



# **ACT AP8616B GPON OLT**

**Hardware  
Installation  
Manual**

**Revision C**

## ACT AP8616B GPON OLT Hardware Installation Manual

ACT Document Number: ACT 8616B Hardware Installation Manual

Installation Manual Revision C

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This document is produced to assist professional and properly trained personnel with installation and maintenance issues for the product. The capabilities, system requirements and/or compatibility with third-party products described herein are subject to change without notice.

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## Revision History

Revision	Date	Reason for Change
A	12/17/2018	Initial release
B	01/07/2019	Updated pictures
C	01/08/2024	Update related chapters

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The document describes the characteristics and parameters of AP8616B GPON and gives an overview of ACT GPON.

AP8616B GPON has 8 GPON SFP ports, 4 gigabit SFP/TX combo ports, 4 gigabit SFP ports, 4 10GE SFP+ ports, 1 console port, and 1 100M Ethernet management port. For details, see the following table.

### Table 0-1 Attributes of the necessary port

Diagram of the power supply section of the PCB. The diagram shows a header with pins 1 through 14. The PCB layout includes a 'COMPOSE' section with pins 1-8, a 'T1' section with pins 9-12, and a 'T2' section with pins 13-14. The components are labeled with their respective pin numbers and names.

No.	Abbrev.	Name	Remarks
1	P2	Indicator of power supply 2	When PWR2 supplies power, the P2 indicator is on.
2	P1	Indicator of power supply 1	When PWR1 supplies power, the P1 indicator is on.
3	SYS	Indicator of system's running	<p>If the indicator is always on, the system is being started.</p> <p>If the indicator flickers, the system works normally.</p> <p>If the indicator is always off, the system works normally.</p>
4	ALM	System Alarm indicator	<p>If the indicator is on and the temperature of the device is over high, the device needs to be checked.</p> <p>If the indicator is always on, the link on the port is normal.</p>
5	G1 to G8	ACT/link indicator of Gigabit port	<p>If the indicator flickers, the data is received or transmitted through the port.</p>

6	T1 to T4	ACT/link indicator of 10GE port	If the indicator is always on, the link on the port is normal. If the indicator flickers, the data is received or transmitted through the port.
7	P1 to P8	ACT/link indicator of PON port	If the indicator is on, the ONU device has been connected; If the indicator flickers, the data is received or transmitted through the port.
8	CLI	CLI port	Manages GPON access device locally.
9	MGMT	Management port	100M external management port. Realizes the upgrade of the GPON access device.
10	G1 to G4	Gigabit TX port	Forwards the 1000M Ethernet electric signals.
11	G1 to G8	Gigabit SFP port	Forwards the 1000M Ethernet optical signals.
12	T1 to T4	10GE SFP+ port	Forwards the 10000M Ethernet optical signals.
13	P1 to P8	Gigabit OLT PON ports	Realizes the access of GPON ONU.
14	/	PON port CLI	Debug serial port of PON port.

Table 0-2 Parts at the front panel of AP8616B GPON

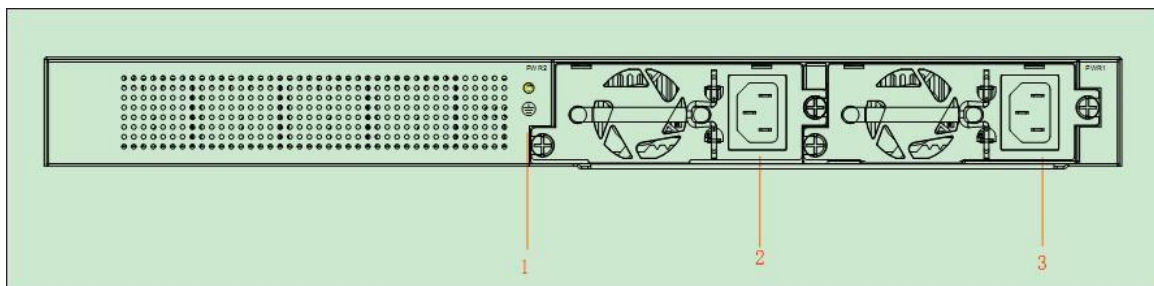


Figure 1-2 Back panel of AP8616B GPON Access Device

No.	Abbrev.	Name	Remarks
1	/	Grounding column	The grounding must be fine.
2	/	P2 power socket	AC100V to 240V, for Power2
3	/	P1 power socket	AC100V to 240V, for Power1

Table 0-3 Parts at the Back Panel of AP8616B GPON Access Device

## 1.2 Special Features Attribute Parameters of ACT GPON

Item	Protocol
Protocol Standard	IEEE 802.1d Spanning Tree Protocol
	IEEE 802.1p Class of Service
	IEEE 802.1q tagged VLAN
	IEEE 802.3x Flow control
	IEEE 802.3ad Link aggregation
	IEEE 802.3ah Ethernet in the First Mile Task Force
Standard of IP Routing Protocol	RFC 1058 RIP
	RFC 1723 RIP v2
	RFC 1583 OSPF v2
Network Management Standard	RFC 1157 SNMP v1/v2
	RFC 1213 MIB II
	RFC 1757 RMON 1,2,3,9
Memory	SPI Flash Memory: 32Mbytes;
	NAND Flash Memory: 1GBytes;
	DDR2: 1GBytes
Standard Configuration	1 CLI port
	1 100M network management port
	4 gigabit SFP/TX combo ports
	4 gigabit SFP ports
	8 gigabit GPON ports
	4 10GE SFP+ ports
Dimensions (W x H x D)	445mm x300mm x44.5mm
Operating Temperature/Humidity	0°C to 45°C ; 10% to 85% non-condensing
Storage Temperature/ Humidity	-40°C to 80°C ; 5% to 95% non-condensing
AC Power Supply	Input voltage: AC100V to 240V
	Input frequency: 47Hz to 63Hz
Power consumption	Up to 65W

Table 0-4 Special Features Attribute Parameters of AP8616B GPON

## 1.3 ROHS Description

Part Number, Name and Description	Toxic or Hazardous Substances and Elements					
	Pb	Hg	Cd	Cr (VI)	PBB	PBDE
Machine Box	○	○	○	○	○	○
Cabinet	○	○	○	○	○	○
Module	○	○	○	○	○	○
Basic Board	○	○	○	○	○	○
Interface Card	○	○	○	○	○	○

O: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-B, EIP-C is above the limit requirement in SJ/T11363-2006.

The referenced environment-friendly use period logo is determined based on normal operating conditions (such as temperature and humidity).

Note-These statements apply only to the China RoHS regulations.



Figure 1-3 ROHS Description

## Chapter 2 Installation Preparation

### 2.1 Cautions

Similar to other electronic products, the semiconductor chip easily gets damaged if you power on and off abruptly and frequently. To restart up the AP8616B GPON, you have to open the power on-off after the power is turned off for three to five seconds.

Avoid severe collision or falling down from the height to protect the parts in AP8608/AP8616B GPON.

Use correct outside ports to connect AP8616B GPON. Do not insert the Ethernet plug into the CLI port (RJ45 8-line socket). Similarly, do not insert the console cable into the Ethernet port (RJ45 8-line socket). The above operations and other wrong operations may cause damage to the internal components of the port.

**Note:**

- 1) When you plug or dial out the power line, keep the power line horizontal with the power socket.
- 2) When the lifetime of our products ends, please handle them according to national laws and regulations, or send these products to our company for collective processing.

### 2.2 Safety Advice

#### 2.2.1 Safety Principles

- Keep dustless and clean during or after the installation.
- Put the cover at the safe place.
- Put tools at the right place where they are not easily falling down.
- Put on relatively tight clothes, fasten the tie or scarf well and roll up the sleeve, avoiding stumbling the chassis.
- Put on the protective glasses if the environment may cause damage to your eyes.
- Avoid incorrect operations that may cause damage to human or devices.

#### 2.2.2 Safety Notices

The safety notices mentioned here means that improper operation may lead to body damage.

- Read the installation guide carefully before you operate the system.
- Only professionals are allowed to install or replace the GPON access device.
- Pull out the AC power socket and close the direct-current power before operating on the chassis or working beside the power supply.
- The final configuration of products must comply with relative national laws and regulations.

#### 2.2.3 Safety Principles for Live Working

When you work under electricity, please follow the following principles:

- Put off ornaments, such as ring, necklace, watch and bracelet, before you operate under live working. When metal articles connect the power to the ground, short circuit happens and components may be damaged.
- Pull out the AC power socket and close the direct-current power before operating on the chassis or working beside the power supply.
- When the power is on, do not touch the power.
- Correctly connect the device and the power socket.
- Only professionals are allowed to operate and maintain the device.
- Read the installation guide carefully before the system is powered on.

**Note:**

- 1) Check potential dangers, such as the humid floor, ungrounded extensible power line and tatty power line.
- 2) Install the emergent on-off at the working room for turning off the power when trouble happens.
- 3) Turn off the power of the GPON access device and plug off the power line before installing or uninstalling the machine box or working beside the power.
- 4) Do not work alone if potential dangers exist.
- 5) Cut off the power before checkout.
- 6) If trouble happens, take the following measures:
  - A. Cut off the system's power.
  - B. Alarm
  - C. Take proper measures to help persons who are hit by the disaster. Artificial respiration is needed if necessary.



- D. Seek for medical help, or judge the loss and seek for available help.

## 2.2.4 Electrostatic Discharge Prevention

Electrostatic discharge may damage devices and circuits. Improper treatment may cause this device to malfunction completely or discontinuously.

Move or locate the devices according to the measures of electrostatic discharge prevention, ensuring the chassis connects the ground. Another measure is to correctly wear the static-proof wristband. If there is no static-proof wristband, use the metal clip with the metal cable to clip the unpainted metal part of the chassis. In this case, the static is discharged to the ground through the metal cable of the clip. You can also discharge the static to the ground through your body.

## 2.3 Requirements for Common Locations

This part describes the requirements for the installation locations.

### 2.3.1 Environment

The location of the chassis, cabinet planning and indoor cabling are very important for normal system's function. Short distance between devices, bad ventilation and untouchable control plate will cause maintenance problems, systematic faulty and breakdown.

For location planning and device locating, refer to section 2.3.2 "**Location Configuration Prevention**". If the device crashes frequently or errors occur, this preventive information can help you prevent the problem from recurring.

### 2.3.2 Location Configuration Prevention

The following preventive measures assist you to design the proper environment for this GPON access device.

- Make sure that the workshop is well-ventilated, the heat of electrical devices is well-discharged and sufficient air circulation is provided for device cooling.
- Avoid to damage devices by following the electrostatic discharge prevention procedure.
- Put the chassis at the place where cool air can blow off the heat inside the chassis. Make sure the chassis is sealed because the opened chassis will reverse the cool air flow.

### 2.3.3 Cabinet Configuration

The following content assists you to make a proper cabinet configuration:

- Each device on the cabinet gives off heat when it runs. Therefore, the sealed cabinet must have the heat-discharge outlet and the cooling fan. Do not put the devices too close, avoiding bad ventilation.
- When you install the machine box at the open cabinet, prevent the frame of the cabinet from blocking the airway of the machine box.
- Ensure that nice ventilation is provided for the devices installed at the bottom of the cabinet.
- The clapboard separates exhaust gas and inflow air, and boost the cool air to flow in the chassis. The best location of the clapboard is decided by the air flow mode in the chassis, which can be obtained through different location tests.

### 2.3.4 Power Requirements

Make sure that the power supply has nice grounding and the power at the input side of this GPON access device is reliable. The voltage control can be installed if necessary. At least a 240 V, 10A fuse or a breaker is provided in the phase line if you prepare the short-circuit prevention measures for a building.

#### Caution:

If the power supply system does not have good grounding, or the input power disturbs too much and excessive pulses exist, the error code rate of communication devices increases and even the hardware system will be damaged.

## 2.4 Installation Tools and Device

The tools and devices to install AP8616B GPON are not provided by the AP8616B GPON. You yourself need to prepare them. The following are the tools and devices needed for the typical installation of AP8616B GPON:

- Screwdriver
- Static-proof wristband
- Bolt
- Ethernet cable
- Other Ethernet terminal devices
- Control terminal

## Chapter 3 Installing AP8616B GPON Device

**Caution:**

Only professionals are allowed to install or replace the devices of this device.

### 3.1 Installation Flow of AP8616B GPON

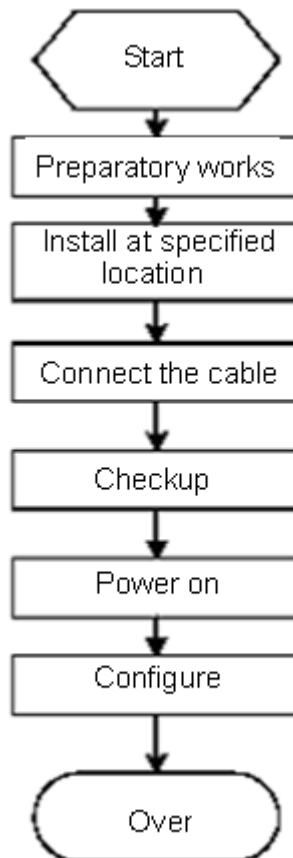


Figure 3-1 Installation Flow of AP8616B GPON

### 3.2 Installing the Machine Box of AP8616B GPON

The machine box of AP8616B GPON can be installed on the desk or can be fixed to other cabinets. Your network installation requirements can be met if you conduct the operations according to the following procedure. It can be described in the following two parts:

- Installing the Machine Box on the Desk
- Installing the Machine Box on the Cabinet

#### 3.2.1 Installing the Machine Box on the Desk

AP8616B GPON can be directly put on the smooth and safe desk.

**Note:**

Do not put things weighing 4.5 kg or over 4.5 kg on the top of AP8616B GPON.

## 3.2.2 Installing the Machine Box on the Cabinet

The machine box of AP8616B GPON is fixed on the cabinet through the brackets. When you fix the brackets, the front panel of AP8616B GPON faces forward. The detailed operations are shown in Figure 3-2.

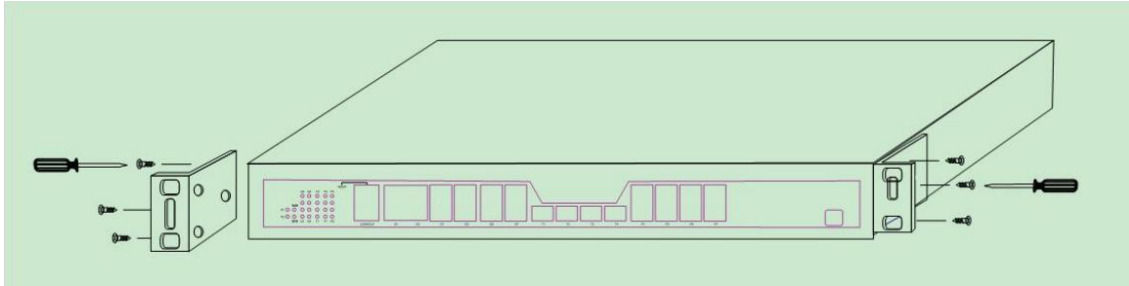


Figure 3-2 Fixing the Machine Box of AP8616B GPON to the cabinet

After the brackets are installed, install the GPON device on the cabinet. See the following figure:

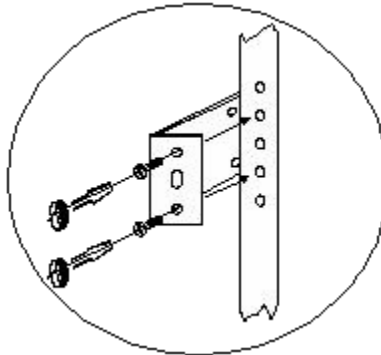


Figure 0-3 Installing the GPON Device On the Cabinet

## 3.3 Connecting the Port

### 3.3.1 Connecting the CLI Port

AP8616B GPON has a CLI port. Its attributes and usage method are described in this section.

The baud rate of the CLI port is a value ranging from 1200bps to 115200bps. It has a standard RJ45 plug. After you connect the CLI port to the serial port of PC through a console cable, you can configure and monitor AP8616B GPON by running the terminal emulation software, such as super Windows terminal. The cable is provided according to the host. The communication parameters of the terminal serial port can be set to a baud rate of 9600bps, eight data bits, one stop bit, no sum check bit and no flow control.

The RJ45 connector of the CLI port is shown in the following figure. The RJ45 plug corresponds to the RJ45 socket, whose pins can be aligned from left to right with the value from 1 to 8.

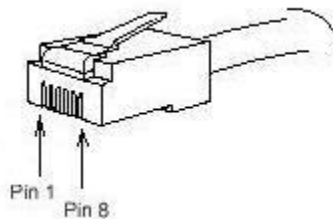


Figure 0-4 RJ-45 connector of the CLI port

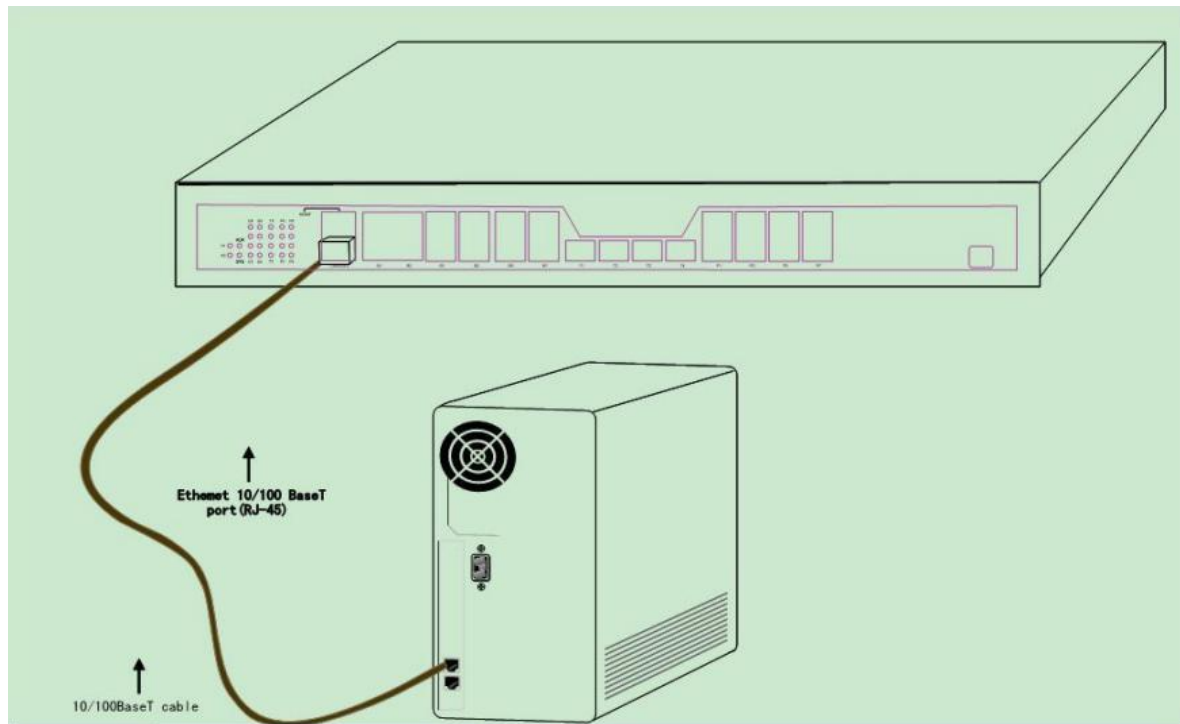


Figure 3-5 Connecting the CLI Port of AP8616B GPON and the Computer

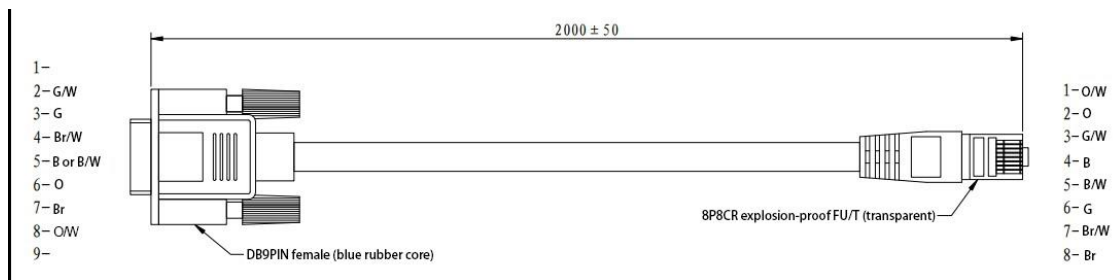


Figure 3-6 Cable connection at the CLI port

**Note:**

The CLI port of AP8616B GPON does not support flow control. Therefore, you must set the option **data flow control** to **none** when you configure AP8616B GPON with the super terminal. Otherwise, the single-pass problem will arise on the super terminal.

The cable is used to connect the CLI port of AP8616B GPON and the outside console terminal device. One end of the cable is an 8-pin RJ45 plug and the other end is a 9-hole plug (DB9). The RJ45 plug is put into the socket of the CLI port on AP8616B GPON.

### 3.3.2 Connecting the GPON SFP Port

AP8616B GPON has 8 GPON SFP ports. The indicators lie in the right side of these ports, indicating the LINK/ACT state. They are used to connect the GPON access devices and other ONUs.

A single-mode SC optical fiber and a GPON optical module are needed for connect AP8616B GPON and other ONUs.

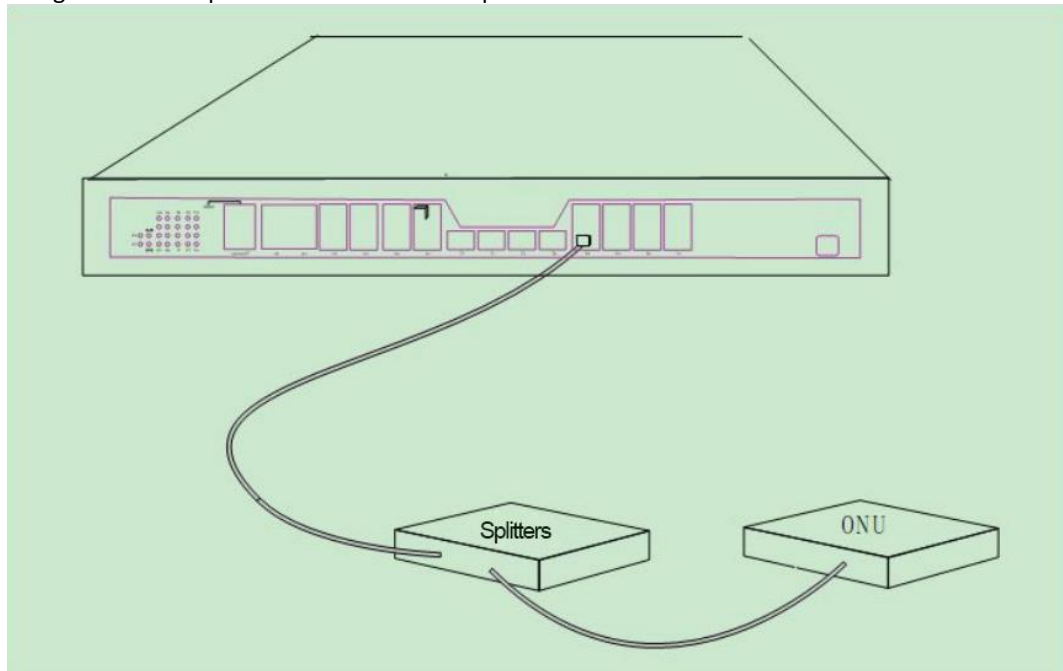


Figure 3-7 Connecting the GPON ports and other ONUs or optical splitters

### 3.3.3 Connecting Gigabit Ethernet SFP Port

AP8616B GPON provides 8 gigabit Ethernet ports, 4 of which are SFP/TX combo ports. Each port corresponds to an indicator light, indicating the LINK/ACT state. If the indicator is always on, the link on the port is normal. If the indicator flickers, the data is received or transmitted through the port. To use the optical port, you need connect it to the SFP optical module, and then to other Ethernet terminal devices through an optical fiber.

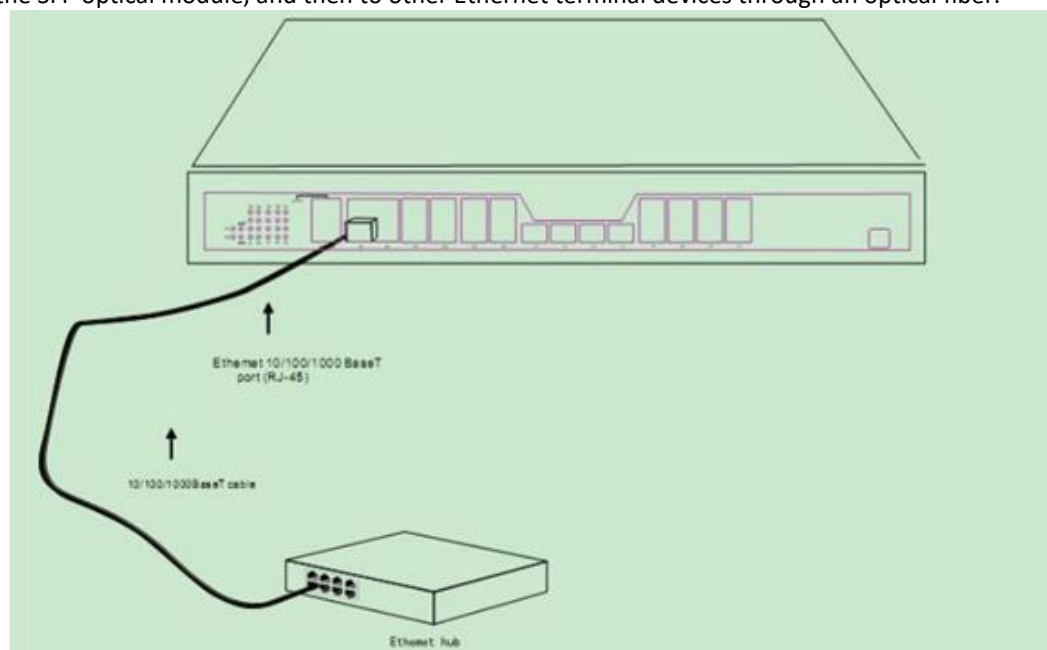


Figure 3-8 Connecting the 1000M SFP port and other devices

## 3.3.4 Connecting Gigabit Ethernet TX Port

AP8616B GPON provides 4 fixed gigabit SFP/TX combo ports (G1 to G4). The indicators lie in the right side of these ports, indicating the LINK/ACT state.

When the TX ports (G1 to G4) are used, the corresponding optical port cannot be used.

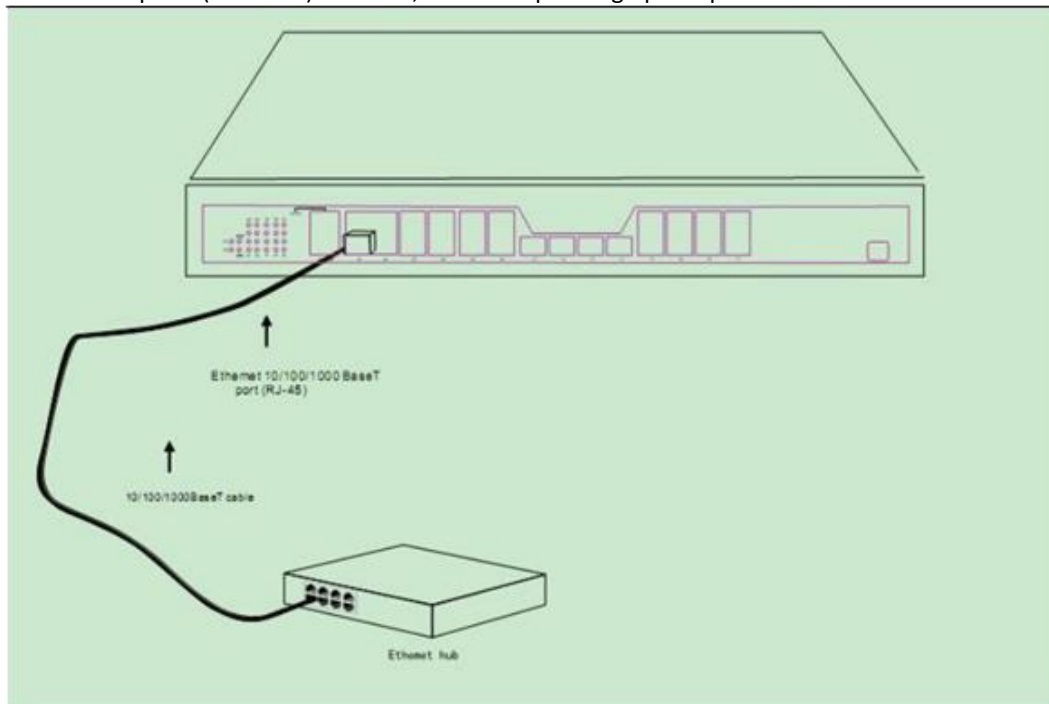


Figure 3-9 Connecting the 1000M TX port and other devices

To use the TX port, you can connect the TX port and other Ethernet devices with the direct-through or cross cable through the UTP port of the GPON access device. In this case, the corresponding optical port cannot be used. The numbering order of the pins in the UTP port is the same as the CLI port.

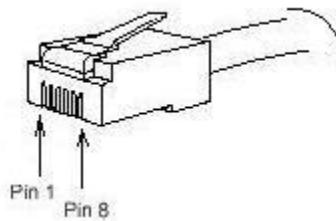


Figure 0-10 RJ-45 connector of the CLI port

Because 4 1000Base-T ports of AP8616B GPON support the MDI/MDIX auto-identification of the cable, AP8616B GPON can adopt cat5 direct-through/cross network cables when it connects other Ethernet terminals.

No.	Pin Name	Symbol	Remarks
1	Sending the normal phase of the data	TXD1+	Output
2	Sending the paraphase of the data	TXD1-	Output
3	Receiving the normal phase of the data	RXD1+	Input

4	Sending the normal phase of the data	TXD2+	Output
5	Sending the paraphase of the data	TXD2-	Output
6	Receiving the paraphase of the data	RXD1-	Input
7	Receiving the normal phase of the data	RXD2+	Input
8	Receiving the paraphase of the data	RXD1-	Input

Table 3-1 Receive and Sending Parameters of AP8616B GPON

The direct-through or cross network cable has the function of auto-identification, so the cat5 direct-through/cross network cables can be used to connect other Ethernet devices.

### 3.3.5 Connecting 10GE SFP+ Ports

AP8616B provides with 4 fixed 10GE SFP+ ports (T1~T4). The indicators lie in the right side of these ports, indicating the LINK/ACT state. If the indicator is always on, the system is linked normally; if the indicator flickers, the data is forwarded through the port. To use the optical port, you need connect it to the SFP+ optical module, and then to other Ethernet terminal devices through an optical fiber.

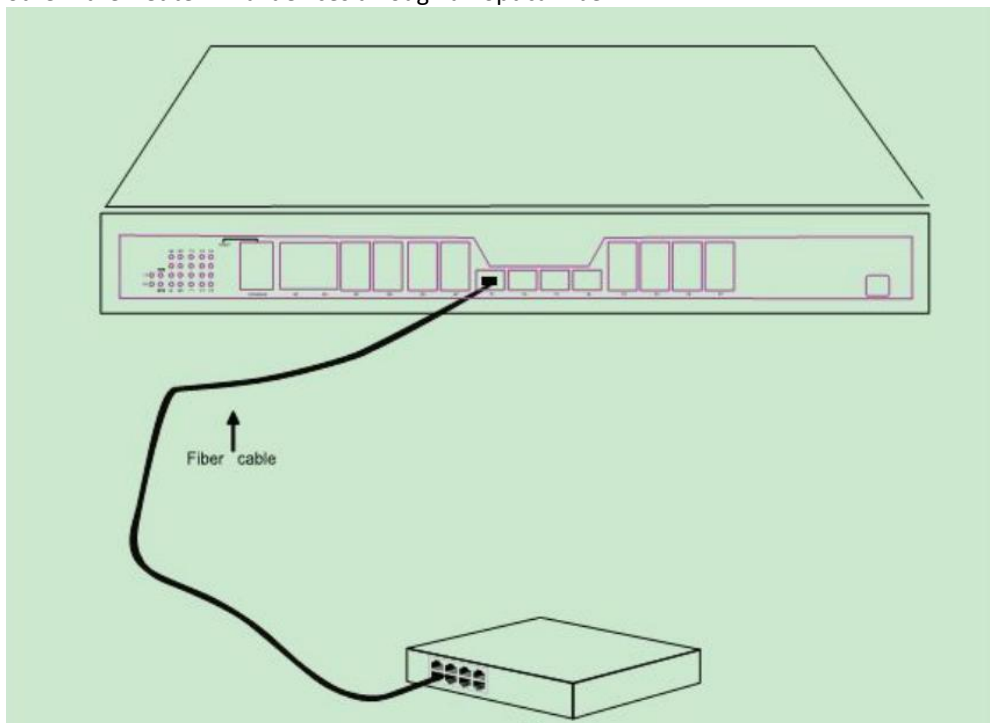


Figure 3-10 Connecting the 10GE SFP+ port and other devices

## 3.4 Checking after Installation

After AP8616B GPON is installed, please conduct the following checkups before it is powered.

- If the GPON access device is installed on the cabinet, check whether the installation point between the cabinet and the GPON access device is strong. If the GPON access device is installed on the desk, check whether there is enough space for the GPON access device to discharge its heat and whether the desk is stable.
- Check whether the connected power meets the power requirements of the GPON access device.
- Check whether the grounding line of the GPON access device is correctly connected.
- Check whether the GPON access device is correctly connected to other terminal devices.



## Chapter 4 Maintaining the GPON Access Device

### Caution:

- 1) Before opening the chassis, make sure you have discharged the static electricity on your body and turned off the power of the GPON access device.
- 2) Before performing operations beside the power supply or on the chassis, turn off the power on-off and plug out the power cable.

### 4.1 Opening the Chassis

This section describes how to open the cover of the GPON access device, required tools and operation methods.

#### Caution:

When the power cable still connects the power supply, do not touch it.

When you open the cover the GPON access device, you may use the following tools:

- Crossed screwdriver
- Static-proof wristband

Perform the following steps to open the cover of the GPON access device.

- 1) Plug out all cables connected the back of GPON access device.
- 2) Take out the bolt from the chassis with the screwdriver.

#### Note:

The chassis comprises of two parts: cover and bottom.

- 3) Open the cover by holding two sides of the cover towards the direction of the arrow key shown in the following figure:

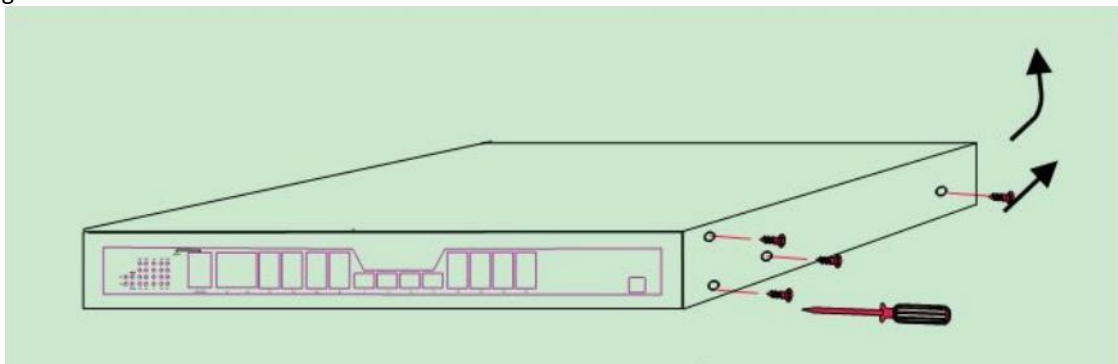


Figure 4-1 Opening the Chassis Procedure 1

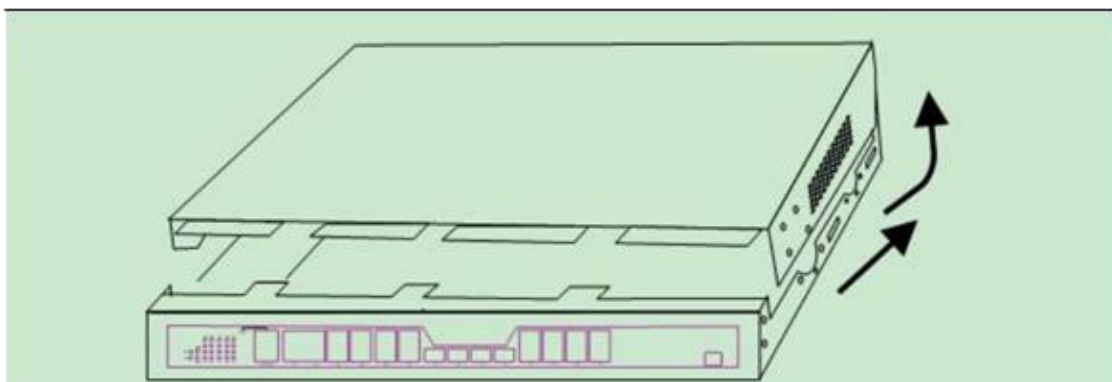


Figure 4-2 Opening the Chassis Procedure 2

- 4) When the cover is opened, put it aside. The main board of the system appears.

#### Note:

After taking off the cover, put it horizontally and avoid it to be crushed or collided. Otherwise, the chassis is hard to install.



## 4.2 Closing the Chassis

The section mainly describes how to put the cover and close the chassis. Do as follows:

- 1) Put them well according to their locations and joint them together along their sides. See the following figure.

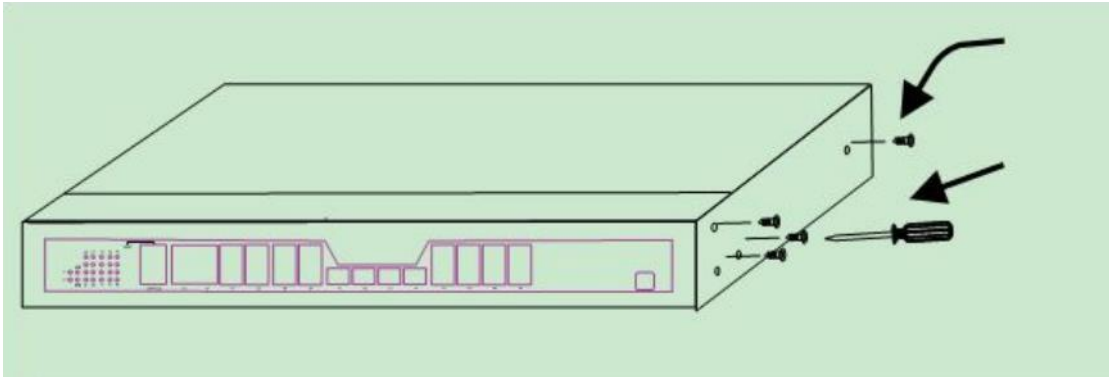


Figure 4-3 Closing the Chassis Procedure 1

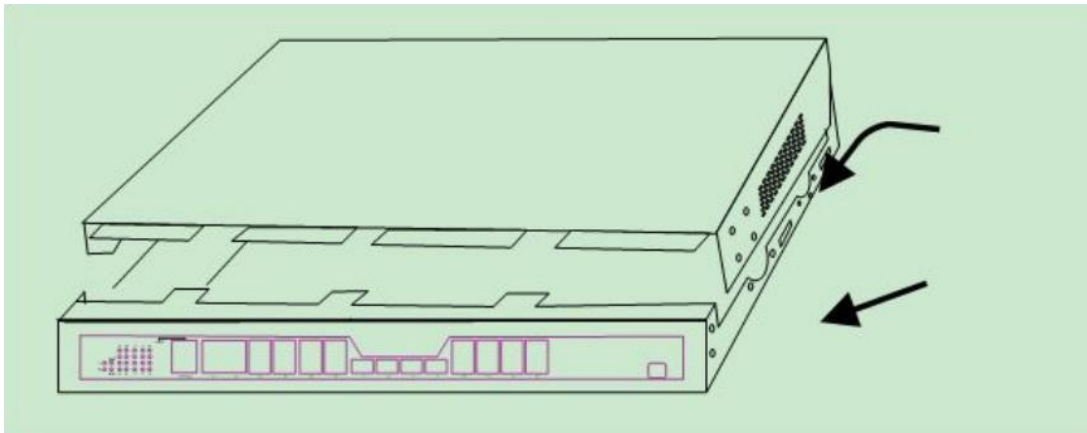


Figure 4-4 Closing the Chassis Procedure 2

- 2) According to the figure above, put close the edges of bottom shell and the cover.
- 3) When the cover and the bottom are closely tied, let the cover slide the slot of the front panel at the bottom.
- 4) Nail the bolt and screw it tightly with the screwdriver.
- 5) Reinstall the GPON access device on the cabinet or the desk.
- 6) Reconnect all cables of the GPON device.

## Chapter 5 Hardware Fault Analysis

The part describes how to remove the fault from the GPON access device.

### 5.1 Fault Separation

The key for resolving the systematic faults is to separate the fault from the system. You can compare what the system is doing with what the system should do to detect the fault. You need to check the following subsystems:

- Power supply - providing the power
- Port, cable and connection - ports on the front panel of the GPON access device and the cables connecting these ports

#### 5.1.1 Performing the Following Power-Supply Steps

- The temperature of the locale where the GPON access device runs should be from 0°C to 50°C. If the GPON access device is too hot, check whether the air outlet and air inlet are clean and then do relative operations in section 2.3 “**Requirements for Common Locations**”.
- If the GPON access device cannot be started and the PWR indicator is off, check the power.

#### 5.1.2 Faults Relative with Port, Cable and Connection

Do the following checkups to help remove the fault:

- If the port of the GPON access device cannot be linked, check whether the cable is correctly connected and whether the peer connection is normal.
- If the CLI port does not work after the system is started up, check whether the CLI port is set to a baud rate of 9600 bps, eight data bits, no sum check bit, one stop bit and no flow control.

### 5.2 Indicator Description

The LEDs are used to show what operations are conducted by the GPON access device. For the LEDs of AP8616B GPON and their description, see the following table:

No.	Abbrev.	Name	Remarks
1	P1, P2	Power indicator	When the device is powered on, the indicator is on.  If the indicator is always off, the system works normally;
2	ALM	Alarm indicator	If the indicator is on and the temperature of the device is over high, the device needs to be checked.
3	SYS	System indicator	If the indicator is always on, the system is being started. If the indicator flickers, the system works normally.
4	/	Indicator of each port	If the indicator is always on, the link on the port is normal. If the indicator flickers, the data is received or transmitted through the port.

Table 5-1 Indicator Description of AP8616B GPON



Ascent Communication Technology Ltd

#### AUSTRALIA

140 William Street, Melbourne  
Victoria 3000, AUSTRALIA  
Phone: +61-3-8691 2902

#### HONG KONG SAR

Unit 9, 12<sup>th</sup> Floor, Wing Tuck Commercial Centre  
177 Wing Lok Street, Sheung Wan, HONG KONG  
Phone: +852-2851 4722

#### CHINA

Unit 1933, 600 Luban Road  
200023, Shanghai CHINA  
Phone: +86-21-60232616

#### USA

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Cheyenne, WY 82001, USA  
Phone: +1-203 816 5188

#### EUROPE

Pfarrer-Bensheimer-Strasse 7a  
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EMAIL: [sales@ascentcomtec.com](mailto:sales@ascentcomtec.com)

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