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Hardware Installation Manual
A-GEAR P1004T EPON Optical Network Unit (ONU)

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Content

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1. Access Device

This chapter mainly describes and introduces overall characteristics and parameters of A-GEAR P1004T EPON access device so that readers can get an overall understanding about A-GEAR P1004T EPON.

1.1. Description of outline in standard configuration

A-GEAR P1004T EPON interface consists of the following parts: 4 100-MB RJ45 ports, 1 GEPON optical port, 1 Power port, 1 switch, 1 Reset and 1 ground point. See following table for detailed description.

Table 1-1. Characteristics of the Ports

Port name	Description
LAN1~4	RJ45 100MB Ethernet port, link cable
GEPON optical port	SFF, link optical fibre
Power port	Link power supply
Switch switch	Control device switch
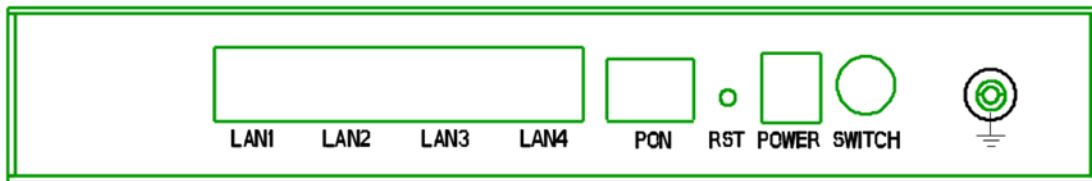
Figure 1-1. Front Panel View of A-GEAR P1004T EPON.

Table 1-2. Description of Front Panel Components of A-GEAR P1004T EPON

Component No.	English name	Chinese name	Description
1	LAN1~4	RJ45 Ethernet Port	100MB Ethernet port, connecting Ethernet cable
2	PON	GEPON optical port	SFF INTERFACE, connecting optical fibre
3	RST	Reset key	Used for reset operation of the equipment
4	POWER	Power supply port	Connecting power supply, used to supply power for the equipment
5	SWITCH	Power switch	Switch of the control device
6	—	Ground point	Through the screw of this point, the equipment outer casing is grounded

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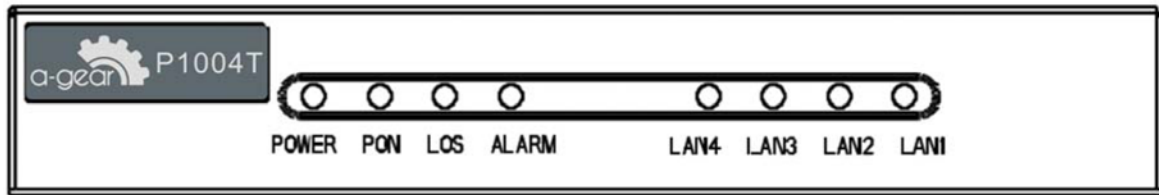
Figure 1-2. Back Panel View of A-GEAR P1004T EPON.

Table 1-3. Description of LEDs on Back Panel of A-GEAR P1004T EPON

LED lamp code	Quantity	Color	Status	Description
POWER lamp	1	Green	Off	ONU is not switched on
			on	ONU Normally switched on,
PON lamp	1	Green	Off	Indicating that ONU does not complete MPCP and OAM discovery and registration
			Flash	Indicating that ONU is trying to establish link
			Normally on	Indicating that MPCP and OAM links of ONU have been activated
LOS lamp	1	Red	Off	Indicating that ONU received light power is normal
			Flash	Indicating that ONU received light power is lower than the sensitivity of the light receiver
ALARM lamp	1	Green	Off	After being normally switched on, it operates normal
			Normally on	After being switch on, failure occurs in software operation
LAN1-LAN4 lamp	4	Green	Off	Not switched on, or Ethernet cable is not plugged or link is not established after being normally switched on
			Flash	After being normally switched on, Ethernet Port successfully establishes link and has data transfer
			On	After being normally switched on,, Ethernet Port successfully establishes link

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1.2. Characteristic parameters of A-GEAR P1004T EPON System

Protocol standard	Supporting standard	IEEE Std 802.3-2005 IEEE Std 802.1D-2004 IEEE Std 802.1Q-2005 Technical requirement for China Telecom EPON equipment YD/T 1475-2006
Hardware characteristics	Memory	Flash Memory: 4M Bytes; PSRAM: 2Mbytes;
	Standard configuration	4 10/100BASE-Tx ports 1 GEPON optical port 1 Reset key 1 POWER port 1 switch key
	Overall dimension	165*128*33mm
	Operating temperature/humidity	-5°C~45°C; 5%~95%, without coagulation
	Storage temperature/humidity	-40°C~60°C; 5%~95%, without coagulation
	Characteristic of power adapter	Input voltage: AC110V-240V, 50/60Hz Output voltage: DC12V/0.7A
	Power consumption	Max. 7W

1.3. ROHS Description

Parts	Toxic or harmful substances or elements					
	Pb	Hg	Cd	Cr (VI)	PBE	PBDE
Chasis	O	O	O	O	O	O
Rack	O	O	O	O	O	O
Baseboard	O	O	O	O	O	O
Module	O	O	O	O	O	O
Interface Card	O	O	O	O	O	O

0: The toxic or harmful substances` levels in each homogeneous materials of each part, are under the limitation of SJ/T 11363-2006 regulation

X: The toxic or harmful substances` levels at least in one homogeneous materials of one part, exceed the limitation of SJ/T 11363-2006 regulation

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2. Installation Preparation

2.1. Precautions for use

Similar to other electronic products, quickly and frequently turning on/off power supply will damage semi-conductor chip. When you need to re-start A-GEAR P1004T EPON, please turn on power switch again 3~5 seconds after it is switched off.

Please do not violently impact A-GEAR P1004T EPON or drop it from a high place, which may damage internal hardware of .EPON access device.

Please use correct external ports to connect A-GEAR P1004T EPON. Improper operation will cause damage to internal elements of the port.

Note:
[1]   Please insert /pull off power line plug in the direction of power socket!
[2]   When the service life of the product expires, please do not discard it at will. To prevent from environmental pollution, please dispose it according to related national laws and regulations, or send it to our company for uniform disposal!

2.2. Safety Suggestions

2.2.1. Ensure safety in compliance with the following principles

- During the course of equipment installation and after installation is completed, please keep if dust-free and clean;
- Place the machine in a safe place;
- Place the tools in a place not easy to drop by touch;
- Do no wear loose clothes to avoid being stumbled by the equipment. Tie up necktie or scarf and scroll up sleeves.
- If the environment may damage eyes, please wear safety goggles;
- Do not conduct operations that may cause personal injury or damage to the equipment.

2.2.2. Safety warnings

Safety warnings in this section refer to the warnings against personal injury that may be caused in the case of improper operation.

- Carefully read the installation guide, and then carry out operation on the system;
- Only those trained, qualified personnel can install or replace EPON access
- device;
- Before operation on the equipment, please cut off the DC connection;
- Final configuration of the product must comply with all applicable national laws
- and regulations.

2.2.3. Operation Safety Principles for Live Parts

When working on live parts, the following principles are applicable:
- Before operation on live devices, take off jewelries (such as finger ring, necklace,
- watch, bracelet, etc.). When metal object contacts «power» and «ground», it may

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- cause short circuit or damage to the elements.
- Before operation on the equipment, cut off DC power supply.
- Improper connection between equipment and power sockets may cause hazard.
- Only those trained, qualified personnel can carry out operation and maintenance
- on the equipment.
- Before the system is switched on, please carefully read installation guide.

Note:
[1]   Carefully observe potential hazard, such as damp floor, non-grounded power
[2]   extension cable, worn power cable
[3]   Place the emergency switch in the workroom so that power can be rapidly cut
[4]   off when accident occurs
[5]   Before installation/disassembly of the equipment, pull off the power cable
[6]   Please do not work independently if there is potential hazard
[7]   Before check, always cut off power supply
[8]   If accident occurs, please take the following measures
    [a]   Switch off the system
    [b]   Give alarm
    [c]   Judge whether the affected person needs [artificial respiration or not, and then take proper measures
    [d]   Where possible, send a possible to seek for medical help; otherwise seek for help according to serious degree

2.3.   General Requirements for Location

This part discusses the requirements for the location of safe installation and use of the system. Before installation, ensure that the location has been properly prepared.

2.3.1.   Environment of the Location

By adoption of card-track installation method, EPON access device can be fixed on DIN card track. The equipment adopts fan-free design. Please note that installation environment should be well-ventilated to facilitate equipment heat dispersion.

When planning location arrangement and equipment placement, please remember to discuss the precautions as set forth in «Precautions for Allocation of the Location». If the equipment often breaks down or error often occurs, such precaution information may help you isolate failure and avoid recurrence of the problem.

2.3.2.   Precautions for Allocation of the Location

Precautions listed below may help you design a suitable environment for EPON access device to avoid system failure caused by the environment.

- Ensure air is well circulated and electrical equipment heat is well dispersed in the work room. Air circulation must be sufficient to provide a good cooling environment;
- Equipment should be better placed in such a way that cool air frequently passes by the equipment. Ensure the outer casing of the equipment is complete and fixed. If it is open, air circulation inside the equipment will be damaged, which may interrupt airflow or change the direction of the cool air that should cool down heat-emitting the internal elements.

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2.3.3. Rack Configuration

The following content helps you design a suitable rack configuration.
- Each equipment on the rack will emit heat during working. To ensure good ventilation, closed rack must be provided with heat dispersion port and cooling fan, and equipment should be closely placed from each other;
- When installing equipment on the open rack, pay attention not to make the rack frame obstruct the vent holes of EPON access device. Please carefully check the equipment location after the equipment is installed to avoid such case.
- Ensure that effective ventilation measure has been provided for the equipment installed at the lower part of the rack.

2.3.4. Power Supply Consideration

Check power supply. Ensure that power supply system is well grounded. Input voltage range should be AC110V~240V. Too high voltage will damage the machine.

Warning:
> If the power supply system is not well grounded, or input power fluctuates greatly with excessive pulse, false code rate of the communication equipment will increase, or even hardware system will be damaged!

2.4. Installation tools and equipment

Tools and equipment required for installation of A-GEAR P1004T EPON are not included in standard configuration of A-GEAR P1004T EPON. User needs to prepare them by himself. The following are typical tools and equipment required for installation of A-GEAR P1004T EPON:
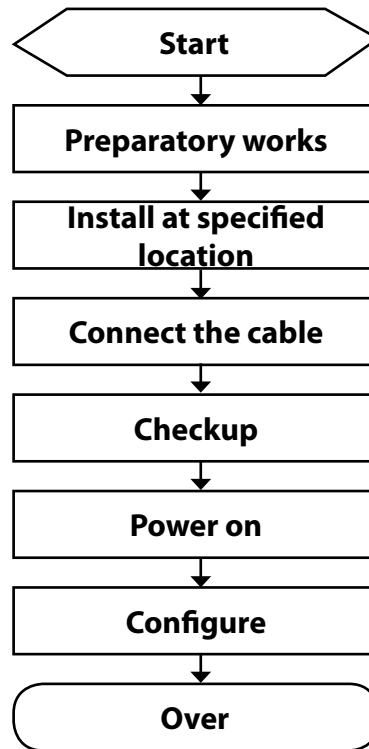- Screw driver
- Anti-static hand ring
- Fastening screws
- Ethernet cable
- Other Ethernet terminal equipment
- Control terminal

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3. Installation of A-GEAR P1004T EPON

Warning: Only those trained, qualified personnel can install or replace the equipment.

3.1. A-GEAR P1004T EPON Installation Flow

```
            ┌──────────────────┐
            │      Start       │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │ Preparatory works│
            └──────────────────┘
                     │
            ┌──────────────────┐
            │ Install at specified │
            │     location     │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │ Connect the cable│
            └──────────────────┘
                     │
            ┌──────────────────┐
            │     Checkup      │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │     Power on      │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │    Configure     │
            └──────────────────┘
                     │
            ┌──────────────────┐
            │       Over       │
            └──────────────────┘
```

3.2. EPON access device installation

EPON access device may be placed on flat desktop or mounted on vertical wall surface. Operation according to the steps in this section can well satisfy you requirement for network installation. The content is divided into the following parts:

- Install the equipment on the desktop.
- Mount the equipment on vertical wall surface.

3.2.1. Install the equipment on the desktop

A-GEAR P1004T EPON may be directly placed on smooth, flat and safe desktop.
Note: Do not place too heavy object (1Kg) on the top of the EPON access device, otherwise it will be damaged.

3.2.2. Mount the equipment on vertical wall surface

By way of the bottom clamping slot, EPON access device may be fixed on vertical wall surface provided with fastening screws During operation, just insert the clamping on the back panel of the machine onto the screws. Please ensure there are at least more than two screws and confirm their tightness.

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3.3. Connecting ports

3.3.1. GEPON SFF Optical Port

A-GEAR P1004T EPON provides 1 GEPON SFF port. Indicator lamps corresponding to this port are PON and LOSS. During use, connect SC optical fibre to the port, and then to optical splitter and then from optical splitter to OLT equipment.

3.3.2. Ethernet Electrical Port

A-GEAR P1004T EPON provides 4 10/100Base-Tx ports. During use, connect UTP port of EPON access device to other Ethernet terminal equipment through network cable (direct connection or cross). See following table for No., sequence and arrangement of UTP port pins.
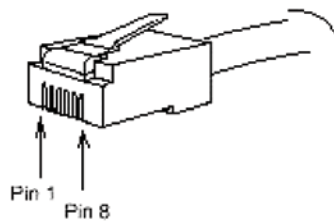

Figure 3-1. RJ-45 Connector.

As all of the four 10/100Base-Tx ports of A-GEAR P1004T EPON support MDI/MDIX self-recognition function of the cable, when connecting A-GEAR P1004T EPON with other Ethernet terminals, either Class V direct network cable or Class V cross network cable may be used, which facilitates the selection of cable.

Table 3-3. Table of Definition of 1000MB RJ45 Pins

Pin No.	Pin name	English name	Remarks
1	Positive phase terminal of data transfer	TXD1 +	output
2	Reverse phase terminal of data transfer	TXD1-	output
3	Positive phase terminal of data receipt	RXD1 +	input
4	Positive phase terminal of data transfer	TXD2+	output
5	Reverse phase terminal of data transfer	TXD2-	output
6	Reverse phase terminal of data receipt	RXD1-	input
7	Positive phase terminal of data receipt	RXD2+	input
8	Reverse phase terminal of data receipt	RXD1-	input

As supporting self-recognition function of the direct/cross network cable, either Class V direct network cable or Class V cross network cable may be used to connect A-GEAR P1004T EPON with other Ethernet equipment.

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3.4. Check after installation

After mechanical installation of EPON access device is completed, please make the following check before starting EPON access device:

- If EPON access device is mounted on vertical wall surface, please check the installation reliability of EPON access device. It installed on desktop, please check if space reserved around EPON access device is sufficient for heat dispersion and if desktop is stable or not.
- Check if power supply connected is consistent with that required for EPON access device or not.
- Check if the ground wire of EPON access device is properly connected or not.
- Check if EPON access device is properly connected with other equipment or not, such as configuration terminal.

4. Maintenance of EPON Access Device

Warning:
[1]   Before opening the equipment, ensure that static electricity that you carry has been released and power switch of EPON access device has been turned off. Before carrying out any step in Annex B, please read the part **«Safety Suggestions»;**
[2]   When you are near power supply or operate the equipment, please turn off power switch and pull of power cable at first.

4.1. Open the equipment

This part mainly describes method, tools required and operation steps for opening the cover of EPON access device.

Warning:
When power cable is connected, do not touch it with bare hand to avoid getting an electric shock.

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Disassembly of the equipment may require some tools, which are not included in standard configuration of EPON access device. These tools are as follows:

- Cross screwdriver
- Anti-static hand ring

Pleas open the cover of EPON access device according to the following steps.

(1) Pull off power cable of EPON access device;

(2) Pull of all cables connected to EPON access device ports;

(3) Release screws on the equipment outer casing with screwdriver;

Note: The equipment outer casing consists of two parts: equipment cover and equipment base.

(4) Remove the cover in the direction of the arrow as shown in the following figure

(5) When the cover is opened, put it aside. The system mainboard appears.

Note:

After removal of the cover, place it stably to avoid squeezing, collision or deformation, otherwise installation of the equipment will become difficult.

4.2. Close the equipment

This part mainly describes the flow for placing cover and closing the equipment. Please operate according to the following steps:

(1) Install the equipment cover and base in place according to the direction and steps in 4.1-(4).

(2) Re-install the screws and tighten them with screw driver.

(3) Re-install EPON access device or place it on the desktop.

(4) Equipment closing work is completed. Re-connect all cables.

5. Analysis of Hardware Failure

This section describes method for failure analysis and isolation of failure from EPON access device:

5.1. Failure Isolation

The key to settle system failure is to isolate failure from the system. Failure isolation and settlement becomes easy by comparison between what the system should do and what the system is doing. The following sub-systems should be considered in solving the problems:

- Power connection;
- Port, cable and link - ports on the front panel of EPON access device and cables connected to the ports.

5.1.1. Power failure

Check the following items to facilitate isolation of problems:

- Confirm that power cable is reliably connected and power is supplied.
- Check the environmental conditions. Note that temperature required for work location of EPON access device should be -5℃ ~ 45℃.

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- If power supply is normal for a certain circuit of EPON access device, the power indicator lamp Power should be lit, otherwise power supply for this circuit is abnormal. When the system is normally registered on OLT, PON lamp should be lit and LOS lamp should be off.

5.1.2. Failure in port, cable and link

Check the following items to facilitate isolation of problems:
- If EPON access device port cannot be linked, check if the link cable is correct and if opposite terminal connection is normal or not.

5.2. Description of indicator lamps

LED indicator lamps indicate the current operation of EPON access device. A-GEAR P1004T EPON indicator lamps and the description are as follows:

LED lamp code	Quantity	Color	Status	Description
POWER lamp	1	Green	Off	ONU is not switched on
			on	ONU Normally switched on,
PON lamp	1	Green	Off	Indicating that ONU does not complete MPCP and OAM discovery and registration
			Flash	Indicating that ONU is trying to establish link
			Normally on	Indicating that MPCP and OAM links of ONU have been activated
LOS lamp	1	Red	Off	Indicating that ONU received light power is normal
			Flash	Indicating that ONU received light power is lower than the sensitivity of the light receiver
ALARM lamp	1	Green	Off	After being normally switched on, it operates normal
			Normally on	After being switch on, failure occurs in software operation
LAN1-LAN4 lamp	4	Green	Off	Not switched on, or Ethernet cable is not plugged or link is not established after being normally switched on
			Flash	After being normally switched on, Ethernet Port successfully establishes link and has data transfer
			On	After being normally switched on, Ethernet Port successfully establishes link