



FR8000

Optical Line System

Maintenance Guide

Release 1.0.0



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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 maintenance guide provides an overview of FR8000-OLS, and describes its engineering, maintenance procedures and cabling methods.

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.

Figures and Screen Captures

For information about customer service, including support, training, code release and updates, contracts, and documentation, visit our websites at www.fiberroad.com.cn.

Before contacting technical support, have this information available.

- Contract number
- Product information

Software and hardware versions

Serial numbers

- Problem description

Troubleshooting

Known Causes

- Trouble Locating and Cleaning attempts

Obtaining Technical Assistance

FIBERROAD maintains a strong global presence, operating Technical Response and Service Centers, in the China, Japan and so on. These centers are available for technical telephone support to entitled customers during normal business hours. After hours support is available to customers who purchase a premium Service Agreement.



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Chapter 1 Routines Maintenance

Well-designed, effective and reliable maintenance routines significantly reduce equipment failure rate, and ensure stable operation.

In addition to minimizing sudden system failures, routine maintenance facilitates the discovery of problem-triggering factors and therefore eliminates potential problems before they occur.

This chapter focuses on FR8000-OLS routine maintenance procedures.

Routines Maintenance Tasks

FR8000-OLS maintenance task schedules are listed in Table 1

Table 1 Maintenance Task Schedule

Maintenance Task	Maintenance Schedule
Checking alarms	At any moment
Checking performance events	At any moment
Checking equipment room temperature	At any moment
Checking logs	At any moment
Checking fans, power	At any moment
Checking management	At any moment

Daily Maintenance Tasks

Checking Alarms

Alarms reflect abnormal network conditions. It is vital to check alarms daily, since they directly affect the network's quality of service.

Alarm Level

(1) Critical (2) Major (3) Minor (4) Information (5) Clear

"*" means trap only, there is no associated condition

Table 2 Alarm Lists

Content	Level
System Alarm List	
* System Cold Reboot	Information
* System Warm Reboot	Information
* Authentication Failure	Information
Shelf Alarm List--- Shelf	
Fan Fault	Major/ Critical



*	Fan Fault Clear	Clear
	Power Fault	Major
*	Power Fault Clear	Clear
*	Shelf Delete	Information
*	Shelf Cold Reboot	Information
*	Shelf Warm Reboot	Information
Managemen Pot		
*	Port Link Up	Clear
	Port Link Down	Information
EDFA Module		
	EDFA Pump Temperature Alarm	Critical
*	EDFA Pump Temperature Alarm Clear	Clear
	EDFA Pump Bias Alarm	Critical
*	EDFA Pump Bias Alarm Clear	Clear
	EDFA Input Power Alarm	Critical
*	EDFA Input Power Alarm Clear	Clear
	EDFA Output Power Alarm	Critical
*	EDFA Output Power Alarm Clear	Clear
	EDFA Temperature Alarm	Critical
*	EDFA Temperature Alarm Clear	Clear
OLP Module		
	SD Of transmit	Critical
*	SD Of transmit Clear	Clear
	SD Of Protect Channel	Critical
*	SD Of Protect Channel Clear	Clear
	SD Of Working Channel	Critical
*	SD Of Working Channel Clear	Clear
	SF Of Transmit	Critical
*	SF Of Transmit Clear	Clear
	SF Of Protect Channel	Critical
*	SF Of Protect Channel Clear	Clear
	SF Of Working Channel	Critical
*	SF Of Working Channel Clear	Clear

PSU

*	PSW switch	Information
*	PSW mode mismatch	Information
*	PSW status mismatch	Information

Note: It should be noted that when an interface is disabled, bias alarm should not be raised.

Checking Performance Events

Performance events, including optical power, bias, Module Temperature and Total LOS second, provide valuable information to assess and analyze network operating status. Daily performance monitoring should be performed to ensure that the network is maintained at peak performance.

Checking the Equipment Room Temperature

The equipment room temperature is often ignored during routine maintenance, although it is vital to the long-term stable operation of the equipment.

Record the room temperature daily for the future reference. If equipment room temperature is too high, install fans or air conditioning units as required.

Checking logs

Log commands, including log system, command, and fault, provide log record. Log system display the record related to the system. Log command display the record related to commands users input. Log fault display the record related to events such as errors.

Checking fans, power

The command “show status” displays all the Powers and the Fans status.

Checking management

This command “show host-management” displays information related to the host access control list. The host access authorization is specified by the host attribute.





Chapter 2 Performance Description

This chapter contains information about the performance reported by FR8000-OLS. Each performance message is described in a table. Each performance message is accompanied by a table containing the following Table 5 information:

Table 5 Format of alarm descriptions

Name	Description
Name	Show the alarm identifier
Description	Describes the alarm and supplies additional information about the fault

Performance Parameters

Table 6 Performance Parameter Descriptions for EDFA

Name	Description
InputPower	input power
OutputPower	Output power
ModuleTemperature	Module temperature
OpCurrent	Current Optical
OpPower	Optical Power
ChipTemperature	pump 1 chip temperature
CoolingCurrent	pump 1 cooling current
Input Alarm Seconds	

Table 7 Performance Parameter Descriptions for OLP

Name	Description
txPwr	Transmit power
rxPwr1	Receive1 power
rxPwr2	Receive2 power





Chapter 3 Troubleshooting Procedures and principles

This chapter describes the troubleshooting procedures and principles. In actual application, various troubleshooting methods should be used flexibly, based on the general principles mentioned below.

Maintenance Requirements

You must be familiar with the functions of the different equipment components and maintenance operations. This includes the functions of specific modules, various alarms and features, work-mode and service configurations.

Transport equipment is not isolated but correlated with other components, You should have knowledge of the network topology, network protection structure, clock tracing relationship, add/drop service, network setting, element management system access methods, etc.

Common Causes

1. External faults

Power supply faults: power failure, under-voltage, etc.

Inter-connected equipment faults, such as faulty switch

Poor grounding and/or connection signal deterioration

Optical or electrical cable faults: signal deterioration and high signal loss; cable cut by underground digging; frost damage; broken cables' poor contact; cold solder connections or un-soldered connections.

2. Equipment faults

Packer Loss

External Cause

Poor grounding or no joint grounding

Low optical power due to over-exhaustion of optical cables

Electrical cable damage or poor cable connection contact

Equipment Faults

Faulty optical interface module-faulty transceiver

Clock precision faults or poorly-synchronized system

Equipment temperature out of normal range

Faulty module, causing coordination problems with other modules

Common solutions

Query alarms and performance data and follow the packet loss generation and feedback principle.

Correction Procedures

- **Exclude external causes**

Check for proper grounding, optical cable connections, optical power reception within the valid range, and equipment temperature.

Observe the interface module for error bits.

For instance, when there are error bits on the interface modules, it is possibly caused by poor



clock synchronization, check whether the clock settings are correct.

Fault locating

This section contains information about how to manage fault case by case.

Packets Loss

When any of the packets are found lost when testing with a network tester, locate the fault as follows;

1. Increase the optical power of the optical port in the corresponding card;
2. Reconfigure the bandwidth

Service fails

If it is found that the service fails when testing with a network tester, locate the fault as follows.

1. Check whether the network tester is set correctly
2. View whether PortXC is set correctly
3. If you fail to locate the problem, contact the related engineer.

LOS Alarm Management

When a LOS alarm is raised, locate the fault as follows.

View whether the red LED on the card works or not, if not:

1. Check whether the fiber are normal and whether the fibers are connected correctly
2. Check whether the optical power is in the normal range or not
3. Perform self-loop (loopback) over LH/SH and check whether the optical works normal

Classification of Faults

Transport faults can be classified into three categories according to maintenance methods:

1. External faults

These include optical fiber faults and cable faults, such as broken cables/fibers, poor cable termination, and lightning damage, any of which can cause a service interruption.

2. Equipment faults

These include both hardware and software faults.

Hardware faults include module failure and module malfunctions. Software faults include coordination failure between modules, protocol processing errors and other problems that can be solved by software upgrades.

3. Interconnection faults

Transport equipment carries a variety of services. This might causes interconnection compatibility problems.

These faults may be caused by:

- Devices are not mutually grounded



This can occur with electrical interface connections. If two interconnected devices are not mutually grounded, ground loop interference will occur. Interface in the transport cable will distort the transport signals. This can cause interconnection failure.

- Other problems

Optical power mismatch (long haul, short haul), optical type mismatching (single-mode, multimode) and so on.

Troubleshooting Principles

To find the cause of a fault categorize it external fault, equipment fault, or interconnection fault. To locate the equipment faults, follows the procedures below:

- 1) Check the fibers, and then check the equipment

After confirming that a fault occurs in one or more fibers check this fibers or this set of fibers' cables first.

If no cable problems are found, then check the equipment.

- 2) Check the equipment, and then check the modules

When a fault occurs, do not take it for granted that the fault must be with a specific module. Check all alarms. From the alarm information the root cause of the fault can be determined, which may have originated somewhere else in the equipment.

- 3) Query the alarm and performance information

Transport network faults often generate many alarms. Through analysis of these alarms, the source of the network fault can be found.





Chapter 4 Troubleshooting

This chapter introduces how to locate and analyze common faults.

LED Problems and Countermeasures

Table 8 POWER/FAN FAULT LED

Problem	Countermeasures
The POWER LED doesn't light up	Ensure that the power cable is properly connected to the FR8000-OLS power terminal.
The FAULT LED is lit up	It is possible that an abnormality was detected within a component such as the power supply or fan during self-diagnosis at startup. Please contact the store or dealer from whom you made your purchase.
The FAN LED is lit up	It is probable that a FAN error was detected during the self-test at start up. Contact the dealer or sales representative.

Table 9 Management Port LED

Problem	Countermeasures
LINK LED does not light up, even if after connecting a twisted pair cable	Examine the twisted-pair cable for problems.
	Confirm whether the connected device is functioning properly.
	Examine the modular jack (RJ-45) connection for problem.
	If the connected device is an NIC or hub cascade port, ensure that the twisted-pair cable has a cross-over specification. Alternatively, if the connection partner is a hub MDI-X port, ensure that the twisted-pair cable has a straight-through specification.
	Ensure that the FR8000-OLS communication speed



matches that the connected device.

Console Problem & Countermeasure

Problem

The Login prompt does not appear, even after turning the power on.

Countermeasures

Ensure that the console terminal's communication settings are correct. Setting values: 9600 bits/s; 8-bit characters; 1 stop bit; no parity; no flow control; RS and ER always on.

Ensure that the console terminal's communication settings are correct. Setting values: 9600 bits/s; 8-bit characters; 1 stop bit; no parity; no flow control; RS and ER always on.

Ensure that the connection at the FR8000-OLS CONSOLE port is normal.

Confirm that the FR8000-OLS POWER LED is lit and that FAULT LED is not lit.

Setting values have not been input normally.

If the setting consists of normal alphanumeric characters, this problem may be result of a malfunction in the FR8000-OLS internal memory. Please contact the store or dealer where you made your purchase.

SNMP Manager Problem and Countermeasures

Problem

Cannot access the FR8000-OLS from the SNMP manager.

Countermeasures

Ensure that the FR8000-OLS's IP address, subnet mask, and default router setting are correct. If the setting is fixed, confirm that they are correct after first resetting the device once again or turning it off and then back on.

Ensure that the correct IP address has been registered fro the SNMP manager.

Ensure that the community names for the SNMP the SNMP manager and the FR8000-OLS are identical.



The SNMP cannot receive traps

Ensure that the IP address to which traps are being sent has been properly set in the FR8000-OLS

TELNET Problem & Countermeasures

Problem

Countermeasures

Login to the FR8000-OLS is not possible from a terminal

Ensure that the FR8000-OLS IP address, subnet mask, and default router settings are correct. If settings are fixed, confirm that they are correct after first resetting the device once again or turning it off and then back on.

Ensure that the communication setting for the connected port has been enabled. If so, examine the cable connection.

Ensure that the address to which you are attempting to TELNET is indeed the FR8000-OLS address.

Ensure that the FR8000-OLS has started up and is functioning normally.

Ensure that TELNET access has not been limited using telnet mode and TELNET IP commands.

