

Product Datasheet

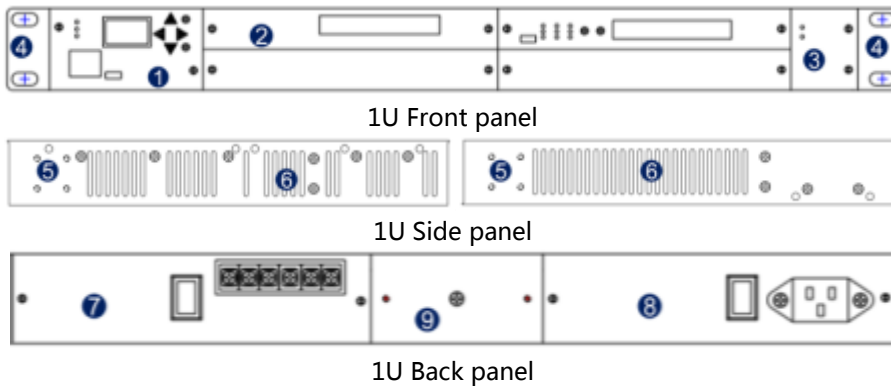
contents

1. Machine frame information.....	3
1.1 Machine frame appearance description	3
1.1.1 1U Machine frame.....	3
1.1.2 2U Machine frame.....	3
1.1.3 4U Machine frame.....	4
1.2 Machine Frame Component	4
1.2.1 Main control card.....	4
1.2.2 POWER and FAN	5
1.3 Machine frame correlation parameter.....	5
1.4 Machine frame component ordering Information	6
2. Business card information	7

1. Machine frame information

1. 1 Machine frame appearance description

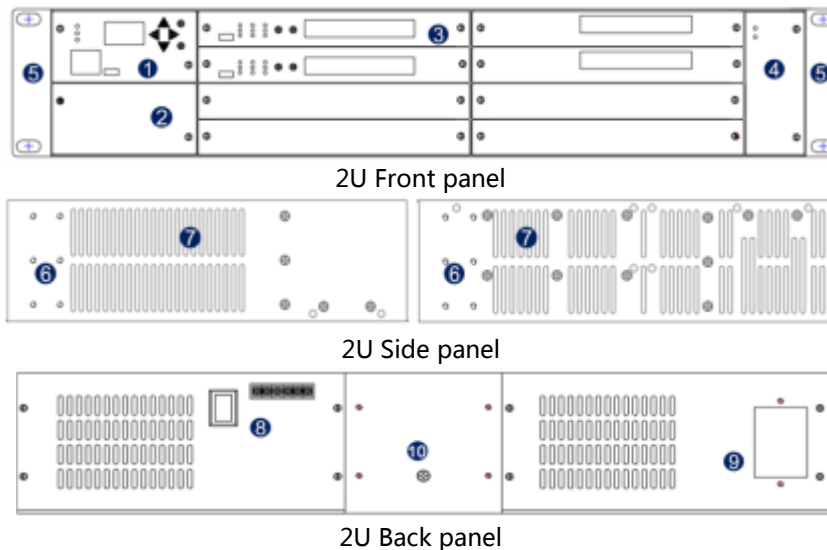
1. 1. 1 1U Machine frame



Explain :

- ①Main control card slot
- ②Business card slot,maximum support four business cards, our business cards all can be mixed interpolation and hot swappable
- ③Fan slot,Support for fan hot swap and independent replacement
- ④Scalable lug ⑤Lug instillation position ⑥Side vent
- ⑦Power 1 slot,can plug in AC power supply or DC power supply, support hot swap
- ⑧Power 2 slot,can plug in AC power supply or DC power supply, support hot swap
- ⑨Grounding screw

1. 1. 2 2U Machine frame

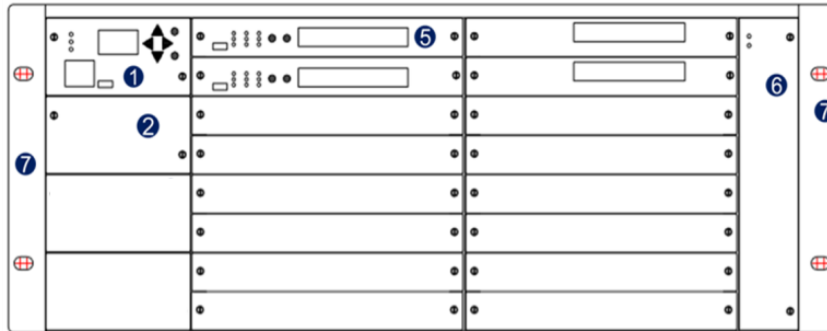


Explain :

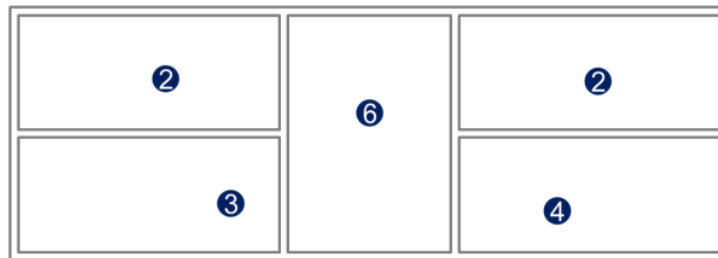
- ①Main control card slot
- ②Expansion slot,can plug in eight Ethernet switch cards or other cards

- ③Business card slot,maximum support eight business cards,all our business card can be mixed interpolation,hot swappable
- ④Fan slot,Support for fan hot swap and independent replacement
- ⑤Scalable lug ⑥Lug instillation position ⑦Side vent
- ⑧Power 1 slot,can plug in AC power supply or DC power supply, support hot swap
- ⑨Power 2 slot,can plug in AC power supply or DC power supply, support hot swap
- ⑩Grounding screw

1. 1. 3 4U Machine frame



4U Front panel



4U Back panel

Explain :

- ①Main control card slot
- ②Expansion slot,can plug in eight Ethernet switch cards or other cards
- ③Power 1 slot,can plug in AC power supply or DC power supply, support hot swap
- ④Power 2 slot,can plug in AC power supply or DC power supply, support hot swap
- ⑤Business card slot,maximum support sixteen business cards,all our business card can be mixed interpolation,hot swappable
- ⑥Fan slot,Support for fan hot swap and independent replacement
- ⑦Scalable lug

1. 2 Machine Frame Component

1. 2. 1 Main control card

Main control card panel

- ①Equipment status indicator : PWR1、 PWR2、 RUN
- ②HD dual color LCD display screen
- ③Operation keys
- ④Ethernet communication interface
- ⑤Micro USB equipment upgrade interface



- ⑥optical port
- ⑦optical port Indicator light

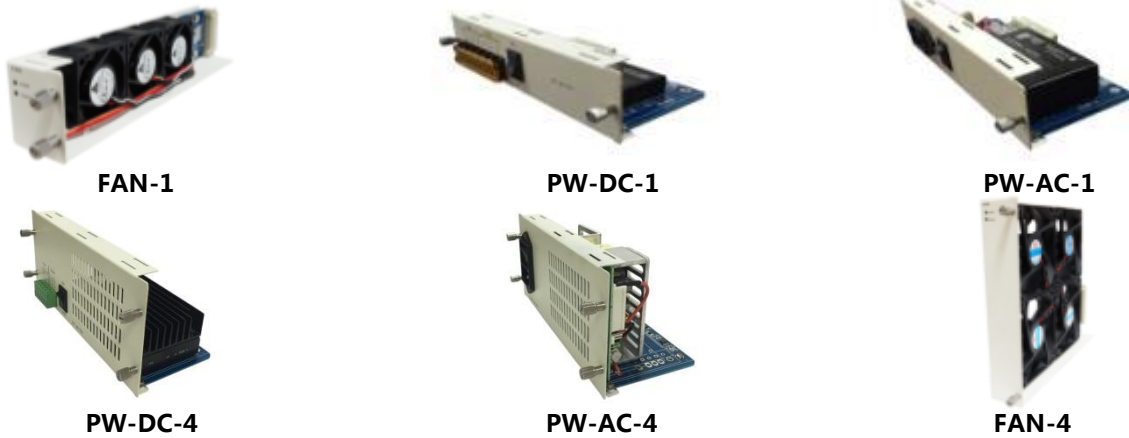
Communication control

- Communication management card using LINUX+ARM9 control design
- Business card using UCOS2+ARM7 control design
- Communication management card and business card work independently

Equipment management

- Equipment state,card performance can be visible completely
- Card parameters can be set by panel
- Alarm audio output,can self-actuated open and close
- Temperature control fan,can self-actuated open and close
- Supports various network management channels of 2M,in-hand and out-hand
- Supports SNMP, Telnet, TCP/IP, Web

1. 2. 2 POWER and FAN



1. 3 Machine frame correlation parameter

Parameters		Unit	Specifications
Environmental parameter	Working	℃	-10~ 60℃
	Storage	℃	-20℃~ 75℃
	Relative	℃	5% ~ 95% No condensation
size	1U	mm	482.6W×300D×44.5H
	2U	mm	482.6W×300D×86H
	4U	mm	482.6W×220D×176H
Power Supply	AC	V	85~264,50~60hz
	DC	V	36~72
Consumption	1U	W	< 50 (Max)
	2U	W	< 100 (Max)
	4U	W	< 200 (Max)

1. 4 Machine frame component ordering Information

TN10	1U Machine frame
TN20	2U Machine frame
TN40	4U Machine frame
PW-AC-1	1U 85V~264VAC Power card
PW-DC-1	1U 36~72VDC Power card
PW-AC-2	2U 85V~264VAC Power card
PW-DC-2	2U 36~72VDC Power card
PW-AC-4	4U 85V~264VAC Power card
PW-DC-4	4U 36~72VDC Power card
CMU-E	Main control card , Support for LCD、 10/100M Ethernet interface
CMU-ES	Main control card , Support for LCD、 10/100M Ethernet interface、 SFP
FAN-1	1U Fan card
FAN-2	1U Fan card
FAN-4	4U Fan card

2. Business card information

Multi-channel erbium doped fiber amplifier

■ Product Description

The product is multi-channel EDFA of high flattening and high stable output. The kernel component of the product is high availability pump laser and high-performance gain flattening filters. The product has high stable output, high gain flatness and high reliability by using unique APC (automatic power control) and ATC (automatic temperature control). The system's flatness and noise can achieve the best optimization by the gain flattening filters of professional design. The system is convenient to regulation and display, reliable, intelligent by using high stable and high precision MPU.

■ Applications

- C-band 40/80CH DWDM
- Other optical systems



■ Product features

- Low-noise high flatness design
- Adjustable output power
- High precision ATC keep system stable operation
- Precision AGC / APC circuit keeps the output Power stability
- Card design highly integrated, space-saving cabinet
- Expansion is very convenient
- Strict accordance with Bellcore GR-1312-CORE requirement for design

■ Performance index

OBA20 (Booster)

Parameters	Unit	Symb	Min	Typ	Max
Operating Wavelength	nm	λ_c	1529	-----	1564
Saturate Output Power	dBm	Po	-----	-----	20
Input Power	dBm	Pi	-12	-----	+8
Gain	dB	G	-----	12	-----
Noise Figure	dB	NF	-----	4.5	6
Power/Gain Stability	dB	ΔP_o	-----	± 0.05	± 0.2
Input Isolation	dB	ISO _i	30	-----	-----
Output Isolation	dB	ISO _o	30	-----	-----
Flatness	dB	GF	-----	1	-----
Return loss	dB	RL	-----	-----	-45
PDG	dB	PDG	-----	-----	0.3

PMD	ps	PMD	-----	-----	0.5
Consumption	W	P	-----	-----	3

OPA13(Pre-Amplifier)

Parameters	Unit	Symb	Min	Typ	Max
Operating Wavelength	nm	λ_c	1529	-----	1564
Saturate Output Power	dBm	Po	-----	-----	13
Input Power	dBm	Pi	-30	-----	-5
Gain	dB	G	-----	20	-----
Noise Figure	dB	NF	-----	4.5	6
Power/Gain Stability	dB	ΔP_o	-----	± 0.05	± 0.2
Input Isolation	dB	ISOi	30	-----	-----
Output Isolation	dB	ISOo	30	-----	-----
Flatness	dB	GF	-----	1	-----
Return loss	dB	RL	-----	-----	-45
PDG	dB	PDG	-----	-----	0.3
PMD	ps	PMD	-----	-----	0.5
Consumption	W	P	-----	-----	3

■ Laser class information security

IIIb level laser products

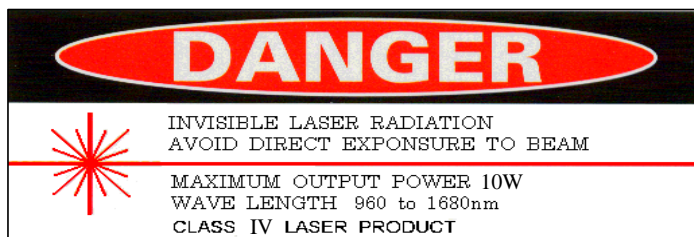
With single-mode fiber pigtail connectors

Wavelength : 0.96~1.68 μ m

Maximum power : <400mW

Products can not be transported in a charged state

Note: this instruction outside of any control, regulation and treatment may result in hazardous radiation exposure



OEO Optical signal regeneration converter

■ Product overview

OEO is optical signal regeneration conversion equipment based on the principle of O-E-O. The product is applied to optical signal wavelength conversion, single mode conversion, relay amplification, signal regeneration and other occasions and is widely used in the field of optical communication.

■ Product application

- SDH
- Ethernet
- C/DWDM



■ Product features

- Full rate access : 155Mbps~11.3Gbps
- Full service access : Ethernet, P/SDH,ATM,etc
- Support 3R function
- Single card supports 4-channel two-way/8-channel one-way business processing
- High level of integration by plug-in design,which saves space of cabinet
- Expansion is very convenient

■ Performance Index

Parameters		Unit	Specifications				
9.95~11.3 Gbps	Workingwavelength	nm	850	1310	1550/CWDM/DWDM		
	Transmission distance	km	0.3	10	40	80	
	Input power range	dBm	-11~-1	-14~0	-16~0	-24~-7	
	Output power range	dBm	-6~-1	-6~0	-1~+3	0~+4	
2.5Gbps	Workingwavelength	nm	1310	1550/CWDM/DWDM		DWDM	
	Transmission distance	km	20	40	80	120	
	Input power range	dBm	-18~0	-18~0	-28~-10	-30~-10	
	Output power range	dBm	-5~0	-2~+3	0~+5	0~+5	
1.25Gbps	Workingwavelength	nm	850	1310	1550/CWDM/DWDM		
	Transmission distance	km	0.55	10	40	80	120
	Input power range	dBm	-18~-3	-18~-3	-24~-1	-24~-1	-31~-9
	Output power range	dBm	-9~-3	-9~-3	-5~0	0~+5	0~+5
622Mbps	Workingwavelength	nm	1310	1550/CWDM		1550	
	Transmission distance	km	20	40	80	120	
	Input power range	dBm	-28~-8	28~-8	28~-8	-31~-9	

	Output power range	dBm	-14~-8	-5~0	-3~+2	0~+5	
155Mbps	Workingwavelength	nm	1310	1550/CWDM			
	Transmission distance	km	20	40	80	120	
	Input power range	dBm	-32~-3	-34~-	-34~-9	-34~-9	
	Output power range	dBm	-14~-8	-7~-2	-5~0	0~+5	
Extinction ratio		dB	≥10				
dithering performance			ConformITU-T G.825 (2000)				
SMSR		dB	> 30				
power dissipation		W	< 10				

Multilayer dielectric film type OADM

■ Product Description

To Separate or insert one or more wavelengths from a multi wavelength channel.

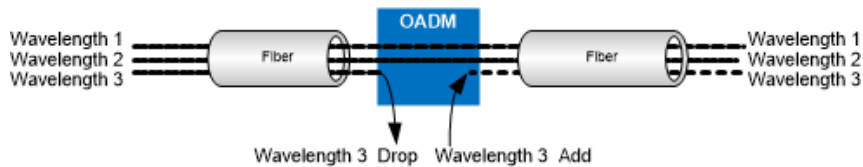
■ Applications

- DWDM systems



■ Product features

- Can access ITU-T C/DWDM wavelength signals ;
- Low insertion loss ;
- Low polarization dependent loss ;
- High channel isolation ;
- Excellent environmental reliability ;



■ Performance index

Parameters		Unit	Specifications			
Wavelength Range			ITU channels 186.6 to 196.1 THz			
Channel Center Wavelength		nm	ITU Grid			
Channel Spacing		Ghz	100	200		
Channel Passband (@-0.5dB)		nm	0.22	0.5		
Channel No.		λ	1	2	4	8
Insertion Loss	Add/Drop	dB	≤ 0.8	≤ 1.2	≤ 1.7	≤ 3.0
	Express	dB	≤ 0.8	≤ 1.6	≤ 2.5	≤ 4.0
Adjacent Channel Isolation		dB	≥ 30			
Non-adjacent Channel Isolation		dB	≥ 45			
Wavelength thermal stability		nm/	≤ 0.003			
Insertion loss thermal stability		dB/	≤ 0.005	≤ 0.007	≤ 0.008	
PDL		dB	≤ 0.1	≤ 0.15	≤ 0.20	≤ 0.25
Polarization mode dispersion		ps	≤ 0.1	≤ 0.15		
Directivity		dB	≥ 50			
Return loss		dB	≥ 45			
Optical Power		mW	≤ 500			
Note: 1. Customization is available.						

TAWG Thermal Arrayed Waveguide Grating

■ Product Description

TAWG : Thermal Arrayed-Waveguide Grating mainly is used in DWDM system. It transmits signal by making different ITU-T DWDM wavelength signals multiplex to single fiber in receiving terminal. It decomposes composite signal into different ITU-T DWDM wavelength signal. The product has a low insertion loss, high channel insertion loss consistency, Need external power supply.

■ Product features

- Low insertion loss
- High consistency channel insertion loss
- Low polarization dependent loss
- High channel isolation
- Excellent environmental reliability
- High level of integration by plug-in design



■ Performance index

Parameters	Notes	Specifications		Units
		Min	Max	
Channels		40		Ch
Channel Spacing		100		GHz
Reference Pass-band	Relative to ITU Grid	± 0.1		nm
ITU Frequency	On ITU grid in C-band Even	196.00	192.10	THz
ITU Wavelength	On ITU grid in C-band Even	1529.553	1560.606	nm
ITU Frequency	On ITU grid in C-band ODD	196.05	192.15	THz
ITU Wavelength	On ITU grid in C-band ODD	1529.163	1560.200	nm
Center Frequency Accuracy	Maximum of the absolute deviation of the 3 dB center wavelength from ITU grid over all channels	-0.05	+0.05	nm
Insertion Loss	Maximum of the insertion loss across the ITU pass-band over all channels		6.2	dB
Insertion Loss Uniformity	Maximum insertion loss variance across all channels		1.3	dB
Ripple	Maximum of the loss variance across the ITU pass-band over all channels		0.5	dB
0.5 dB Bandwidth	0.5 dB from min Insertion Loss, full width, worst case polarization	0.2		nm
1dB Bandwidth	1dB from min Insertion Loss, full width, average polarization	0.4		nm
3dB Bandwidth	3 dB from min Insertion Loss, full width, average polarization	0.55		nm
20 dB bandwidth	20 dB from min Insertion Loss, full width, average polarization		1.2	nm

Adjacent Channel Isolation	Ratio of peak transmission to the maximum transmission over both adjacent pass-bands	25		dB
Non-Adjacent Channel Isolation	Ratio of peak transmission in channel pass-bands to maximum transmission over all non-adjacent pass-bands	30		dB
Total Crosstalk	Ratio of power in channel to power in all other pass-bands	21		dB
Polarization Dependent Loss	Maximum ratio of transmissions over all polarization states, over the ITU pass-band		0.5	dB
Return Loss		40		dB
Polarization Mode Delay (PMD)	In Reference Passband over all channels		0.5	ps
Chromatic Dispersion	In Reference Passband over all channels	-15	15	ps/nm

DWDM Dense Wavelength Division Multiplexer

■ Product Description

DWDM : Dense Wavelength Division Multiplexing is a metropolitan area network backbone layer or a long wavelength division transmission technology. It transmits signal by making different ITU-T DWDM wavelength signals multiplex to single fiber in receiving terminal. It decomposes composite signal into different ITU-T DWDM wavelength signal.

■ Product features

- Low insertion loss
- Low polarization dependent loss
- High channel isolation
- Good environment reliability
- High level of integration by plug-in design



■ Performance Index

Parameters	Unit	Specifications			
Wavelength Range		ITU channels 186.6 to 196.1 THz			
Channel Center Wavelength	nm	ITU channels			
Channel Spacing	Ghz	100	200		
Channel Pass band (@-0.5dB)	nm	0.22	0.5		
Channel No.	λ	2	4	8	16
Insertion Loss	dB	≤ 1.0	≤ 2.0	≤ 2.8	≤ 5.2
Adjacent Channel Isolation	dB	≥ 30			
Non-adjacent Channel Isolation	dB	≥ 45			
Wavelength thermal stability	nm/°C	≤ 0.003			
Insertion loss thermal stability	dB/°C	≤ 0.005			
PDL	dB	≤ 0.1	≤ 0.15	≤ 0.15	≤ 0.20
Polarization mode dispersion	ps	≤ 0.1			
Directivity	dB	≥ 50			
Return loss	dB	≥ 45			
Optical Power	mW	≤ 500			

10G FEC Forward Error Correction Converter

■ Product overview

The product is applied to optical fiber long distance communication system or DWDM system. It can reduce bit error rate, reduce OSNR capacity of optical receiver equipment and add transmission distance.

■ Product features

- Compatible 10GE、STM-64、FC、CPRI
- Single card supports 4-channel service of two-way.
- FEC encoding gain ≥ 8 dB
- High integration plug-in design



■ Performance index

Parameters	Unit	Specifications
Input Wavelength Range	nm	Customer Side : 1260~1650 , Line Side : 1530~1565
Signal type	----	Ethernet : 10G
	----	FC : 8G/10G
	----	CPRI : 9.8G
	----	SDH : STM-64
FEC Coding Gain	dB	≥ 8
Optical transceiver	----	SFP +
Consumption	W	< 10

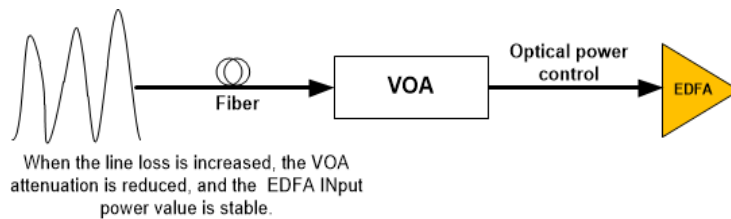
■ Product ordering information

Product code	-	Rate	-	Encoding gain	-	Channel (two-way)
FEC		10G		1 : 8dB		1 : 1 Channel
				2 : 12dB		2 : 2 Channels
						3 : 3 Channels
						4 : 4 Channels

VOA Variable Optical Attenuator

■ Product Description

VOA : Variable optical attenuator is an online attenuation amount adjustment device. It is applied to the situation of optical power required strict control in network, which the most common is cooperate with EDFA.



■ Product features

- Wide operating wavelength range
- Ultra wide adjustable range
- Regulation accuracy is 0.1dB
- High multi channel attenuation stability
- Single card supports signal attenuation of 4-channel one-way
- Online attenuation adjustment makes business is more safer
- Automatically attenuation adjustment makes the network is intelligent



■ Performance index

Parameters	Unit	Specifications
Operating	nm	1310 or 1550 or 1490 or 1585
Bandwidth	nm	±20
Insertion Loss	dB	Typ:0.4 Max:0.5
Attenuation range	dB	0.8~60
Isolation (min)	dB	≥30
Return Loss	dB	≥60
PDL	dB	≤0.05
PMD	dB	≤0.25
Transmission Power	mw	≤500

■ Product ordering information

Product code	-	Wavelength	Attenuation Range	Channel number (One-way)	-	Interface
VOA		1 : 1290~1330	1 : 30dB	04 : 4 channels		LP : LC/PC
		2 : 1530~1570	2 : 60dB	08 : 8 channels		

OLP Optical Line Protector

■ Product overview

OLP-Optical Line Protection is a product that is used in the protection of network transmission line, the product can realize optical power monitoring and automatic switching. In optical communication network, OLP real-time monitoring optical power of working optical fiber and standby optical fiber. When the optical power value of working optical fiber is below the set switching threshold, the system raise the alarm prompt and switches to standby fiber automatically, which achieve line protection of optical transmission system.

■ Product features

- Low insertion loss
- Business non-invasive switch
- Transparent transmission characteristics
- Reduce the loss caused by line fault
- Increase the reliability of the transmission network, improve network quality
- High level of integration by plug-in design, which saves space of cabinet
- Expansion is very convenient



■ Performance Index

Parameters	Unit	1+1 Protect	1:1 Protect
Wavelength Range	nm	1310±50 and 1550±50	
Monitor Range	dBm	+23 ~ -50	
Monitor Precision	dB	±0.25	
Optical power resolution	dB	±0.01	
Return Loss	dB	≥55	
Polarization Dependent Loss	dB	≤0.05	
Wavelength Dependent Loss	dB	≤0.1	
Insertion Loss	dB	Tx<1.2、Rx<0.8	Tx<3.6、Rx<0.8
Switching Period	ms	<35	<15
Operating Life		>107	
Power dissipation	W	<3	

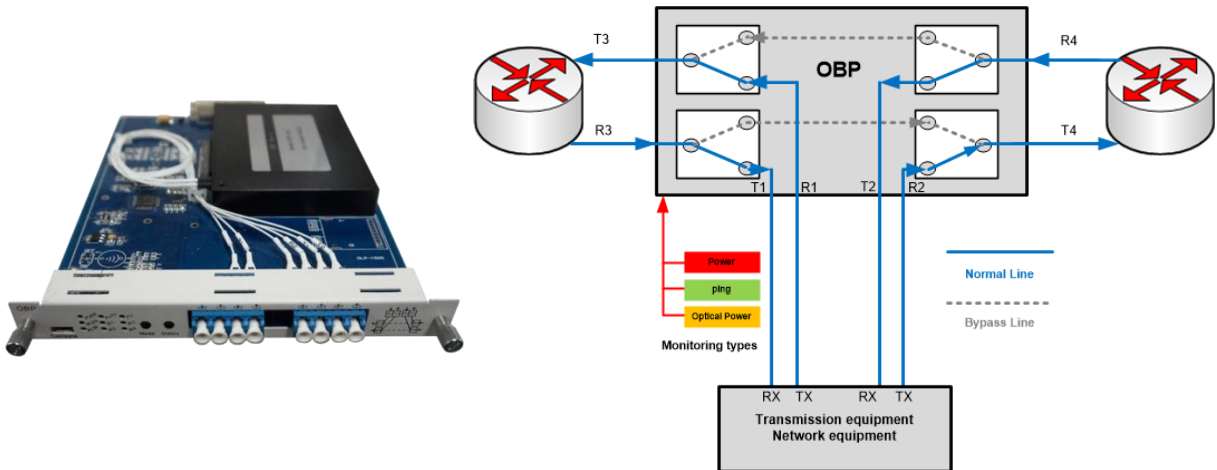
■ Product ordering information

Product code	-	Transmission mode	Protection mode	-	Optical fiber interface
LP		1 : Single fiber one-way	00 : 1-1		LP : LC/PC
		2 : Double fiber two-way	11 : 1:1		
		3 : BIDI	12 : 1:1B		
			22 : 1 + 1		

OBP Optical ByPass Protection

■ Product Description

The OBP equipment is used in a safety protection network transmission equipment products, when the network equipment in the software crash, power off, optical power failure (No optical signal output), the OBP system automatically bypassing the faulty equipment, to ensure that the network transmission is not interrupted.



■ Product features

- The passive optical system, traffic signal transmission
- Low insertion loss
- Automatically switched instantaneously, without human intervention
- Support light power monitoring network equipment
- Support network equipment heartbeat monitoring
- Support power-off protection, no optical signal output protection, heartbeat crash protection
- High integration plug-in design, space saving cabinet, convenient expansion

■ Performance index

Parameters	Unit	Specifications	
Working wavelength	nm	1310±50 和 1550±50	850
Monitoring optical power range	dBm	+23 ~ -50	
Monitoring optical power accuracy	dB	±0.25	
Optical power resolution	dB	±0.01	
Return loss	dB	≥45	≥5
PDL	dB	≤0.05	
WDL	dB	≤0.1	
Insertion loss	dB	< 1.5	
Switching speed	ms	<10	
Working life	Times	>10000000	
Power	W	< 3	

Power detection points

Fig.1: 1 way Bypass with 2 optical power detection points

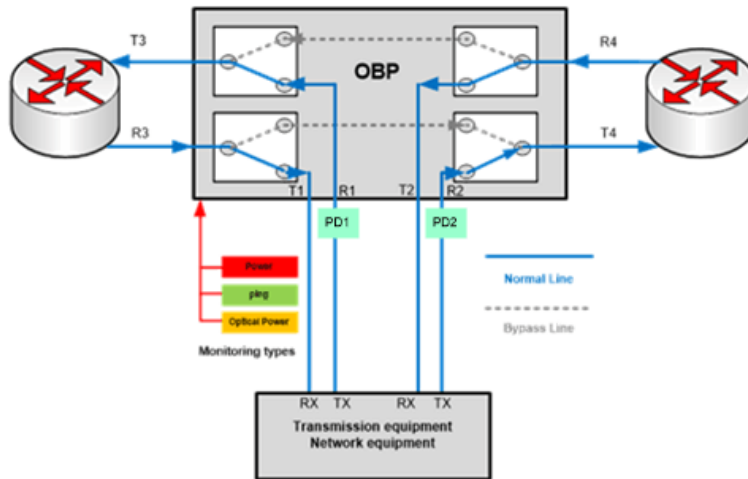


Fig.1

Fig.2: 1 way Bypass with 4 optical power detection points

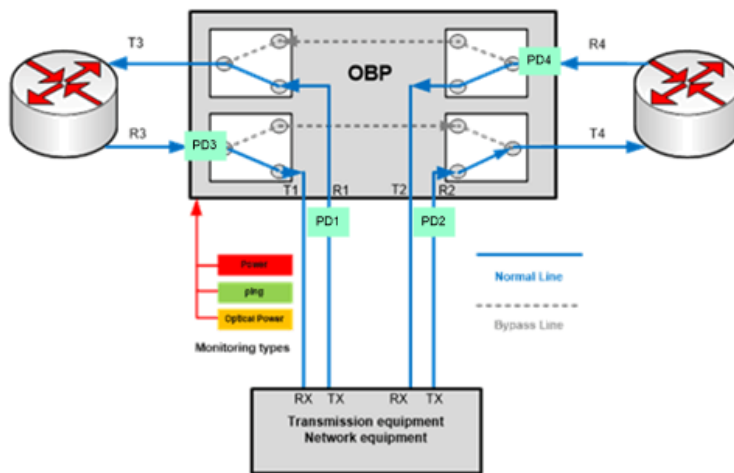


Fig.2

OPM Optical Performance Monitor

■ Product overview

The product is applied to monitoring and analysis of optical performance about high speed DWDM signal. It can monitor and analyze multiple links by combining the way of optical switch, which include optical wavelength monitoring, optical power monitoring, OSNR monitoring.

■ Product features

- Single card provide 1 ~ 8 signal monitoring port road
- Support optical signal monitoring of 80 waves DWDM
- Support the OSNR precision measurement
- Support the wavelength accuracy measurement
- Optical power precision measurement



■ Performance index

Parameters	Unit	Specifications
Input Wavelength Range	nm	1528-1568
Channel Spacing	GHZ	50/100/200
Wavelength Accuracy	pm	±50
Channel Input Power Range	dBm	-10~-40
Channel Power Accuracy	dB	±0.5
Power Resolution	dB	0.1
OSNR Accuracy	dB	±1.5

■ Product ordering information

Product code	-	Channel interval	-	Transmission rate	-	Monitor port number
OPM		1 : 50GHZ		10G		1 : 1
		:2 : 100GHZ				2 : 2
		:3 : 200GHZ				3 : 3
						-
						8 : 8

OPD Optical Power Detection

■ Product Overview

Optical power detection is a kind of optical power monitoring equipment. Which can carry on the high precision optical power detection. Detecting wavelength can be customized, Support online sampling or offline.

■ Product Features

- High optical power monitoring accuracy
- Wide optical power monitoring scope



■ Performance Index

Parameters	Technical Index
Working Wavelength	1310±50 nm
Optical Power Monitoring Accuracy	±0.25 dB
Optical Power Distinguishability	0.01
Optical Power Monitoring Scope	-70~+3
Crosstalk	> 55dB
Insertion Loss (online collecting)	≤ 1dB
Connector	LC/PC
Channel Optional	4/8/16 channels

LSU Light Source Unit

■ Product Overview

Light source unit is a stable light-emitting equipment. Inside use the DFB laser, its features is good light stability, high luminous power, long working life, etc. Output channel number can be customized, support luminous channels open or closed.

■ Product Features

- Good light stability
- High luminous power
- Long working life
- Support for luminous control



■ Performance Index

Parameters	Technical Index
Working Wavelength	1310nm / 1550 nm
Luminous Intensity Power	> -5dBm
Working Life	> 150000h
Connector	LC/PC
Channel Optional	4/8/16...

OTDR Optical Time Domain Reflector

■ Product Overview

OTDR optical time domain reflector, which can measure fiber length, optical fiber transmission attenuation, splice attenuation and fault location, etc. It can be applied to optical fiber cable monitoring, fiber optic cable construction and maintenance.

■ Product Features

- Optional dynamic range
- Short dead zone



■ Performance Index

Parameters	Technical Index
Dynamic range (dB)	24~40
Wavelength (optional)	1310 /1550/1625/1650 (+/- 20 nm)
optical fiber	9/125 μm SMF
Joint converter	LC/UPC
Pulse Width	5ns,10ns,20ns,40ns,80ns,160ns,320ns,640ns,
Event Dead Zone	≤2m
Attenuation Dead Zone	≤10m
Minimum Sampling Interval	0.25m
Maximum Sampling	32k
Ranging accuracy	$\pm (1m+5\times 10^{-5}\times \text{distance} + \text{Sampling interval})$
Connector	SC/UPC