

EON-OMP-2

Hardware Installation Guide

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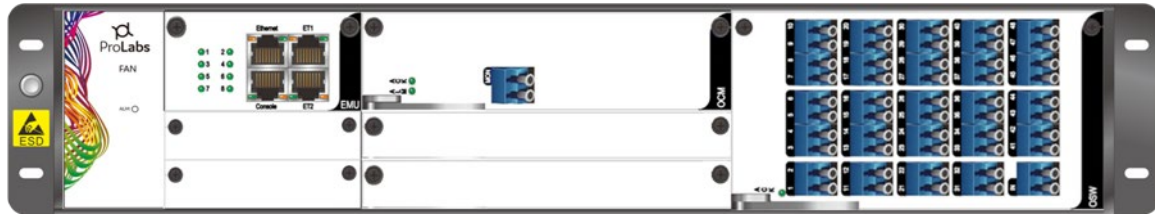
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1 Device Introduction

1.1 Product Appearance



Product Description

The 2U subrack has built-in backplane, which can be configured with power supply, main control and fan. There are 8 function card slots, which accommodate all main configuration modules of the OCM products. Any slot of 8 function card slots can accept an OCM card, an OSW card, or an OTDR card. DC-48V and AC220V power supply can be located back, either dual DC or AC power supplies can be 1 + 1 hot standby.

Product Specification

Parameters	Spec.
Management Interface	10/100M Ethernet port
Power Supply	-48VDC or 220VAC, supports 1 + 1 hot-standby
Max Power Consumption	≤50W (max. full configuration)
Chassis Size	482mm(L)×320mm(W)×89mm(H)
Working Temperature	-5 to 50°C
Storage Temperature	-20 to 70°C
Working Relative Humidity	≤90% (Non-condensing)

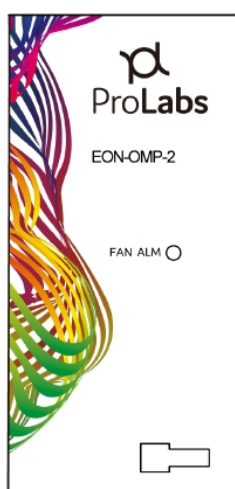
1.2 Card Introduction

Card Type	Description	Note
FAN	FAN Card	For system cooling
POWER	Power Card	For system power supply, Three types: front DC module, back DC, and back AC
EMU	Main Control Card	For external communication and local debugging of the system
OTDR	Line Monitoring Card	Fault location and performance for optical fiber lines including attenuation, return loss and reflection

OSW	Optical Switch Card	Four types: 8 port, 16 port, 32 port, and 48 port
OCM	Optical Channel Monitoring Card	For analyzing channel power and OSNR of C-band input DWDM signals

3 System Cards Introduction

3.1 FAN Card



Product Description

This Fan card of the 2U OSP chassis can automatically adjust the speed according to the ambient temperature. It is maintenance free and easy to replace.

There is an indicator on the panel of the 1U FAN unit as defined below:

NO.	Item	Status	Description
1	ALM	Off	The FAN unit works normally.
		Red	The FAN unit works abnormally or reaches end-of-life.

Product Specification

NO.	PARAMETER	SPECIFICATION			UNITS	NOTE
		MIN.		MAX.		
1	Operating Voltage Range	4.5		13.8	V DC	
2	Power Consumption			15	W	
3	Speed			9500	R.P.M.	
4	Number of Fans			6		
5	Operating Temperature	-5		50	°C	

6	Operating Humidity	40		75	%RH	
7	Module Size	215mmX41mmX84mm				L *W*H

3.2 Power Cards



Rear DC power



Rear AC power



Front DC power

Product Description

The power cards supply power for the 2U OSP platform. The front can be equipped with dual DC power cards, and the rear can be equipped with dual DC power cards or dual AC power cards.

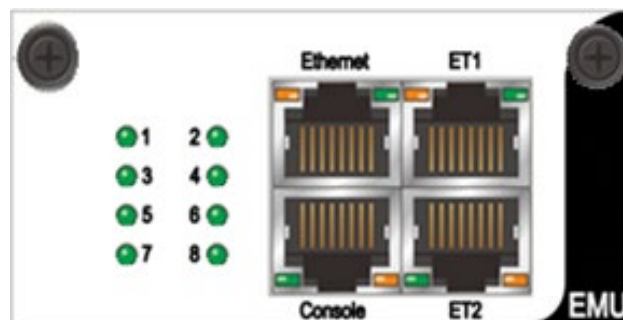
There is an indicator on the panel of the power card, and is defined as below:

NO.	Item	Status	Description
1	PWR	Green	The power unit works normally.
		Off	The power unit works abnormally.

Product Specification

NO.	PARAMETER	SPECIFICATION			UNITS	NOTE
		MIN.		MAX.		
1	-48V DC Supply Voltage	-40		-60	V DC	
	Power Supply Efficiency			95%		
2	220V AC Supply Voltage	100		240	V AC	
	Power Supply Efficiency			90%		
3	12V DC Output Voltage	11.4	12	12.6	V	
4	Operating Temperature	-5		50	°C	
5	Operating Humidity	40		75	%RH	
6	Maximum Power Capacity			200	W	2U
7.1	Module Size(Rear)	90mmX200mmX64mm				L*W*H
7.2	Module Size(front)	215mmx84mmx20mm				L*W*H

3.3 EMU Card



Product Description

The EMU card is based on the P1010 Linux system. It mainly realizes the function of OC monitoring-station management. The EMU can manage OSW cards, OCM card and OTDR card. In addition, the EMU also supports a variety of management interfaces, and database management functions.

There are 8 indicators on the panel of the 2U EMU unit, and are defined as below:

NO.	Item	Status	Description
1~8	Slot Status indicator	Green blinks	The card in the slot works normally.
		Off	The Slot is empty or the unit works abnormally

There are 4x RJ45 jacks on the panel of the 2U EMU unit, and are defined as below:

NO.	Item	Status	Description
1	Ethernet	-	The management interface of the unit that the product status can be monitored and configured through IP network.
2	ET1	-	The network interface of the unit that the slot status can be monitored.
3	ET2	-	The network interface of the unit that the slot status can be monitored.
4	Console		The serial interface of the unit for CLI console interface.

Product Specification

NO.	PARAMETER	SPECIFICATION			UNITS	NOTE
		MIN.		MAX.		
1	Operating Voltage Range	4.5		13.8	V DC	
2	Input Power			5	W	
3	Operating Temperature	-5		50	°C	
4	Operating Humidity	40		75	%RH	
5	Module Size	212.5mm × 71.25mm × 41.1mm				L*W*H

3.4 OCM Card



Product Description

OCM card is used for optical performance monitoring in DWDM system. The module de-multiplexes 100/50 GHz spaced channel DWDM optical signals within the range of 1528nm to 1568nm through an optical tunable filter, from its input that is tapped from an optical network. The results including channel power, channel wavelength and channel OSNR are provided to the customer.

There are 2 OCM indicators on the panel of the OCM Unit, and are defined as below:

No	Item	Status	Description
1	ALM	Red	The unit works abnormally
		Off	The unit works normally.
2	ACK	Green blinks	The unit works normally.
		Off	The unit works abnormally.

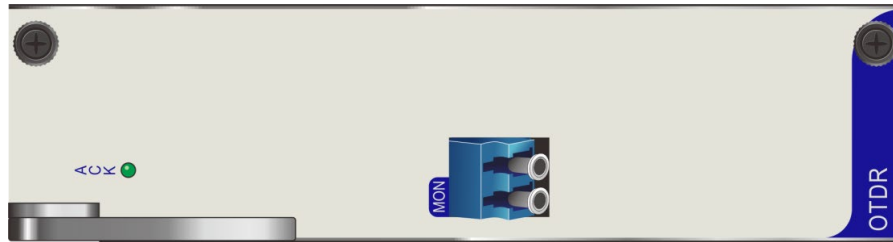
There is an Optical interface on the panel of the OCM unit, and is defined as below:

1	MON	LC/UPC	Monitor input
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Product Specification

NO.	PARAMETER	SPECIFICATION			UNITS	NOTE
		Min	Typical	Max		
1	Channel Spacing		50/100		GHz	
2	Wavelength Range	1528		1568	nm	Extended C-band
3	Supported Signal Rate	10G			bits/s	
4	Absolute Wavelength Accuracy			+/-50	pm	
5	Channel Power Range	-40		-10	dBm	
6	Absolute Power Accuracy			+/-0.8	dB	
7	Relative Power Accuracy			1	dB	
8	Power Resolution		0.1		dB	
9	Adjacent Channel Power Divergence			6	dB	
10	Non-Adjacent channel power divergence			10	dB	
11	OSNR Range			25	dB	
12	OSNR accuracy			+/-2	dB	OSNR>20dB
				+/-1.5	dB	OSNR<=20dB
13	Scan time			1000	ms	
14	Sweep times	1			Billion	
15	Operating Voltage Range	4.5		13.8	V DC	
16	Input Power			5	W	
17	Operating Temperature	-10		65	°C	
18	Operating Humidity	40		75	%RH	
19	Module Size	213mm × 154.5mm × 40.4mm				L*W*H

3.5 OTDR Card



Product Description

The OTDR card has built-in OTDR module for fiber-optic cable fault location and performance monitoring, including attenuation, loss, reflection and other optical parameters.

There are 2 OTDR indicators on the panel of the OTDR card and are defined as below:

No	Item	Status	Description
1	ACK	Green blinks	The unit works normally.
		Off	The unit works abnormally.

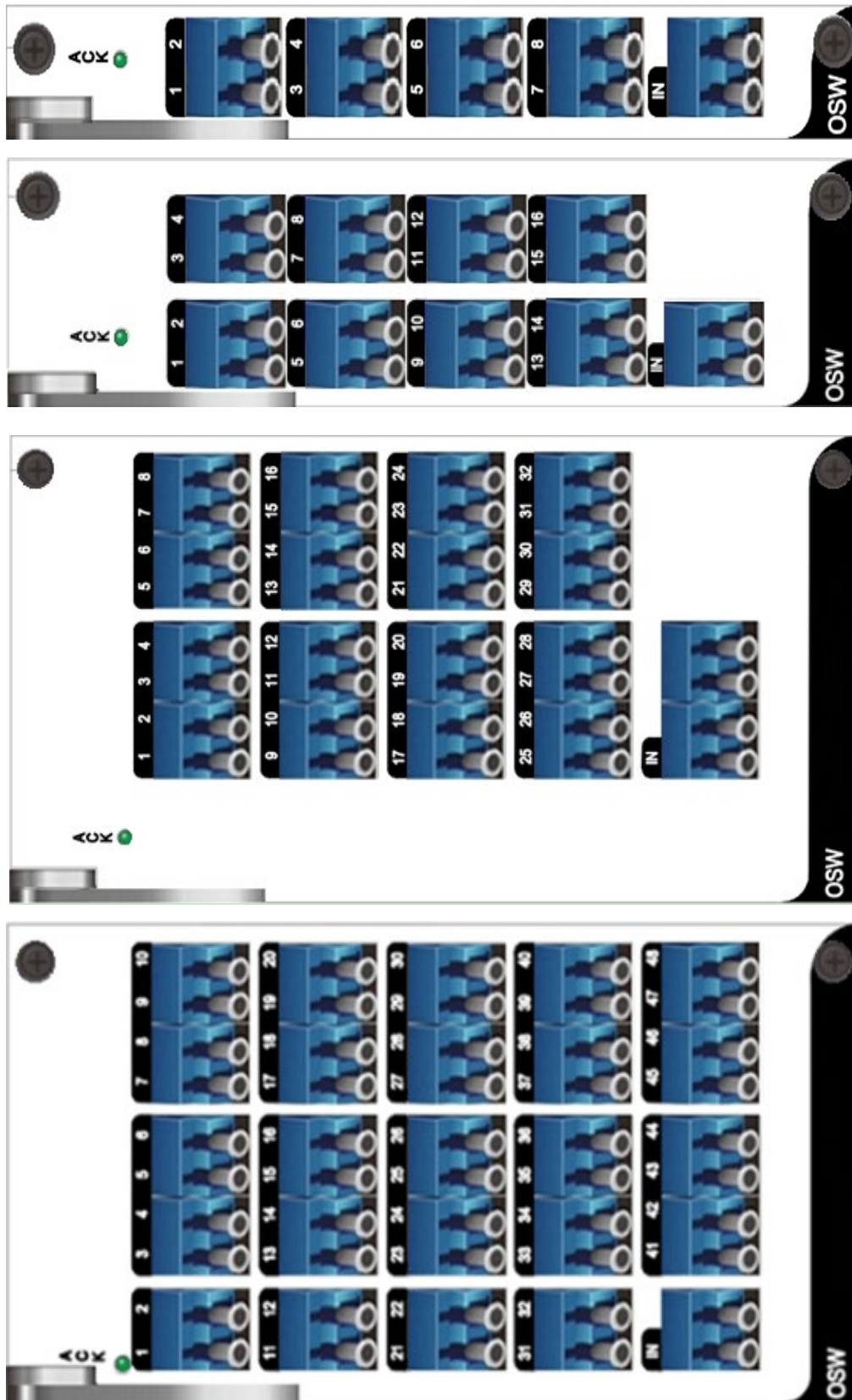
There is an Optical interface on the panel of the OTDR card, and defined as below:

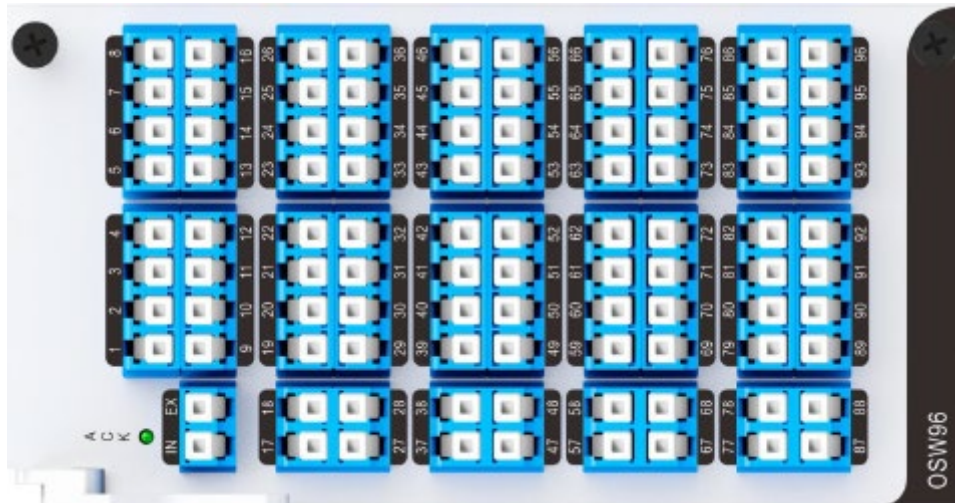
1	MON	LC/UPC Or LU/APC	Monitor port
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Product Specification

NO.	PARAMETER	SPECIFICATION	UNIT	NOTE
1	Wavelength	1625nm±10	nm	
2	Event dead zone	≤1	m	
3	Attenuation dead zone	≤5	m	
4	Dynamic Range	45(max)	dB	
5	Distance accuracy	10 ⁻⁵ x distance +/- sampling point spacing +/- 1m	m	
6	Linearity	0.05	dB/dB	
7	Scope of group refractive index	1.400000-1.700000		
8	Distance resolution	0.05	m	
9	Pulse width	5n~20u	s	
10	Power consumption	15	W	
11	Operating Temperature	-5~50	°C	
12	Operating Humidity	40~75	%RH	
13	Module Size	213mm × 154.5mm × 40.4mm		L*W*H

3.6 OSW Cards





Product Description

The Optical Switch card (OSW card) consists of on-board optical switches whose main function is to select the output routing through a variety of channels (1×8, 1×16, 1×32, 1×48, 1×96), for the OCM or OTDR test signal to select different fiber paths and realize detection of optical fiber status (OTDR) or channel signal monitoring (OCM). The 1x96-port OSW is supported by 4.2.2.7.3 or later of the web GUI.

There is an indicator on the panel of the OSW Card, and is defined as below:

1	ACK	Green blinks	Module works normally
		Off	Module has Fault or not powered on

The OSW card front-panel supports LC/UPC optical interfaces as defined as below:

NO.	Item	Status	Description
1	IN	LC/UPC	The input optical interface
2	EX	LC/UPC	Reserved expansion optical interface
3	1,2....96	LC/UPC	The output optical interface

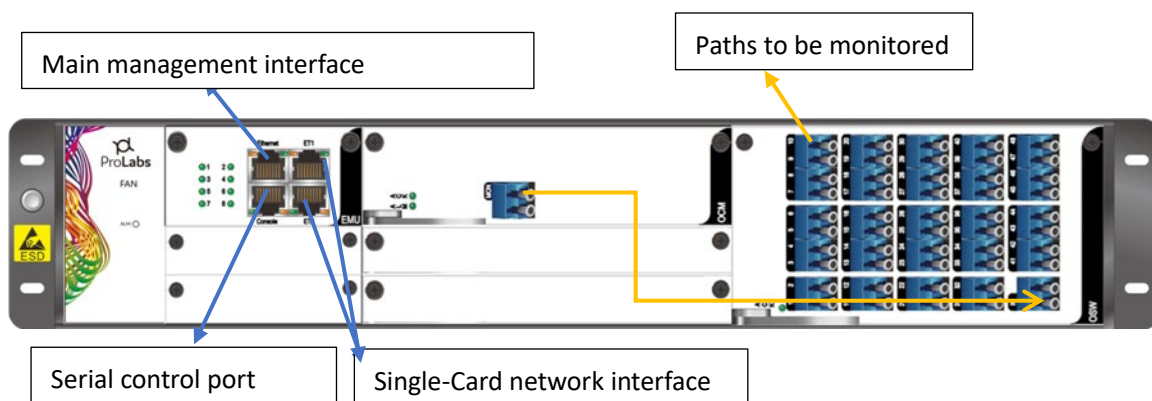
Product Specification

NO.	PARAMETER	SPECIFICATION			UNITS	NOTE
		MIN.	TYP.	MAX.		
1	Wavelength	1525	1550	1650 1565 (for 1x96)	nm	
2	Insertion Loss	1.2 (for 1x 8, 1x16)		2.2 (for 1x32, 1x48) 2.6 (for 1x96)	dB	
3	PDL			0.1 0.15 (for 1x96)	dB	

4	Return Loss	50 45 (for 1x96)			dB	
5	WDL			0.3	dB	
6	ISO	50 45 (for 1x96)			dB	
7	Repeatability			0.05	dB	
8	Lifetime	10 ⁹		10 ⁹	times	
9	Switching Time			100	ms	
10	Maximum Optical Power			500	mW	
11	Switch Mode	Non-Latching				
12	Channels	1×8, 1×16, 1×32, 1x48, 1x96				
13	Input Power			5	W	
14	Operating Temperature	-5		60	°C	
15	Operating Humidity	40		75	%RH	
16	Module size	213mm × 156.5mm × 20.4mm(8 port)				(L*W*H)
		213mm × 156.5mm × 40.4mm(16 port)				
		213mm × 156.5mm × 82.5mm(32/48/96 port)				

4 Device Connection

4.1 Connection Diagram



For a single OCM card (typical scenario), the MON port on the OCM card is directly connected with the IN port of OSW card (using LC/UPC to LU/UPC jumper).

Optical paths to be monitored are connected with OUT ports of the OSW card. Each port is connected with an external DWDM network typically via an optical tap. OSW IN-to-OUT port connection is controlled by the network management.

Main management interface (Ethernet) is the platform management port that is connected via IP network

to a management station.

Serial console port is the serial console port of the device.

Single-card network interface (ET1, ET2) is used for access and debugging of a single card in the chassis and generally does not need to be connected.

4.2 OCM Platform Power Consumption

As an example, deployment configuration of the OCM platforms, the total power consumption of the 2U OC platform using dual DC or AC power supplies that includes: FAN, EMU, one OSW (1x16, 1x32, 1x48, and 1x96) and OCM. The total power consumptions are shown as below:

Platform power requirements for 2U Chassis+FAN+EMU+OCM using Dual-DC-Powers	Plus 1x16 OSW	Plus 1x32 OSW	Plus 1x48 OSW	Plus 1x96 OSW
Power consumption (W), (PS efficiency 95%)	28.8	30.1	30.7	31.2
PS voltage (VDC)	48			
Ampere (A)	0.60	0.63	0.64	0.64

As above configuration, total power consumption under dual 22V AC include: FAN, EMU, 1*16 OSW, and OCM. If choose any other type of OSW, then total power consumption shown as below:

Platform power requirements for 2U Chassis+FAN+EMU+OCM using Dual-AC-Powers	Plus 1x16 OSW	Plus 1x32 OSW	Plus 1x48 OSW	Plus 1x96 OSW
Power consumption (W), (PS efficiency 90%)	32.0	33.5	34.2	34.8
PS voltage (V-rms)	220			
Ampere (A-rms)	0.15	0.15	0.16	0.16

5 OCM System Installation

5.1 Unpacking Inspection

Before the installation of the equipment, it is necessary to open the box for inspection, and carefully check whether the equipment model is consistent; check whether the equipment and accessories in the packing box are consistent with the quantity and name on the packing list, and whether they are complete. In case of any missing, please contact Customer Support immediately.

Open package inspection shall be carried out after confirming that the equipment is free of omission and damage.



5.2 Rack Installation

During the installation, first clear the space in the cabinet where the OCM equipment will be placed, straighten out the original optical fiber, cable, etc. in the wiring area on both sides of the cabinet, adjust the left and right sub rack brackets in the cabinet to the selected installation position, and clamp the combination nuts into the corresponding positioning holes on the left and right sides in front of the cabinet (the number can be determined according to the number of positioning holes on the OCM equipment). Then wear the anti-static bracelet, take out the OCM rack from the packing box, gently place the OCM rack on the sub rack bracket of the cabinet, slowly push it into place, and fasten the OCM rack and the cabinet together with the combined decoration screw with washer after positioning.



5.3 Cards Installation

After the rack is installed in place, the installation of the single card can be carried out. When inserting the single card, first push the single card gently along the upper and lower guide grooves of the rack to the bottom of the drawer position, and align the upper positioning screw of the front panel of the single card with the positioning hole on the rack. At this time, the single card is in the floating state. Then check the socket on the back plate of the rack to make sure that the single plate plug is aligned with the back plate socket, and then use the puller to push the single plate panel to the basic insertion of the single plate with a little force. It is strictly prohibited to forcibly insert when it feels that the insertion is obstructed, and try

again after adjusting the position of the single plate. When the single disc plug is fully matched with the position of the back plate socket, push the single card panel inward until the single disc is fully inserted, and tighten the upper fixing screw of the panel.

5.4 Management Network Cable Installation and Layout

After inserting the management network cable into the RJ-45 interface (the "Ethernet" port) on the front panel of the equipment, enter the cable trough of the cabinet according to the direction from left to right or from right to left (depending on the position of the Ethernet interface and the actual situation), arrange the network cable along the position of the cabinet cable tie beam and the partition board, and fix the network cable on the cable tie beam or the partition board with plastic cable tie coil at a certain distance. Depending on the requirements of the machine room, the other end of the network cable can lead out from the top of the cabinet or the bottom of the cabinet, and then lead the network cable to the interface of the communication network monitoring equipment in the computer room according to the requirements of the computer room wiring.

5.5 Power Cable Installation and Layout

AC Power Supply

- 1) Following module unpacking and inspection, insert the rear DC power supply into the rear power-supply slots.



- 2) Plug in the power connector into the "220V" socket (Note 110-240Vac power source is the voltage range).

DC Power Supply

- 1) When installing the power cable, first use a cross screwdriver to loosen the fixing screw of the power terminal on the OCM equipment, then insert the cross connector between the metal pressing plate of the terminal and the base of the terminal, and finally use a screwdriver to tighten the fixing screw.

Note: The module's "0V" power interface (two on the left) is connected to the "ground" of the cabinet power supply, and the negative "-48V" interface (two on the right) is connected to the -48V DC output of the cabinet power supply, as shown in the figure:



- 2) When laying the power cable, mark "main power supply" and "standby power supply" on the other end of the power cable after the wiring is completed at the 4 terminals as shown in the figure for dual supply installation.

Discharge the cable to the air opening of the cabinet along the position of the cabinet cable tie beam and the partition board, and fix the cable in the cabinet with a plastic cable tie coil at a certain distance, pay attention not to reverse the polarity of the power supply.

- 3) The "ground" at the power interface (indicated as "0V" on the backplane) shall be connected with the positive pole on the power subrack of the cabinet, "-48VDC" shall be connected with the negative pole on the power subrack of the cabinet.

Chassis Ground

When installing the chassis ground wire, the following steps shall be followed:

1. Cables complying with standards and specifications shall be used.
2. Check the insulation layer of the cable to be laid for obvious damage or crack.
3. Estimate the cable length according to the grounding distance of the equipment to be installed, and cut off the corresponding length (margin is required).
4. Lay the grounding wire according to the specifications and requirements of the machine room.
5. Connect one end to the connection marked with grounding indication on the chassis mounting-ear. When the cable has more exposed metal core, it shall be wrapped with insulating tape, and the grounding screw shall be tightened to ensure that there is no looseness, loose connection, etc.
6. Connect the other end of the cable at the designated location of the machine room according to the above methods.
7. If the other end of the ground wire is a common ground terminal, i.e. where multiple devices are connected together, make sure that the connection terminals are correct when connecting the cable terminals.
8. When using installation tools, appropriate tools shall be selected, which shall be stable during operation, and force shall not be exerted to avoid serious consequences such as short circuit caused by tool falling off.
9. When the cable is connected correctly, bind the cable according to the specification requirements and make corresponding marks.
10. After all the wires and cables are connected, clean the inside and outside of the cabinet and OCM rack, clear all the cables and check the quality of wiring.
11. Check the power supply link from the output end of the power distribution device to the power input end of the load OCM device.
12. Check all wires of power supply link for short circuit with cabinet components.

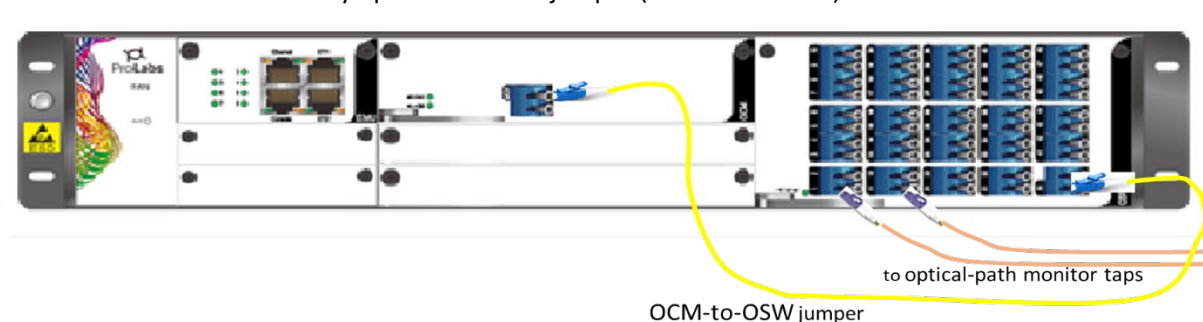
When all the inspection work is completed, the next work can be carried out after confirming that the connection is correct.

5.6 Power-on and Start-up Inspection

After confirming that all cables are connected correctly, use a multi-meter to check the polarity, continuity and insulation of the cabinet power supply. Turn on the power switch and observe the panel indicator after confirming that there is no error. After normal power on, the power indicator light (green light) on the power panel shall be on. In case of any abnormality, the power shall be cut off in time to find out the fault. Turn off the power supply after the power on inspection is completed and carry out the next step.

5.7 Optical Fiber Cable Installation and Layout

The installation and laying of optical fiber cable refers to the connection of OCM equipment with the line interface to realize this test by optical fiber and jumper (see also Sec. 4.1).



- 1) Connect the OCM-to-OSW jumper (LC/UPC to LC/UPC) as shown from the OCM module “MON” port to OSW module “IN” port.
- 2) Connect other ports on the OSW (marked “1”, “2”, .. ,etc.) to DWDM system optical-path monitor taps (typically 3-5% copy of the DWDM signal).

Connector Cleaning and Fiber Jumper Management

Attention shall be paid to the following matters during the installation of optical fiber cables:

When pulling out any optical fiber connector, whether the optical board interface and the fiber pigtail interface in the cabinet are used or not, the optical interface protection cap must be used to cover it, so as to avoid the invisible laser emitted by the laser from irradiating the personnel, any possible injury to the human eye, and prevent dust from contaminating the end face of the optical fiber, so as to increase the insertion loss of the optical fiber interface.

When inserting any optical fiber connector, whether it is used for the first time or not, special cleaning tools and materials must be used to clean the connector of the pigtail, so as to avoid large insertion loss and damage to the optical fiber connector inside the equipment caused by the unclean connector.

Before the installation and laying of optical fiber cables, the relevant information of the monitored optical fiber cables shall be understood in detail, and the corresponding optical fiber terminals in the ODF frame of the optical fiber cables to be monitored, as well as the corresponding relations of OSW, OCM and OTDR, shall be accurately found and marked, so as to avoid the insertion and insertion of the wrong optical fiber

during the construction, so that the corresponding relations are wrong, resulting in the monitoring information error.

The minimum bending radius of optical fiber (cable) wiring shall be greater than 40mm no matter where it turns.

Optical fiber (cable) cannot be tied together with wire (cable), and it shall be protected by soft plastic sleeve before entering and leaving the cabinet.

In order to ensure the correct connection of optical fiber and the convenience of future maintenance work, the two ends of optical fiber jumper must be labeled during the installation of optical fiber cable. It should be noted that the label content of the same optical fiber jumper should be consistent. After the optical fiber jumper is laid out, please mark it with label according to the corresponding relationship between single card optical interface and ODF frame.

5.8 Optical Interface Cleaning and Verification

The cleaning of optical interface refers to the cleaning of optical devices by using special tools and standard operation methods to meet the opening requirements of the system. The verification method is to confirm whether the cleaning of optical devices is effective through the curve chart reflected on the display screen after the test of test software or network management.

Special cleaning tools for OCM system include:

1. End face detector
2. Fiber cleaning paper (fiber eraser)
3. Flange cleaning tools

Note:

The above tools are necessary for OCM system installation. After cleaning, the optical devices can only be cleaned after passing the verification.

Warning:

Special cleaning tools and materials must be used to clean the optical fiber connector and optical interface. It is absolutely forbidden to use any cleaning tools and materials that cannot be proved suitable for cleaning the optical fiber connector and optical interface board laser! Using unqualified cleaning tools and materials for the optical fiber connector and optical interface will damage the optical fiber connector interface.