Precision Rated Optics

Work with a PRO!

OCC-CWDM-301-18 Series

Optical Channel Checker

Operation Guide

Notices

Warranty

The material contained in this document is subject to change without notice. The Provider makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The Provider shall not be liable for errors contained herein or for incidental or consequential damages in connection with furnishing, performance, or use of this material.

The battery is a consumable part and is not subject to the OTDR warranty.

ISO9001 Certification

Produced to ISO9001 International Quality System Standard as part of the Provider, objective of continually increasing customer satisfaction through improved process control.

Safety Instructions

During each stage of operation of this instrument, please always observe the following safety instructions. Not taking any safety precautions or following the instructions will violate the safety standards of design, manufacturing and application of these instruments. In no case will the Provider bear the responsibilities for consequences incurred by violation of the following instructions.

GENERAL

This product is a Safety Class 3 instrument. The protective features of this product may be impaired if it is used in a manner not specified in the operation instrument.

Environmental conditions

It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables.

Before applying power

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument’s external markings described under Symbols.

Do not operate in an explosive atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Do not remove the instrument cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.

Instrument that appears damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Safety Terms Used in This Manual

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personnel injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or the entire product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

The **NOTE** sign information that may be beneficial during the use and maintenance of the instrument.

Warning

- OTDR is a laser instrument. Users should avoid looking directly into the optic output. And the use of microscope or magnifier should also be avoided, for the use of such devices can focus a highly intense beam onto the retina, which may result in permanent eye damage
- Make sure that the optical fiber or cable is not in use and there is no laser beam in the fiber before testing via OTDR. Otherwise, it may result in imprecise test trace, even permanent damage for the OTDR

Caution

Battery: Battery for this instrument is rechargeable NiMH battery. If unused for a long time, battery should be recharged before being used. If the instrument is left idle for more than two months, it should be recharged to maintain adequate battery volume. Do not recharge batteries for more than 8 hours. Do not take batteries out without technical staff's help. Do not expose batteries to fire or intense heat. Do not open or mutilate batteries. Avoid touching the electrolyte in the batteries, which is corrosive and may cause injuries to eyes, skin or damage to clothes.

External Power: The OLT-CC-18-301 Series supports external power. Power requirements: DC 13.8V/1.2A..

Laser Radiation: To avoid serious eye injury, never look directly into the optical outputs of fiber optic network equipment, test equipment, patch cords, or test jumpers.

- Always avoid looking directly into the optical output port, when the instrument is working
- Always replace protective dust cap on the detector port when the instrument is not being used
- Always avoid looking directly at unconnected end of optic fiber in testing and make the unconnected end pointing at a non-reflective object, if possible

Table of Contents

1. General Information

1.1 Scope of this Manual

Thank you for your purchase from Precision Rated Optics. Please read this manual carefully before use. Always observe the warnings and cautions appearing throughout this manual.

This manual contains the information necessary for proper operation and maintenance of your equipment, troubleshooting instructions as well as information regarding obtaining services.

This instrument is carefully assembled and undergo a rigorous mechanical, electrical, and optical inspection prior to shipment. Beside the instrument, the package should also include a data transfer cable, a power adapter, a PC Analysis software installation disk and this users' manual etc. For detailed information, refer to the packing list

Upon receiving the instrument, please check for any obvious signs of physical damage that may have occurred during shipment. Report any damage to the shipping agent or the representative of the Provider immediately. Retain the original packing materials in case reshipment becomes necessary.

1.2 Unpacking and Inspection

This instrument has been carefully packed in accordance with standard shipping procedures. Examine the instrument for damage that may have occurred during shipment. If you find any damage or the instrument is not working, or if any of the following items are not included, please contact your representative of the Provider.

1.3 Introduction

The OCC-CWDM-301-18 Series Handheld CWDM Optical Channel Checker is specially designed for CWDM installation, maintenance and troubleshooting, which is able to measure and monitor power values of up to 18 CWDM channels. The OCC-CWDM-301-18 Series can replace high-cost Spectrometers and conduct quick and reliable measurements in all environments. Thanks for its light, compact and sturdy design, the OCC-CWDM-301-18 Series is the ideal tool for CWDM installation and maintenance technicians.

Features:

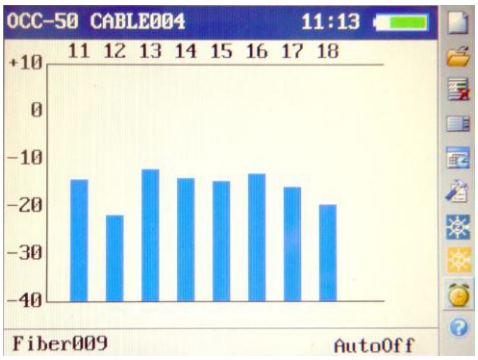
Basic applications:

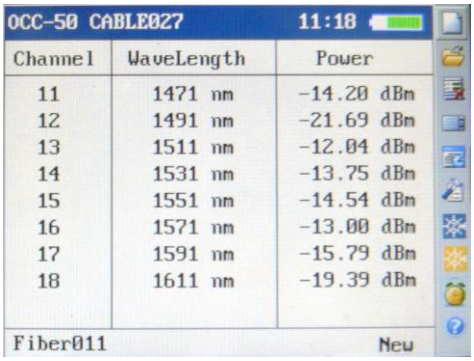
- Clear TFT LCD display (320×240)
- 18-channel measurement: Model OCC-CWDM-301-18B, 1271-1611nm
- 8-channel measurement: Model OCC-CWDM-301-18A, 1471-1611nm
- Result display in histogram and list
- Applicable to normal optical power measurement
- Internal clock & fiber S/N editable
- User definable threshold setting
- Data Transfer to PC via USB
- No warm-up, quick start

- Backlight
- 10 hours continuous operation
- Pocketsize, lightweight and easy-to-use
- CE, FCC certificates

Result display in histogram and list

Straightforward result display for easy understanding.





Internal clock & fiber S/N editable

Internal clock enables OCC-50 to save test data with time and editable fiber SN information for convenient archiving and editing.

2. Basic Operation

2.1 Foreword

This part introduces the basic operation on the OTDR. Specific operations of each type instrument are elaborated in Chapter 3 of this manual. Please read this manual carefully for optimal operation. Should you encounter any problems during operation, you are welcome to contact the technical staff of our company or representatives.

2.2 Instrument Interfaces Instructions

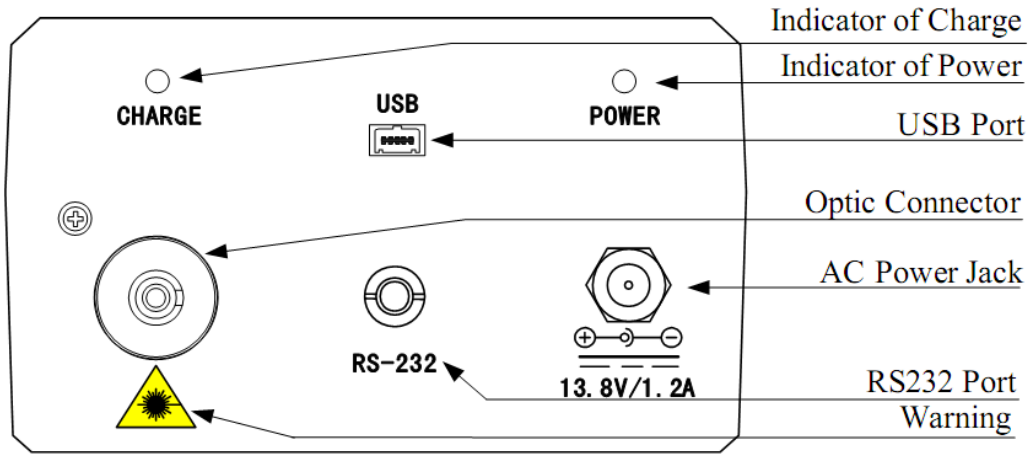


Figure 2-1. Coping of OTDR

AC Power Jack

Power adapter jack requirements: 13.8V DC@1.2A.

Data Transfer Port

For all types, there are USB interface and RS232 interface. This interface is used to transfer saved traces in the instrument to a PC for further analysis by associated trace manager.

Power/Charge Indicator

When measurement power on or charging, the relevant indicator will be lightened.

Caution

Invisible laser radiation

Please always avoid looking directly at the optical output or stare at laser beam.

2.3 Use of Batteries

Battery for OTDR is NiMH battery.

Cautions during Operation:

The following may bring auto power off of the instrument:

- The instrument will be auto power off when there is insufficient power during operation and low power will be shown on the LCD.
- If unused for a long time and cause insufficient power, the instrument will be power off several seconds after powering on so as to protect the batteries in case of excessive discharging. The inside batteries should be recharged immediately through adapter.
- Please charge only when battery remaining capacity is low or adapter should be unplugged. Irregular charging operation may seriously shorten battery life.

Cautions in Recharge:

- Quick charge is needed first and then switch to trickle charge after the voltage reaches a predefined Figure. Quick charge temperature is +5~+45℃, and trickle charge temperature is 0~+55℃, suitable for indoors. Battery will not be full or be damaged if the charging temperature is beyond the above range, which may shorten batter life.
- 3 hours for quick charge;
- Do not charge for over 8 hours

2.4 Keypad Functions

[On/Off]	Power on or off
Run/Stop	Under GUI, Press to start measurement. While testing, press this key to stop measurement
Enter	Under GUI, press this key to confirm the current operation Together with [Shift/], can browse the event list downwards
▲ ▼	Move menu bar in menu operation Highlight the icon to be operated Adjust parameter in parameter configuration Together with [Shift/], can zoom out or zoom in trace vertically
◀ ▶	Select parameter to be adjusted in parameter configuration Move marker leftwards or rightwards in Trace operation Turn page while in Help sub-menu Together with [Shift/], can zoom out or zoom in trace horizontally
	Read help when power on Cancel the current operation Exit menu configuration Switch between information Windows Together with [Shift/], can review the event list upwards
[Shift/]	This is the hot key to active the integration function by being pressed together with other keys. Besides, by pressing this key singly under the GUI of displaying trace, the trace can be resumed to the original size without any zoom

3. Basic Information of OTDR

3.1 Principle of OTDR

OTDR (Optical Time Domain Reflectometer) is a measurement instrument for identifying optic fiber transmission features. The instrument is mainly used to measure attenuation of a whole optic fiber chain and provide attenuation details relating to length, namely detect, locate and measure any event in optic fiber chain (events refer to faults caused by welding, connectors, and bending whose transmission change can be measured). Its non-destructive, one-end connection and rapid measurement has made the OTDR an indispensable tool for manufacture, construction, and maintenance of optic fiber.

The faults and heterogeneity of optic fiber itself cause Rayleigh scattering of light pulse transmitted in optic fiber. Part of light pulse is scattered in the reverse direction, and this is called Rayleigh backward scattering, which actually provides attenuation details relating to length.

Information relating to distance is obtained through time information (that's the reason why there is "time Domain" in the name of OTDR). Fresnel reflection occurs at the boundary between two media of different IOR (for example, connections of faults, connectors, or optic fiber end). This reflection is used to locate the discontinuous points on optic fiber. The magnitude of reflection depends on the difference between IOR and the smoothness of boundary.

OTDR sends out a light pulse into connected optic fiber, and receive reflections of events and backward scattering power of pulse in time. Locus will be displayed on LCD. The y-axis is dB value of backward scattering power, and the x-axis is the distance.

3.2 Basic Definition and Classification of Events

3.2.1 Events

Events refer to any abnormal points causing attenuation or sudden change of scattering power besides the normal scattering of optic fiber, which include all kinds of losses like bending, connections and ruptures.

Events points displayed on LCD are abnormal points that cause traces to deviate from straight line.

Events can be classified as reflection events and non-reflection events.

3.2.1.1 Reflection Events

When some pulse energy is scattered, reflection events happen. When reflection event occurs, peak shows on trace, as shown in Figure 3-1.

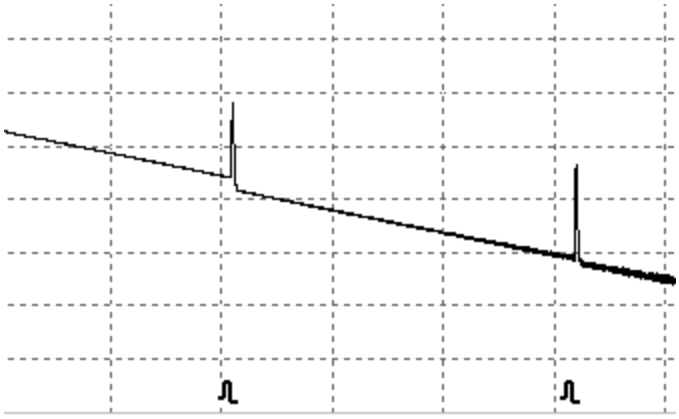


Figure 3-1. Reflection Event

3.2.1.2 Non-Reflection Events

Non-reflection events happen at certain points where there is some optic loss but no light scattering. When non-reflection event occurs, a power decline shows on trace, as in Figure 3-2.

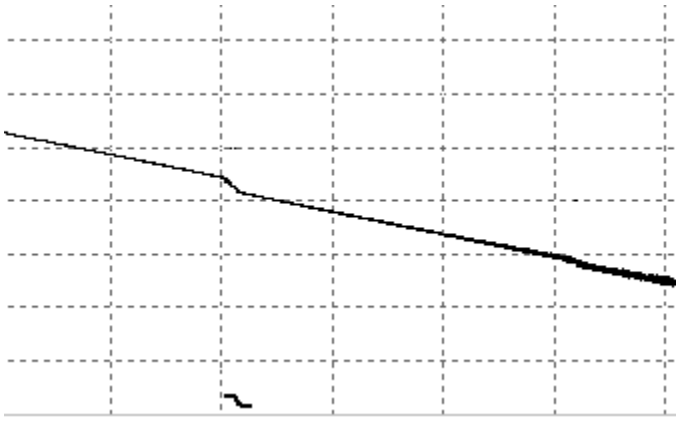


Figure 3-2. Non-reflection Event

3.2.1.3 Inspection Events

OTDR sends off a light pulse into the optic fiber to be inspected, and then receive returning light signals, and starts calculating the “event” distance. The farther the distance is, the longer time need for scattered light to be received by the instrument. Event distance can be calculated according to the time of receiving events signals.

Through inspection of scattered signals, properties of optic fiber, connectors and tie-ins can be identified.

3.3 Measurement Application of OTDR

OTDR displays power relating to distance of returning signals. This information can be used to identify the main properties of an optic fiber chain.

3.3.1 Measurement Contents of OTDR

- Event location (distance), end or rupture of optic fiber chain
- Attenuation coefficient of fiber
- Loss of a single event (for example, one optic tie-in), or total loss from upper end to end
- Range of a single event like reflection of connectors (or grade of reflection)
- Auto measurement of cumulative loss of a single event

3.3.2 Trace Analysis of OTDR

The trace analysis of OTDR is fully automatic. The trace locates:

- Reflection events of connections and mechanic tie-ins
- Non-reflection events (usually at welding tie-ins)
- End of optic fiber.
  Through scanning the first loss event that is larger than end threshold, end of optic fiber can be identified.
- Events list, event type, loss, reflection and distance.

3.4 Trace Display Screen of OTDR

Trace displays on OTDR screen, as in Figure 3-3.

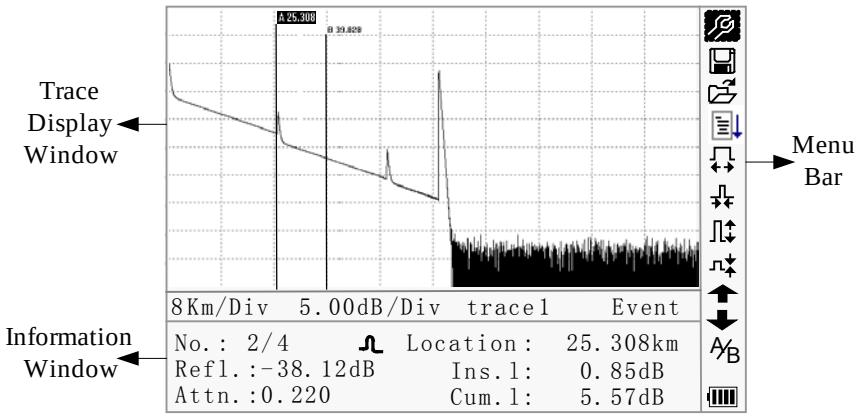


Figure 3-3. Trace Display Screen

3.4.1 Trace Display of OTDR

This window displays the trace after one measurement.

Definition of Trace：After one measurement, reflection power diagram will be displayed as distance function. This diagram is referred to as trace.

Trace of OTDR displays measurement result in a graphic form. The y-axis stands for power, and the x-axis stands for distance, as shown in Figure 3-4.

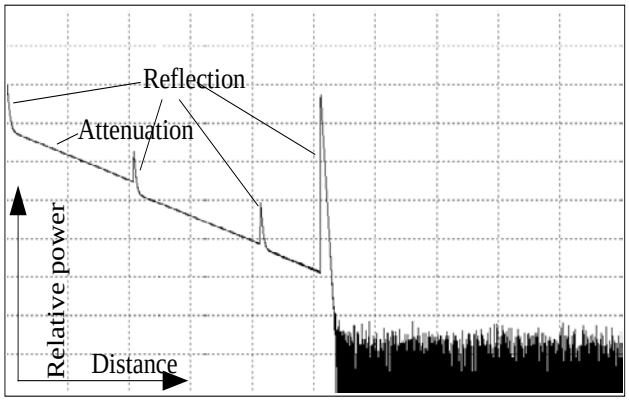


Figure 3-4. Traces and Coordinates

3.4.2 Information Window of OTDR

Contents of this window: measurement parameters, events list, marker A/B and analysis parameters.

3.4.2.1 Measurement Trace Parameters

Important measurement and analysis parameters always display in the information window as shown in Figure 3-5.(a), (b):

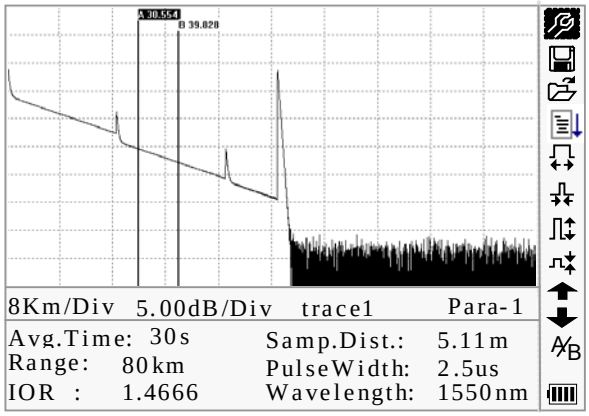


Figure 3-5.(a) Measurement Trace Parameters

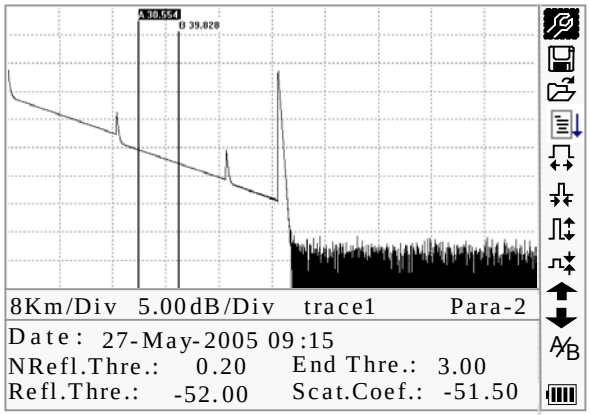


Figure 3-5.(b) Analysis Trace Parameters

For definitions and configurations of items in Figure 3-5.(a) (Avg. time, sample distance, Range, IOR, wave length and pulse width) showed in the interface, please refer to parameter configuration.

For definitions of items in Figure 3-5.(b) (date, reflection threshold, non-reflection threshold, end threshold, scattering coefficient), please refer to parameter configuration.

3.4.2.2 Events List

To indicate the location of events inspected. Any defined posts will be displayed in event list, for example, non-reflection event like welding points and reflection event like connectors, as shown in Figure 3-6.

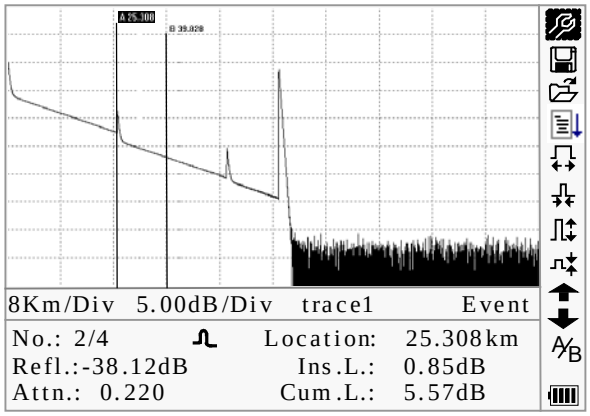


Figure 3-6. Events List

Four types of events:

⊢ Begin end; ⎍ Reflection event ; ⊣ Fiber end; ⎣ Attenuation event;

Loc: Distance from beginning point to event;

Refl: Magnitude of reflection;

Insl: Loss of Inserted event;

Attn: Attenuation characteristic from one event point to the current event.

Cuml: Cumulative loss, calculating from beginning point to the current event.

3.4.2.3 Information of Marker A/B

Marker is used to mark and analyze a single event, trace section and distance. Distance, attenuation, loss at marker or between markers will be displayed in information of markers, as shown in Figure 3-7.

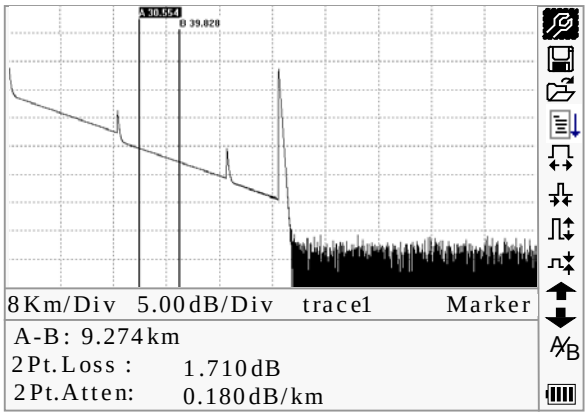


Figure 3-7. Information of Marker A/B

The following parameters are measured between marker A and B. When you change either marker, record will change accordingly.

- "A-B"： Distance between two markers
- "2 points loss": Loss between two markers; power difference between two markers
- "2 points attenuation": 2 points loss of unit length

The specific operations of the above are to be elaborated afterwards.

3.4.2.4 Information of Fiber

Information of fiber includes total attenuation, length and loss of the tested fiber. As shown in figure 3-8.

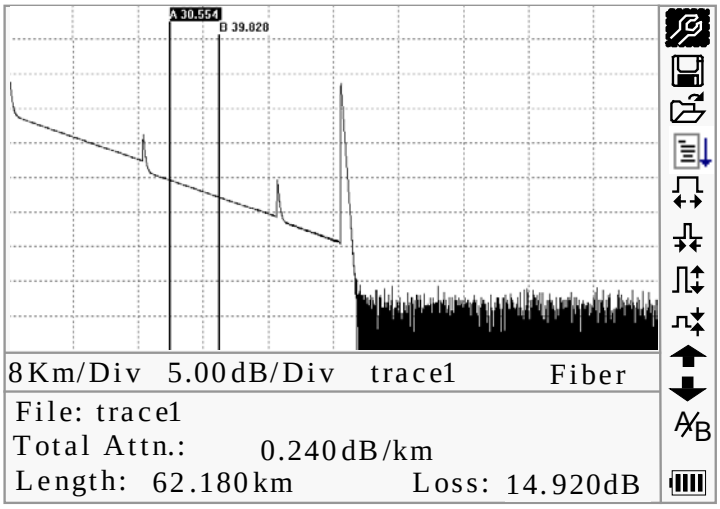


Figure 3-8. Information of Fiber

3.4.3 Menu Bar and Window of OTDR

3.4.3.1 Menu Bar and Icons of OTDR

Icon	Description
	Parameter configuration
	Save file
	Open file
	Re-analyze the trace
	Zoom in trace horizontally
	Zoom out trace horizontally
	Zoom in trace vertically
	Zoom out trace vertically
	Switching between markers
	Review events list upwards
	Review events list downwards
	Battery power indicator

Note

- Under Help Menu, only No.1 and 3 are operational
- In the process of measurement, all function on menu bar will be disabled
- No.3, 4, 5, 6, 7, 8 and 9 are tools for trace analysis; No.10 and 11 are tools for reviewing events list
- No.1 is elaborated in Figure 3.4.3.2

3.4.3.2 Parameter Configuration on OTDR Menu Bar

Correct parameter configuration is a necessity for accurate measurement; therefore, necessary configuration must be performed before using the instrument. Please refer to the following examples:

Use [▲] and [▼] to highlight, i.e. parameter configuration, then press [Enter], as shown in Figure 3-9;
Press [↩] to exit.

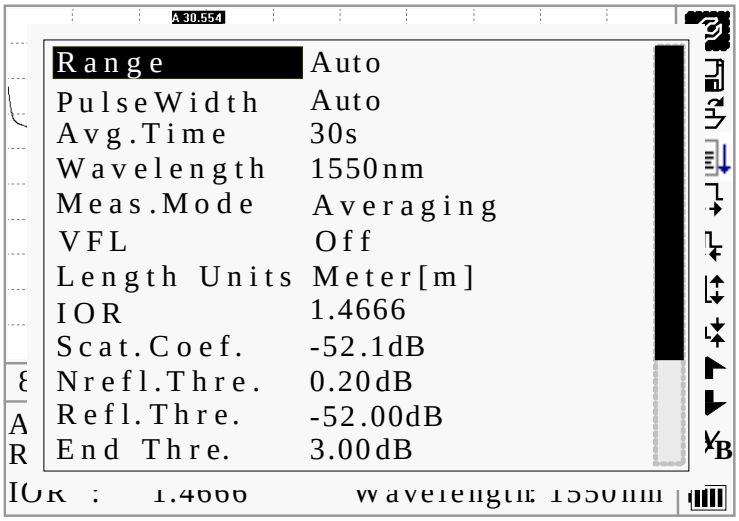


Figure 3-9. (a) Parameter Configuration

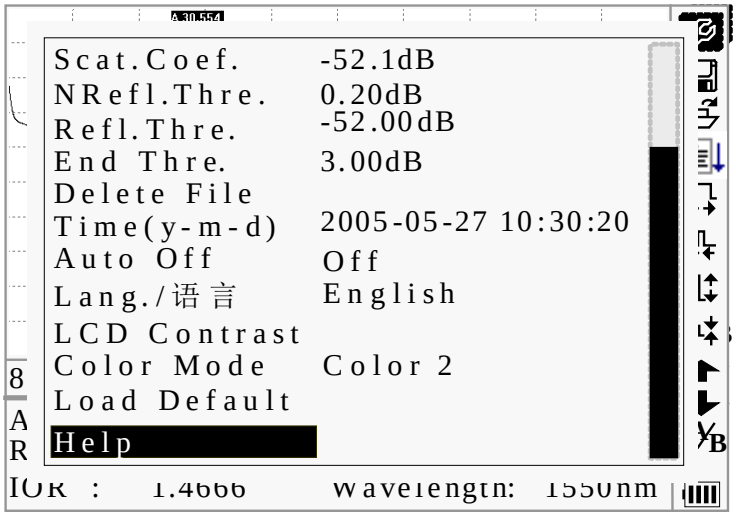


Figure 3-9. (b) Parameter Configuration

Definitions of Measurement Parameters

Parameter	Definition of Parameter
Range	Length of optic fiber relevant to the trace
Pulse Width	Width of laser pulse sending out from OTDR to optic fiber
Average Time	To select suitable testing time.
Wave length	To select laser wave length for measurement
Measurement Mode	To select mode for measurement
VFL(option)	Power on or off visible laser
Length Units	To select length units
IOR	IOR of optic fiber which affects the transmission speed of laser
Scatter Coefficient	Which affects backward scatter power of laser in fiber
Non reflection threshold	Events whose insertion loss is greater than the threshold displays here
Reflection threshold	Reflection events GE the threshold will be displayed.
End threshold	The first event with insertion loss GE the threshold is considered the end of fiber, and all following events will be ignored
Delete Files	Delete stored trace data in the instrument
Time	Show current system time
Auto Off	On or off of Auto off function
Lang	Choose the language
LCD contrast	Adjust the contrast of LCD to select
Color mode setting	Select suitable displaying color setting
Load Default	Set all parameters to factory setting
Help	Show help files (Quick Reference)

Range Configuration

Generally, range will be set according to actual length of optic fiber, so as to insure the accuracy of measurement.

Under the menu of parameter configuration, use [▲] and [▼] to highlight “Range”; Press [Enter] to enter, as shown in Figure 3-10; press [↩] to exit.

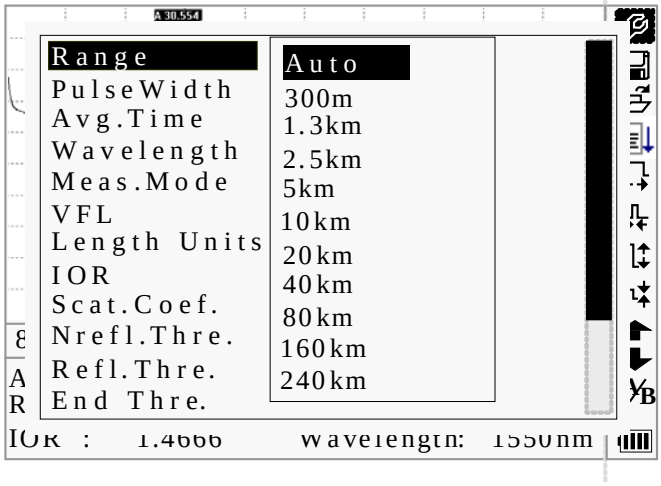


Figure 3-10. Set Range

Use [▲] and [▼] to select adequate range; Press [Enter] to confirm.

Note

- “Auto” means the automatic measurement. When this function is selected, the instrument will automatically make an intelligentized selection of adequate range and pulse width for measurement. The whole process of measurement does not need any intervention of the operator
- “Auto” means the default setting

Pulse Width Configuration

The selection of pulse width affects the dynamic range and resolution of measurement trace. With narrow pulse width, there will be higher resolution and smaller dead zone, however, the dynamic range will be decreased. On the contrary, wide pulse width can bring higher dynamic range and measure comparatively long distance, but resolution and dead zone will be affected. Therefore, users should make choice between dynamic range and dead zone.

There will be different pulse width options for reference according to different range of distance being chosen.

Under menu of parameter configuration, use [▲] and [▼] to highlight “Pulse Width”; Press [Enter] to select as shown in Figure 3-11. Press [↩] to exit.

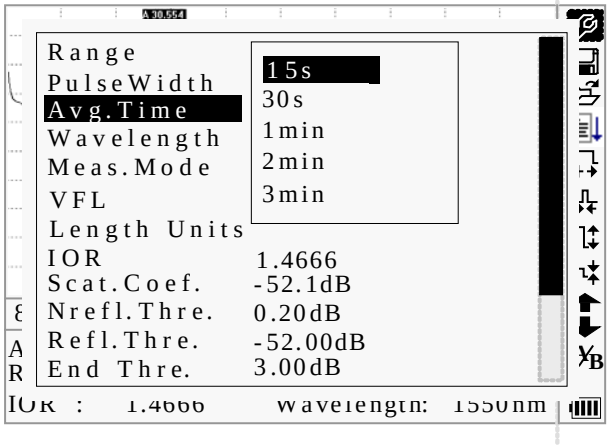


Figure 3-11. Pulse Width Configuration

Use [▲] and [▼] to highlight pulse width; Press [Enter] to confirm.

Note

- "Auto" means the default setting
- When Range is set to "Auto", pulse width will automatically become "Auto"

Average Time Configuration

Average time will affect the SNR directly. The longer the average time is, the higher SNR is, as well as dynamic range. Therefore, in case of measurement of long-distance optic fiber, long average time should be selected in order to review events at long-distance end.

Under parameter configuration, use [▲] and [▼] to highlight “Average time”; press [Enter] to confirm, as shown in Figure 3-12. Press [↶] to exit.

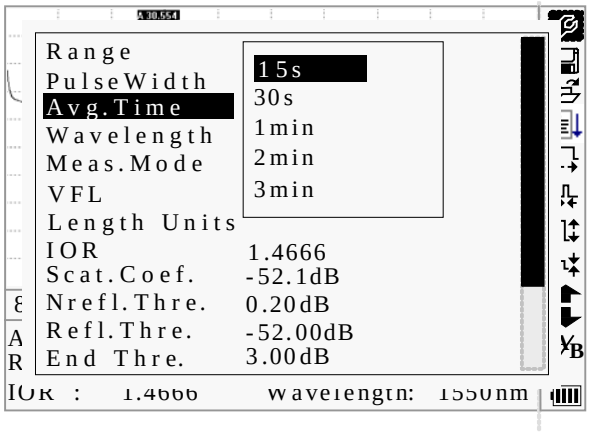


Figure 3-12. Average Time Configuration

Use [▲] and [▼] to highlight the desired time; and press [Enter] to confirm.

Note

- There are 5 levels of predefined average time: 15s, 30s, 1min, 2min and 3min
- The default setting is 30s

Wavelength Configuration

Under parameter configuration, use [▲] and [▼] to highlight ”wavelength”; press [Enter] to change wavelength, as shown in Figure 3-13.

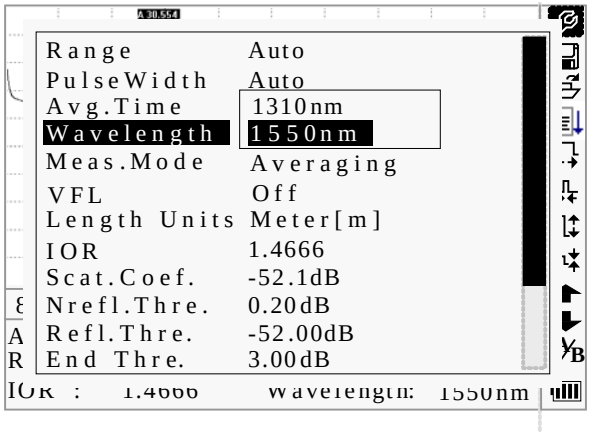


Figure 3-13. Wavelength Configuration

Measurement Mode Configuration

There are two kinds of measurement mode: Averaging and Real time mode. Under Real time Mode, OTDR will undertake realtime measurement for the connector of exterior fiber and refurbish the measure trace. While under Real time Mode, press key "Run/Stop" to stop, otherwise it will measure all along. Under Averaging Mode, OTDR will average the data within the measure time which is set by user. While exceeding the set time, it will stop automatically and display the result. Generally, we suggest Averaging Mode.

Under menu of parameter configuration, use [▲] and [▼] to highlight "Measurement Mode"; Press [Enter] to choose Averaging mode or Realtime mode, as shown in Figure 3-14. Press [↩] to exit.

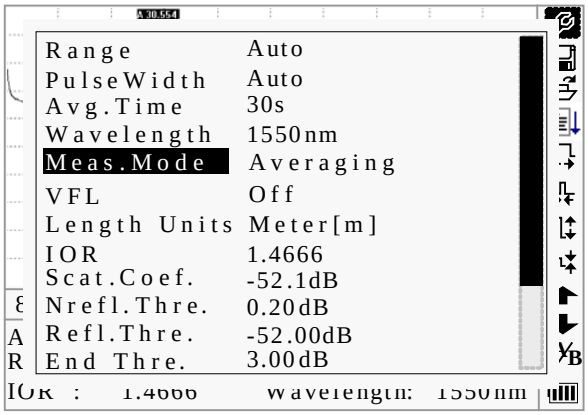


Figure 3-14. Measurement Mode Configuration

VFL Configuration

Under parameter configuration, use [▲] and [▼] to highlight "VFL"; according to different demand, press [Enter] to select CW, 1Hz or off, Press [↩] to exit When VFL is on, ✷ icon will be displayed under A/B icon, which is in the right menu bar. as in Figure 3-15.

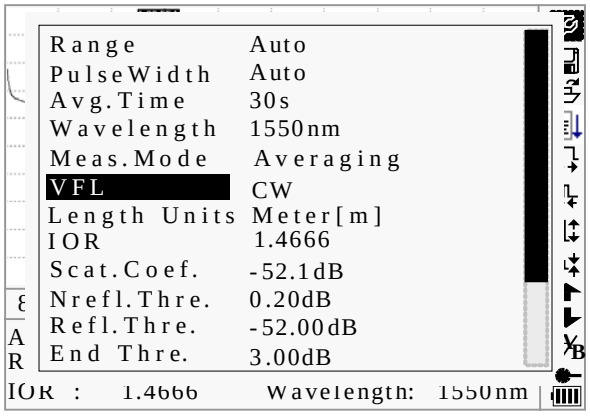


Figure 3-15. VFL Configuration

Length Units Configuration

Under the parameter configuration menu use [▲] and [▼] to highlight “Length Units”; press [Enter] to select the desired units of measurement, as in Figure 3-16. Press [↩] to exit

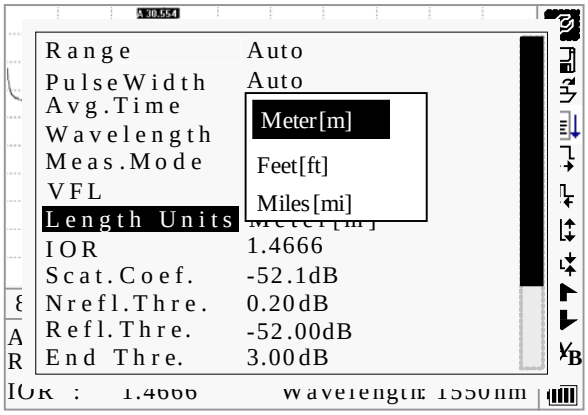


Figure 3-16. Length Units Configuration

IOR Configuration

IOR is a key factor to affect the speed of laser transmission in optic fiber; and in this case, IOR configuration has direct impact on the accuracy of measurement. Generally speaking, the IOR parameter is provided by optic fiber Provider, and it can be set to the accuracy of four digits after decimal point between 1.0-2.0.

Under parameter configuration, use [▲] and [▼] to highlight “IOR”; and press [Enter] to enter, as in Figure 3-17. Press [↩] to exit.

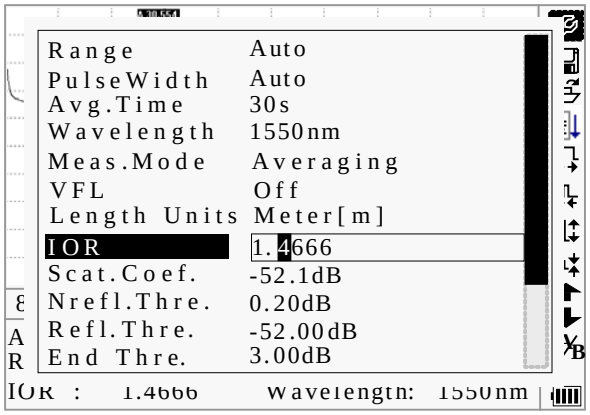


Figure 3-17. IOR Configuration

Use [◄] and [►] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.

Scatter Coefficient Configuration

Scatter coefficient determines the value of backward scatter power. The configuration affects the calculation of reflection value.

Under parameter configuration, use [▲] and [▼] to highlight “Scatter coefficient”; press [Enter] to enter, as shown in Figure 3-18. Press [↩] to exit.

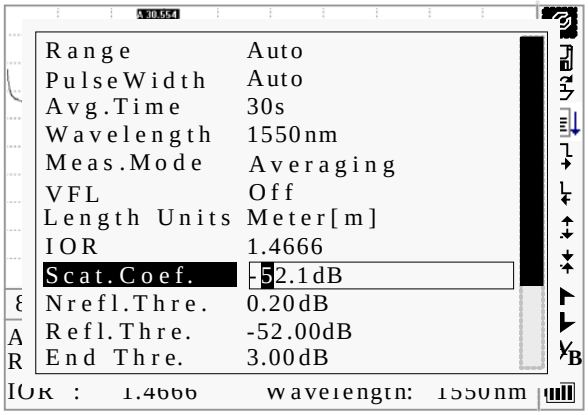


Figure 3-18. Scatter Coefficient Configuration

Use [◄] and [►] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.

Non Reflection Threshold Configuration

This configuration has direct impact on the listing of insertion loss events. Only events GE this threshold will be listed.

Under parameter configuration, use [▲] and [▼] to highlight “Non reflection threshold”; press [Enter] to enter, as shown in Figure 3-19. Press [↩] to exit.

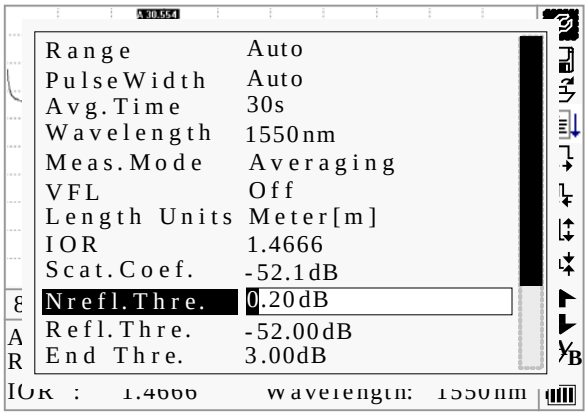


Figure 3-19. Non Reflection Threshold Configuration

Use [◄] and [►] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.

Note

The default setting is 0.2dB

Reflection Threshold Configuration

This configuration has direct impact on reflection events listing. Only reflection events GE this threshold will be displayed in events list.

Under parameter configuration, use [▲] and [▼] to highlight “reflection threshold”; press [Enter] to enter, as shown in Figure 3-20. Press [↩] to exit.

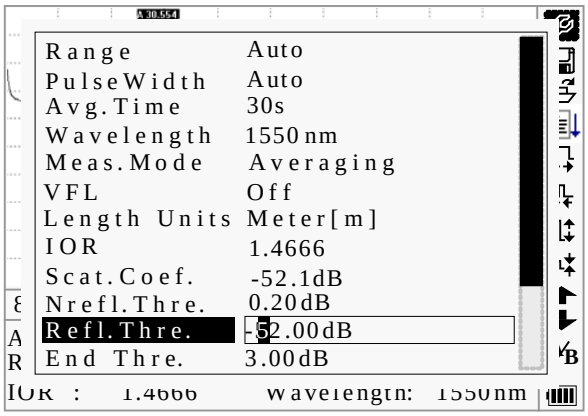


Figure 3-20. Reflection Threshold Configuration

Use [◄] and [►] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.

Note

The default setting is -52.00dB

End Threshold Configuration

This threshold is the end threshold of optic fiber. If the end threshold equals 3.0dB, then the first event with insertion loss GE 3dB will be considered as the end of the optic fiber. If the value is set to 0dB, there will be no end threshold.

Under parameter configuration, use [▲] and [▼] to highlight “End threshold”; press [Enter] to enter, as shown in Figure 3-21. Press [↶] to exit.

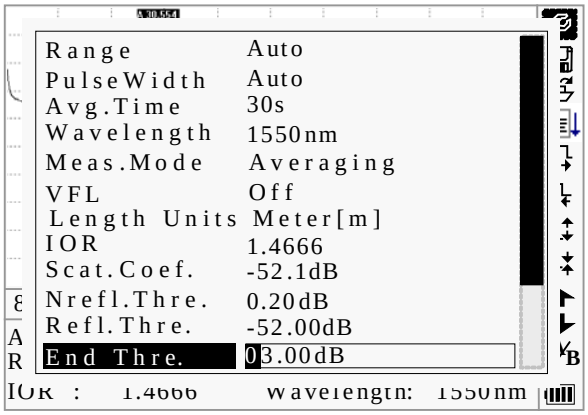


Figure 3-21. End Threshold Configuration

Use [◄] and [►] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.

Note

The default setting is 3.00dB

Delete File

This function is designed to delete saved traces.

Under parameter configuration, use [▲] and [▼] to highlight “Delete file”; press [Enter] to enter, as shown in Figure 3-22. Press [↶] to exit.

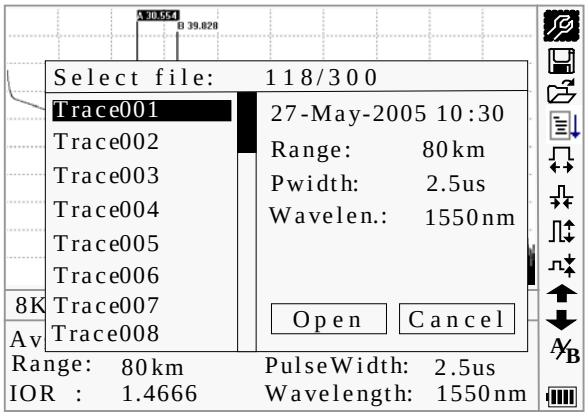


Figure 3-22. Delete File

Press [▲] and [▼] to choose the files to be deleted, and then press [Enter] to confirm. Users can delete one or several files by one time. Press [◄] and [►] to choose [Delete]. Press [Enter], according to the instruction, choose “Yes” to delete; choose “No” to not delete. If choose [Cancel], it will exit the file delete menu.

Time Configuration

Time configuration is used to change system time.

Under parameter configuration, use [▲] and [▼] to highlight “Time”; press [Enter] to change, as shown in Figure 3-23. Press [↶] to exit.

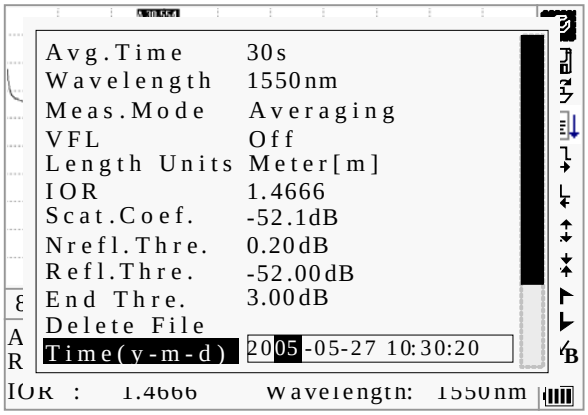


Figure 3-23. Time Configuration

Use [◄] and [►] to adjust the position of highlights; use [▲] and [▼] to change the digits. After setting, press [Enter] to confirm.

Auto off Configuration

This function is designed for conserving battery power. If auto off is on, the instrument will auto power off within 5 minutes of idleness.

Under parameter configuration, use [▲] and [▼] to highlight “Auto off”; press [Enter] to switch, as shown in Figure 3-24. Press [↶] to exit.

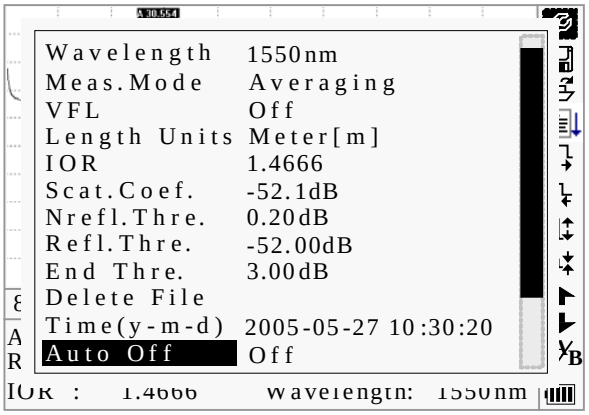


Figure 3-24. Auto off Configuration

Note

The default setting is “auto off” on

Language Configuration

There are two language options: English and Chinese.

Under parameter configuration, use [▲] and [▼] to highlight “Lang./语言”; press [Enter] to switch, as shown in Figure 3-25. Press [↩] to exit.

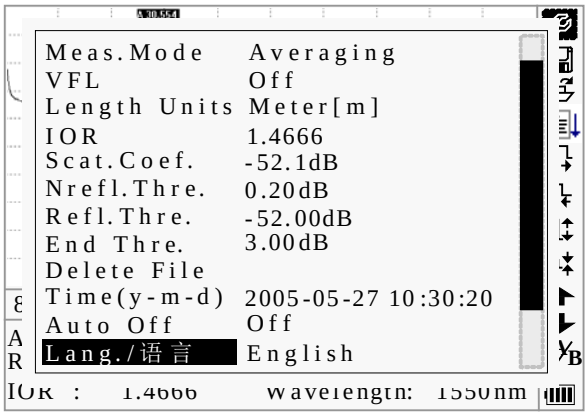


Figure 3-25. Language Configuration

Contrast Adjustment of LCD Display

The contrast of LCD has been adjusted. And users can adjust the contrast according to personal visual habits.

Under parameter configuration, use [▲] and [▼] to highlight “LCD Contrast”; press [Enter] to adjust, as shown in Figure 3-26. Press [↩] to exit.

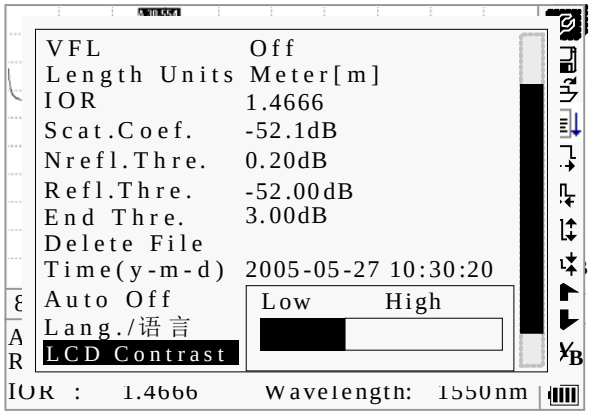


Figure 3-26. Contrast Adjustment of LCD Display

Use [◄] and [►] to adjust contrast, and press [Enter] to confirm.

Color Mode Setting

Choose the different displaying color scheme according to the user's fancy.

Under parameter configuration, use [▲] and [▼] to highlight "Color mode", press [Enter] to choose different mode. Press [↩] to exit, as shown in Figure 3-27.

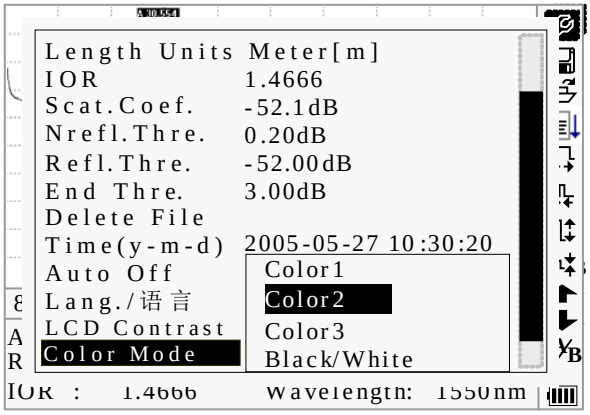


Figure 3-27. Color Mode Setting

Use [▲] and [▼] to highlight suitable color mode setting; press [Enter] to confirm the selection.

Default Set

This function is used to set OTDR parameters to factory settings. Those parameters include; range, pulse width, average time, IOR, non-reflection threshold, reflection threshold, end threshold, and scatter coefficient. Under parameter configuration, use [▲] and [▼] to highlight "Load default"; press [Enter] to enter, as shown in Figure 3-28. Press [↩] to exit.

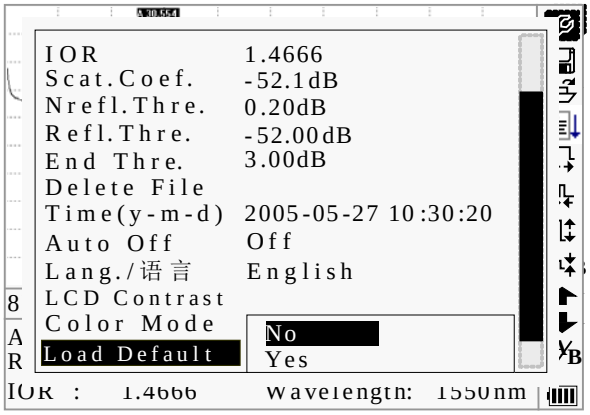


Figure 3-28. Load Default

Use [▲] and [▼] to highlight "yes" or "no"; press [Enter] to confirm.

Help

Users can get the quick reference via Help menu.

Under parameter configuration, Use [▲] and [▼] to highlight “Help”; Press [Enter] to enter, as shown in 3-29.(a), (b), (c). Press [↶] to exit.

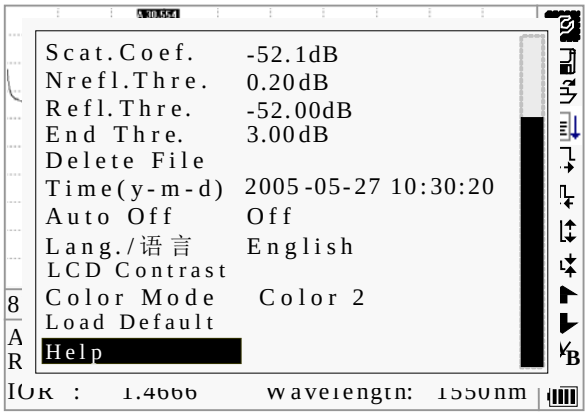


Figure 3-29. (a) Help

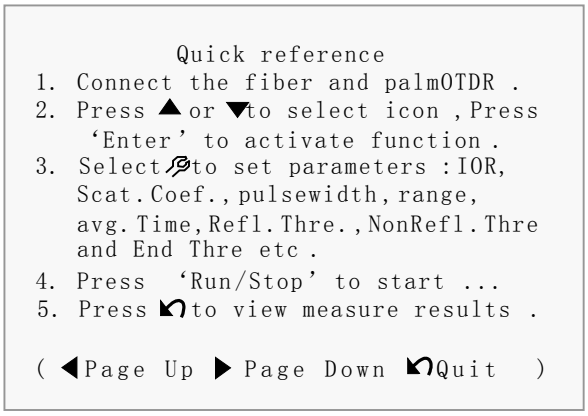


Figure 3-29. (b) Help

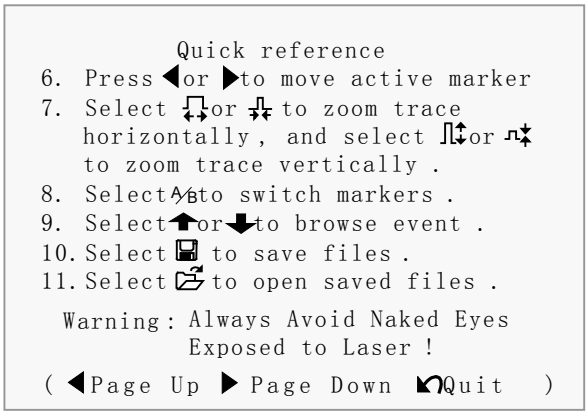


Figure 3-29. (c) Help

3.5 Battery Recharge Status

When the instrument is power off and powered through AC/DC adapter, the “CHARGE” indicator on the coping (Figure 1.) will turn on. When batteries are fully recharged, the indicator will turn off.

When the instrument is power on and powered through AC/DC adapter, the inside batteries are automatically recharged. The meanings of signals are as follows:

 The batteries are being recharged

 The batteries are fully recharged

When the instrument is powered by inside rechargeable batteries, power volume of batteries is shown on the LCD:

 No power

 Low power

 Half power

 More than half power

 Full power.

4. Trace Measurement and Processing of Existing Traces

4.1 Instructions on GUI

After power on, power on interface displays on the LCD, as shown in Figure 4-1:

Figure 4-1. Power on Interface

OTDR-XXXX： Model

---Version X.X---： Software Version.

Three seconds after power on, the interface will be automatically directed to quick reference:

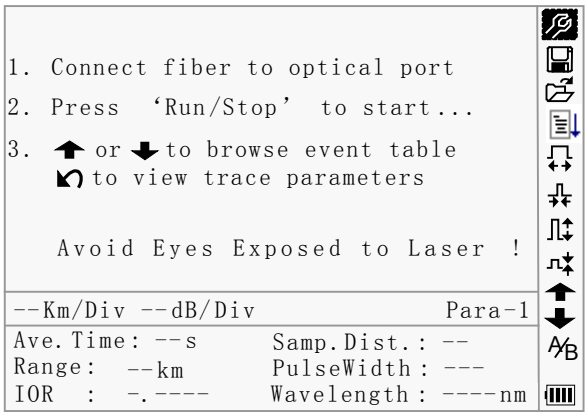


Figure 4-2. Quick Reference

4.2 Trace Measurement of OTDR

One complete trace can be obtained for each measurement. Also, OTDR can load a saved trace.

Note

- Before each measurement, if the operator is not familiar with the cautions, please do follow instructions in this manual for personal safety
- Make sure that the optical fiber or cable is not in use and there is no laser beam in the fiber before testing via OTDR. Otherwise, it may result in imprecise test trace, even permanent damage for the OTDR

4.2.1 Trace Measurement- Connect Optical Fiber

Connect optic fiber to OTDR optic output directly, no tools needed.

- Clean connectors. For details please refer to chapter A
- Clean tie-ins and check whether they are FC/PC tie-ins or not
- Connect optic fiber to the instrument

4.2.2 Trace Measurement - Parameter Configuration

For details relating to parameter configuration, please refer to 3.4.3.2, Parameter Configuration on OTDR Menu Bar. If the parameters are unclear, please use the default parameters of the instrument, however, this may cause an increase of measurements errors.

Note

Range is set to “Auto”, when auto measurement is on.

4.2.3 Trace Measurement- Auto

Auto measurement can be applied in case that the length of optic fiber is unidentifiable. OTDR auto select adequate range for measurement.

Steps for Auto measurement:

- Parameter configuration: for detailed operations, please refer to 3.4.3.2, Parameter Configuration on OTDR Menu Bar. Set range to “AUTO”
- Measure: press [Run/Stop] to start measurement, and the interface is as in Figure 4-3. (a), (b)

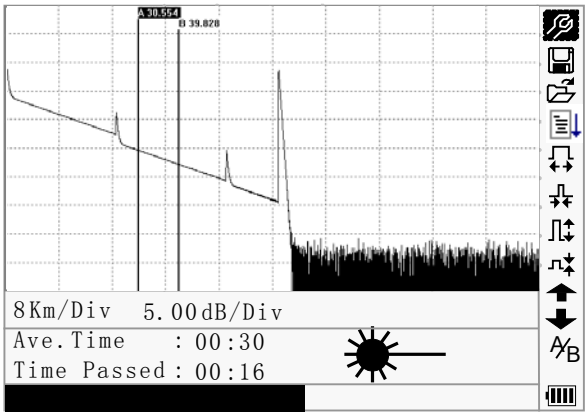


Figure 4-3. (a) Measuring

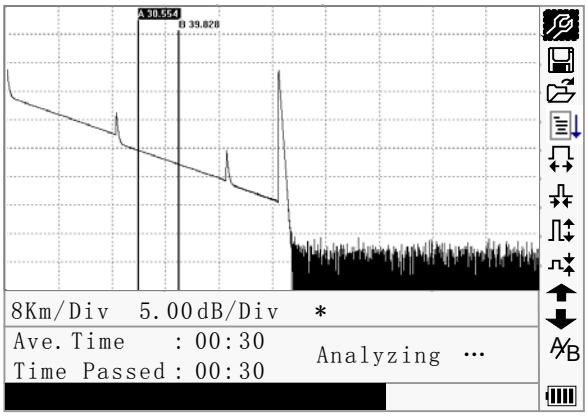


Figure 4-3.(b) Measuring

Interface:

“Total: 00:30” ---------- Measure time which is set by user is 30 seconds

“Passed: 00:16” ---------- Total measurement time has passed 16 seconds

“ “---------- Flickering of this sign means laser is active

Note

After a certain period of time, the trace displays on the GUI. The trace in the Figure below is a trace during measurement, which will be refreshed for every certain period of time to demonstrate the whole process to users in real time. But at the end of measurement, the trace will be final, as shown in Figure 4-4.

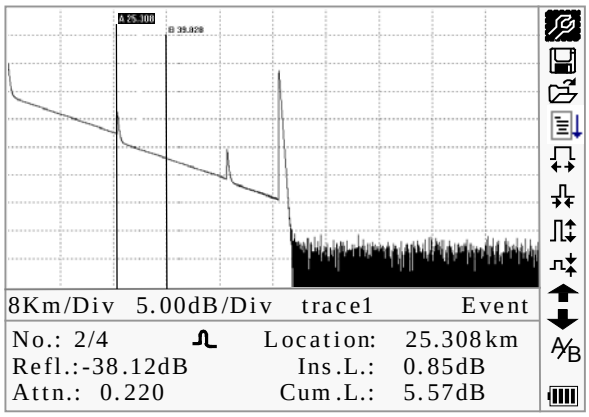


Figure 4-4. Trace Measurement of OTDR

4.2.4 Trace Measurement - Manual

If the operators have full knowledge of measured optic fiber, they can set accurate parameters, and achieve optimal measurement results.

- Change “range”: Refer to 3.4.3.2.2 range configuration to select adequate range
- Measure： Press [Run/Stop] to start measurement. The process is the same with Auto measurement

4.2.5 Trace Measurement -Reasons of Measurement Failures

If measurement failures occur, reasons may be one of the following:

- Events may be too close to each other
  Shorten the pulse width, and make another try. If failure still occurs, please try to measure at the other end of the optic fiber
- Low SNR
  Try to use wider pulse or increase average time, and make another try
- Incorrect parameter configuration
  Check parameter configuration, and make another try

4.3 Information Window

Items of information window: measurement parameters, analysis parameters, and information regarding marker A/B.

For details regarding information window, please refer to 3.4.2 OTDR information window.

4.3.1 Switch between Information Window Items

Under GUI of Figure 4-4., press [↶] and the items of information window will display in circulation: measurement parameter→ analysis information→ Event list→ information of marker A/B →fiber →measurement parameter.

4.3.2 Review Event List

Under GUI of Figure 4-4, press [↶], items in information window will switch to event list information.

Use [▲] and [▼] too highlight ▲ or ▼, then press [Enter] to review events list, ▲ is to browse upwards and ▼ downwards; or to browse events list upwards and downwards by the combining hot key [Shift/🔍] + [↶] and [Shift/🔍] + [Enter] in the keyboard

4.3.3 Review Marker A/B Information

4.3.3.1 Switching between Marker A/B

Under GUI of Figure 4-4., use [▲] and [▼] to highlight, and then press [Enter] to switch between marker A/B.

Use [◄] and [►] to move marker A or B.

4.3.3.2 Information between Marker A/B

Under GUI of Figure 4-4., press [↶] switch information window to marker A/B.

Press [◄] or [►] to change the position of marker A or B, and information of marker A/B will change accordingly in information window.

4.4 Zoom in Trace Horizontally

This function is designed for users to review details of every event more carefully.

- Under GUI of Figure 4-4.,use [▲] and [▼] to highlight  ,then press [Enter] to zoom in trace horizontally; or to zoom in trace horizontally by the combining hot key [Shift/🔍]+[►] in the keyboard
- Press [◄] or [►] to move marker to the event point to be observed
- To examine information of event point, please according to”4.3.3.1 Switching between Marker A/B”

4.5 Zoom out Trace Horizontally

This function is to zoom out trace horizontally.

Under GUI of Figure 4-4., use [▲] and [▼] to highlight, and press [Enter] to zoom out trace. or to zoom out trace horizontally by the combining hot key [Shift/🔍]+[◄] in the keyboard.

4.6 Zoom in Trace Vertically

This function is designed for users to review event points more carefully.

- Under GUI of 4-4, press [▲] and [▼] to highlight , then press [Enter] to zoom in vertically; or to zoom in trace vertically by the combining hot key [Shift/🔍]+[▲] in the keyboard
- Use [◄] and [►] to mover marker to event point to be observed
- For details, please refer to 6.3.3.1 switching between Marker A/B

4.7 Zoom out Trace Vertically

This function is designed to zoom out trace vertically.

- Under GUI of Figure 4-4, press [▲] and [▼] to highlight , then press [Enter] to zoom out trace vertically or to zoom out trace vertically by the combining hot key [Shift/🔍] + [▼] in the keyboard.

4.8 Re-analyze the trace

While the test result at a certain threshold is not good enough, it can be re-analyzed by this function (to change the threshold). Please note that this function can be effective while the OTDR is disconnected from the fiber.

- Under parameter configuration menu, edit the threshold value you want, press [↩] to exit parameter configuration menu, then press [📄↓] to re-analyze the trace.

4.9 Save Trace

When auto or manual measurement is finished, the measurement trace can be saved. Contents of trace saved include: Trace curve, related information of trace.

- Under GUI of Figure 4-4., use [▲] and [▼] to highlight  , then press [Enter] to enter, as shown in Figure 4-5.

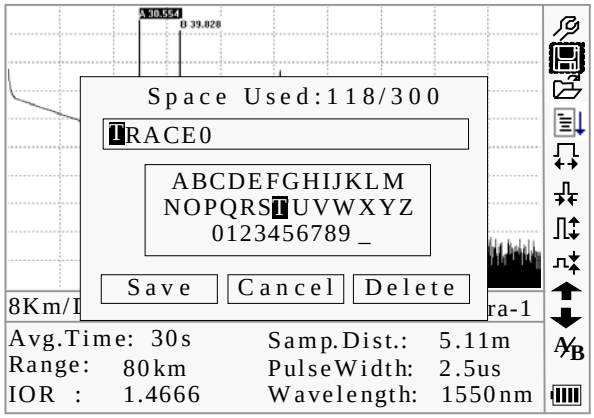


Figure 4-5. Save Trace

- Input filename: use [▲],[▼],[◄] and [►] to choose the alphabet or Arabic numerals one by one, and press [Enter] to confirm. The length of filename will not exceed 8 characters of alphabet or Arabic numerals
- Save file: use [▲],[▼],[◄] and [►] to highlight “OK”, press [Enter] to save
- Cancel saving file: use [▲],[▼],[◄] and [►] to highlight “cancel”, press [Enter] to cancel the operation of “save file”
- Delete alphabet/Arabic numerals: use [▲],[▼],[◄] and [►] to highlight “Delete”, press [Enter] to delete the alphabet/Arabic numerals
- Memory space: 118/300 means that total memory space is 300 files; it has already saved 118 files so far

4.10 Browse Saved Traces

Under GUI of Figure 4-4, use [▲] and [▼] to highlight, press [Enter] to confirm, as shown in Figure 4-6.

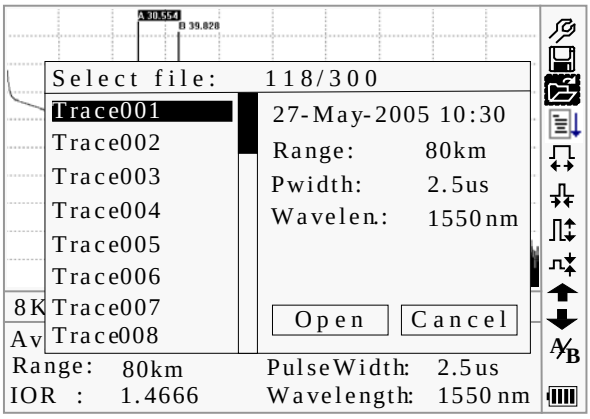


Figure 4-6. Browse Saved Traces

- Use [▲] and [▼] to highlight the certain trace, then use [◄] and [►] to choose [Open] or [Cancel]; Press [Enter] to confirm
- Memory space: 118/300 means that total memory space is 300 files; it has already saved 118 files so far

4.11 Upload Saved Traces

Saved traces can be uploaded to PC through the associated software of trace manager, with which traces can be further processed on PC.

- Install the software, and run
- Power off OTDR
- Connect OTDR to PC through RS232(or USB) interface cable
- Power on OTDR, and upload data with the software. The whole process is as in Figure 4-7.

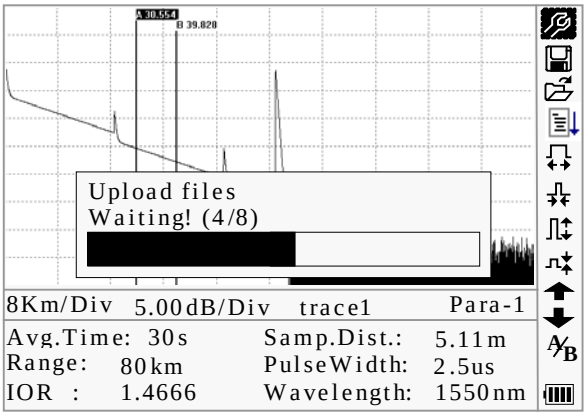


Figure 4-7. Upload Saved Traces

Note

- Make sure the instrument is power off when connecting to PC through RS232 (or USB) data cable; Make sure it's fastened, then power off.
- USB sustains the electrification hot plug. However USB operation rules must be obeyed while connecting to PC. To install USB driver correctly is necessary before uploading the data; Make sure USB is pulled out safely. Otherwise it will result in losing data.
- This operation cannot be applied under GUI of parameter configuration, save trace, browse saved traces, and measuring in progress.

4.12 Alter Measurement in Realtime Testing

To alter measurement in realtime testing, follow these steps:

- Use [▲] and [▼] to highlight "  ", and the press [Enter]. A parameter will appear at the bottom of the screen.
- Use [◄] and [►] to move the parameter to be changed (Figure 4-8), and the press [Enter].
- Use [▲] and [▼] to change the Ref value. Select "Averaging" to select averaging testing.
- Press "OK" to exit the parameter configuration menu.

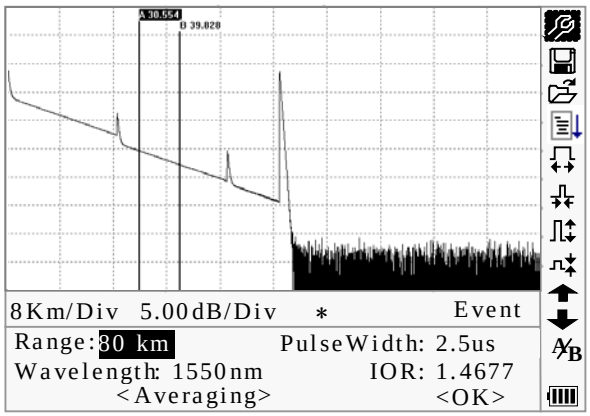


Figure 4-8. Realtime Testing

5. Maintenance and Calibration

5.1 Maintenance and Replacing of Batteries

Battery for this instrument is rechargeable NiMH battery.

Note

Notes for maintenance of batteries in the instrument:

- In order for the OTDR (including the batteries) to meet specifications, the storage temperature should be within 15℃ to 30℃. And the instruments should be stored in low humidity environments
- If the instrument is left unused for a long time (idle for over 2 months), it is recommended to recharge the battery every other month
- Procedure of replacing battery is as follows.
    - Take off cover of the battery chamber
    - Remove the battery and draw out socket from the jack of chargeable battery, then change the battery if necessary
    - Remove the RTC clock battery, then change it if necessary

5.2 Cleaning of Interfaces

Interfaces must be kept clean. Special alcohol may be used to clean optic output. Always replace protective dust caps when the unit is not being used, and keep the protective dust caps clean.

In addition, flanges must be kept clean periodically,

Effects of Cleaning Interfaces and Connectors

The diameter of optic core is 9um, and diameter of dust and other particulates ranges from 1/100 to 1/1/10 um. Comparatively speaking, the size of dust and other particulates can cover part of optic end and therefore degrade the performance of the instrument.

In addition, power density may burn dust into optic fiber and induce further damage (for example, 0dBm optic power may produce about16000000W/m*m power density in single mode fiber). In this case, measurement will be inaccurate and irreversible.

Safety instructions to be followed before cleaning

- Make sure the instrument is power off when cleaning
- Any operations contradict to the instructions may result in dangerous laser injuries
- Make sure laser source is off, when clean any optic connectors
- When the instrument is in operation, please always avoid looking directly into optic output. Although laser radiation is invisible, it may do serious injury to eyesight
- Be cautious of electric shock and make sure AC power is disconnected with the instrument before cleaning. Always use dry or moistest soft cloth to clean the outside of the instrument, and never clean the inside
- Please do not add any accessory to optic instrument or adjust the instrument at discretion

- For maintenance, always go to qualified or certified professionals

Tools for Cleaning Interfaces and Connectors

- Optic fiber cleaner (for cleaning of optic connectors)
- Optic fiber cleaning rod (for cleaning of optic outputs)
- Optic fiber cleaning tissue (for cleaning optic interfaces)
- Isopropyl alcohol
- Cotton ball
- Paper tissue
- Cleaning brush
- Condensed air

Preferred Procedure for Cleaning Interfaces and Connectors

As in Figure 5-2. Preferred Procedure is as follows:

- Screw off the cap of flange
- Clean the laser head carefully
- Screw on the cap of flange

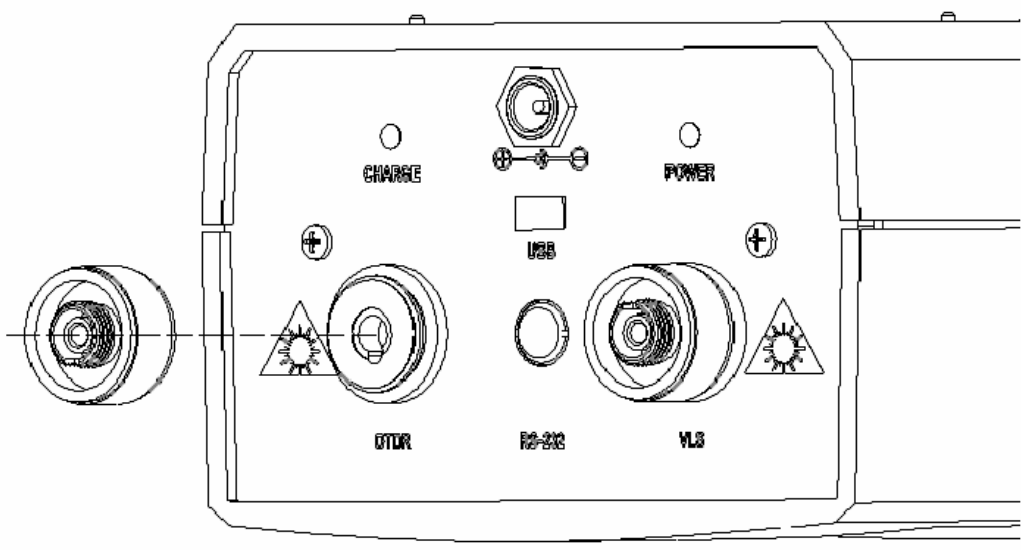


Figure 5-2. Structure of Flange

5.3 Calibration Requirements

Calibration of the instrument is recommended every two years. Please contact our representatives or nearby customer service centers for proper calibration.

6. Warranty Information

Terms of Warranty

OTDR is warranted against defective material and workmanship for a period of one (1) year from the date of shipment to the original customer. Any product found to be defective within the warranty period would be repaired or replaced by the Provider free of charge.

In no case will the Provider's liabilities exceed the original purchase price of the product.

Exclusions

The warranty on your equipment shall not apply to defects resulting from the following:

- Unauthorized repair or modification
- Misuse, negligence, or accident

The Provider reserves the right to make changes to any of its products at any time without having to replace or change previously purchased units.

Warranty Registration

A warranty registration card is included with the original shipment of equipment. Please take a few moments to fill out the card and mail or fax it to the local Customer Service Center of the Provider to ensure proper initiation of your warranty term and scope of your warranty.

Returning Instruments

To return instrument for reasons of yearly calibration or other, please contact the local Customer Service Center of the Provider to obtain additional information and a RMA# (Return Materials Authorization number). And describe briefly reasons for the return of the equipment, to allow us offer you more efficient service.

Note

To return the instrument in the case of repair, calibration or other maintenance, please note the following:

- Be sure to pack the instrument with soft cushion like Polyethylene, so as to protect the shell of the instrument.
- Please use the original hard packing box. If use other packing material, please ensure at least 3 cm soft material around the instrument.
- Be sure to correctly fill out and return the warranty registration card, which should include the following information: company name, postal address, contact, phone number, email address and problem description.
- Be sure to seal the packing box with exclusive tape.
- Be sure to ship to your representative or the agent of the Provider in a reliable way.

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