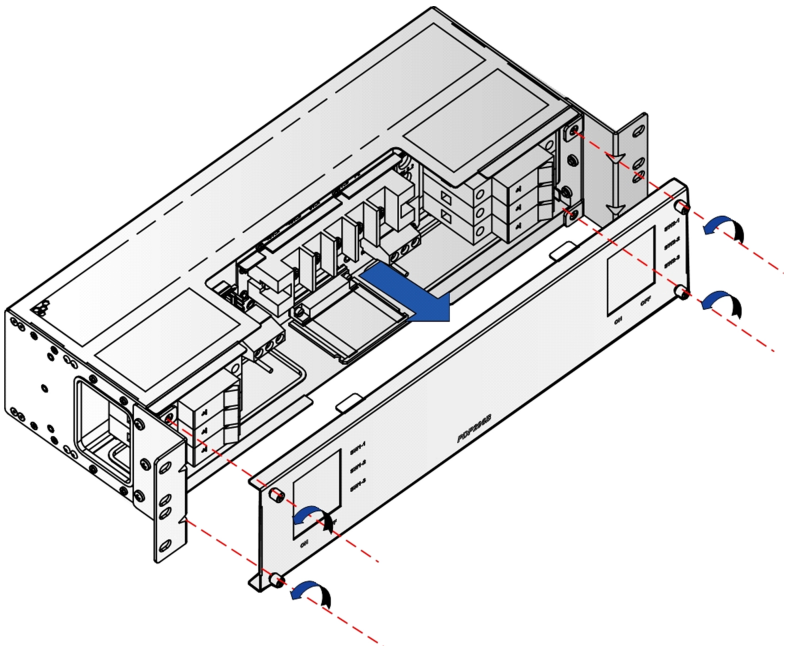
Component	Code
Cabinet protection earth ground cable	408000007

2. Record the locations and cabling modes on both ends of the cabinet protection earth ground cables to be replaced.

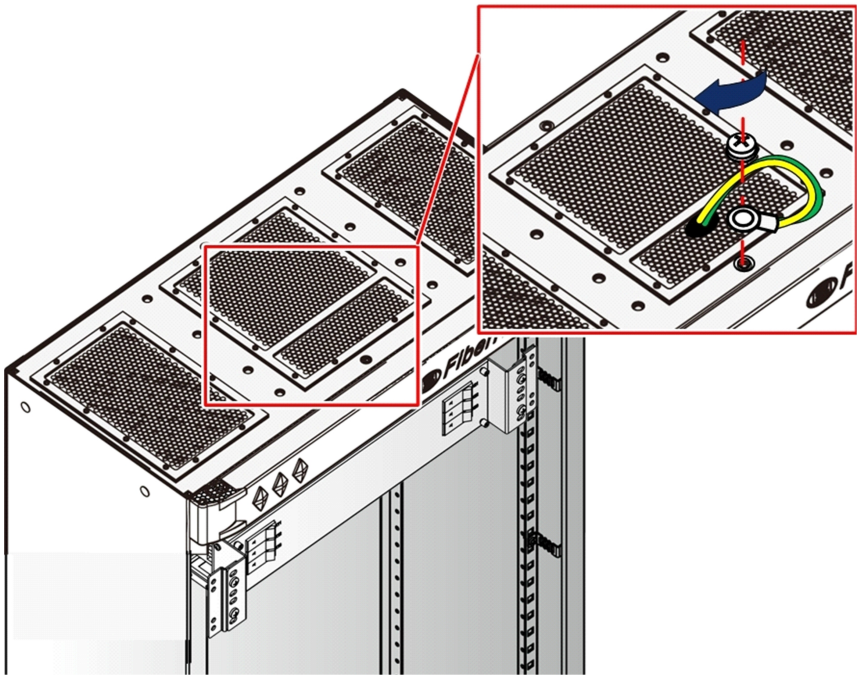
Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.

2. Loosen the screws on the PDP’s front panel and remove the front panel.



3. Loosen the screws on the PE connectors of the PDP connecting with the cabinet protection earth ground cable to be replaced, and pull out the cable.
4. Loosen the screws on the cabinet-top earth ground point connecting with the cabinet protection earth ground cable to be replaced, and pull out the cable.
5. Attach labels to the replaced cabinet protection earth ground cable, record the fault symptom, and then put them into the dedicated cable box.
6. Cling the M6 uninsulated ring tongue crimped terminal of the new cabinet protection earth ground cable to the cabinet-top earth ground point, and use a screw to secure it.



7. Use the screw to secure the cord end terminal of the new cabinet protection earth ground cable to the PE connector on the PDP.
8. Install the PDP's front panel and secure it with the screws.
9. Make new labels according to the labels of the original cabinet protection earth ground cables.
10. Attach the labels to the new cabinet protection earth ground cables.

Subsequent operations

Connect one end of the multimeter to the cabinet protection earth ground cable and the other end to the earth ground bar of the equipment room to check whether the cable is securely connected.

6.2.2 Replacing a Subrack Protection Earth Ground Cable

Replacement is required when the subrack protection earth ground cable fails.

Cable appearance

Figure 6-4 The subrack protection earth ground cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- A cross screwdriver
- A multimeter
- A dedicated cable box

Precautions

- Pay attention to electrical safety when replacing the subrack protection earth ground cable, refer to Safety Precautions.
- When removing a subrack protection earth ground cable, be sure not to pull other cables to prevent interruption of other services.
- When rearranging the subrack protection earth ground cable, comply with the arrangement requirements and avoid intertwining the cables.

Prerequisite

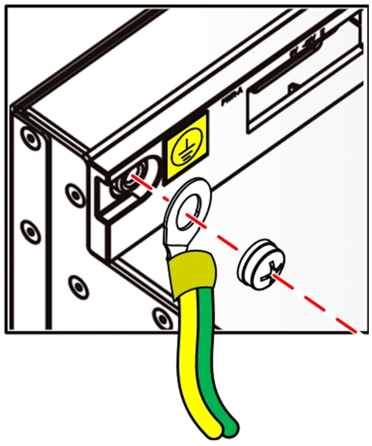
1. Record the type of the subrack protection earth ground cables to ensure that the type of the new cables matches the ones to be replaced.

Component	Code
Subrack protection earth ground cable	3.696.084

2. Record the locations and cabling modes on both ends of the subrack protection earth ground cables to be replaced.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Loosen the screws on the subrack ESD protection earth ground fastener connecting with the subrack protection earth ground cable to be replaced, and pull out the cable.
3. Loosen the screws on the cabinet vertical mounting flange connecting with the subrack protection earth ground cable to be replaced, and pull out the cable.
4. Attach labels to the replaced subrack protection earth ground cable, record the fault symptom, and then put them into the dedicated cable box.
5. Align one end of the new subrack protection earth ground cable with the original vertical mounting flange and use the screw to secure them.
6. Use the screw to secure the other end of the new subrack protection earth ground cable to the subrack ESD protection earth ground fastener.



7. Make new labels according to the labels of the original subrack protection earth ground cables.
8. Attach the labels to the new subrack protection earth ground cables.

Subsequent operations

Connect one end of the multimeter to the subrack protection earth ground cable and the other end to the earth ground bar of the equipment room to check whether the cable is securely connected.

6.3 Replacing a Subrack Alarm Cable

Replacement is required when the subrack alarm cable fails.

Cable appearance

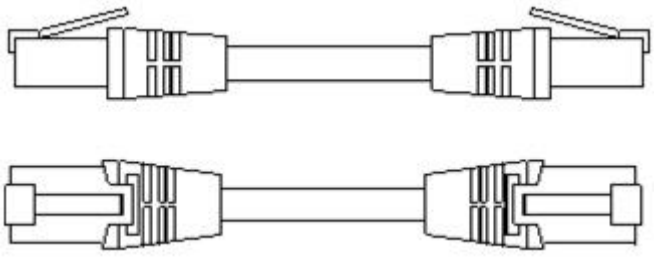


Figure 6-5 The subrack alarm cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Cable labels
- A dedicated cable box

Precautions

- During the replacement of the subrack alarm cable, the alarm signal between the subrack and the PDP will be temporarily interrupted. If there is an alarm on the equipment, the alarm buzzer will not sound and the alarm LED indicator on the top of the cabinet will be OFF.
- When removing a subrack alarm cable, do not pull other cables.
- When rearranging the subrack alarm cables, comply with the arrangement requirements and avoid intertwining the cables.

Prerequisite

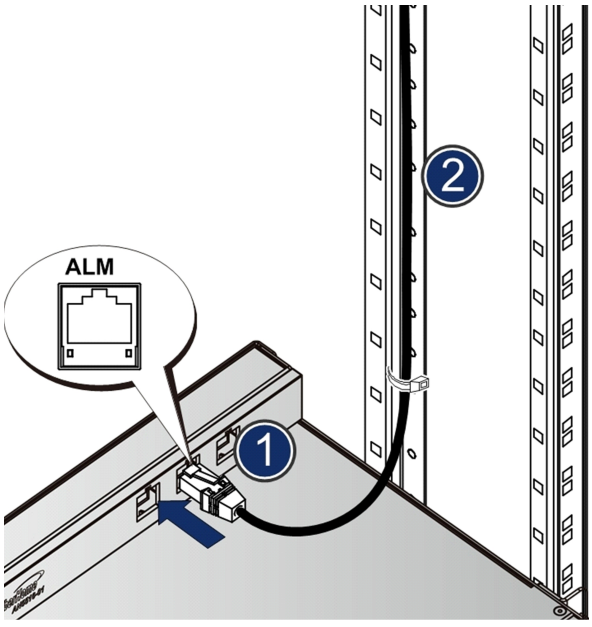
1. Record the type of subrack alarm cables to ensure that the type of the new cables matches the ones to be replaced.

Component	Hardware Code
Subrack alarm cable	3.695.095

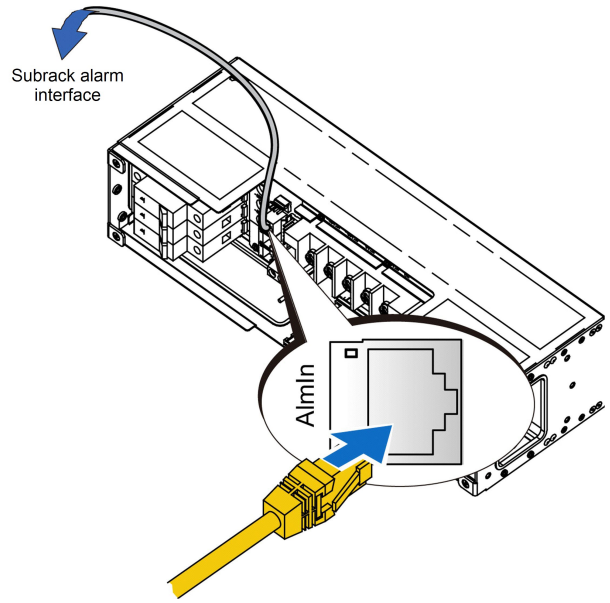
2. Record the locations and cabling modes on both ends of the subrack alarm cables to be replaced.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Arrange the new subrack alarm cable in the cabinet according to the cabling mode of the original one.
3. Pull out the RJ-45 connector for the PDP AlmIn interface of the subrack alarm cable to be replaced.
4. Pull out the RJ-45 connector for the subrack ALM interface of the subrack alarm cable to be replaced.
5. Remove the replaced subrack alarm cables, attach the labels, record the fault symptom, and then put them into the dedicated cable box.
6. Insert one RJ-45 connector of the new subrack alarm cable into the ALM interface of the subrack. When a click is heard, it indicates that connection is secure.



7. Insert the other RJ-45 connector of the new subrack alarm cable into the AlmIn interface of the PDP.



8. Make new labels according to the labels of the original subrack alarm cables.
9. Attach the labels to the new subrack alarm cables.

Subsequent operations

Check whether the alarm signal is normally transmitted to the PDP once the subrack has an alarm. If the alarm buzzer sounds and the alarm indicator LED on the top of the cabinet is illuminated, it shows that the subrack alarm cable has been successfully replaced.

6.4 Replacing a Fiber Jumper

Replacement is required when the fiber jumper fails.

Cable appearance

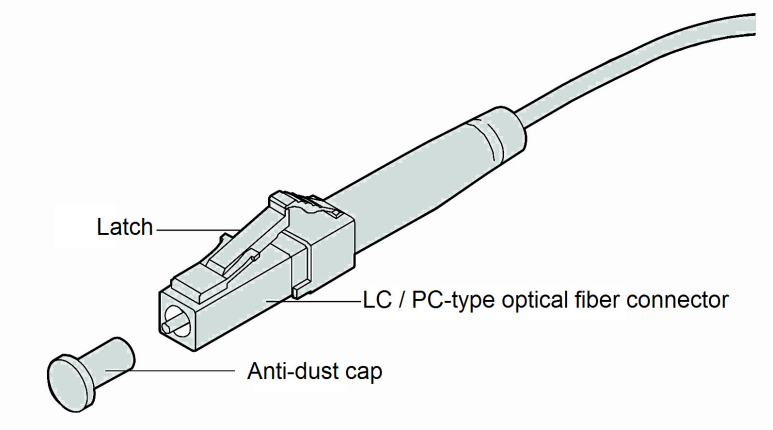


Figure 6-6 The LC / PC-type optical fiber jumper

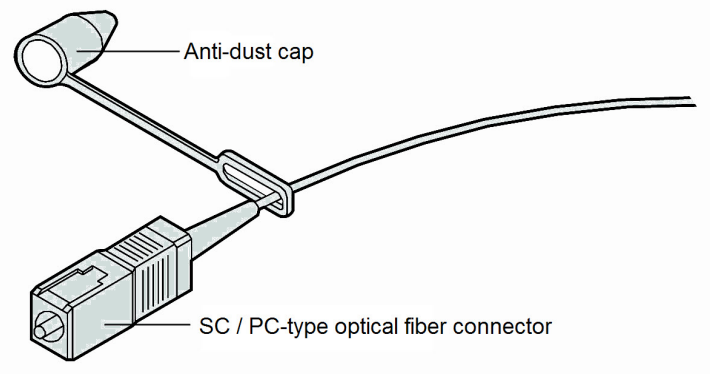


Figure 6-7 The SC / PC-type optical fiber jumper

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- A corrugated duct
- Diagonal pliers
- Fiber binders
- Cable labels
- A roll of adhesive tape

Precautions

- During the replacement of a fiber jumper, the service carried by it will be temporarily interrupted.

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- When inserting or removing a fiber jumper, take care to avoid damaging the fiber connector.
- When removing a fiber jumper, be sure not to pull other cables to prevent interruption of other services.
- When rearranging a new fiber jumper, comply with the arrangement requirements and do not wrap it with other cables.
- Never look directly into the end of the optical fiber or connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Prerequisite

1. Record the type of fiber jumper to ensure that the new one is identical with that to be replaced.

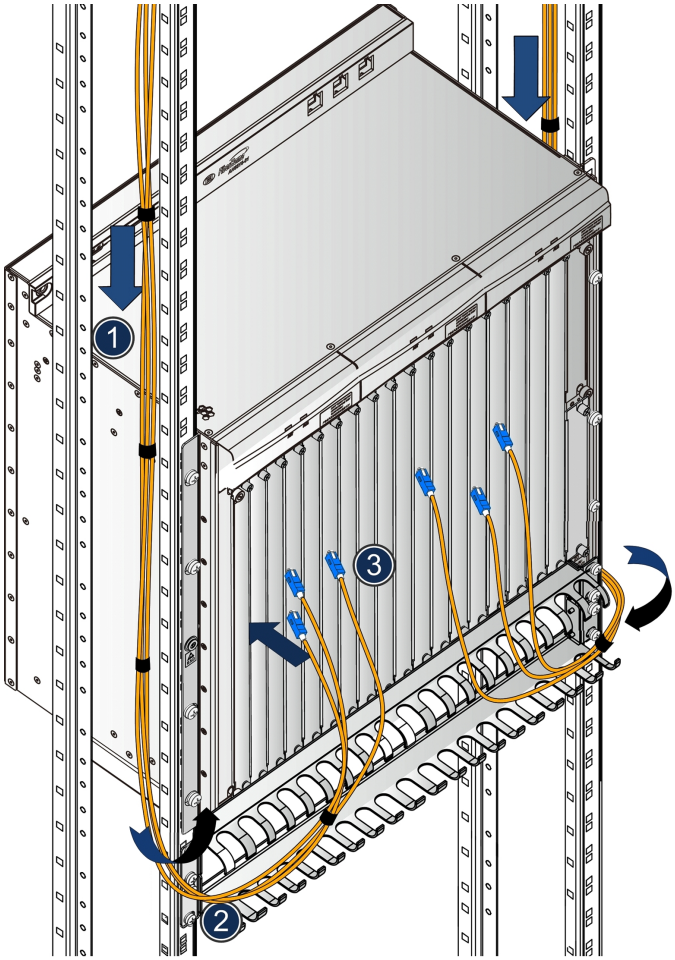
Component	Hardware Code	Corresponding Card
Fiber jumper	OFC-LC / PC-LC / PC-S-20	HU1A, HU2A, GU6F, C155A
	OFC-SC / PC-SC / PC-S-20	EC4B, EC8B, GC4B, GC8B

2. Record the locations and cabling modes on both ends of the subrack power cables to be replaced.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Cut the protection casing according to the length of the new fiber (all fibers between the local cabinet and the cabinet or ODF on which the fiber terminates shall be provided with protection casing), and thread the fiber through the protection casing.
3. Using the top access wiring mode as an example, arrange the new fiber installed in the protection casing from the ODF through the upper support channel to the top of the cabinet, and thread it through the top wiring hole into the cabinet.

4. Pull out the fiber connector to be replaced, and cut off the fiber at the orifice of the corrugated duct. Since the orifice was sealed with adhesive tape at the time of installation, it is not easy to take out the replaced fiber jumper.
5. Arrange the fiber along the cabinet wiring channel downwards to the fiber passage area in the subrack.
6. Thread the fiber upwards through the wiring hole in the fiber passage area, and then insert the new fiber connector into the optical interface in accordance with the record.



7. Make new label according to the label of the original fiber jumper.
8. Attach the label to the new fiber jumper.
9. Use soft plastic cable binders to bind the fibers inside the cabinet and close to the fiber passage area, to secure the fibers. The interval between binders should be 3 to 4 times larger than the length of the fiber bundle diameter and the intervals should be equally spaced.

Subsequent operations

1. Refresh the list of alarms and performance parameters, view and confirm there are no additional alarms or abnormal performance data.
2. Confirm that the service carried by the fiber jumper has recovered.

6.5 Replacing a Network Cable

Replacement is required when the network cable fails.

Cable appearance

Figure 6-8 The network cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Diagonal pliers
- Network cable pliers
- Wire binders
- Cable labels
- A network cable tester
- A dedicated cable box

Precautions

- During the replacement of a network cable, communications between the equipment sets connected by the cable will be temporarily interrupted.

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- When removing a network cable, be careful not to pull other cables to prevent interruption of other services.
- When rearranging a network cable, comply with the arrangement requirements and do not wrap it with other cables.

Prerequisite

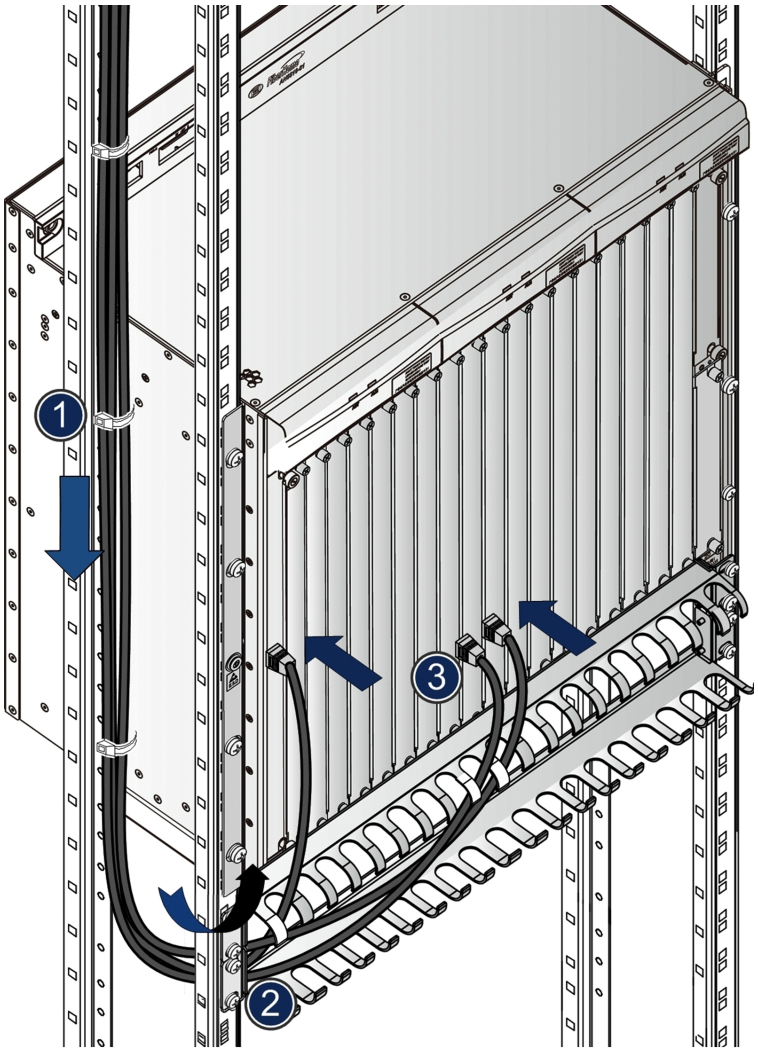
1. Record the type of the network cable to be replaced to ensure that the new cable is identical with that to be replaced.

Component	Hardware Code
Network cable	3.695.095

2. Record the locations and cabling modes on both ends of the network cables to be replaced.
3. If the length of the network cable is not appropriate, use the network cable pliers to prepare a new cable.
4. Use a network cable tester to test the cable connectivity to ensure that the new cable is in good condition and correctly connected.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Arrange the new network cable in accordance with the cabling mode of the cable to be replaced. The following figure shows the top access wiring mode.



3. Use a pair of diagonal pliers to cut and remove the wire binders binding the network cable.
4. Disconnect the network cable to be replaced with its connector and then remove it.
5. Attach a label to the replaced network cable, record the symptom and then put it into the dedicated cable box.
6. Insert the new network cable into the network port in accordance with the record. When a click is heard, it indicates that connection is secure.
7. Make a new label according to the label of the original fiber jumper.
8. Attach the label to the new network cable.

9. Arrange the new network cable in the cabinet, and use wire binders to bind it in place.

Subsequent operations

1. View the indicator LED on the network port. If the green indicator LED is illuminated, it indicates that the link is normal.
2. Issue a Ping command to check whether the communication between equipment sets connected by the network cable is normal.If not, check whether the network cable plug is inserted correctly.
3. Refresh the list of alarms and performance parameters, view and confirm there are no additional alarms or abnormal performance data.
4. Confirm that the service carried by the network cable has recovered.

6.6 Replacing a Dry Contact Cable

Replacement is required when the dry contact cable fails.

Cable appearance

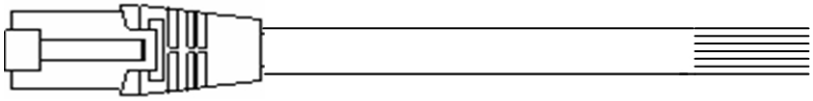


Figure 6-9 The dry contact cable

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- Diagonal pliers
- Wire binders
- Cable labels
- A dedicated cable box

Precautions

- During the replacement of a dry contact cable, the dry contact alarm signal corresponding to it will be temporarily interrupted.
- When removing a dry contact cable, be careful not to pull other cables to prevent interruption of other services.
- When rearranging a dry contact cable, comply with the arrangement requirements and do not wrap it with other cables.

Prerequisite

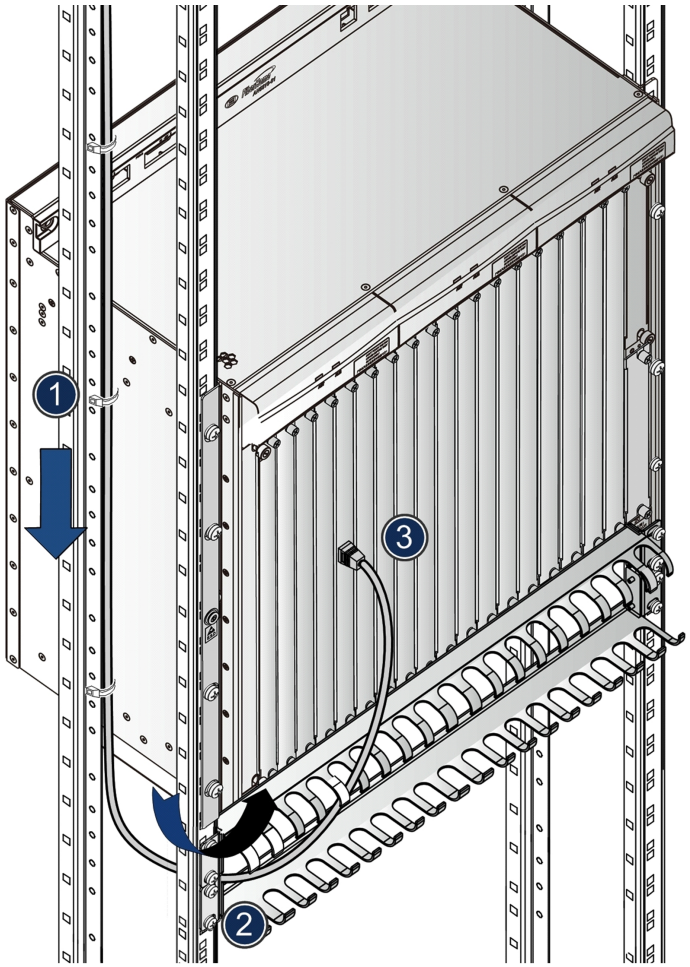
1. Record the type of the dry contact cable, to ensure that the new cable is identical with that to be replaced.

Component	Code
Dry contact cable	3.695.452

2. Record the locations of both ends of the dry contact cable to be replaced and the cabling mode.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Arrange the new dry contact cable according to the cabling mode of that to be replaced, the following figure use the top access wiring mode as the example.



3. Disconnect the dry contact cable with its connector, and then remove the cable.
4. Attach labels to the replaced dry contact cable, record the fault symptom, and then put them into the dedicated cable box.
5. Insert the connector of the new dry contact cable into the signal interface of the original dry contact cable. When a click is heard, it indicates that connection is secure.
6. Make new labels according to the labels of the original dry contact cables.
7. Attach the label to the new dry contact cable.
8. Arrange the new dry contact cable in the cabinet, and use wire binders to bind it in place.
9. Replace the seven cores on the other side of the dry contact cable according to the original connection.

Subsequent operations

Once there is an alarm on the dry contact, the network management system will report it, indicating the replacement of dry contact cable is successful.

7 Replacing an Optical / Electrical Module

☑ Replacing an Optical Module

☑ Replacing an Electrical Module

7.1 Replacing an Optical Module

Replacement of an optical module is required when one of the following events occurs: the optical module fails; the optical module is aged (it may cause abnormal Tx and Rx optical powers); the optical module rate needs to be upgraded; the optical module rate needs to be lowered.

Note:

Only external optical modules can be directly replaced. If a built-in optical module is damaged, it is required to replace the corresponding card. The following descriptions are only for the replacement of external optical modules.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- An optical module puller
- An ESD protection bag
- An optical power meter

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- When inserting or removing a fiber jumper, take care to avoid damaging the fiber connector.
- When removing a fiber jumper, be sure not to pull other cables to prevent interruption of other services.
- Never look directly into the optical interface or the optical fiber connector.
- When replacing the optical modules, be sure to keep the optical interfaces and fiber connectors clean. If the optical interface or fiber connector is contaminated, use the dedicated fiber wiping paper to clean it.

- When inserting the optical module, pay careful attention to its orientation. The module cannot be inserted if not properly oriented. If the module cannot be completely inserted, change the orientation.

Prerequisite

- Confirm that the standby optical module is identical with that to be replaced.
- Confirm that the standby optical module has no component missing or damaged.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.
2. Pull out the fiber jumper of the interface on the optical module to be replaced, provide the optical connector with an anti-dust cap and place the fiber jumper in a safe location.
3. Use the hook of the optical module puller to hook the square pull ring of the optical module to be replaced and open the square pull ring, as shown in the following figure.

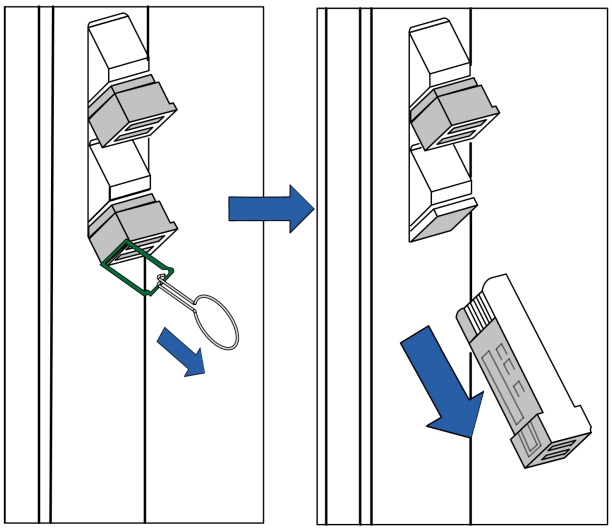


Figure 7-1 Replacing an optical module

Note:

As the optical module interface faces downwards, after opening the square pull ring using the module puller, pull out the optical module gently, to prevent the optical module from falling.

4. Hook and hold the square pull ring, and then slowly pull out the optical module to be replaced.
5. Put the removed optical module into an ESD protection bag, label the bag, record the fault and symptoms, and then properly take care of it.
6. Insert the new optical module into the optical interface using the same orientation as the original module. When a click is heard, it indicates that the optical module has been fully inserted.

Note:

Before restoring the fiber jumper connection, please test the optical line using an optical power meter to confirm that the optical line is normal.

7. Remove the anti-dust cap on the fiber jumper, and restore the connection of the fiber jumper.

Subsequent operations

Query the parameters of the new optical module via the ANM2000, and view whether the parameters are normal. If so, confirm that the services carried by the card with the replaced optical module have been restored.

7.2 Replacing an Electrical Module

Replacement of an electrical module is required when one of the following events occurs: the electrical module fails; the electrical module rate needs to be upgraded; the electrical module rate needs to be lowered.

Note:

Only external electrical modules can be directly replaced. If a built-in electrical module is damaged, it is required to replace the corresponding card. The following descriptions are only for the replacement of external electrical modules.

Tools and Instruments

- An ESD protection wrist strap or ESD protection gloves
- An optical module puller
- An ESD protection bag

Precautions

- It is recommended that the replacement operation be carried out at night when the service traffic is at a relatively low volume.
- Avoid damage to the RJ-45 connector when connecting or disconnecting the network cables.
- When removing a network cable, be careful not to pull other cables to prevent interruption of other services.
- When inserting the electrical module, pay careful attention to its orientation. The module cannot be inserted if not properly oriented. If the module cannot be completely inserted, change the orientation.

Prerequisite

- Confirm that the standby electrical module is identical with that to be replaced.
- Confirm that the standby electrical module is no component is missing or damaged.

Procedure

1. Wear an ESD protection wrist strap, ensure that one end of the plug of the ESD protection wrist strap is securely connected to an ESD protection earth ground fastener on the cabinet, or wear ESD protection gloves.

2. Pull out the network cable of the interface on the electrical module to be replaced and arrange the network cable.
3. Use the hook of the electrical module puller to hook the square pull ring of the electrical module to be replaced and open the square pull ring, as shown in the following figure.

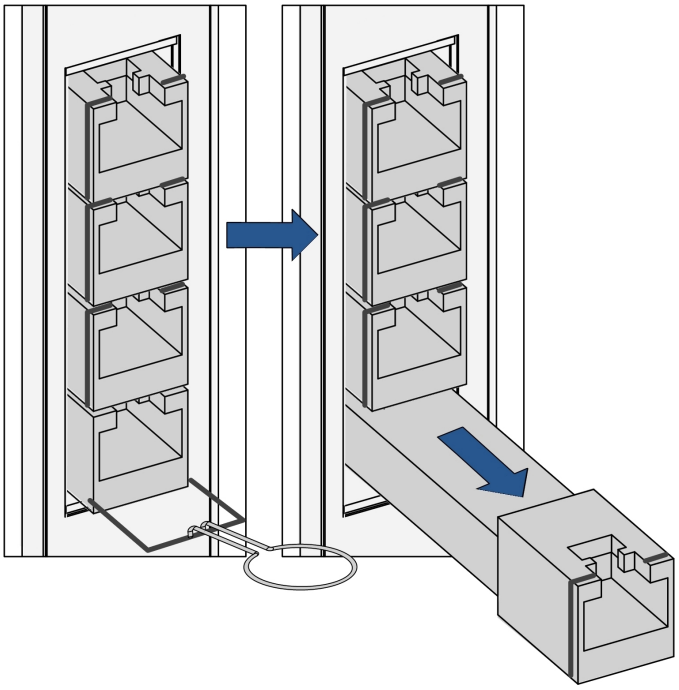


Figure 7-2 Replacing an electrical module

Note:

As the electrical module interface faces downwards, after opening the square pull ring using the module puller, pull out the electrical module gently, to prevent the electrical module from falling.

4. Hook and hold the square pull ring, and then slowly pull out the electrical module to be replaced.
5. Put the removed electrical module into an ESD protection bag, label the bag, record the fault and symptoms, and then properly take care of it.
6. Insert the new electrical module into the electrical interface using the same orientation as the original module. When a click is heard, it indicates that the electrical module has been fully inserted.

7. Reconnect the network cables.

Subsequent operations

Query the parameters of the new electrical module via the ANM2000, and view whether the parameters are normal. If so, confirm that the services carried by the card with the replaced electrical module have been restored.

8 Replacing an ONU

This chapter describes the operations necessary to replace an ONU.

☑ Replacing an EPON ONU

☑ Replacing a GPON ONU

8.1 Replacing an EPON ONU

The operations necessary to replace an EPON ONU can follow any one of the three procedures: replacing an ONU based on the physical ID authentication, replacing an ONU based on the logical ID authentication, and replacing an ONU with no authentication.

8.1.1 Replacing an ONU Based on the Physical ID Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.
- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.
- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

◆ Operations on the equipment side

1) Log into the CLI network management system and enter the configuration mode, as shown below.

```
Login: GEPON
Password:GEPON
User>en
Password:GEPON
Admin#
```

2) In the Admin\epononu# directory, replace the old ONU MAC address with the new ONU MAC address using the set gepon slot <slot> pon <pon> onu <onu> replace_mac <mac_address> command.

3) In the Admin\device # directory, set the aging time of the EPON ONU using the set onu_replace aging <300-2147483647> command.

◆ Operations on the network management side

1) Log into the ANM2000.

2) Right-click the active HSWA card in the **Object Tree** pane, and select **Service Config Relevance→ONU Replace**. Click **Edit → Append** in the menu bar, or click the  button in the toolbar, to add one entry. Correctly input the slot No., PON port No., ONU No., original physical address, and new physical address.

3) Click the  button to apply the configuration to the equipment, as shown in Figure 8-1. Close the window to return to the ANM2000 main GUI.

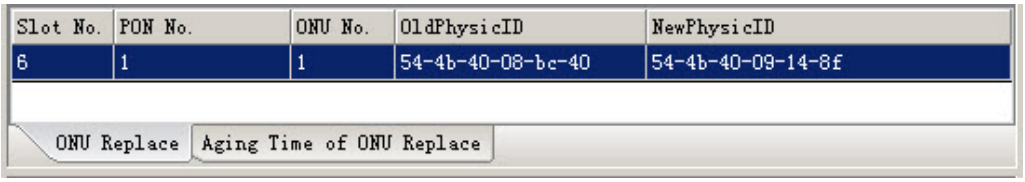


Figure 8-1 Configuring the replacement of an EPON ONU

4) Right-click the active HSWA card in the **Object Tree** pane, and select **Service Config Relevance→EPON Aging Time Of ONU Replace** in the shortcut menu to set the aging time. Click the  button to apply the configuration to the equipment, as shown in Figure 8-2.

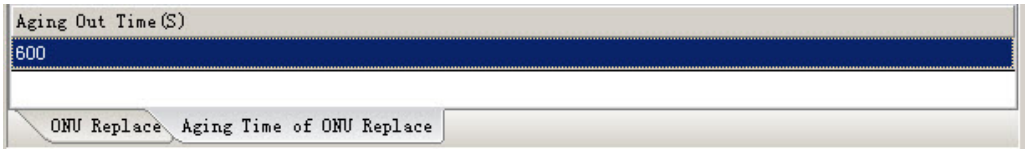


Figure 8-2 Configuring the replacement aging time of an EPON ONU

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

Note:

It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables. During the replacement, keep the optical fiber connectors clean.

3. Replace the old ONU with the new one within the provisioned aging time and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Note:

The replacement of an ONU must be completed within the provisioned aging time, otherwise the replacement will fail.

Subsequent operations

- Operations on the equipment side

  In the Admin\epononu# directory, query the ONU replacement status using the show gepon slot <slot> pon <pon> onu <onulist> replace_mac command. If the configured replacement information is not displayed in the query results, it indicates that the ONU replacement is successful.

- Operations on the network management side

Verify the ONU replacement information of the equipment in the ANM2000. The detailed operation steps are described as follows:

1) Right-click the active HSWA card in the **Object Tree** pane, and select **ONU Authentication→ONU Physic_IDaddress Whitelist** in the shortcut menu. Click the  button to read the ONU replacement information of the equipment and record it in the ANM2000, as shown in Figure 8-3.

Physical Address	Password	Slot No.	PON No.	ONU Type	ONU No.	Implemented Status
544b4008bc40		6	1	AN5006-04	1	UnImplemented
544b4009148f		6	1	AN5006-04	1	Implemented

Figure 8-3 Refreshing the EPON ONU authorization information

Note:

After the ONU replacement is completed, the **Implemented Status** of the old ONU becomes **UnImplemented**, and the **Implemented Status** of the new ONU becomes **Implemented**.

2) View the ONU list, as shown in Figure 8-4; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.

Object Name	ONU Autho...	ONU Type	Slot No.	PON No.	Physical Address	Password	Logical SN	Logical SNPassword	Light Spliter Port NO.
PON[1.	1	AN5006-04	6	1	54-4B-40-09-14-8F				0

Figure 8-4 The EPON ONU list: based on the physical ID authentication

8.1.2 Replacing an ONU Based on the Logical ID Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.

- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.
- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

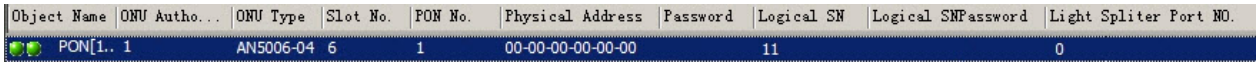
Note:

- It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables.
- Before replacement, you need to configure logical ID for the new ONU. The logical ID should be the same with that of the ONU to be replaced.

3. Replace the old ONU with the new one and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Subsequent operations

View the ONU list, as shown in Figure 8-5; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.



Object Name	ONU Autho...	ONU Type	Slot No.	PON No.	Physical Address	Password	Logical SN	Logical SNPassword	Light Spliter Port NO.
PON[1.. 1		AN5006-04	6	1	00-00-00-00-00-00		11		0

Figure 8-5 The EPON ONU list: based on the logical ID authentication

8.1.3 Replacing an ONU with No Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.
- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.
- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side

1) Log into the CLI network management system and enter the configuration mode, as shown below.

```
Login: GEPON
Password: GEPON
User>en
Password: GEPON
Admin#
```

2) In the Admin\epononu# directory, replace the old ONU MAC address with the new ONU MAC address using the set gepon slot <slot> pon <pon> onu <onu> replace_mac <mac_address> command.

3) In the Admin\device # directory, set the aging time of the EPON ONU using the set onu_replace aging <300-2147483647> command.

◆ Operations on the network management side

1) Log into the ANM2000.

2) Right-click the active HSWA card in the **Object Tree** pane, and select **Service Config Relevance→ONU Replace**. Click **Edit** → **Append** in the menu bar, or click the button in the toolbar, to add one entry. Correctly input the slot No., PON port No., ONU No., original physical address, and new physical address.

3) Click the button to apply the configuration to the equipment, as shown in Figure 8-6. Close the window to return to the ANM2000 main GUI.

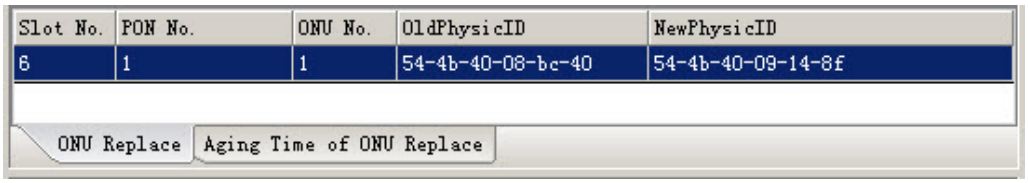


Figure 8-6 Configuring the replacement of an EPON ONU

4) Right-click the active HSWA card in the **Object Tree** pane, and select **Service Config Relevance→EPON Aging Time Of ONU Replace** in the shortcut menu to set the aging time. Click the button to apply the configuration to the equipment, as shown in Figure 8-7.

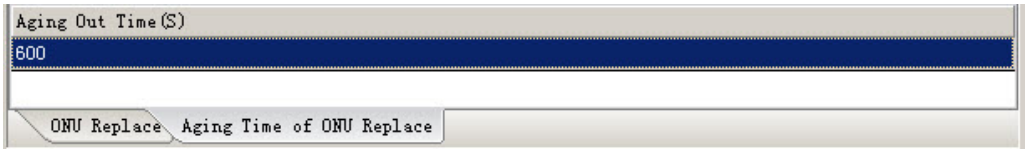


Figure 8-7 Configuring the replacement aging time of an EPON ONU

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

Note:

It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables. During the replacement, keep the optical fiber connectors clean.

3. Replace the old ONU with the new one within the provisioned aging time and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Note:

The replacement of an ONU must be completed within the provisioned aging time, otherwise the replacement will fail.

Subsequent operations

- Operations on the equipment side

  In the Admin\epononu# directory, query the ONU replacement status using the show gepon slot <slot> pon <pon> onu <onulist> replace_mac command. If the configured replacement information is not displayed in the query results, it indicates that the ONU replacement is successful.

- Operations on the network management side

View the ONU list, as shown in Figure 8-8; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.

Object Name	ONU Autho...	ONU Type	Slot No.	PON No.	Physical Address	Password	Logical SN	Logical SNPassword	Light Spliter Port NO.
PON[1.	1	AN5006-04	6	1	54-4B-40-09-14-8F				0

Figure 8-8 The EPON ONU list: based on the non-authentication mode

8.2 Replacing a GPON ONU

The operations necessary to replace a GPON ONU can follow any one of the three procedures: replacing an ONU based on the physical ID authentication, replacing an ONU based on the password authentication, and replacing an ONU with no authentication.

8.2.1 Replacing an ONU Based on the Physical ID Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.
- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.
- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side

  1) Log into the CLI network management system and enter the configuration mode, as shown below.

```
Login: GEPON
Password:GEPON
User>en
Password:GEPON
Admin#
```

  2) In the Admin\epononu# directory, replace the old ONU MAC address with the new ONU MAC address using the set gepon slot <slot> pon <pon> onu <onu> replace_mac <mac_address> command.

  3) In the Admin\device # directory, set the aging time of the EPON ONU using the set onu_replace aging <300-2147483647> command.

- Operations on the network management side

  1) Log into the ANM2000.

  2) Right-click the active HSWA card in the **Object Tree** pane, and select **Service Config Relevance→ONU Replace**. Click **Edit** → **Append** in the menu bar, or click the button in the toolbar, to add one entry. Correctly input the slot No., PON port No., ONU No., original physical address, and new physical address.

  3) Click the button to apply the configuration to the equipment, as shown in Figure 8-9. Close the window to return to the ANM2000 main GUI.

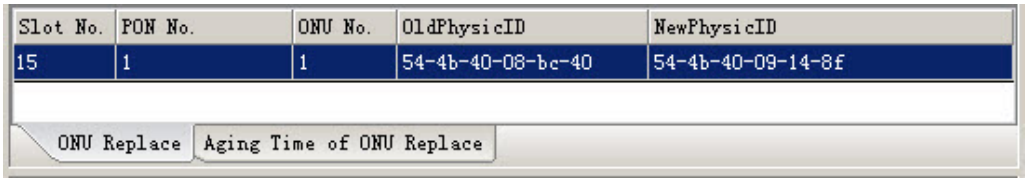


Figure 8-9 Configuring the replacement of a GPON ONU

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

Note:

It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables. During the replacement, keep the optical fiber connectors clean.

3. Replace the old ONU with the new one and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Subsequent operations

- Operations on the equipment side

  In the Admin\epononu# directory, query the ONU replacement status using the show gepon slot <slot> pon <pon> onu <onulist> replace_mac command. If the configured replacement information is not displayed in the query results, it indicates that the ONU replacement is successful.

- Operations on the network management side

  Verify the ONU replacement information of the equipment in the ANM2000. The detailed operation steps are described as follows:

  1) Right-click the active HSWA card in the **Object Tree** pane, and select **ONU Authentication→ONU Physic_IDaddress Whitelist** in the shortcut

menu. Click the  button to read the ONU replacement information of the equipment and record it in the ANM2000, as shown in Figure 8-10.

Physical Address	Password	Slot No.	PON No.	ONU Type	ONU No.	Implemented Status
544b4009148f		15	1	AN5506-04-B	1	Implemented
544b4008bc40		15	1	AN5506-04-B	1	UnImplemented

Figure 8-10 Refreshing the GPON ONU authorization information

Note:

After the ONU replacement is completed, the **Implemented Status** of the old ONU becomes **UnImplemented**, and the **Implemented Status**of the new ONU becomes **Implemented**.

2) View the ONU list, as shown in Figure 8-11; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.

Object Name	ONU Autho...	ONU Type	Slot No.	PON No.	Physical Address	Password	Logical SN	Logical SNPassword	Light Spliter Port NO.
PON[1.	1	AN5506-04-B	15	1	54-4B-40-09-14-8F				0

Figure 8-11 The GPON ONU list: based on the physical ID authentication

8.2.2 Replacing an ONU Based on the Password Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.
- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.

- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

Note:

- It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables.
- Before replacement, you need to configure logical ID for the new ONU. The logical ID should be the same with that of the ONU to be replaced.

3. Replace the old ONU with the new one and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Subsequent operations

View the ONU list, as shown in Figure 8-12; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.

Object Name	ONU Autho...	ONU Type	Slot No.	PON No.	Physical Address	Password	Logical SN	Logical SNPassword	Light Spliter Port NO.
PON[1.	1	AN5506-04-B	15	1		14854			0

Figure 8-12 The GPON ONU list: based on the password authentication

8.2.3 Replacing an ONU Based on the Logical ID Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.
- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.
- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

Note:

- It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables.
- Before replacement, you need to configure logical ID for the new ONU. The logical ID should be the same with that of the ONU to be replaced.

3. Replace the old ONU with the new one and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Subsequent operations

View the ONU list, as shown in Figure 8-13; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.

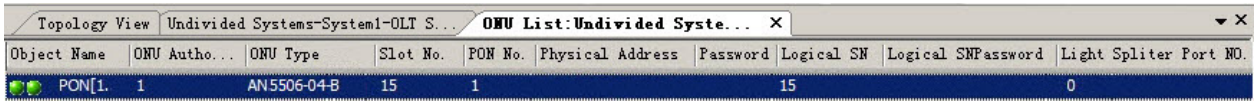


Figure 8-13 The GPON ONU list: based on the logical ID authentication

8.2.4 Replacing an ONU with No Authentication

Tools and Instruments

An ESD protection wrist strap or ESD protection gloves

Precautions

- Replacement is required when the ONU fails and needs replacement. The new ONU should be the same type as the one to be replaced.
- It is recommended that users disconnect cables from the ONU to be replaced in the following order: First disconnect the strong electricity cables, second disconnect the weak electricity cables, and then disconnect any remaining cables. When restoring the connection, the reverse order must be followed.
- When inserting or removing a fiber jumper, a network cable, or a twisted-pair cable, do not damage the connector.
- Never look directly into the ONU PON interface or the optical fiber connector.
- The fiber bend radius should be 20 times more than the fiber diameter. Generally it should be more than or equal to 38 mm.

Prerequisite

Note:

Operations performing the same function through the CLI network management system and through the ANM2000 should not be issued repeatedly.

- Operations on the equipment side

  1) Log into the CLI network management system and enter the configuration mode, as shown below.

```
Login: GEPON
Password: GEPON
User>en
Password: GEPON
Admin#
```

  2) In the Admin\epononu# directory, replace the old ONU MAC address with the new ONU MAC address using the set gepon slot <slot> pon <pon> onu <onu> replace_mac <mac_address> command.

- Operations on the network management side

  1) Log into the ANM2000.

  2) Right-click the active HSWA card in the **Object Tree** pane, and select **Service Config Relevance→ONU Replace**.

  3) Click **Edit** → **Append** in the menu bar, or click the button in the toolbar, to add one entry. Correctly input the slot No., PON port No., ONU No., original physical address, and new physical address.

  4) Click the button to apply the configuration to the equipment, as shown in Figure 8-14. Close the window to return to the ANM2000 main GUI.

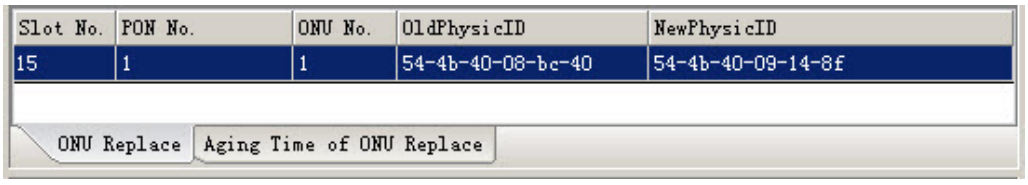


Figure 8-14 Configuring the replacement of a GPON ONU

Procedure

1. If the old ONU has power supply switches, first turn them off to power off the ONU. If the old ONU has no power supply switches, ➔ Step 2.
2. Disconnect the cables from the old ONU in turn, and label them.

Note:

It is recommended that users disconnect the cables in the following order: First disconnect the power cables, and then disconnect the PON port fibers, network cables, twisted-pair cables, CATV cables. During the replacement, keep the optical fiber connectors clean.

3. Replace the old ONU with the new one and reconnect the cables to the new ONU in the reverse order of the disconnection. After completing the connection, power on the new ONU.

Subsequent operations

- Operations on the equipment side

  In the Admin\epononu# directory, query the ONU replacement status using the show gepon slot <slot> pon <pon> onu <onulist> replace_mac command. If the configured replacement information is not displayed in the query results, it indicates that the ONU replacement is successful.

- Operations on the network management side

  View the ONU list, as shown in Figure 8-15; the ONU list displays the information of the new ONU. After the replacement is completed, the new ONU will perform the service functions, taking the place of the old ONU.

Object Name	ONU Autho...	ONU Type	Slot No.	PON No.	Physical Address	Password	Logical SN	Logical SNPassword	Light Spliter Port NO.
PON[1.	1	AN5506-04-B	15	1	54-4B-40-09-14-8F				0

Figure 8-15 The GPON ONU list: based on the non-authentication mode

Product Documentation Customer Satisfaction Survery

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Documentation Name	
Code and Version	

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☐ Frequently ☐ Rarely ☐ Never ☐ Other (please specify) _____

2. When do you use the documentation?

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☐ 100% ☐ 80% ☐ 50% ☐ 0% ☐ Other (please specify) _____

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1. Is the information organized and presented clearly?

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3. Are any contents in the documentation inconsistent with the product?

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5. Are the product working principles and the relevant technologies covered in the documentation sufficient for you to get known and use the product?

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