ASCENT
Communication Technology

ACT A1600
Optical
Transport
System

Installation
Manual

Revision F

ACT A1600 Optical Transport System

Installation Manual

ACT Document Number: ACT A1600 Optical Transport System Installation Manual

Manual Revision F

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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.

For more information, contact ACT: support@ascentcomtec.com

Revision History

Revision	Date	Reason for Change
A	01/04/2020	Initial release
B	01/11/2020	Minor updates
C	06/21/2020	Updated section 1.7.2
D	10/04/2020	Updated section 5
E	09/01/2021	Updated section 5.5
F	12/20/2023	Add Chapter 7 & Chapter 8

Contents

Precautions

Warning The device's transmitting port outputs invisible laser radiation. When the device is connected to work, the connector end face should not be directly viewed under any circumstances to avoid burning eyes and skin.

Caution The device contains precision optics to avoid damage caused by severe impact. Avoid arranging vibrations and collisions. The pigtail is easily broken, please be careful.

Caution The device contains static sensitive components. Please be careful and ensure that the grounding is good and the power supply is normal.

Caution If you have any problems, please contact us. Do not disassemble the equipment. Otherwise, it may cause irreparable damage. We will treat the unauthorized removal of the equipment as automatically waive warranty rights.

1. A1600 Optical Transmission Platform

1.1.1 Product Overview

A1600 1U, 2U and 4U platforms are highly integrated, compact in size. It features standard 19" 1U, 2U, 4U chassis, power supply (AC/DC optional), 1+1 backup, ready to install. 1U, 2U, and 4U transmission platforms support max 4, 8 and 16 services slots, mixed different interface modules (hot pluggable), in-band and out-of-band network management, flexible bandwidth per channel, remote update, easy maintenance.

1.1.2 Product Appearance and Size

The 4U chassis has a standard length of 19 inches and a height of 4U, which is suitable for most standard cabinet installations. The main body of the chassis contains 16 card slots, including 15 service cards and 1 network management card unit. The network management card unit is installed in slot #16 by default (this slot is also available for service card when the network management card unit is not required). Support different service cards to mix and install (such as OTU wavelength conversion card unit, OEO relay amplification card unit, ETU photoelectric conversion card unit, OLP optical line protection card unit, OBP optical bypass protection card unit, OSS optical selective system card unit, ODM mux/demux card unit, OADM optical add/drop multiplex card unit, EDFA erbium-doped fiber amplifier card unit, DCM dispersion compensation card unit., etc.). There are also 2 power slots on the rear panel of the chassis, and all cards and power supplies are hot swappable. The dual power supply slots support AC and DC, and the specific configuration is optional according to customer requirements.

Chassis size: width * height * depth = 440 * 177 * 250mm.
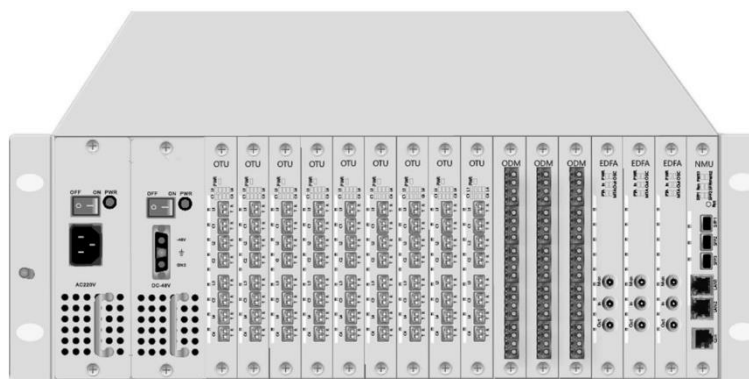
Front View
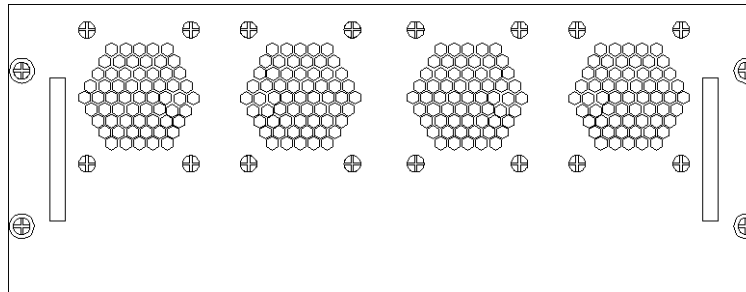
Rear View
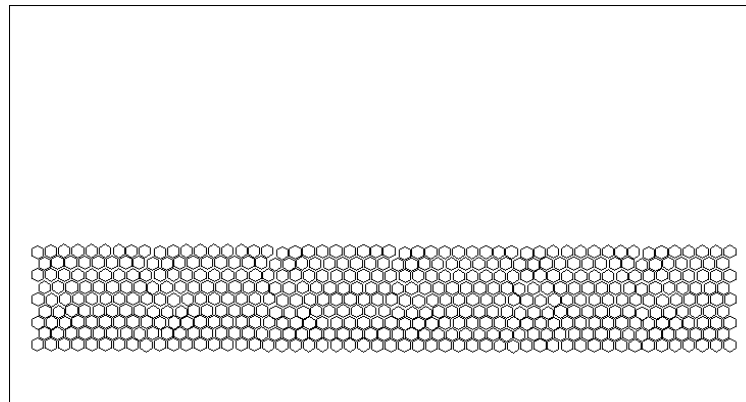
Bottom view

1.1.3 Equipment Air Duct

4U platform

The front and bottom sides of the chassis are heat dissipation channels, and the cooling fan is installed on the rear side of the chassis. The cold air is sucked in through the ventilation holes on the front of the bottom of the chassis and on the board panel, and is drawn out by the cooling fan on the rear panel. When installing the equipment, make sure that there is no obstruction in the range of 40mm on the front, rear and bottom vents of the chassis to ensure smooth airway and ensure smooth operation of the equipment.
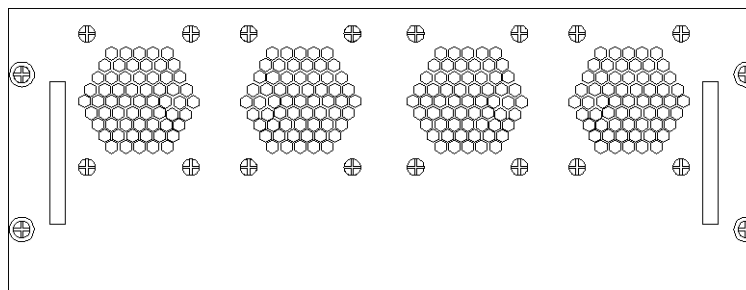
Rear Fan Illustration
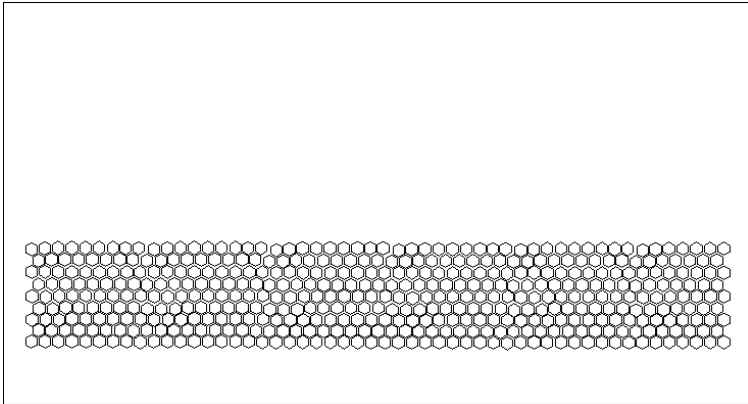
Bottom Air Inlet
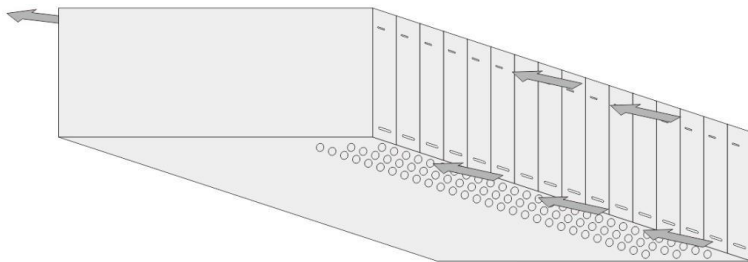
Heat Dissipation Diagram of Simulated Air Duct

1.1.4 Physical Parameters

Item	Description
Physical Dimensions (W×D×H)	440 mm × 177 mm × 250 mm
Full Weight	≤20 kg
Operating Temperature	-10 °C to +60°C
Relative Humidity	5 % to 95 % (non-condensing)
Ambient Temperature	-40 °C to +80°C
Relative Humidity	5 % to 95 % (non-condensing)
Supply Voltage (AC or DC)	220 V_{AC} (voltage range 90 V to 265 V), or -48 V_{DC} (voltage range -36 V to -72 V)
Fully Equipped with Max. Power Consumption	<300W

1.1.5 Appearance of Equipment

1.2 Installation Preparation

1.2.1 Safety Matters

1.2.1.1 Universal Security

- Make sure that the floor of the installation site is dry and level, and that you are ready to do so.
- Keep the equipment clean and free of dust. Do not place the device in a damp place.
- When handling equipment, please take care to avoid the body being scratched by sharp parts of the equipment.

1.2.1.2 Electrical Safety

- Carefully check the work area for potential hazards such as ungrounded power, unreliable power grounding, and wet ground.
- Before installation, please know the location of the emergency power switch in the room where the equipment is located. When an accident occurs, first turn off the emergency power switch.
- Always unplug all external cables (including the power cord) before moving the device.
- When performing live maintenance, it is recommended that two or more people be on site.
- When turning off the power, please make sure that the zero line of the equipment has been disconnected, be sure to check and confirm.

1.2.1.3 Static Electricity Safety

To prevent static electricity from damaging the electronics of the device, antistatic measures are required.

- If you need to install or replace various parts of the equipment, especially when there are components of the circuit board (such as a single board), you must wear an anti-static wrist.
- When taking the board, take the edge of the board and avoid touching components and printed circuits.

- For your safety, check the resistance of your ESD wrist. The resistance between the human body and the earth should be between 1 and 10 megohms.

➢ **The steps to use the antistatic wrist are as follows:**

- Step 1: Put your hand into the anti-static wrist cover.
- Step 2: Tighten the lock to confirm that the metal piece on the anti-static wrist has good contact with the skin.
- Step 3: Clamp the alligator clip of the ESD-preventive wrist strap to the grounding post of the device.
- Step 4: Confirm that the ESD wrist strap is well grounded.

➢ **How to use the ESD wrist strap refer to the below picture.**
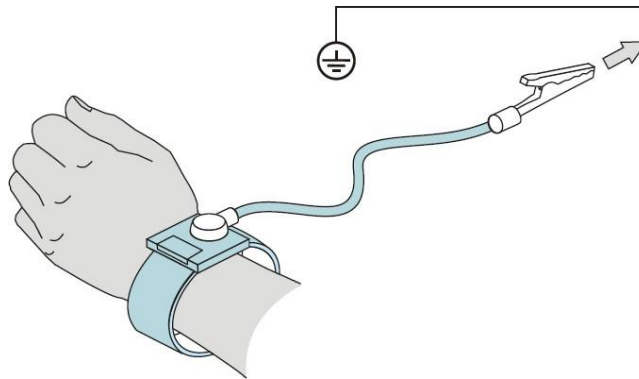
1.2.1.4 Handling Safety

- Unplug all external cables (including the power cord) before handling or moving the device.
- If the distance is too long, it is recommended to use professional mechanical handling tools.

1.2.1.5 Laser Safety

For transceiver modules and passive devices with optical interfaces, avoid looking directly at the laser beam emitted from the inside.

- Directly looking at the laser beam from inside the optical interface can cause damage to your eyes.

1.2.2 Environmental Inspection

1.2.2.1 Checking the Condition of the Machine Room

Check temperature and humidity

- In order to ensure the normal operation and service life of the equipment, a certain temperature and humidity must be maintained in the machine room. The ambient humidity of the machine room should be controlled at 5 to 95% (non-condensing).
- If the relative humidity is too large, it may cause poor insulation or even leakage of the insulating material, and corrosion of metal parts may occur.
- If the relative humidity is too low, it is easy to generate static electricity and the loosening of the fastening screws caused by the shrinkage of the insulating gasket.
- The ambient temperature of the equipment room should be controlled between 0 and 40 °C.
- Excessive ambient temperatures accelerate the aging process of components and insulation.
- If the ambient temperature is too low, the system may be unstable.

Check cleanliness / ventilation

- Dust is a major hazard to the safety of the equipment. Indoor dust falling on the body will cause electrostatic adsorption, which will cause poor contact between metal inserts or metal contacts, which will not only affect the life of the equipment, but also cause communication failure. Therefore, the environment to be placed must be kept clean and it is forbidden to place the equipment in a dusty environment such as renovation. In addition, make sure that there is at least 4 cm of space at the air inlet and outlet of the equipment, and maintain good ventilation to facilitate heat dissipation of the chassis.

Check the power supply conditions

- A good power supply system is the basis for the power-on and stable operation of the equipment. This equipment is rack-mounted. The power supply has been configured at the factory. Users only need to check that the power supply system of the installation site can meet the requirements.
- Check whether the power supply facilities in the machine room are complete and whether the power meets the equipment requirements.
- Check whether the power supply of the machine room is consistent with the equipment requirements, and the voltage is consistent.
- Make sure the power supply system in the machine room is stable.
- When using an electrical outlet to provide the nearest AC power to the equipment, be sure to use a power outlet with a grounded protective connector and ensure that the grounding protection point of the power supply is securely connected in the building.

Check grounding conditions

- Confirm that the machine room, cabinet or workbench have good grounding conditions.

Check electromagnetic environmental conditions

The device may encounter various interference sources during operation, which may adversely affect the normal operation of the device. In order to enhance the anti-jamming and lightning protection capabilities of the equipment, the following suggestions are made:

- Keep away from high-power radios, radar launchers, and high-frequency, high-current devices.
- The equipment application environment needs to have a level of lightning protection measures.
- The power supply system should be used as much as possible and take effective measures to prevent grid interference.
- Ensure that the power supply of the equipment is well grounded or that it is added to the lightning protection device.

Checking equipment

- Check if the installation space and the handling space are sufficient.
- This equipment can be placed directly on a clean, flat workbench. Please ensure the stability of the workbench and good ventilation.
- When the device is installed in the cabinet, in addition to maintaining a good ventilation and cooling system for the cabinet, it is also required to be strong enough to support the weight of the device. In addition, ensure that the installation cabinet has good grounding conditions.

1.2.2.2 Tools and Instruments that May be Used

Tools and Instruments

Cross screwdriver	Level
Slotted screwdriver	Multimeter
Diagonal pliers	Cable tie
Wrench	Gloves
Square / ruler / tape measure, etc.	Anti-static gloves
Crystal head crimping pliers	Anti-static wrist strap
Wire stripper	Optical power meter

1.2.3 Unpacking and Inspection

After confirming the safety items and the installation environment meets the requirements, you can unpack, inspect goods and confirm that the equipment and accessories are correct and complete.

1.2.3.1 Unpacking the Device

The equipment is first sealed with a transparent plastic bag (internal desiccant, mainly waterproof), then the pearl cotton (protection equipment) is placed on both sides, and then put into the packaging carton, and the relevant accessories are put in, and then sealed. Finally, the carton is placed in a transparent plastic bag, sealed, and packaged with a baler.

The equipment unpacking steps are as follows:

Step 1: Confirm that the box is placed face up with the front side facing down through the up arrow (个个) mark on the side of the box.

Step 2: Check the packing list on the side of the box to confirm that the equipment specifications and model are correct.

Step 3: First cut the strap on the box with a paper cutter and then remove the clear plastic bag from the box.

Step 4: Use a paper cutter to cut the sealing tape at the top and side edges of the top of the box. Be careful not to insert it too deeply to avoid scratching the contents of the box.

Step 5: Open the package, take out the accessories, take out the equipment together with the pearl cotton, remove the pearl cotton and the plastic bag on the equipment, and then take out the equipment. Equipment should be placed on a clean, level surface to avoid contamination and scratching equipment.

1.2.3.2 Equipment Inspection

Take out the "Packing List" in the accessories in the box, check whether the equipment is correct and the accessories are complete according to the items listed in the list.

Note:

1. Please keep the accessories in the box safe to prevent loss.

2. Please keep the original equipment packaging materials as much as possible in case you need to return them.

1.3 Equipment Installation

The equipment is designed according to the installation requirements of the standard 19-inch cabinet. The height is 4U. It can be directly installed on the working platform or installed in a 19-inch standard cabinet. The following two installation methods are described separately.

1.3.1 Equipment is Installed in the Cabinet

The height of the device is 4U, and the length is designed according to the standard 19-inch cabinet. Occupies the height of the cabinet is 4U (about 177mm).

Precautions before installation:

- Wear an antistatic wrist strap.
- Check the grounding and stability of the cabinet and confirm that there are no obstacles affecting the installation of the equipment inside and around the cabinet.
- Confirm that the cabinet has good ventilation and heat dissipation.
- Make sure that the chassis lug screw is locked, otherwise use a cross screwdriver to tighten it clockwise.
- When installing multiple devices into the cabinet, keep a certain distance between the devices as much as possible to facilitate heat dissipation.

Installation steps

1. Determine the location where the device should be installed in the cabinet, compare the mounting holes of the mounting ears, and determine the position where the nut on the square hole of the cabinet should be installed.
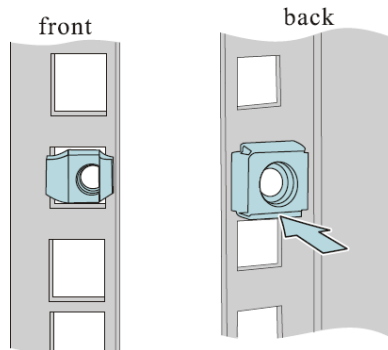
2. Install the nuts to the appropriate locations as indicated.

3. Under the marked mark, install a tray or rail to hold the device before reinforce lugs and square bars. (If you cannot find auxiliary tools such as trays or rails in the machine room, you may need to hold the equipment until the screws are reinforced.)

4. 4. Push the device from the front of the cabinet along the tray or rail slowly into the cabinet. Align the mounting holes of the mounting bracket with the previously installed nuts, and then lock the two screws with the matching screws. If necessary, the tray or rail can be removed, leaving enough space for the device to dissipate heat, and it is also convenient to use it to continue to install subsequent devices.
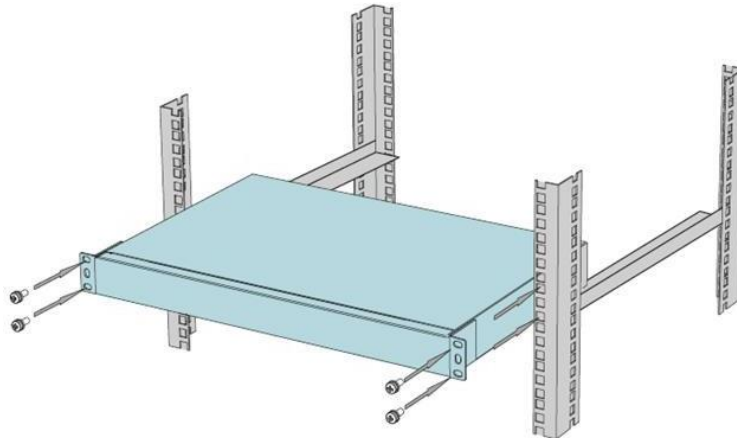
Note   When loading the device, it should be handled as lightly as possible to avoid scratching the device. Make sure that the chassis mounting ears are securely fastened to the cabinet.

1.3.2 Equipment Installed to the Workbench

Precautions and installation steps:

1. Wear an antistatic wrist strap.

2. Make sure the workbench is clean, stable, secure, and has good ventilation, power and grounding conditions.

3. Check the grounding and smoothness of the workbench and confirm that there are no obstacles around the installation.

4. The vents of the 4U equipment are on the left and right sides of the chassis. Therefore, ensure that there is no obstruction near the vents of the equipment to ensure that the ventilation passages are unobstructed.

5. Place the unit face up and place it on the work surface.

Note   Do not place heavy objects on the device.

1.3.3 Equipment Grounding

A grounding screen (printed with a grounding mark⏚) is attached to the rear panel of the device, and it is connected to the grounding bar on the cabinet or workbench with a grounding wire.

Grounding wire installation steps:

1. Remove the two lugs and one grounding wire from the equipment accessories and use a wire stripper to peel the skin at both ends of the grounding wire by about 1 cm. Then, the stripped head is inserted into the crimping hole of the lug, and then the crimping forceps are used to crimp the two together. In the same way, crimp the two ends of the ground wire.

2. Unscrew the grounding screw on the back of the unit, thread it through the ear hole of the grounding wire, and then screw the screw into the original grounding hole and tighten. Connect the other end of the ground wire to the grounding point on the cabinet or workbench in the same way.

Connect to the cabinet ground terminal
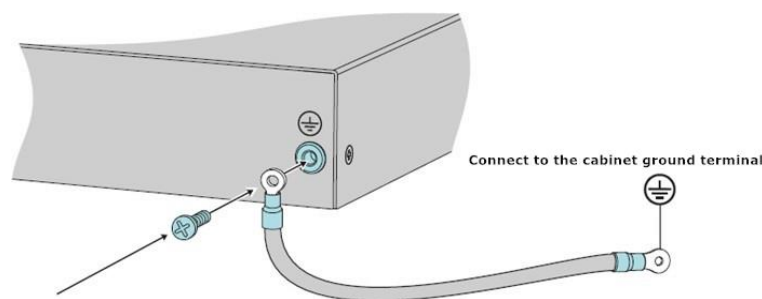
1.3.4 Connecting the Power Cord

Connect the AC power cord

Plug one end of the AC power cord (one end with three pin-shaped holes) into the AC power outlet on the rear panel of the device and the other end (with one end of the two or three pin-shaped pins) into the socket of the external power supply system.

Connect to the device power input   Connect to the patch panel
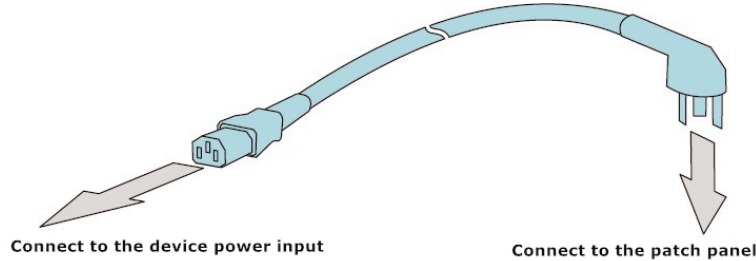
Connect DC power cable

The DC power cord is three-color three-core (blue, brown, and yellow-green). The connection method is: brown is connected to the positive pole (GND), blue is connected to the negative pole (-48V), and yellow-green is connected to the protective ground. When connecting, strip the 6-core tail cladding at both ends of the DC power cable to expose the metal wire to a length of about 4 cm. According to the label on the power cord, find the corresponding chassis power connector (each connector has a corresponding printed logo), loosen the screw of the power connector; then wrap the end of the stripped end on the loose screw. Make sure that the two are in good contact, and then tighten the screws with a cross screwdriver to make the two firmly contact. The other end of three cores are used to connect the power supply of the machine room or cabinet. Before connecting, you need to measure the power supply voltage with a multimeter, confirm the positive and negative poles and the protection ground, and connect them after confirming no any errors.

Note:

1. Before connecting the power cord, make sure the switch on the power supply is "OFF".

2. Verify that the connected power supply voltage meets the requirements.

1.3.5 Post-installation Check

The inspection after installation is very important, because the installation is firm or not, the grounding is good or not, and the power supply is matched or not, which is directly related to the normal operation of the equipment. Therefore, after the equipment is installed, you should pay attention to the following items:

1. Check if there is enough space for heat dissipation around the equipment, and whether the installation workbench or the installation cabinet is stable.

2. Check that the ground wire connection is secure.

3. Check that the power cord is securely connected and the power supply is matched to the power required by the device.

1.4 Device Plugging

1.4.1 Plug and Unplug the Card

Under normal circumstances, when the device is received, all the cards have been correctly installed in the front panel of the chassis. If you need to install the card, replace the card, or adjust the card slot, you need to insert and remove the card.

Pull out the card:

1. Use a cross screwdriver to turn the captive screws on the upper and lower ends of the card counterclockwise.

2. Loosen the screw by hand until it is completely clear of the chassis panel.

3. Holding the two captive screws on the upper and lower ends of the board panel at the same time, pull out the card slowly and pull it out.

Insert the card:

1. Locate the slot where you want to insert the card, and then align the upper and lower edges of the card with the guide rails on the upper and lower edges of the slot. Pinch the captive screws of the card with both hands and push the card slowly into the chassis along the guide rails until the card is properly connected to the chassis backplane.

2. Tighten the captive screws on the top of the card panel clockwise and then use a cross screwdriver to reinforce.

Note:

1. Do not use excessive force when pulling out the card. If it is difficult to pull out, please confirm whether the screw is completely loose, and if there is any abnormality, the card is stuck.

2. Insert the card slowly. Do not use brute force. If the insertion is difficult, check if the socket pin is bent, deformed or broken, and the guide rail is deformed.

3. Try to avoid plugging and unplugging the card during normal working of the chassis.

4. Try to avoid inserting and removing the card when it has an external connection.

1.4.2 Plugging and Unplugging Transceiver Modules

Under normal circumstances, when the device is received, all transceiver modules have been correctly inserted into the card as required. If you need to insert, replace, or adjust the transceiver module slot, you need to insert and remove the transceiver module.

Pull out the transceiver module:
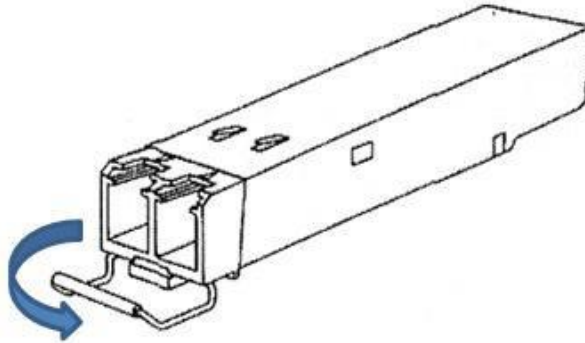
1. Pull the tab of the head of the transceiver module (as shown above).

2. Hook the tab with your finger and pull the transceiver module out in parallel.

Insert the transceiver module:

1. Locate the slot where you need to insert the transceiver module.

2. Insert the transceiver module along the shield in parallel and slowly until the transceiver module is in good contact with the card.

Note:

1. Do not reverse the direction when inserting the transceiver module.

2. Do not use excessive force when plugging or unplugging the transceiver module. If it is difficult to insert or remove, check if there is any foreign object blocking in the shield.

3. Insert the transceiver module slowly. Do not use brute force. If the insertion is difficult, check whether the socket pin is bent, deformed or broken, and the guide rail is deformed.

4. Try to avoid plugging and unplugging transceiver modules with optical fibers inserted.

5. Do not touch the gold finger of the transceiver module with your fingers during the process of plugging and unplugging the transceiver module.

6. Wear a dust cap when the transceiver module is not in use.

7. During the process of plugging and unplugging the transceiver module, if the transceiver module is powered on, you should avoid the eyes from looking directly at the transceiver module to avoid eye damage.

1.4.3 Plug and Unplug the Power Supply

Under normal circumstances, when the device is received, all power supplies have been correctly inserted into the back of the chassis as required. If the power supply needs to be replaced, then you need to plug and unplug the power supply.

Unplug the power:

1. Use a cross screwdriver to loosen the captive screws on both sides of the power box panel counterclockwise.

2. Hold the chassis with one hand and pull the handle on the power box with one hand, and slowly pull the power box out of the chassis.

Plug in the power:

1. Along the power rail on the back of the chassis, slowly push in the power supply until it is in good contact with the backplane.

2. Turn the captive screws at the four corners of the power box panel clockwise and then use a flat-blade screwdriver to reinforce them.

Note:

1. Before plugging and unplugging the power supply, make sure that the power cord is not connected and confirm that the chassis power is off.

2. Insert the power supply slowly. Do not use brute force. If the insertion is difficult, check if the socket pin is bent, deformed or broken, and the guide rail is deformed.

1.4.4 Plugging and Unplugging Optical Jumpers

The optical jumpers used to connect the cards in this device mainly have three types of connectors: SC, LC, and FC.

For the optical jumper of the SC head (large square):
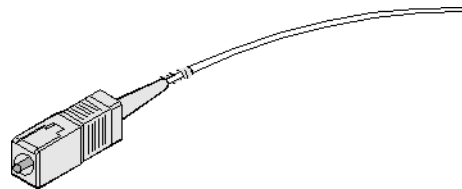
- When inserting the optical jumper:

Carefully align the fiber head with the optical interface on the optical interface board (the bump on the fiber head is aligned with the corresponding notch of the adapter), push it in with a moderate force, and hear a click. Indicates that it is inserted in place.

- When pulling out the optical jumper:

Press the connector first, push the fiber plug inward, and then pull out the plug.

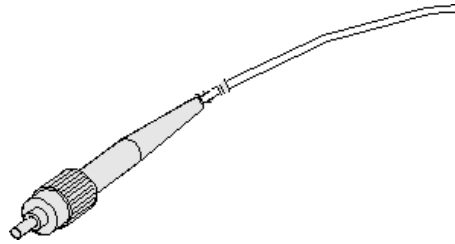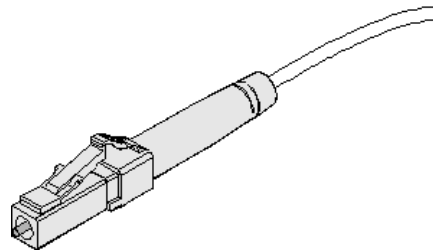**For the jumper (round head) of the FC head:**

- When inserting the optical jumper:

Carefully align the fiber head with the optical interface on the optical interface board (the bump on the fiber head is aligned with the corresponding notch of the adapter), push it in with a moderate force, and then rotate the outer ring screw sleeve clockwise. , tighten the optical connector.

- When pulling out the optical jumper:

Firstly, rotate the outer ring screw sleeve of the fiber interface counterclockwise. When the screw is loose, pull out the fiber slightly.

For the jumper of the LC head (small square head):

- When inserting the optical jumper:

Carefully align the fiber head with the optical interface on the optical interface board, and push it in with a moderate force. When you hear a click, the spring bounces to indicate that it has been inserted.

- When pulling out the optical jumper:

Press the tab first, and then pull out the plug.

Note:

1. Wear a dust cap when the optical jumper or the corresponding adapter is not in use.

2. When plugging and unplugging the optical jumper, you must straighten in and out. Do not use brute force.

3. Clean the ceramic end face of the jumper with a clean paper before inserting the optical jumper.

1.5 Power on the Device

1.5.1 Check before Power-on

1. Check that the power cord is connected properly.

2. Check that the ground wire is connected properly.

3. Check that the card and module are correctly inserted.

1.5.2 Power on the Device

1. Turn on the chassis power switch.

The device is usually equipped with dual power supplies (single power supply can also provide the voltage required for the whole machine). By default, dual power supplies are turned on.

1.5.3 Check after Power-on

1. When the chassis power switch is turned on, the corresponding power panel indicator lights up.

2. The chassis fan starts to work: blow out (with a fan sound and feel it).

3. After all cards have been loaded, all card power indicators will illuminate.

4. Check that the air inlet of the chassis is clear.

Note   If the device fails to power on after the above steps, please contact the supplier.

1.6 Equipment Testing and Connection

1.6.1 Connecting the Network Management System

For the connection method, refer to the NetRiver User Manual and the Web User Manual.

1.6.2 Card Testing and Connection

According to the requirements of the scheme design, test the parameter index of each port to see if the scheme design requirements are met. Then, according to the design scheme, use the corresponding optical jumper or network cable to connect each port between the cards. After confirming, that the input/output indicators of the port are within the design requirements, and the interfaces between all the cards and the external lines can be connected in turn.

Note:

1. When installing the equipment, the staff wears an anti-static bracelet, and the ground of the bracelet should be connected to the ground of the cabinet.

2. When using the optical power meter to test the input optical power value of the port, do not let the optical power exceed the overload power of the port to avoid light saturation and damage the device.

The optical port must be cleaned before connecting the fiber. After removing the fiber, the ceramic core must be covered with a dust cap to avoid contamination.

The connection between devices should be neat, compact and organized.

The optical jumper should be as straight as possible and turn to a large bend (diameter > 5cm) to avoid the impact of small bends on insertion loss or breaking the fiber.

1.7 Equipment Running

All the above steps and operations, tests, and connection confirmation are correct, that is, the device is normally running.

1.7.1 Sample Diagram for 10G DWDM System Testing
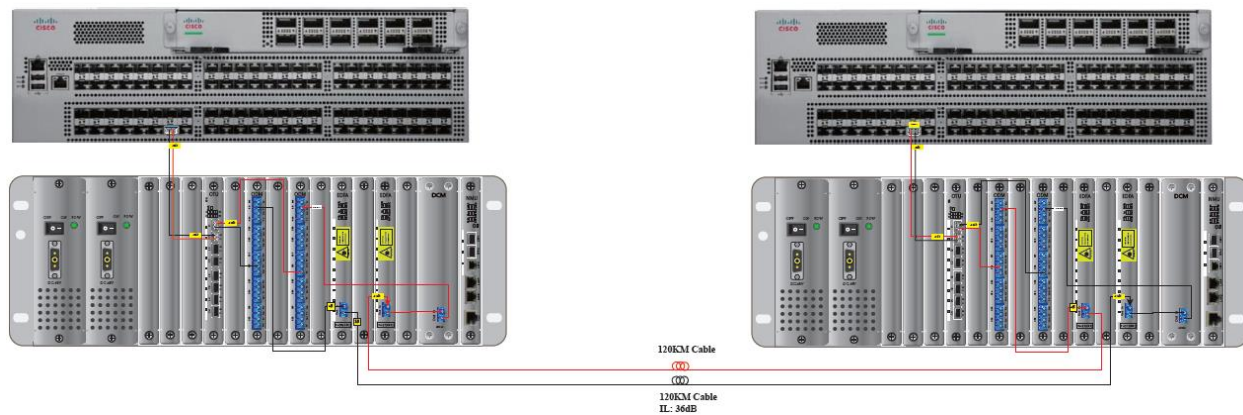
120KM Cable
120KM Cable
IL: 36dB

Notes:

1. The sensitivity of the optical module.

Line site: The receiving sensitivity range of the 10G-80KM-C36 module is -7 dBm to +23 dBm, and the Rx power is recommended to be greater than -20 dBm to have a certain redundancy.

Client site: The receiving sensitivity range of the 10G-80KM-1310nm module is +0.5 dBm to -14 dBm, and the Rx power is recommended to be greater than -10 dBm to have a certain redundancy.

2. EDFA (BA) power amplifier (20/G20).

You can set the input to -5 dBm and the output to +15 dBm via the VOA function.

3. EDFA (PA) preamplifier (17/G25)

The test predicts that the input (IN) needs to be greater than -21 dBm, and the output is +4 dBm.

4. Adjust the light attenuation by adding a fixed attenuator.

1.7.2 Sample diagram for 100G DWDM System Testing
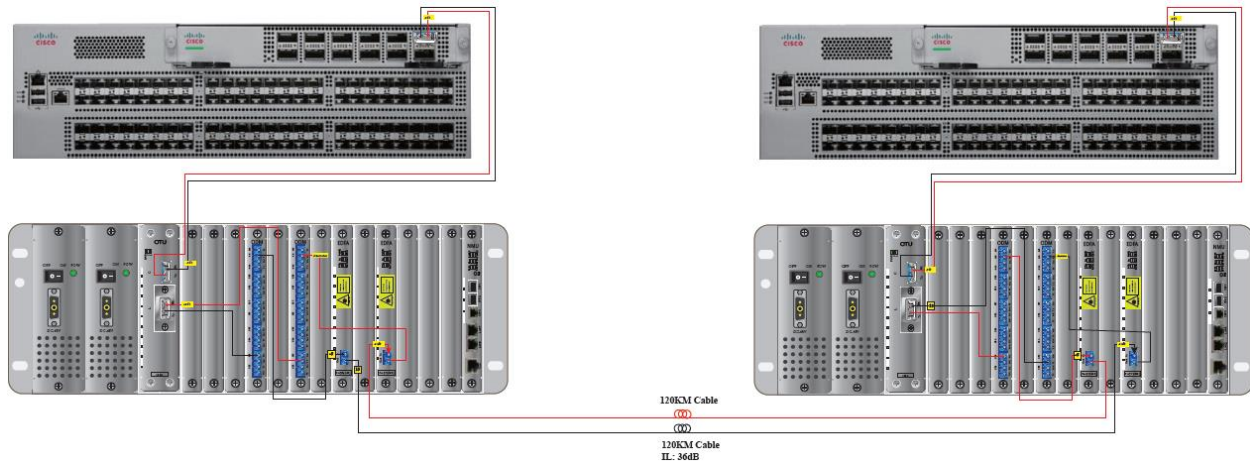
120KM Cable
120KM Cable
IL: 36dB

Notes:

1. The sensitivity of the optical module.

Line site: The receiving sensitivity range of the 100G-coherent optical-C33 module (tunable wavelength) is -24 dBm to +5 dBm, and the Rx power is recommended to be greater than -20 dBm to have a certain redundancy.

Client site: The total receiving sensitivity range of the 100G-10KM-1310nm module is -6 dBm to +10.5 dBm, and the Rx power is recommended to be greater than -5 dBm. The receiving sensitivity range of single lane channel is ≥-10.5 dBm, it is recommended that single lane channel receiving sensitivity is ≥-8 dBm to have a certain redundancy.

2. EDFA (BA) power amplifier (20/G20).

You can set the input to -5 dBm and the output to +15 dBm via the VOA function.

3. EDFA (PA) preamplifier (17/G25)

The test predicts that the input (IN) needs to be greater than -21 dBm, and the output is +4 dBm.

4. Adjust the light attenuation by adding a fixed attenuator.

1.8 Precautions

1. Before testing, you must have a certain understanding of the wavelength of the measured light and the amount of optical power. Choose a wavelength that is similar or consistent. Do not allow the input optical power to exceed the range that each module or device can accept. Excessive optical power can damage the device.

2. Make sure that the equipment is powered when the equipment is well grounded. Make sure the input supply voltage is within the voltage requirements of the device. In the case of an indeterminate voltage range, the multimeter's maximum range position test can be used to confirm and re-access.

3. If there is a sudden disturbance in the host, the host should be shut down and then deal with it.

4. The optical connection port must be connected and accurately positioned. Otherwise, the optical power attenuation will become large, and the transmission distance and power test value of the optical signal will be incorrect.

5. Be sure to keep the input and output pigtail end faces clean, especially if the output end faces are dirty, it is easy to make the output power of the output pigtail end face become smaller, and the transmission equipment cannot be guaranteed to work normally.

Equipment maintenance:

- Reasonable installation, use and proper storage of equipment can maintain good performance indicators for a long time and prolong their service life, so proper maintenance is required.
- Equipment should avoid strong mechanical vibrations, collisions, drops and other mechanical damage. Good packaging and vibration, rain and waterproof measures must be taken during transportation.
- The equipment should be kept clean and the working environment should be free of corrosive gases such as acid and alkali. Gently scrub the chassis and panel with a clean towel dampened with water or soapy water. Do not scrub with solvents such as alcohol.
- The layout of the pigtails should be reasonable and it is forbidden to be placed in a position that is easily squeezed and pulled. A sleeve is required to protect the pigtails if necessary.
- Wear the dust cap in time to remove the fiber optic cable to prevent hard objects, dust, contamination and damage to the end face of the connector.

2. 100G CFP Coherent Transponder
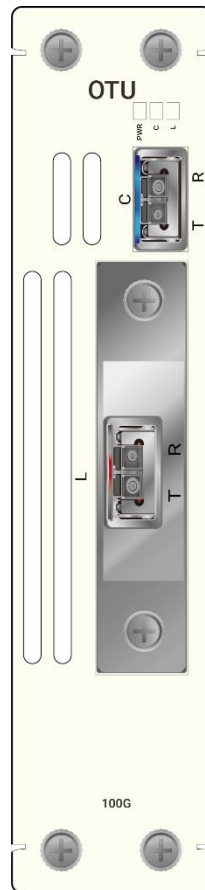
The CFP 100G transponder is a 100G service access module designed by for optical fiber links. It can realize the wavelength tunable of CFP coherent transceiver module, and can be converted into DWDM standard wavelength optical signal, cooperates with DWDM multiplexer/demultiplexer to realize wavelength division multiplexing transmission. It provides a high-quality solution for solving transmission lines with insufficient fiber resources and high fiber line loss.

2.1 Board Introduction

1. The board supports hot-swap, and can be plugged into any slot on the front panel of the 1U/2U/4U/5U chassis.

2. The OTU board has two slots, QSFP28 (supporting rate 100 Gbps) and CFP (supporting rate 100 Gbps).

3. The board panel has 3 indicators.

4. The indicator is used to indicate the running status of the board.

5. Two modules L and C form a unidirectional or bidirectional, where L represents the line side (plug-in CFP coherent optical module), C represents the client side (plug-in single-mode or multi-mode

QSFP28 optical module).

6. A label is attached to the upper left corner of the front of the panel, which indicates the speed of the module inserted on the board and the transmission distance of the line-site module.

7. The wavelength of the module is affixed to the line port of the panel so that the user can distinguish it when using it.

2.2 Functional Description

- Support Ethernet and OTU4 service access.
- Support client single-mode or multi-mode.
- Support DDM signal monitoring.
- Support the setting of line-side CFP module wavelength and emitted light power.
- Support FEC function.
- Support link detection.
- Support each port non-self-loopback.
- Support software to close the port.
- Support one channel unidirectional or bidirectional business access.
- Support network management function, support Telnet/Web/SNMP management mode.

2.3 Indicator Description

Indicator	Definition	Green Light	Light off
PWR	Power Indicator	Board power up	Board power down
L	Line optical port indicator	Received optical power is within the module threshold	No light at the receiving end
C	Client optical port indicator	Received optical power is within the module threshold	No light at the receiving end (when there some parts have light, it will be red.)

Note:

1. The CFP module wavelength is tunable.

2. The port optical module is set to be forced to emit light by default.

2.4 Description of Common Transmission Types

1) Dual fiber bidirectional (client single mode or multimode)

L and C form a channel bidirectional link. The local client signal (single-mode or multi-mode) is input from the C/R port. After OTU conversion (the client signal wavelength is converted to the wavelength of the wavelength division module), the L/T port sends out. the opposite site signal is input from L/R port, after OTU conversion (the line site signal wavelength is converted to the wavelength of the client module), then sent out from the C/T port. (as

shown in the below figure, the solid line and the dashed line respectively represent a group of signals, and the optical path directions of the central office and the end are the same.)
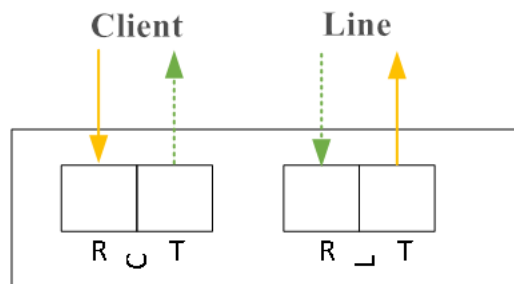
2) Single fiber unidirectional (client single mode or multimode)

L and C form a unidirectional link, The local client signal (single-mode or multi-mode) is input from the C/R port, and after OTU conversion (the client signal wavelength is converted to the wavelength of the wavelength division module), it is sent out from the L/T port. (as shown in the below figure, the left picture shows the direction of the light path at the central office, and the right picture shows the direction of the end light path)
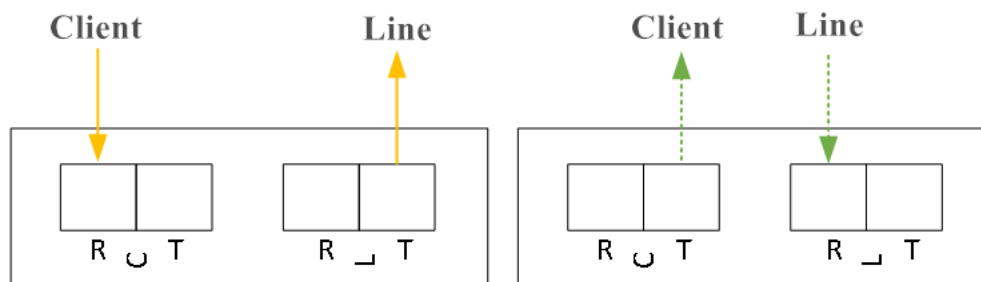
2.5 Board Connection Method

Transponder is usually used in WDM system and is used in conjunction with passive multiplexing and demultiplexing units. The TX/RX port of the client module is connected to the RX/TX port of the client device, and the line site TX/RX port connects to the multiplexing/demultiplexing port of the passive device(the channel must be matched).

2.6 Technical Parameters

Line Site

Rate	100G
Transmission Distance	1000 km
Transmit Power	≥0 dBm
RX Sensitivity	≤-25 dBm

Saturated Optical Power   0 dBm

Client Site

Single-Mode

Rate   100G

Transmission Distance   10 km

Transmit Power   ≥4 dBm

Single Lane RX Sensitivity   ≤-10.6 dBm

Saturated Optical Power   4 dBm

Multi-Mode

Rate   100G

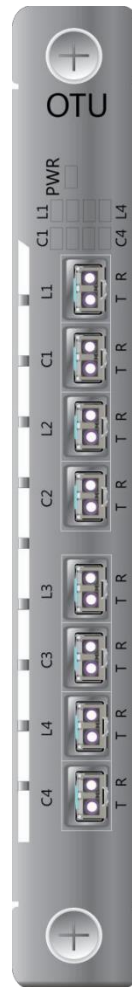Transmission Distance   2 km

Transmit Power   ≥4 dBm

Single Lane RX Sensitivity   ≤-10 dBm

Saturated Optical Power   4 dBm

Note   The above parameters are for reference only. In actual application, please refer to the product test report provided with the devices.

3. 2.5G and 10G Transponder

Ascent's 2.5G & 10G Transponder is mainly used for wavelength conversion. Firstly, the G.957 compliant multiplexed optical path signals are converted into optical/electrical (O/E), and then the converted electrical signals are shaped, regularly extracted, and regenerated (ie 3R), or no regeneration (ie 2R), and finally electrical/optical (E/O) conversion. The output wavelength, dispersion, and luminous power all meet the CWDM/DWDM multiplexed optical path signals required by the G.692 specification.

3.1 Board Introduction

1. The board supports hot-swap, and can be plugged into any slot on the front panel of the 4U chassis or 1U chassis.

2. There are three types of 2.5G & 10G Transponder: SFP slot (Supporting speed 100M to 2.5 Gbps), XFP slot (Supports 100M to 11.7Gbps), SFP+ slot (Supports 100M to 11.7 Gbps). The SFP and SFP+ panels are the same.

3. The panel of the XFP 10G board contains 6 indicators and 4 XFP module slots. SFP 2.5G and SFP+ 10G boards have 9 indicators and 8 SFP(SFP+) module slots.

4. The indicator is used to indicate the running status of the board.

5. Two modules of L1 and C1 form a bidirectional circuit, where L represents the line site (Plug-in CWDM or DWDM module) and C represents the client site (Plug-in single-mode or multi-mode module). L2/C2, L3/C3. . . The meaning is the same as above.

6. A label is attached to the upper left corner of the front of the panel, which indicates the speed of the module inserted on the board and the transmission distance of the line-site module.

7. The right side of the optical module on the panel is affixed with the module's wavelength and single-mode and multi-mode labels, so that users can distinguish it when using it.

3.2 Functional Description

- Supports CWDM/DWDM transmission and wavelength conversion.
- Supports multiple services such as IP/SDH/PDH/SAN/Sonet/FICON/ESCON.
- Supports client single-mode or multi-mode.
- Supports DDM signal monitoring.
- Supports 3R function (Reshaping, Retiming, Regeneration).
- Supports CDR function.
- Supports loop-back of each port (Controllable by software or hardware).
- Supports link detection (LED light off when no RX signal).
- Supports software to close the port.
- The optical port supports rate of SFP 2.5G board is 100M to 2.5 Gbps, and the XFP 10G and SFP+ 10G board are 100M to 11.7 Gbps.
- The XFP 10G board supports a maximum of 2 bidirectional or 4 unidirectional service access, and the SFP 2.5G and SFP+ 10G boards support a maximum of 4 bidirectional or 8 unidirectional service access.

3.3 3. Indicator Description

| Indicator	Definition	Green Light	Light off
PWR	Power Indicator	Board power up	Board power down
OPM	Mode indicator	Protection mode	Normal mode
L1, L2, L3, L4	Line optical port indicator	Received optical power is within the module threshold	Received optical power exceeds the module threshold
C1, C2, C3, C4	Client optical port indicator	Received optical power is within the module threshold	Received optical power exceeds the module threshold

Note:

1. Only XFP 10G board has OPM indicators.

2. XFP 10G board does not have L3, C3, L4, C4 ports.

3. The port of optical module is set to be forced light-emitting by default.

4. When the board is used as a single-mode unidirectional, the 8 ports are WDM modules.

## 3.4 Description of Common Transmission Types

3.4.1 Dual fiber bidirectional (Client single mode or multimode)

L1/C1, L2/C2, L3/C3, L4/C4 form bidirectional transmission group. Take the first group of L1/C1 as an example: The local client signal (Single-mode or multi-mode) is input from the C1/RX port, after the Transponder conversion (Converts the client signal wavelength to the wavelength corresponding to the wavelength division module.), and output from the L1/TX port; the opposite end signal is input from the L1/RX port, and after Transponder conversion (Converts the line side signal wavelength to the wavelength corresponding to the client module.), and output from the C1/TX port. L2/C2, L3/C3, L4/C4 groups have the same optical path direction. (As shown in the figure, the solid line and the dashed line respectively represent a group of signals, and the local and end optical path directions are the same.).
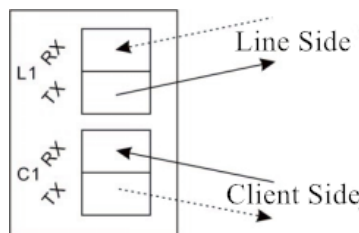

3.4.2 Single fiber unidirectional (Client single mode)

L1, C1, L2, C2, L3, C3, L4, C4 each port self-loop constitutes a single unidirectional path. Take the first group of L1 as an example: The local client single-mode signal is input from the L1/RX port, after Transponder conversion (Converts the client signal wavelength to the wavelength of the wavelength division module), and sent out from the L1/TX port. The optical paths of C1, L2, C2, L3, C3, L4 and C4 groups are the same. (As shown in the figure, the solid line and the dashed line respectively represent a group of signals. The picture shows the direction of the optical path at the public end. Usually, there is a demultiplexing device directly connected to the client device without Transponder board conversion.).
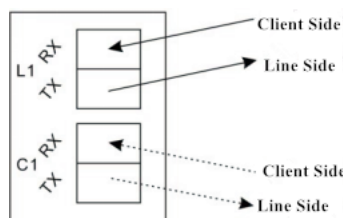
3.4.3 Single fiber unidirectional (Client multimode)

L1/C1, L2/C2, L3/C3, L4/C4 form one unidirectional group. Take the first group of L1/C1 as an example: The local client multi-mode signal is input from the C1/RX port and converted by Transponder (The client signal wavelength is converted to the wavelength corresponding to the wavelength division module) and then sent out from the L1/TX port. The optical light paths of the L2/C2, L3/C3, and L4/C4 groups are the same. (As shown, the left picture shows the direction of the local optical light path, and the right picture shows the direction of the end optical light path.).
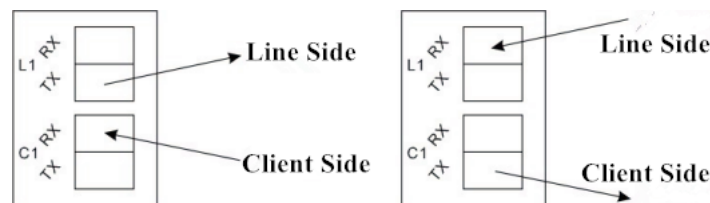
3.5 Board Connection Method

Transponder is usually used in WDM system and is used in conjunction with passive multiplexing and demultiplexing units. The TX/RX port of the client module is connected to the RX/TX port of the client device, and the line site TX/RX port connects to the multiplexer/demultiplexer port of the passive device(the channel must be matched).

3.6 Technical Parameters

Line Site

Rate	Transmission Distance (km)	Transmit Power (dBm)	RX Sensitivity (dBm)	Saturated Optical Power (dBm)
155M	40	≥-7	≤-34	≥-9
	80	≥-5	≤-34	≥-9
	120	≥0	≤-34	≥-9
1.25G	40	≥-5	≤-23	≥-1
	80	≥0	≤-24	≥-1
	120	≥0	≤-31	≥-9
2.5G	40	≥-2	≤-18	≥0
	80	≥0	≤-28	≥-9
10G	40	≥-1	≤-16	≥-1
	80	≥0	≤-24	≥-7

Client Site

Rate	Single-mode				Multi-mode			
	TD (km)	LP (dBm)	RS (dBm)	SOP (dBm)	TD (km)	LP (dBm)	RS (dBm)	SOP (dBm)
155M	2	≥-14	≤-24	≥-8	2	≥-10	≤-24	≥-6
1.25G	10	≥-9	≤-18	≥-3	0.55	≥-9	≤-18	≥-0
2.5G	2	≥-10	≤-18	≥-3	0.3	≥-10	≤-18	≥-3
10G	10	≥-6	≤-14	≥0.5	0.3	≥-6	≤-11	≥-1

Note The above parameters are for reference only. In actual application, please refer to the product test report provided with the devices.

4. Fixed Dispersion Compensation Module (DCM)

DCM is widely used in long-haul high-speed communication systems to mitigate the optical dispersion, applicable to popular G.652&G.655 standard SM fiber cables. DCM Complies with slope compensation function, it can compensate wide wavelength dispersion in C-Band for G.652 SM fiber cables, optimize the residual dispersion of system.

4.1 Module Introduction

1. The module supports hot-swap, and can be plugged into any slot on the front panel of the 4U chassis or 2U chassis.

2. The module panel provides 2 optical interfaces, and the optical interfaces support LC/UPC or LC/APC.

3. The interface is printed with: IN, OUT. The IN port is used to receive the optical signal to be compensated, and the OUT port is used to output the compensated optical signal.

4. The module with different compensation distances is different because of the different optical fibers, so the number of slots in the chassis occupied varies from 2 to 4 slots (See the actual distance).

5. There will be a label in the below of panel indicating the compensation distance of the module, such as 20km, 40km, 60km etc.

4.2 Functional Description

- Supports DWDM system.

- With lower insertion loss.
- It has low polarization mode dispersion.

4.3 Technical Parameters

Parameter	Index						Unit
Dispersion Compensator	20	40	60	80	100	120	km
@ 1545 nm	-340±20	-680 ± 20	-1020±20	-1360±20	-1700±20	-2040±20	Ps/nm
Relative Dispersion Slope @ 1545 nm	0.0036 ± 20%						nm^{-1}
Insertion Loss @ 1525 nm to 1565 nm	≤3.5	≤5.5	≤7	≤8.5	≤10	12	dB
Polarization Mode Dispersion	≤0.7	≤0.8	≤0.9	≤1.0	≤1.1	≤1.2	ps
Polarization Mode Dispersion (Typical)	0.2	0.3	0.4	0.5	0.6	0.7	ps
Polarization Dependent Loss	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	dB
Brillouin Scattering Threshold	≥6						dBm
Non-Linear System (n^2/Aeff)	≤1.4*10^{-9}						W^{-1}
Effective Area (Aeff)	≥20						μm^2

📖

Note

The above parameters are for reference only. In actual application, please refer to the product test report provided with the devices.

5. Optical Amplifier (EDFA) + VOA

EDFA amplification module is designed to accompany with DCM for long-haul digital fiber optic transmission. Its core parts consist of reliable PUMP laser, unique APC (Automatic Power Control), ATC (Automatic Temperature Control), generating stable power output and great reliability. Sophisticated GFF (Gain Flat Filter) and advanced optical route design optimize the flatness and noise.

5.1 Board Introduction

1. The board supports hot-swapping, compatible with Ascent's 1U/2U/4U/5U chassis.

2. It can support three optical interface types: LC/FC/SC.

3. The printing on the interface is: Out, In, Mon. The In port is used to receive the optical signal to be amplified, the Out port is used to output the amplified optical signal, and the Mon port is used to monitor the optical signal at the receiving end.

5.2 Functional Description

- Supports input attenuation adjustable function.
- Supports attenuation memory function.
- Supports optical signal amplification of DWDM system.
- Supports pre-amplification (PA), line amplification (LA), power amplification (BA), and 1550 nm single-channel signal amplification.
- Supports a maximum saturated output power of 21 dBm and a minimum input power of -33 dBm.
- Supports gain range: 8 dB to 33 dB.
- Supports output optical monitoring port (Mon).
- Supports OSC channel (1510 nm) jump and amplification.
- Supports local and remote control and SNMP network management.

5.3 Indicator Description

Indicator	Definition	Green Light	Red Light & Light off
PWR	Power indicator	Board power up	Board power off (light off)
OSC	OSC channel receiving indicator	OSC channel OEO module receiving normally	The module does not receive or the received optical power is too low (light off)
IN	Input optical power alarm indicator	No alarms	Alarms (red light)
OUT	Output optical power alarm indicator	No alarms	Alarms (red light)
PTA	Pump temperature alarm indicator	No alarms	Alarms (light off)
MTA	Module temperature alarm indicator	No alarms	Alarms (light off)

5.4 Technical Parameters

Variable Optical Attenuator (VOA)

Parameter	Min.	Typ.	Max.	Unit	Remark
Working Wavelength	1260	/	1650	nm	
Attenuation Range	0	/	30	dBm	
Insertion Loss	/	0.5	0.7	dBm	
Response Time	/	/	2	ms	
PMD	/	/	0.1	ps	
Return Loss	55	/	/	dB	
Power Consumption	/	/	5	W	

Pre-amplifier (PA)

Amplifier Type		Pre-amplifier (PA)				
Parameter		Min.	Typ.	Max.	Unit	Remark
Working Wavelength	40CH	1529.5		1560.1	nm	
	48CH	1527.22		1565.5	nm	
Input Optical Power Range		-33		-10	dBm	
Signal Gain		14	25	31	dB	
Output Signal Optical Power				21	dBm	
Input Optical Power Threshold		-32			dBm	Settable
Gain Flatness			0.9	1.5	dB	
Noise Figure				5.5	dB	
Input/Output Return Loss			50		dB	

5.5 Operation Instructions:

1. Click "EDFA" to enter the unit information

EDFA Unit

2. Unit information

Unit Information

3. EDFA+VOA operation instructions, working mode: "Fixed Output"

4. Click "Edit mode"

Modify Configuration

5. Select "Fixed Output" mode, set the "Output Power(dBm)" value (this output value is the input value of EDFA), click "Apply" to save the settings.

Modify Fixed Output

6. Network Management Unit (NMU)

NMU interface module is special module designed for A1600 series products; it can manage all devices under A1600 platform. NMU embeds high speed ARM processor with strong data processing, provides management interfaces NetRiver, Web, CLI. Both Server edition (C/S structure) and Standalone edition are available. Ideal network management solution to networks with different scale for telcos and enterprises.

6.1 NMU Introduction

1. The card is hot-swap and can be inserted vertically into the 16th slot of the 4U chassis or the 4th slot of the 1U chassis.

2. The panel contains 6 indicators, 1 reset button, 3 SFP optical ports and 3 RJ45 ports.

3. The indicator is used to indicate the operating status of the device (See the table below for details).

4. The RST button is used to restart the network management unit.

5. The 3 SFP slots can only be used to insert SFP-1.25G transceiver modules, which are mainly used to transmit OSC network management signals.

6. The 2 Ethernet ports LAN1 and LAN2 are used to access the Ethernet. Support SNMP, WEB, CLI and other management methods to achieve remote network management.

7. The Con port is used to connect to the computer's RS-232 interface and can be configured through a Cisco-compatible command line.

8. The factory default IP setting of this device is 192.168.1.228.

6.2 Function Description

- Supports SNMP, Web, CLI, and Telnet network management methods.
- Supports monitoring and management of all service cards that are inserted in the same chassis.
- Supports in-band, out-of-band network management.
- Supports cascading of multiple NMUs of the same type.
- Supports Ethernet switching.

1. Indicator Description

Indicator	Definition	Green Light	Red Light & Light Off
PWR1	Power supply 1 indicator	Power supply 1 is working properly	Power supply 1 is abnormal (Light off)
PWR2	Power supply 2 indicator	Power supply 2 is working properly	Power supply 2 is abnormal (Light off)
FAN	Fan running status indicator	4 fans are working properly	At least 1 fan abnormal (Red light)
SFP1	Transceiver module 1 connection indicator	Module 1 has received RX	Module 1 not received RX (Light off)
SFP2	Transceiver module 2 connection indicator	Module 2 has received RX	Module 2 not received RX (Light off)
SFP3	Transceiver module 3 connection indicator	Module 3 has received RX	Module 3 not received RX (Light off)

6.3 Connecting to Network Devices

Refer to the NetRiver User Manual and the Web User Manual.

7. Optical Line Protection Module Card(OLPM)

OLPM 5G fronthaul system optical protection card is used for the protection system of optical fiber line backup, it adopts advanced optical path automatic switching module, which is a kind of optical device used for active and standby optical path switching in the field of optical fiber communication, it can automatically identify the signal state of active and standby system optical path, and perform instantaneous optical path switching, thus ensuring the normal operation of the protection system when the active optical cable suffers from full obstruction, and improving the service quality of operation.
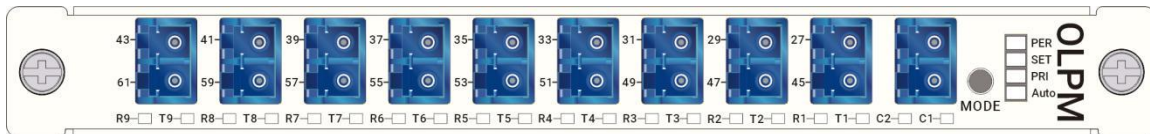
7.1 General Introduction

(1)   The board supports hot swapping and can be plugged into any slot on the front panel of a 1U, 2U, 4U, or 5U chassis.

(2)   The panel contains 24 indicators, 1 button and 20 LC optical ports.

(3)   The optical ports are: T1 (1271), R1 (1451), T2 (1291), R2 (1471), T3 (1311), R3 (1491), T4 (1331), R4 (1511), T5 (1351), R5 (1531), T6 (1371), R6 (1551), T7 (1391), R7 (1571), T8 (1411), R8 (1591), T9 (1431), R9 (1611), C1 (COM1), C2 (COM2); COM1 (C1) and COM2 (C2) are the active and standby circuits of the line respectively; T1, T2, T3, T4, T5, T6, T7, T8, T9 are the input of client signals, R1 , R2, R3, R4, R5, R6, R7, R8, R9 are the output ports of the client signal.

7.2 Functional Description

(1)   Support 3 groups, 6 groups or 9 groups of business transmission.

(2)   Support 1+1 active and standby routing protection.

(3)   Support single fiber bidirectional protection.

(4)   Support automatic and manual working modes.

(5)   Support the function of maintaining the optical path status after power failure.

(6)   Support manual setting.

(7)   Support optical cable quality inspection.

7.3 Indicator and Button Function Description

| Indicator	Definition	Green Light	Light off
PWR	Power Indicator	Board power on	Board power off
SET	Device settings indicator	Button function enabled	Button function is not enabled
	Note: After the button function is enabled, press and hold the button for 6 seconds and then release the button to switch between the active and standby links.		
PRI	Active/Standby indicator	Active link	Standby link
AUTO	Working mode indicator	Automatic mode	Manual mode
C1	Active link RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
C2	Standby link RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
T1	27 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R1	45 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T2	29-port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R2	47 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T3	31 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R3	49 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T4	33 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R4	51 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T5	35 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R5	53 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T6	37 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R6	55 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T7	39 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold

R7	57 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T8	41 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R8	59 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold
T9	43 port RX power indicator	The RX power is normal	The RX power is lower than the alarm threshold
R9	61 port TX power indicator	The TX power is normal	The TX power is lower than the alarm threshold

7.4 Connection Diagram
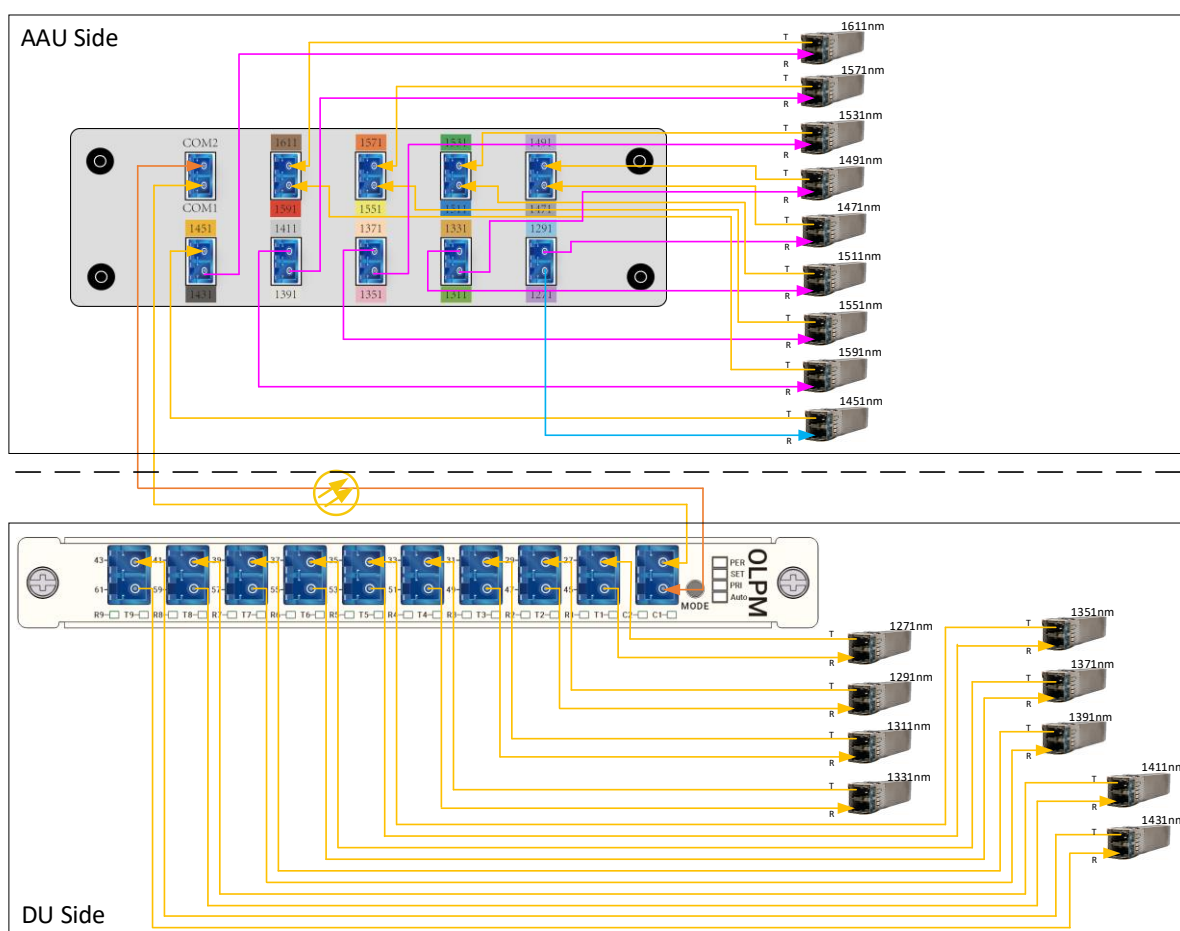
Description:
1.Adjacent channels of colored light modules are used in pairs
2.Check whether the equipment quantity is complete before use
3.Pay attention to the module allocation on the AAU side and DU side
4.Pay attention to the receiving and transmitting port in case of reverse insertion.
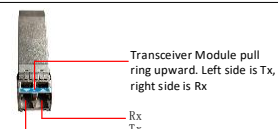
After the optical signal from the AAU site is split by a 50:50 coupler, it is simultaneously transmitted to the DU site through the active and standby links. At the receiving end, based on the power of the two signals

received, the receiver of the DU site selects to receive one channel signal. At the same time, the optical signal emitted by the DU will also be transmitted to the AAU through the optical path selected by the receiver.

7.5 Technical Parameters

Light Source	Port Direction	IL Requirement	Channel IL Uniformity (dB)	Passband Flatness (dB)	Adjacent Channel Isolation (dB)	Non-adjacent Channel Isolation (dB)	Return Loss (dB)	Wavelength Thermal Stability	Channel IL Thermal Stability	Switching Time (ms)
1271	T1→C1	≤2.5	≤2	≤0.5	≥25	≥30	≥40	≤0.002	≤0.007	≤50
1271	T1→C2									
1291	T2→C1									
1291	T2→C2									
1311	T3→C1									
1311	T3→C2									
1331	T4→C1									
1331	T4→C2									
1351	T5→C1									
1351	T5→C2									
1371	T6→C1									
1371	T6→C2									
1391	T7→C1									
1391	T7→C2									
1411	T8→C1									
1411	T8→C2									
1431	T9→C1									
1431	T9→C2									
1451	C1→R1									
1451	C2→R1									
1471	C1→R2									
1471	C2→R2									

1491	C1→R3											
	C2→R3											
1511	C1→R4											
	C2→R4											
1531	C1→R5											
	C2→R5											
1551	C1→R6											
	C2→R6											
1571	C1→R7											
	C2→R7											
1591	C1→R8											
	C2→R8											
1611	C1→R9											
	C2→R9											

* 1) (Wavelength Thermal Stability is tested after constant temperature of -10°C to 55°C for 30 minutes) (nm/°C)

2) (Channel IL Thermal Stability is tested after constant temperature of -10°C to 55°C for 30 minutes) (dB/°C)

3) The above indicators are for reference only. For actual use, please refer to the product test report provided with the product.

7.6 Network Management Operation Instructions

Basic Information:

Part Number, Hardware Version, Serial Number, Firmware Version, Manufacture Date, Card Type

OLPM information:

Get the real-time optical power and unit temperature of the current access port.

Set information:
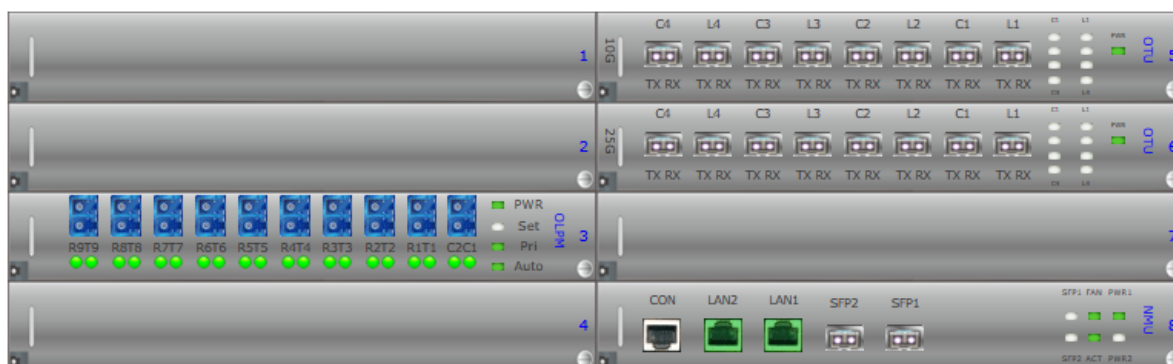
You can view the current setting threshold of the active link switching optical power, the current setting threshold of the standby link switching optical power, switching module, current setting return time, current setting return mode, and currently used link status. Click the "Modify" button to pop up the following window:

Setting content:

Optical power threshold for active and standby link switching: COM1 is the active link and COM2 is the standby link. When the received optical power of the COM port is lower than the set threshold, switching will be performed (prerequisite switching mode: Auto)

Return time (this time will only take effect when the return mode is turned on), setting unit: 1 minute

Switch mode:

Auto: After this mode setting takes effect, it will be switched based on whether the optical power threshold of the active link switching exceeds the threshold. If the return mode is turned on, when the active link optical power does not exceed the set threshold, it will return to the active link.

Protection lock: After setting, it will be locked to the selected active link /standby link and will not switch regardless of any triggering switching conditions.

Forced switching: After setting, force switching to the target link.

Manual switching: After setting, you can manually switch the active link /standby link.

Line selection: Active link /standby link (this option cannot be selected when the switching module is automatic)

Return mode: non-return/return. When non-return, the return time does not take effect, even if the active channel signal quality improves, the signal will not be switched to the active channel.

Slot #3=>Custom Info	Basic Info	OLPM Info	Set Info	Alarm Threshold	
Switching Trigger Mode		Low Power Switching	Alarm Mode		Automatic Recovery
High Temperature Alarm Threshold(°C)		70	Low Temperature Alarm Threshold(°C)		-20
T1 Power Threshold(dBm)		-15	R1 Power Threshold(dBm)		-25
T2 Power Threshold(dBm)		-15	R2 Power Threshold(dBm)		-25
T3 Power Threshold(dBm)		-15	R3 Power Threshold(dBm)		-25
T4 Power Threshold(dBm)		-15	R4 Power Threshold(dBm)		-25
T5 Power Threshold(dBm)		-15	R5 Power Threshold(dBm)		-25
T6 Power Threshold(dBm)		-15	R6 Power Threshold(dBm)		-25
T7 Power Threshold(dBm)		-15	R7 Power Threshold(dBm)		-25
T8 Power Threshold(dBm)		-15	R8 Power Threshold(dBm)		-25
T9 Power Threshold(dBm)		-15	R9 Power Threshold(dBm)		-25
COM1 Alarm Reversal Status		Disable	COM2 Alarm Reversal Status		Disable
T1 Alarm Reversal Status		Disable	R1 Alarm Reversal Status		Disable
T2 Alarm Reversal Status		Disable	R2 Alarm Reversal Status		Disable
T3 Alarm Reversal Status		Disable	R3 Alarm Reversal Status		Disable
T4 Alarm Reversal Status		Disable	R4 Alarm Reversal Status		Disable
T5 Alarm Reversal Status		Disable	R5 Alarm Reversal Status		Disable

Slot #3=>Custom Info	Basic Info	OLPM Info	Set Info	Alarm Threshold	
T5 Power Threshold(dBm)		-15	R5 Power Threshold(dBm)		-25
T6 Power Threshold(dBm)		-15	R6 Power Threshold(dBm)		-25
T7 Power Threshold(dBm)		-15	R7 Power Threshold(dBm)		-25
T8 Power Threshold(dBm)		-15	R8 Power Threshold(dBm)		-25
T9 Power Threshold(dBm)		-15	R9 Power Threshold(dBm)		-25
COM1 Alarm Reversal Status		Disable	COM2 Alarm Reversal Status		Disable
T1 Alarm Reversal Status		Disable	R1 Alarm Reversal Status		Disable
T2 Alarm Reversal Status		Disable	R2 Alarm Reversal Status		Disable
T3 Alarm Reversal Status		Disable	R3 Alarm Reversal Status		Disable
T4 Alarm Reversal Status		Disable	R4 Alarm Reversal Status		Disable
T5 Alarm Reversal Status		Disable	R5 Alarm Reversal Status		Disable
T6 Alarm Reversal Status		Disable	R6 Alarm Reversal Status		Disable
T7 Alarm Reversal Status		Disable	R7 Alarm Reversal Status		Disable
T8 Alarm Reversal Status		Disable	R8 Alarm Reversal Status		Disable
T9 Alarm Reversal Status		Disable	R9 Alarm Reversal Status		Disable
Power Difference Switching Threshold(dBm)		4			

Refresh   Modify

Alarm threshold:

You can obtain/set the current optical power over-limit alarm value set for each port, the alarm inversion status of each port, switching trigger conditions, alarm mode, power difference switching threshold, high temperature alarm threshold, and low temperature alarm threshold.

The optical power limit alarm value set by the port: When the optical power of the access port is lower than the set value, an alarm will be reported

Switching trigger condition: Low optical power switching/Optical power difference switching

Low optical power switching: Switching occurs when the light received by the COM port exceeds the set threshold;

Optical power difference switching: When there is a power difference between COM1 and COM2, the difference shall be based on the settings.

Port alarm inversion: Enable/Disable. When enabled, no alarm will be generated when exceeds the threshold;, but an alarm will be reported when it is restored. If it is disabled, an alarm will be reported when exceeds the threshold.

Alarm mode: No reversal/Automatic recovery

Power difference switching threshold: Set the power difference. When the active and standby link has some changes and the power difference reaches the set value, it will switch.

8. Waterproof Fiber Optic Enclosure

8.1 Introduction to CWDM MUX/DEMUX Cassette
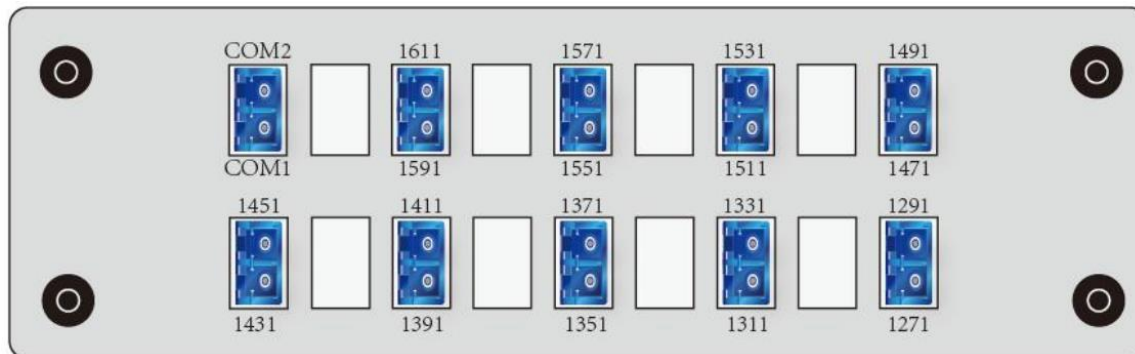
8.1.1 Functional Characteristics

(1) Is fully transparent to service signals and can be accessed at any rate.

(2) Has excellent optical performance indicators, such as low insertion loss, low polarization sensitivity, high return

loss, without affecting the transmission quality of optical signals.

(3) Support master and backup route protection.

(4) Adopts the telecom standard plastic insert package structure, which can be used in outdoor environment.

(5) Passive products, plug and play, no configuration, simple maintenance.

(6) Is small and easy to install.

(7) Enables the transmission of up to 18 unidirectional services in one fiber or up to 9 bidirectional
   services in one fiber.

8.1.2 Technical Specifications

| Parameters	Unit	Min	Typical Values	Max
Number of Channels	/		18	
Center Wavelength	nm		1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611	
Center Wavelength Deviation	nm	/	/	±6.5
Passband Flatness	dB	/	/	0.5

Channel Insertion Loss	dB	/	/	5.5
Channel Insertion Loss Uniformity	dB	/	/	2
Adjacent Channel Isolation	dB	25	/	/
Non-adjacent Channel Isolation	dB	30	/	/
Wavelength Thermal Stability	nm/℃	/	/	0.002
Insertion Loss Thermal Stability	dB/℃	/	/	0.007
Polarization-Related Losses	dB	/	/	0.15
Return Loss	dB	/	/	50
Operating Temperature	℃	-40	/	+80
Storage Temperature	℃	-40	/	+80

8.1.3 Waterproof Fiber Optic Enclosure Introduction

Waterproof Fiber Optic Enclosure is suitable for fiber optic access network in the wiring cable and home leather cable junction point, can adapt to the user's different installation environments (such as wall-mounted installation, holding pole installation, placed on the workbench), is a sealed, waterproof, dustproof, portable mini-encapsulated box. The splitter box can be built-in cassette, which can realize the compact installation of the cassette.

8.1.4 Internal structure
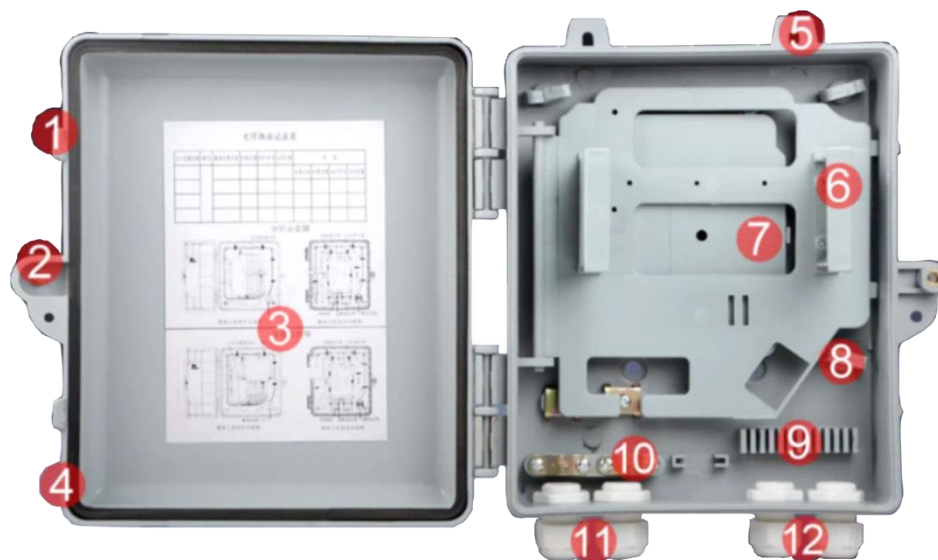
| ① Sealing and Reinforcing Clips	⑦ Fusion Fiber Tray
② Anti-theft Locks	⑧ PVC Tie
③ Cable Log Sheets	⑨ Leather Cord Retaining Clasp
④ PE Waterproof Sealing Ring	⑩ Metal Fixtures
⑤ Wall Mounted Holes	⑪ Fiber Optic Insert Port
⑥ Splitter Bay	⑫ Fiber Optic Outlet

8.1.5 Technical Specifications

Serial Number	Project	Technical Specifications	Remarks
1	Working Environment	Indoors and outdoors	
2	Operating Temperature	-40~+80℃	
3	Storage Temperature	-40~+80℃	
4	Functional Characteristics	Rain, dust and theft resistant	
5	Protection Class	IP55	
6	Product Dimensions	265mm*240mm*85mm	

7	Product Weight	0.8KG
8	Equipment can be Loaded	2 single slot high insert cassettes or 1 two-slot high insert cassette

8.2 Installation Steps

8.2.1 Wall mounting

Step 1: Install the waterproof tail sleeve at the entrance and exit of the optical fiber, as shown in below picture.
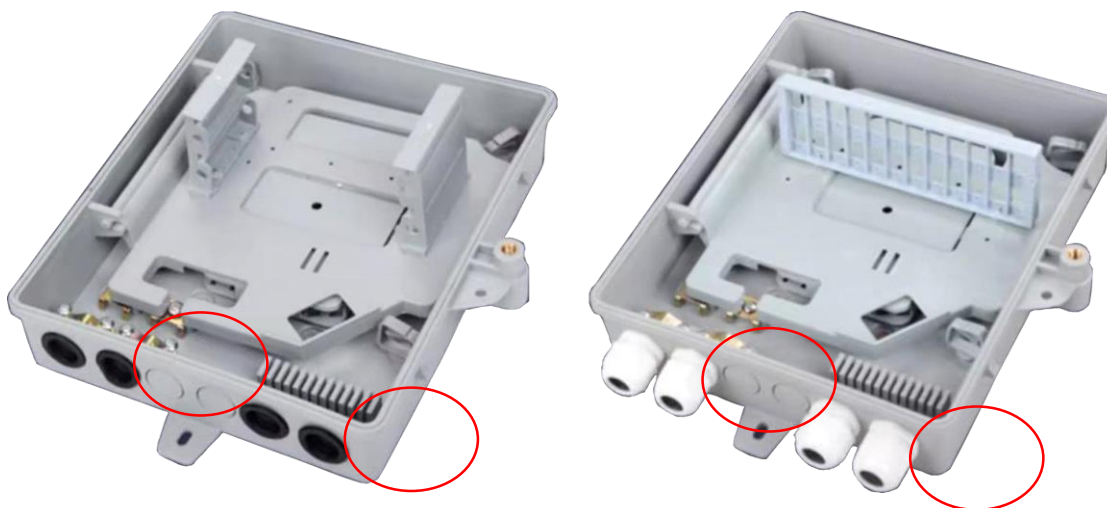
Step 2: Determine the wall of the installation, the back of the fiber optic waterproof box close to the wall, and then through the waterproof Fiber Optic Enclosure front of the three wall-hanging holes, mark the wall, the back of the waterproof box and wall-hanging holes as shown in below picture.

Step 3: Use a drill to drill holes for the identified wall hole markings, and tap the expansion plugs into the punched holes.

Step 4: Put the waterproof Fiber Optic Enclosure close to the wall and align its wall mounting holes with the screw holes on the wall, then use a Phillips screwdriver to screw the Phillips self-tapping screws into the expansion plug holes in order to fix the waterproof Fiber Optic Enclosure to the wall.


8.2.2 Pole mounting

Step 1: Install the waterproof tail sleeve at the entrance and exit of the optical fiber, as shown in below picture.

Step 2: Put the front side of the metal patch shown in Figure 9 against the back side of the waterproof Fiber Optic Enclosure, and make the holes of the small iron piece and the waterproof Fiber Optic Enclosure aligned with the holes of the waterproof Fiber Optic Enclosure. Then put the screws through the holes on the back of the metal patch, and then use the nut to lock the screws inside the Fiber Optic Enclosure.
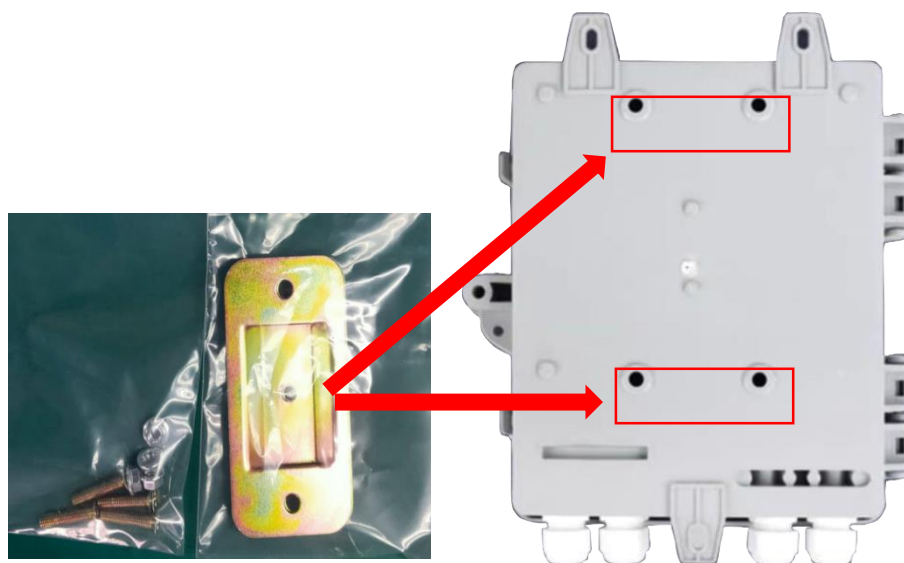
Step 3: Loosen the fastening screws of the metal ring and pull out one end of the metal ring, then pass the metal ring through the fixing groove of the small metal iron piece in the way shown in below picture.

Step 4: Place the waterproof Fiber Optic Enclosure onto the pole to be fixed, and then lock the metal ring, as shown in below picture.

8.2.3 Installation of cassettes

Step 1: Insert the insert cassette passively into the slot inside the waterproof Fiber Optic Enclosure in the direction of the arrow, as shown in below picture.

Step 2: Slowly press the top and bottom 4 pull pins down so that the pull pins snap into the jacks of the waterproof Fiber Optic Enclosure, as shown in below picture.

Step 3: The need to access to the insert box passive optical patch fiber from the fiber optic inlet (signal in) and fiber optic outlet (signal out) through, as shown in below picture.

Step 4: Connect the LC optical jumper fibers to the passive ports of the patch boxes to be docked, as shown in below picture.

Step 5: Close and lock the lid of the waterproof Fiber Optic Enclosure.

8.2.4 Fiber connection and disconnection

The passive interface of the cartridge is usually the LC interface (SC or FC interface can also be used as required),
The appearance of SC, FC and LC connectors is shown in the below picture
(1) For SC head optical jumper (large square head):
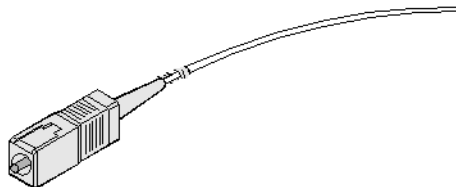
Insert the optical jumper, you should carefully align the fiber optic head on the optical interface board on the optical interface (fiber head of the bumps aligned with the corresponding notch adapter), moderate force into the push, hear the "click" sound, said to have been inserted into place.
When pulling out the optical patch cord, you should first press down the snap-on connector, push the fiber plug inward slightly, and then pull out the plug outward.
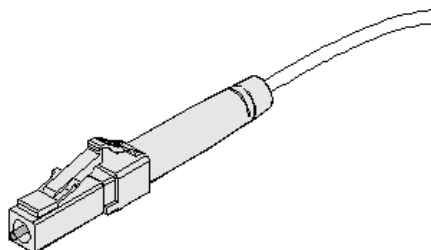**(2) For FC head optical jumper (round head):**
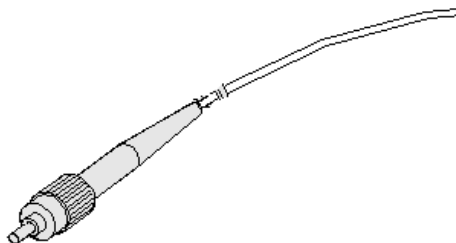
When inserting the optical jumper, you should carefully align the fiber head with the optical interface on the optical interface board (the bumps on the fiber head are aligned with the corresponding notches on the adapter), push in with moderate force, and then rotate the outer ring of the screw sleeve clockwise to tighten the optical connector.

When pulling out the optical jumper, first turn the outer ring of the fiber optic connector counterclockwise, and when the screw is loosened, pull out the fiber optic with a little force.

(3) For optical jumper of LC head (small square head):

Insert the optical jumper, should be carefully aligned with the optical fiber head on the optical interface board optical interface, moderate force pushed into the "click" sound, the shrapnel pop-up, said to have been inserted into place.

To unplug the optical patch cord, press down on the tabs and then pull out the plug.

Caution.

1.   **Wear a dust cap when the optical patch cable or the corresponding adapter is not in use.**

2.   **Do not use brute force when inserting or removing optical patch cords.**

3.   **When the end face of the fiber optic head is in contact with other objects, clean the ceramic end face of the jumper with dust-free paper before inserting the optical jumper.**

8.3 Maintenance

Common Failures

Project	The Cause of The Failure	Processing Methods
1	The optical module does not emit light	(1) Confirm whether the port settings of BBU/DU and RRU/AAU devices are normal; (2) Confirm whether the optical module can match the BBU/DU, RRU/AAU equipment; (3) Replace the port to confirm that the optical module is illuminated.
2	The optical module is not receiving light	(1) Check that the optical module at the opposite end is illuminated. (2) Check that the fiber optic cable or

3	The optical module receives light weakly	optical patch fiber has not been broken; and
		(1) Check whether the length of the transmission fiber optic cable matches the transmission distance of the fiber optic module, if not, replace the fiber optic module that matches the transmission distance and the length of the fiber optic cable. (2) Check whether the insertion loss of the fiber optic cable is too large, or the loss is large due to the bending of the fiber optic patch cable. (3) Confirm the center wavelength of the optical module to see if it matches the channel of the connected cassette. (4) Check the optical module corresponding to the channel of each node optical power, confirm the optical power in which the node began to deteriorate, available fiber optic cleaning pen on the node fiber end face cleaning. (5) Check whether the light emitted by the optical module at the opposite end is weak, and use the fiber optic cleaning pen to clean the end surface of the optical module or replace the optical module.

9.   OADM/ODM Optical Add-Drop Multiplexer/Demultiplexer

ODM Optical Add-Drop Multiplexer/Demultiplexer is a CWDM/DWDM multiplexer/demultiplexer. It can mux and demux CWDM/DWDM channels, greatly save customers' optical fiber resources, and flexibly change network configuration according to customers' requirements. The 100Ghz DWDM system supports smooth upgrade to 48 channels, and the 50GHz DWDM system supports smooth upgrade to 96 channels. Higher spectrum utilization, saving bandwidth resources. Moreover, the CWDM system supports a smooth upgrade to 18 channels.

9.1 Board Introduction

1.   The board supports hot-swap, and can be plugged into any slot on the front panel of the 4U chassis or 1U chassis.

2. The board is divided into two types according to the provided interfaces, occupying one slot in the chassis.

3. All interfaces are LC/UPC or LC/APC. A single slot board supports up to 20 LC optical port outputs.

4. All interfaces are printed to identify their port attributes: channel, common (com), upgrade (UPG), etc.

5. Supports the upgrade channel, which is convenient for users to expand capacity (UPG is the upgrade port, and it is optional).

6. OM means multiplexer (combined), and its port should be used to receive optical signals; OD means demultiplexer (division), and its port should be used to transmit optical signals.

7. TX indicates that the port sends optical signals, and RX indicates that the port receives optical signals.

8. If "N/A" is printed on the optical port, it means that the optical port is not used.

9.2 Functional Description

- Supports CWDM/DWDM multiplexing and demultiplexing system.
- Support OADM add/drop multiplexing.
- Support CATV, PON, etc.
- Support the wavelength specified by the user.
- It has lower insertion loss and higher channel isolation.
- The system is a passive device with high reliability and stability.

9.3 Common Transmission Type Description

The multiplexing port(OM) of the ODM card is connected to the TX port of the corresponding channel of optical module on the OTU or ETU card, and the demultiplexing port(OD) of the ODM card is connected to the RX port of the corresponding channel of optical module on the OTU or ETU card.
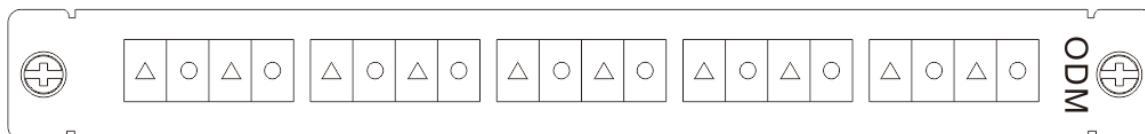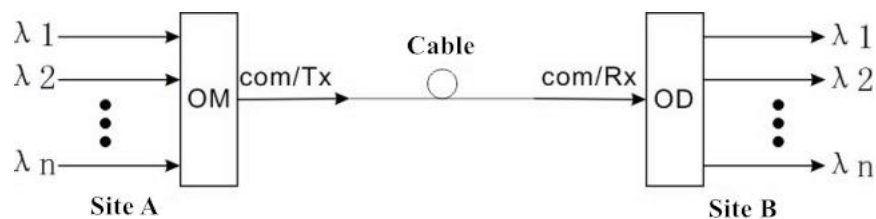

1) Dual fiber bidirectional

Note: The ODM board contains two independent passives. The two ports on the panel are in groups, the ports on the left of all groups are the same passive, and the ports on the right are another passive, as shown below. The channels of adjacent ports can be the same or different (Mainly according to customer requirements).
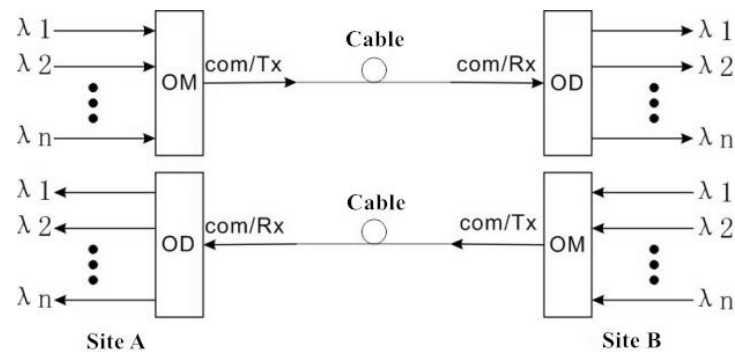
2) Single fiber unidirectional

3) Single fiber bidirectional
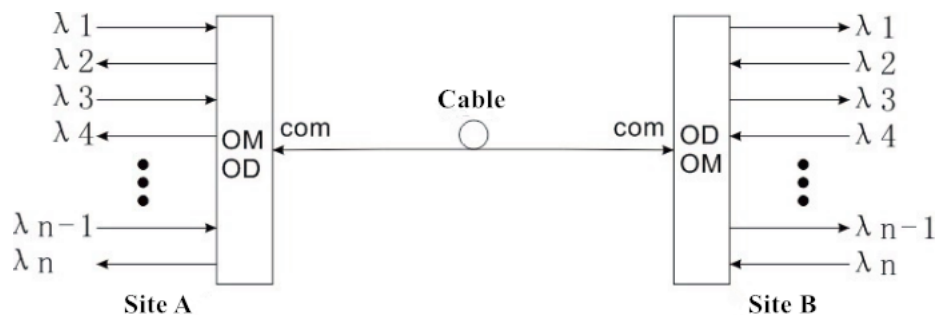
9.4 Technical Parameters

Coarse Wavelength Division Multiplexer - CWDM (Filter Chip)

Parameter	Unit	Index			
Channel Number		2	4	8	16
Center Wavelength	nm	ITU, ITU + 1			
Passband Width	nm	ITU ± 6.5			
Working Wavelength	nm	1260 to 1620			
0.5 dB Bandwidth	nm	≥14			
Channel Spacing	nm	20			
Fiber Type		SMF-28e or user specified			
Insertion Loss (Typical/Maximum)	dB	1.0/1.2	1.4/1.8	2.6/3.0	5.0/5.4
Isolation of Adjacent Channels	dB	30			
Non-Adjacent Channel Isolation	dB	45			
Ripple	dB	0.3	0.4	0.5	0.5
Polarization Dependent Loss	dB	0.2			

Polarization Mode Dispersion ps 0.1

Return Loss dB 45

Directivity dB 50

Dense Wavelength Division Multiplexer - DWDM (Filter Chip)

Parameter	Unit	Index							
Channel Spacing	GHz	100				200			
Channel Number		2	4	8	16	2	4	8	16
Central Wavelength		ITU Grid							
Channel Width	nm	ITU±0.11		ITU±0.25					
0.5 dB Bandwidth	nm	0.3		0.6					
Fiber Type		SMF-28e or user specified							
Insertion Loss (Typ./Max.)	dB	1.4/1.8	1.6/2.0	2.6/3.2	3.8/4.5	1.4/1.8	1.6/2.0	2.6/3.2	3.8/4.5
Isolation of Adjacent Channels	dB	25							
Non-Adjacent Channel Isolation	dB	40							
Polarization-Dependent Loss	dB	0.2							
Polarization Mode Dispersion	ps	0.1							
Return Loss	dB	45							
Directivity	dB	50							

Dense Wavelength Division Multiplexer - DWDM (Athermic Array Waveguide Grating)

Parameter	Index	
Channel Spacing (GHz)	100	
Channel Number	40	48
Central Wavelength	ITU Grid	
Channel Width (nm)	ITU±0.11	
0.5 dB Bandwidth (nm)	0.2	
1.0 dB Bandwidth (nm)	0.4	
3.0 dB Bandwidth (nm)	0.6	
Fiber Type	SMF-28e or user specified	
Insertion Loss (Typical/Maximum) (dB)	5.5/6.0	
Isolation of Adjacent Channels (dB)	25	
Non-Adjacent Channel Isolation (dB)	30	
Polarization-Dependent Loss (dB)	0.5	
Polarization Mode Dispersion (ps)	0.5	
Return Loss (dB)	40	
Directivity (dB)	48	

📖
Note
The above parameters are for reference only. In actual application, please refer to the product test report provided with the devices.

10. Command-line Interface (CLI)

10.1 Overview

10.1.1 Introduction

CLI: command-line interface, the command line interface is an interface that allows you to type executable instructions at the user prompt. The use of the CLI has the advantages of low requirements, only a serial port, easy to use and convenient function extension.

In order to prevent users from forgetting to log out of the system after querying or modifying the information, and avoid the loss caused by the non-staff modification, the system has set a timeout to log in again (time is 30 minutes). When there is no operation action within the specified time, the system will automatically exit, and the user needs to log in again to enter the system.

10.1.2 Login command-line interface

You can access the CLI via Telnet or HyperTerminal.

10.1.2.1 Telnet login

Start - Run - cmd: Enter into the command-line interface, enter the initialization IP: 192.168.1.228, press "Enter" to enter the device command line management interface (see below).
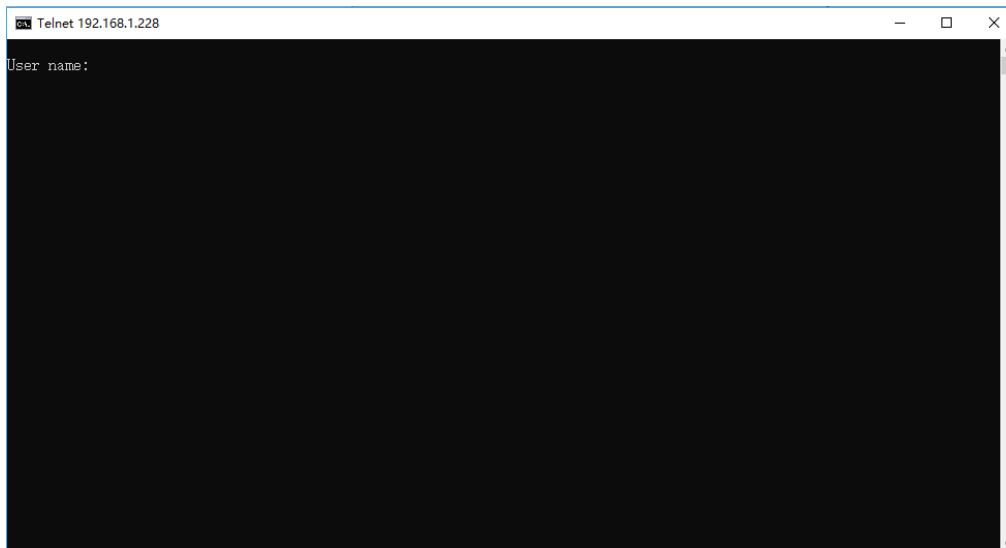
Login Page

Enter the initial username and password to log in.

Username: root/admin/guest

Password: root@9102/ascent/guest@9102

Function Permission	Function Selection	Root	Admin	Guest
	Refresh View	✔	✔	✔
Device Information	Chassis Information	✔	✔	✔
	Unit List	✔	✔	✔
	Device Name/Type	✔	✔	✗
	Current Alarm	✔	✔	✔
	History Alarm	✔	✔	✔
Alarm Management	Alarm Strategy	✔	✔	✗
	Alarm Configuration	✔	✔	✗
	Export Mode	✔	✔	✔
	System Time	✔	✔	✔
	Network Configuration	✔	✔	✔
System Configuration	HTTP Configuration	✔	✔	✔
	Websocket Configuration	✔	✔	✔
	Cascading Mapping	✔	✔	✗
	NMU Configuration	✔	✔	✔
	Community	✔	✔	✔
SNMP Configuration	Trap Receiver	✔	✔	✔
	Connection Testing	✔	✔	✔
	SNMP Option	✔	✔	✔
	Process View	✔	✔	✔
	Process Startup	✔	✔	✗
System Maintenance	NMU Upgrade	✔	✗	✗
	Unit Upgrade	✔	✗	✗
	Restore Factory Settings	✔	✗	✗
	Reboot System	✔	✔	✔
	Firewall White List	✔	✔	✗
Security Management	Port Forward	✔	✔	✗
	User Management	✔	✔	✔
	Modify Password	✔	✔	✔
	Exception Log	✔	✗	✗
Log Management	Operation Log	✔	✗	✗
	Log Configuration	✔	✗	✗

User Function Table

10.1.2.2 HyperTerminal login

Step 1: To establish a local configuration environment, simply connect the serial port of the PC (or terminal) to the serial port of the network management card through a standard RS232 cable.

Step 2 : Run the terminal emulation program (such as Win98 HyperTerminal, etc.), follow the pop-up prompt to set, set the number of seconds per bit to 115200, 8 data bits, 1 stop bit, no checksum and flow control.

Step 3: Power on, automatically execute the Bootrom program, interactively prompt the user to configure the parameters necessary for the initial startup of the switch or display the last startup configuration parameters until the command line prompt appears.

Username: root/admin/guest

Password: root@9102/ascent/guest@9102

10.1.3 Mode description

Mode	Description	Entry Method	Identifier
Common mode	This mode can only view information	Input disable	$
Management mode	This mode can view and configure information	Input enable	#

10.1.4 Command basic format

The command is a hierarchy.

Example: # show ?

```
# show
  acl                   Show access control list rules
  date                  Show date and time
  interfaces            Interface status and configuration
  ip                    Network information
  module                Module information
  snmp                  SNMP configuration information
  startup-configuration Startup process
  system                System running information

# show
```

10.2 Global Command

📖
Note

Some subcommands will exist in different parent commands at the same time, and repeated commands will only be introduced once.

Input? All global commands are displayed as follows

10.2.1 acl

View firewall configuration information.

Its sub-command:

1) add

Its sub-command:

acl> add ?

> **add ipaddr**

Add a whitelist IP address.

Command: acl>add ipaddr + ip address

> **add iprange**

Add a whitelist IP continuous range.

Command: acl>add iprange + ip address-ip address

> **add macaddr**

Add a whitelist MAC address.

Command: acl>add macaddr +mac address

2) clear

Clear whitelist data.

3) del

Delete the whitelisted IP address or MAC address.

Command: acl>del + number (whitelist list ID)

4) disable

Disable whitelisting.

5) enable

Enable whitelisting.

6) exit

Return to the main menu.

7) help

View help information.

8) history

View the operation history.

Command: history + number (number of records)

9) logout

Log out system: Re-login to the system requires a username and password.

10) ping

Check if the network is connected.

Its sub-command:

acl>ping ?

```
acl> ping
  ip      Send ICMP IPv4 messages to network hosts (default)
  ipv6    Send ICMP IPv6 messages to network hosts
  arp     Send ARP requests to a neighbour host
  String  Hostname or IP-address to ping

acl> ping
```

➢ **ping ip**

Check if the ip address of the ipv4 version is connected.

Command: acl>ping ip +<ip-addr>

Command: acl>ping ip 192.168.1.32

➢ **ping ipv6**

Check if the ip address of the ipv6 version is connected.

Command: acl>ping ipv6 +<ip-addr>

Command: acl>ping ipv6 192.168.1.32

➢ **ping**

Directly check if the ip address is connected.

Command: acl>ping ip/ipv6/arp/ +<ip-addr>

Command: acl>ping 192.168.1.32

11) save

Save whitelist data.

12) show

Display internal information.

Its sub-command:

acl> show ?

Example 1: Display a whitelist list

Command: acl>show acl

Example 2: Display system time

Command: acl>show date

Example 3: Display the network management card IP

Command: acl>show ip

Example 4: Display device unit

Command: acl>show module + slot number (1-16)

Example 5: Display snmp

Command: acl>show snmp

Example 6: Display the configuration that needs to be restarted when booting

Command: acl>show startup-configuration

Example 7: Display system name, model number, serial number, hardware and software version, power supply voltage, chassis temperature, register footprint, basic information of network management card.

Command: acl>show system

13) traceroute

Print routing packets that track to the network host.

Its sub-command:

acl> traceroute ?

Command: acl>traceroute ip/ipv6/arp/ +<ip-addr>

Example 1: Print the IP address of the ipv4 version packet

Command: acl>traceroute ip 192.168.1.32

Example 2: Print the IP address of ipv6 version packet

Command: acl>traceroute ipv6 192.168.1.32

Example 3: Print an IP address packet

Command: acl>traceroute 192.168.1.32

14) user

User Management

Its sub-command:

acl>user ?

```
acl> user
    add        add a new user
    delete     delete a user
    list       List all users
    password   modify password

acl> user
```

Command: acl>user + add/delete + name (username) + role (role)

acl>user + list

acl>user + password + name(username)

Example 1: Add a new user

Command: acl>user add mary admin

Example 2: Delete a user

Command: acl>user delete mary

Example 3: Display the user list

Command: acl>user list

Example 4: Modify user password

Command: acl>user password mary

15) who

Display the current login account role

10.2.2 configure

Enter configuration mode: See configure configuration mode for details

Its sub-command:

1) help

See above for details.

2) history

See above for details.

3) interface

Ethernet interface number.

Command: (config)#interface ethernet

4) ip

Network settings.

Its sub-command:

Command: (config)#ip + default-gateway (default gateway) + IP address

(config)#ip + route + netmask (subnet mask)

(config)#ip + routing

(config)#ip + set + IP address + -mask + netmask (subnet mask) + -gw + gateway (gateway)

Example 1: Set router gateway

Command: (config)#ip + default-gateway + gateway

Example 2: Set the static router configuration

Command: (config)#ip + route + subnet mask

Example 3: Set the router switch

Command: (config)#ip + routing +

Example 4: Set the IP address

Command: (config)#ip set 192.168.1.32 –mask 255.255.255.0 -gw 192.168.1.1

5) logout

See above for details.

6) ping

Check if the network is connected.

Its sub-command:

```
(config)# ping
  ip      Send ICMP IPv4 messages to network hosts (default)
  ipv6    Send ICMP IPv6 messages to network hosts
  arp     Send ARP requests to a neighbour host
  String  Hostname or IP-address to ping

(config)# ping _
```

Command: (config)#ping + arp + IP address

Example 1: (config)#ping arp 192.168.1.32

7) show

See above for details.

8) snmp

SNMP configuration:

Its sub-command:

```
(config)# snmp
  community  snmp community configuration
  trapdest   snmp trapdest configuration

(config)# snmp _
```

SNMP configuration information.

Command: (config)#snmp + community + set + read community name + write community name

Example 1: (config)#snmp community set public private

Alarm target host configuration.

Its sub-command:

Command: admin (config)# snmp trapdest + add + id (target host number) + -ipaddr + ip address (target address) + -port (default 9162) + port number + name (target host name) + true/false (enable/disable)

Note

When set the name, it cannot be set to the existing target address name. Otherwise, it cannot be added. In the network management software NetRiver, the IP host in the disabled state cannot receive the alarm information.

Example 1: admin (config)# snmp tradest add 4 –ipaddr 192.168.2.32 –port 9162 32D true

9) time

Set the system time.

Command: (config)#time + set + year + month + day + hour:minute:sec

Example 1: (config)#time set 2019 1 29 16:14:00

10) top

Return to the previous level.

11) traceroute

See above for details.

12) user

See above for details.

13) who

See above for details.

10.2.3 debug

Debug system information.

Its sub-command:

1) execute

Execute the command line.

Command: execute + command "such as ls, ps, etc."

2) help

See above for details.

3) history

See above for details.

4) logout

See above for details.

5) ls

Display file list details.

6) ping

See above for details.

7) proc

View system information such as process status, CPU Command, and virtual memory.

8) ps

Display process.

9) shell

Enter script editing.

10) show

See above for details.

11) top

See above for details.

12) traceroute

See above for details.

13) user

See above for details.

14) who

See above for details.

10.2.4 disable

Exit the management mode and enter the common mode.

10.2.5 enable

Exit the common mode and enter the management mode.

10.2.6 exit

📖
Note   This command can only be executed on the main interface under the management mode.

Exit the current account.

10.2.7 help

View help information.

10.2.8 history

View the operation history.

Command: history + number (number of records)

Example 1: Display the top 100 records

Command: history 100

10.2.9 log

Manage log information.

Its sub-command:

Command: #log delete

10.2.10 logout

Log out the system: Re-login to the system requires a username and password.

10.2.11 ping

See above for details.

10.2.12 prompt

Prompt of setting the command line interface.

10.2.13 reboot

Restart the system.

Command: # reboot

Description: The system will restart, and no other operations can be performed at this time.

10.2.14 shell

Enter script editing.

10.2.15 show

Display information about the network management card.

Its sub-command:

1) acl

Display firewall whitelist.

Command: show + acl

2) date

Display the network management card system time.

Command: show + date

3) interfaces

Display information such as the network management card IP, subnet mask, and gateway.

Command: show + interfaces

4) ip

Display the network management card IP.

Command: show + ip

5) module

Display device unit information.

Command: show + module

6) snmp

Display SNMP community information.

Command: show + snmp

7) startup-configuration

Display the configuration that needs to be restarted when booting.

Command: show + startup-configuration

8) system

Display system name, model number, serial number, hardware and software version, power supply voltage, chassis temperature, register footprint, basic information of network management card, etc.

Command: show + system

10.2.16 startup

Display boot restart configuration.

Its sub-command:

```
# startup
    show          Show startup process
    Edit select   operate type (add/mod)

# startup
```

1) show

Show the status of each process after power-on and restart.

Command: startup + show

2) add

Add a new custom process name.

Command: startup + add + custom + custom name

3) mod

Modify the process command for booting and restarting.

Its sub-command:

```
# startup mod
   sys      system type
   custom   custom type

# startup mod
```

Modify the name of the system process.

Command: startup + mod + sys + telnet/webs/snmp + true/false // command line to turn telnet/webs/snmp on or off.

Modify the name of the custom process.

Command: startup + mod + custom + custom name

10.2.17 system

System configuration.

Its sub-command:

```
# system
   reset-configuration   Erased the configuration to reconfigure
   upgrade               upgrade module firmware by TFTP
   upload                upload file by TFTP

# system
```

1) reset-configuration

Clear the original system configuration and reconfigure.

Command: system + reset-configuration + filename (user/snmp/desthost/alarmlog/errlog/operatelog/network).

2) upgrade

Update the network management card system from the server IP.

Command: system + upgrade + server IP address

3) upload

Upload files to the system from the server IP.

Command: system + upload + -p + server IP address

10.2.18 traceroute

Print routing packets that track to the network host.

Its sub-command:

```
# traceroute
  ip      IPv4
  ipv6    IPv6
  String  Hostname or IP-address to trace the route

# traceroute
```

Command: traceroute ip/ipv6/arp/ +<ip-addr>

Example 1: Print the IP address of the ipv4 version packet

Command: traceroute ip 192.168.1.32

Example 2: Print the IP address of ipv6 version packet

Command: traceroute ipv6 192.168.1.32

Example 3: Print an IP address packet

Command: traceroute 192.168.1.32

10.2.19 user

User Management

Its sub-command:

```
# user
  add       add a new user
  delete    delete a user
  list      List all users
  password  modify password

# user
```

Command: user + add/delete + name (username) + role (role)

user + list

user + password + name (username)

Example 1: Add a new user

Command: user add mary admin

Example 2: Delete a user

Command: user delete mary

Example 3: Display the user list

Command: user list

Example 4: Modify user password

Command: user password mary

10.2.20 who

Display the current login account role.

10.3 Common Commands

10.3.1 acl

View firewall configuration information

Its sub-command:

```
# acl
acl>
  add        add access control list
  clear      Clear acl rules
  del        Del the num acl rule from white list
  disable    Disable acl rules
  enable     Enable acl rules
  exit       Exit from acl mode
  help       Display an overview of the CLI syntax
  history    Display the current session's command line history
  logout     Logout from the CLI
  ping       Send messages to network hosts
  save       Save acl rules
  show       Show acl rules
  traceroute Print the route packets trace to network host
  user       User managment
  who        show login user's name

acl>
```

1) add

Its sub-command:

```
acl> add
  ipaddr    add ipaddr to white list
  iprange   Add iprange to white list
  macaddr   Add macaddr to white list

acl> add
```

acl>add ？

add ipaddr

Add a whitelist IP address.

Command: acl>add ipaddr + ip address

add iprange

Add a whitelist IP continuous range.

Command: acl>add iprange + ip address -ip address

add macaddr

Add a whitelist MAC address.

Command: acl>add macaddr +mac address

2) clear

Clear whitelist data.

3) del

Delete the whitelisted IP address or MAC address.

Command: acl>del + number (whitelist list ID)

4) disable

Disable whitelisting.

5) enable

Enable whitelisting.

6) save

Save whitelist data.

10.3.2 configure

Enter configuration mode: See configure configuration mode for details.

Its sub-command:

```
# configure
(config)#
  help        Display an overview of the CLI syntax
  history     Display the current session's command line history
  interface   Select an interface to configure
  ip          network configure
  logout      Logout from the CLI
  ping        Send messages to network hosts
  show        Show running system information
  snmp        snmp configuration
  time        Utility commands for time related details
  top         Exit from configure mode
  traceroute  Print the route packets trace to network host
  user        User managment
  who         show login user's name
(config)#
```

1) ip

Network settings.

Its sub-command:

Command: (config)#ip + default-gateway (default gateway) + IP address

(config)#ip + route + netmask (subnet mask)

(config)#ip + routing

(config)#ip + set + IP address + -mask + netmask (subnet mask) + -gw + gateway (gateway)

Example 1: Set up a router gateway

Command: (config)#ip + default-gateway + gateway

Example 2: Set the static router configuration

Command: (config)#ip + route + subnet mask

Example 3: Set the router switch

Command: (config)#ip + routing +

Example 4: Set the IP address

Command: (config)#ip set 192.168.1.32 –mask 255.255.255.0 -gw 192.168.1.1

2) snmp

SNMP configuration.

Its sub-command:

SNMP configuration information.

Command: (config)#snmp + community + set + read community name + write community name

Example 1: (config)#snmp community set public private

Alarm target host configuration.

Its sub-command:

Command: admin (config)# snmp trapdest + add + id (target host number) + -ipaddr + ip address (target address) + -port (default 9162) + port number + name (target host name) + true/false (enable/disable)

Note

When set the name, it cannot be set to the existing target address name. Otherwise, it cannot be added. In the network management software NetRiver, the IP host in the disabled state cannot receive the alarm information.

Example 1: admin (config)# snmp tradest add 4 –ipaddr 192.168.2.32 –port 9162 32D true

3) time

Set the system time.

Command: (config)#time + set + year + month + day + hour:minute:sec

Example 1: (config)#time set 2019 1 29 16:14:00

10.3.3 disable

Exit the management mode and enter the common mode.

10.3.4 enable

Exit the common mode and enter the management mode.

10.3.5 logout

Log out the system: Re-login to the system requires a username and password.

10.3.6 reboot

Restart the system.

Command: # reboot

Description: The system will restart, and no other operations can be performed at this time.

10.3.7 show

Display information about the network management card.

Its sub-command:

```
# show
  acl                     Show access control list rules
  date                    Show date and time
  interfaces              Interface status and configuration
  ip                      Network information
  module                  Module information
  snmp                    SNMP configuration information
  startup-configuration   Startup process
  system                  System running information

# show _
```

1) acl

Display firewall whitelist.

Command: show + acl

2) date

Display the network management card system time.

Command: show + date

3) interfaces

Display information such as the network management card IP, subnet mask, and gateway.

Command: show + interfaces

4) ip

Display the network management card IP.

Command: show + ip

5) module

Display device unit information.

Command: show + module

6) snmp

Display SNMP community information.

Command: show + snmp

7) startup-configuration

Display the configuration that needs to be restarted when booting.

Command: show + startup-configuration

8) system

Display system name, model number, serial number, hardware and software version, power supply voltage, chassis temperature, register footprint, basic information of network management card, etc.

Command: show + system

10.3.8 startup

Display boot restart configuration.

```
# show
  acl                    Show access control list rules
  date                   Show date and time
  interfaces             Interface status and configuration
  ip                     Network information
  module                 Module information
  snmp                   SNMP configuration information
  startup-configuration  Startup process
  system                 System running information

# show _
```

Its sub-command:

```
# startup
  show           Show startup process
  Edit select  operate type (add/mod)

# startup
```

1) show

Shows the status of each process after power-on and restart.

Command: startup + show

2) add

Add a new custom process name.

Command: startup + add + custom + custom name

3) mod

Modify the process command for booting and restarting.

Its sub-command:

```
# startup mod
  sys      system type
  custom   custom type

# startup mod
```

Modify the name of the system process.

Command: startup + mod + sys + telnet/webs/snmp + true/false // command line to turn telnet/webs/snmp on or off.

Modify the name of the custom process.

Command: startup + mod + custom + custom name

10.3.9 system

System Configuration.

Its sub-command:

```
# system
    reset-configuration  Erased the configuration to reconfigure
    upgrade              upgrade module firmware by TFTP
    upload               upload file by TFTP

# system
```

1) reset-configuration

Clear the original system configuration reconfiguration.

Command: system + reset-configuration + filename
(user/snmp/desthost/alarmlog/errlog/operatelog/network).

2) upgrade

Update the network management card system from the server IP.

Command: system + upgrade + server IP address

3) upload

Upload files to the system from the server IP.

Command: system + upload + -p + server IP address

10.3.10 user

User Management

Its sub-command:

```
# user
    add       add a new user
    delete    delete a user
    list      List all users
    password  modify password

# user
```

Command: user + add/delete + name (username) + role (role)

user + list

user + password + name (username)

Example 1: Add a new user

Command: user add mary admin

Example 2: Delete a user

Command: user delete mary

Example 3: Display the user list

Command: user list

Example 4: Modify user password

Command: user password mary

Ascent Communication Technology Ltd

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

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

CHINA
Unit 1907, 600 Luban Road
200023, Shanghai CHINA
Phone: +86-21-60232616

USA
2710 Thomes Ave
Cheyenne, WY 82001, USA
Phone: +1-203 816 5188

EUROPE
Pfarrer-Bensheimer-Strasse 7a
55129 Mainz, GERMANY
Phone: +49 (0) 6136 926 3246

VIETNAM
15 /F TTC Building, Duy Tan Street
Cau Giay Dist., Hanoi, VIETNAM
Phone: +84 243 795 5917

WEB: www.ascentcomtec.com

EMAIL: sales@ascentcomtec.com