Multifunctional OTDR
User's Manual

Multifunctional OTDR
Test Platform

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ISO9001 Certification

Produced to ISO9001 International Quality System Standard as part of Promax, is 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 Promax bear the responsibilities for consequences incurred by violation of the following instructions.

GENERAL

This product is a Safety Class 1 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 OTDR's external markings described under Symbols.

Do Not Operate in an Explosive Atmosphere

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

Do Not Remove OTDR 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

WARNING!

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.

CAUTION!

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.

NOTE

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

Laser Safety Announcements

WARNING!

OTDR is a laser instrument. Users should avoid looking directly into the optic output.

➢ Always avoid looking directly into the optical output port, when OTDR is working. 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.

➢ Always replace protective dust cap on the probe port when OTDR 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 available.

Electric Safety Announcements

If need to assure instrument thorough outage, please pull up power line and take the battery out.

WARNING!

◆ AC/DC adaptor should be used only indoors.

◆ The ambient air of OTDR place should be free flow.

◆ Any using of electric tools near inflammable gas or smog will be a big safety threat.

◆ In order to avoid electric shock, please don't use instrument if there is damage on any outside surface part(top cover, panel, etc)

◆ Only qualified professional staff can do electrified adjustment, maintenance and repair to the operating instrument.

◆ Even OTDR power is cut off; the capacity in OTDR might be electrified in some time after that.

Agreement and Statement

Button or menu: The operating units in GUI that can be clicked by stylus, indicated by letters in square brackets, e.g. **[Setup]** and **[Start]**.

Key: The function key on front panel, indicated by letter or icon in quotation marks, e.g.

" ⏻ " (POWER) and " ☼ " (BACKLIGHT).

Option label: Indicated by letters in brace, e.g. {Event} and {Trace Parameter}.

Label and subordinate specific options: Indicated by letters in angle brackets and square brackets, e.g. <Mode> [Average], which stands for averaging mode option; <Wavelength> [1310nm], which stands for 1310nm wavelength option.

Mode or module: Indicated by letters in quotation marks, e.g. "OTDR" and "OCI".

Conversation: Indicated by letter in quotation marks e.g."Confirm and Cancel .

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FIGURES CONTENTS

1 General Information

1.1 Scope of this Manual

Thank you for purchasing Promax instrument. Please read this manual carefully before using any of Promax series fiber-optic instrument. Always observe the warnings and cautions appearing throughout this manual.

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

1.2 Introduction

OTDR series are the compact multi-functional platform. It is convenient and accurate for auto/manual testing, multi-wavelength testing, Integrated intelligent and multi-functional analysis.

OTDR is easy to handle with large color LCD touch screen and smart user-interface. Linux system, large built-in and extended memory enable convenient test data storage, access and transfer to PC via USB for further analysis and reporting. Management software on the PC can be further analysis the data.

Product has the following characteristics:

➢   7 inch color LCD touch screen of sharp display, 4-level adjustable brightness;

➢   Convenient and flexible handling: Touch-screen, keypad and external USB mouse/keyboard;

➢   Large-capacity data storage;

➢   USB data interface (Host and Client), Supports a variety of data backup;

➢   PC software for test data analysis and reporting;

➢   Auto screensaver feature for power saving;

➢   AC/DC dual power supply;

➢   Optimized power management: 10 hours continuous operation.

Optional Built-in Functional Modules

➢   OTDR function module, detail specification for later chapters

➢   LS100: Stabilized Laser Source Module (as OTDR)

➢   PM100: Optical Power Meter Module

➢   MCI100: Optical Connector Inspector Module, detail specification for later chapters

➢   RC100: Remote control Module

➢   LM100: Link Image Module

1.3 Product Appearance

Fig. 1.1 Front View

NOTE

⏻ Power On/Off key is lower than other keys to avoid misoperation.

Fig. 1.2 Front View

1.4 Front Panel Indicators Introduction

Icon	Status	Meaning
⏻ Power On/Off	Off	System off
	Green, constant	System on
	Red, blinking	Low battery, charging needed
🔌 Charging Indicator	Red, constant	Charging, with power adaptor
	Green, constant	Charging complete, with power adaptor
	Off	Power adaptor unplugged or connection is poor
☀ Laser Indicator	Red, blinking	Laser on
	Off	Laser off

Tab. 1.1 Front Panel Indicators Introduction

1.5 Front Panel Keys Instruction

Name	Function
▶/■ Start/Stop	Press to start, press again to stop.
	Launch selected module in main interface.
Esc	Back
△	Move up or extended function to be defined, please refer to Help of current interface.
▽	Move down or extended function to be defined, please refer Help of current interface.

Name	Function
◁	Move left or extended function to be defined, please refer Help of current interface.
▷	Move right or extended function to be defined, please refer Help of current interface.
OK	Confirm button to confirm certain operations, please refer Help of current interface.
Nav	Enter Help of current interface.
Del	In character input box editing, provide backward delete functions.
Num0 ~ 9	In the digital input box for editing, digital input function.
☼ LIGHT	LCD brightness adjustment. 4-level brightness, press to toggle between different levels.
⊡	Call the soft keyboard.
⊟	Call the save window key.
⏻ POWER	Power on/off
	Press to power on system when system is off.
	When system is on, press and hold 1 second to enter screensaver mode for power saving; press and hold 3 seconds to power off system.
	In screensaver mode, press any key and hold 1 second to restore normal status (Or by clicking anywhere on touch screen with stylus, clicking mouse left key)

Tab. 1.2 Front Panel Keys Instruction

1.6 Operating Parts Instructions

Name	Operation	Description
Stylus	Click	Select certain module or menu.
	Double click	Mainly used in file explorer window.
	Draw frame	1. Batch files selection in File Explorer. 2. Zoom in/out selected part of displayed trace.
	Click and hold	1. Open menu or select in File Explorer. 2. Select object in other windows.
Mouse (Optional)	Left click	Similar to stylus, more convenient for desktop application.
	Left double click	
	Left key draw frame	

Name	Operation	Description
	Right click	
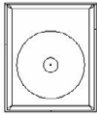
Tab. 1.3 Operating Parts Instructions

NOTE

◆ Stylus shouldn't touch the screen insufficient, otherwise might cause unable to operating regularly

◆ Stylus shouldn't touch the screen with too much force, otherwise might damage the LCD and touch screen.

◆ Please apply adequate force with stylus on the touch screen.

◆ Only use OTDR stylus, do not use other device. Sharp object like ball pen tip may smear or damage the touch screen.

1.7 Instrument Interfaces Instructions

·**Interfaces on Platform Top (Left to right)**

Name	Appearance	Icon	Description
Power		− −⊙− +	Power adaptor input
Audio Output			Connection to USB devices, e.g. printer, mouse, keyboard and USB interface testing devices (Driver needed)
USB Slave			
RJ45 Port			10/100Mbps Ethernet port
Serial Interface	◎		For system adjustment (Not open to user)

Tab. 1.4 Interfaces on Platform Top

·**Optical Ports**

OTDR is equipment with FC/PC connectors (Interchangeable SC, ST and LC)

Name	Appearance	Icon	Description
Optical Port		OTDR	Normal OTDR port

Name	Appearance	Icon	Description
		VFL	Visible Red Laser port
		OLT	PON Power Meter downstream input
		ONT	PON Power Meter upstream input
		SLS	Stabilized Light Source port
		OPM	Multi-wavelength Optical Power Meter port

Tab. 1.5 Optical Ports

NOTE

The amount of connectors depends on module configuration, not all modules are equipped with abovementioned optical ports

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.

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 OTDR is working.

➢ Always replace protective dust cap on the detector port when OTDR 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 available.

1.8 GUI Icons Instruction

Icon	Status	Operation	Description
	Appear	--	Power adaptor plugged
	Green part change	--	Showing battery power level with percentage behind.
	Appear	--	Battery unplugged or connection is poor.

Icon	Status	Operation	Description
Start	---	Click	Start selected function
Setup	---	Click	Enter Setup interface, including Interface style, Language and System setting etc.
? Help	---	Click	Enter Help of current interface
About	---	Click	Enter "About" interface
(power)	---	Click	System off

Tab. 1.6 GUI Icons Instruction

1.9 Power Instruction

OTDR uses following power supplies:

➢ AC adaptor (Connect to standard outlet – Indoor use only)

➢ Li-ion rechargeable battery (Auto power supply when AC adaptor is unplugged)

➢ Battery dock cover must be closed properly when OTDR is working.

➢ AC adaptor and battery power supply can be switched without affecting operation

➢ After AC/DC power adaptor is connected, built in Li-ion battery will be automatically charged.

When only using Li-ion battery as power supply, following situations may cause OTDR automatically power off or dysfunction

➢ The battery power indicator displayed on LCD screen will turn red (Low battery) when the battery power is insufficient and OTDR may automatically power off.

➢ If unused for a long time, OTDR may not power on properly, please connect power adaptor and recharge the battery.

1.10 Use of Rechargeable Battery

➢ Battery for OTDR is Lithium rechargeable battery.

➢ 3.5 hours for full charge

➢ When OTDR is charged by AC/DC power adaptor, charging indicator on the front panel will turn red and turn green after charge is complete.

➢ When OTDR is powered on and being charged, LCD will also indicate charging status.

75%: Showing battery power level with percentage behind, 75% indicates

the current battery power is 75% of the total battery power.

[X] : Battery unplugged or connection is poor.

: Power adaptor plugged.

NOTE

OTDR battery is rechargeable Li-ion battery. If unused for a long time, please charge the battery to 50%-70% before conservation.

CAUTION!

Keep the battery off from fire and intense heat; do not open or short circuit the battery.

2 Basic Operation

2.1 Foreword

This part introduces the basic operation on the OTDR. 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 Power On/Off

Power on: Press ⏻ button and hold 1 seconds till the LED power indicator is on.

Power off:

Press ⏻ button and hold 3 seconds till the LED power indicator is off.

NOTE

Power off OTDR will completely shut down the platform and modules. When power on, OTDR will restart.

2.3 Enter and Exit Power Saving Mode

When power is on, user can set OTDR to power saving mode and return to normal status. In power saving mode, the LCD backlight will turn off.

Two ways to enter power saving mode:

➢ Press ⏻ (Power) button once to turn off LCD backlight, LED power indicator keeps on. (Note: when the button is raised, the backlight close action)

➢ When power is on, OTDR will automatically enter power saving mode after its idle time exceeds pre-set value.

Exit power saving mode:

➢ Press ⏻ (Power) button , LCD backlight will turn on;

➢ Or press any key on the front panel;

➢ Or click the touch screen with stylus;

2.4 Adjust LCD Brightness

The LCD lightness is 4-level adjustable.

Press ☀ button to toggle between different levels. When it is the minimum level and press the ☀ button, it will be the maximum brightness.

2.5 Start Application

When OTDR is powered on, system will load the main program of Linux (Application software package) and enter main interface, as shown in Fig. 2.1

Fig. 2.1 Main Interface

Launch OTDR program:

1. Select "Modules" label and then "OTDR Module" in main menu, the part will be highlighted.
2. Then click [Start] to start program.

Launch other application program:

1. Select "Modules" label, then "VFL ", "OPM", "OCI" or "SLS".
2. Then click **[Start]** to start the program**.**
   (Note: Double click the module label to start the application)

> **NOTE**

Application program is available only when relative functional is purchased.

3 Common Settings and Special Settings

3.1 Main Setting Menu

In setting menu, user can set up many settings, including language, power saving, and load default.

Enter main setting menu:

When power is on, press the **[Setup]** button to enter the setting menu, as shown below:

Fig 3.1 Main Setting Menu

3.2 Select language

Switching language:

1. Click **[Setup]** to enter into setting menu.
2. In language area, choose the requiring language.
3. Press "OK" to confirm modification

3.3 Automatic Power Saving Setting

The feature is designed to save the battery power.

When power is on, OTDR will automatically enter power saving mode after its idle time exceeds pre-set value.

Setting Power Saving Mode:

1. Click **[Setup]** to enter into setting menu.
2. In power saving area of setup menu, choose preferred option in "Turn Off LCD".
3. Press "OK", Exit setup menu and opening power saving mode.

NOTE

Power saving mode is on by default, and LCD backlight turn off automatically in 10 minutes.

3.4 Load Default

This function is used to set system settings to factory default. Those parameters include: Interface style, language, power saving and OTDR features.

Load default:

1. In main interface, click **[Setup].**

2. In setting menu, click [**Load Default**], system promotes a warning message: "Restore factory settings?"

3. Click "Yes" to continue, click "No" to cancel.

NOTE

Unless it's necessary, please do not load default because it will erase your existing settings.

4 Basic Information of OTDR Module

4.1 Principle of OTDR Module

OTDR (Optical Time Domain Reflectmeter) is a measurement instrument for identifying

optic fiber transmission features. It 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 splicing, connectors and bending). Its non-destructive, one-end connection and rapid measurement features have made the OTDR module an indispensable tool for the testing application of optic fiber manufacture, construction and maintenance.

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 the 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.

4.2 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, such as the optic transmission characteristic of fiber, connector and etc.

Full auto trace analysis will realize the following measurement:
- Event location (Distance),end or rupture of optic fiber chain
- Attenuation coefficient of fiber
- Loss of a single event (e.g. 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
- Events list: event type, loss, reflection and distance.

4.3 Basic Definition and Classification of 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.

4.3.1 Reflection Events

When some pulse energy is scattered, reflection events happen. When reflection event occurs, peak shows on trace, as shown below:
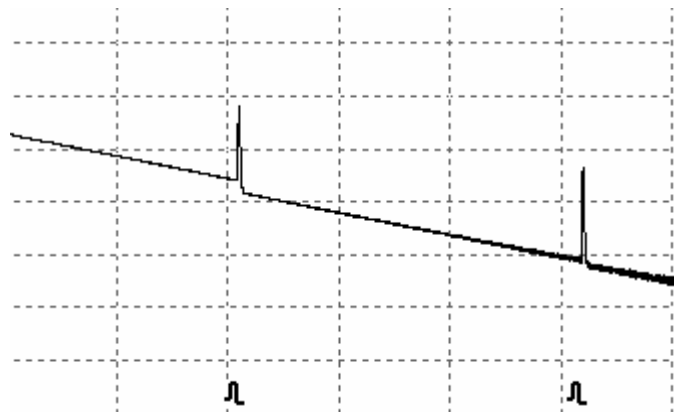
Fig.4.1 Reflection Event

4.3.2 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, see below:
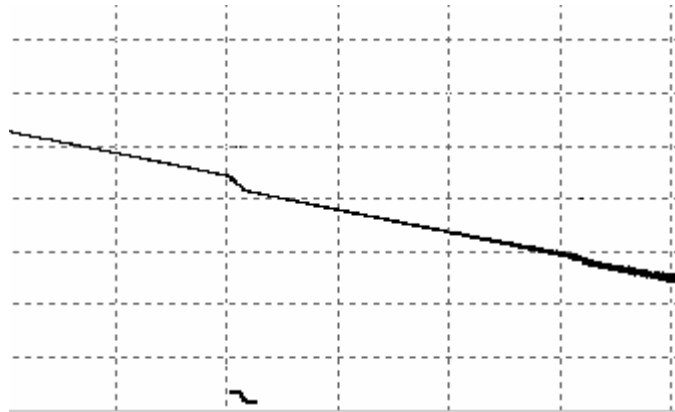
Fig.4.2 Non-reflection Event

4.4 Optic Fiber Link and Event Types

Optic fiber link and event type:

Event Type	Description
⊢	Beginning of optic fiber link
⌐⌐	Reflection event
⌐⌐	Non-reflection event
⊣	End of optic fiber link

Tab.4.1 Optic fiber link and event type

NOTE

End of optic fiber can be identified through scanning the first loss event that is greater than end threshold.

5 Instruction of OTDR Modules of OTDR

5.1 Main Features of OTDR Module

➢ High dynamic range and short dead zones.

➢ Complete sampling under low noise, realize accurate low loss locating.

➢ Resolution is accurate to 10cm.

➢ Multiple test model, convenient to meet the requirement of any test condition.

CAUTION!

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.

5.2 Measurement Mode of OTDR module

For convenience of customers use, OTDR offer many kinds of measurement mode. These modes can be used with combination.

5.2.1 Auto Mode and Manual Mode

Auto mode: Calculate the length of fiber, setting Sampling parameters, getting and showing the trace, analyze the events.

Manual Mode: Advanced Mode which user can control all OTDR parameters to test.

5.2.2 Averaging Mode and Realtime Mode

Realtime Mode: OTDR will undertake realtime measurement for the connector of exterior fiber and refurbish the measure trace. Under realtime mode, unless the user stops measurement, it will measure all along.

Averaging Mode: 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.

NOTE Generally, we suggest averaging mode.

5.2.3 In-service Mode and Normal Mode

In-service Mode: Measure live fiber, which use 1625nm to test. This mode doesn't affect the normal working wavelength in the fiber under test.

Normal Mode: Use other wavelength except 1625nm (such as 1310nm, 1490nm, 1550nm and etc.) Make sure there is no laser transmitting in the fiber under test before testing.

CAUTION!

When using the In-service mode, the fiber must be connected to the right port of 1625nm. If it is connected to other port; it may result in imprecise test trace, even permanent damage for the OTDR.

NOTE

◆ Only OTDR has 1625nm wavelength, In-service mode is available.
◆ When OTDR is on In-service mode, other wavelength (such as 1310nm, 1490nm,1550nm etc.) is not available.
◆ Above modes can be used with combination, but some mode is not available in certain conditions.

5.3 OTDR Interface

When power on, it will show the main menu automatically

In main menu, select "OTDR module", click [**Start**] button to enter OTDR user interface, as follows:

Fig. 5.1 OTDR Main Interface
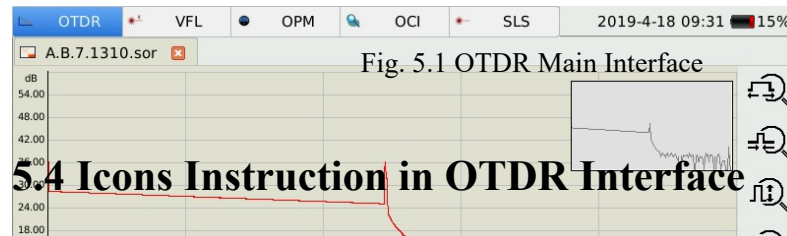
5.4 Icons Instruction in OTDR Interface

No.	Icon	Description
1	Start	Start testing
2	Stop	Stop testing
3	Setup	Parameter settings
4	Save	Save trace file
5	Open	Open trace file
6		Zoom in trace horizontally
7		Zoom out trace horizontally
8		Zoom in trace vertically
9		Zoom out trace vertically
10		Full-trace view
11		A/B marker switch

No.	Icon	Description
12		Move marker or marking point left/right
13		Toggle between marking points
14		Close trace
15		Return to previous menu
16		Return to previous menu

Tab.5.1 Buttons and icons in OTDR main interface

NOTE

Not all icons are displayed in one interface, they can be seen in different functional interfaces.

5.5 Trace Processing

The "OTDR Trace Manager" software in MTP-Suite is for trace review and analysis on PC after acquisition without connecting to OTDR.

Trace processing includes:

➢ Trace editing (Single trace, multi traces)
➢ Printing (Single trace printing, batch printing)
➢ Trace reanalysis
➢ Trace format conversion

Bi-directional averaging program (for single mode fibers only) is available in advanced versions to increase loss testing accuracy by averaging the measured loss values of each event from both directions.

5.6 Available OTDR Module

OTDR module details is in appendix, including wavelength, dynamic range, dead zone and etc.

6 Prepare to Use OTDR

6.1 Connectors Instruction

The optical ports equipped on OTDR are FC/PC (Interchangeable SC, ST and LC)

6.2 Cleaning and Connecting to Optical Fiber

To insure measurement accuracy, please clean and connect fiber properly before testing.

Connecting fiber to OTDR port is tool-free.

> ➢ Please refer to "Maintenance and Calibration" for optical port and connector cleaning.
> ➢ Clean connectors and check if fiber connector type is FC/PC
> ➢ Connect fiber to OTDR port.

NOTE

Improperly connected fiber may cause serious loss and reflection.

WARNING!

Please refer to Safety Instructions of this manual before testing to ensure personal safety.

CAUTION!

◆ When testing with OTDR, unless connected to specific optical port, please make sure there is no working laser in the fiber under test or it may cause incorrect result and even permanent damage to test instrument.

◆ Please not screw connectors too tight or it may damage fiber and optical port.

7 Test with OTDR

7.1 OTDR Quick Test

1. Check the connection between fiber and OTDR optical port, make sure it's well connected.

2. Click [**Start**] icon or press ▶/■ button to start testing.

3. Click **[Stop]** icon or press ▶/■ button to stop testing.

Fig 7.1 shows the OTDR interface after trace acquisition:
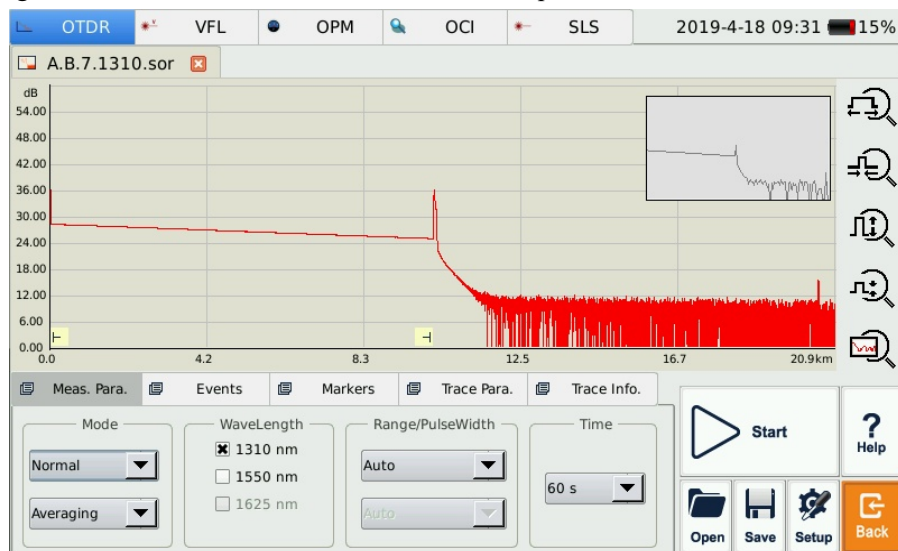
Fig. 7.1 OTDR Trace Acquisition Interface

NOTE

◆ Click the [Start] button with stylus or mouse.

◆ During testing, the averaging trace shows in the trace display area and refresh at certain intervals, the trace after testing finishes is the final trace.

◆ User can stop testing any time, application will show all the information when test stops.

◆ After test is finished or interrupted by user, system will perform automatic analysis which takes about 5 seconds or longer before user can start a new test.

◆ In Averaging mode, the interface will show the remaining time of the test.

◆ In Real-time mode, test will keep going until user stops it.

7.2 Trace Processing

After test and automatic analysis is complete, event types will be displayed below the trace area; user can review all events information in events list which is on {Events} label.

After test and automatic analysis is complete, user can save traces. Please refer to the "Save Trace".

After test and automatic analysis is complete, user can view the trace detail and manually analysis. Please refer to "Trace Viewing and Analysis Operation".

After test and automatic analysis is complete, user can start a new test after trace acquisition.

NOTE

Application will promote user to save unsaved trace before starting new test.

7.3 Unsaved Traces

Unsaved traces will be titled as "*U_xxxx" (xxxx stands for the current testing wavelength) which is displayed on the left upper corner of trace display area.

7.4 Save Trace

When test is finished, user can save the trace with parameters information. The content includes trace parameters and etc.

Procedure:

1. Click **[Save]** on the right lower corner of main interface and save dialog window will pop up.
2. File format: User can choose file format as ".sor" or ".jpg".
3. User can click button on the top of save file dialog to choose saving directory.
4. User can edit the name of the file to be saved; the file name consists of letters and numbers which can be input by soft keyboard.
5. File saving: In save dialog window, click **[Save]** button to save file.
6. Click **[Cancel**] to cancel file saving.

Save dialog window and options are shown below in Fig 7.2:
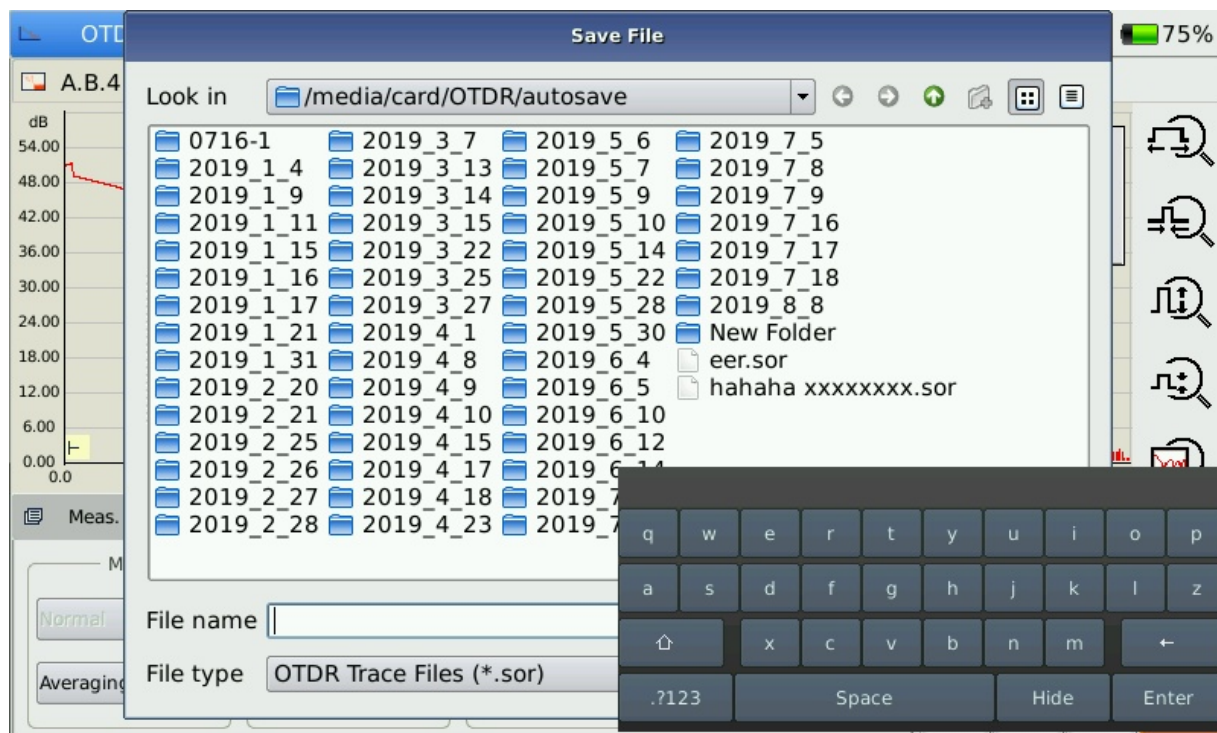
Fig. 7.2 Save dialog window

NOTE

◆ Title bar shows the current folder path, as shown in Fig 7.2: "\SDMMC_DISK\Traces\".

◆ System will automatically enter newly created folder.

◆ After file is saved, file name will be displayed on left upper corner of trace display area. Please note only the first 10 characters of the file name will be displayed and the rest are abbreviated as a "~" mark.

◆ If the name of the file to be saved already exists, system will promote a warning message.

◆ For DWDM OTDR, if user select more than one wavelength, OTDR will test one wavelength after another and automatically save all traces in AutoSave folder. OTDR will display the trace of the last tested wavelength.

7.5 Open Saved Trace

Click [**Open**] button on the right lower corner in OTDR interface to open saved trace

1. In single trace display mode, when opening a new trace, the currently-displayed trace will be closed.

2. In Multi-trace display mode, user can open and display up to four traces at the same time.

NOTE

◆ Enable/disable Multi-trace display mode in OTDR Setup by checking/unchecking "Multi-trace" in Display Option.

◆ ".jpg" format trace can be also loaded to PC for viewing.

7.6 Trace Viewing and Analysis Operation

User can zoom in/out trace, utilizing markers and marking points for trace characterization including loss, attenuation, reflection and etc. All of their operation can be realized by stylus.

Zoom in/out trace:

➢ In trace display area, draw selection frame from left upper corner to right lower corner to zoom in trace.

➢ Draw selection frame from right lower corner to left upper corner to zoom out trace.

Show A/B marker:

➢ Click {**Markers**} label in OTDR main interface and markers or marker labels will show in trace display area.

Move marker quickly:

➢ Select and hold the marker, drag it left or right to move quickly.

➢ Or click [◆] [➡] button on {**Markers**} label to move active marker left or right.

Switch A/B markers:

➢ Click button to switch A/B markers on {**Markers**} label.

➢ Or click the marker to select in trace display area with stylus.

NOTE

◆ When holding and moving marker with stylus, please apply adequate force or the

operation may not be successful. Please try several times to get used to it.

◆ Marker operation and re-analysis are not applicable to '.jpg" format trace.

◆ For more information, please refer to "Trace Analysis and Event Operation".

7.7 Information and Function Windows

Information and function windows are located at the bottom of OTDR interface.

Information includes: Event list, measurement parameters, markers information (A/B marker, marking points and etc.), trace parameters and trace information.

Information and function windows description:

Label	Function
Meas. Para.	Measurement parameters: Mode, Wavelength, Range, Pulse Width, Averaging Time and etc.
Events	Add event, modify event, delete event and analyze event.
Markers	A/B switch, move, lock, loss and reflection analysis.
Trace Para.	Trace testing parameters
Trace Info.	Cable and fiber information viewing and editing.

Tab. 7.1 Information and Function Windows Description

Note: For detail information, please refer to "Trace Analysis and Event Operation".

7.7.1 Switch Information and Function Windows

Click the labels of information and function windows to switch.

7.7.2 Events info reference

Click {**Events**} information window changes into events information.
Click [▲] and [▼] in scroll bars to look over events information.

7.7.3 Reanalyze

When not satisfied with threshold, change threshold, then reanalyze the trace by this function to get satisfactory trace.

Reanalyze the trace:

1. If possible, look over or reset threshold.
2. In {**Events**}, click **[Analyze]**, system will reanalyze the trace.

3. When the analysis finished, events list will show the new results.

NOTE

◆ Reanalyzing trace may cause added events are deleted, events revised are resumed, and events deleted come back etc.

◆ For more operation on events, please refer to "Trace Analysis and Event Operation".

7.8 Upload Trace to PC

On computer, user can manage the trace file flexibly.

Copy or move the trace to computer:

1. User can copy the saved trace to computer via USB by PC software
2. Or user can copy and move the saved trace to computer by mobile hard disk drive/ USB flash disk

For more operation, please refer to "Manage files and data"

7.9 Get help on OTDR

Click [**Help**] or "?" (HELP) to get detailed help, click " ↰ "(BACK) to exit.

8 Testing Optical Fiber in Auto Mode

8.1 Instruction of Auto Testing Mode

When don't know the optical fiber length, can simply use the auto testing function to get the trace and analyze.

After the auto mode started, OTDR will automatically estimate the optical fiber length, set sampling parameter, get trace and display the event list and etc.

Under Auto Mode, user can set follow parameters directly.

> ➢ The wavelength be used for testing(at least one wavelength)
> ➢ Testing time span

NOTE

After Auto mode started, according to the situation of optical fiber link which connecting the equipment, application program will estimate the optimum setting automatically and it will need around 5s. If the testing was cut off, any date won't be displayed.

CAUTION!

Except the specific light port (light port used for online testing), do not connect the optical fiber which load signal to the OTDR port, any external signal over **-30dBm** will affect the OTDR sampling and cause permanent damage to the OTDR.

8.2 The procedures of auto testing mode

Test and get trace in Auto mode:

1. Connect the optical fiber to the right OTDR light port.
2. Set parameter: set the "Range" to " AUTO".
3. Set testing time span.
4. Start testing: Use stylus click **[Start]** or press down the "▶/■" (Start/Stop) on front panel.
5. After test, can save the trace, check the trace, re-analyze the trace and etc. As to the

detailed operation way, please refer to relative paragraph previous.

<div style="border:1px solid green; display:inline-block;">**NOTE**</div>

◆ When testing automatically, Range is "AUTO".

◆ When setting the parameter, if the optical fiber parameter is not clear, can directly use the default value, but it may cause a bigger testing error.

9 Testing the optical fiber in Manual mode

Manual mode can set various test parameters more precisely.

The premise is know the general situation of optical fiber and then set parameters precisely and gets more ideal test result.

Correct parameters setting is the essential condition of optical fiber accurate measurement. So, when test manually, must set parameters according to requirements.

9.1 Common using parameters for OTDR testing

Following testing parameters displaying on {Meas. Para.} option card on the OTDR surface, users can set conveniently.

Parameter	Definition
Range	Distance range of the testing
Pulse Width	The width of laser pulse launched to optical fiber by OTDR
Averaging Time	Testing time, choose the proper testing time
Wavelength	Laser wavelength, testing laser wavelength selecting
Mode	Testing mode, testing mode selecting

Tab. 9.1 OTDR common use parameters sheet

9.2 OTDR test parameters Configuration

Testing parameters in this section should be set in "OTDR Setting", click **[Setup]** on the OTDR surface to enter.

These testing parameters include: Optical fiber general setting, analysis parameters setting and etc.

Parameter	Definition
IOR	IOR of optic fiber which affects the transmission speed of laser. Need to set separately according to working wavelength relatively
Scatter Coefficient	Also be called back scatter, which affects backward scatter power of laser in fiber.
Non Reflection Threshold	Also be called splice loss detecting threshold. Non reflection event with insertion loss greater than this threshold will be displayed on trace.

Parameter	Definition
Reflection Threshold	Also called reflectivity. Reflection events with insertion loss greater than this threshold will be displayed on trace.
End Threshold	Also be called optical fiber end detecting threshold. The first event with insertion loss greater than this threshold is identified as the end of fiber, and all following events will be ignored on trace.
Default	Revert to the values when leave factory

Tab. 9.2 OTDR test parameters setting sheet

9.3 OTDR display and other Configuration

It is including setting of save method, testing display area and etc. Parameters setting in this part won't affect the testing result.

Setting	Content
Display grid line	If be selected, the grid line will be displayed when trace be displayed, otherwise not be displayed.
Support multi traces	If be selected, then support multi trace testing and display, otherwise only test single trace and display.
navigator window	If be selected, there will be a trace navigator window on the upper right on the trace window, it's easier to check the contracted drawing of whole trace. Meanwhile, can check or move magnify the windows position. If not be selected, can't see the navigator window and system default select "navigator window".
Display the zoom toolbar	If be selected, there will be a zoom toolbar on the right side of the trace window; if not be selected, there will be no zoom toolbar but a bigger trace display zone.
length unit	Set the length unit displayed.

Tab. 9.3 OTDR display or other parameters setting

9.4 Real time and average test mode

Under sampling and accumulating condition, test mode has real time and average mode.

1. Under real time mode, instrument test the external optical fiber connection in real time and refresh display testing trace in real time. When instrument working under real time mode, user click [**Stop**] or press "▶/■"(Start/Stop) on front panel, the test will be stopped or the test will proceeding all the time.

2. Under average mode, instrument accumulate and average the testing data according to the time user choose, test time is equal or greater than test time user set, display the

result after the testing finished.

Under general condition, user chooses average mode will be ok.

Operating instructions

✔ Real time mode and average mode are controlled by **[Real time/Average] in {test setting}<test mode>.**

✔ When the button highlight display "Average", it means average mode; when button sag and display "Real time", it means real time mode.

✔ When click the button, it will change between average and real time.

9.5 Range Configuration

Under general condition, the Range setting is to select relative scope according to the optical fiber real length; it will guarantee the test accuracy.

Range options: Auto,1.3km, 2.5km, 5km, 10km, 20km, 40km, 80km   160km, 240km etc.

Operation:

Click on the right range settings.

NOTE

◆ "Auto" is Auto test mode of OTDR; select this function, OTDR will select a proper test range intelligently and the proper pulse width to test. The whole process no need user participate.

◆ Default value is "Auto".

9.6 Pulse Width Configuration

Pulse width selection affects the trace dynamic and resolution, select the smaller width to test can get a higher distance resolution and smaller dead zone, but the dynamic certainly damaged; oppositely, wider pulse width can get higher dynamic, test longer optical fiber, but it will affect the resolution and dead zone, the user must select between dynamic and dead zone.

Operation:

Click the pulse width number in pulse width parameter zone.

NOTE

◆ Default value: Auto

◆ When the distance range is "Auto", the pulse width will be "Auto", no need the

user to set.

◆ There will be different pulse width options according to different distance range.

9.7 Averaging Time Configuration

Test times affects the test trace SNR, the longer test time, the higher SNR and get a bigger dynamic; so, when test long distance optical fiber and check far end event, need to select longer test time.

Operation:

Click the time span number in time span zone.

NOTE

◆ Averaging time: Auto, Quick, 15s, 30s, 45s, 60s, 90s, 120s, 180s and etc.

◆ The default value is 60s

9.8 Laser Wavelength Configuration

Select certain single wavelength or multi select up to the entire wavelength.

NOTE

The effective wavelength will be different according to modules purchased.

9.9 IOR Setting

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 manufacturer, and it can be set to the accuracy of four digits after decimal point between 1.0000 and 1.9999.

9.10 Scatter Coefficient (Back Scatter) Setting

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

NOTE

Configuration zone is -10 to -70dB

9.11 Non-reflection Threshold (Splice Loss Detecting Threshold) Setting

This configuration has direct impact on the listing of insertion loss events. Only insertion loss event which is greater than this threshold will be listed.

> **NOTE** The default value is 0.20dB.

9.12 Reflection Threshold (Reflection Detecting Threshold) Setting

This configuration has direct impact on reflection events listing. Only event reflection which is greater than this threshold will be listed. The value configuration zone is -10dB to -65dB.

> **NOTE** The default value is -52.00dB

9.13 End Threshold (Optical Fiber End Detecting Threshold) Setting

This threshold is the end threshold of optic fiber. If the end threshold equals 3.0dB, then the first event with insertion loss greater than 3dB will be considered as the end of the optic fiber.

The value configuration zone is 0.0dB to 20.0dB.

> **NOTE** The default value is 3.00dB.

9.14 Load Default

In OTDR Setup surface, there are 3 "default" button, corresponding to IOR, scatter coefficient (back scatter), non-reflection threshold (splice loss detecting threshold), reflection threshold (reflection detecting threshold) and end threshold (optical fiber end detecting threshold).

10 Use OTDR Test FTTx-PON Network Optical Fiber Link

For FTTx-PON network optical fiber link, it's different from normal optical fiber link; and there is branching unit in link. So, it needs to know and notes follow items when use this instrument to test FTTx-PON network.

10.1 Use PON Optimized OTDR Instrument

Some models optimized specific to FTTx-PON network optical fiber link, can get fairly ideal result.

In order to get ideal result, it needs to correctly set distance range, end threshold (optical fiber end detecting threshold), reflection threshold (reflection detecting threshold) and etc.

10.2 Select the Proper Distance Range

As there is branching unit in FTTx-PON network optical fiber link, there will be a big attenuation event of tens dB, auto test may get a wrong distance. Suggest manually select the parameters like proper distance range, pulse width and etc according to the prescient optical fiber link length.

10.3 End Threshold (Optical Fiber End Detecting Threshold)

As there is branching unit in FTTx-PON network optical fiber link, there will be a big attenuation event of tens dB, if the end threshold configuration is not proper, end event may be analyzed inaccurate.

For normal optical fiber link, end threshold configuration can be 3.0dB, as to PON network optical fiber link with branching unit, it need to set the end threshold to a proper value and then OTDR can locate the end event correctly. Please refer to follow end threshold configuration sheet.

10.4 Test parameter recommendation value

Splitter type	Loss reference value	End threshold configuration reference value	Recommend test pulse width
1:8	≥9dB	12dB	100ns 300ns
1:16	≥12dB	15dB	100ns 300ns
1:32	≥15dB	18dB	300ns 1us
1:64	≥18dB	21dB	300ns 1us

Tab. 10.1 Recommended parameter values for PON network optical fiber link

11 Trace Analysis and Event Operation

11.1 Open Trace File

Open trace file:

1. Press down [**Open**] in button column in OTDR surface.

2. Select the file need to be opened in the files dialog box.

If necessary, change the file position to search saved files.

If necessary, click the scrollbar on the right side, check the listed files.

3. Click [**Open**] and the file opened.

If click [**Cancel**], the file can't be opened and quit dialog box.

4. The file name displayed on the surface top left.
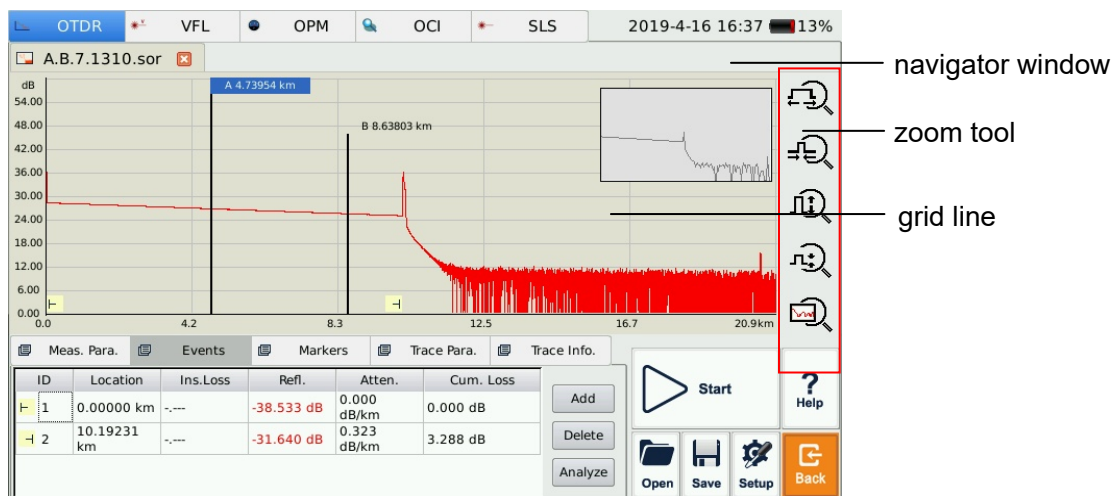
Fig. 11.1 Trace file opened

NOTE

◆ Check or open ".jpg" format trace file, please use the "File Explorer" in {Program}.
◆ Can't open bidirectional trace file on instrument. If need to, use the bidirectional analysis program provided by MTP-Suite which installed on computer.

11.2 Simultaneous Display Multi Traces

In order to let user compare trace files, OTDR support opening and displaying multi traces.

When open multi trace, current trace is red, the icon in front of the file name is red, other icons are grey.

Open single trace or multi trace, user need to set.

Open multi traces setting:

In OTDR **[Setup]**, in the options of test, select the "Support multi traces".

NOTE

System can open 4 traces at the same time. When need to open other traces, please close some opened traces.

11.3 Close Trace File

Close trace file:

Click **[Close trace]** button on the upper right corner of the interface to close the trace file.

NOTE

Using tip: when under single trace mode (none multi traces mode), open new trace will close the opened trace automatically, this will reduce the operating steps and make it easier to use.

11.4 Trace Display and Operating Instruction

After trace opened, application program will display the trace and analysis result in the trace window. The events on the trace will be marked by small icons, these events marked and display below the trace.

X axis shows the relative distance from the testing point.

The number on the Y axis shows the reflection power value (relative power) and its range.

After get the trace, the trace display parameters can be revised (like grid line and zoom window screen). Please refer to the paragraphs of "trace display parameters configuration"

NOTE

The content of trace window changes according to options changing. Some items of trace can be saw all the time, but other items displayed when select to display them or switch the options from one to another.

Event Options:

In {**Event**} options, there are various parameters of events listing, including event type, number, position, insert loss, reflection loss, attenuation and accumulation and etc.

When switch to {**Event}**, application program will display a marker on the tracing graph.

When some event in event list is selected, the marker will move to that event position and indicate.

When open multi trace, event options only display current trace.

Markers Options:

When switch to {**Markers**} options, application program display two Markers A and B, or include some gauge points. Particular cases depend on the function button in the button area.

Move these Markers along the trace to calculate loss, attenuation, reflection and etc.

Can use the buttons in Markers area to relocate all Markers and also can drag them in trace display window.

11.5 Switch And Move Markers

There are many ways can switch and move Markers, users can choose one from them or use them in combination way to increase efficiency.

➢ In trace displaying area, use stylus or mouse select A/B Markers or label above Markers, then can press and drag A/B move in the trace service area to the target position.

➢ In the buttons area on the bottom of surface, click [ ] to switch between A and B.

➢ After select Markers, continuously click [ ] or [ ] to move Markers.

➢ After select marked point, click [ ], [ ], towards left or right to move the Markers.

NOTE

◆ For easier using, the position of Markers will be remembered, when open OTDR and trace next time, the Markers will maintain the position operated last time.

◆ There is marked point when proceed the loss or reflection analysis.

11.6 Switch And Move the Marked Point

When proceed loss or reflection analysis, there will be marked point used for auxiliary test near the selected Markers.

There are various ways to switch, move the marked point, user can use one of them or use the combination to increase efficiency.

➢ Use stylus or mouse select marked point in the trace displaying area, then can press on and drag the marked point move in the trace service area to the target position.

➢ In the buttons area on the interface, click [ ] to switch circulated between the marked points under current Markers.

➢ After select the point, continuously click [ ] or [ ] can move the point.

NOTE

The points under each Marker in the process of movement:

◆ Marked points on the left side can't cross the Markers to the right side
◆ Marked points on the right side can't cross the Markers to the left side

11.7 Fast Move the Markers Outside the Window

When magnify the trace, Markers may be positioned outside of the window.

When the Markers on the left side outside the window, there will be a sign on the left margin of the window: A← or B←

When the Markers on the right side outside the window, there will be a sign on the right margin of the window: →A or →B

Drag the signs above mentioned can move the Markers in to current window.

11.8 Lock AB Markers

In the surface of {**Markers**}, press down [|**A-B**|], A and B Markers will be locked.
After AB Markers locked, when moving one Marker, the other one will move with it and the distance maintains the same.

For some special tests, this function may be more convenient.

NOTE

When one Markers move to the trace boundary, the distance between AB won't maintain. But it will revert when it's not on the trace boundary.

11.9 Zoom the Trace

In order to check the event or detail in the trace, it needs to zoom the trace.

System provide two ways to zoom the trace for easier use for the user:

1. Zoom the trace by cross frame, operation is smooth and fast
2. Use the zoom toolbar on the right side, operation is easier and directly perceived

NOTE

◆ After magnify operation, Markers may disappear from the current trace window
◆ Method 2, it needs to open the option of "display zoom toolbar"

11.10 Cross Frame to Zoom the Trace

In the trace display area, magnify the traces by cross frame from upper left to lower right.

In the trace display area, contract the trace from upper right to lower left.

Repeat above operation mentioned to magnify or contract the trace continuously.

NOTE

◆ Do not cross to the outside of the trace display area, otherwise the operation won't have a respond.

◆ The trace can't be magnify unlimited, it can't be magnified after a certain degree.

◆ The trace can't be contracted more after contracted to 1:1 size.

◆ Application program will maintain the zoom situation for further test and check of similar trace.

11.11 Use Zoom Toolbar to Zoom the Trace

On the right side of trace window, there is a zoom toolbar vertical ranked. Can use the zoom toolbar to zoom the trace to check the event detail on the trace.

NOTE

◆ Press the magnify button for the first time, trace window will display the trace in the middle.

◆ After the trace magnified, in order to move trace window, click the place outside the magnified area, trace window will move around this place. Also can use the direction key on the front panel to move the trace.

11.11.1 Revert the Whole Trace View

Click [   ] to revert the whole trace view.

11.11.2 Zoom In Trace Horizontally

Click [   ] to zoom in the trace horizontally.

11.11.3 Zoom Out Trace Horizontally

This function is to zoom out trace horizontally. Click [image] to zoom out trace.

11.11.4 Zoom In Trace Vertically

Click [[image]] to Zoom in trace vertically.

11.11.5 Zoom out Trace Vertically

Click [[image]] to Zoom out trace vertically.

11.12 Remember the Zoom Status Automatically

In the process of testing or opening trace, the magnified proportion and position will be remembered temporary. When test under the same distance once again, the magnified status of the window remain the same for continuous test.

NOTE

◆ When user turns off OTDR, the zoom info won't be reserved. Turn on OTDR again; trace window will revert to whole trace status.

◆ When user changes wavelength, pulse width and time, as long as the distance is not changed, auto memory of zoom status will be effective.

◆ When user changes the distance, trace window will revert to whole trace status.

11.13 Move the Magnified Trace Window

After the trace magnified, the trace window will only display part of the trace. There are two ways to move the trace window:

1. Use stylus to operate in navigation window.
2. Use 4 direction keys on the front panel to operate.

To move magnified trace window in the navigation window

In the navigation window, can see the position of current window on the whole magnified trace. Click some place outside the magnified area in the navigation window, trace window will move to the place correspondingly.

NOTE

In navigation window, if click the shadow region (display scope of magnified window), the operation invalid.

Use direction keys to move trace window

As to the magnified trace, press down the direction keys on the front panel, the trace window will move correspondingly.

➢ Click "△" , the trace window move upward

➢ Click" ▽ ", the trace window move downward

➢ Click "◁", the trace window move towards the left

➢ Click "▷ , the trace window move towards the right.

NOTE

When display the whole trace, the trace window can't be moved.

11.14 Operation of Event Options

Event sheet lists all the events tested on the trace. Event can be defined as point where optical transmission occurred change. Events are constituted loss which caused by transmission, splice, connector or crack. If event was not in the certain threshold, it was defect event.

	ID	Location	Ins.Loss	Refl.	Atten.	Cum. Loss	
Meas. Para.	Events	Markers	Trace Para.	Trace Info.			
⊢	1	0.00000 km	-.---	-38.533 dB	0.000 dB/km	0.000 dB	Add
⊣	2	10.19231 km	-.---	-31.640 dB	0.323 dB/km	3.288 dB	Delete
							Analyze

Fig. 11.2 Events options

As to every event in the even sheet, display follows info:

➤ Type: Different indicator used for different event type instruction. As to the detailed indicator instruction, please refer to the paragraphs previous.

➤ ID: Event number(one continuous number designated by OTDR application program).

➤ Location: Distance between OTDR and event or event and starting point of optical fiber link.

➤ Insert Loss: The loss of every event by unit of dB(calculated by application program).

➤ Reflection value: Calculated value for each event.

➤ Attenuation: The attenuation for each optical fiber length(loss/distance).

➤ Accumulation: The accumulating loss from the link starting point to the end of the link.

NOTE

Accumulating loss calculates the events listed in the event sheet and doesn't calculate the hidden events. About the more accurate link loss, please refer to the loss result displayed in {**Markers**}.

11.14.1 Display the Event on the Trace and Locate Event In Even Sheet

Through rolling the event sheet, user can check the relative info about all events tested on the trace. When an event selected, there will be Markers appear on the trace which above the event.

NOTE

◆ When the trace under magnification status, event and its Markers may not in the current window.

◆ It is better to locate event under whole trace status and then magnify to see the detail.

11.14.2 Add Event

User can insert event into event sheet at any time manually. For example, when there is a splice point on some given position, but as it hidden in the noise or the splice loss lower than the minimum value of non-reflection detecting threshold, then the analysis didn't test that point, this operation will be quite useful. User can manually add this event to the event sheet. This will add a number on the insertion position but won't modify the trace.

NOTE

Important Hint: When reanalyze the trace; the inserted event will be removed.

Add event:

1. Press[**Add**] on {**Event**} label;

Fig. 11.3 Add event

2. Fill in the event information in the add event dialog window.

Fig. 11.4 Add Event Dialog Window

3. Press [**Enter**] to save and back to main window after edit finished, the event will appear in the event list. If pressed [**Cancel**], it will quit without save.

NOTE

There are reflection event and non-reflection event for inserted event.

11.14.3 Delete event

Except following events, almost all of the events can be deleted from event sheet.

➤   Analysis finished

➤   Starting point of the link

➤   End point of the link

Important hint: The only way to recover the deleted items is to reanalyze the trace, like analyze new traces. Please refer to the part "analyze or reanalyze trace".

Delete event

1. Select the event need to be deleted
2. Click the {**Delete**} on the right side
3. Press "Yes" when the program hint or press "No" don't delete event and go back to main interface.

ID	Location	Ins.Loss	Refl.	Atten.	Cum. Loss	
⊢ 1	0.00000 km	-.---	-38.533 dB	0.000 dB/km	0.000 dB	Add
⊣ 2	10.19231 km	-.---	-31.640 dB	0.323 dB/km	3.288 dB	Delete
						Analyze

Meas. Para. Events Markers Trace Para. Trace Info.

Fig. 11.5 Delete Event

11.15 Analysis Detecting Threshold Configuration

In order to optimize the event detection, user can set follow analysis detecting threshold:

➢ Change non-reflection threshold (splice loss threshold): It can display or hide small non reflection event.

➢ Change the reflection threshold (Reflection threshold): It can hide the fake reflection event caused by noise, turn the harmless reflection event to loss event or check the event which may cause damage to network and other optical fiber equipment.

➢ Change the finish threshold (optical fiber end threshold): It can analyze the important loss event (like breakpoint) and stop the event analysis after that event.

"Auto" mode and "Manual" mode can use these thresholds.

Set analysis detecting threshold

1. Press [**Setup**] in the button area which in the lower right area to enter setting surface.

2. Set these parameters in the parameters analysis part. In the relative edit frame, enter value needed or press [**Default**] revert the default value.
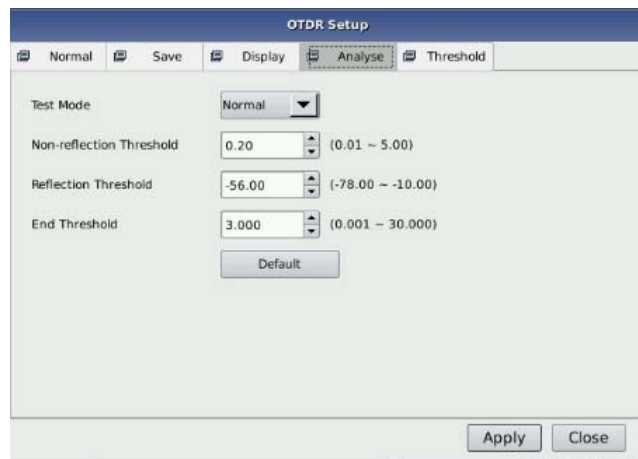
Fig. 11.6 Parameters analysis edit frame

3. Press [**OK**] to save setting and then quit setting surface; If press **[Close]**, it will quit without setting saved.

NOTE

Analysis detecting threshold just set will used for trace tested after the set and reanalysis of the trace.

11.16 Reanalyze the Trace

User can reanalyze the trace. Reanalyze the trace has follow effects:

➢ Create new event sheet for trace.

➢ Reanalyze the trace got by the software of latest version.

➢ Re-found the original event sheet (if the event sheet has been modified).

NOTE

Application program will analyze the newest tested trace. User can check the analytic result in the event options.

Reanalyze the trace:

1. In the [**Event**] options, press [**Analysis**], it will reanalyze the whole trace;
2. After analysis finished, the new analytic result will be listed in the event sheet.

NOTE

◆ If user wished to find some new events or filter some events he didn't pay attention, please change the analysis detecting threshold first and then to proceed the analysis.

◆ Effected by instrument features or detecting threshold, the analytic result may be inconsistent to the result user preconceive.

11.17 Analyze the Optical Fiber in Specific Optical Fiber Link

As to the PON optical fiber link which has splitter, it need set the proper finish threshold (optical fiber end detecting threshold) to analyze the end event which through the splitter. Please refer to the sheet "Recommend parameters value of PON network optical fiber link". Please change the analysis detecting threshold first and then to analyze. This will analyze some events after splitter correctly.

11.18 Set Trace Display Parameter

User can modify following trace display options before or after the test and trace opened:

➢ Grid line: It can display or hide the grid line displayed on the Fig background; it will display the grid line under default status.

➢ Navigation window: It can display or hide the window which used for whole trace survey on the upper right position of the trace window.

➢ Length unit: it can select the length unit will be used in the whole application program.

Before the trace opened, it can change following trace display options:

➢ Multi traces: Control whether to open multi traces at the same time

> ➢ Zoom toolbar: It can display or hide the zoom icon area which on the right side; will get maximized trace display area after hide the zoom toolbar. The zoom toolbar is displayed under default status.

NOTE

For the first time entering OTDR functions surface, the help information for simple operation displayed in the trace area and can't see the navigation window and grid line. Only after test or after the trace opened can see the grid line and navigation window.

To set the trace display parameters:

1. To press [**Setup**] in the button bar which on the lower right of the OTDR menu.
2. In the options of test display area, select and modify the display options.
3. Press [**Application**] and make change become effective, then quit the setting dialog box; or press [**Cancel**] to quit the setting dialog box without setting save.

Fig. 11.7 Options of test display area

NOTE

To hide or display the zoom toolbar must turn off all the trace opened. Otherwise the setting won't go into effect.

11.19 Set the Length Unit

In the OTDR parameters setting dialog box, select the length unit in the test display area options. The unit can be meter, feet or mile.

NOTE

- ◆ The default length unit is meter.
- ◆ Some certain values such as pulse width, wavelength and etc won't change along with the distance. Pulse indicated by second, wavelength indicated by nm.
- ◆ When select m as length unit, system will display km in some place.
- ◆ When select ft as length unit, system will display kft in some place.
- ◆ When select mi as length unit, system will display kmi in some place.

11.20 Display or Switch the Trace

In the OTDR test application program, when opened multi trace, there are two ways to switch the displayed trace:

1. To hide or display the trace: click the file name label on the upper left.
2. Or click the [✖ **close trace**] on the surface upper right to close current trace.

11.21 Check Current Trace Parameters

Check current trace information on {**Trace Info.**} label.
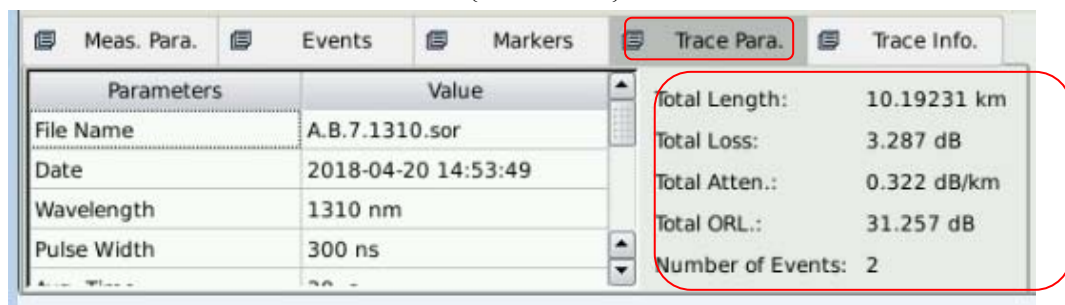
Fig. 11.8 Check the trace parameters

The content displayed is shown below:

File name, save date and time, test wavelength, test pulse width, test time, test distance, total loss, average loss.

- ➢ File name: The name of current trace.

➢ Date: Date and time of test.

➢ Wavelength: Laser wavelength used for test.

➢ Pulse width: Laser pulse width used for sampling.

➢ Averaging time: Continuous sampling time.

➢ Range: Distance used for test.

➢ Link length: The length of optical fiber link calculated after test.

➢ Link loss: The total loss of the link starting point to the link end.

➢ Link attenuation: Average loss of the total link, indicated as function of distance.

➢ Event quantity: Total events number got from current trace analysis which is according to test parameters

The content displayed on the right:

IOR, back scatter, splice threshold, reflection threshold, end detecting threshold.

➢ IOR: Indicate the trace IOR (also called group coefficient). If modify this parameter, it will adjust the trace distance test.

➢ Back scatter: Rayleigh back scatter parameter setting of the displayed trace.

➢ Non-reflection threshold: Check the current setting of small non reflection event during the trace analyzing.

➢ Reflection threshold: Check the current setting of small reflection event during the trace analyzing.

➢ End threshold: Check the current setting of the loss of important events(will affect the transmission performance during the trace analyzing)

NOTE

Trace parameters options only displays the selected trace even multi traces are opened. Please switch to the trace if you want to display the parameters of other traces. The trace selected is in red color.

12 Manual Trace Analysis

User can use markers and zoom tools to measure splice loss, attenuation and reflection, or use markers to locate event position and relative power level.

12.1 Use Markers

Click {**Markers**} label in OTDR main interface to activate markers.

12.2 Event Location and Loss Information

OTDR application automatically calculates event location and display the location in events list. User can manually check event location and distance between events. Loss information can be also displayed. The X-axis represents distance and Y-axis represents relative power.

Fig. 12.1 Event location and loss information

To acquire event location and loss information

1. Click {**Markers**} label in OTDR main interface.
2. Place marker A or B to at the beginning of the event, the marker label will show distance.
3. Fig 12.1 shows the insertion loss of current marker and A-B loss.

12.3 Measure Insertion Loss (2-point and 5-point method)

Insertion loss (unit: dB) is calculated by measuring the signal level of Rayleigh backscatter (RBS) and the magnitude of reduction. Insertion loss can be created by reflection and non-reflection events.

System calculates real timely the loss between Marker A and B, and also calculates the insertion loss at Marker A or B. Insertion loss is calculated in 5-point method.

2-point method (A-B Loss):

Insertion loss is calculated as shown in Fig. 12.2.

Fig. 12.2 2-point Loss

2-point method is suitable for measuring splice loss but not applicable to measuring reflection events.

NOTE

- ◆ "A-B Loss" is for quick loss measurement of certain segment of the fiber marked between Marker A and B.
- ◆ ""A-B Loss" is not applicable to measuring reflection events.

5-point method to measure event loss:

Event loss is measured by 5-point method. When the [**Loss**] button in "Markers" Label is not pressed, the marking points used by 5-point method will not display; however, the system use 5-point method by default.

When apply 5-point method manually, the marker and its related 4 marking points divide the trace around the event into 2 areas: the left to the active marker and the right to the marker, the 2 marking points on the left and the 2 on the right both form a straight line, move the two lines close to the event center and the power difference between the two lines is the event insertion loss.

It also applies to the measurement of point A's or B's insertion loss.

Fig.12.3 5-point method

When [**Loss]** button is pressed, OTDR will show the marking points to measure the event loss. When Marker A is selected, the screen will display the 4 marking points related to Marker A.

When Marker B is selected, the screen will display the 4 marking points related to Marker B. The Markers and marking points can move separately.

The procedure to apply 5-point method:

1. In the main interface of OTDR OTDR module, click "**Markers**" label;

2. Press **[Loss]** button, Marker A, Marker B and their related marking points will be displayed on the trace;

3. Zoom the trace to view the event clearly, move Marker A to the end of linear part of the trace before the event;

4. Move the first marking point to the beginning of the linear part of the trace before the event;

5. Move the second marking point to the end of the linear part of the trace before the event;

6. Move the third marking point to the beginning of the linear part of the trace after the event;

7. Move the fourth marking point to the end of the linear part of the trace after the event;
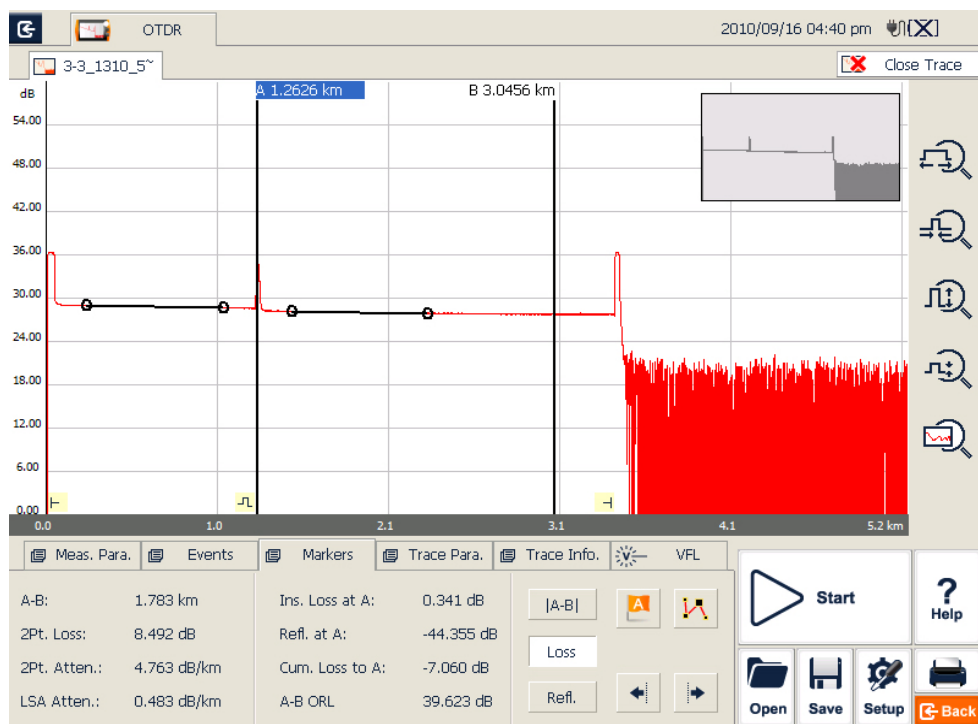
Fig. 12.4 Measure insertion loss in 5-point method

NOTE

◆ The marking points on the left of the active marker cannot be moved the right and vice versa.

◆ The loss showed in the Event List is measured by 5-point method.

12.4 Measure Attenuation (2-point and LSA method)

2-point method measures the attenuation between Marker A and B calculated by all the loss over the distance between Marker A and B (Unit: dB/Km). Use only these two points to calculate and the average value does not exist.

LSA (least-squares approximation) method uses linear regressions that is applied to the backscatter before and after an event (Between Marker A and B) to estimate the attenuation in the backscatter resulting from the event's loss. LSA method only measures the amplitude (decibel) change between the crossing points of the trace with Marker A and B.

Compared to 2-point method, LSA method is more accurate because it is less sensitive to trace noise and suitable for measuring splice attenuation. However, LSA method should not be applied to measure attenuation when there are reflection events between Marker A and B.

Measure attenuation:

1. Click **{Markers}** label in OTDR main interface to show Marker A and B.
2. Place Marker A and B at different points on trace.
3. Zoom in the trace to adjust marker position when necessary.
4. Check 2Pt. Atten. (2-point attenuation) and LSA Atten. (LSA attenuation) values, as shown in Fig. 12.5.

📋 Meas. Para.	📋 Events	📋 Markers	📋 Trace Para.	📋 Trace Info.	
A-B:	3.89849 km	Ins. Loss at A:	0.003 dB	|A-B|	
2Pt.Loss:	1.269 dB	Refl. at A:	-.------	Loss	
2Pt.Atten.:	0.326 dB/km	Cum. Loss to A:	1.524 dB		
LSA Atten.:	0.326 dB/km	A-B ORL:	36.819 dB	Refl.	
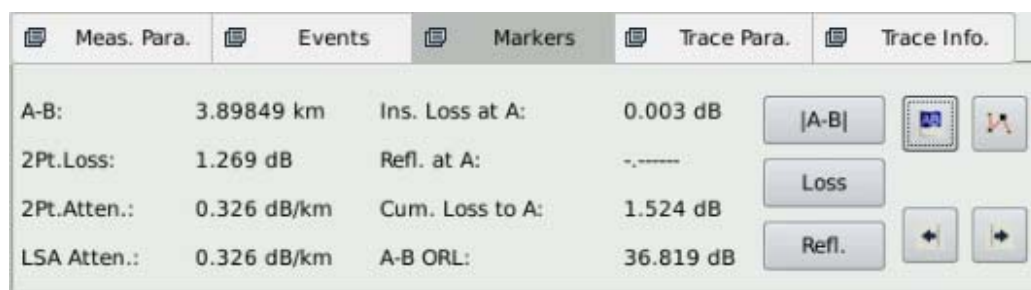
Fig. 12.5 View attenuation

NOTE

There should not be any event between Marker A and B when measuring attenuation with 2-point method.

12.5 Measure Reflectance

Reflectance is the ratio of reflected power (Pr) to incident power (Pi) of an event (such as a connector).

Reflectance = 10 log (Pr/Pi).

1. Click {**Markers**} label in OTDR main interface to show Marker A and B.
2. Click [**Refl.**] button to show marking points.
3. Before measurement, zoom in the trace and place Marker A to the end of linear part of the trace before the event.
4. Move the first marking point to the beginning of the linear part of the trace before the event and Marker A.
5. Move the second marking point to the end of the linear part of the trace before the event and Marker A.
6. Place the marking point behind Marker A to the peak of the reflection event to be measured.
7. View the reflectance.

> **NOTE**

Above process is applicable to measuring all reflection events' reflectance even they are very close to each other.
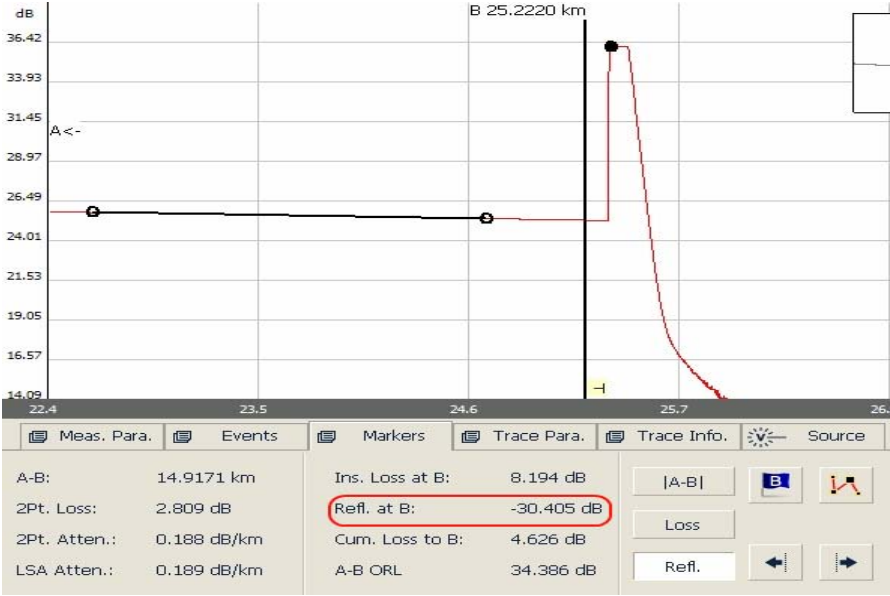
Fig 12.6 Measure reflectance

NOTE

For non-reflection events, reflectance will show as "-----"

13 Trace File Management

User can save, open, rename and delete trace file after acquisition.

User can save and open trace file in OTDR main interface.

User can rename, copy, move and delete file in **File Explorer**.

13.1 Save Trace in Different Formats

In OTDR main interface, user can choose trace saving format as Bellcore (.sor) or JPEG (.jpg).

If saving trace as other formats, user should copy the trace file to the PC and use the OTDR Trace Manager of MTP-Suite, which has installed on the PC, to select other formats.

13.2 Copy, Move, Rename and Delete Trace

There are two ways to copy, move, rename and delete trace.

Method one: Though **File Explorer:**

A. In OTDR main interface, click {**Program**} label and click **[File Explorer]** icon as shown in Fig 13.1:
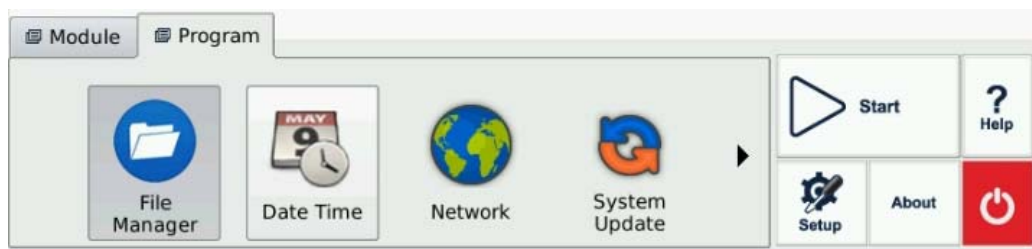
Fig 13.1 File explorer

B. Click [**Start**] button or press ▶/■ (Start/Stop) button on front panel to enter File Explorer.

C. Copy, move, rename and delete trace.

D. After operation, click [×] button to return to main interface.

NOTE

◆ User can move, rename and delete files saved in SD card but the disk itself cannot be moved, renamed or deleted.

◆ For more information, please refer to the Help file on OTDR.

Method two: User can connect OTDR to PC, OTDR will be recognized as a mobile device. User can copy, move, rename and delete files in PC's Windows System.

13.3 Check Disk Space

User can check disk space utilization status (used space and free space) in **File Explorer**:

1. Enter **About** in OTDR main interface.
2. Select Platform..
3. "SD Card" space utilization status is shown below:
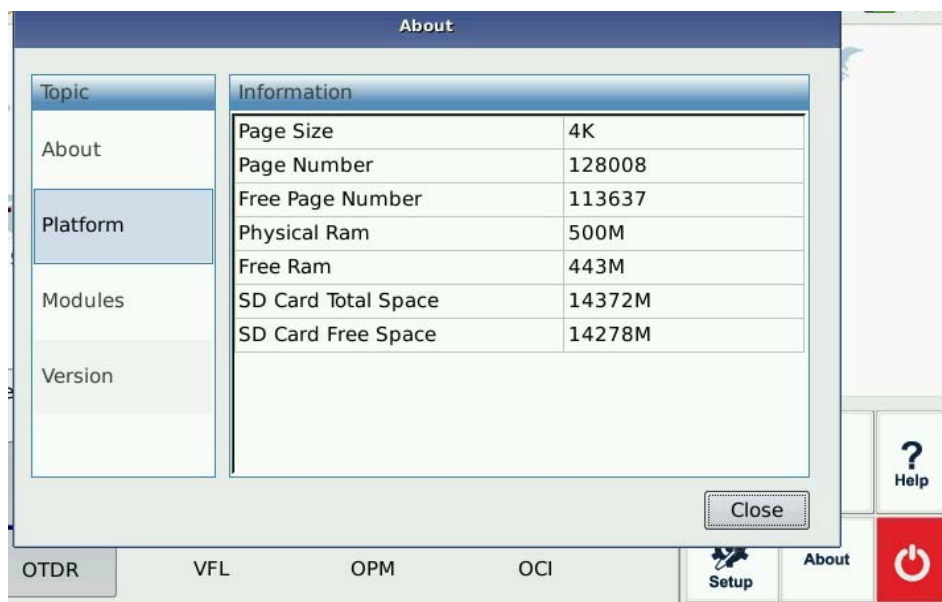
Fig. 13.2 Check disk space utilization

4. Click "Close" to exit disk properties.

NOTE

It's suggested to check disk space utilization status from time to time and transfer or back up files to avoid insufficient disk space when OTDR is in use.

14 Print OTDR Report

User can manage saved trace files in OTDR and print report.

For reference and report printing, it is necessary to manage and update trace information.

14.1 Trace Information

After trace acquisition, user can add or update tested fiber information which includes: Cable ID, Fiber ID, Fiber Type, Start Location, End Location and Operator.

Adding or updating the information can be completed in {**Trace Info.**}.

14.2 Check and Edit Trace Information

User can check and edit trace information in {**Trace Info.**} function window.

When newly tested trace is saved, the trace is saved with above information.

User can also edit saved trace information and save the trace with updated information.

NOTE

◆ After editing trace information of a saved trace, the updated trace file name will show a star sign ("*") to indicate the change. If user closes the editing window without saving, system will promote user to save.

◆ The update to trace information is only effective to current active trace in Multi-trace display mode.

◆ Editing trace information does not affect measurement parameters and result.

Edit and save trace information:

1. Click {**Trace Info.**} label in OTDR main interface.
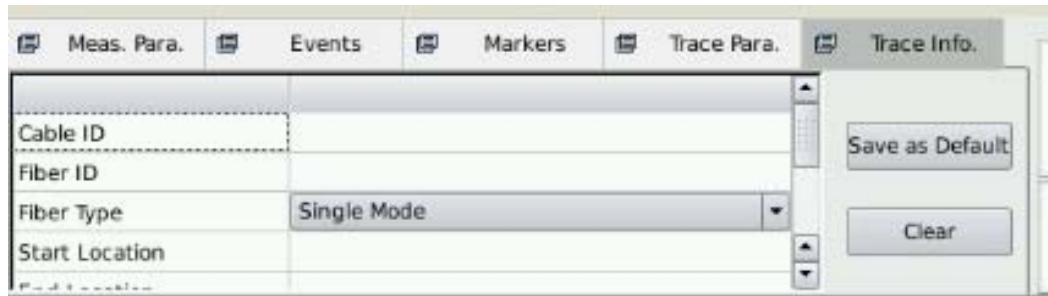
Fig. 14.1 Trace information and editing

2. Input trace information in the pop-up window.

3. Click **[Save]** button in OTDR main interface to save the trace again and the updated information will be saved with the trace file.

4. Can use the same steps to view or change the trace information at any time.

NOTE

◆ Edited and saved trace can be used as a template for user's later reference.

◆ User can also use MTP-Suite to edit and save trace information.

15 OTDR Module Built-in Stabilized Laser Source LS100

Enter Module-SLS.

interface is shown as Fig 15.1
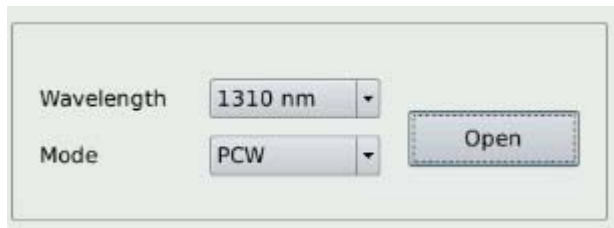
Fig.15.1

"Wavelength": Same as the wavelength of OTDR, wavelengths can be selectable.

"Mode": Select different modes at PCW, 1KHz, 2KHz, 1KHz+Flash, 2KHz+Flash.

After the setup, click **[Open]** button to start the measurement. Click **[Stop]** button to stop the measurement.

NOTE

The function icon turns red while switching on this function module.

16 OTDR Module Built-in Optical Power Meter PM100

Optical power meter operation:

Click "OPM" icon to enter Optical Power Meter interface as shown in Fig 16.1.
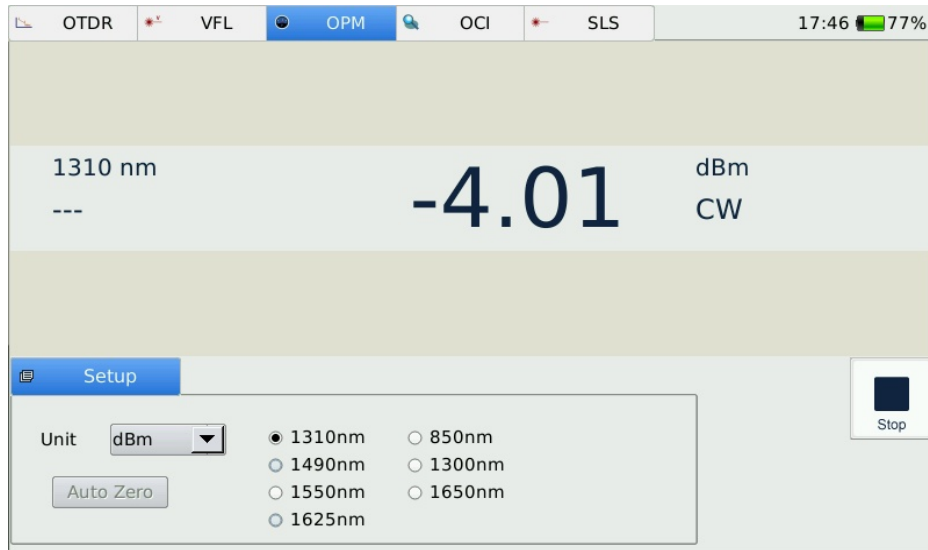
Fig. 16.1 Optical Power Meter

After the setup, click [**Start**] button to start the measurement. Click **[Stop]** button to stop the measurement.

NOTE

◆ The function icon turns red while switching on this function module.

"**Unit**": Shift between dBm and W.
"**Auto zero**": This function provides an easy method of auto zero of power meter, which can be used to rectify the instrument's power value under non-luminous state in daily testing.

NOTE

Put protective cap on optical power testing output, and ensure that the tie-in is completely airproof.

"**Wavelength**": Support 850, 1300, 1310, 1490, 1550, 1625, 1650nm wavelengths selectable.

NOTE

PM100 is only available with the OTDR module built-in PM100. With PM100, OTDR port will issue a special modulation signal.

CAUTION!

Except the specific light port (light port used for online testing), do not connect the optical fiber which load signal to the OTDR port, any external signal over **-30dBm** will affect the

OTDR sampling and cause permanent damage to the OTDR.

OTDR built-in source:

1. Clean connector properly.

2. Connect tested fiber to OTDR port.

3. Click {**Source/VFL**} in OTDR main interface.

4. Select the suitable wavelength.

5. Select the modulation.

6. Press the **[Open Source]** in the {**Source/VFL**}.

7. Press the **[Close Source]** to break off the source.

NOTE

◆ If there is only one wavelength, the default is to select this wavelength.

◆ Under the modulation for loss measurement, please select the CW.

◆ Under the modulation for fiber identification, please select the **1kHz** or **2kHz**.

◆ For fiber identification easily, OTDR also offers a blink mode. When user select the blink mode, modulating signal (**1kHz** or **2kHz**) will be emitted in 1s, then the next 1s signal will be closed, and then will be emitted in next 1s, and so on. User can select **1kHz+Blink** or **2kHz+Blink** for the Blink Mode.

17 VFL Application

The built-in VFL of OTDR module can shoot red laser into the tested fiber, the red laser will glow at the marco bend, breaking points and bare fiber end.

The maximum detection range for OTDR VFL is over 5Km, it is a practical tool for fiber identification, detecting and highlighting breaks, tight bends, splices or defective connectors in optical fibers.

VFL is a perfect complementary tool to OTDR for its visualized detecting method in close range like OTDR dead zone.

Fault locating with VFL:

Clean connector properly.

Connect tested fiber to VFL port.

Click { ![icon] **Source**} in OTDR main interface.

Check "CW" option to emitter laser continuously or check "Flash" to emitter modulated laser at 1Hz.

Press [**VFL On**] button to start VFL and the { ![icon] **Source**} icon will turn orange.

When VFL is working, press [**VFL Off**] to turn off VFL and the { ![icon] **Source**} icon will turn back to grey.

Fig. 17.1 VFL operation

18 OCI (Optical Connector Inspector) of MCI100

MCI100 Optical Connector Inspector (OCI) can display connector surface enlarged view and find dirty or damaged connector. It is convent for the operator to view the connector and remove any hidden troubles,which may affect the transmission quality.

Optical fiber end face microscope connects the OCI by USB, and LCD displays the fiber end image. Then user can judge it qualified or not. In order to meet different tests, MCI100 offers kinds of specifications of male and female port adapter, including SC, FC, LC, MU and etc.

MCI100 support the following video fiber inspection probe for common functions:

- ➢ Zoom in control: Support 200x and 400x.
- ➢ Focus control: Fine tuning display quality.
- ➢ Image capture: Can capture and save the image which displays in the LCD.

NOTE

MCI100 is only available with the OTDR module built-in MCI100.

18.1 Inspect the Optical Connector

1. Connect the probe to the USB port.
2. Test fiber inserts the probe connector (Please select a suitable size connector).
3. Click "OCI" icon to enter Optical Connector Inspector interface as shown in Fig 18.1.
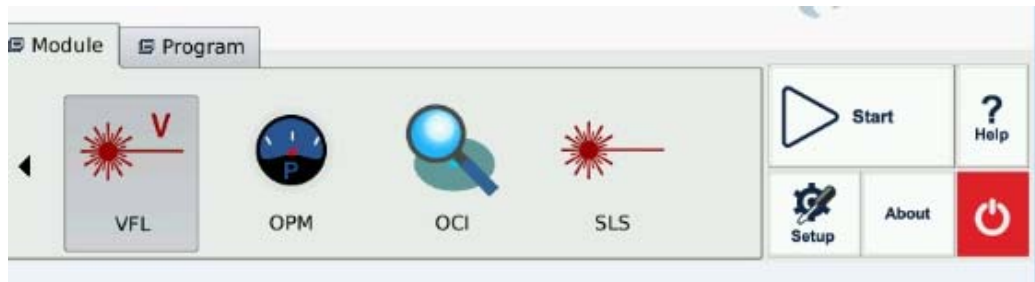
Fig. 18.1 Optical Connector Inspector Interface

4. Click **[Start]** button or Press "▶/■" Start/Stop button on OTDR front panel to start the measurement. As shown in Fig 18.2

Fig. 18.2 Measurement

5.Click **[Stop]** button or Re-Press " ▶/■ "   Start/Stop   button on OTDR front panel to stop the measurement.

6. Exit this OCI interface: Click the exit button in the upper left corner; it will back to the main interface.

NOTE

◆ In order to obtain a clear image, user needs to adjust focal length of probe and the brightness and contrast of image.

◆ If the probe is connected to the OCI before starting the application, user has to restart the application to Initializes.

18.2 Focus Control

Control the focus by the focus control knob in the probe.

18.3 Capture Image

Inspection the fiber connector, user can capture images and save images in BMP formats. Capture images can be view in the OCI or be sent to the PC to make a report.

Capture Image:

1. Press [**Start**] button, and view the image. Then adjust the focus, brightness and contrast until satisfied with the image.

2. Press [**Save**] button capture images and enter the save file dialog box.

3. Choose the file name and save location.

4. Press [OK] button to save the image and back to the main interface.

18.4 View the saved Image

1. Click the file manger of main interface program.

2. Open the folder which saves the capture image.

3. Double click the capture image file which you want to view.

4. Press the [File] <OFF> to exit the file manager after you are finished.

19 VPN Function

User can select VPN function, as following:
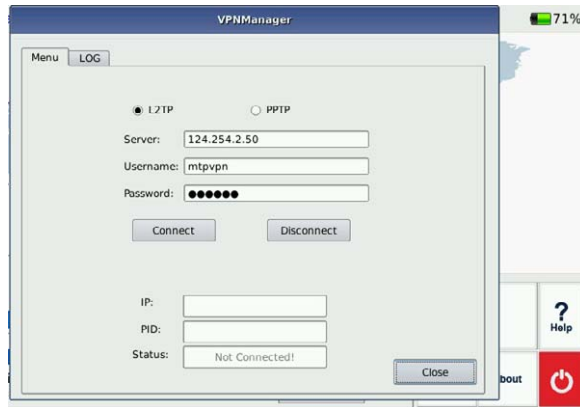
Fig. 19.1 VPN Function

20 File Management

User can directly copy, move, rename and delete file or folder on OTDR.

Files can also be exchanged between OTDR and external storage devices like USB flash disk, USB hard drive and PC.

OTDR is equipped with two types of USB ports:

> USB host (Type A, for connecting to USB storage devices.

20.1 Transfer Files or Folders between OTDR and USB Storage Device

1. Connect USB storage device to OTDR USB port.
2. Click [**File Explorer]** icon on {**Program**} label to enter **File Explorer** where active drives including USB drives and folders are displayed for file management.
3. After file transfer, user can directly unplug the USB storage device from OTDR.

NOTE

In case USB storage device is not shown in **File Explorer**, please close **File Explorer** and enter again.

20.2 Delete Saved Files

1. Click **File Explorer** icon on {**Program**} label to enter **File Explorer**.
2. Select the files or folders to be deleted.
3. Click "Delete" in "File" menu to delete.

21 Maintenance and Calibration

21.1 Cleaning of Optical 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.

21.2 Necessity of Cleaning

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

In addition, power density may burn dust into optic fiber and induce further damage (for example, 0dBm optic power may produce about $16,000,000W/m^2$ power density in single mode fiber). In this case, measurement will be inaccurate and irreversible.

21.3 Safety Instructions before Cleaning

1. Make sure OTDR is power off when cleaning

2. Any operations contradict to the instructions may result in dangerous laser injuries.

3. Make sure laser source is off, when cleaning any optic connectors

4. When OTDR is in operation, please always avoid looking directly into optic output. Although laser radiation is invisible, it may do serious injury to eyesight.

5. Be cautious of electric shock and make sure AC power is disconnected with OTDR before cleaning. Always use dry or moist soft cloth to clean the outside of OTDR, and never clean the inside

6. Please do not add any accessory to optic instrument or adjust OTDR at discretion.

7. For maintenance, always go to qualified or certified professionals

21.4 Cleaning Tools

1. Optic fiber cleaner (for cleaning of optic connectors)

2.   Optic fiber cleaning rod (for cleaning of optic outputs)

3.   Optic fiber cleaning tissue (for cleaning optic interfaces)

4.   Isopropyl alcohol

5.   Cotton ball

6.   Paper tissue

7.   Cleaning brush

8.   Condensed air

21.5 Cleaning Procedure

1.   Screw off the cap of flange
2.   Clean the laser head carefully
3.   Screw on the cap of flange

21.6 Battery Charging Instructions

Typically, OTDR Lithium battery supports over 7 hours continuous working.

Charging status is indicated in system main interface and OTDR front panel indicator.

1. In system main interface, charging status is displayed in the right upper corner.

Icon	Description
	DC input is on
70%	Battery remaining power

2. Front panel charging indicator ( ) also indicated charging status (Please refer to 1.4 Front Panel Indicators Introduction).

21.7 Battery Instruction

NOTE

◆   New battery is not fully charged, please charge the battery before the first time use which takes approximately 3 hours.

◆   Charging time is subject to the type of functional modules in use, environment and etc.

◆ After the battery is used for some time, its capacity may not match charging status indication (e.g. charging indicator indicates full but OTDR may power off due to low battery), then battery calibration is necessary (Please refer to 20.9 Battery Calibration).

WARNING!

◆ Please do not store battery in the environment where temperature is over 60℃

(140F).
◆ Use specified charger to charge the battery.

21.8 Charge Battery

Plug the charger to OTDR and power outlet, charging process automatically starts and finishes after battery is fully charged.

21.9 Battery Calibration

After the battery is used for some time, the battery gauge may not be accurate, e.g. it indicates battery has run out but the battery can still provide power supply, or battery power is zero, but the battery power can last a long time. Then the battery should be re-calibrated.
Procedure:

1. Run out of the battery completely.
2. Charge the battery until fully charged.

21.10 Change Battery

1. Power Off OTDR and unplug power adaptor.
2. Open the battery dock cover.
3. Change battery.
4. Close the battery dock cover.

NOTE

◆ Please note if the power indicator on front panel is off before changing battery; make sure OTDR is completely off before changing battery.

◆ Only factory can change clock battery.

21.11 Calibration Requirements

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

21.12 Shipment

During shipment, please keep OTDR in prescribed temperature range.

Please note following points to protect OTDR during shipment:

➢ Use original packing materials.

➢ Avoid excessive temperature and humidity change.

➢ Avoid direct exposure to sunlight.

➢ Avoid shock and vibration.

22 Troubleshooting

22.1 Common Problems and Solutions

Problem	Possible Reason	Solution
Power on failure	Battery power run out	◆ Charge the battery. ◆ Change a new battery. ◆ Connect OTDR to external power supply.
	External power supply is not connected	Connect OTDR to external power supply.
	External power supply is unplugged	Make sure external power supply is well connected on both ends.
	Battery dock cover is not closed properly	Close the battery dock cover properly.
Black Screen	Screen backlight is off, but power indicator is on.	Press any key to exit power saving mode.
	Battery run out, OTDR is off, power indicator is off.	◆ Charge the battery. ◆ Change a new battery. ◆ Connect OTDR to external power supply.
External keypad no response	External keypad is not recognized.	◆ Unplug the keypad and re-plug ◆ Power off OTDR, plug keypad and power on OTDR again.
External mouse no response	External mouse is not recognized.	◆ Unplug the mouse and re-plug ◆ Power off OTDR, plug mouse and power on OTDR again.
Screen display blurs	Brightness is not set properly.	Adjust brightness
Application no response	Problem error.	Restart OTDR and run the application again.
Operation time is short	Battery run out.	Change the battery.
	Battery is not fully charged.	◆ Charge the battery. ◆ Re-calibrate the battery.
Touch screen is not responding properly	Touch screen larger deviation	Connect external USB mouse to calibrate the stylus.

with stylus		
OTDR indicates low battery after battery is fully charged	Battery is not fully charged.	Re-calibrate the battery

Tab. 21.1 Common Problems and Solutions

22.2 Trace Measurement Problems and Solutions

Problem	Possible Reason	Solution
Expected events are not shown in the trace	Events are too close to each other.	◆ Try again with short pulse width ◆ Try testing from the other end of the fiber
	SNR is poor	Try again with wide pulse width or increase averaging time.
	Wrong configuration	Check OTDR parameters, such as Reflection threshold, non-reflection threshold and end threshold; and then re-analyze or test again.
Special events appear at the end of the trace	Wrong configuration, e.g. wrong end threshold setting.	Adjust configuration and test again.
	The fiber under test is too long to exceed the range.	Select proper range and test again.

Tab. 21.2 Trace Measurement Problems and Solutions

22.3 Finding Information on Promax Website

Promax (http://www.promaxelectronics.com/ing/) provides FAQ (Frequency Asked Questions) about the OTDR.

1. Type http://www.promaxelectronics.com/ing/ in the address bar of browser.
2. Press the [Service and Support] TAB COBTROL. .
3. Click the FAQ, and then Associated with searchable list of questions.

The web of Promax also provides the latest technical specifications of products.

23 Warranty

23.1 Terms of Warranty

All Promax products are 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 PROMAX free of charge. In no case will POMAX liabilities exceed the original purchase price of the product.

23.2 Exclusion

The warranty on your equipment shall not apply to defects resulting from the following:
- ➢ Unauthorized repair or modification
- ➢ Misuse, negligence, or accident

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

23.3 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 PROMAX to ensure proper initiation of your warranty term and scope of your warranty.

23.4 Returning Instruments

To return instrument for reasons of yearly calibration or other, please contact the local Customer Service Center of PROMAX 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 OTDR in the case of repair, calibration or other maintenance, please note the following:
- ➢ Be sure to pack OTDR with soft cushion like Polyethylene, so as to protect the shell of OTDR.
- ➢ Please use the original hard packing box. If use other packing material, please ensure at least 3 cm soft material around OTDR.
- ➢ 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 our local representative or directly to us in a reliable way.

23.5 Contacting Customer Service

Please check our web site for updates to this manual and additional application information. If you need technical or sales support, please contact local PROMAX Customer Service.

PROMAX ELECTRONICA S. L.

Tel : (34) 93 184 77 00

Fax : (34) 93 338 11 26

http://www.promaxelectronics.com/ing/

THANK YOU