AN5116-06B

Optical Line Terminal Equipment

Hardware Description

Version: B

Code: MN000000067

FiberHome Telecommunication Technologies Co., Ltd.

Feburary 2012

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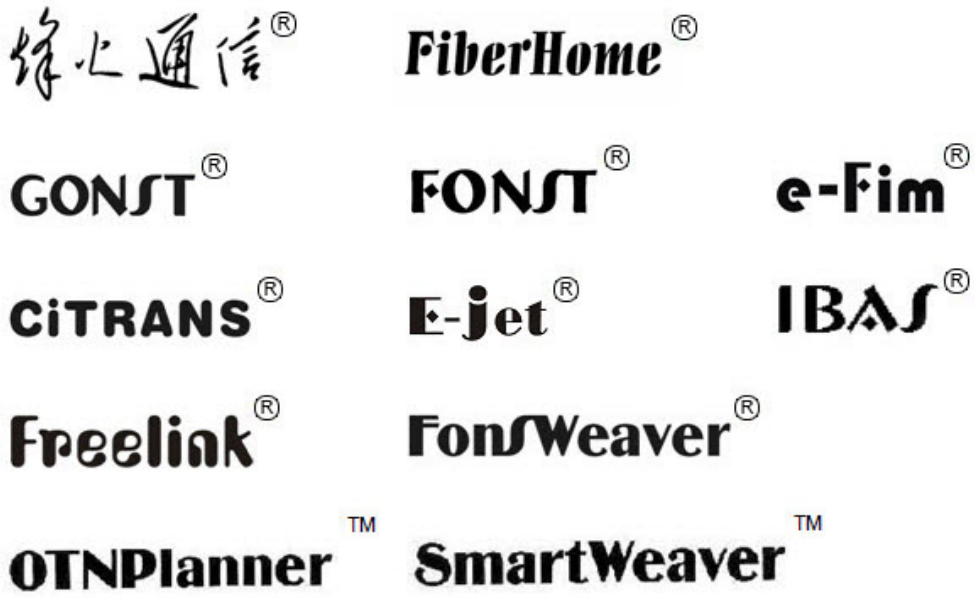

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Preface

Related Documentation

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

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

Version

Version	Description
A	This manual corresponds to EPON V1.1 and GPON V1.0 of the AN5116-06B. Initial version.
B	This manual corresponds to EPON V3.1 and GPON V3.1 of the AN5116-06B. Adds the GC8B card and the XG2B card, and optimize the content.

Intended Reader

This manual is intended for the following readers:

- Project commissioning engineers
- Operation and maintenance engineers

To utilize this manual, these prerequisite skills are necessary:

- Electrical safety knowledge
- Relevant mechanical engineering knowledge

Conventions

Terminology Conventions

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

Symbol Conventions

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

Contents

Figures

Tables

1 Cabinet

☑ 19-inch Cabinet

☑ 21-inch Cabinet

1.1 19-inch Cabinet

1.1.1 Code

The 19-inch cabinets include the following types.

Table 1-1 19-inch cabinet type

Dimension (height × width × depth)	Hardware Code
2000mm×600mm×600mm	4.102.597
2200mm×600mm×600mm	4.102.598
2600mm×600mm×600mm	4.102.599

1.1.2 Appearance

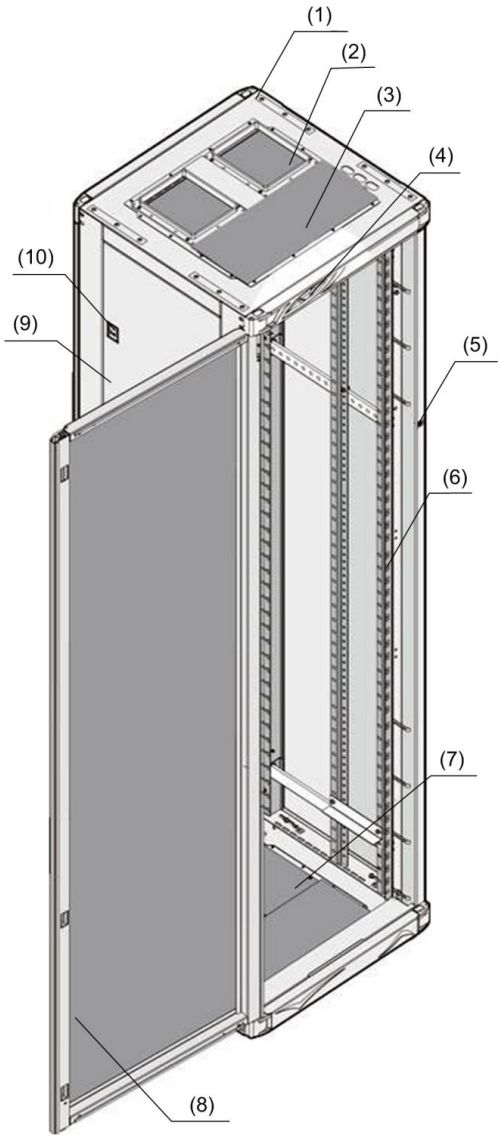
The appearance of the 19-inch cabinet is shown in Figure 1-1.

Figure 1-1 19-inch cabinet appearance

1.1.3 Structure

Composition and components

The cabinet structure and the component names are shown in Figure 1-2.



(1) Top-connection bent angle installation hole	(2) Wiring holes for inlet and outlet of the wires and cables on the top of the cabinet
(3) Ventilation holes on the top of the cabinet	(4) Indicator LEDs
(5) ESD protection earth ground fastener	(6) Installation holes on vertical mounting flange
(7) Wiring holes for inlet and outlet of the wires and cables at the bottom of the cabinet	(8) Front door
(9) Side door	(10) Side door switch

Figure 1-2 19-inch cabinet structure

Indicator LEDs

Three indicator LEDs are on the top of the cabinet. Table 1-2 lists the meanings and statuses.

Table 1-2 The indicator LEDs description of the 19-inch cabinet

Color	Meaning	Status	Description
Red LED	Critical alarm indicator	ON	The critical alarm occurs on the equipment
		OFF	The critical alarm does not occur on the equipment
Yellow LED	Non-critical alarm indicator	ON	The non-critical alarm occurs on the equipment
		OFF	The non-critical alarm does not occur on the equipment
Green LED	Idle		

1.1.4 Equipment Arrangement

The typical cabinet arrangement is shown in Figure 1-3.

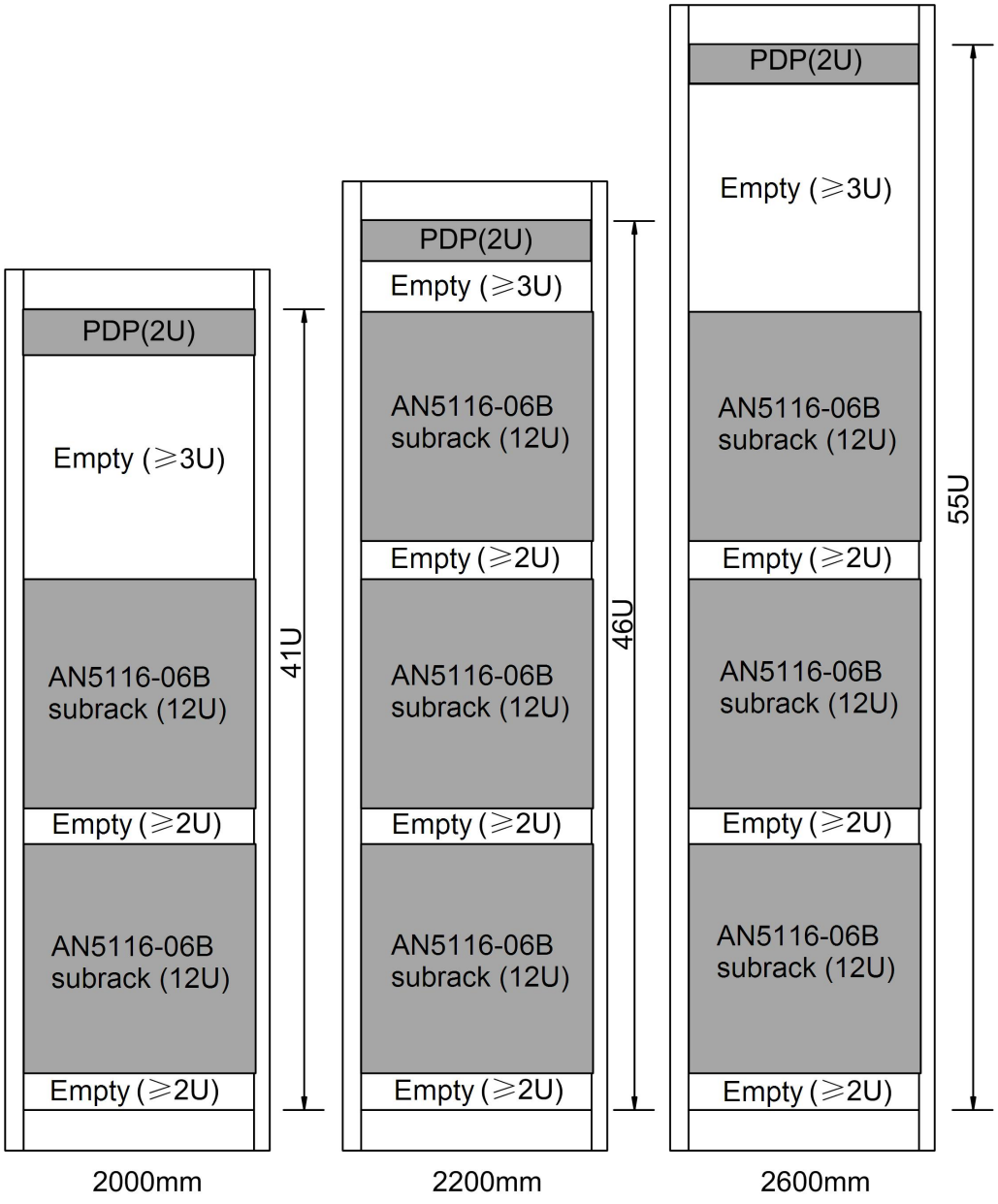


Figure 1-3 Typical arrangement of 19-inch cabinet

Note:

If the cabinet is not fully configured, you should configure the subrack from the bottom up so as to reserve the upper space for the later capacity expansion.

1.1.5 Wiring Modes

Depending on the location of the wiring channel in the equipment room, cables inside the cabinet can be arranged in the top access wiring or floor access wiring mode. Figure 1-4 and Figure 1-5 shows the wiring in the cabinet of the top access wiring mode and the floor access wiring mode respectively.

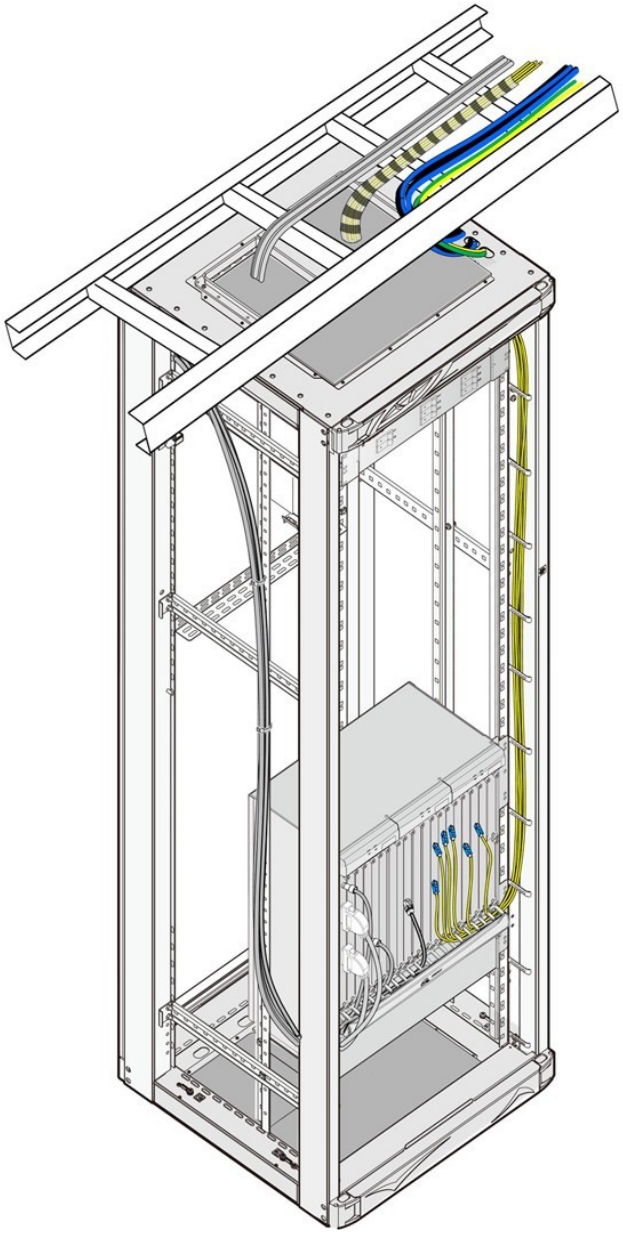


Figure 1-4 Top access wiring mode in the 19-inch cabinet

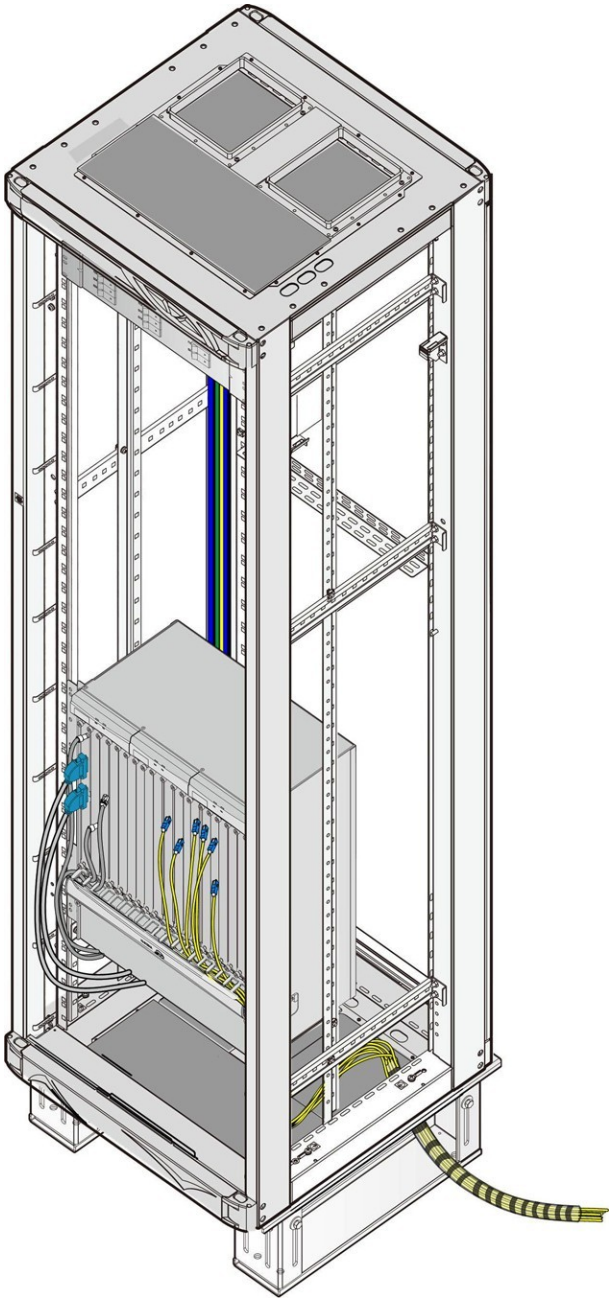


Figure 1-5 Floor access wiring mode in the 19-inch cabinet

1.1.6 Ventilation Principle

The ventilation principle in the cabinet is shown in Figure 1-6. A flow of air is forced by the air guide unit at the lower part of the subrack into the cabinet. After being blown by the fan unit on the top of the subrack, the cooling air passes upward through the subracks and is exhausted from the top of the cabinet.

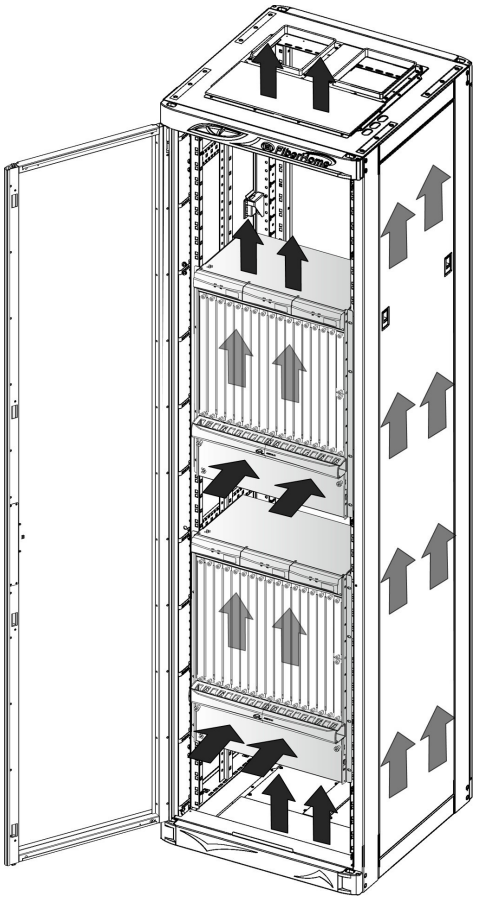


Figure 1-6 Ventilation principle of the 19-inch cabinet

1.1.7 Technical Specifications

The cabinet are classified into three types according to the height. Table 1-3 lists the size and weight of the three types of cabinet.

Table 1-3 Size and weight of the 19-inch cabinets

Dimension (height × width × depth)	Hardware Code	Weight (empty cabinet)
2000mm×600mm×600mm	4.102.597	109kg
2200mm×600mm×600mm	4.102.598	117kg
2600mm×600mm×600mm	4.102.599	134kg

Table 1-4 lists the other parameters of the 19-inch cabinet.

Table 1-4 Other parameters of the 19-inch cabinet

Item	Performance Specification
Long-term working environment temperature	0℃ to 45℃
Long-term working relative humidity	10% to 90% (no condensation)
Short-term working environment temperature	-5℃ to 55℃
Short-term working relative humidity	5% to 95%
Maximum power consumption	4500W
Typical power consumption	3000W
Average power consumption	2000W

1.2 21-inch Cabinet

1.2.1 Cabinet Types

The 21-inch cabinets include the following types.

Table 1-5 21-inch cabinet type

Dimensions (height × width × depth)	Hardware code
2000mm×600mm×300mm	404000069
2200mm×600mm×300mm	404000070
2600mm×600mm×300mm	404000071

1.2.2 Appearance

The appearance of the 21-inch cabinet is shown in Figure 1-7.

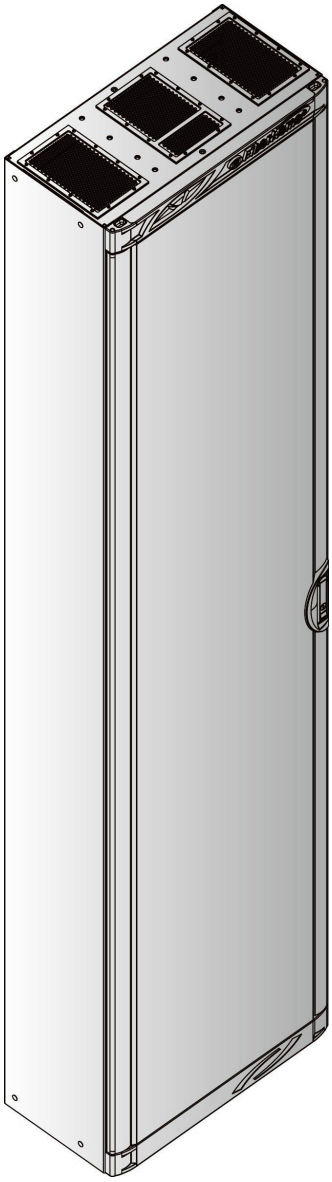
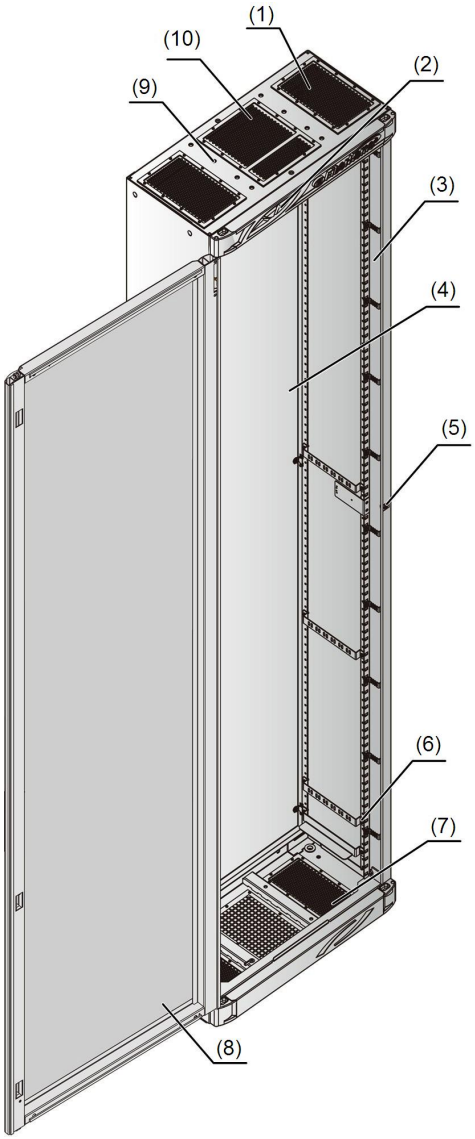


Figure 1-7 21-inch cabinet appearance

1.2.3 Structure

Composition and components

The cabinet structure and the component names are shown in Figure 1-8.



(1) Wiring holes for inlet and outlet of the wires and cables on the top of the cabinet	(2) Indicator LEDs
(3) Wiring channel	(4) Rear door
(5) ESD protection earth ground fastener	(6) Installation holes on vertical mounting flange
(7) Wiring holes for inlet and outlet of the wires and cables at the bottom of the cabinet	(8) Front door
(9) Top-connection bent angle installation hole	(10) Ventilation holes on the top of the cabinet

Figure 1-8 21-inch cabinet structure

Indicator LEDs

Three indicator LEDs are on the top of the cabinet. Table 1-6 lists the meanings and statuses.

Table 1-6 The indicator LEDs description of the 21-inch cabinet

Color	Meaning	Status	Description
Red LED	Critical Alarm indicator	ON	The critical alarm occurs on the equipment
		OFF	The critical alarm does not occur on the equipment
Yellow LED	Non-critical Alarm indicator	ON	The non-critical alarm occurs on the equipment
		OFF	The non-critical alarm does not occur on the equipment
Green LED	Idle		

1.2.4 Equipment Arrangement

The typical cabinet arrangement is shown in Figure 1-9.

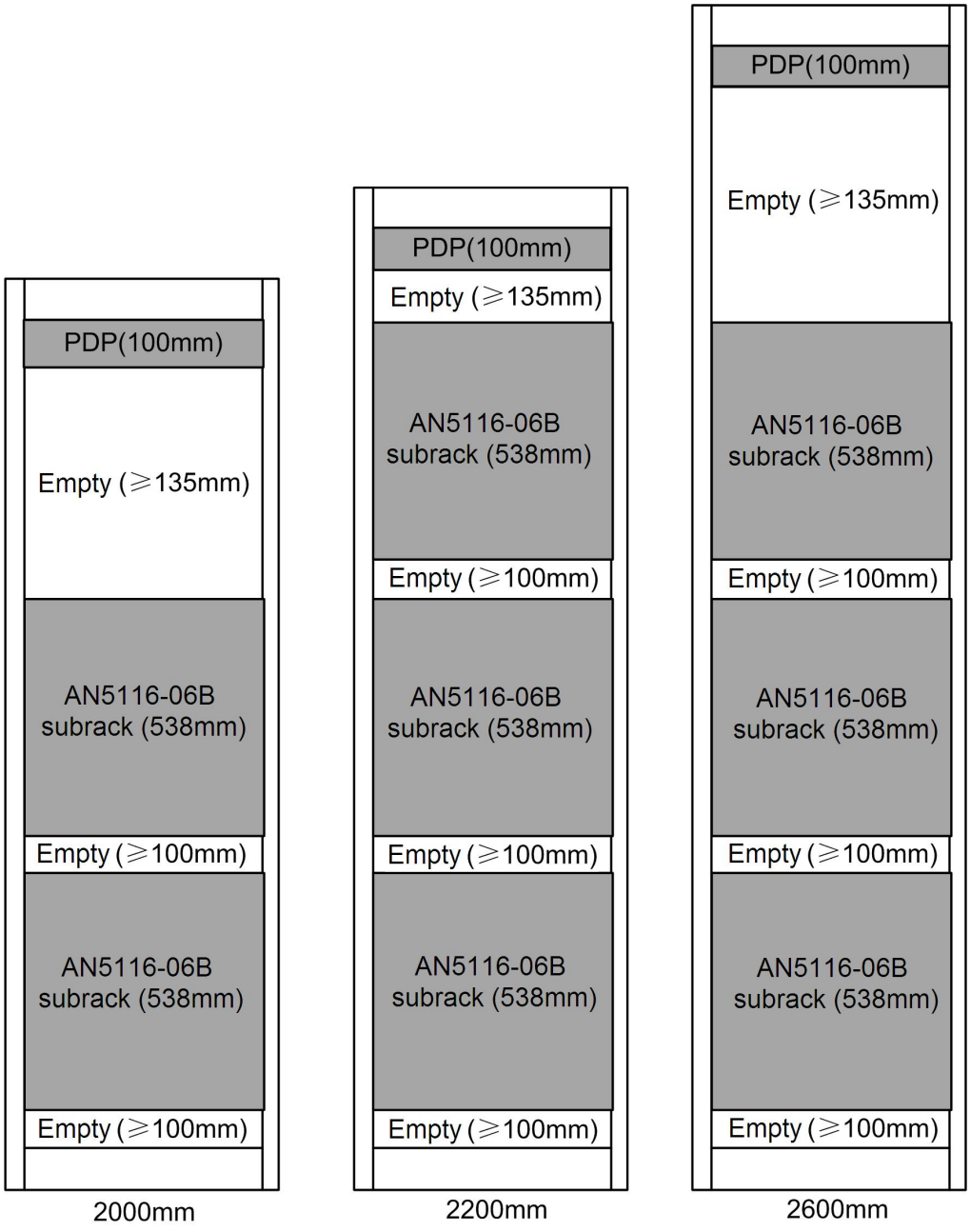


Figure 1-9 Typical arrangement of 21-inch cabinet

Note:

If the cabinet is not fully configured, you should configure the subrack from the bottom up so as to reserve the upper space for the later capacity expansion.

1.2.5 Wiring Modes

Depending on the location of the wiring channel in the equipment room, cables inside the cabinet can be arranged in the top access wiring or floor access wiring mode. Figure 1-10 and Figure 1-11 shows the wiring in the cabinet of the top access wiring mode and the floor access wiring mode respectively.

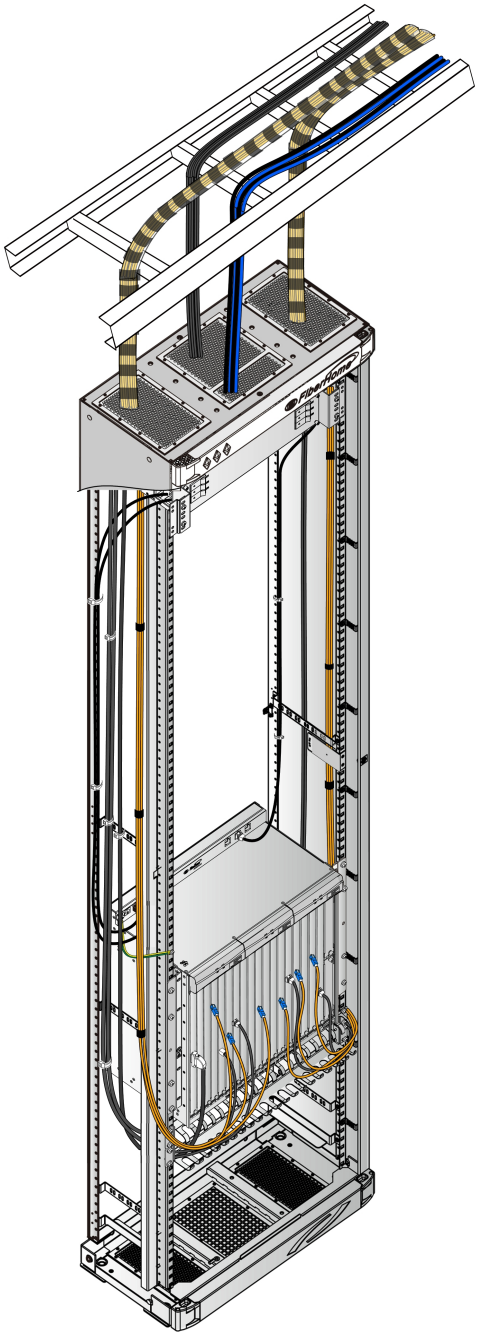


Figure 1-10 Top access wiring mode in the 21-inch cabinet

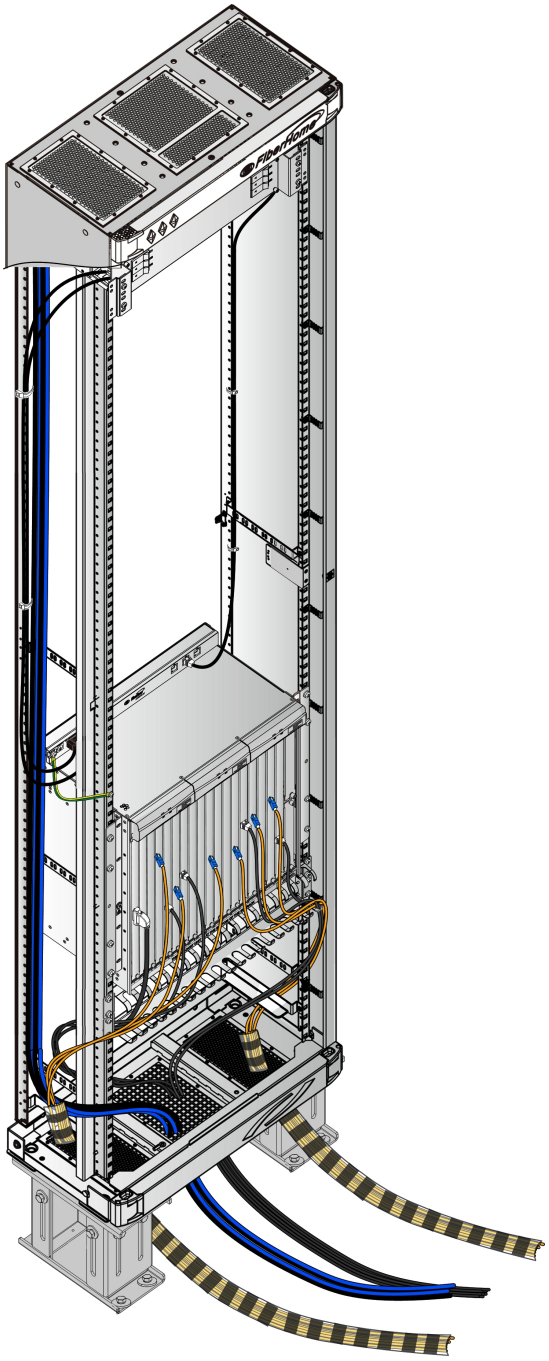


Figure 1-11 Floor access wiring mode in the 21-inch cabinet

1.2.6 Ventilation Principle

The ventilation principle in the cabinet is shown in Figure 1-12. A flow of air is forced by the air guide unit at the lower part of the subrack into the cabinet. After being blown by the fan unit on the top of the subrack, the cooling air passes upward through the subracks and is exhausted from the top of the cabinet.

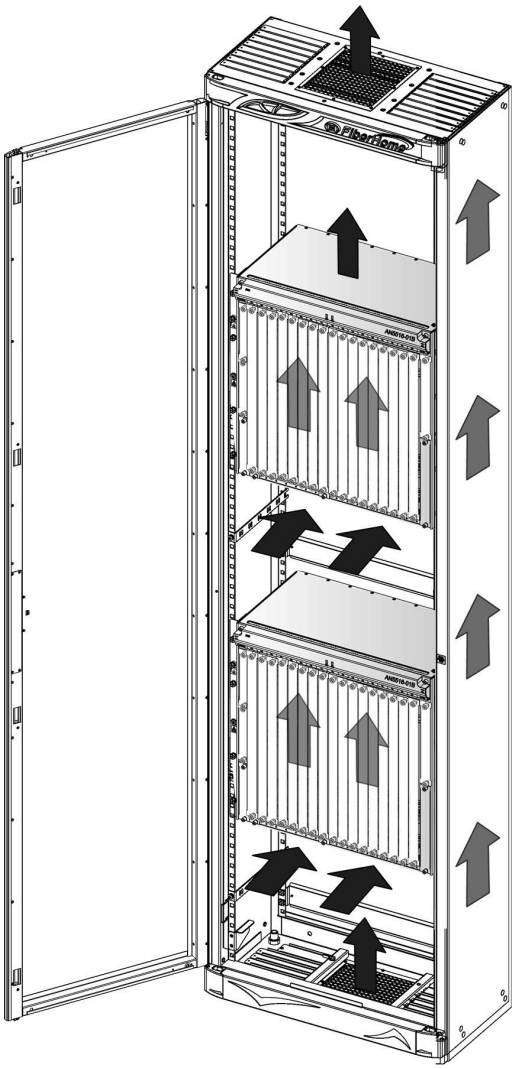


Figure 1-12 Ventilation principle of the 21-inch cabinet

1.2.7 Technical Specifications

The cabinet are classified into three types according to the height. Table 1-7 lists the size and weight of the three types of cabinet.

Table 1-7 Size and weight of the 21-inch cabinets

Dimension (height × width × depth)	Hardware Code	Weight (empty cabinet)
2000mm×600mm×300mm	404000069	69kg
2200mm×600mm×300mm	404000070	74kg
2600mm×600mm×300mm	404000071	85kg

Table 1-8 lists the other parameters of the 21-inch cabinet.

Table 1-8 Other parameters of the 21-inch cabinet

Item	Performance Specification
Long-term working environment temperature	0℃ to 45℃
Long-term working relative humidity	10% to 90% (no condensation)
Short-term working environment temperature	-5℃ to 55℃
Short-term working relative humidity	5% to 95%
Maximum power consumption	4500W
Typical power consumption	3000W
Average power consumption	2000W

2 PDP

- ☑ PDP Type
- ☑ Function
- ☑ Appearance
- ☑ Front Panel
- ☑ Connectors
- ☑ Technical Specifications

2.1 PDP Type

The AN5116-06B uses the PDP296B and the hardware code of the PDP is 3.000.068.

2.2 Function

The PDP can perform the following functions:

- The PDP inducts two channels of DC -48V power (active and standby) from the external (e.g. the power cabinet) and provides three sets of redundant branch power rails (six branch power rails total) for the three subracks.
- Performs the lightning protection, protecting the common mode 2kV (1.2/50us to 8/20us mixed wave) and differential mode 1kV (1.2/50us ~ 8/20us mixed wave) on the power line from the lightning efficiently.
- Performs alarm input and output function: collects the alarm information reported by the corresponding devices in the cabinet, provides the corresponding audio-video alarm, and outputs the alarm signal to the superior equipment (such as the head of row cabinet).

2.3 Appearance

Figure 2-1 shows the PDP296B appearance.

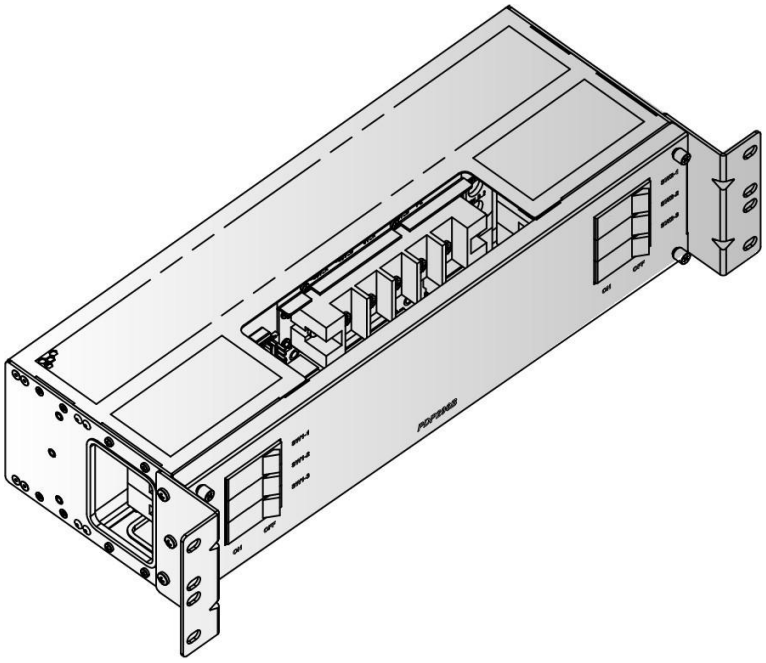


Figure 2-1 PDP296B appearance

2.4 Front Panel

The location is identified on the front panel, as shown in Figure 2-2.

- SW1-1 to SW1-3 controls the switching of -48V_A_1 to -48V_A_3.
- SW2-1 to SW2-3 controls the switching of -48V_B_1 to -48V_B_3.

Figure 2-2 Front panel of the PDP296B

2.5 Connectors

Remove the front panel of the PDP and you can see the components (such as connection terminals and buzzer) distributed on the PDP panel, as shown in Figure 2-3.

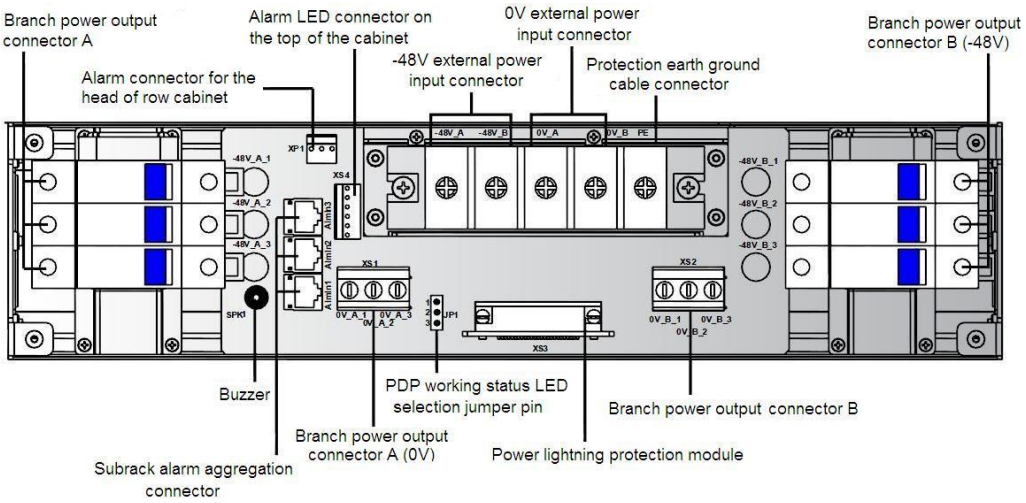


Figure 2-3 PDP connectors

2.5.1 Power Connector

- The description of the external power input connectors is shown in Table 2-1.

Table 2-1 Description of the external power input connector

Connector	Description
-48V _A, -48V_B	-48V external power input connector. The -48V _A and -48V_ B connectors back up each other.
0V _A, 0V_B	0V external power input connector. The 0V _A and 0V_B connectors back up each other.
PE	Protection earth ground connector

- The description of the branch power output connectors is shown in Table 2-2.

Table 2-2 Description of the branch power output connector

Connector	Description
-48V_A_1 to -48V_A_3	Power automatic circuit breakers. The external connector acts as the -48V branch power output connectors, corresponding to -48V_A.
-48V_B_1 to -48V_B_3	Power automatic circuit breakers. The outer connector acts as the -48V branch power output connectors, corresponding to -48V_B.
0V_A_1 to 0V_A_3 (XS1)	0V branch power output connectors, corresponding to 0V_A.
0V_B_1 to 0V_B_3 (XS2)	0V branch power output connectors, corresponding to 0V_B.

2.5.2 Alarm Terminal

- Subrack alarm aggregation terminal AlmIn1 to AlmIn3

  The AlmIn1 to AlmIn3 are all RJ45 sockets, receiving the alarm information reported by the corresponding devices in the cabinet.

- Alarm output terminal XP1

  The XP1 is a three-conductor D-type socket, outputing the alarm information to the head of row cabinet.

- Alarm output terminal XP4

  XS4 is a six-conductor D-type socket, outputing the alarm LED triger signal to the LED on the top of the cabinet.

2.5.3 Jumper Pin

JP1 is the jumper pin for selecting the working status indicator LED of the PDP. It can be set in the following two ways:

- Short pin1 and pin2 of JP1, the green LED on the top of the cabinet will indicate the working status of the PDP.
- Short pin2 and pin3 of JP1, the green LED on the top of the cabinet will be controlled by the CALL signal.

Note:

Pin2 and pin3 of JP1 are shorted by default before delivery of the PDP296B.

2.5.4 Audio Alarm Buzzer

SPK1, as the buzzer, can perform the audio alarm, generating the alarm prompt tone when an alarm occurs.

2.5.5 Lightning Protection Module

The power lightning protection module, whose card number / board number is 3.578.403 / 7.200.038, uses the standard DB-25 plug to connect with the lightning protection module socket (XS3) on the PDP. The lightning protection module can withstand the surge of 2KV (1.2/50us-8/20us combination wave) under the common mode, and withstand the surge of 1kV under the differential mode, so as to guarantee the normal work of the equipment.

2.6 Technical Specifications

The technical specifications of the PDP is shown in Table 2-3.

Table 2-3 Technical specifications of the PDP

Item		Performance Specification
Input features	Range of input voltage	-38V to -60V
	Input mode	Inducts two channels of power (active and standby)
	Maximum input current	The maximum current of a single channel of power is 96A
Output features	Range of output voltage	-38V to -60V
	Output power rails	Outputs six branch power rails
	Output current	The maximum current of a single channel of power is 32A

Table 2-3 Technical specifications of the PDP (Continued)

Item			Performance Specification
Functions		Alarm signal processing	Receives signals of alarm reported by the corresponding equipment; provides acoustic alarm according to the alarm signals, illuminates the indicator LED on the cabinet top, and outputs alarm signals to the upper-layer device (e.g. the head of row cabinet).
		Alarm-reporting function of the lightning protection module	When the lightning protection module fails to work, the PDP will output the lightning protection failure alarm signals to the equipment, and the equipment will then report the alarm to the network management system.
Electro-magnetic compatibil-ity (EMC)	EMI	Radiated emission (RE)	Complies with the EN55022 Class B
		Conducted emission (CE)	Complies with the EN55022 Class B
	EMS	ESD	Complies with the IEC61000-4-2
		RS	Complies with the IEC61000-4-3
		Electrical fast transient (EFT)	Complies with the IEC61000-4-4
		Surge	Complies with the IEC61000-4-5
		Conducted susceptibility (CS)	Complies with the IEC61000-4-6
		Voltage dip (DIP)	Complies with the IEC61000-4-29
Safety standard			Complies with the IEC60950
DC lightning protection		Differential mode lightning protection	Withstands a surge current of 8/20Us/2kA between -48V and 0V of the external power input connectors, respectively five times for the positive and negative directions. After the surge current testing, the PDP will operate normally.

Table 2-3 Technical specifications of the PDP (Continued)

Item		Performance Specification
	Common mode protection	Withstands a surge current of 8/20Us/2kA between -48V / 0V and PE of the external power input connectors, respectively five times for the positive and negative directions. After the surge current testing, the PDP will operate normally.
Environment	Operating temperature	-10℃ to 55℃
	Storage temperature	-40℃ to 70℃
	Relative humidity	≤95%
	Atmospheric pressure	70 KPa to 106KPa

3 Subrack

- Type
- Function
- Appearance
- Structure
- Slot Distribution and Typical Configuration
- Technical Specifications

3.1 Type

The subrack type is 3.061.101.

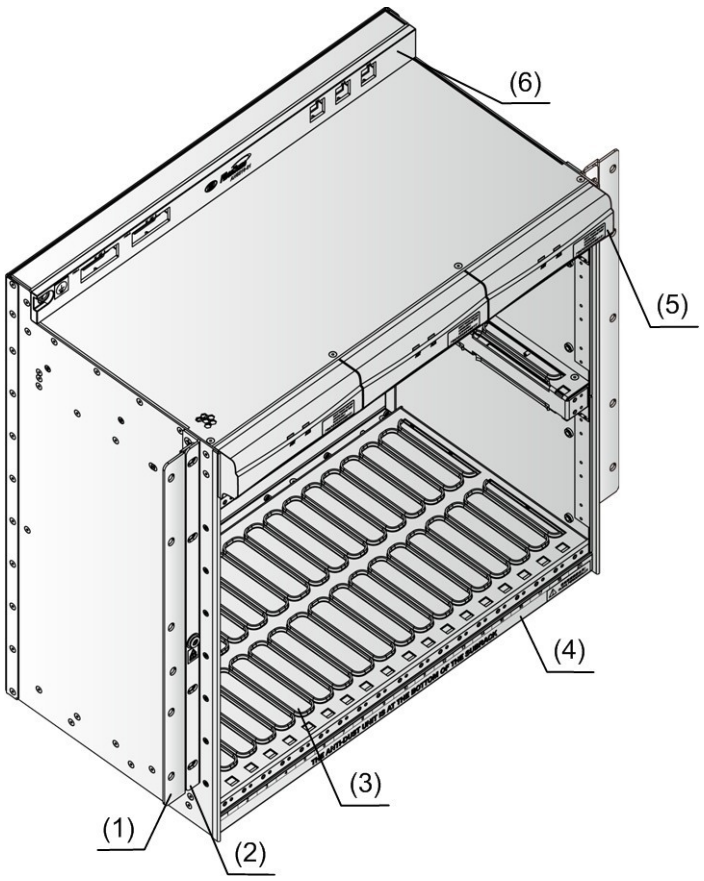
3.2 Function

You can configure different service cards for the subrack to perform various functions.

- Provides the EPON / GPON accessing.
- Provides the GE/10GE/E1/STM-1 uplinking.
- Provides other interfaces, such as alarm interface, dry contact interface, management interface and clock interface.

3.3 Appearance

The backplane of the AN5116-06B is located in the rear of the subrack. All cards of the equipment are plugged from the front of the subrack and front wiring mode is used. Figure 3-1 shows the structure and the components of the subrack.



(1) Mounting ear (2) Adaptor mounting ear (3) Card area

(4) Anti-dust screen (5) Fan Unit (6) Rear panel

Figure 3-1 Subrack structure

The description of the subrack components is shown in Table 3-1.

Table 3-1 Subrack structure description

Serial Number	Name	Main Function
(1)	Mounting ear	Secures the subrack in the 19-inch cabinet
(2)	Adaptor mounting ear	Secures the subrack in the 21-inch cabinet
(3)	Card area	Holds the cards for performing various functions of the equipment
(4)	Anti-dust screen	Protects the subrack and prevents dust intrusion

Table 3-1 Subrack structure description (Continued)

Serial Number	Name	Main Function
(5)	Fan Unit	For heat dissipation
(6)	Rear panel	Connects each modules and provides the bussing function

3.4 Structure

3.4.1 Fan Unit

3.4.1.1 Type

The fan unit type is 4127192.

3.4.1.2 Function

Located at the top of the subrack, the fan unit is used for forced air cooling, so as to ensure the equipment operation temperature is within the normal range.

3.4.1.3 Appearance

The AN5116-06B is provided with 3 fan units. Each fan unit can be installed and removed independently. The fan unit appearance is shown in Figure 3-2.

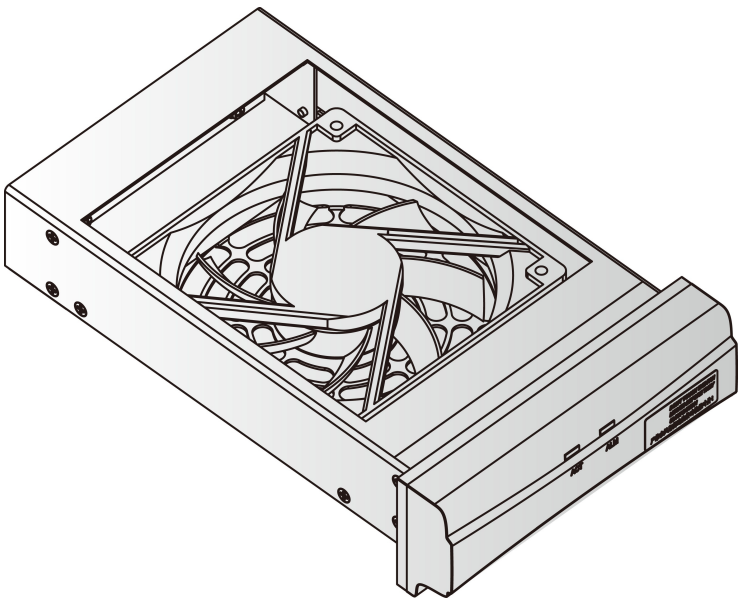


Figure 3-2 Fan Unit

3.4.1.4 Working Principle

The working principle of the fan unit is as follows:

- Located on the top of the subrack, the fan unit is used for forced air cooling. A flow of cooling air enters into the cabinet through the bottom of the subrack, passes each card in the subrack and is exhausted from the top of the cabinet.
- The fan unit is configured with the monitoring board, which can check whether the fan is working normally. The monitoring board also provides the communication between the interface and the core switch card of the AN5116-06B, and sends the detected messages to the core switch card.
- The fan unit supports speed control with 8 speed choices. The speed control modes include manual mode and intelligent mode.
  - In the manual mode, the fan unit operates at the speed set in the network management.
  - In the intelligent mode, the core switch card of the AN5116-06B automatically adjusts the fan's speed according to the detected card temperature.

3.4.1.5 Indicator LEDs

Two indicator LEDs are located on the front panel of the fan unit, whose description is shown in Table 3-2.

Table 3-2 Indicator LED description of the fan unit

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The fan unit is powered on normally.
			OFF	The fan unit is not powered on normally.
ALM	Alarm indicator	Red	ON	The fan is faulty.
			OFF	The fan is working normally.

3.4.1.6 Technical Specifications

The technical specifications of the fan unit is shown in Table 3-3.

Table 3-3 Technical specifications of the fan unit

Item	Parameter
Single fan size (height ×width×depth)	54.5mm×146.2mm×243.9mm
Single fan weight	1.52kg
Single fan power consumption	≤20W

3.4.2 Anti-dust Screen

3.4.2.1 Type

The anti-dust screen type is 405000053.

3.4.2.2 Function

The anti-dust screen is on the bottom of the subrack, for preventing the dust from entering into the subrack.

3.4.2.3 Appearance

The appearance of the anti-dust is shown in Figure 3-3.

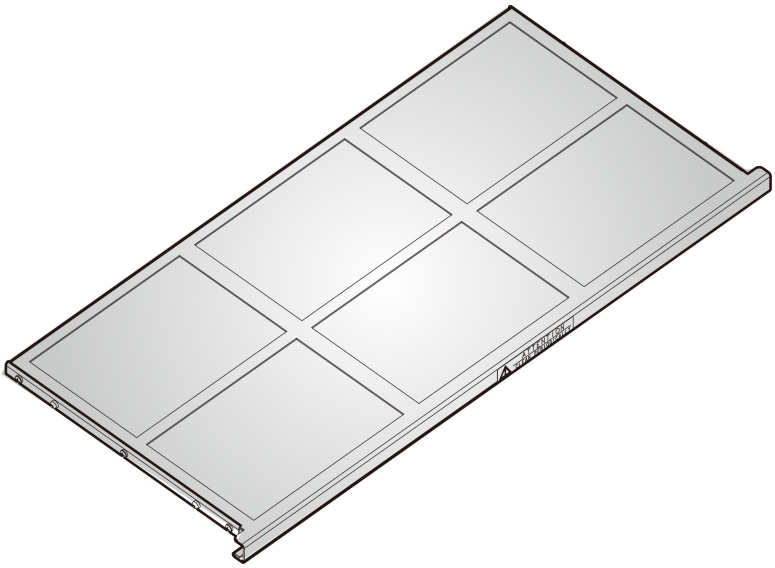


Figure 3-3 Anti-dust screen

3.4.3 Subrack Interface

3.4.3.1 Power Interface

Interface Identifier	Interface Type	Interface Number	Usage
PWR-A, PWR-B	DC –48V	2	Connects with the PDP using the subrack power line to provide DC power for the subrack.

3.4.3.2 Environmental Monitoring Interface

Interface Identifier	Interface Type	Interface Number	Usage
ESC	RJ-45	1	Not in use

3.4.3.3 Alarm Interface

Interface Identifier	Interface Type	Interface Number	Usage
ALM	RJ-45	1	Connects with the PDP using the subrack alarm line to output the subrack alarm signal to the PDP.

3.4.3.4 Out-of-band Network Management Interface

Interface Identifier	Interface Type	Interface Number	Usage
EMS	RJ-45	1	Connects with the network management computer using the network cable.

3.5 Slot Distribution and Typical Configuration

The slot distribution and typical configuration is shown in Figure 3-4.

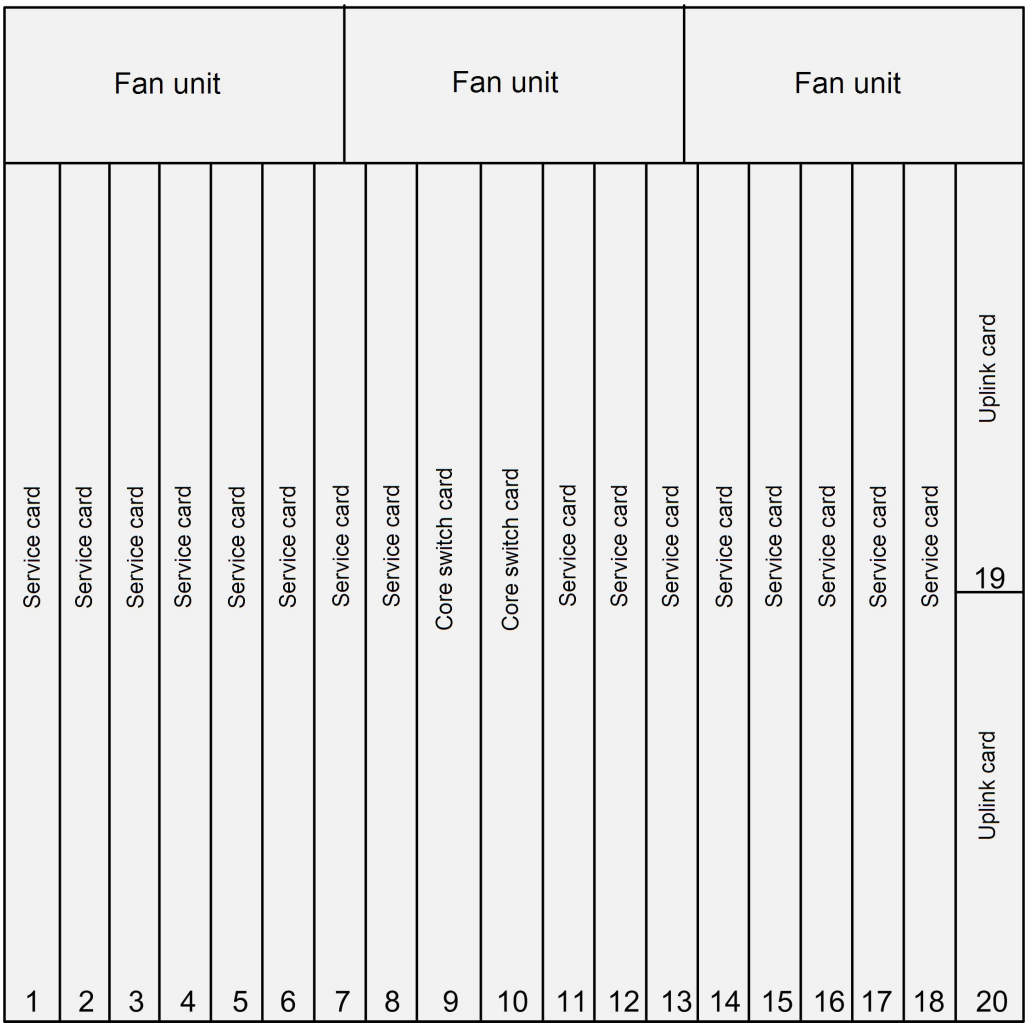


Figure 3-4 Slot distribution and typical configuration

The AN5116-06B subrack provides 20 vertical slots.

- The slots 1 to 8 and 11 to 18 are dedicated for various service cards, such as EPON interface card, 10G EPON interface card, GPON interface card, TDM interface card and public card.
- The slots 9 and 10 have wider space for the core switch cards.
- The slots 19 and 20 are two slots with half height, which are located on the right side of the subrack for the uplink cards.

3.6 Technical Specifications

AN5116-06BThe technical specifications of the subrack is shown in Table 3-4.

Table 3-4 Subrack technical specifications

Item	Parameter
Dimensions (height × width × depth)	488.2mm×480mm×255.4mm
Empty subrack weight (without fan unit)	9.3kg

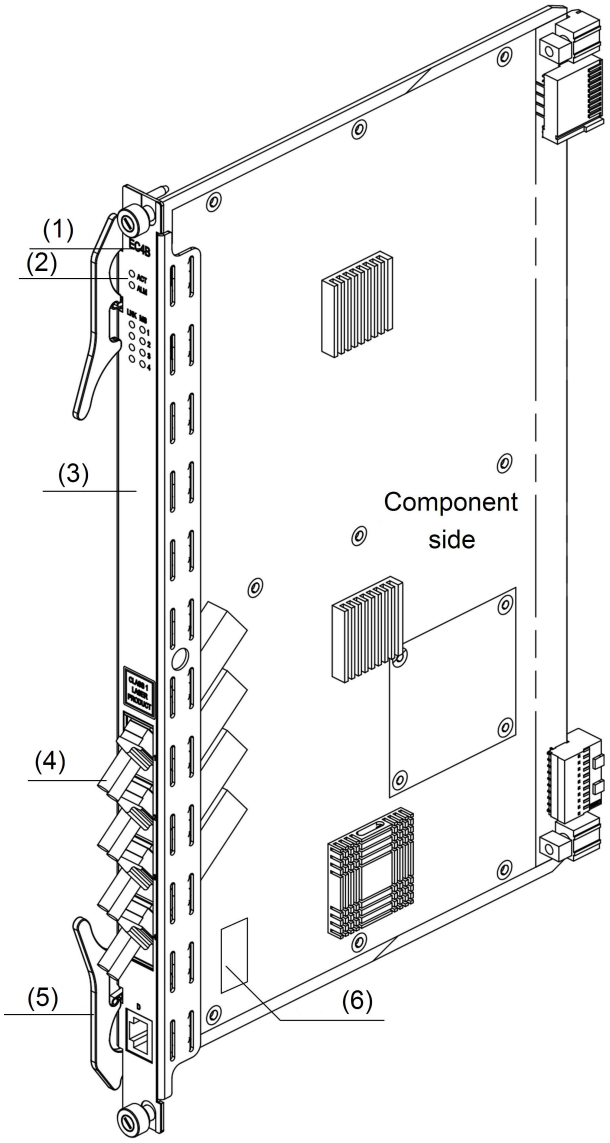
4 Card

- Card Structure
- Card Numbers
- Card Position in the System
- Relationships between Cards and Slots
- HSWA Card
- EC4B Card
- EC8B Card
- XG2B Card
- GC4B Card
- GC8B Card
- CE1B Card
- C155A Card
- HU1A Card
- HU2A Card
- GU6F Card
- PUBA Card

4.1 Card Structure

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

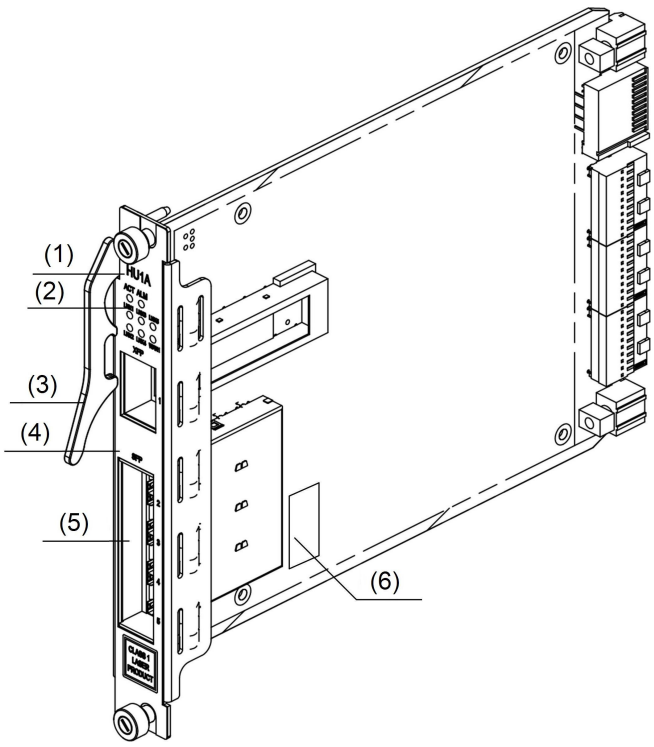
- The EC4B card whose height is 366mm is used as an example, as shown in Figure 4-1.
- The HU1A card whose height is 182mm is used as an example, as shown in Figure 4-2.



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

(4) Interface (5) Latch (6) Card number

Figure 4-1 The EC4B card structure



(1) Card name (2) LED (3) Latch

(4) Card panel (5) Interface (6) Card number

Figure 4-2 The HU1A card structure

Note:

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

4.2 Card Numbers

Table 4-1 Card numbers

Card Type	Card Name	Card Number
Core switch card	HSWA	2.115.334 (EPON)
		2.115.331 (GPON)
EPON interface card	EC4B	2.119.318
	EC8B	2.119.354
10G EPON interface card	XG2B	2.119.376
GPON interface card	GC4B	2.119.348

Table 4-1 Card numbers (Continued)

Card Type	Card Name	Card Number
	GC8B	2.200.012
TDM interface card	C155A	2.170.821
	CE1B	2.170.845
Uplink card	HU1A	2.170.846
	HU2A	2.170.854
	GU6F	2.170.855
Public Card (type A)	PUBA	2.167.177

4.3 Card Position in the System

The position of each card of the AN5116-06B in the system is shown in Figure 4-3. The card position description is shown in Table 4-2.

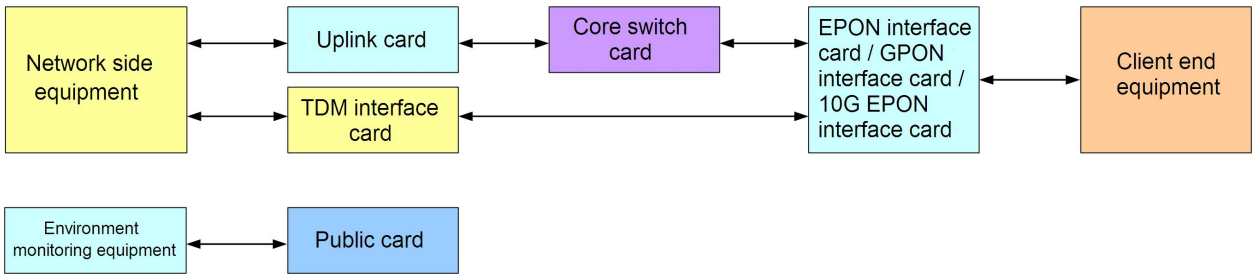


Figure 4-3 Card position in the system

Table 4-2 Card position description

Card Type	Card Name	Remark
Core switch card	HSWA	Performs the aggregation, switch and management of traffic flow; processes Layer-2 protocols; manages the troubleshooting, performance and configuration of the equipment. Provides a local Console management interface and a local Ethernet management interface.
EPON interface card	EC4B	Provides four EPON interfaces.
	EC8B	Provides eight EPON interfaces.
10G EPON interface card	XG2B	Provides two 10G EPON interfaces.
GPON interface card	GC4B	Provides four GPON interfaces.
	GC8B	Provides eight GPON interfaces.

Table 4-2 Card position description (Continued)

Card Type	Card Name	Remark
TDM interface card	C155A	Provides two STM-1 uplink optical interfaces, and performs 1+1 protection.
	CE1B	Provides 32 E1 uplink electrical interfaces.
Uplink card	HU1A	Provides four GE uplink optical / electrical interfaces and one 10GE uplink optical interface.
	HU2A	Provides two GE uplink optical / electrical interfaces and two 10GE uplink optical interfaces.
	GU6F	Provides six GE uplink optical interfaces.
Public Card (type A)	PUBA	Provides 14 dry contact alarm interfaces.

4.4 Relationships between Cards and Slots

The relationships between cards and slots are shown in Table 4-3.

Table 4-3 Relationships between cards and slots

Card Type	Slot	Card Name	Quantity
Core switch card	9, 10	HSWA	1 to 2
EPON interface card	1 to 8, 11 to 18	EC4B	0 to 16
		EC8B	0 to 16
10G EPON interface card	1 to 8, 11 to 18	XG2B	0 to 16
GPON interface card	1 to 8, 11 to 18	GC4B	0 to 16
		GC8B	0 to 16
TDM interface card	1 to 8, 11 to 18	C155A	0 to 2
	1 to 8, 11 to 18	CE1B	0 to 2
Uplink card	19, 20	HU1A	1 to 2
		HU2A	
		GU6F	
Public Card (type A)	1 to 8, 11 to 18	PUBA	0 to 1

4.5 HSWA Card

4.5.1 Type

Two types of the HSWA card: 2.115.334 and 2.115.331.

- The HSWA card of type 2.115.334 provides the EPON access function.
- The HSWA card of type 2.115.331 provides the GPON access function.

4.5.2 Function

The main functions of the HSWA card are as follows:

- Provides a RS-232 interface to connect a local CLI network management system computer.
- Supports multiple management VLANs and multiple management IPs.
- Supports up to twelve GE uplink interfaces or four 10GE uplink interfaces.
- Supports the uplink port mirroring and trunking.
- Supports PON interface protection.
- Supports multicast signaling function. Four multicast modes are provided: Proxy, Snooping, Proxy-Snooping and controllable multicast.
- Supports broadcast packet, multicast packet and unknown packet suppression and prevents generation of broadcast storms on the network.
- Supports port-based and IEEE 802.1q-based VLAN.
- Supports flexible QinQ VLAN and VLAN translation.
- Supports NGN voice; supports three voice protocols: MGCP, SIP and H.248.
- Supports remote software upgrade of all cards.
- Supports RSTP to avoid generation of loops in the network.
- Supports CoS queues and processes user services on the basis of CoS.
- Supports environmental monitoring information and alarm information reporting of the AN5516-06 and the connected ONUs.
- Supports ACL functions and has a strict security protection mechanism.

- Supports DHCP Snooping and DHCP Option 82.
- Supports traffic shaping.
- Supports Layer 2 switching function.
- Support Layer 2-7 packet classification.
- Supports ARP and ARP Proxy function.
- Supports the routing protocol (such as OSPF and RIP) uplinking.
- Supports the DHCP SERVER / RELAY/SNOOPING function.
- Supports the multicast protocol such as PIM-SM/DM and IGMPv2/v3.

4.5.3 Working Principle

The working principle of the HSWA card is shown in Figure 4-4.

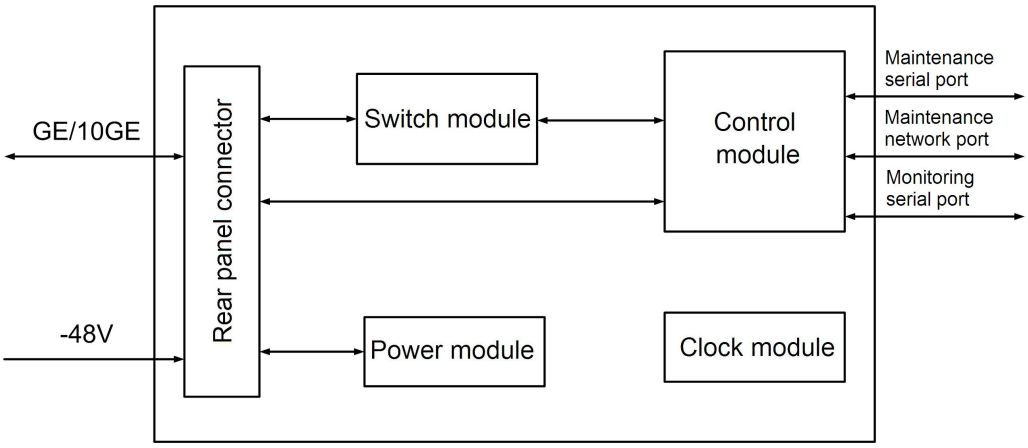


Figure 4-4 Working principle of the HSWA card

The working principle of the HSWA card is as follows.

- The control module is used for configuring the entire system, collecting and reporting statuses and providing network port and serial port.
- The switch module is used for distributing the 10GE bus.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.5.4 Panel Description

Panel

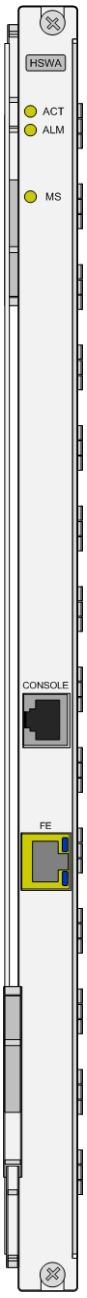


Figure 4-5 The HSWA card panel

Interface

Table 4-4 The HSWA card interface description

Interface Identifier	Meaning	Description
Console	Local Management Serial Interface	Used to connect a CLI network management computer.
FE	Local Management Ethernet Interface	Used to connect an out-of-band ANM2000 network management computer.

Indicator LEDs

Caution:

By default, the core switch card inserted in the slot 10 is the standby unit. When the ACT indicator LED of a standby card is blinking slowly, do not remove the active card or execute the command of active-to-standby switching, which may cause loss of card configuration.

Table 4-5 The HSWA card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is the standby unit and is executing a configuration command from the active card.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting or experiencing an alarm.
			OFF	The card is working normally.
MS	Active / standby status LED	Green	ON	The card is active.
			OFF	The card is standby.

4.5.5 Key Description

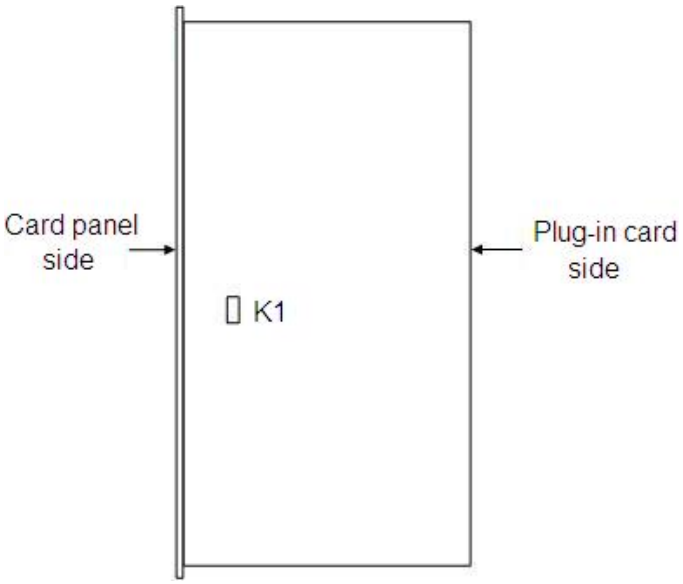


Figure 4-6 The HSWA card key location

Caution:

The reset operation may result in interruption of all services carried by the AN5116-06B. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-6 The HSWA card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.5.6 Technical Specifications

Table 4-7 The HSWA card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3u, IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE802.1p, IEEE 802.1Q, etc.
Working modes supported	10/100/1000Mbit/s, 10Gbit/s (full duplex)
Switching mode	Store-and-Forward
Capacity of the core switch card	488Gbit/s
Backplane switch rate	960Gbit/s
Maximum packet forwarding rate	14881000pps（10Gbps）
MAC address	32k
Buffer size	1Mbytes
Switching time	≤50ms
Power consumption	≤40W
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.6 EC4B Card

4.6.1 Type

The EC4B card type: 2.119.318.

4.6.2 Function

The main functions of the EC4B card are as follows:

- Provides four EPON interfaces.
- Supports multiple services including data, voice and IPTV.
- Supports IGMP proxy / snooping multicast and controllable multicast.
- Supports real-time DBA;
- Provides flexible QoS and SLA.
- Provides FEC.
- Supports local and remote loopback tests.
- Provides OAM.
- Supports automatic discovery and detection of ONUs.
- Supports pre-authorization and pre-configuration of ONUs.
- Supports ONU configuration in a batch manner.
- Provides automatic upgrade of ONU software for convenient ONU maintenance and management.
- Supports remote software upgrade of the card software.

4.6.3 Working Principle

The working principle of the EC4B card is shown in Figure 4-7.

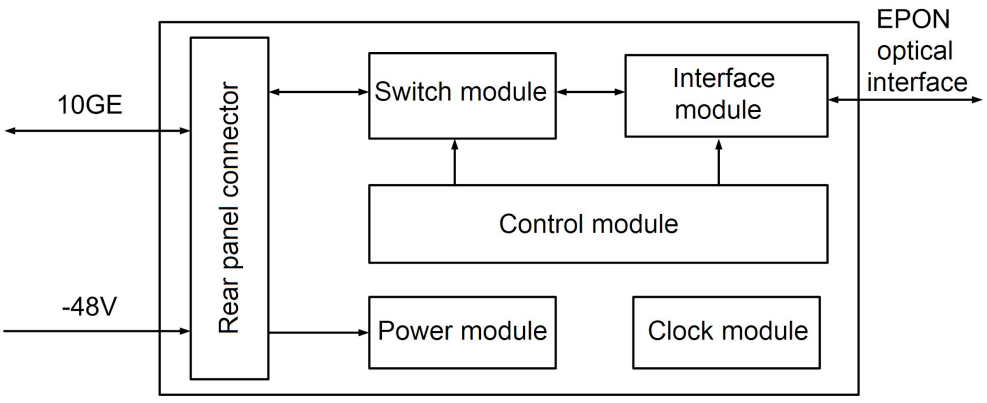


Figure 4-7 Working principle of the EC4B card

The working principle of the EC4B card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The switch module performs the signal convergence for four EPON ports.
- Interface module performs the mutual conversion between the EPON optical signal and the Ethernet messages.
- The power module receives the -48V power from the rear panel and converses it into the working power for each functional modules in this card.
- The clock module provides clock for each functional module in the card.

4.6.4 Panel Description

Panel

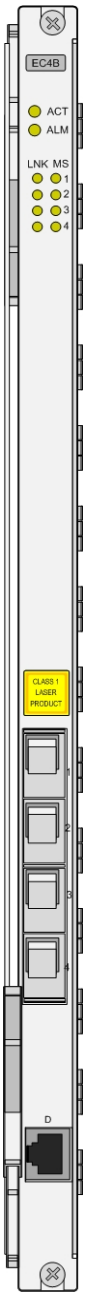


Figure 4-8 The EC4B card panel

Interface

Table 4-8 The EC4B card interface description

Interface Identifier	Meaning	Description
1 to 4	EPON interfaces 1 to 4	Connected to a remote ONU using an ODN.
D	Debugging interface	Reserved for FiberHome use.

Indicator LEDs

Table 4-9 The EC4B card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing or the software is starting. The communication link between the active card and the standby card has not been established yet.
			Blinking quickly	The card is executing a configuration command or is establishing a communication link between the active card and the standby card.
			OFF	The card has not been powered on or the software has not been started.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LINK 1 to 4	Port status LEDs	Green	ON	A remote ONU is connected and authorized.
			OFF	No remote ONU is connected or authorized.
MS 1 to 4	Active / standby status LED	Green	ON	The optical interface is active in a PON protection group.
			OFF	The optical interface is the standby unit in a PON protection group; or not configured with any PON protection group.

4.6.5 Key Description

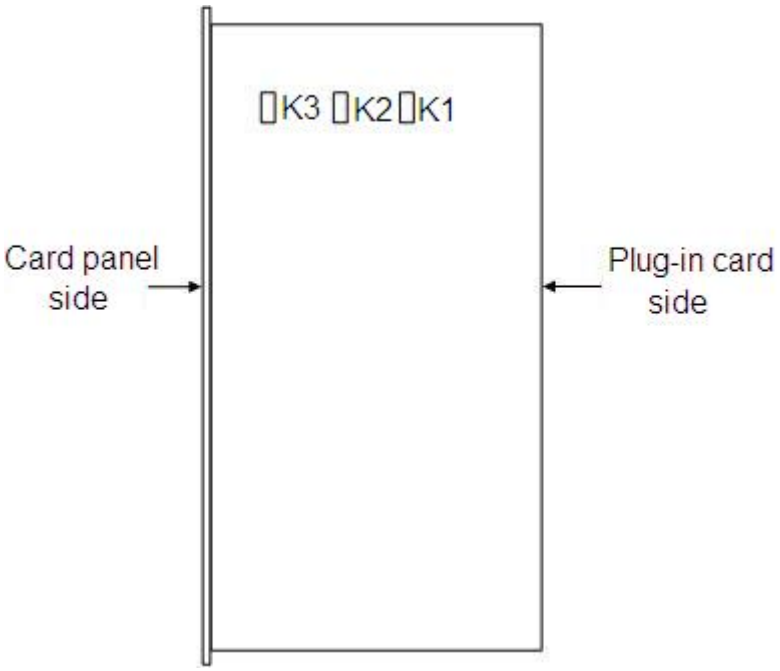


Figure 4-9 The EC4B card key location

Caution:

The reset operation may result in interruption of all ONU services carried by the EC4B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-10 The EC4B card key description

Symbol	Meaning	Description
K1	Reset key of EPON interfaces 1 & 2	For EPON1 system reset. May result in interruption of the connected ONU services of EPON interfaces 1 & 2.
K2	Reset key of EPON interfaces 3 & 4	For EPON2 system reset. May result in interruption of the connected ONU services of EPON interfaces 3 & 4.
K3	Card reset key	For card reset. May result in interruption of all connected ONU services.

4.6.6 Technical Specifications

Table 4-11 The EC4B card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3ah, IEEE802.3u, IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE802.1p, IEEE 802.1Q, etc.
Working modes supported	Full duplex / half duplex
Switching mode	Store-and-Forward
Maximum packet forwarding rate	Wire-speed forwarding
MAC address	16k
Buffer size	512Mbytes
Maximum split ratio	1:64
Maximum LLID	256
Bandwidth allocation granularity	64kbit/s
Optical fiber connector	SC/PC
Network cable	1000BASE-PX10: G.652 single-mode fiber, transmission distance ≥10km
	1000BASE-PX20: G.652 single-mode fiber, transmission distance≥20km
Power consumption	≤40W
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.7 EC8B Card

4.7.1 Type

The EC8B card type: 2.119.354.

4.7.2 Function

The main functions of the EC8B card are as follows:

- Provides eight EPON interfaces.
- Supports multiple services including data, voice and IPTV.
- Supports IGMP proxy / snooping multicast and controllable multicast.
- Supports real-time ;
- Provides flexible QoS and SLA.
- Provides FEC.
- Supports local and remote loopback tests.
- Provides OAM.
- Supports automatic discovery and detection of ONUs.
- Supports pre-authorization and pre-configuration of ONUs.
- Supports ONU configuration in a batch manner.
- Provides automatic upgrade of ONU software for convenient ONU maintenance and management.
- Supports remote software upgrade of the card software.

4.7.3 Working Principle

The working principle of the EC8B card is shown in Figure 4-10.

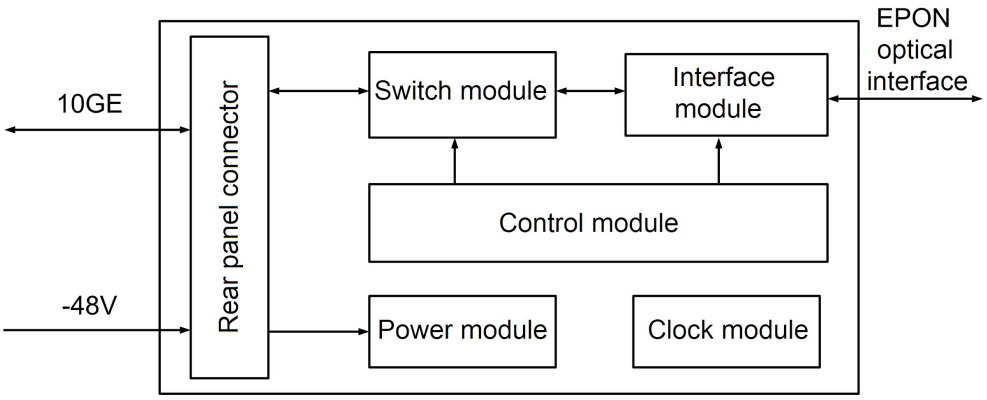


Figure 4-10 Working principle of the EC8B card

The working principle of the EC8B card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The switch module performs the signal convergence for eight EPON ports.
- Interface module performs the mutual conversion between the EPON optical signal and the Ethernet messages.
- The power module receives the -48V power from the rear panel and converses it into the working power for each functional modules in this card.
- The clock module provides clock for each functional module in the card.

4.7.4 Panel Description

Panel

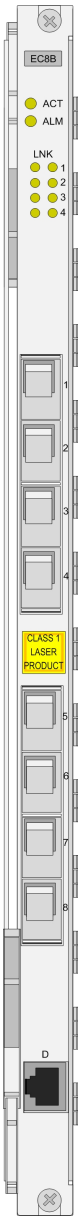


Figure 4-11 The EC8B card panel

Interface

Table 4-12 The EC8B card interface description

Interface Identifier	Meaning	Description
1 to 8	EPON interfaces 1 to 8	Connected to a remote ONU using an ODN.
D	Debugging interface	Reserved for FiberHome use.

Indicator LEDs

Table 4-13 The EC8B card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing or the software is starting. The communication link between the active card and the standby card has not been established yet.
			Blinking quickly	The card is executing a configuration command or is establishing a communication link between the active card and the standby card.
			OFF	The card has not been powered on or the software has not been started.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LINK 1 to 8	Port status LEDs	Green	ON	A remote ONU is connected and authorized.
			OFF	No remote ONU is connected or authorized.

4.7.5 Key Description

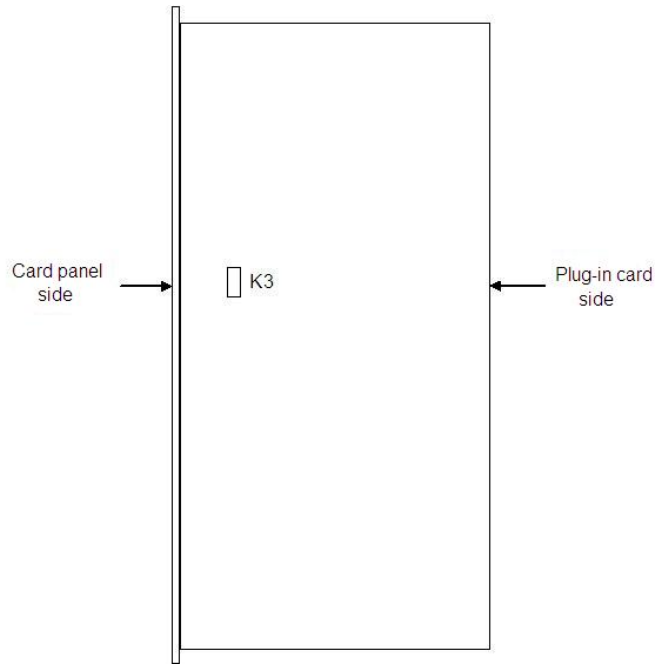


Figure 4-12 The EC8B card key location

Caution:

The reset operation may result in interruption of all ONU services carried by the EC8B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-14 The EC8B card key description

Symbol	Meaning	Description
K3	Card reset key	For resetting the card.

4.7.6 Technical Specifications

Table 4-15 The EC8B card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3ah, IEEE802.3u, IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE802.1p, IEEE 802.1Q, etc.
Working modes supported	Full duplex / half duplex
Switching mode	Store-and-Forward
Maximum packet forwarding rate	Wire-speed forwarding
MAC address	32k
Buffer size	512Mbytes
Maximum split ratio	1:64
Maximum LLID	256
Bandwidth allocation granularity	64kbit/s
Optical fiber connector	SC/PC
Network cable	1000BASE-PX10: G.652 single-mode fiber, transmission distance ≥10km
	1000BASE-PX20: G.652 single-mode fiber, transmission distance≥20km
Power consumption	≤40W
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.8 XG2B Card

4.8.1 Type

The XG2B card type: 2.119.376.

4.8.2 Function

The main functions of the XG2B card are as follows:

- Provides two 10G EPON interfaces.
- Supports 10G/1G asymmetric access mode.
- Supports multiple services including data, voice, IPTV and CATV.
- Supports IGMP proxy / snooping multicast.
- Supports real-time ;
- Provides flexible QoS and SLA.
- Provides FEC.
- Supports local and remote loopback tests.
- Provides OAM.
- Supports automatic discovery and detection of ONUs.
- Supports pre-authorization and pre-configuration of ONUs.
- Supports ONU configuration in a batch manner.
- Provides automatic upgrade of ONU software for convenient ONU maintenance and management.
- Supports remote software upgrade of the card software.
- Supports split ratio which is at least 1:128; supports PRX30 link budget.

4.8.3 Working Principle

The working principle of the XG2B card is shown in Figure 4-13.

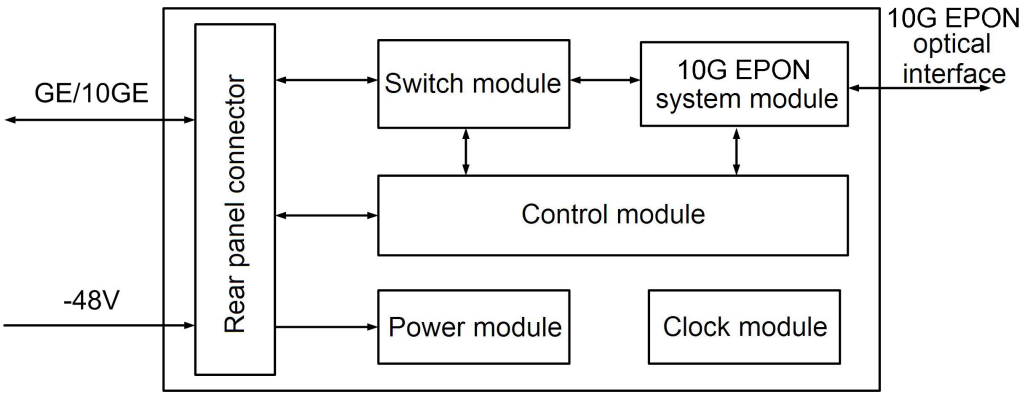


Figure 4-13 Working principle of the XG2B card

The working principle of the XG2B card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The switch module performs the signal convergence for two 10G EPON ports.
- Interface module performs the mutual conversion between the 10G EPON optical signal and the Ethernet messages.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.8.4 Panel Description

Panel

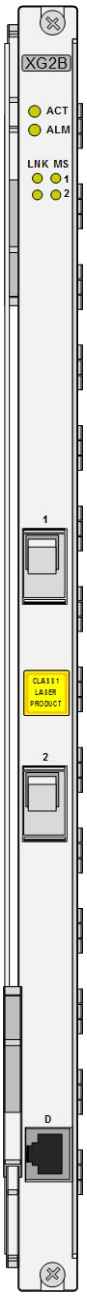


Figure 4-14 The XG2B card panel

Interface

Table 4-16 The XG2B card interface description

Interface Identifier	Meaning	Description
1 to 2	10G EPON interface 1 to 2	Connected to a remote ONU using an ODN.
D	Debugging interface	Reserved for FiberHome use.

Indicator LEDs

Table 4-17 XG2B card LED description

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing or the software is starting. The communication link between the active card and the standby card has not been established yet.
			Blinking quickly	The card is executing a configuration command or is establishing a communication link between the active card and the standby card.
			OFF	The card has not been powered on or the software has not been started.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LINK 1 to 2	Port status LEDs	Green	ON	A remote ONU is connected and authorized.
			OFF	No remote ONU is connected or authorized.
MS 1 to 2	Active / standby status LED	Green	ON	The optical interface is active in a PON protection group.
			OFF	The optical interface is the standby unit in a PON protection group; or not configured with any PON protection group.

4.8.5 Key Description

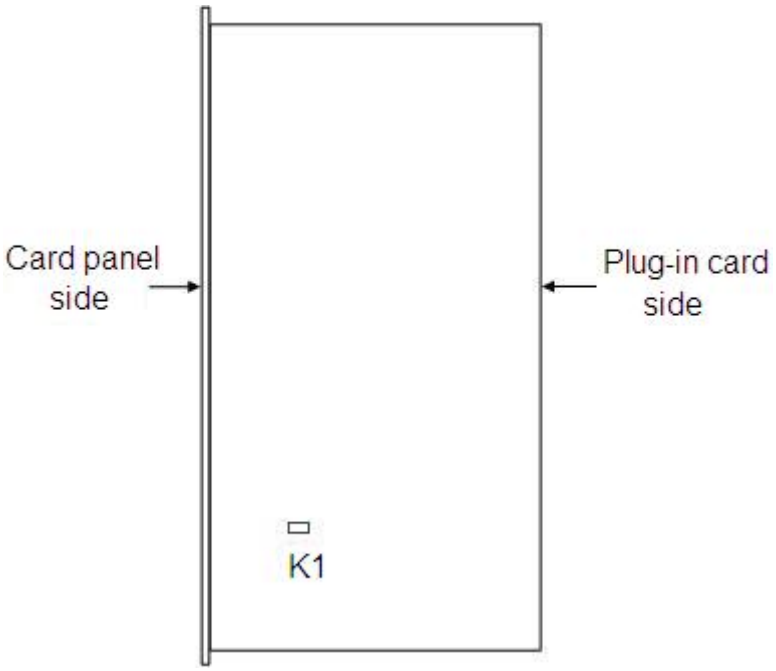


Figure 4-15 The XG2B card key location

Caution:

The reset operation may result in interruption of all ONU services carried by the XG2B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-18 The XG2B card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.8.6 Technical Specifications

Table 4-19 The XG2B card technical specifications

Item	Specification
Network standards	IEEE802.3av, IEEE802.3, IEEE802.3ah, IEEE802.3u, IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE802.1p, IEEE 802.1Q, etc.
Working modes supported	Full duplex / half duplex
Switching mode	Store-and-Forward
Maximum packet forwarding rate	Wire-speed forwarding
MAC address	16k
Buffer size	256Mbytes
Maximum split ratio	1:128
Maximum LLID	1024
Bandwidth allocation granularity	64kbit/s
Optical fiber connector	SC/PC
Network cable	10G/1GBASE-PRX30: G.652 single-mode fiber, transmission distance≥20km
Power consumption	≤40W
Operating temperature	-10℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.9 GC4B Card

4.9.1 Type

The GC4B card type: 2.119.348.

4.9.2 Function

The main functions of the GC4B card are as follows:

- Provides four GPON interfaces.
- Supports multiple services accessing including data, voice and IPTV.
- Supports IGMP proxy / snooping multicast and controllable multicast.
- Supports real-time ;
- Provides flexible QoS and SLA.
- Provides FEC.
- Supports local and remote loopback tests.
- Provides OAM.
- Supports automatic discovery and detection of ONUs.
- Supports pre-authorization and pre-configuration of ONUs.
- Supports ONU configuration in a batch manner.
- Supports remote software upgrade of the card software.

4.9.3 Working Principle

The working principle of the GC4B card is shown in Figure 4-16.

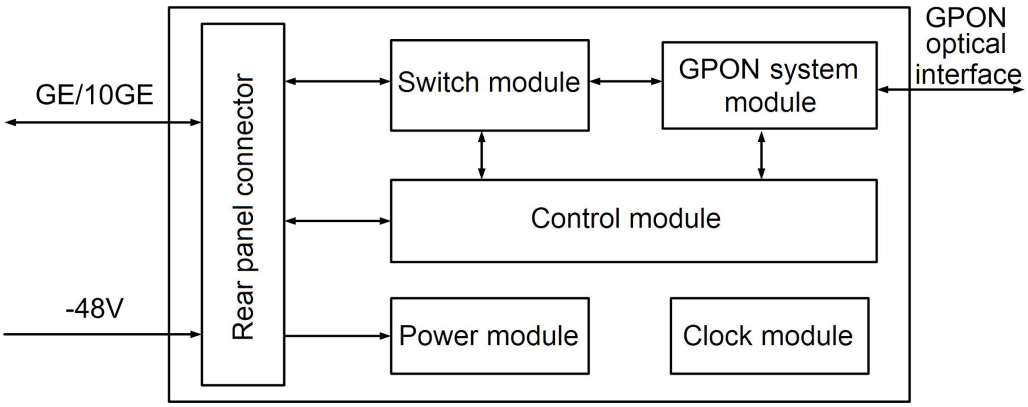


Figure 4-16 Working principle of the GC4B card

The working principle of the GC4B card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The switch module performs the signal convergence for four GPON ports.

- Interface module performs the mutual conversion between the GPON optical signal and the Ethernet messages.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.9.4 Panel Description

Panel

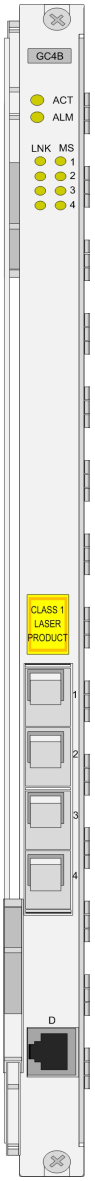


Figure 4-17 The GC4B card pane;

Interface

Table 4-20 The GC4B card interface description

Interface Identifier	Meaning	Description
1 to 4	GPON interface	Connected to a remote ONU using an ODN.
D	Debugging interface	Reserved for FiberHome use.

Indicator LEDs

Table 4-21 The GC4B card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing or the software is starting. The communication link between the active card and the standby card has not been established yet.
			Blinking quickly	The card is executing a configuration command or is establishing a communication link between the active card and the standby card.
			OFF	The card has not been powered on or the software has not been started.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LINK 1 to 4	Port status LEDs	Green	ON	A remote ONU is connected and authorized.
			OFF	No remote ONU is connected or authorized.

Table 4-21 The GC4B card indicator LEDs (Continued)

LED	Meaning	Color	Status	Description
MS 1 to 4	Authorization status LEDs	Green	ON	The ONU pre-authorization information exists in this PON port.
			OFF	The ONU pre-authorization information does not exist in this PON port.

4.9.5 Key Description

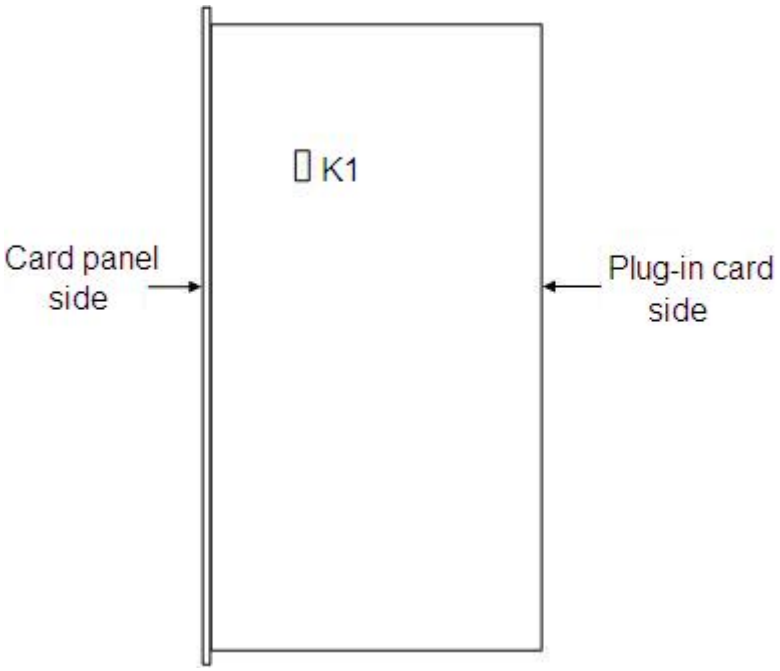


Figure 4-18 The GC4B card key location

Caution:

The reset operation may result in interruption of all ONU services carried by the GC4B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-22 The GC4B card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.9.6 Technical Specifications

Table 4-23 The GC4B card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3ah, IEEE802.3u, IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE802.1p, IEEE 802.1Q, etc.
Working modes supported	Full duplex / half duplex
Switching mode	Store-and-Forward
Maximum packet forwarding rate	14881000frame/s (10GBASE-LR)
MAC address	32k
Buffer size	128Mbytes
Maximum split ratio	1:64
Maximum Alloc ID	1k/PON
Maximum Port ID	4k/PON
Bandwidth allocation granularity	64k
Optical fiber connector	SC/PC
Network cable	G.652 single-mode fiber
Power consumption	≤40w
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.10 GC8B Card

4.10.1 Type

The GC8B card type: 2.200.012.

4.10.2 Function

The main functions of the GC8B card are as follows:

- Provides eight GPON interfaces.
- Supports multiple services accessing including data, voice and IPTV.
- Supports IGMP proxy / snooping multicast and controllable multicast.
- Supports real-time ;
- Provides flexible QoS and SLA.
- Provides FEC.
- Supports local and remote loopback tests.
- Provides OAM.
- Supports automatic discovery and detection of ONUs.
- Supports pre-authorization and pre-configuration of ONUs.
- Supports ONU configuration in a batch manner.
- Supports remote software upgrade of the card software.

4.10.3 Working Principle

The working principle of the GC8B card is shown in Figure 4-19.

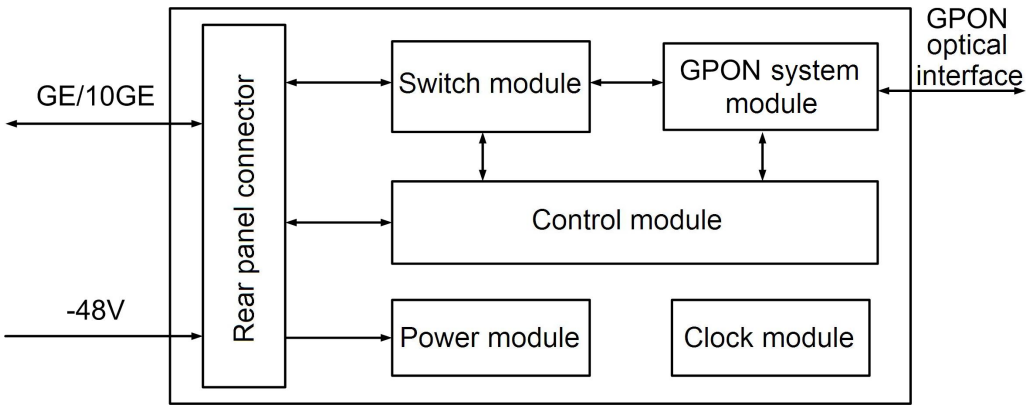


Figure 4-19 Working principle of the GC8B card

The working principle of the GC8B card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The switch module performs the signal convergence for eight GPON ports.
- Interface module performs the mutual conversion between the GPON optical signal and the Ethernet messages.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.10.4 Panel Description

Panel

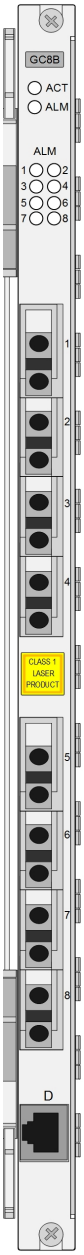


Figure 4-20 The GC8B card panel

Interface

Table 4-24 The GC8B card interface description

Interface Identifier	Meaning	Description
1 to 8	GPON interface	Connected to a remote ONU using an ODN.
D	Debugging interface	Reserved for FiberHome use.

Indicator LEDs

Table 4-25 The GC8B card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing or the software is starting. The communication link between the active card and the standby card has not been established yet.
			Blinking quickly	The card is executing a configuration command or is establishing a communication link between the active card and the standby card.
			OFF	The card has not been powered on or the software has not been started.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LINK 1 to 8	Port status LEDs	Green	ON	A remote ONU is connected and authorized.
			OFF	No remote ONU is connected or authorized.

4.10.5 Key Description

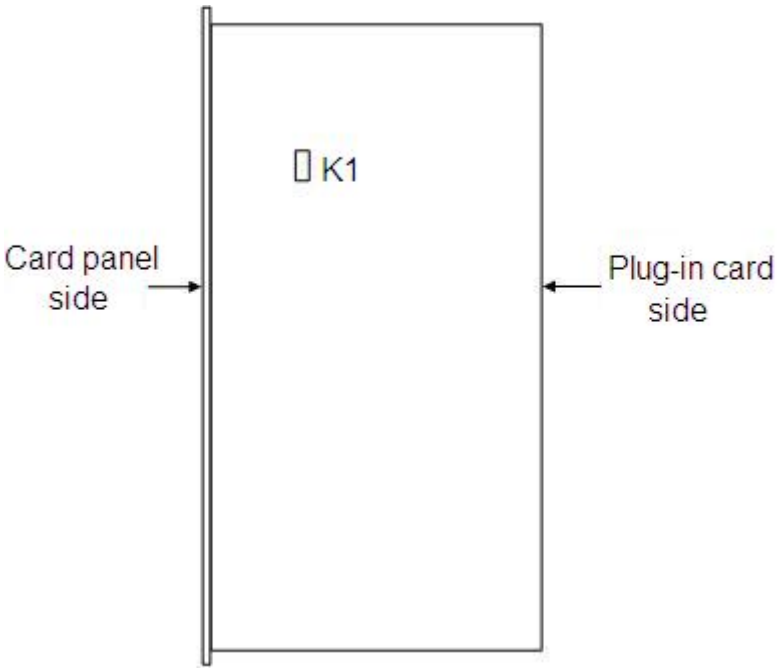


Figure 4-21 The GC8B card key location

Caution:

The reset operation may result in interruption of all ONU services carried by the GC8B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-26 The GC8B card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.10.6 Technical Specifications

Table 4-27 The GC8B card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3ah, IEEE802.3u, IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE802.1p, IEEE 802.1Q, etc.
Working modes supported	Full duplex / half duplex
Switching mode	Store-and-Forward
Maximum packet forwarding rate	14881000frame/s (10GBASE-LR)
MAC address	32k
Buffer size	256Mbytes
Maximum split ratio	1:64
Maximum Alloc ID	1k/PON
Maximum Port ID	4k/PON
Bandwidth allocation granularity	64k
Optical fiber connector	SC/PC
Network cable	G.652 single-mode fiber
Power consumption	≤40w
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.11 CE1B Card

4.11.1 Type

The CE1B card type: 2.170.845.

4.11.2 Function

The main functions of the CE1B card are as follows:

- Provides 32 E1 uplink electrical interfaces.
- Supports E1 circuit emulation.
- Supports four clock acquisition modes: Clock extraction from the input E1 line, external input reference clock, internal free running clock and clock received from other clock cards. The clock acquisition modes can be selected according to the network condition.

4.11.3 Working Principle

The working principle of the CE1B card is shown in Figure 4-22.

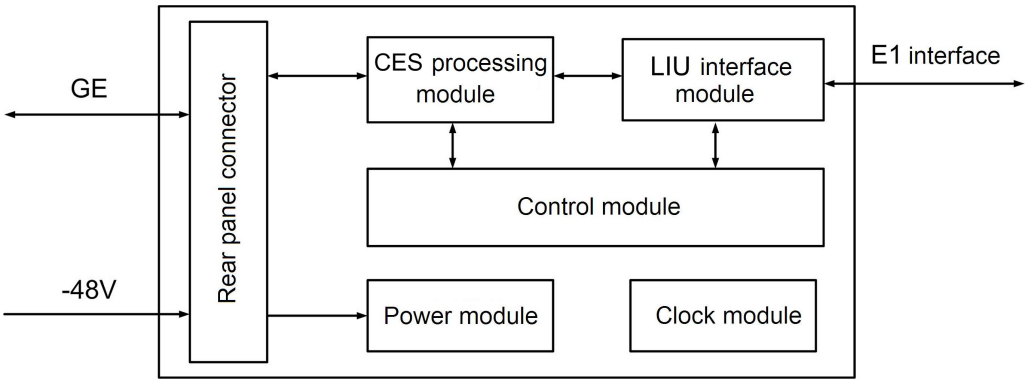


Figure 4-22 Working principle of the CE1B card

The working principle of the CE1B card is as follows.

- The CES processing module performs the conversion between the Ethernet messages and the TDM signal.
- The LIU interface module provides E1 interface for user.
- The control module performs the management and control for the entire card.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.11.4 Panel Description

Panel

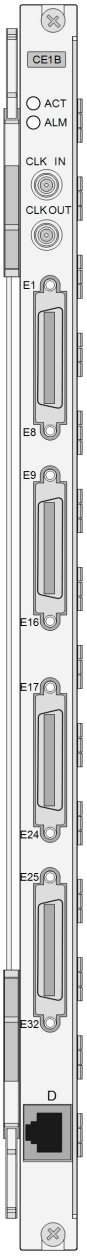


Figure 4-23 The CE1B panel

Interface

Table 4-28 The CE1B card interface description

Interface Identifier	Meaning	Description
E1 to E32	E1 interface	Provides E1 interfaces and is connected with the transmission network.
CLIK IN	Clock input interface	Inducts the external clock.
CLIK OUT	Clock output interface	Connects the clock input of cascade equipment to synchronize the clock.

Indicator LEDs

Table 4-29 The CE1B card LEDs description

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is executing a configuration command.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.

4.11.5 Key Description

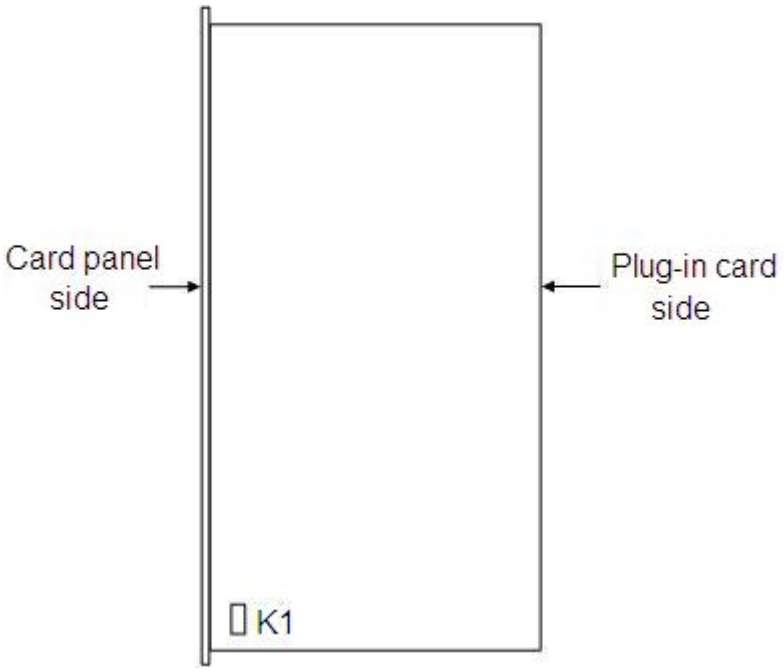


Figure 4-24 The CE1B card key location

Caution:

The reset operation may result in interruption of all services carried by the CE1B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-30 The CE1B card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.11.6 Technical Specifications

Table 4-31 The CE1B card technical specifications

Item	Specification
Network standards	IEEE802.3, PWE3, G.825
Working modes supported	75Ω unbalanced
Delay	Loopback delay <3ms
Bit error ratio	Bit error free for 24 hours
Power consumption	≤40W
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.12 C155A Card

4.12.1 Type

The C155A card type: 2.170.821.

4.12.2 Function

The main functions of the C155A card are as follows:

- Provides two STM-1 uplink optical interfaces and implements 1+1 protection.
- Supports E1 circuit emulation.
- Supports four clock acquisition modes: Clock extraction from the input E1 line, external input reference clock, internal free running clock and clock received from other clock cards. The clock acquisition modes can be selected according to the network condition.

4.12.3 Working Principle

The working principle of the C155A card is shown in Figure 4-25.

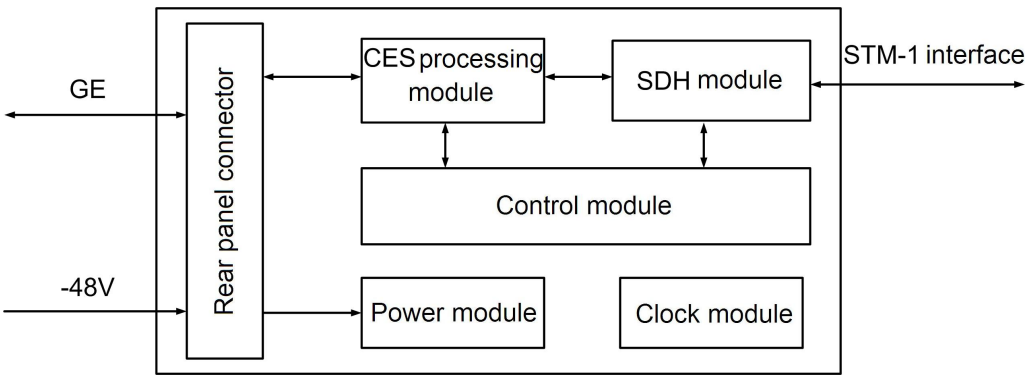


Figure 4-25 Working principle of the C155A card

The working principle of the C155A card is as follows.

- The CES processing module performs the conversion between the Ethernet messages and the TDM signal.
- The SDH module performs the conversion between the E1 signal and the STM-1 signal.
- The control module performs the management and control for the entire card.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.12.4 Panel Description

Panel

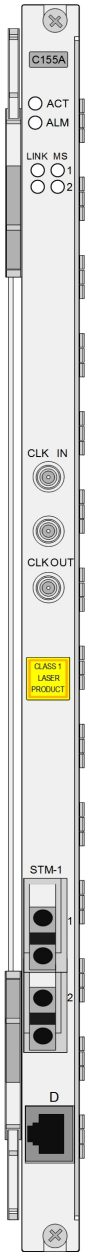


Figure 4-26 The C155A card panel

Interface

Table 4-32 The C155A card interface description

Interface Identifier	Meaning	Description
CLK IN 1	Clock input interface	The first external clock input.
CLK IN 2	Clock input interface	The second external clock input.
CLK OUT	Clock output interface	The external clock output.
STM-1 1 to 2	STM-1 uplink optical interface	Provides two STM-1 optical interfaces and is connected with the transmission network. If the two interfaces are used at the same time, optical interface 1 will be active by default.

Indicator LEDs

Table 4-33 The C155A card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is executing a configuration command.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LINK 1 to 2	Port status LEDs	Green	ON	This optical interface is connected with the equipment on the far end.
			Blinking quickly	The optical interface is transmitting or receiving data.

Table 4-33 The C155A card indicator LEDs (Continued)

LED	Meaning	Color	Status	Description
			OFF	This optical interface is not connected with the equipment on the far end.
MS 1 to 2	Active / standby status LED	Green	ON	The optical interface is active.
			OFF	The optical interface is the standby unit.

4.12.5 Key Description

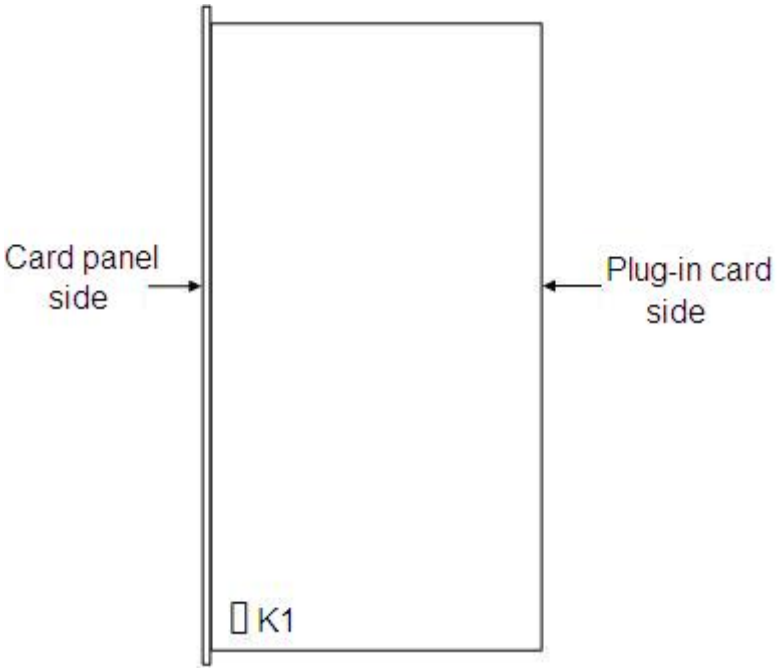


Figure 4-27 The C155A card key location

Caution:

The reset operation may result in interruption of all services carried by the CE1B card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-34 The C155A card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.12.6 Technical Specifications

Table 4-35 The C155A card technical specifications

Item	Specification
Network standards	IEEE802.3, PWE3, G.825
Working modes supported	STM-1
Delay	Loopback delay <3ms
Bit error ratio	Free of bit error in 24 hours.
Power consumption	≤40w
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.13 HU1A Card

4.13.1 Type

The HU1A card type: 2.170.846.

4.13.2 Function

The main functions of the HU1A card are as follows:

- Provides four GE uplink optical / electrical interfaces and one 10GE uplink optical interface.
- Each uplink interface can be used as an in-band network management interface to connect a network management computer.

- Each uplink interface can be used as a cascade interface allowing multiple devices to be cascaded to the IP network via a single IP port.

4.13.3 Working Principle

The working principle of the HU1A card is shown in Figure 4-28.

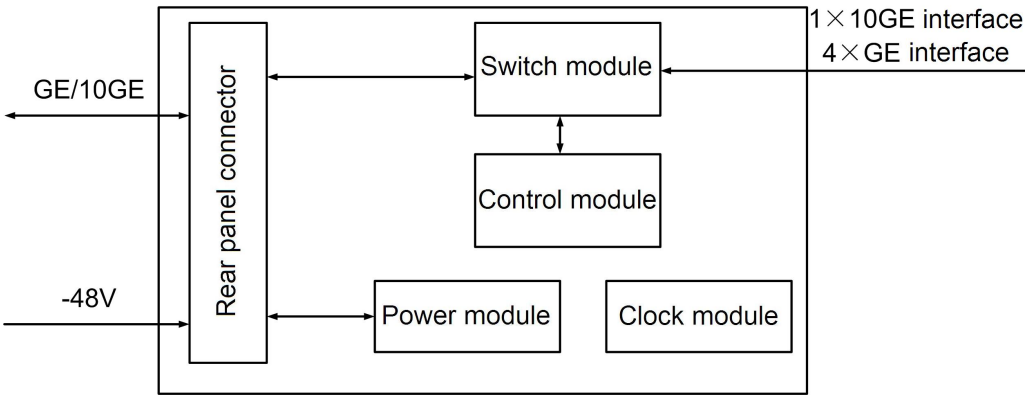


Figure 4-28 Working principle of the HU1A card

The working principle of the HU1A card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The conversion module performs the data transparent transmission.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.13.4 Panel Description

Panel

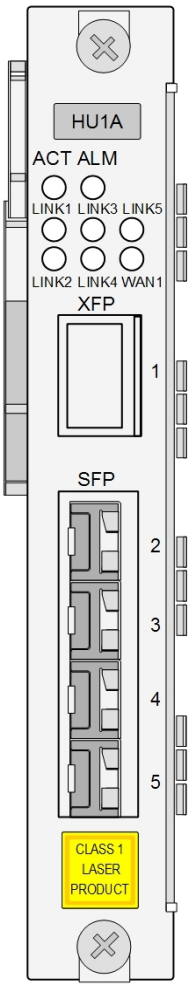


Figure 4-29 The HU1A card panel

Interface

Table 4-36 The HU1A card interface description

Interface Identifier	Meaning	Description
XFP 1	10GE uplink optical interface	Provides10GE uplink optical interface and is connected with the IP network.
SFP 2 to 5	GE uplink optical / electrical interface	Provides GE uplink optical / electrical interface and is connected with the IP network. The four GE uplink optical interfaces support the replacement of GE optical / electrical module; uplink optical interfaces 3 and 4 are self-adaptive to the opposite-end equipment.

Indicator LEDs

Table 4-37 The HU1A card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is executing a configuration command.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LNK1 to LNK5	Port status LEDs	Green	ON	The port is linked up with the higher layer equipment, for example, switches.
			Blinking quickly	The uplink port is transmitting data to or receiving data from the upper level equipment.
			OFF	The port is not linked up.

Table 4-37 The HU1A card indicator LEDs (Continued)

LED	Meaning	Color	Status	Description
WAN1	WAN / LAN LED	Green	ON	The WAN mode of 10GE interface.
			OFF	The LAN mode of 10GE interface.

4.13.5 Technical Specifications

Table 4-38 The HU1A card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3z, IEEE802.3ae, etc.
Optical module interface standard	XENPAK/X2 3.0, XPAK MSA, XFP/XFI/SFP+, etc.
Working modes supported	1000Mbps, 10Gbps (full duplex)
Power consumption	≤10w
Operating temperature	0℃ to 45℃
Storage temperature	-30℃ to 60℃
Storage humidity	10% to 90%

4.14 HU2A Card

4.14.1 Type

The HU2A card type: 2.170.854.

4.14.2 Function

The main functions of the HU2A card are as follows:

- Provides two GE uplink optical / electrical interfaces and two 10GE uplink optical interfaces.

- Each uplink interface can be used as an in-band network management interface to connect a network management computer.
- Each uplink interface can be used as a cascade interface allowing multiple devices to be cascaded to the IP network via a single IP port.

4.14.3 Working Principle

The working principle of the HU2A card is shown in Figure 4-30.

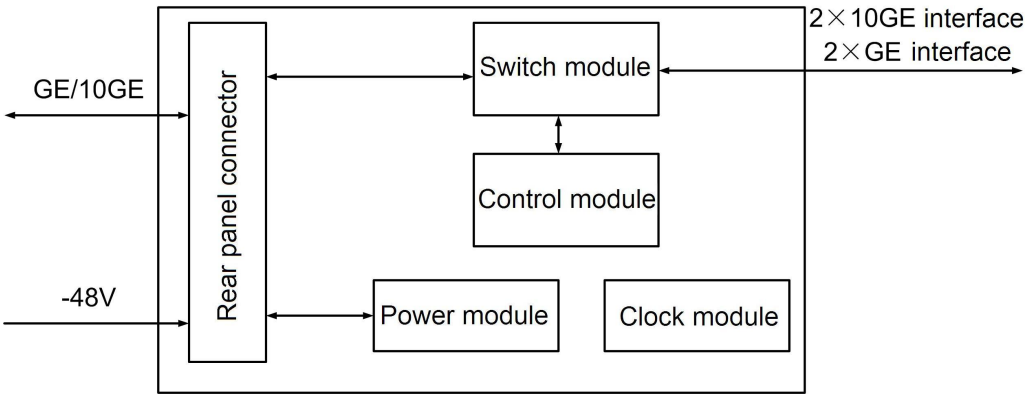


Figure 4-30 Working principle of the HU2A card

The working principle of the HU2A card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The conversion module performs the data transparent transmission.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.14.4 Panel Description

Panel

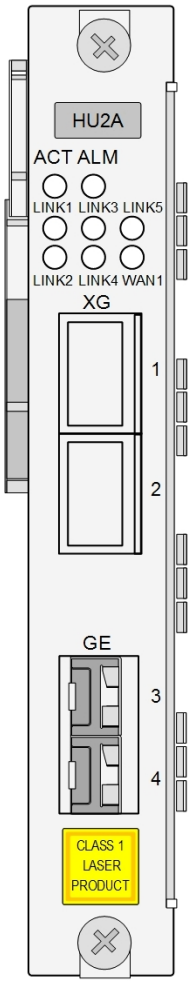


Figure 4-31 The HU2A card panel

Interface

Table 4-39 The HU2A card interface description

Interface Identifier	Meaning	Description
XG 1 to 2	10GE uplink optical interface	Provides10GE uplink optical interface and is connected with the IP network.
GE 3 to 4	GE uplink optical / electrical interface	Provides GE uplink optical / electrical interface and is connected with the IP network. Replaces the optical / electrical module to select the optical / electrical interface

Indicator LEDs

Table 4-40 The HU2A card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is executing a configuration command.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LNK1 to LNK4	Port status LEDs	Green	ON	The port is linked up with the higher layer equipment, for example, switches.
			Blinking quickly	The uplink port is transmitting data to or receiving data from the upper level equipment.
			OFF	The port is not linked up.
WAN1 to WAN2	WAN / LAN LED	Green	ON	The WAN mode of 10GE interface.
			OFF	The LAN mode of 10GE interface.

4.14.5 Technical Specifications

Table 4-41 The HU2A card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3ae, etc.
Optical module interface standard	XENPAK/X2 3.0, XPAK MSA, XFP/XFI/SFP+, etc.
Working modes supported	1000Mbps, 10Gbps (full duplex)

Table 4-41 The HU2A card technical specifications (Continued)

Item	Specification
Power consumption	≤10w
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.15 GU6F Card

4.15.1 Type

The GU6F card type: 2.170.855.

4.15.2 Function

The main functions of the GU6F card are as follows:

- Provides six GE uplink optical interfaces.
- Each uplink interface can be used as an in-band network management interface to connect a network management computer.
- Each uplink interface can be used as a cascade interface allowing multiple devices to be cascaded to the IP network via a single IP port.

4.15.3 Working Principle

The working principle of the GU6F card is shown in Figure 4-32.

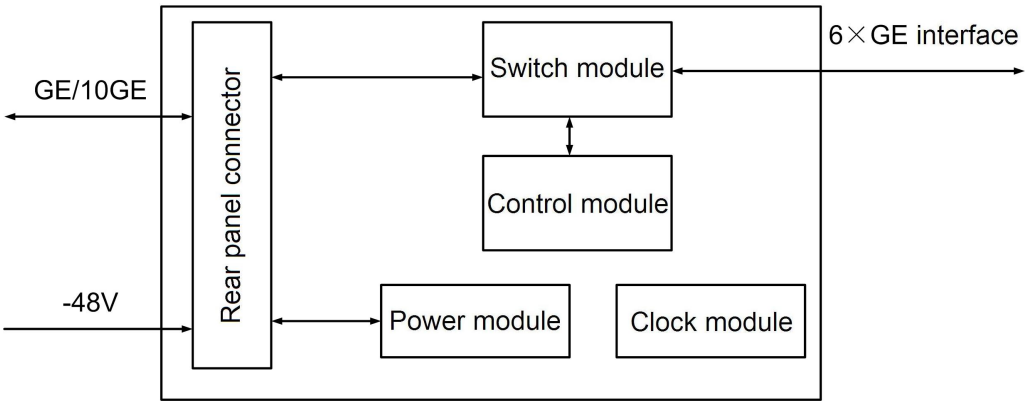


Figure 4-32 Working principle of the GU6F card

The working principle of the GU6F card is as follows.

- The control module performs the functions such as software loading, operation control and management for the card.
- The conversion module performs the data transparent transmission.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.15.4 Panel Description

Panel

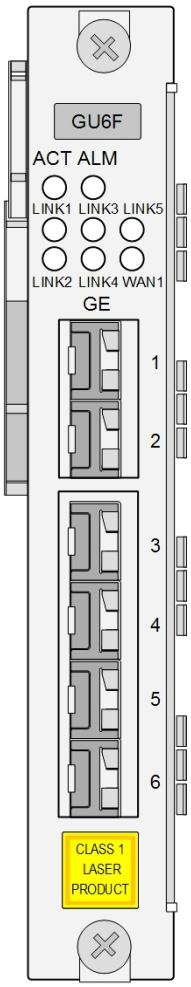


Figure 4-33 The GU6F card panel

Interface

Table 4-42 The GU6F card interface description

Interface Identifier	Meaning	Description
GE 1 to 6	GE uplink optical / electrical interface	Provides GE uplink optical / electrical interface and is connected with the IP network. Users can replace the optical / electrical module to select the corresponding optical / electrical interface. Among these interfaces, the optical interfaces 3 and 4 are auto negotiate to rates 10/100/1000M.

Indicator LEDs

Table 4-43 The GU6F card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is executing a configuration command.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.
LNK1 to LNK6	Port status LEDs	Green	ON	The port is linked up with the higher layer equipment, for example, switches.
			Blinking quickly	The uplink port is transmitting data to or receiving data from the upper level equipment.
			OFF	The port is not linked up.

4.15.5 Technical Specifications

Table 4-44 The GU6F card technical specifications

Item	Specification
Network standards	IEEE802.3, IEEE802.3z, etc.
Optical module interface standard	XENPAK/X2 3.0, XPAK MSA, XFP/XFI/SFP+, etc.
Working modes supported	1000Mbps (full duplex)
Power consumption	≤10w
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

4.16 PUBA Card

4.16.1 Type

The PUBA card type: 2.167.177.

4.16.2 Function

The main functions of the PUBA card are as follows:

- Provides interfaces for signals of 14 dry contacts.

4.16.3 Working Principle

The working principle of the PUBA card is shown in Figure 4-34.

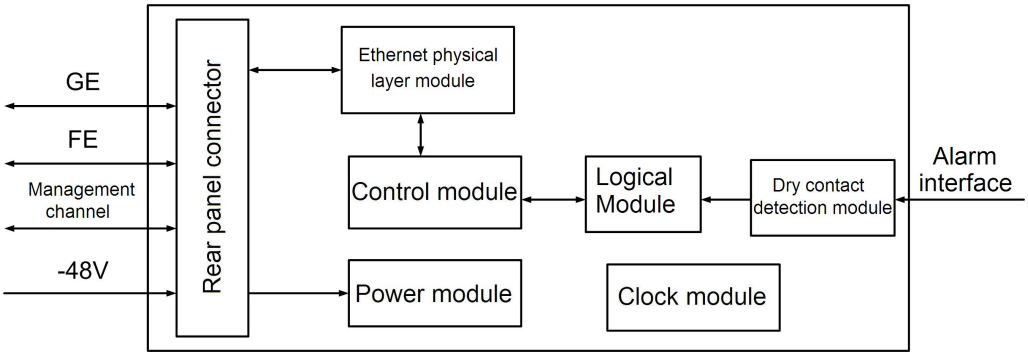


Figure 4-34 Working principle of the PUBA card

The working principle of the PUBA card is as follows.

- The control module performs the management and control for the functions of the card.
- The dry contact detection module receives the dry contact signal and send the signal to the control module via the logical module.
- The Ethernet physical layer module performs the signal conversion in the physical layer.
- The power module provides power for each functional module in the card.
- The clock module provides clock for each functional module in the card.

4.16.4 Panel Description

Panel

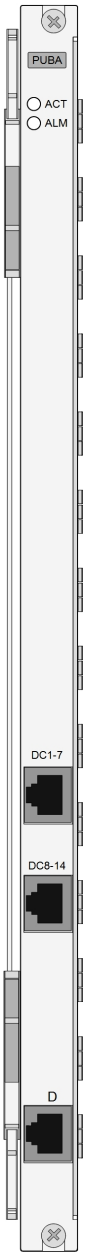


Figure 4-35 PUBA card panel

Interface

Table 4-45 The PUBA card interface description

Interface Identifier	Meaning	Description
DC1-7/DC8-14	Environmental Monitoring Interface	Used to connect dry contact signals.
D	Debugging interface	Reserved for FiberHome use.

Indicator LEDs

Table 4-46 The PUBA card indicator LEDs

LED	Meaning	Color	Status	Description
ACT	Operation indicator	Green	ON	The card is working normally.
			Blinking slowly	The card is initializing.
			Blinking quickly	The card is executing a configuration command.
			OFF	The card has not been powered up.
ALM	Alarm indicator	Red	ON	The card is resetting, experiencing an alarm or has failed to establish a communication link between the active card and the standby card.
			OFF	The card is working normally.

4.16.5 Key Description

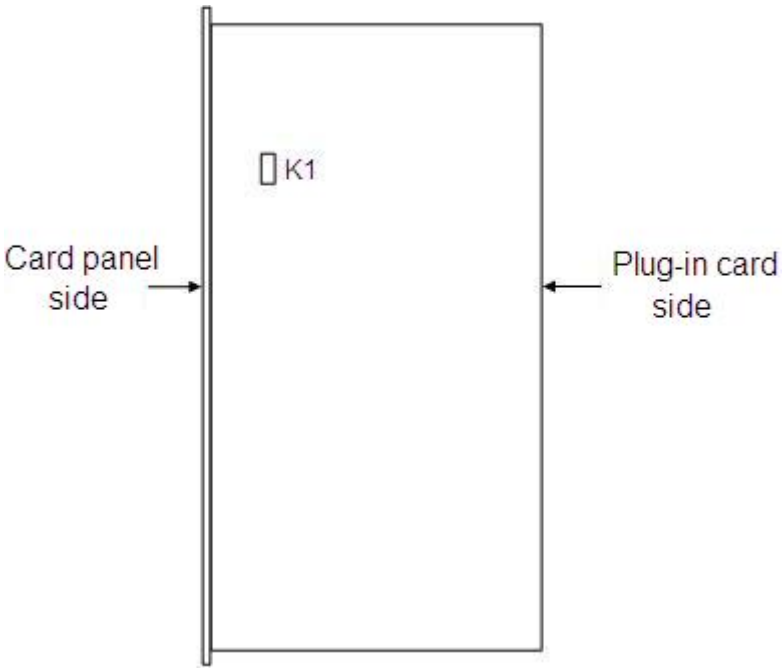


Figure 4-36 The PUBA card key location

Caution:

The reset operation may result in communication interruption of the card. The reset operation is generally conducted in course of the card maintenance and upgrade. It is not recommended that the user directly issue a reset command using the reset key.

Table 4-47 The PUBA card key description

Symbol	Meaning	Description
K1	Card reset key	For resetting the card.

4.16.6 Technical Specifications

Table 4-48 The PUBA card technical specifications

Item	Specification
Network standards	IEEE802.3ah, IEEE802.3, IEEE802.3u , IEEE 802.3z , IEEE802.3x, IEEE 802.1d, IEEE 802.1p, IEEE 802.1Q, etc.
Switching mode	Store-and-Forward
Power consumption	≤10w
Operating temperature	0℃ to 45℃
Ambient temperature for storage	-30℃ to 60℃
Ambient humidity for storage	10% to 90%

5 Wires and Cables

- ☑ Introduction of Wires and Cables
- ☑ Power Cable
- ☑ Protection Earth Ground Cable
- ☑ Alarm Cable
- ☑ Fiber Jumper
- ☑ Network cable
- ☑ Coaxial E1 Cable
- ☑ Coaxial Clock Cable
- ☑ Serial Port Cable
- ☑ Dry Contact Cable

5.1 Introduction of Wires and Cables

- The internal cables refer to the cables that are connected inside the cabinet. These are usually connected before delivery.
- The external cables refer to the cables that connect the cabinet with the external equipment. These cables need to be connected on site.

Table 5-1 shows the usage of the wires and cables

Table 5-1 Usage of the wires and cables

Category	Name	Usage
Internal cables	The cabinet protection earth ground cable	Performs the cabinet protection earth grounding.
	Subrack power cable	Inducts the branch power supplies from the PDP to the subracks
	The subrack protection earth ground cable	Performs the subrack protection earth grounding.
	The subrack alarm cable	Inducts the subrack alarms to the PDP.
External cables	Cabinet power cable	Connects the external power supplies to the equipment.
	Alarm cable for the head of row cabinet	Inducts the equipment alarms to the head of row cabinet
	Clock cable	Connects the CLK interface of the TDM interface card and the external clock equipment.
	Dry contact cable	Connects the public card DC1-7 or DC8-14 and the dry contact equipment.
	Network management cable	Connects the Ethernet electrical interface of the uplink card and the network management computer, and connects the Ethernet interface of the core switch card and the out-of-band network management computer.
	Ethernet cable	Connects the Ethernet electrical interface of the uplink card and the uplink equipment.
	Serial port line	Connects the CONSOLE interface of the core switch card the serial port of the network management computer.

Table 5-1 Usage of the wires and cables (Continued)

Category	Name	Usage
	Optical fiber	Connects the optical interface of the card and the ODF side.

5.2 Power Cable

5.2.1 Cabinet Power Cable

5.2.1.1 Type

The cabinet power cable is composed of three cables:

- The blue power cable is the DC -48V power cable, whose type number is 408000076 (preference, 16mm^2) and 408000021 (standby, 25mm^2).
- The black power cable is the working earth ground cable, whose type number is 408000075 (preference, 16mm^2) and 408000020 (standby, 25mm^2).
- The yellow power cable is the protection earth ground cable, whose type number is 408000041 (preference, 16mm^2) and 408000019 (standby, 25mm^2).

5.2.1.2 Usage

The cabinet power cable is used to input power from the equipment room to the PDP in the cabinet.

5.2.1.3 Structure

As shown in Figure 5-1, the one end of the cabinet power cable is the uninsulated ring terminal and the other end is the naked wire. The naked wire colors include blue, black and yellow - / green .

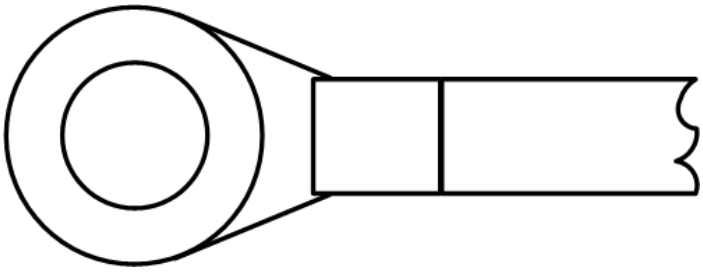


Figure 5-1 Cabinet power cable

5.2.1.4 Wiring Scheme

Table 5-2 shows the wiring scheme of the cabinet power cable.

Table 5-2 Wiring scheme of the cabinet power cable.

Cable Name	Terminal	Connection Description
Cabinet power cable	The uninsulated ring terminal of the blue cable	Connects with the -48V_A / -48V_B end of the PDP
	The uninsulated ring terminal of the black cable	Connects with the 0V_A / 0V_B end of the PDP
	The uninsulated ring terminal of the yellow cable	Connects with the PE end of the PDP
	Naked wire end	Connects with the equipment room power

5.2.1.5 Technical Specifications

The technical specifications of the cabinet power cable is shown in Table 5-3.

Table 5-3 Technical specifications of the cabinet power cable

Parameter Item	Specifications (408000076 / 408000075 / 408000041)	Specifications (408000021 / 408000020 / 408000019)
Cable type	Double-sheathed heat-resistant (withstanding a temperature up to105℃) single-core soft cable	Double-sheathed heat-resistant (withstanding a temperature up to105℃) single-core soft cable
Color	Blue, black, yellow - / green	Blue, black, yellow - / green

Table 5-3 Technical specifications of the cabinet power cable (Continued)

Parameter Item	Specifications (408000076 / 408000075 / 408000041)	Specifications (408000021 / 408000020 / 408000019)
Maximum current	80A	100A
Conductor cross-sectional area	16mm^2	25mm^2

5.2.2 Subrack Power Cable

5.2.2.1 Type

The Type of the subrack power cable is 3.696.229.

5.2.2.2 Usage

The subrack power cable is used to connect the PDP and the subrack and provide both the active and standby power supplies for the subracks. The subrack power cables have already been connected in the cabinet before delivery.

5.2.2.3 Structure

As shown in Figure 5-2, one end of the subrack power cable is two tube terminals and the other end is a D type three-conductor plug.

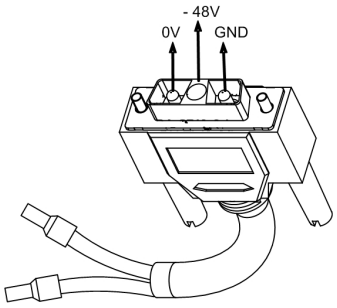


Figure 5-2 Subrack power cable

The D type three-conductor plug's terminals are illustrated in Figure 5-3. The pins A1 and A3 electrically connected and insulated during manufacture of the plug.

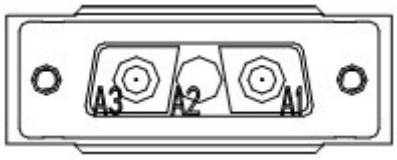


Figure 5-3 D type three-conductor plug

5.2.2.4 Wiring Scheme

Table 5-4 shows the wiring scheme of the subrack power cable.

Table 5-4 Wiring scheme of the subrack power cable

Cable Name	Terminal	Connection Description
Subrack power cable	Blue cable tube terminal	Connects with the -48V_A_1 to -48V_A_3 / -48V_B_1 to -48V_B_3 end of the PDP
	Black cable tube terminal	Connects with the 0V_A_1 to 0V_A_3 / 0V_B_1 to 0V_B_3 end of the PDP
	D type three-conductor plug	Connects with the power interface PWR-A / PWR-B.

5.2.2.5 Technical Specifications

The technical specifications of the subrack power cable is shown in Table 5-5.

Table 5-5 Technical specifications of the subrack power cable

Parameter Item	Specification
Cable type	Double-sheathed two-core cable
Color	Blue, black
Maximum current	30A
Conductor cross-sectional area	2×6mm^2

5.3 Protection Earth Ground Cable

5.3.1 Cabinet Protection Earth Ground Cable

5.3.1.1 Type

The type of the cabinet protection earth ground cable is 408000007.

5.3.1.2 Usage

The cabinet protection earth ground cable is used to connect the protection earth ground of the PDP with the cabinet earth ground point. The cabinet protection earth ground cable has already been connected to the PE inside terminal of the PDP before delivery.

5.3.1.3 Structure

As shown in Figure 5-4, one end of the cabinet protection earth ground cable is a tube terminal and the other end is a M6 uninsulated ring terminal and between them is a yellow - / green cable .

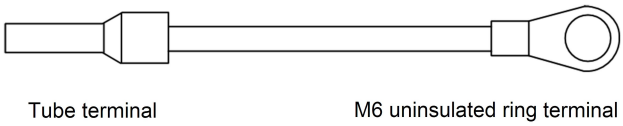


Figure 5-4 The cabinet protection earth ground cable

5.3.1.4 Wiring Scheme

Table 5-6 shows the wiring scheme of the cabinet protection earth ground cable.

Table 5-6 Wiring scheme of the cabinet protection earth ground cable

Cable Name	Terminal	Connection Description
The cabinet protection earth ground cable	M6 uninsulated ring terminal	Connects with the earth ground point on the top of cabinet
	tube terminal	Connects with the PE end of the PDP

5.3.1.5 Technical Specifications

The technical specifications of the protection earth ground cable is shown in Table 5-7.

Table 5-7 Technical specifications of the protection earth ground cable

Parameter Item	Specification
Cable type	Single core soft cable
Color	yellow - / green
Maximum current	40A
Conductor cross-sectional area	10mm^2

5.3.2 Subrack Protection Earth Ground Cable

5.3.2.1 Type

The type of the subrack protection earth ground cable is 3.696.084.

5.3.2.2 Usage

The subrack protection earth ground cable is used to connect the subrack with the vertical mounting flange of the cabinet to achieve protection earth ground of the subrack.

5.3.2.3 Structure

As shown in Figure 5-5, the two ends are the two pre-insulation terminals and between them is a yellow - / green cable.

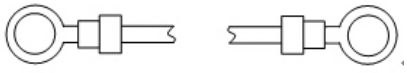


Figure 5-5 The subrack protection earth ground cable

5.3.2.4 Wiring Scheme

Table 5-8 shows the wiring scheme of the subrack protection earth ground cable.

Table 5-8 Wiring scheme of the subrack protection earth ground cable

Cable Name	Terminal	Connection Description
The subrack protection earth ground cable	The pre-insulation terminal on one end	Connects with the vertical mounting flange of the cabinet
	The pre-insulation terminal on the other end	Connects with the subrack earth ground fastener

5.3.2.5 Technical Specifications

The technical specifications of the subrack protection earth ground cable is shown in Table 5-9.

Table 5-9 Technical specifications of the subrack protection earth ground cable

Parameter Item	Specification
Cable type	Single-sheathed heat-resistant (withstanding a temperature up to 90℃) single-core soft cable
Color	yellow - / green
Maximum current	32A
Conductor cross-sectional area	4mm^2

5.4 Alarm Cable

5.4.1 Alarm Cable for the Head of Row Cabinet

5.4.1.1 Type

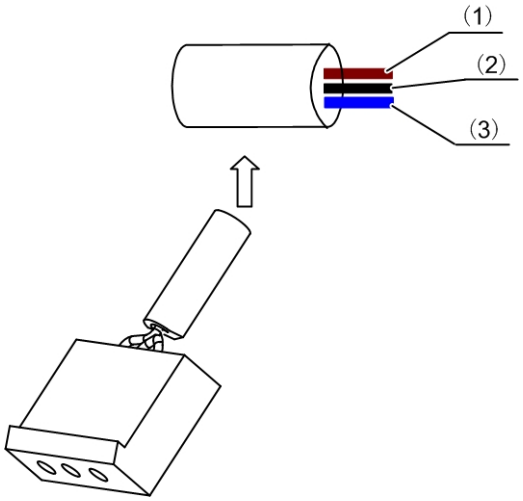
The type of the alarm cable for the head of row cabinet is 3.696.135.

5.4.1.2 Usage

The alarm cable for the head of row cabinet is used to connect the PDP and the head of row cabinet and output the equipment alarm signal from the cabinet to the head of row cabinet.

5.4.1.3 Structure

As shown in Figure 5-6 one end of the alarm cable for the head of row cabinet is a three-conductor D-type connector and the other end is three wires.



(1) Protection earth ground cable (2) Working earth ground cable

(3) –48V DC power cable

Figure 5-6 Alarm cable for the head of row cabinet

5.4.1.4 Wiring Scheme

Table 5-10 shows the wiring scheme of the alarm cable for the head of row cabinet.

Table 5-10 Wiring scheme of the alarm cable for the head of row cabinet

Cable Name	Terminal	Connection Description
Alarm cable for the head of row cabinet	Three-conductor D-type connector	Connects with the XP1terminal of the PDP
	Three-conductor cable	Connects with the head of row cabinet

5.4.1.5 Technical Specifications

Table 5-11 shows the technical specifications of the alarm cable for the head of row cabinet.

Table 5-11 Technical specificationsn of the alarm cable for the head of row cabinet

Parameter Item	Specification
Cable type	AVVR
Color	Brown, black and blue
Maximum current	3A
Conductor cross-sectional area	3×0.5mm^2

5.4.2 The Subrack Alarm Cable

5.4.2.1 Code

The type of the subrack alarm cable is 3.695.095.

5.4.2.2 Usage

The subrack alarm cable connects the subrack with the PDP, and outputs the subrack alarm to the PDP.

5.4.2.3 Structure

The subrack alarm cable is the straight-through network cable, as shown in Figure 5-7.

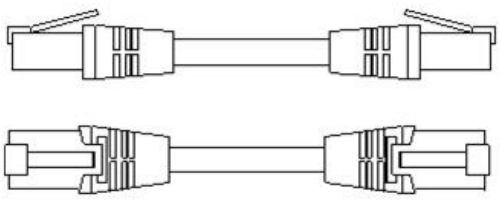


Figure 5-7 The subrack alarm cable

The both ends of the subrack alarm cable are the RJ-45 connector, as shown in Figure 5-8.

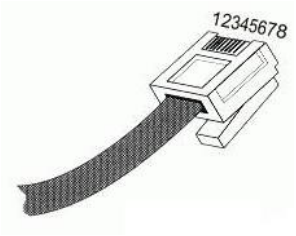


Figure 5-8 RJ-45 connector

The wiring scheme of the connector pins on the two ends of the straight-through network cable is shown in Table 5-12.

Table 5-12 The wiring scheme of the straight-through network cable

Pin of the Local End	Wire Color	Pin of the Opposite End
1	White-orange	1
2	Orange	2
3	White-green	3
4	Blue	4
5	White-blue	5
6	Green	6
7	White-brown	7
8	Brow	8

5.4.2.4 Wiring Scheme

Table 5-13 shows the wiring scheme of the subrack alarm cable.

Table 5-13 Wiring scheme of the subrack alarm cable.

Cable Name	Terminal	Connection Description
The subrack alarm cable	RJ-45 connector on one end	Connects with the subrack alarm interface ALM
	RJ-45 connector on the other end	Connects with one of the terminals AlmIn1 to AlmIn3 of the PDP

5.4.2.5 Technical Specifications

The technical specifications of the subrack alarm cable is shown in Table 5-14.

Table 5-14 Technical specifications of the subrack alarm cable

Parameter Item	Specification
Cable type	CAT-5 twisted pair
Connector type	RJ-45
Number of cores	8
Conductor diameter	AWG 24
Breakdown voltage	2000V

5.5 Fiber Jumper

5.5.1 Type

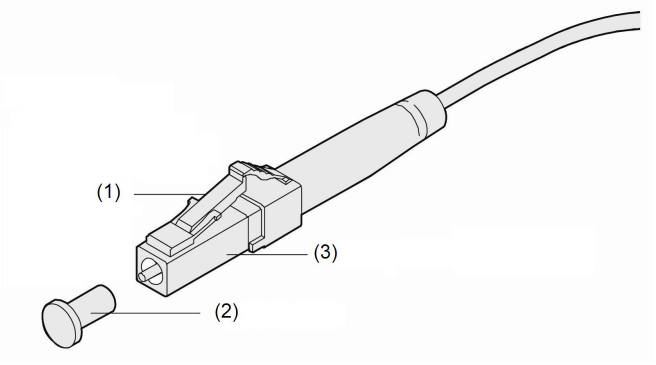
Two types of the fiber jumper: the code of the LC/PC fiber jumper is OFC-LC/PC-LC/PC-S-20; the code of the SC/PC fiber jumper is OFC-SC/PC-SC/PC-S-20.

5.5.2 Usage

Acting as the transmission carrier of optical signal, the fiber jumper is applied in the short distance transmission of optical signal to connect the optical interface of the card and the ODF side.

5.5.3 Structure

The LC / PC-type optical fiber jumper is shown in Figure 5-9.

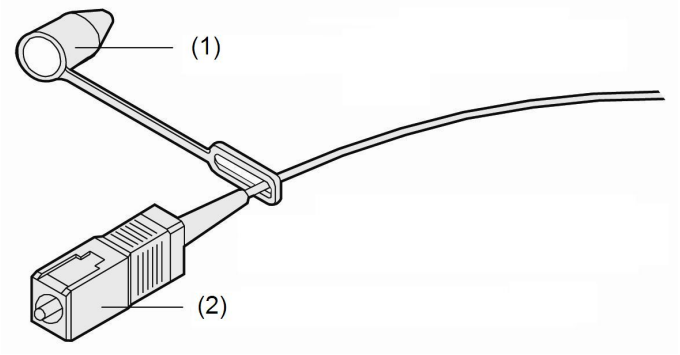


(1) Latch (2) Anti-dust cup

(3) LC / PC optical fiber connector

Figure 5-9 The LC / PC-type optical fiber jumper

The SC / PC-type optical fiber jumper is shown in Figure 5-10.



(1) Anti-dust cup (2) SC / PC optical fiber connector

Figure 5-10 The SC / PC-type optical fiber jumper

5.5.4 Wiring Scheme

Table 5-15 shows the wiring scheme of the fiber jumper.

Table 5-15 Wiring scheme of the fiber jumper

Cable Name	Terminal	Card	Interface	Connection on the ODF side
Fiber jumper	SC / PC connector	EC4B	1 to 4	Provides the EPON downlink channel for connecting the remote ONU.
		EC8B	1 to 8	
		GC4B	1 to 4	Provides the GPON downlink channel for connecting the remote ONU.
		GC8B	1 to 8	
	LC / PC connector	HU1A	SFP / XFP	Provides GE and 10 GE optical channels to connect the IP network.
		HU2A	GE / XG	
		GU6F	GE	
		C155A	STM-1 1 to 2	Provides STM-1 optical channel to connect the transmission network.

5.5.5 Technical Specifications

The technical specifications of the optical fiber is shown in Table 5-16.

Table 5-16 Technical specifications of the optical fiber

Parameter Item	Specification
Optical fiber type	Single-mode / multi-mode
Connector type	SC/PC, LC/PC

5.6 Network cable

5.6.1 Type

The AN5116-06B can automatically identify a straight-through and cross-over network cable. Users can use either of the two types. The network cable type is 3.695.095.

5.6.2 Usage

The network cable is used for uplinking the electrcal interface or monitoring the network management, and connecting the uplink equipment, the network management computer and the environment monitoring equipment.

5.6.3 Structure

The network cable is shown in Figure 5-11.

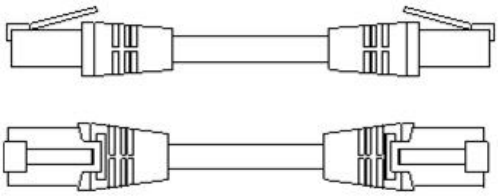


Figure 5-11 Network cable

Both ends of the network cable are the RJ-45 connector, as shown in Figure 5-12.

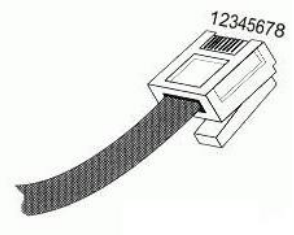


Figure 5-12 RJ-45 connector

The wiring scheme of the connector pins on the two ends of the straight-through network cable is shown in Table 5-17.

Table 5-17 The wiring scheme of the straight-through network cable

Pin of the Local End	Wire Color	Pin of the Opposite End
1	White-orange	1
2	Orange	2
3	White-green	3
4	Blue	4
5	White-blue	5
6	Green	6

Table 5-17 The wiring scheme of the straight-through network cable (Continued)

Pin of the Local End	Wire Color	Pin of the Opposite End
7	White-brown	7
8	Brow	8

The wiring scheme of the connector pins on the two ends of the cross-over cable network cable is shown in Table 5-18.

Table 5-18 The wiring scheme of the cross-over network cable

Pin of the Local End	Wire Color	Pin of the Opposite End
1	White-orange	3
2	Orange	6
3	White-green	1
4	Blue	4
5	White-blue	5
6	Green	2
7	White-brown	7
8	Brow	8

5.6.4 Wiring Scheme

Table 5-19 shows the wiring scheme of the network cable.

Table 5-19 Wiring scheme of the network cable

Cable Name	Terminal on One End	Card	Interface	Connection on the Other End
Network cable	RJ-45 connector	HU1A	SFP	Connects with the IP network to perform the electrical interface uplinking; connects with the ANM2000 computer to perform the network management monitoring.
		HU2A	GE	
		GU6F	GE	
		HSWA	FE	Connects with the out-of-band ANM2000 computer to perform the network management monitoring

5.6.5 Technical Specifications

The technical specifications of the network cable is shown in Table 5-20.

Table 5-20 Technical specifications of the network cable

Parameter Item	Specification
Cable type	CAT-5 twisted pair
Connector type	RJ-45
Number of cores	8
Conductor diameter	AWG 24
Breakdown voltage	2000V

5.7 Coaxial E1 Cable

5.7.1 Type

The hardware code of the 75Ω E1 cable is 3.695.442.

5.7.2 Usage

A coaxial E1 cable carries eight E1 signals, mainly used to connect the E1 interfaces of the CE1B card and the MDF. The AN5116-06B uses the 75Ω E1 cable.

5.7.3 Structure

The appearance is as follows:

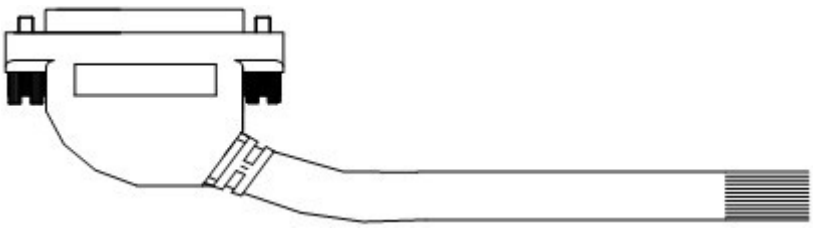


Figure 5-13 75Ω E1 cable

The end of the E1 cable connected with the CE1B card is DB-44P type plug, and the end connected with the MDF is composed of bare wires. Figure 5-14 shows the DB-44P type plug and Table 5-21 shows the pin definition.

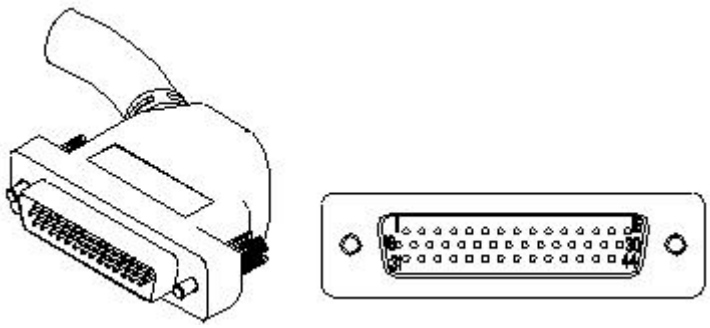


Figure 5-14 DB-44P plug

Table 5-21 2M interface pin description

E1 Interface Number	Pin	Coaxial Cable Number	E1 Interface	E1 Interface Number	Pin	Coaxial Cable Number	E1 Interface
1 to 8	15, 30	1	1st E1 Rx	9 to 16	15, 30	1	9th E1 Rx
	14, 29	2	1st E1 Tx		14, 29	2	9th E1 Tx
	13, 28	3	2nd E1 Rx		13, 28	3	10th E1 Rx
	12, 27	4	2nd E1 Tx		12, 27	4	10th E1 Tx
	11, 26	5	3rd E1 Rx		11, 26	5	11th E1 Rx
	10, 25	6	3rd E1 Tx		10, 25	6	11th E1 Tx
	9, 24	7	4th E1 Rx		9, 24	7	12th E1 Rx
	8, 23	8	4th E1 Tx		8, 23	8	12th E1 Tx
	7, 22	9	5th E1 Rx		7, 22	9	13th E1 Rx
	6, 21	10	5th E1 Tx		6, 21	10	13th E1 Tx
	5, 20	11	6th E1 Rx		5, 20	11	14th E1 Rx
	4, 19	12	6th E1 Tx		4, 19	12	14th E1 Tx
	3, 18	13	7th E1 Rx		3, 18	13	15th E1 Rx
	2, 17	14	7th E1 Tx		2, 17	14	15th E1 Tx
	1, 16	15	8th E1 Rx		1, 16	15	16th E1 Rx
	31, 32	16	8th E1 Tx		31, 32	16	16th E1 Tx
17 to 24	15, 30	1	17th E1 Rx	25 to 32	15, 30	1	25th E1 Rx
	14, 29	2	17th E1 Tx		14, 29	2	25th E1 Tx
	13, 28	3	18th E1 Rx		13, 28	3	26th E1 Rx
	12, 27	4	18th E1 Tx		12, 27	4	26th E1 Tx

Table 5-21 2M interface pin description (Continued)

E1 Interface Number	Pin	Coaxial Cable Number	E1 Interface	E1 Interface Number	Pin	Coaxial Cable Number	E1 Interface
	11, 26	5	19th E1 Rx		11, 26	5	27th E1 Rx
	10, 25	6	19th E1 Tx		10, 25	6	27th E1 Tx
	9, 24	7	20th E1 Rx		9, 24	7	28th E1 Rx
	8, 23	8	20th E1 Tx		8, 23	8	28th E1 Tx
	7, 22	9	21th E1 Rx		7, 22	9	29th E1 Rx
	6, 21	10	21th E1 Tx		6, 21	10	29th E1 Tx
	5, 20	11	22th E1 Rx		5, 20	11	30th E1 Rx
	4, 19	12	22th E1 Tx		4, 19	12	30th E1 Tx
	3, 18	13	23th E1 Rx		3, 18	13	31th E1 Rx
	2, 17	14	23th E1 Tx		2, 17	14	31th E1 Tx
	1, 16	15	24th E1 Rx		1, 16	15	32th E1 Rx
	31, 32	16	24th E1 Tx		31, 32	16	32th E1 Tx

5.7.4 Wiring Scheme

Table 5–22 shows the wiring scheme of the 75Ω coaxial E1 cable.

Table 5-22 Wiring scheme of the 75Ω coaxial E1 cable

Cable name	Terminal	Description
75Ω coaxial E1 cable	DB-44P-type plug	Connects the E1 interface to the E32 interface of the CE1B card.
	naked wire	Connects with the MDF

5.7.5 Technical Specifications

The technical specifications of the 75Ω coaxial E1 cable are shown in Table 5-23.

Table 5-23 Technical specifications of the network cable

Parameter Item	Specification
Cable type	SYFZ-75-2-1×16
Connector type	D-Sub, Type B, 44P male plug

Table 5-23 Technical specifications of the network cable (Continued)

Parameter Item	Specification
Characteristic impedance	75±3Ω
Conductor diameter	11.2mm
Number of cores	16
Diameter of inner conductor	2.15mm
DC resistance of inner conductor	≤350Ω/ km
Frequency attenuation	1MHz: ≤2.9 dB/100m 2MHz: ≤3.7dB/100m 10MHz: ≤9.5dB/100m
Capacitance	1KHz: ≤64 pF/m

5.8 Coaxial Clock Cable

5.8.1 Type

The type of the coaxial clock cable is 3.695.187.

5.8.2 Usage

The coaxial clock cable is used to transmit the clock signal, connect the equipment clock interface and the clock in upper / lower level clock equipment.

5.8.3 Structure

As shown in Figure 5-15, one end of the coaxial clock cable is the SAA series L type coaxial plug, and the other end is bare wires.

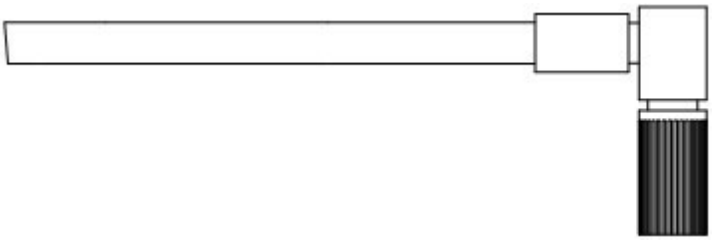


Figure 5-15 Coaxial clock cable

5.8.4 Wiring Scheme

The wiring scheme of the coaxial clock cable is shown in Table 5-24.

Table 5-24 Wiring scheme of the coaxial clock cable

Cable Name	Terminal	Connection Description
Coaxial Clock Cable	SAA series L type coaxial plug	Connects with the CLK IN 1/CLK IN 2/CLK OUT interface of the C155A card
	Naked wire end	Connects with the external clock equipment

5.8.5 Technical Specifications

The technical specifications of the coaxial clock cable is shown in Table 5-25.

Table 5-25 Technical specifications of the coaxial clock cable

Parameter Item	Specification
Cable type	SYV-75-2-2
Connector type	SAA type coaxial plug
Characteristic impedance	75Ω
Number of cores	1

5.9 Serial Port Cable

5.9.1 Type

The serial port cable type is 3.695.341.

5.9.2 Usage

The serial port cable is used for commissioning or local maintenance. It connects the CONSOLE interface of the core switch card and the serial port of the network management computer.

5.9.3 Structure

The serial port cable is shown in Figure 5-16.

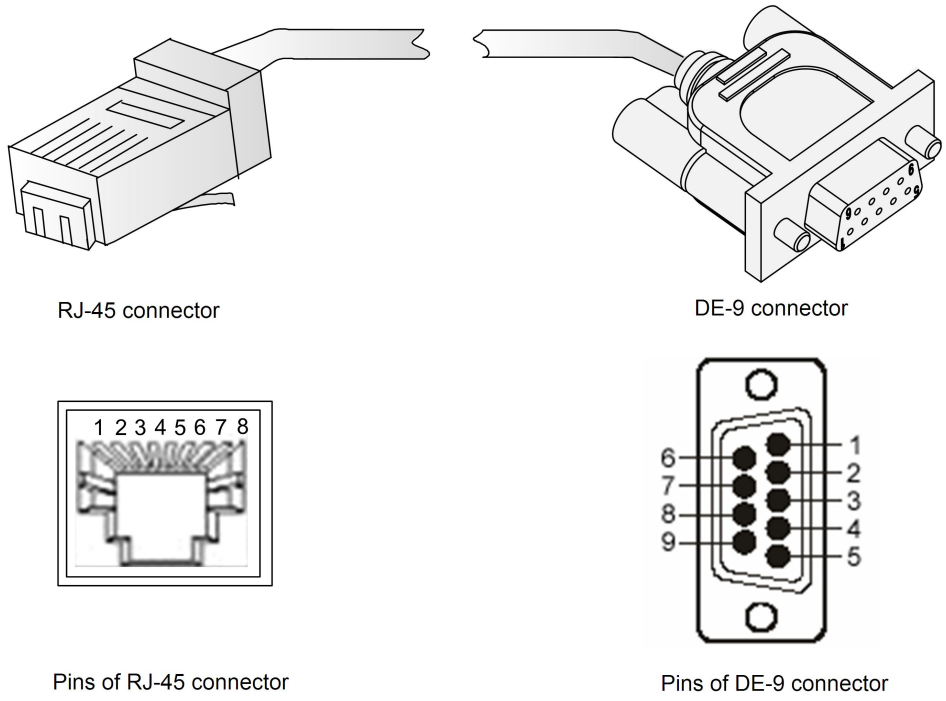


Figure 5-16 Serial port cable

The terminal definition of the serial port cable is shown in Table 5-26.

Table 5-26 Terminal definition of the serial port cable

Connected Signal	DE-9 Connector Pin	RJ45 Connector Pin
Tx	2	3
GND	5	4/5
Rx	3	6

5.9.4 Wiring Scheme

Table 5-27 shows the wiring scheme of the serial port cable.

Table 5-27 Wiring scheme of the serial port cable

Cable Name	Terminal	Connection Description
Serial Port Cable	RJ-45 connector	Connects with the CONSOLE interface of the HSWA card
	DE-9 connector	Connects with the serial port of the network management computer,

5.9.5 Technical Specifications

The technical specifications of the serial port cable is shown in Table 5-28.

Table 5-28 Technical specifications of the serial port cable

Parameter Item	Specification
Cable type	CAT-5 twisted pair
Connector type	DE-9SJS-X; RJ-45
Number of cores	8
Conductor diameter	AWG 24

5.10 Dry Contact Cable

5.10.1 Type

The type of the dry contact cable is 3.695.452.

5.10.2 Usage

The dry contact cable is used to connect the DC1 to DC7 and DC8 to DC14 interfaces of the PUBA card on the AN5116-06B with the external dry contact devices that monitor infrared detection, smoke, electric supply, humidity, temperature, fan, vibration and access control.

5.10.3 Structure

As shown in Figure 5-17, one end of the dry contact cable is the RJ-45 connector and the other end is bare wire.

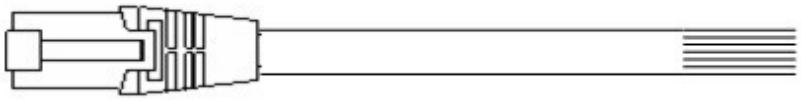


Figure 5-17 Dry contact cable

The terminal definition of the dry contact cable is shown in Table 5-29.

Table 5-29 Terminal definition of the dry contact cable

Pin of the Local End	Wire Color	Opposite End
1	Orange	Earth ground
2	White-orange	Dry contact device level output end
3	Green	Dry contact device level output end
4	White-green	Dry contact device level output end
5	Blue	Dry contact device level output end
6	White-blue	Dry contact device level output end
7	Brow	Dry contact device level output end
8	White-brown	Dry contact device level output end

5.10.4 Wiring Scheme

Table 5-30 shows the wiring scheme of the dry contact cable.

Table 5-30 Wiring scheme of the dry contact cable

Cable Name	Terminal	Connection Description
Dry contact cable	RJ-45 connector	Connects with the DC1 to DC7 and DC8 to DC14 interface of the PUBA card

Table 5-30 Wiring scheme of the dry contact cable (Continued)

Cable Name	Terminal	Connection Description
	Naked wire end	Connects with the dry contact equipment

5.10.5 Technical Specifications

Table 5-31 shows the technical specifications of the dry contact cable.

Table 5-31 Technical specifications of the dry contact cable

Parameter Item	Specification
Cable type	CAT-5 twisted pair
Connector type	RJ-45
Number of cores	8
Conductor diameter	AWG 24

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