



FR8000
Optical Line System
System Overview

Release 1.0.0

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Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

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Revision History

Version	Date	Author	Reasons of Change	Section(s) Affected
1.0	2021/11/01		Initial Release	All



Warning!

- **Please don't open the cover**

Opening the cover of this equipment is absolutely forbidden.

This has an electric shock hazard. Besides, this is a factor that may cause faults.

- **Please don't use when the equipment is abnormal**

In case of abnormal conditions like fume, peculiar smell, strange sounds, etc., please stop using the equipment lest that fire or electric shock occurs. Please switch it off immediately, and then ask the sale shop or sale site from which you purchased it for repair after the smoke surely disappears. Never repair it by yourself, lest that hazard occurs.

- ❖ When using AC power: please pull out the power plug from socket.
- ❖ When using DC power: please remove the power cable from junction board.

- **Please don't damage the power wires**

Please don't scratch, damage or stretch the power wires, otherwise the power wires may break and cause hazards of fire or electric shock.

- **Plug in the plug properly**

When using AC power, the power plug should be fully inserted. Besides, please don't use loose socket to avoid bad contact. Otherwise fire or electric shock may occur.

- **The power wires should be firmly connected with junction board**

When using DC power, the power wires should be firmly connected with junction board. As long as the [0V], [-48V] and [FG] junctions are contacted, not only the internal power of the equipment will fail, but also fire or electric shock may occur.

- **Hold the plug when plugging it in/out**

When plugging in or pulling out the power wires, please make sure to hold the plug with your hand. Stretching the wires parts may damage them and cause electric shock or fire.

- **Please don't touch the plug/junction board with wet hand**

Please don't touch the power plug or connect the junctions with wet hand. Otherwise electric shock may occur.

- **Plug/junction board cleaning**

Please make sure that the plug and junction board are not covered with dust before you connect them. If they are covered with dust, fire or electric shock may occur.

- **Please don't touch the equipment in thunder**



When thundering please don't perform connection tasks of communication cables and don't touch the equipment. Touching the equipment in thunder may cause electric shock.

- **Don't interfere with ventilation**

The vents are designed lest that the internal temperature increases. Please don't place the equipment at unventilated positions or place objects on or near the vents, otherwise its internal temperature may increase and cause fire or faults.

Please don't place objects on the soft power wires

Please don't place objects on the power wires. The breakage of it may cause fire or electric shock.

- **Pull out the soft power wires from socket in case of damage**

When the soft power wires are damaged, please switch the power off immediately and ask the sale shop or sale site from which you purchased it for repair. Letting it alone may cause fire or electric shock.

- **Pull it out from the socket in case of damage**

In case the host is dropped or damaged, please switch the power off immediately and ask the sale shop or sale site from which you purchased it for repair. Letting it alone may cause fire or electric shock.

- **Please don't place it at unstable sites**

Please don't place the equipment at rocky, declining or unstable sites. Otherwise it may be damaged by dropping or overturn.

- **Please don't place it at the sites with abominable environment**

Placing the equipment at the following sites will shorten the life of it and thereby cause faults. Please conserve it properly. Don't place it at the following sites.

Very damp or dusty sites

Sites that generate lampblack or corrosive gases

Continuously vibrated sites

Sites under direct sunlight

High-temperature sites near ovens or other hot apparatus

- **Please don't impose pressure at will**

Please don't impose pressure on the connector or touch it with metal at will. Otherwise a fault may occur



About This Guide

Introduction

This document chapter includes an introduction to the Fiberroad products family, FR8000 features, Optical Module functions, network application and configuration.

Conventions

This document contains notices, figures, screen captures, and certain text conventions.

Figures and Screen Captures

This document provides figures and screen captures as example. These examples contain sample data. This data may vary from the actual data on an installed system.





Chapter 1 System Description

FR8000-OLS is a new generation of the optical interconnection, particularly for IPoverDWDM and meet the transport capacity demand for more line system, apply to edge data center applications. Provide a cost-effective than 4T.

1.1 Key Feature

- Super T-bit Capacity
- Extra Long Distance -2000km, Without electric repeater transmission capacity.
- Support 100M to 400G mixed transmission.
- Smooth network update for high bandwidth.
- Whole network intelligent protection, high reliability.
- Line-side Support 1+1 Double port selecting redundancy protection
- The modular design of Power Supply, Fan Unit, Services Card for easy maintenance.

1.2 Various Format

- 1U/1.25U open and modularized chassis structure.
- 1/4 universal module slots
- High-density Mux/Demux

1.3 Intelligent Network Management

- Support SNMP、CLI、WEB、TELNET
- Completely visual graphic information
- Support electronic map positioning, fault location and isolation quickly and accurately
- Support voice alarm, e-mail alerts, SMS alerts approach, real-time online remote monitoring
- EMS Management platform, covering the entire Process from Plan to maintenance.
- Support fault quick diagnosis, one-click export resource statements
- Support Cable Fault point localization diagnosis, real-time detection cable quality.
- Support OPM transmission performance scan



1.4 Sub-rack

The FR8000-OLS unit is designed to be mounted on two vertical rack mounting rails of 19" RACK. 2 front mounting rail is used as four mounting point using the flanges provided at the front of each FR800-OLS.

The allowable positions for rails and how to install the FR8000-OLS are shown in 0:



Figure 1 FR8000-OLS Appearance

Designed based on the 19-inch standard, FR8000-OLS can be installed in a 19-inch cabinet. The cabinet is 435 (L) × 295 (W) × 43 (H) (height x width x depth).

Interface Description

FR8000-OLS has an open and cost-effective structure. [错误!未找到引用源。](#) illustrates the interface arrangement of a FR8000-OLS sub-rack.

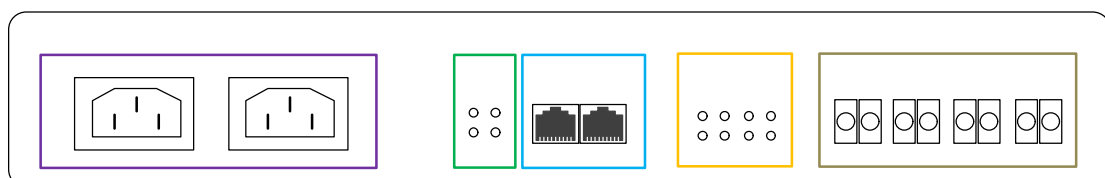


Figure 2 : Front-End Interface

- 1 : Power Supply Socket
- 2 : Management Port Status Indicators
- 3 : Network Management Port(Ethernet and Console)
- 4 : Module Status Indicators



1.5 Chassis Specifications

System parameter	Description
Power Supply	(Optional)2*DC-48V , (Optional)2*AC 220V
FAN	4 *FAN units
Operation Temperature	0°C ~ 50°C
Altitude	0-10,000ft
Humidity	5% ~ 95% (Non-condensing)
Dimension	430(D)*355(W)*265(H)nm

System Architecture and Features

FR8000-OLS is a new generation of Optical Line System.

Some of the salient features of FR8000-OLS are listed below:

System Features

Network Management Function

The FR8000-OLS operates as an SNMP agent: When the SNMP manager requests MIB information or settings, the device conducts the appropriate processing to fulfill the request and sends response data to the SNMP manager.

The SNMP managers that connect to the FR8000-OLS can be restricted as follows:

❖ SNMP manager access restriction

SNMP manager IP address

- If an IP address is set, all access except from the registered SNMP manager will be ignored.

- Read-only community name

- Read-write community name

❖ Setting and updating of management information (MIB)

- Of the Internet standard MIB prescribed by MIB RFC 1213 (MIB II Revision 2), the device can set and change system and interface settings.

- FIBERROAD proprietary MIB such as the operation management MIB for displaying the status of each port can be set and changed.

- Of the MIB prescribed by RFC2863 (interface group MIB), the device can set and change ifXEntry.



❖ Trap send function

The FR8000-OLS is capable of sending the following traps to a manager that has been set as the trap receiver.

- Cold trap on startup
- Power failure and recovery status
- Cooling fan failure and recovery status
- Self-diagnostic test failure
- SNMP authentication failure
- LINK UP/DOWN

File Transfer

The FR8000-OLS features a TFTP client function, allowing it to download firmware updates, transfer logs, and upload and download, sending information to a server on the network.

Log Record

The FR8000-OLS can save log information for the items. Specifically, a log is saved when the reboot command is executed. Note that if the power is turned off without executing the reboot command, the log will not be saved. In addition, as the FR8000-OLS is SYSLOG compatible, it can automatically send logs to a network-connected SYSLOG server.

NTP and Clock

Incorporating a real-time clock, the FR8000-OLS allows logs to be recorded at a time specified by the user. It is also NTP compatible, allowing it to use a user-prepared server to synchronize the internal clock. A lithium battery saves the time setting even when the power is turned off.

Ethernet Service Processing Capability

Network Interfaces Protocols

The following section lists the FR8000-OLS standard:

- IEEE 802.3u: 100MBase-T



Console interfaces

ITU-T V.24/V.28

Network management protocols

RFC 1157: SNMP (Simple Network Management Protocol)

Objects managed by the network

- RFC 1213: Internet standard MIB (Management Information Base) (system, interface)
- RFC 2863: Interface group MIB (ifXEntry)
- FIBERROAD private mib: FR8000-OLS-mibs.mib

Communication protocols

- RFC 793: TCP (Transmission Control Protocol)
- RFC 768: UDP (User Datagram Protocol)
- RFC 791: IP(Internet Protocol)
- RFC 826: ARP (Address Resolution Protocol)
- RFC 854: TELNET
- RFC 792: ICMP (Internet Control Message Protocol)
- RFC 1305: NTP
- RFC 3164: SYSLOG

Power and Fan

FR8000-OLS system provides two power supply modules. The monitoring system can monitor abnormalities of the power supply voltage, and report the alarm information to the Network Management System.

FR8000-OLS has two pluggable fan trays which has six Fans, with an Alarm LED for the fans, and power supply Alarm LED for the Power Supplies.

Fan Alarm LED

When the software detects any abnormal Fan, the Fan Fault LED is red;

When the software detects all normal Fans, the Fan Fault is off;



Power Alarm LED

When the software detects any abnormal Power, the PWR Fault LED is red;

When the software detects all normal power, the PWR Fault is extinguished;

Please connect the power wires with the FR8000-OLS series. After this connection and powering on, the FR8000-OLS series starts to run.

Power Supply

The power supply must be provided by customer. Power capacity and cable cross-sections should conform to the equipment room's power consumption requirements.

The incoming power supply must be stable. It must be free of noise and distortion, with a voltage range is as follows:

DC Power range: -48V~-55 VDC 5.2A; 7A (The DC power itself has fuse.)

AC Power range: 100/200V, 50/60Hz. 2.75/1.375A; (The AC power itself has no fuse)

AC power in the United States is using the 110 V/50 Hz of the AC, while in China using the 220 V/60Hz the AC, they are compatible;

DC-48V power corresponding type

The customer will prepare power wires corresponding to the power distribution equipment. The recommended power wires are wires above AWG18 in thickness. Following that, please make sure that the voltage output of the DC supplier is in stop status. Connect the equipment terminal of the power wire with the terminal panel on the back of the FR8000-OLS series, and connect the power terminal of the power wire with a DC power. Connect the terminal indicated [0V] with DC 0V, the terminal indicated [-48V] with DC -48V, and the terminal indicated [FG] with the ground of the setting site. It shows the power connection method of the FR8000-OLS series (DC-48V power corresponding types).



Figure 3: DC Power

The DC power connection -48VDC is made to the -48V terminal lug for both of the power feeds.



**Warning!**

Connection of power cable must be performed when the voltage output from the DC power is stopped.

Special note: If, however, the output doesn't stop, please don't directly touch the metal parts of the FR8000-OLS series DC power terminal or the power cable terminal to prevent personal injury. Besides, necessary processing is necessary to protect the insulation parts between power cables and that between the power cable and other devices to prevent the cables from confusion, or the operator may get an electric shock or the FR8000-OLS series or the customer's distribution equipment may fail.

AC power corresponding type

The FR8000-OLS Series uses an AC power source as its power source.

For the AC version, an AC power source is required. For power supply redundancy, two such AC sources, (preferably independent) are required. Each source should be capable of supplying 100 watts per FR8000-OLS equipment. The AC power cables from the AC source attach to the AC power module that is mounted at the rear of FR8000-OLS equipment.

An AC circuit breaker is recommended for the AC power source which supplies AC power to each FR8000-OLS equipment. This circuit breaker should protect against excess currents, short circuits, and earth faults in accordance with national and local electrical codes.





Chapter 2 Module Description

This chapter provides a card/module level hardware description of the eWAE5101 optical transport system and describes available service cards, common modules and their functions.

System Main Control Panel

The system main control panel integrates main control, real-time system control, terminal interface, Network management function, stacking function and auxiliary Interface.

Panel Function

Main Control Module

- The control module is equipped with communication CPU
- CPU connects externally multiple types of storage devices: large-capacity SDRAM and FLASH. Critical data of key databases is saved in different storage media.
- OSC channel processing capability
- Real-time clock function. The clock functions with Gregorian calendar dates between years 2000 to 2099
- LOG information query

Auxiliary Interfaces

- One Ethernet interface for network management system (10MM BASE-T, RJ-45 connector)
- One RS-232 standard serial interface is provided for debugging



Main Control Panel Faceplate

The front panel is equipped with a variety of LED, CONSOLE ports, and expansion slots shown in Figure 4

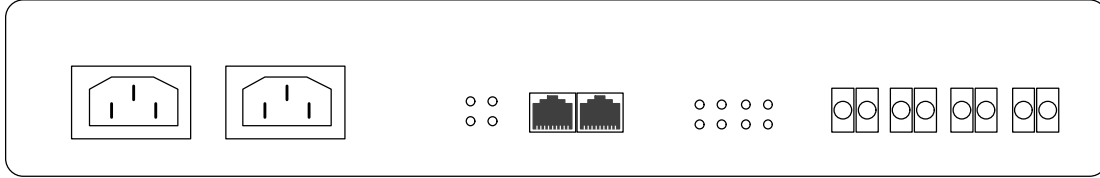


Table 1 Names and functions of all parts at the front panel

Names	Silk Display	Colors	Description
Power Status LED	PS-A	Green	Power supply unit 1 is normal
	PS-B	Green	Power supply unit 2 is normal
	ERR	Red	Power support is abnormal
Console Status LED	N/A	Green	Port connected
	N/A	Yellow	Data in running
Eth Status LED	N/A	Green	Port connected
	N/A	Yellow	Data in running
Module Status LED	RUN	Green	Operation in normal
	PWR	Green	Power on
	In	Red	Input power in abnormal
	Out	Red	Output power in abnormal
	mA	Red	mA in abnormal
	Pump	Red	Pump in abnormal
	Ptem	Red	Pump temperature in abnormal
	Tem	Red	Total temperature in abnormal

Booster - EDFA Module

Model	Description	Gain (dB)	Max.Output (dBm)	Min.Input (dBm)	Max.Input (dBm)	Typ.NF (dB)
Booster Amplifier						
BA16/G12	Booster, Max.Output 16dBm, Gain 12dB, With OSC	12dB	16dB	-10dBm	4dBm	5dB
BA16/G12NS	Booster, Max.Output 16dBm, Gain 12dB, Without OSC	12dB	16dB	-10dBm	4dBm	5dB
BA20/G12	Booster, Max.Output 20dBm, Gain 12dB, With OSC	12dB	20dB	-10dBm	8dBm	5dB
BA20/G12NS	Booster, Max.Output 20dBm, Gain 12dB, Without OSC	12dB	20dB	-10dBm	8dBm	5dB
Bi-Directional Booster Amplifier						



BA16/G12B	Bidi Booster, Max.Output 16dBm, Gain 12dB, With OSC, Pass 1528~1543.2 (Blue) , Reflection 1547~1561nm (Red)	12dB	16dB	-10dBm	4dBm	5dB
BA16/G12NSB	BidiBooster, Max.Output 16dBm, Gain 12dB, Without OSC, Pass 1528~1543.2 (Blue) , Reflection 1547~1561nm (Red)	12dB	16dB	-10dBm	4dBm	5dB
BA20/G12B	BidiBooster, Max.Output 20dBm, Gain 12dB, With OSC, Pass 1528~1543.2 (Blue) , Reflection 1547~1561nm (Red)	12dB	20dB	-10dBm	8dBm	5dB
BA20/G12NSB	BidiBooster, Max.Output 20dBm, Gain 12dB, Without OSC, Pass 1528~1543.2 (Blue) , Reflection 1547~1561nm (Red)	12dB	20dB	-10dBm	8dBm	5dB
BA16/G12R	BidiBooster, Max.Output 16dBm, Gain 12dB, With OSC, Pass 1547~1561nm (Red) , Reflection 1528~1543.2 (Blue)	12dB	16dB	-10dBm	4dBm	5dB
BA16/G12NSR	BidiBooster, Max.Output 16dBm, Gain 12dB, Without OSC, Pass 1547~1561nm (Red) , Reflection 1528~1543.2 (Blue)	12dB	16dB	-10dBm	4dBm	5dB
BA20/G12R	BidiBooster, Max.Output 20dBm, Gain 12dB, With OSC, Pass 1547~1561nm (Red) , Reflection 1528~1543.2 (Blue)	12dB	20dB	-10dBm	8dBm	5dB
BA20/G12NSR	BidiBooster, Max.Output 20dBm, Gain 12dB, Without OSC, Pass 1547~1561nm (Red) , Reflection 1528~1543.2 (Blue)	12dB	20dB	-10dBm	8dBm	5dB



Pre - EDFA Module

Pre-amplifier						
PA16/G20	Pre-amplifier, Max.Output 16dBm, Gain 20dB, With OSC	20dB	16dB	-29dBm	-4dBm	4.5dB
PA16/G20NS	Pre-amplifier, Max.Output 16dBm, Gain 20dB, Without OSC	20dB	16dB	-29dBm	-4dBm	4.5dB
PA16/G20-8	Midstage accessPre-amplifier, Max.Output 16dBm, Gain 20dB, With OSC, Midstage insertion loss 8dB	20dB	16dB	-29dBm	-4dBm	5dB
PA16/G20NS-8	Midstage access Pre-amplifier, Max.Output 16dBm, Gain 20dB, With OSC, Midstage insertion loss 8dB	20dB	16dB	-29dBm	-4dBm	5dB
PA16/G25	Pre-amplifier, Max.Output 16dBm, Gain 25dB, With OSC	25dB	16dB	-30dBm	-9dBm	4.5dB
PA16/G25NS	Pre-amplifier, Max.Output 16dBm, Gain 25dB, Without OSC	25dB	16dB	-30dBm	-9dBm	4.5dB
PA16/G25-8	Pre-amplifier, Max.Output 16dBm, Gain 25dB, With OSC, Midstage insertion loss 8dB	25dB	16dB	-30dBm	-9dBm	5dB
PA16/G25NS-8	Pre-amplifier, Max.Output 16dBm, Gain 25dB, With OSC, Midstage insertion loss 8dB	25dB	16dB	-30dBm	-9dBm	5dB
PA20/G25	Pre-amplifier, Max.Output 20dBm, Gain 25dB, With OSC	25dB	20dB	-30dBm	-5dBm	5dB
PA16/G25-8	Pre-amplifier, Max.Output 16dBm, Gain 25dB, With OSC, Midstage insertion loss 8dB	25dB	16dB	-30dBm	-9dBm	6dB

SOA - Amplifier Module

Parameter	Condition	Min	Typ	Max	Unit
Wavelength Range	40GE	1260		1340	nm
	100GE	1290		1320	nm
Input Power		-20		-10	dBm
Saturated Output Power			8	11	dBm
Gain			16		dB
Flatness				2	dB
Noise				7.5	dB
Polarization Dependent Gain				2	dB
Operating Temperature		-5		55	°C



Operating Humidity		5		95	%
Storage Temperature		-40		85	°C
Voltage		220VAC,-48VDC			V
Power Consumption	SOA	20			W
Dimensions	Single card	26.5 (W) × 195 (H) × 252 (D)			mm
	1 slot	482.6 (W) x44.5 (H) x320 (D)			1U
	8 slots	482.6 (W) x111 (H) x360 (D)			2.5U
Connector		LC/SC			

Raman - Amplifier Module

Parameters	Min	Typ	Max	Unit
Operating wavelength	1525	1550	1565	nm
Pump wavelength	1425	\	1505	nm
Pump output power	650	500	1400	mW
Operating Input Power range	-40	-1.5	10	dB
ON/OFF Gain range	6	\	20	dB
Gain Flatness	\	1	1.5	dB
Polarization Dependent Gain	\	\	0.3	dB
PMD	\	\	0.3	dB
Effective Noise Figure	\	-2	0	dB

Dispersion-Compensating Fiber

Parameters	DCM-20	DCM-40	DCM-60	DCM-80	DCM-100	DCM-120
Compensated Distance (km)	20	40	60	80	100	120
1545nm dispersion (ps/nm)	-340+/-10	-670+/-20	-1000+/-30	-1340+/-40	-1680+/-50	-2010+/-60
1545nm relative dispersion slope (nm ⁻¹)	0.0036 +/- 10%					
Insertion Loss (dB)	≤3.3	≤4.7	≤6.4	≤8.0	≤9.5	≤11.0
Insertion Loss (typ) (dB)	2.7	4.0	5.4	6.7	8.0	9.3
Polarization mode dispersion (ps)	≤0.6	≤0.7	≤0.8	≤0.9	≤1.0	≤1.1
Polarization mode dispersion (typ) (ps)	0.2	0.3	0.4	0.5	0.6	0.7
Polarization dependent loss (dB)	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1	≤0.1



Parameters	MIN	MAX	UNIT	NOTES
Brillouin Scattering Threshold	6	-	dBm	
Non-linear Coefficient(n^2/A_{eff})	-	1.4×10^{-9}	W ⁻¹	
Effective Area(A_{eff})@1550nm	20	-	μm^2	
Maximum Input Power	-	23	dBm	
Operating Temperature Range	0°C	50°C	°C	
Storage Temperature Range	-40°C	85°C	°C	
Relative Humidity	< 85%		%	
Environmental/Reliability testing	Comply with Telcordia GR-2854 and GR-1221 standard			

Fiber Bragg grating (FBG) Dispersion Compensator

Parameters	Option 1	Option 2	UNIT
Dispersion Compensation Level	20 to 100	20 to 200	KM
Channel Spacing	100	50 and 100	GHz
Operation Bandwidth	> 60	> 25	GHz
Insertion Loss	≤ 3.0	≤ 3.0	dB
Latency	< 25	< 25	ns
Operating Temperature	-5 to 70		°C
Storage Temperature	-40 to 85		°C

Tunable Dispersion Compensator

Parameters	Specifications					Units
Channel Grid	50		100			GHz
Wavelength Range	1529.55 – 1567.54			1527.99 – 1566.31		nm
Compensation Range	0-80		-40 to 40	0-80		km
	0-40	40-80		0-40	40-80	
Typical -3dB bandwidth	34	30	34	68	50	GHz
Phase Ripple Std Deviation	≤ 0.1	≤ 0.13	≤ 0.12	≤ 0.12	≤ 0.15	rad
Slope-Matching Error	≤ 25	≤ 35	≤ 30	≤ 20	≤ 35	ps/nm
Dispersion Accuracy	≤ 2	≤ 2.5	≤ 2	≤ 2	≤ 3	km
Insertion Loss	< 6					dB
Tuning Stability	± 5					ps/nm
Tuning Time	25					Sec
Polarization-dependent loss	≤ 0.5					dB
Polarization mode dispersion	≤ 1					ps
Maximum input power	< 27					dBm
Control interface	I ² C					
Voltage	5					V
Typical power consumption	4					W
Operating temperature	-5 to 70					°C
Storage temperature	-40 to 85					°C



Module Warm-Up Time	180	Sec
Life	20	Year

Optical Power Monitoring

Parameters	Index	Unit
Working Wavelength	1529-1561	nm
Channel Space	50/100	GHz
Single wave output power	-30 ~ -10	dBm
Wavelength detection accuracy	< 2.5	nm
Power detection accuracy	< 1.5	dBm
Check the number of optical ports	1/2/4/8	
Operating Temperature	-10 ~ +60	°C
Storage Temperature	-20 ~ +75	°C
Relative Humidity	5% ~ 95% No condensation	%
Power Consumption	< 5W	W

Optical Line Protection

parameter	1:1 protection	1+1protection
Working wavelength(nm)	1310±50nm and 1550±50nm	
Monitor optical power range(dBm)	+ 23 ~ -50	
Monitor optical power accuracy(dB)	±0.25	
Monitor optical power resolution(dB)	±0.01	
Return loss(dB)	≥55	
Polarization dependent loss(dB)	≤0.05	
Wavelength dependent loss(dB)	≤0.1	
Insert loss(dB)	Transmit<1.2、Receive<1.2	Transmit<4、Receive<1.2
Switching time(ms)	<30	<15
Environment	Operating temperature (°C)	-10 ~ +60°C
	Storage temperature (°C)	-20 ~ +75°C
	Relative humidity	5%~95% Non-condensing
Power consumption(W)	< 5W	
Power down stating	on	





Chapter 3 Network Configurations and Applications

The FR8000-OLS is specially designed for carriers or service providers who require a very cost-effective and highly reliable network. It supports transparency transmission.

This chapter includes the typical network configurations and applications of FR8000-OLS, contains the following topics:

- Equipment Application Advantages
- Typical Deployment Configurations
- Network Design with FR8000-OLS

Application Advantages

When comprised with conventional optical transmission equipment, FR8000-OLS has the following remarkable application advantages brought about by the implementation of new technologies FR8000-OLS is a 1U Mini-chassis type which has a flexible configuration for various network applications.

Network Management

The FR8000-OLS operates as an SNMP agent: When the SNMP manager requests MIB information or settings, the device conducts the appropriate processing to fulfill the request and sends response data to the SNMP manager. It contains management information, and responds to requests from the manager, for retrieving information or settings to be adjusted. SNMP supports both V1 and V2 versions at the same time, based on Client side to determine the actual version.

The SNMP managers that connect to the FR8000-OLS can be restricted as follows:

- SNMP manager access restriction: read-only, read-write.
- If an IP address is set, all access except from the registered SNMP manager will be ignored.
- Read-only community name
- Read-write community name

Managing via SNMP

The FR8000-OLS works as an SNMP agent. When the SNMP manager requires reading or setting of the MIB contents, FR8000-OLS will carry out some processes and transmit the response data to



the SNMP manager according to the request.

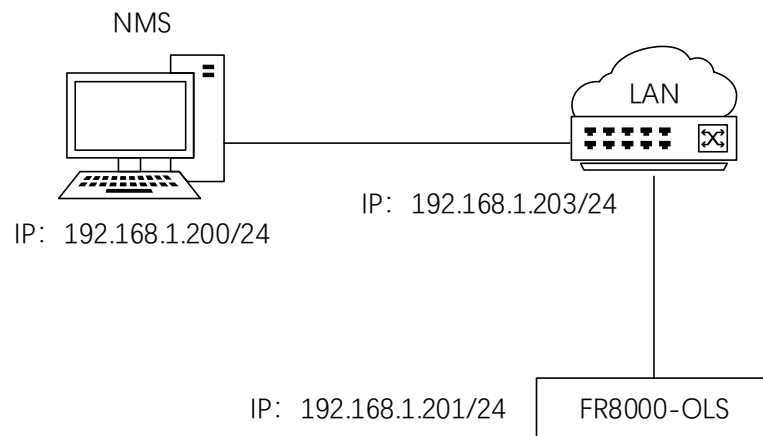


Figure 5 SNMP Manager Maps, Remote management via SNMP protocol

- ❖ Setting and updating of management information (MIB)
 - Of the Internet standard MIB prescribed by MIB RFC 1213, the device can set and change system and interface settings.
 - FIBERROAD proprietary MIB such as the operation management MIB for displaying the status of each port can be set and changed.
 - Of the MIB prescribed by RFC 2863 (interface group MIB), the device can set and change ifXEntry.
- ❖ Trap sends function

FR8000-OLS is capable of sending the following traps to a manager that has been set as the trap receiver.

- Cold trap on startup
- Power failure and recovery status
- Cooling fan failure and recovery status
- SNMP authentication failure
- LINK UP/DOWN



Traps Transmission

The equipment works as a trap source and transmits the traps to the preset managers. The connection method is as follow Figure 6.

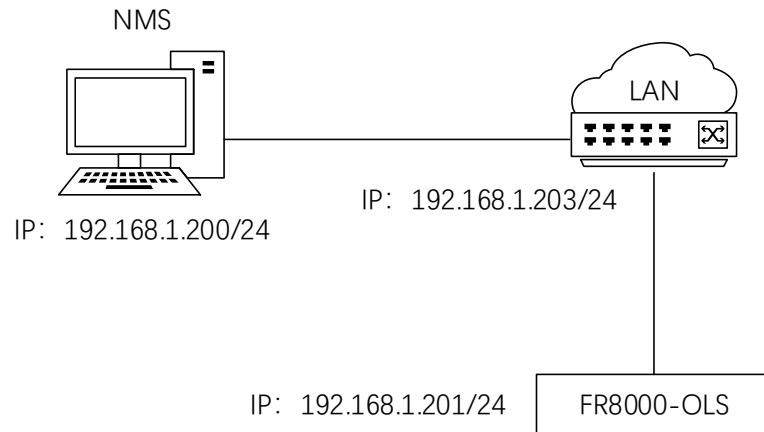


Figure 6 Traps Transmission





Chapter 4 Operation, Administration and Maintenance

Introduction

The network management system is used to perform the operation, administration and maintenance functions of the FR8000-OLS. In addition, command line terminal is also supported.

Command Line Interface

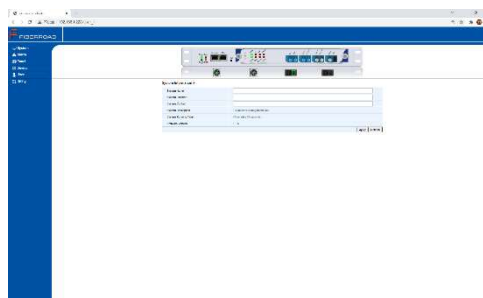
There are two methods to connect with FR8000-OLS series for configuration setup via PC.

- The managed device must first be configured correctly using the serial port. Connect the computer to the FR8000-OLS via RS-232 port. The entire auto configuration is completed using RS-232 protocol.
- The second is by connecting your computer with the management port of FR8000-OLS, then login to the FR8000-OLS via Telnet session. This second method works only when the FR8000-OLS management port is connected to LAN and the IP address has been configured. User login with different privilege levels. Administrator user can configure and query equipment, and user only read equipment information.

Web-based GUI Interface

FR8000-OLS series supports web-based GUI interface for general parameter configuration. This method works only when the FR8000-OLS management port is connected to LAN and the IP address has been configured.

User logs in to web GUI using standard web browser such as Firefox.



Fault Management

Alarm surveillance involves detection and report of the related events/conditions happening in the network element. Alarm is generated automatically by the event, and input signal. There are 5 severity levels of the alarms in FR8000-OLS. These are Critical, Major, Minor, Information and Clear. The alarm and its level are shown through the alarm indicator on the FR8000-OLS sub-rack. After the alarm is sent to network management system, the system can automatically analyze the detail description of the alarm and possible cause to help troubleshooting.

Security

Users who login into the equipment are divided into two different levels: Administrator and User; they have the corresponding user name for themselves. Administrator default user name is "admin"; the other default user name is "user".

The two users' rights are different, for example: Administrator users can configure and query the equipment for information of all users, and modify the password the of user level users, but not modify the password of any other Administrator users except for itself; User level users see the equipment information only, but no configure information.

Memory Backup

FR8000-OLS provides multiple backup for the configuration data. System supports "write flash-memory" command. Configuration data in the RAM can be backed up to FLASH database through the network management system or CLI to prevent the loss of the configuration in case of a power failure. If the data is backup to RAM, and power is lost so is the configuration data. If the data is backed up to FLASH database, and it remains in case power off. And in next step, configuration data will be backup to USB disk.

Equipment Configuration

The FR8000-OLS support off-line card configuration and allows the operator to configure its card type and associated software. The version information about software can be queried. This software can be backup and upgraded without interrupting the services. The fail over mechanism is built in FR8000-OLS system. The software can roll back to the previous working version by re-load.

