PROLITE-45
Multi-functional OTDR

User's Manual

PROMAX

PROLITE-45
Multi-functional OTDR

CE

Notices

Warranty

The material contained in this document is subject to change without notice. PROMAX makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. PROMAX shall not be liable for errors contained herein or for incidental or consequential damages in connection with furnishing, performance, or use of this material.
The battery is a consumable part and is not subject to the PROLITE-45 warranty.

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

This instrument (without AC/DC adapter) is a Class I safety equipment, suitable for use at maximum relative humidity is 95%. For AC power supply voltage requirements and operating environment temperature, please refer to the technical index table.

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. The external power supply for PROLITE-45 is DC 5V/2A.

Do Not Operate in an Explosive Atmosphere

Do not operate PROLITE-45 in the presence of flammable gases or fumes.

Do Not Remove the Cover of Tester

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel.
Instrument that appears damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Safety Terms Used in This Manual

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

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

Laser Safety Announcements

WARNING!

PROLITE-45 is a laser instrument. Users should avoid looking directly into the optic output.

- Always avoid looking directly into the optical output port, when PROLITE-45 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 PROLITE-45 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 PROLITE-45 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 PROLITE-45 power is cut off; the capacity in PROLITE-45 might be electrified in some time after that.

Agreement and Statement

Button or Menu: The operating units in GUI that can be clicked by finger or capacitive pen, indicated by letters in square brackets, e.g. **[Expert OTDR]**, **[File Manager]**, etc.

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

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”.

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

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1General Information

1.1 Scope of this Manual

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

This manual contains the necessary information for proper operation and maintenance of PROLITE-45, troubleshooting instructions as well as information regarding obtaining services.

1.2 Introduction

PROLITE-45 OTDR are the compact multi-functional OTDR with combination of optical fiber testing and RJ45 cable testing functions together which includes Auto OTDR, Expert OTDR, Link Image, Optical Power Meter, Stabilized Laser Source, Optical Loss Test, Visual Fault Locator, RJ45 Cable Length, RJ45 Cable Sequence and RJ45 Cable Tracker. It is easy to handle with a large and easy-to-read color LCD display which can display measurement data, traces and graphics. The technicians can easily backup or upload measurement data to PC. The management software running on PC can further analyze the measurement data, archive, report and print test records.

Product has the following characteristics:

- Compact, handheld, lightweight & easy to use
- 5 inch capacitive touch screen for easily operation and quick response
- Fast boot-up for fiber troubleshooting and restoration
- Multi-tasking operation which can perform OTDR, OPM and VFL function simultaneously
- Auto OTDR/Expert OTDR/Averaging/Real Time test
- Link Image – smart Icon-based map view by multi pulse widths acquisition
- Built-in Stabilized Laser Source, Optical Power Meter, Optical Loss Testing and Visual Fault Locator
- Optional RJ45 cable testing function supported (Available for ADVANCED models)
- 8G memory card, supporting more than 200,000 test records storage
- PC software for test data analysis and reporting;
- 8 hours continuous operation / 20 hours standby

1.3Hardware Overview

Front View

Fig. 1.1 Front View

Top View

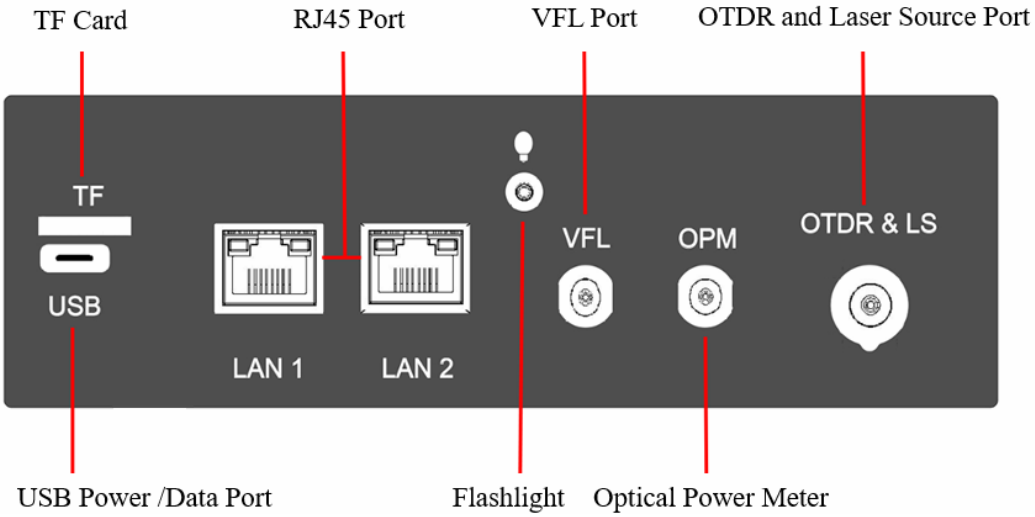


Fig. 1.2 Top View

1.4 Front Panel Indicators Introduction

Icon	Status	Meaning
Power On/Off Indicator	Off	System off
	Orange, constant	System on
Battery Charging	Red, constant	Charging, with power adaptor

Icon	Status	Meaning
Indicator	Green, constant	Charging complete
	Off	The unit is off
Laser Indicator	Red, constant	Laser on
	Off	Laser off
Flashlight	White, constant	Light on
	Off	Light off

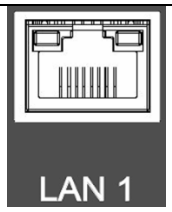
1.5 Front Panel Keys Instruction

Name	Function
	Home, back to main menu
	Press to start, press again to stop
	Exits the current menu
	Power on/off
	Press to power on system when system is off.
	When the unit is on, quickly press to turn on Flashlight, quickly press again to turn off Flashlight.

1.6Top Panel Interfaces Instructions

·Interfaces on Top Panel (Left to right)

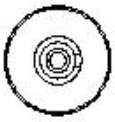
Name	Appearance	Description
USB		Battery charging and data output
TF		External memory card

Name	Appearance	Description
Flashlight		Lighting in a dark environment
LAN1		RJ45 Length /Sequence Test
LAN2		RJ45 Tracker

Tab. 1.4Interfaces on Top Panel

·Optical Ports

PROLITE-45 is equipment with FC/PC connectors (Interchangeable SC, ST)

Name	Appearance	Icon	Description
Optical Port		OTDR& LS	OTDR and Laser Source port
		VFL	Visual Fault Locator port
		OPM	Optical Power Meter port

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 PROLITE-45 is working.
- Always replace protective dust cap on the detector port when PROLITE-45 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.

1.7 GUI Icons Instruction

Icon	Description
	Shortcut menu, including screen capture, flashlight, backlight adjustment and other functions
	TF Card is available
	Battery is charging
	USB is connected
	Battery power status

Tab. 1.6 GUI Icons Instruction

1.8 Power Instruction

PROLITE-45 uses following power supplies:

- AC adaptor (Connect to power 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 PROLITE-45 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 PROLITE-45 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 PROLITE-45 may automatically power off.
- If unused for a long time, PROLITE-45 may not power on properly, please connect power adaptor and recharge the battery.

1.9 Use of Rechargeable Battery

- Battery for PROLITE-45 is Lithium rechargeable battery.
- 5 hours for full charge
- When PROLITE-45is charged by AC/DC power adaptor, charging indicator on the front panel will turn red and turn green after fully charged.
- When PROLITE-45 is powered on and being charged, LCD will also indicate charging status.

NOTE

PROLITE-45 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 PROLITE-45. 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 and hold button.

Power off: Press and hold button till note windows pops up, click “YES”.

NOTE

Power off PROLITE-45 will completely shut down the platform and modules. When power on, PROLITE-45 will restart.

2.3 Enter and Exit Power Saving Mode

When power is on, user can set PROLITE-45 to power saving mode and return to normal status. In power saving mode, the LCD backlight will turn off.

- When power is on, PROLITE-45 will automatically enter power saving mode after its idle time exceeds pre-set value.

Exit power saving mode:

- Press touch screen, LCD backlight will turn on;

2.4Adjust LCD Brightness

The LCD lightness is 6-level adjustable.

Click “System Setting” – “Backlight Brightness”, select the suitable brightness, or click  in Shortcut Menu, click on “ 

”to select the suitable brightness.

2.5 Start Application

When PROLITE-45 is powered on, the instrument will load the program and enter main menu, as shown in Fig. 2.1

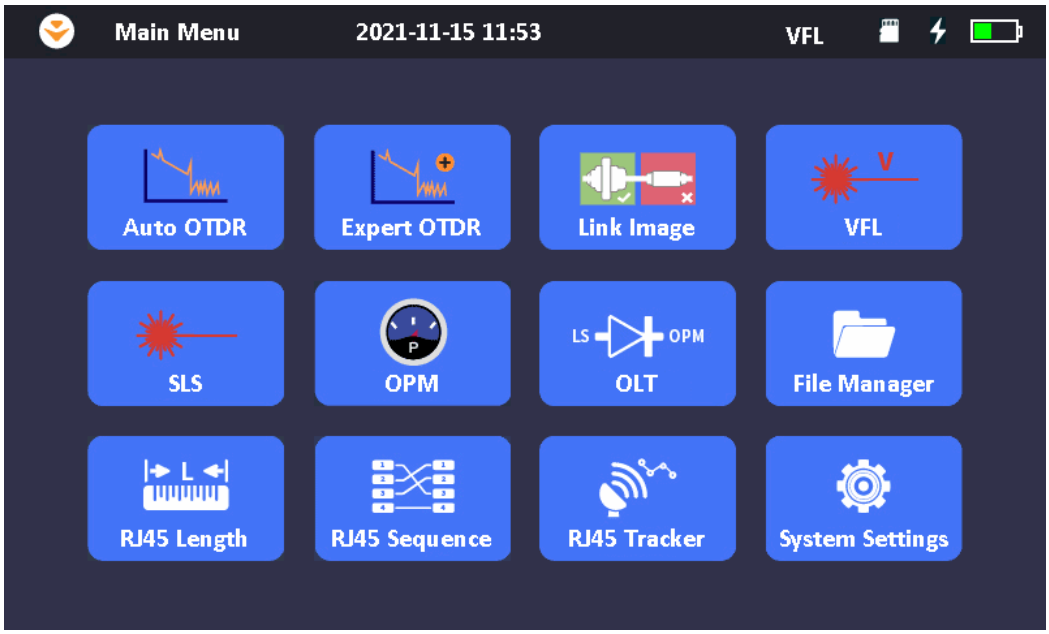


Fig. 2.1 Main Interface of ADVANCED models

Launch OTDR program:

1. Select “Auto OTDR” or “Expert OTDR” in main menu.
2. Then press  button

Launch other functions such as OPM, SLS and VFL:

1. Click on relative icon in main menu such as SLS, OPM, and VFL.
2. Then click ‘ON’ to start program (for SLS function).

NOTE

Application program is available only when relative function is purchased.

3 Common Settings and Special Settings

3.1System Settings Menu

In “System settings” menu, user can set up many settings, including language, Backlight Brightness, Date & Time, Firmware upgrade etc.

Enter System settings menu:

Click ‘System setting’ in main menu and it is shown below:

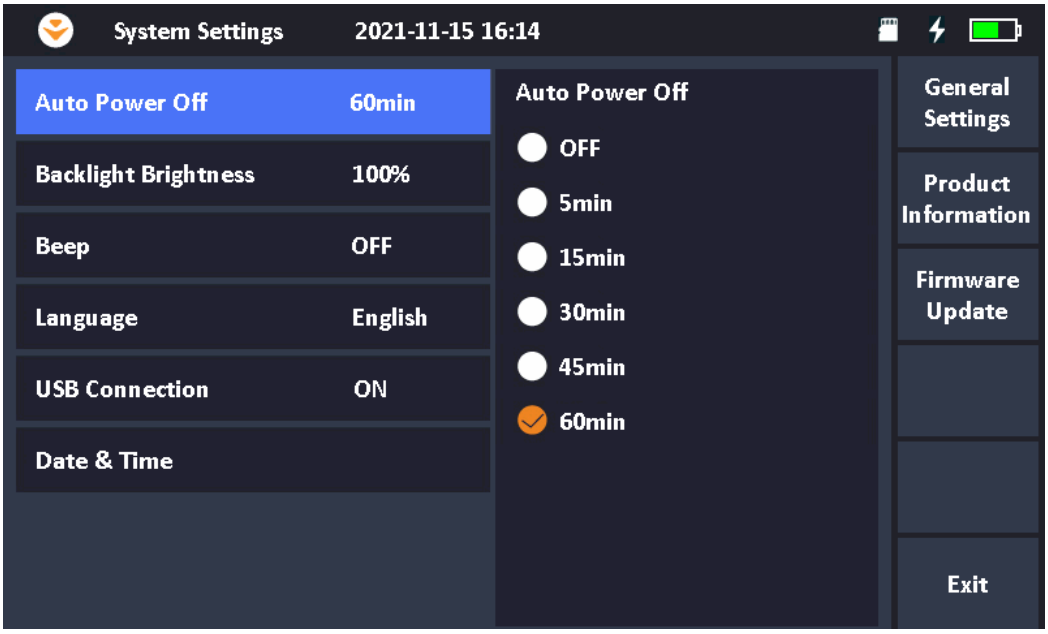


Fig 3.1 System Settings Menu

3.2Select language

Switching language:

1. Click **"Language"** to select the required language.

4 Basic Information of OTDR

4.1 Principle of OTDR

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.

4.3.1Reflection Events

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

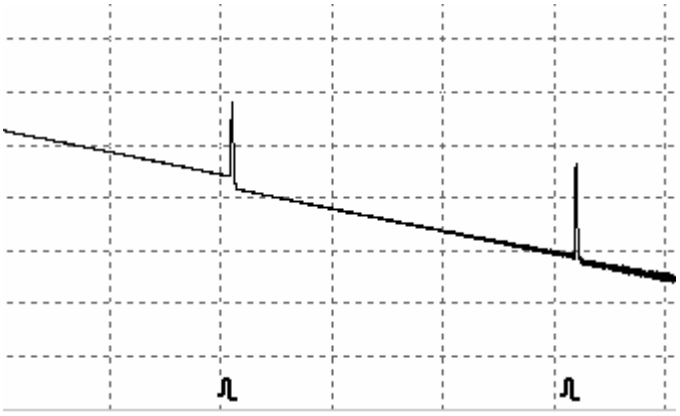


Fig.4.1 Reflection Event

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:

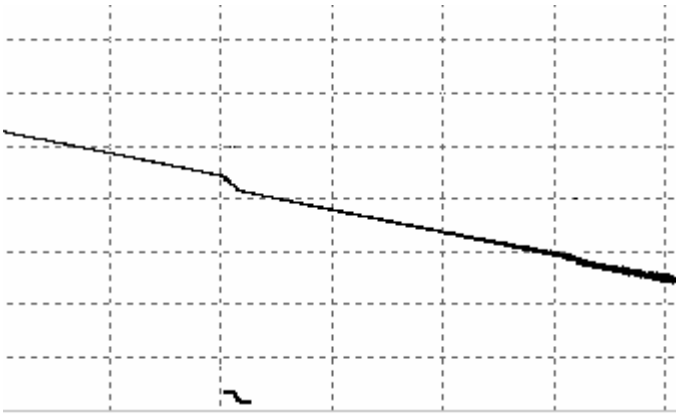


Fig.4.2 Non-reflection Event

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 function

5.1 Main Features of OTDR function

- High performance dynamic range and short dead zones indication.
- Complete sampling under low noise, realize accurate low loss locating.
- Resolution is accurate to 5cm.
- Multi-tasking operation which is 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 function

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 Real Time Mode

Real Time Mode: OTDR will undertake real time measurement for the connector of exterior fiber and refurbish the measure trace. Under real time 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.

5.3 OTDR GU Interface

When the instrument is power on, it will show the main menu automatically

In main menu, select “Auto OTDR/Expert OTDR”, click [**Start**] button to enter OTDR user interface, as follows:

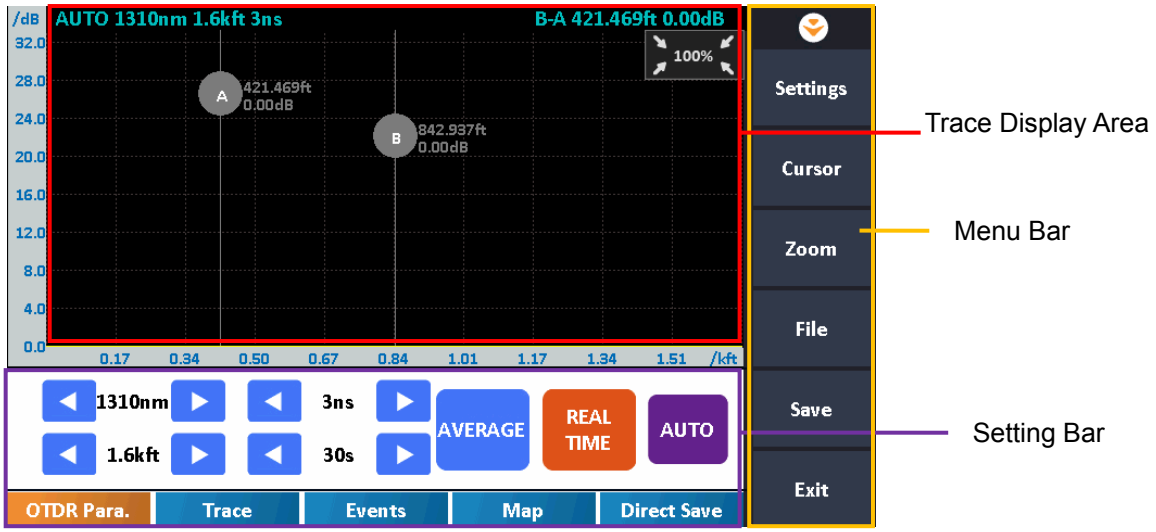


Fig.5.1 OTDR Main Interface

5.4 Trace Processing

The PC software in PROLITE-45 is for trace review and analysis on PC after acquisition without connecting to PROLITE-45.

Trace processing includes:

- Trace editing
- Report Printing

6 Prepare to Use OTDR

6.1Connectors Introduction

The default connector of PROLITE-45 is FC/PC (Interchangeable SC, ST)

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.

- Clean connectors and check if fiber connector type of patch cord can fit OTDR connectors.
- Connect fiber connector to OTDR port.

Improperly connected fiber may cause big loss and reflection.

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.

7OTDR Testing

7.1OTDR Test

1. Check the connection between the fiber and OTDR, 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.

The OTDR interface after trace acquisition as shown below:

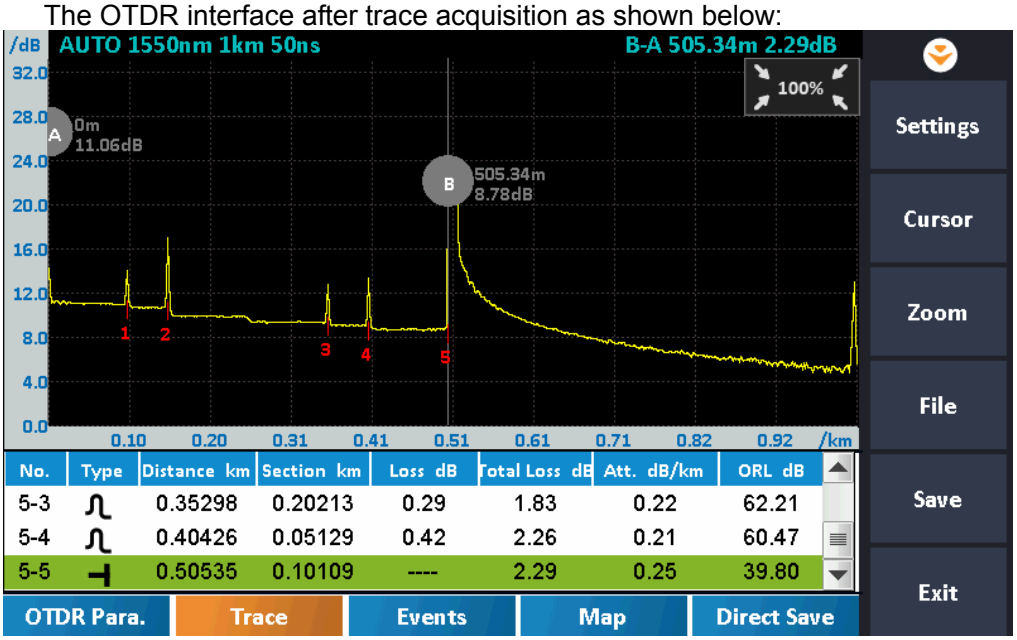


Fig. 7.1 OTDR Trace Acquisition Interface

NOTE

- Click the ▶/■ button to start or stop OTDR testing.
- 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 the 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”.

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 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] or [Direct Save]**, and save dialog window will pop up.
2. File format: .sor.
3. 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.
4. File Save: Click [Save] button, and the system will save the file according to the file name, or click ‘Exit’ to exit the file save.

7.4 Auto Naming

System supports auto naming when saving traces.

Procedure:

1. Click “File Manager”– “Save Setup”.
2. Enable/disable auto naming by selecting “Yes” or “No’ in ‘Auto Save’ setup.
3. User can edit auto naming rule by modifying file name prefix and sequence.

7.5 Open Saved Trace

Click [**File**] button on the right in OTDR interface to open saved trace

7.6 Trace Viewing and Analysis Operation

User can zoom in/out trace, utilizing markers and marking points to analyze trace characterization, including loss, attenuation, reflection and etc.:

Zoom in/out trace: Click [**Zoom**] at the right of OTDR main interface, then to click on the required zoom bar.
Show A/B marker: Click [**Cursor]** at the right of OTDR main interface and cursors or cursors labels will show in trace display area.
Move Cursor quickly: Select and hold the cursor, drag it left or right to move quickly or click [] [] button to move active marker left or right.
Switch A/B markers: Click **[Cursor A]**or **[Cursor B]** button to switch A/B markers Or click the marker to select it in trace display area.

NOTE

- When holding and moving marker, please apply adequate force or the operation may not be successful. Please try several times to get used to it.

7.7 Information and Function Windows

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

Label	Function
Settings	Measurement parameters: Mode, Wavelength, Range, Pulse Width, Averaging Time and etc.
Cursor	A/B switch, move, loss and reflection analysis.

Zoom	Zoom out/in for different direction.
File	Select and open saved trace.
Save	Save trace
Exit	Exit current interface.

Tab.7.1 Information and Function Windows Description

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

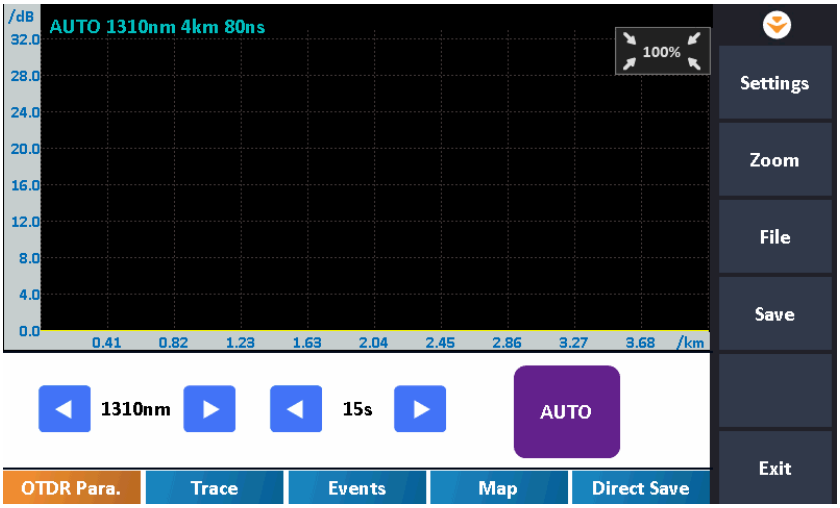
7.8 Upload Trace to PC

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 cable.
2. Or user can copy and move the saved trace to computer via.TF card.

8 [Auto OTDR] mode testing



8.1 Instruction of [Auto OTDR] 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] started, OTDR will automatically estimate the optical fiber length, set sampling parameter, get trace and display the event list and etc.

Under [Auto OTDR] Mode, user can set follow parameters directly.

- The wavelength to be used for testing.
- 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!

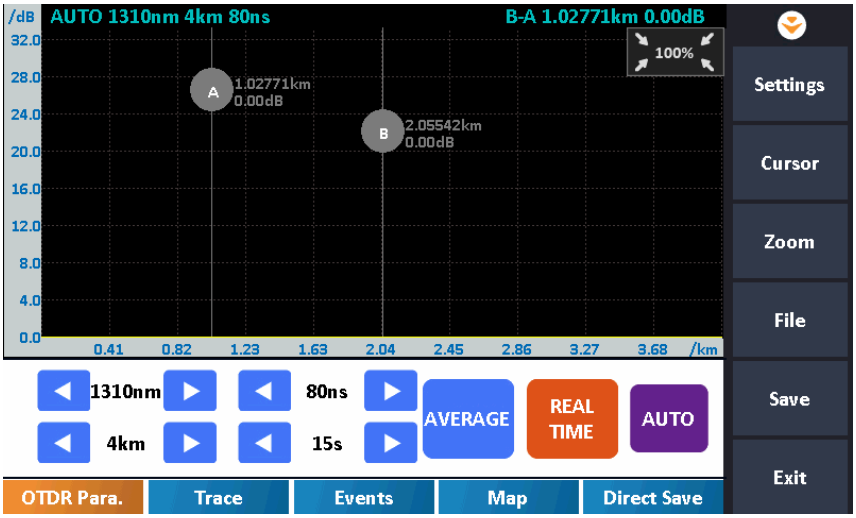
Except the specific light port (light port used for online testing), do not connect the optical fiber which load signal to the OTDR port, any external signal over **-30dBm** will affect the OTDR sampling and cause permanent damage to the OTDR.

8.2 The procedures of [Auto OTDR] mode

Test and get trace in [Auto OTDR]:

1. Connect the optical fiber to the right OTDR port.
2. Select wavelength.
3. Set testing time span.
4. Start testing: Click **[AUTO]** or press the "▶/■" (Start/Stop) button.
5. After test, user can save the trace, check the trace, etc. As to the detailed operation way, please refer to relative paragraph previous.

9 [Expert OTDR] mode testing



[Expert OTDR] mode can set various test parameters more precisely.

The premise is to 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 in [Expert OTDR] mode, 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 main interface, 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

Tab. 9.1 OTDR common use parameters sheet

9.2 OTDR test parameters Configuration

Click **[Setting]** on the OTDR interface to enter.

These testing parameters include: Measure Setup, Pass/Fail Setup and Analysis Setup.

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.
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 factory default

Tab. 9.2 OTDR test parameters setting sheet

9.3 Real time and average test mode

Under sampling and accumulating condition, test mode has real time and average mode, user can click [AVERAGE] or [REAL TIME] to select.

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.

9.4 Distance 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: 500m, 1km, 2km, 4km, 8km, 16km, 32km, 64km, 100km, etc.

Operation: Click and choose on the right distance required.

9.5 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 and choose the right pulse width required.

NOTE

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

9.6 Averaging Time Configuration

Test times affects the test trace SNR(Signal-Noise Ratio), 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 and choose the right time span required.

NOTE

◆ Averaging time: 5s, 15s, 30s, 60s,120s, 180s.

9.7 Wavelength Configuration

Select certain single wavelength as required.

Operation: Click and choose the right wavelength required.

NOTE

The effective wavelength will be different according to modules purchased.

9.8 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.

9.9 Non-reflective 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

9.10 Reflective Threshold Setting

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

NOTE The default value is 40dB

9.11 End 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.

NOTE

The default value is 10dB.

10 Trace Analysis and Event Operation

10.1 Open Trace File

Open trace file:

1. Click**[File]**at the right of OTDR interface.
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 [**Load**] and the file opened.

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

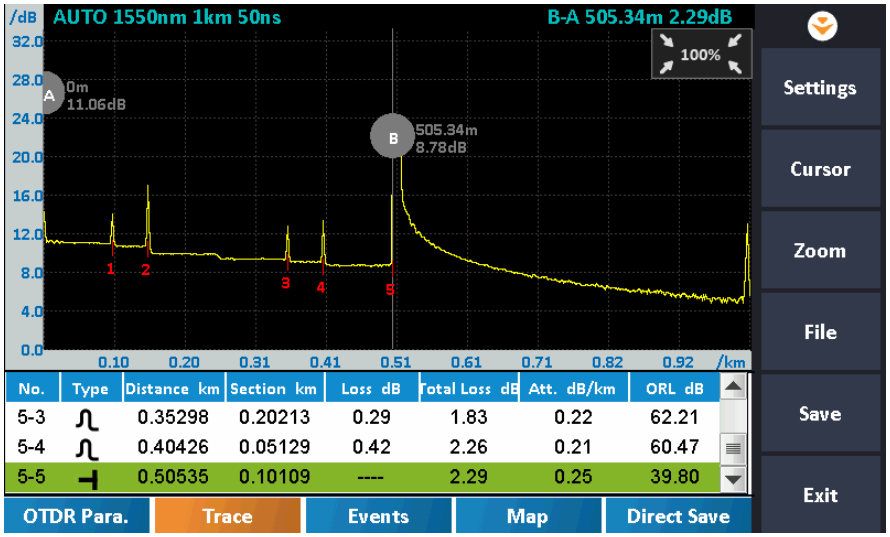


Fig.10.1 Trace file opened

NOTE

- Check or open ".bmp" format trace file, please click "File Manager" in main menu, or open on PC.

10.2 Close Trace File

Close trace file:

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

10.3 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.

Events Options:

In [**Events**] options, there are various parameters of events listing, including event type, number, position, insert loss, reflection loss, attenuation and etc.

When switch to [**Events]**, 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.

Trace Options:

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

Move these Cursors along the trace can calculate loss, attenuation, reflection and etc.

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

After zooming in the trace, cursors is not in display area, can click [Cursor A], [Cursor B] bottom to arrive the relative cursor.

10.4 Zoom the Trace

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

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

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

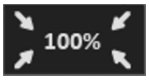
Click ‘Zoom’ enter into zoom tool bar.

Click [] to zoom in the trace horizontally.

Click  to zoom out trace horizontally.

Click [] to Zoom in trace vertically.

Click [] to Zoom out trace vertically.

Click 

to restore complete trace view.

10.5 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.

Fig.10.2 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.
- Number: Event number(one continuous number designated by OTDR application program).
- Section: Distance between the current event and the previous event of optical fiber link.
- 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).
- Total Loss: The total loss from the link starting point to the end of the link.

10.6 Analysis Threshold Configuration

In order to optimize the event detection, user can set follow analysis 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.

Set Analysis threshold

1. Press [**Setting**] – [**Analysis Setup**] in the button area to enter setting surface.
2. Set these parameters in the parameters analysis part. Enter value needed in the relative edit frame or click [**Default**] revert the default value.

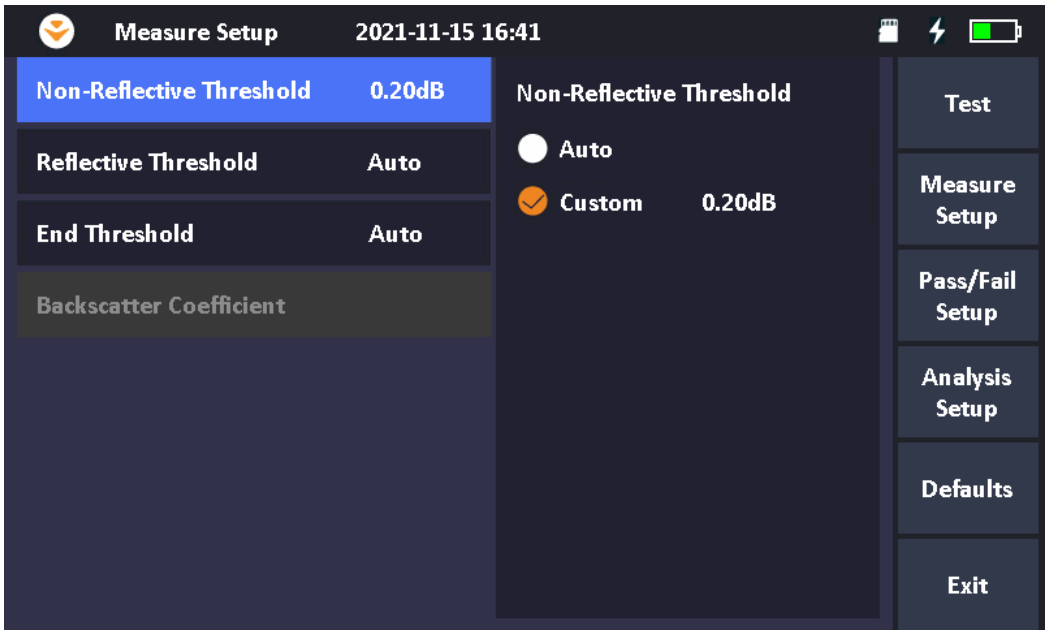


Fig. 10.3 Parameters analysis edit frame

10.7 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 km, kft, mi.

NOTE

- The default length unit is km
- When select km as length unit, system will display m in some place.
- When select kft as length unit, system will display ft in some place.
- When select mi as length unit, system will display mi in some place.

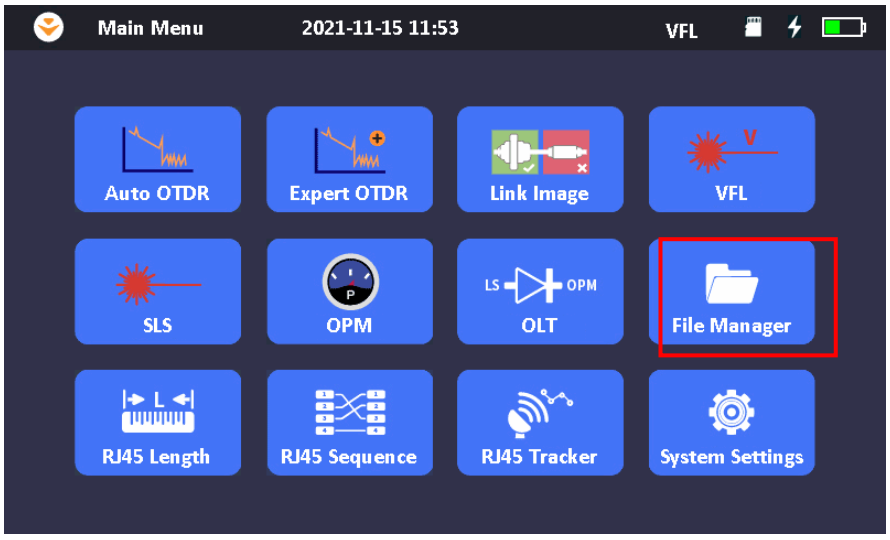
11Trace File Management

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 Manager**].

11.1Open File Manager

1. In main menu, click [File Manager]



2. User can open, rename, copy, move and delete file

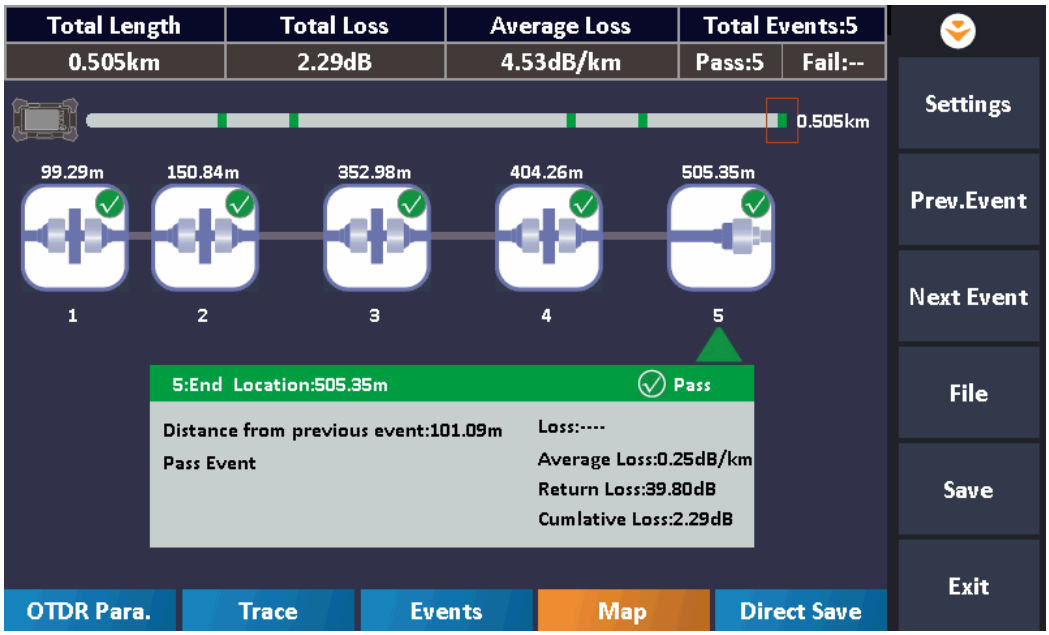
3. After operation, click “Exit” back to main menu.

11.2 Connect to PC via. USB cable

Connect PROLITE-45 to PC with USB cable, user can open, rename, copy, move and delete file on PC.

12 Link Image OTDR Testing

The Link Image is a graphic display of each fiber link event; it can display the even with pass/fail analyze. It is more direct to show all the test result.

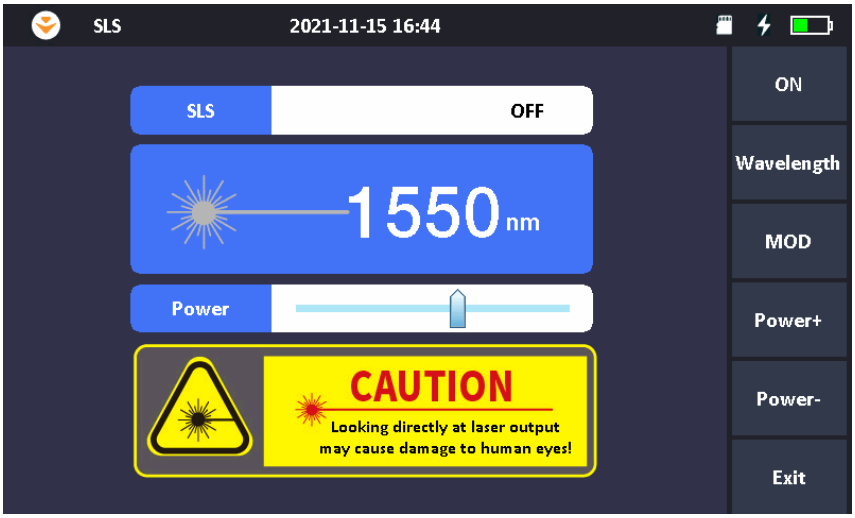


Operation:

Click [Link Image] in main menu as shown above.
Testing setting and testing operation are the same as OTDR trace testing. More details please refer to [Expert OTDR] setting.
The test result shows detail information of each event and all the fiber link.
Each event has pass/fail assessment.

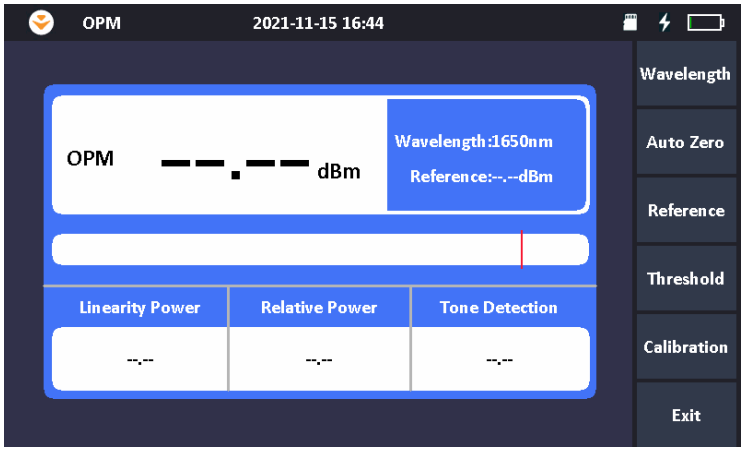
13 Stabilized Laser Source (SLS)

Click [SLS] in main menu to enter laser source interface.
Wavelength is same to OTDR Wavelength.
Click [ON]/[OFF] to start or stop the testing.



14 Optical Power Meter (OPM)

Click [OPM] in main menu to enter optical power mete interface.



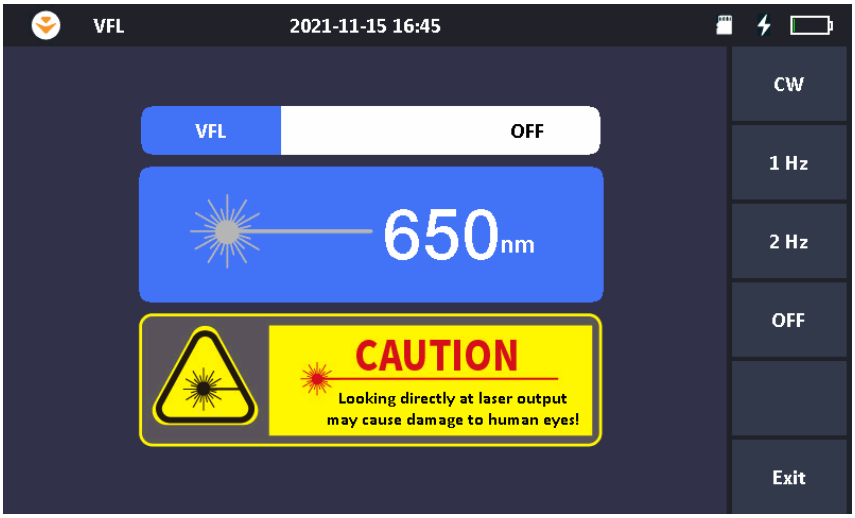
"**Auto zero**": This function provides an easy method of auto zero of power meter, which can be used to rectify the instrument's power value under non-luminous state in daily testing.

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

Wavelength supports 850, 1300, 1310, 1490, 1550, 1625, 1650nm

15 Visual Fault Locator (VFL)

Click [VFL] in main menu to enter VFL interface. There are [CW], [1Hz], [2Hz] selectable.



16 Optical Loss Test (OLT)

Enter the loss test interface, click [**ON**] to perform loss test on the fiber loop as shown in Figure 16.1; The loss value will be displayed directly as shown in Figure 16.2.

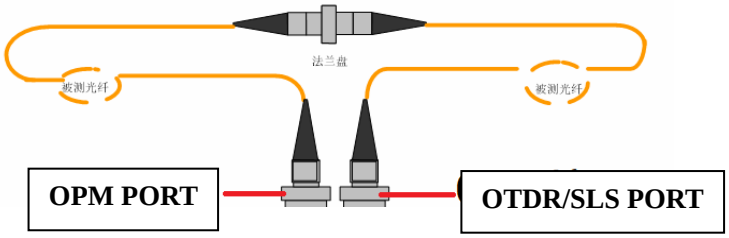


Fig. 16.1 Loss test on the fiber loop

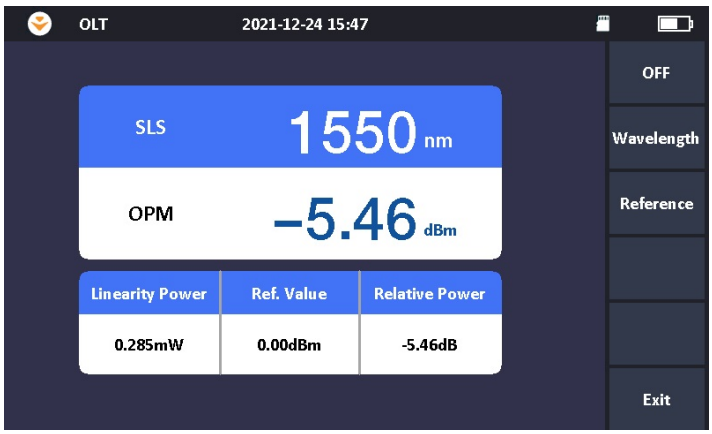
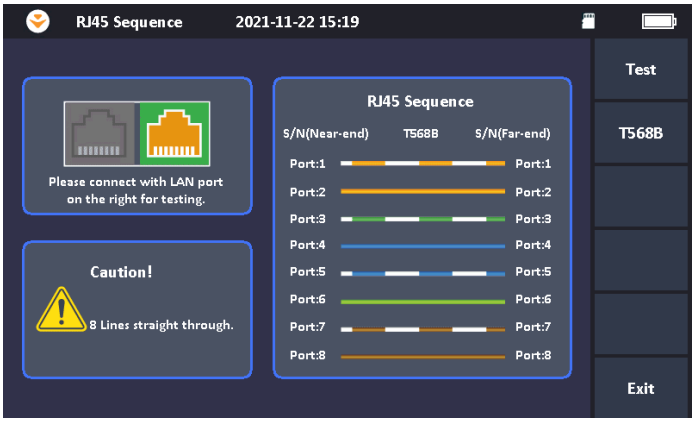


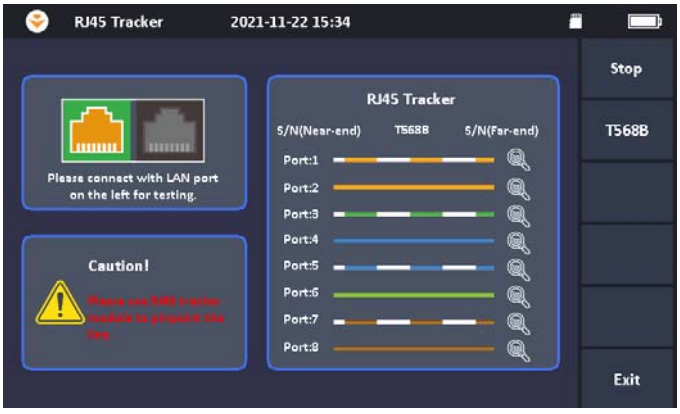
Fig. 16.2 Loss value display

17 RJ45 Cable Testing

RJ45 Cable Testing includes RJ45 sequence, RJ45 length and RJ45 Tracker. The procedures are as follows:

Plug network cable into the LAN2 port and click test to test cable sequence and the length of the network cable.





Plug network cable into the LAN1 port to track the cable with tool “Wire Tracker Receiver” together provided.

18 System Settings

18.1 General Setting

[Auto Power Off]: select the time required, if no operation is performed on the instrument within the corresponding time, the instrument will automatically power off.

[Backlight Brightness]: select the desired brightness as per test environment requests.

[Beep]: The user can turn on or off the operation beep sound as per requests.

[Language]: select the operating language.

[USB Connection]: Select 'ON' can connect to PC directly via USB cable.

[Date & Time]: Click the "+"or"-" icon on the upper and lower sides of the year, month, day, hour and minute to adjust the corresponding time, and then click [Apply].

18.2 Product Information

It includes PROLITE-45 Hardware and software version information, etc.

18.3 Firmware Update:

The procedures of firmware update are as follows:

1. Connect PROLITE-45 with PC via USB cable.
2. Copy the firmware file from PC and save under the root directory of TF card.
3. Disconnect PROLITE-45 with PC
4. Click [System Settings] in main menu and Click [Firmware Update]. Then one dialogue window will pop up, select [Yes], the upgrading will be in process.

Note: During firmware update process, please do not turn off the power or pull out TF card. Otherwise the system will not be operated normally.

19 Maintenance and Calibration

19.1 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.

19.2 Necessity of Cleaning

The diameter of optic core is 9μm, 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 PROLITE-45.

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.

19.3 Safety Instructions before Cleaning

1. Make sure PROLITE-45 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 PROLITE-45 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 PROLITE-45 before cleaning. Always use dry or moist soft cloth to clean the outside of PROLITE-45, and never clean the inside
6. Please do not add any accessory to optic instrument or adjust PROLITE-45 at discretion.
7. For maintenance, always go to qualified or certified professionals

19.4 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

19.5 Cleaning Procedure

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

19.6 Battery Instruction

NOTE

- New battery is not fully charged, please charge the battery before the first time use.
- 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 PROLITE-45 may power off due to low battery), then battery calibration is necessary (Please refer to 19.8 Battery Calibration).

WARNING!

- Please do not store battery in the environment where temperature is over 60 ℃(140F).
- Use specified charger to charge the battery.

19.7 Charge Battery

Plug the charger to PROLITE-45 and power outlet, charging process automatically starts and finishes after battery is fully charged.

19.8 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.

19.9 Change Battery

1. Power Off PROLITE-45 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 PROLITE-45 is completely off before changing battery.

19.10 Calibration Requirements

Calibration of PROLITE-45 is recommended every two years. Please contact our representatives or nearby customer service centers for proper calibration.

19.11 Shipment

During shipment, please keep PROLITE-45 in prescribed temperature range.

Please note following points to protect PROLITE-45 during shipment:

- Use original packing materials.
- Avoid excessive temperature and humidity change.
- Avoid direct exposure to sunlight.
- Avoid shock and vibration.

20 Troubleshooting

20.1 Common Problems and Solutions

Problem	Possible Reason	Solution
Power on failure	Battery power run out	◆ Charge the battery. ◆ Change a new battery. ◆ Connect PROLITE-45 to external power supply.
	External power supply is not connected	Connect PROLITE-45 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.	Touch the screen to exit power saving mode.
	Battery run out, PROLITE-45 is off, power indicator is off.	◆ Charge the battery. ◆ Change a new battery. ◆ Connect PROLITE-45 to external power supply.
Screen display blurs	Brightness is not set properly.	Adjust brightness
Application no response	Problem error.	Restart PROLITE-45 and run the application again.
Operation time is short	Battery runs out.	Change the battery.
	Battery is not fully charged.	◆ Charge the battery. ◆ Re-calibrate the battery.
PROLITE-45 indicates low battery after battery is fully charged	Battery is not fully charged.	Re-calibrate the battery

20.2 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.

20.3 Finding Information on PROMAX Website

PROMAX (www.promaxelectronics.com) provides FAQ (Frequency Asked Questions) about the PROLITE-45.

1. Type http://www.promaxelectronics.com 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.

21 Warranty

21.1 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 Inc. free of charge. In no case will PROMAX liabilities exceed the original purchase price of the product.

21.2 Exclusion

The warranty on your equipment shall not apply for 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.

21.3 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.

21.4 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 PROLITE-45 in the case of repair, calibration or other maintenance, please note the following:

- Be sure to pack PROLITE-45 with soft cushion like Polyethylene, so as to protect the shell of PROLITE-45.
- Please use the original hard packing box. If use other packing material, please ensure at least 3 cm soft material around PROLITE-45.
- 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.

21.5 Contacting Customer Service

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

THANK YOU FOR CHOOSING
PROMAX

PROMAX TEST & MEASUREMENT S.L.U.

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