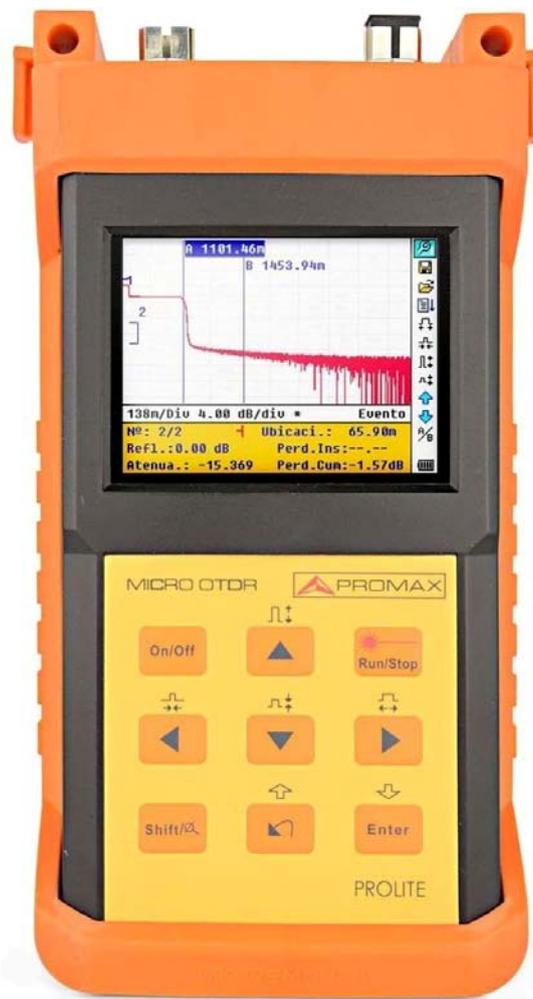


# PROLITE-50

## OPTICAL REFLECTOMETER (OTDR)



## SAFETY NOTES

Read the user's manual before using the equipment, mainly **SAFETY RULES** paragraph.

The symbol  on the equipment means **SEE USER'S MANUAL**. In this manual may also appear as a Caution or Warning symbol.

**WARNING AND CAUTION** statements may appear in this manual to avoid injury hazard or damage to this product or other property.

## USER'S MANUAL VERSION

Version	Date	Software Version
2.0	November 2018	7.04

## SAFETY RULES

- \* **The safety could not be assured if the instructions for use are not closely followed.**
- \* This is a **class I** equipment, for safety reasons plug it to a supply line with the corresponding **ground terminal**.
- \* When using some of the following accessories **use only the specified ones** to ensure safety.
  - Mains power supply **AL-005**.
  - Clock Battery.
- \* Observe all **specified rating** both of supply and measurement.
- \* Remember that voltages higher than **70 V DC** or **33 V AC rms** are dangerous.
- \* Use this instrument under the **specified environmental conditions**.
- \* **The user is only authorised to** carry out the following maintenance operations:
  - Any other change on the equipment should be carried out by qualified personnel.
- \* Follow the **cleaning instructions** described in the Maintenance paragraph.

### Specific precautions

**CLASS 1  
LASER PRODUCT**

#### CAUTION



It is recommended do not watch directly the laser beam.

The use of devices that are not the specified ones in this manual as well as internal manipulation of the equipment can be cause of dangerous radiation.

#### CAUTION



The battery used can present danger of fire or chemical burn if it is severely mistreat. Do not disassembly, cremate or heat the battery above 100 °C under no circumstances.

\* Symbols related with safety:

	DIRECT CURRENT		ON (Supply)
	ALTERNATING CURRENT		OFF (Supply)
	DIRECT AND ALTERNATING		DOUBLE INSULATION (Class II protection)
	GROUND TERMINAL		CAUTION (Risk of electric shock)
	PROTECTIVE CONDUCTOR		CAUTION REFER TO MANUAL
	FRAME TERMINAL		FUSE
	EQUIPOTENTIALITY		EQUIPMENT OR COMPONENT TO BE RECYCLED

### Descriptive Examples of Over-Voltage Categories

**Cat I** Low voltage installations isolated from the mains.

**Cat II** Portable domestic installations.

**Cat III** Fixed domestic installations.

**Cat IV** Industrial installations.

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# OPTICAL REFLECTOMETER (OTDR) **PROLITE-50**

## 1 GENERAL

### 1.1 Introduction

**PROLITE-50** is the preferred choice for the measurement of optical fiber's specifications. With **PROLITE-50**, you can make assessment of one single optical fiber or a whole optical fibre chain. Especially, you can directly observe loss and events distribution of optical fibre chain.

**PROLITE-50** checks the transmission quality of optic fibre through measurement of backward scattered lights. Standard organizations like International Telecom Union (ITU) define backward scattered lights as effective analysis means of measurement of optical fibre loss. Backward scattering is also the only effective way of connector inspection, which can be applied to measure the length of optical fibre, too. Therefore, **PROLITE-50** is a useful tool for optical fibre manufacturing, installation and maintenance.

Therefore, the **PROLITE-50** is a very useful tool for the optical fibre manufacturing, installation and maintenance.

**PROLITE-50** works through reviewing "events" in optical fibre (for example, irregularities and connectors), which is quite helpful for quality control for those who are in charge of optical fibre manufacturing, installation and maintenance. **PROLITE-50** can help identify the irregularities in optical fibre, locate them, and measure their attenuation, relevant loss and their homogeneity.

**PROLITE-50** is more helpful for field operation. It can help to check the qualification of optical fibre chain circuit on a regular basis. For the purpose of future maintenance, transmission quality and condition of optical fibre need to be recorded and stored, which includes measurement of optical path, total loss, and loss of all tie-ins and connectors.

Besides, **PROLITE-50** is easy to use, small and compact. According to the ergonomics, they are designed to fully embody the user's convenience with its large LCD display and graphical interface. They can save and transfer the measurement curves data to a PC by the provided software for further analysing, reporting and printing.

**PROLITE-50** basic applications:

- Measure the length of optical fibre and cable.
- Measure the distance between two points on optical fibre and cable.
- Locate faults and ruptures of optical fibre and cable.
- Display distribution curve of optical fibre and cable loss.
- Measure attenuation coefficient of optical fibre and cable.
- Measure loss between two points on optical fibre and cable.
- Measure loss of tie-ins.
- Measure reflection of reflection events of optical fibre and cable.

For a specific event (transmission quality changed due to faults caused by welding, connector, bending etc.), the following measurements can be carried out with **PROLITE-50**:

- For each event: distance, loss and reflection;
- For each section of optical fibre: length and loss of dB or dB/Km;
- For the whole optical fibre chain: length and loss of dB;

**PROLITE-50** features by:

- Large Colorful LCD display with auto or manual adjustment of contrast.
- Backlight LCD display supports night operation.
- Easy operation with trace graphic display.
- Trace storage function.
- USB Data upload port.
- PC analysis software-Trace Manager for analysing and reporting previously stored data.
- Auto off function conserving battery life.
- DC/AC power supply.
- Over 8 hours operation for one charge.



## 2 DESCRIPTION OF CONTROLS ELEMENTS

### 2.1 Patch panel

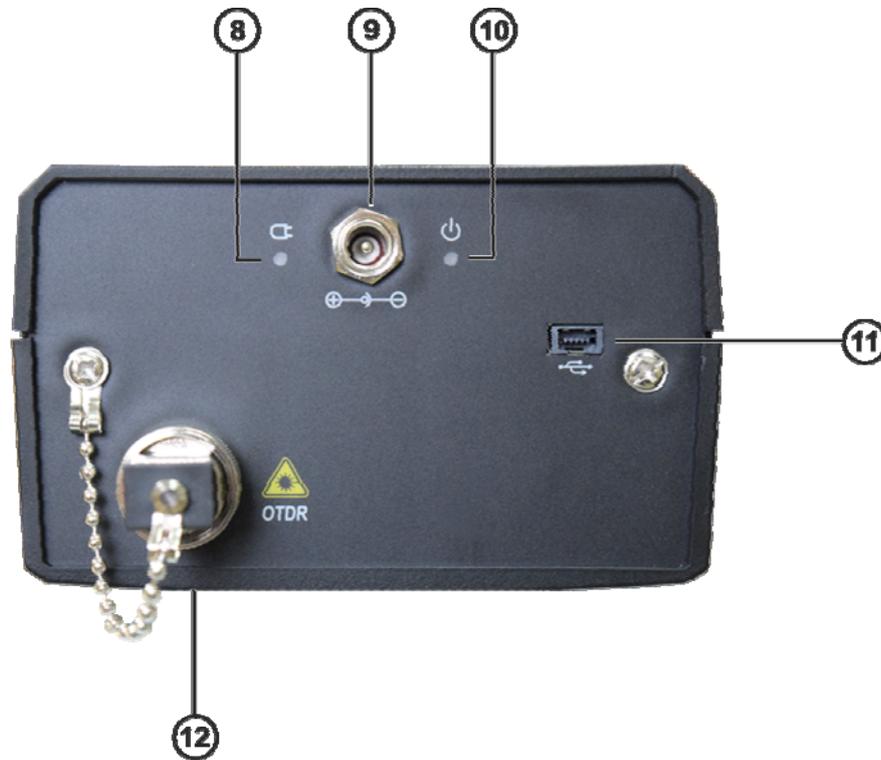


Figure 1.- Patch panel.

- 8 Power on indicator.
- 9 Connector for AC power supply adapter.
- 10 Charge indicator
- 11 **USB** interface in order to connect the equipment to a **PC**. It allows transferring the traces stored to the **PC** to be analysed later.
- 12 **Optical fibre connector (SC/APC).**

**CAUTION**

**Invisible laser radiation**



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



## 2.2 Keypad Functions

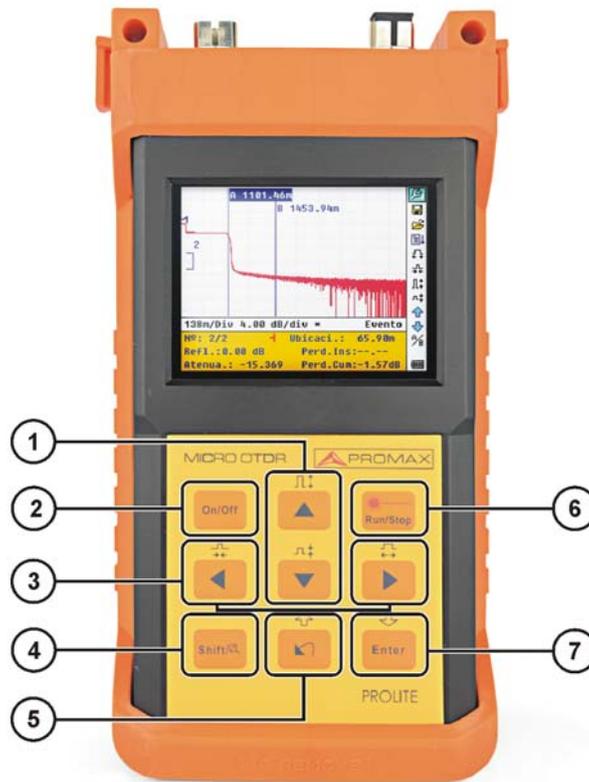


Figure 2.- Operation Interface of PROLITE-50.

- 1  On / Off for system.
- 2  Main functions:  
They allow moving within the different menus as well as to increase/decrease the value of configuration parameters.
- 3  Pressing [  ] previously in the visualisation display of trace, allows to increase/decrease vertically the size of the trace.
- 3  Main functions:  
They allow moving within the different menus as well as to move the cursors horizontally throughout the plan.
-  Pressing [  ] previously in the visualisation display of trace, allows to increase/decrease horizontally the size of the trace.



- 4  Pressing it previously allows executing the secondary functions. Also it serves to cancel the zoom in / zoom out actions for trace visualisation, which has been done.

- 5   Main functions:  
This key allows going forward through pages from Help, cancelling the selected operation, exiting from configuration menu and changing between information windows from visualised trace.

Press [  ] to review the previous trace events.

- 6  Key to start/stop the measurement process.

- 7  Press this key to confirm the operation selected.

Press [  ] to review the later trace events.



### 3 BASIC INFORMATION OF PROLITE-50

#### 3.1 Principle of PROLITE-50

**OTDR** is a measurement instrument for identifying optic fiber transmission features. The instrument is mainly used to measure attenuation of a whole optic fiber chain and provide attenuation details relating to length, namely detect, locate and measure any event in optic fiber chain (events refer to faults caused by welding, connectors, and bending whose transmission change can be measured). Its non-destructive, one-end connection, and rapid measurement has made the **PROLITE-50** an indispensable tool for manufacture, construction, and maintenance of optic fiber.

The faults and heterogeneity of optic fiber it self 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.

**PROLITE-50** sends out a light pulse into connected optic fiber, and receive reflections of events and backward scattering power of pulse in time. Locus will be displayed on LCD. The y-axis is dB value of backward scattering power, and the x-axis is the distance.

#### 3.2 Basic definition and classification of events

##### 3.2.1 Events

Events refer to any abnormal points causing attenuation or sudden change of scattering power besides the normal scattering of optic fiber, which include all kinds of losses like bending, connections and ruptures. Events points displayed on LCD are abnormal points that cause traces to deviate from straight line.

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



■ **Reflection Events**

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

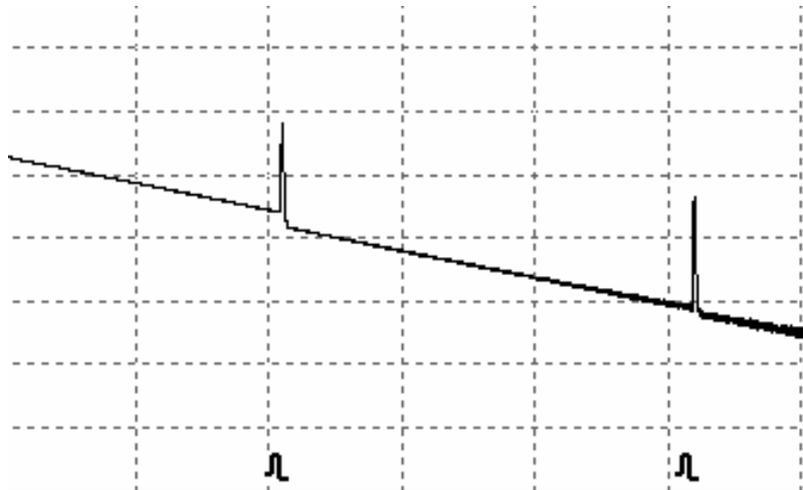


Figure 3.- Reflection Event.

■ **Non-reflection Events**

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

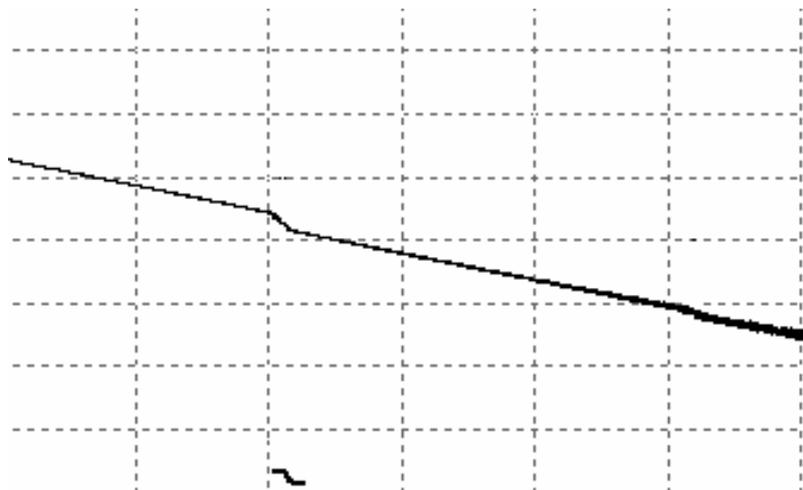


Figure 4.- Non-reflection Event.



## ■ Inspection Event

**PROLITE-50** sends off a light pulse into the optic fiber to be inspected, and then receive returning light signals, and starts calculating the “event” distance. The farther the distance is, the longer time need for scattered light to be received by the instrument. Event distance can be calculated according to the time of receiving events signals.

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

### 3.3 Measurement Application of PROLITE-50

**PROLITE-50** displays power relating to distance of returning signals. This information can be used to identify the main properties of an optic fiber chain.

#### 3.3.1 Measurement Contents of PROLITE-50

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

#### 3.3.2 Trace Analysis of PROLITE-50

The trace analysis of **PROLITE-50** is fully automatic. The trace locates:

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



### 3.4 Trace Display Screen

Trace displays on **PROLITE-50** screen, as shown in figure below.

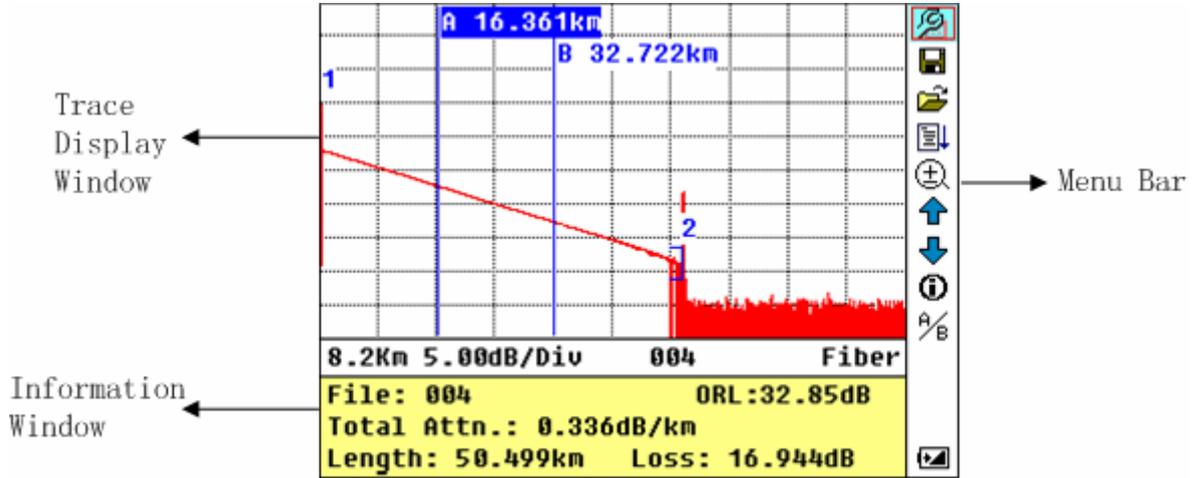


Figure 5.- Trace Display Screen

#### 3.4.1 Trace Display

This window displays the trace after one measurement.

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

Trace of **PROLITE-50** displays measurement result in a graphic form. The y-axis stands for power, and the x-axis stands for distance, as shown in figure below.

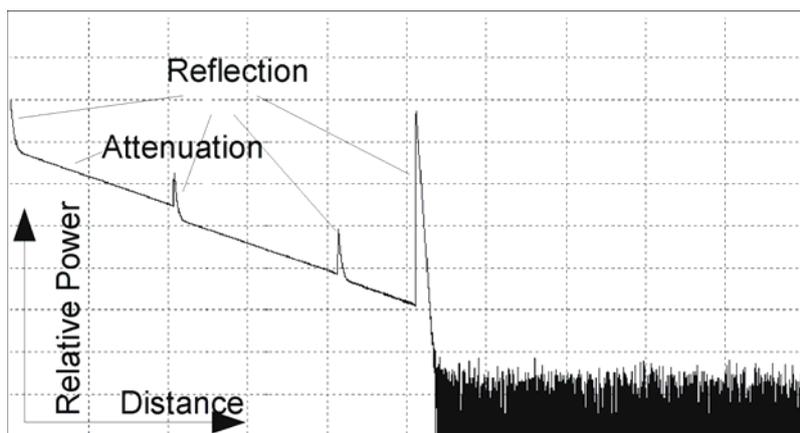


Figure 6.- Traces and Coordinates

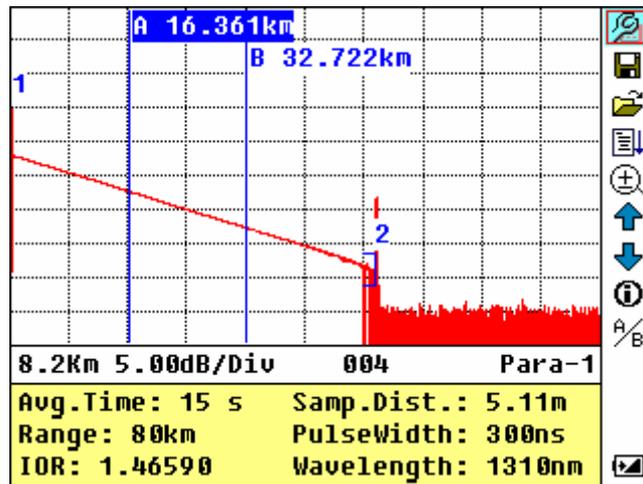


**3.4.2 Information Window**

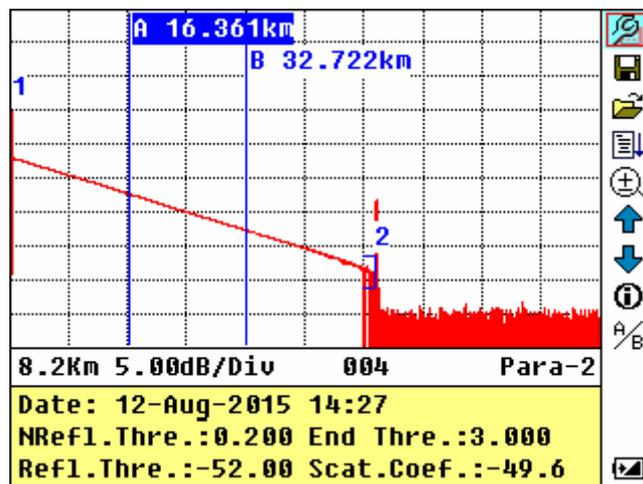
Contents of this window: measurement parameters, events list, marker A/B and analysis parameters.

**■ Measurement Trace Parameters**

Important measurement and analysis parameters always display in the information window, as shown in figure below:



**Figure 7.- Measurement Trace Parameters**



**Figure 8.- Analysis Trace Parameters**

For definitions and configurations of items on the upper figure (Avg. time, Range, IOR, wave length and pulse width), refer to parameter configuration.

For definitions of items on the lower figure (date, reflection threshold, non-reflection threshold, end threshold, scattering coefficient), please refer to parameter configuration.



■ Events List

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

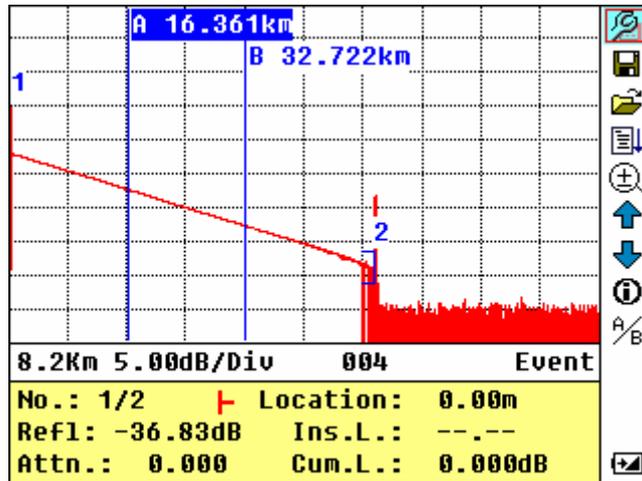


Figure 9.- Events List

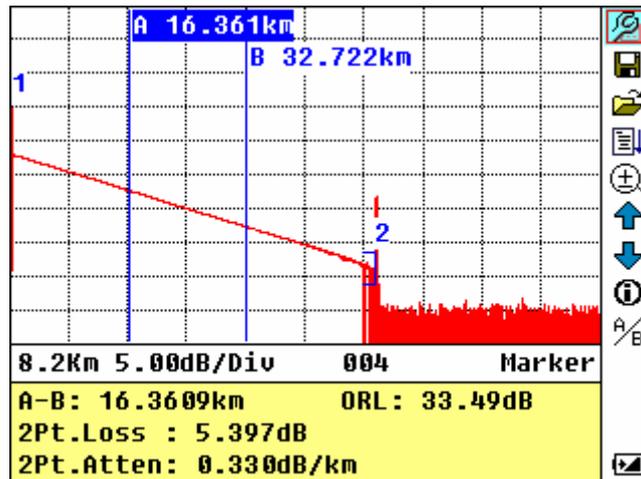
- No:** Event sequence No.
- Four types of events:**
  - ┆ Fiber beginning; ↯ Reflection event → Fiber end;
  - └ Attenuation event.
- Loc.:** Distance from beginning point to event.
- Refl.:** Magnitude of reflection.
- Insl.:** Loss of Inserted event.
- Atn.:** Attenuation characteristic from one event point to the current event.
- Cuml.:** Cumulative loss, calculating from beginning point to the current event.



■ **Information of Marker A/B**

Marker is used to mark and analyze a single event, trace section and distance.

Distance, attenuation, loss at marker or between markers will be displayed in information of markers, as shown in figure below.



**Figure 10.-** Information of Marker A/B

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

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

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



■ **Information of Fiber**

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

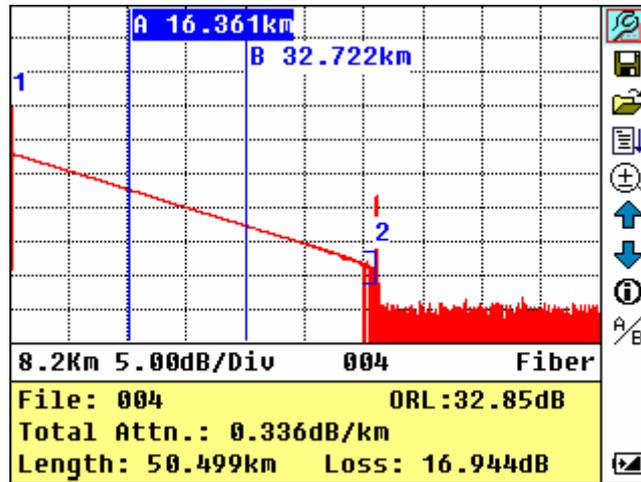


Figure 11.- Information of Fiber

3.4.3 **Menu Bar and Window**

■ **Menu Bar and Icons**

On the right side of **LCD** display is located vertically the menu bar of the **PROLITE-50** in form of icons. Press [  ] and [  ] in order to move the cursor along the menu of options. Select the function by pressing [  ].

No.	Icons	Meanings
1		Parameter configuration
2		Save file
3		Open file
4		Re-analyze the trace
5		Zoom in trace horizontally
6		Zoom out trace horizontally
7		Zoom in trace vertically

No.	Icons	Meanings
8		Zoom out trace vertically
9		Switching between markers
10		Go to the previous event
11		Go to the next event.
12		Battery power indicator

**NOTE:** Under Help Menu, only No. 1 and 3 are operational.

In the process of measurement, all function on menu bar will be disabled.

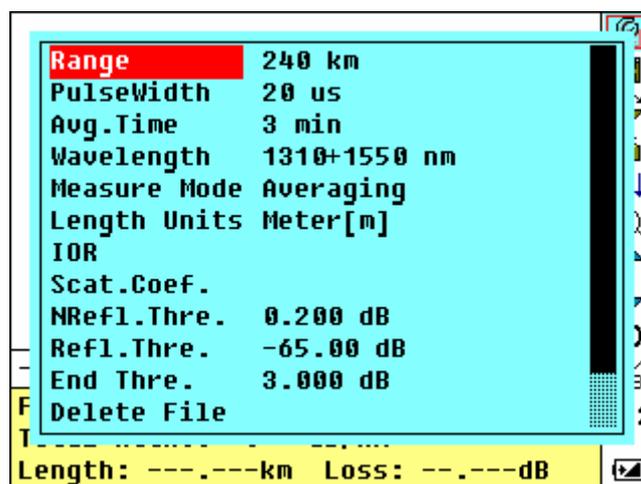
No. 4, 5, 8 and 9 are tools for trace analysis; No.6 and 7 are tools for reviewing events list.

No. 1 is elaborated in next figure.

### ■ Parameter Configuration on Menu Bar

Correct parameter configuration is a necessity for accurate measurement; therefore, necessary configuration must be performed before using the instrument.

Use [] and [] to highlight , parameter configuration, then press [], as shown in figure below. Press [] to exit.



**Figure 12.-** Parameter Configuration



Following screen shows a list measurement parameters:

Parameter	Definition of Parameter
<b>Range</b>	Length of optic fiber relevant to the trace.
<b>Pulse Width</b>	Width of laser pulse sending out from <b>OTDR</b> to optic fiber.
<b>Average Time</b>	To select suitable testing time.
<b>Wavelength</b>	To select laser wave length for measurement.
<b>Measurement Mode</b>	To select mode for measurement.
<b>Length Units</b>	To select length units.
<b>IOR</b>	IOR of optic fiber which affects the transmission speed of laser.
<b>Scatter Coefficient</b>	Which affects backward scatter power of laser in fiber.
<b>Non-reflection Threshold</b>	Events whose insertion loss is greater than the threshold displays here.
<b>Reflection Threshold</b>	Reflection events GE the threshold will be displayed.
<b>End Threshold</b>	The first event with insertion loss GE the threshold is considered the end of fiber, and all following events will be ignored.
<b>Delete Files</b>	Delete stored trace data in the instrument.
<b>Load Default</b>	Set all parameters to factory setting.
<b>Help</b>	Show help files (Quick Reference).



### Range Configuration

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

Under the parameters configuration menu, use [▲] and [▼] to select "Range"; Press [Enter] to access.

Use [▲] and [▼] to select adequate range; Press [Enter] to confirm, or press [Back] to exit, as shown in figure below.

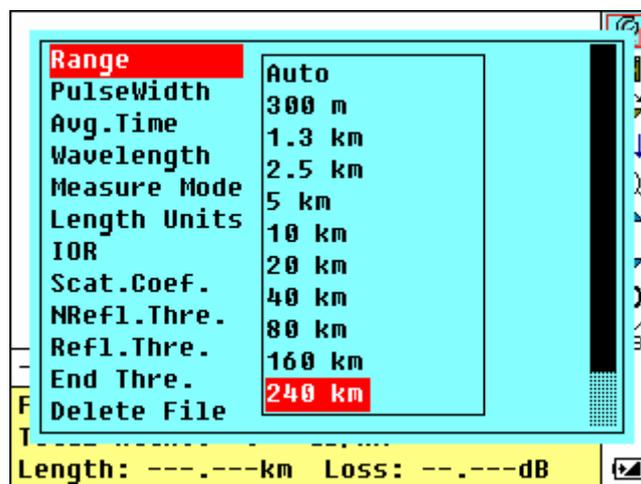


Figure 13.- Set Range

**NOTE:** There are 11 levels of predefined scales : Auto, 300 m, 1.3 Km, 2.5 Km, 5 Km, 10 Km, 20 Km, 40 Km, 80 Km, 160 Km and 240 Km.

«Auto» means the automatic measurement. When this function is selected, the instrument will automatically make an intelligent selection of adequate range and pulse width for measurement. The whole process of measurement does not need any intervention of the operator. This is the default settings.



### ■ Pulse Width Configuration

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

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

Under menu of parameter configuration, use [▲] and [▼] to highlight “**pulse width**”; Press [Enter] to select as shown in figure below. Press [↩] to exit.

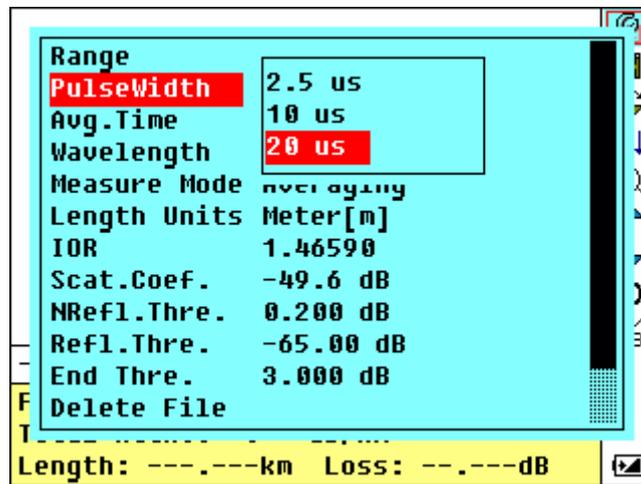


Figure 14- Pulse Width Configuration

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

**NOTE:** Five are preset pulse width : 30 ns, 100 ns, 275 ns, 1.0 μs and 2.5 μs.  
 «Auto» means the default settings.  
 When Range is set to «Auto», pulse width will automatically become «Auto».



### ■ Average Time Configuration

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

Under parameter configuration, use [▲] and [▼] to highlight "Average time"; press [Enter] to confirm, as shown in figure below. Press [Esc] to exit.

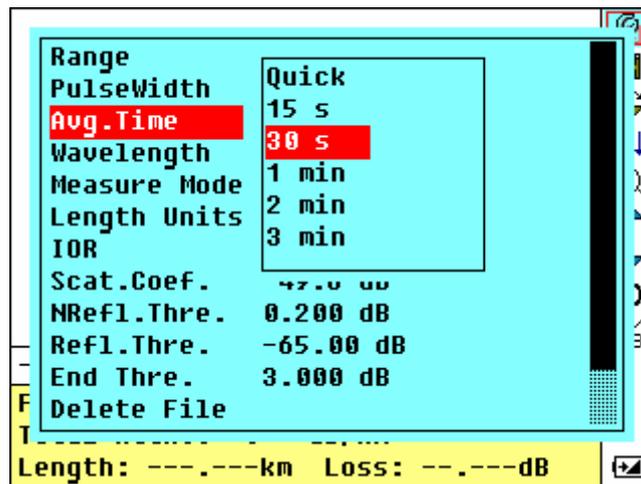


Figure 15- Average Time Configuration

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

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



### ■ Wavelength Configuration

The **PROLITE-50** works with different wavelengths (see specifications).

Under parameter configuration, use [▲] and [▼] to highlight "wavelength"; press [Enter] to change wavelength, as shown in figure below.

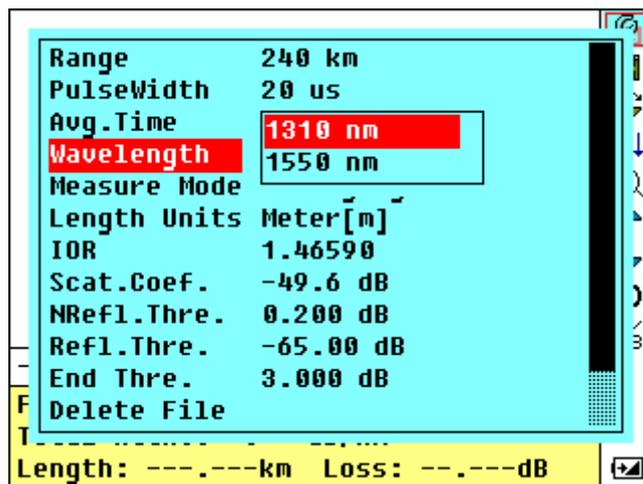


Figure 16- Wavelength Configuration



### ■ Measuring Mode Configuration

There are two kinds of measurement mode: Averaging and Real time mode. Under Real time Mode, **PROLITE-50** will undertake realtime measurement for the connector of exterior fiber and refurbish the measure trace. While under Real time Mode, press key [  ] to stop, otherwise it will measure all along. Under Averaging Mode, **PROLITE-50** will average the data within the measure time which is set by user. While exceeding the set time, it will stop automatically and display the result. Generally, we suggest **Averaging Mode**.

Under menu of parameter configuration, use [  ] and [  ] to highlight "**Measurement Mode**"; Press [  ] to choose **Averaging mode** or **Realtime mode**, as shown in figure below. Press [  ] to exit.

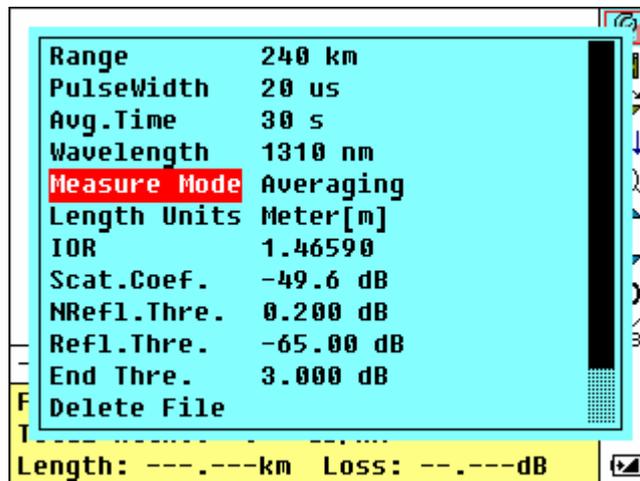


Figure 17- Measurement Mode Configuration



■ Length Units Configuration

Under the parameter configuration menu use [▲] and [▼] to highlight “Length Units”; press [Enter] to select the desired units of measurement, as in figure below. Press [↵] to exit.

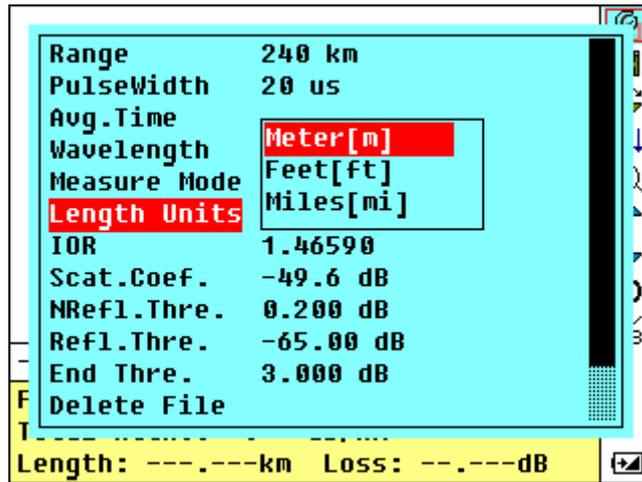


Figure 18- Length Units Configuration



■ **IOR (Refractive index) Configuration**

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

Under parameter configuration, use [▲] and [▼] to highlight “**IOR**”; and press [Enter] to enter, as shown in figure below. Press [↩] to exit.

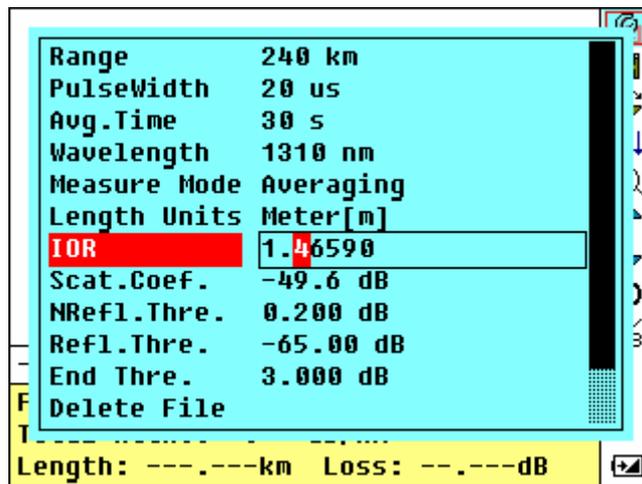


Figure 19- Configuration IOR

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

**NOTE:** The default is 1.4666.



### ■ Scatter Coefficient Configuration

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

Under parameter configuration, use [, , , , , ] to highlight "Scatter Coefficient"; press [] to enter, as shown in figure below. Press [] to exit.

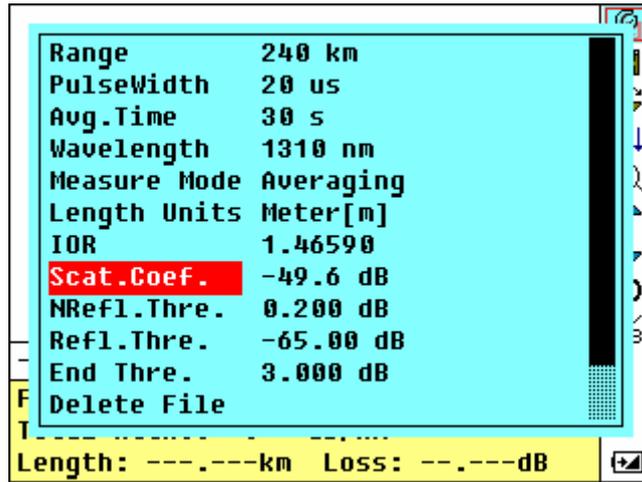


Figure 20- Scatter Coefficient Configuration

Use [, , , , , ] to adjust the position of highlights; use [, , , , , ] to change the digits. After setting, press [] to confirm.



### ■ Non Reflection Threshold Configuration

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

Under parameter configuration, use [▲] and [▼] to highlight “**Non reflection threshold**”; press [Enter] to enter, as shown in figure below. Pres [↩] to exit.

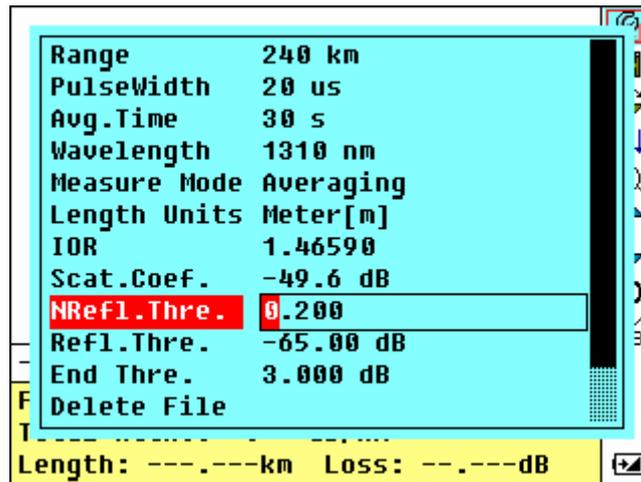


Figure 21- Non Reflection Threshold Configuration

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

**NOTE:** The default setting is 0.20 dB.



### ■ Reflection Threshold Configuration

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

Under parameter configuration, use [▲] and [▼] to highlight “**Reflection Threshold**”; press [Enter] to enter, as shown in figure below. Press [Esc] to exit.

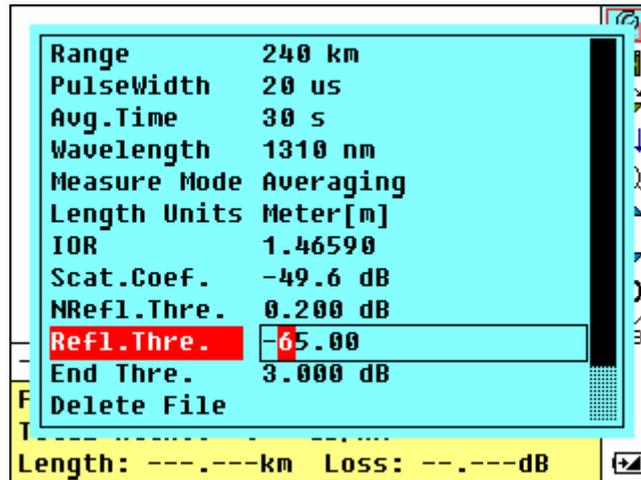


Figure 22- Reflection Threshold Configuration

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

**NOTE:** The default setting is -52.00 dB.



### ■ End Threshold Configuration

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

Under parameter configuration, use [▲] and [▼] to highlight "End threshold"; press [Enter] to enter, as shown in figure below. Press [↵] to exit.

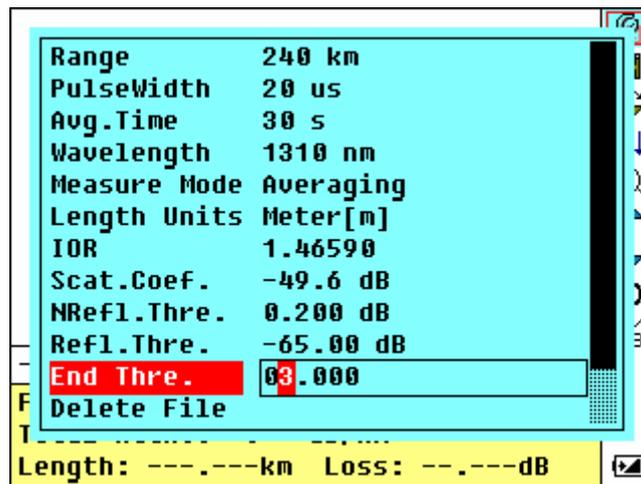


Figure 23.- End Threshold Configuration

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

**NOTE:** The default setting is 3.00 dB.



■ **Delete File**

This function is designed to delete saved traces.

Under parameter configuration, use [▲] and [▼] to highlight **"Delete file"** press [Enter] to enter, as shown in figure below. Press [↩] to exit.

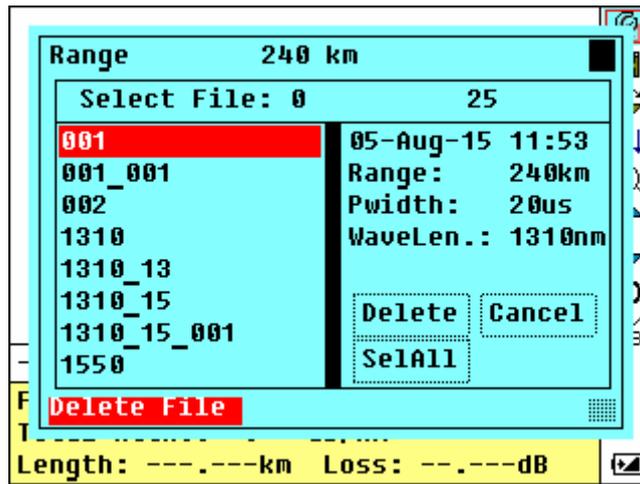


Figure 24.- Delete File

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



■ **Help**

User scan get the quick reference via Help menu.

Under parameter configuration, use [▲] and [▼] to highlight "Help"; press [Enter] to enter, as shown in figure below. Press [↶] to exit.

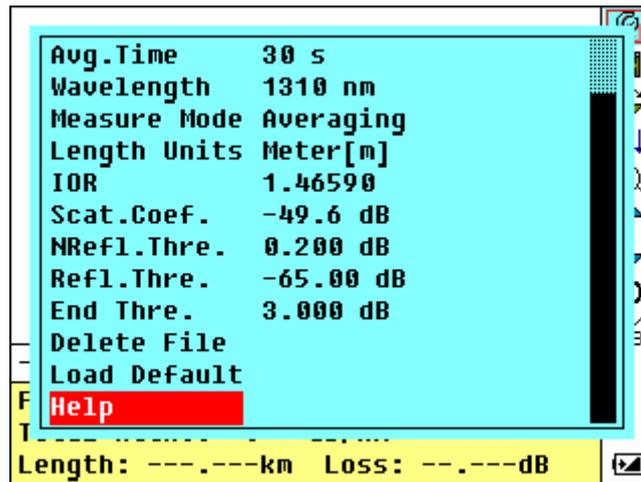


Figure 25.- Help (a)

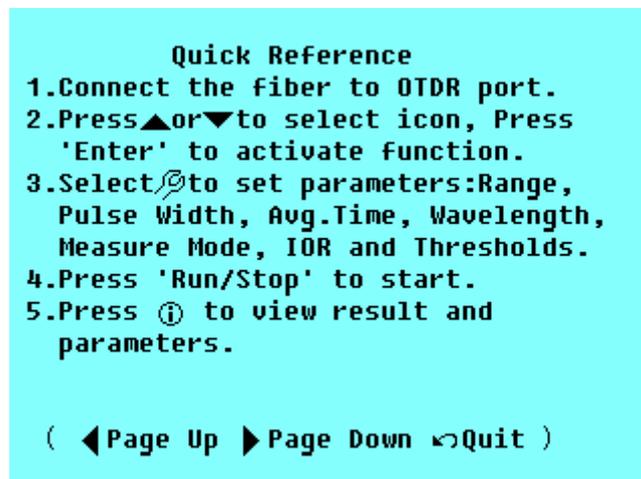


Figure 26.- Help (b)



### 3.5 Battery Recharge Status

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

-  The batteries are being recharged.
-  The batteries are fully recharged.

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

-  No power.
-  Low power.
-  Half power.
-  More than half power.
-  Full power.



## 4 TRACE MEASUREMENT AND PROCESSING OF EXISTING TRACES

### 4.1 Instructions on Graphic User Interface (GUI)

After power on, power on interface displays on the LCD, as shown in figure below:

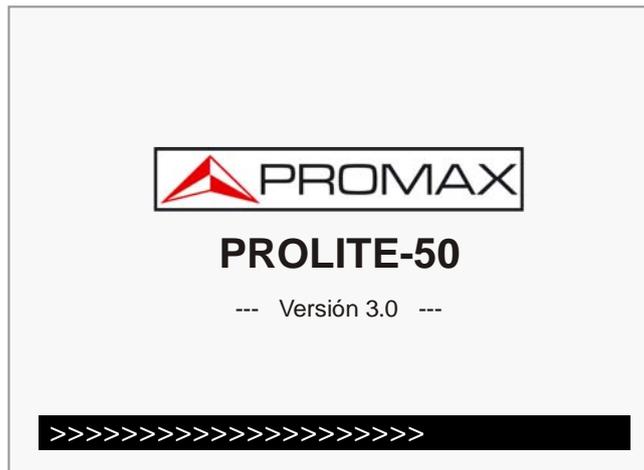


Figure 27.- Starting up screen

Three seconds after power on, the interface will be automatically directed to the standby main interface (according to the different configuration function, the main interface is different):

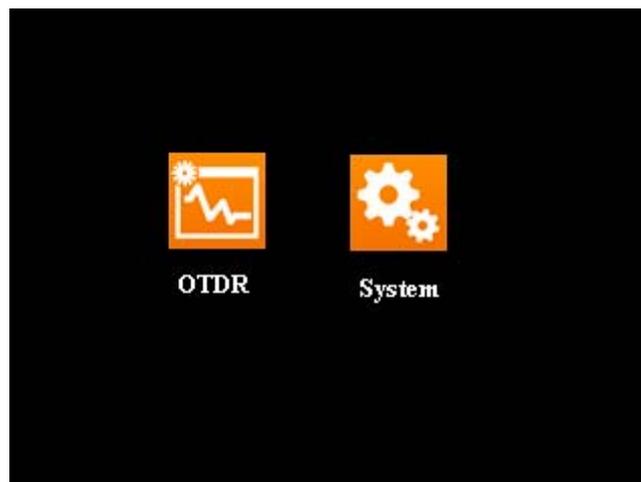


Figure 28.- Main interface (a)



## 4.2 Trace Measurement

One complete trace can be obtained for each measurement. Also, **PROLITE-50** can load a saved trace.

**NOTE:** Before each measurement, if the operator is not familiar with the cautions, please do follow instructions in this manual for personal safety.

Make sure that the optical fiber or cable is not in use and there is no laser beam in the fiber before testing via **PROLITE-50**. Otherwise, it may result in imprecise test trace, even permanent damage for the **PROLITE-50**.



**4.2.1 Trace Measurement – Connect Optical Fiber**

Connect optic fiber optic output directly, no tools needed:

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

**4.2.2 Trace Measurement – Parameter Configuration**

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

**NOTE:** Range is set to "Auto" when auto measurement is on.

**4.2.3 Trace Measurement - Auto**

Auto measurement can be applied in case that the length of optic fiber is unidentifiable. **PROLITE-50** auto select adequate range for measurement.

Steps for Auto measurement:

- 1 Parameter configuration: for detailed operations, please refer to "Parameter Configuration on Prolite-50 Menu Bar". Set range to "AUTO".
- 2 Measure: press [  ] to start measurement, and the interface is as shown in figures below.

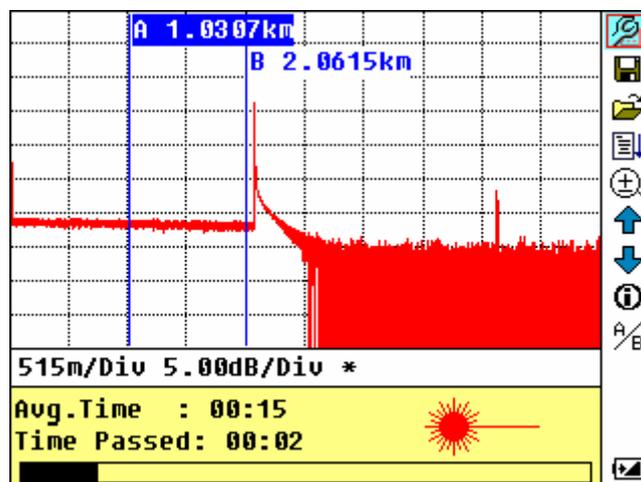


Figure 29.- Measuring

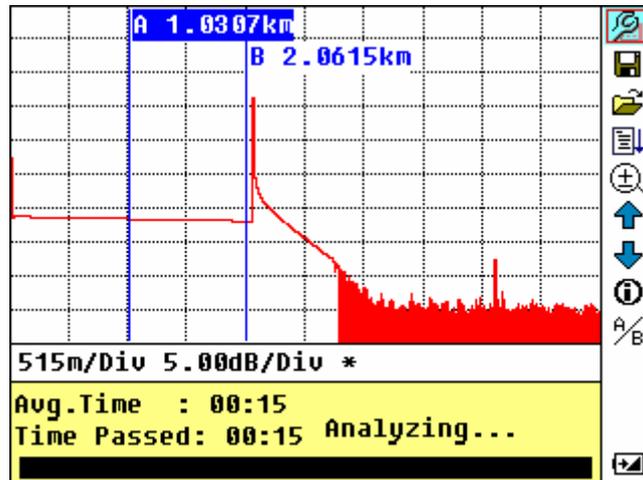


Figure 30.- Analyzing

While the measurement is done, it appears the following information on screen.

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

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

“ ” ..... Flickering of this sign means laser is active.

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

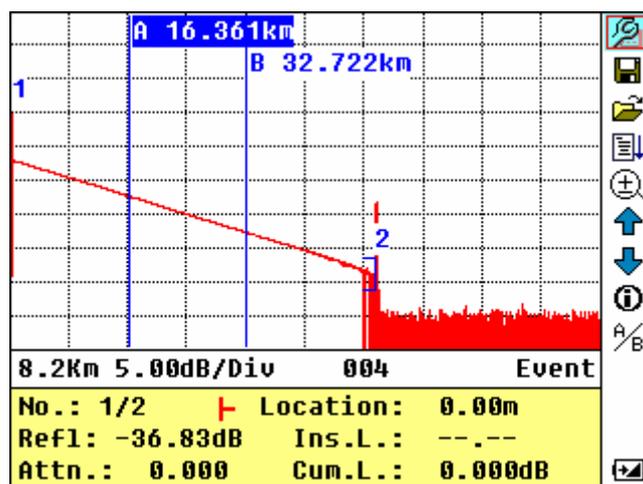


Figure 31.- Trace Measurement



#### 4.2.4 Trace Measurement - Manual

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

- Set the parameters: Refer to the section; Configuration of parameters.
- Measure: Press [] to start measurement. The process is the same with Auto measurement.

#### 4.2.5 Trace Measurement – Reasons of Measurement Failures

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

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



### 4.3 Information Window

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

For details regarding information window, please refer to 4.4.2 **PROLITE-50** information window.

#### 4.3.1 Switch between Information Window Items

Under **GUI**, press [>], and the items of information window will display in circulation: measurement parameter → analysis information → Event list → information of marker A/B → measurement parameter

#### 4.3.2 Review Event List

Under **GUI**, press [>], items in information window will switch to event list information.

Use [>] and [>] too highlight  or , then press [>] to review events list:  is to browse upwards and  downwards; or to browse events list

upwards and downwards by the combining hot key [>] + [>] and [>] + [>] in the keyboard.



### 4.3.3 Review Marker A/B Information

The **PROLITE-50** has two cursors (A and B) available which can be displaced throughout the trace in order to provide specific information about each point. In order to exchange the active cursor to use [] and [] to select the  $A/B$  icon, later press [] to switch between marker A/B.

Use [] and [] to move the A or B marker.

Press [] to change the information window to A or B marker.

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

### 4.4 Increasing and decreasing of the trace visualization

In order to be able to visualize the events more accurately, the equipment incorporates the increasing and decreasing functions of trace visualization.

- The function indicated with [] icon in menu, serves to increase the trace horizontally, whereas the [] icon serves to diminish it.
- The function indicated with the [] icon in menu serves to increase the trace vertically, whereas the [] icon serves to diminish it.

Use [] and [] to select the function desired and press [].

The visualisation of the plan can be increased up to 10 times. In the case of the horizontal increase, the zone of plan of the cursor will be centred in display that is active.

Use [] and [] to move cursors more accurately through the trace.

The cursor (A/B) switching function as well as movement through events [] and [] does not modify the visualization of the plan and automatically it centres on screen the cursor or event selected with these functions. The increasing / decreasing function, also can be executed by means of a combination of hotkeys for quick access.



- In order to increase the trace horizontally to keep pressed [  ] and later [  ].
- In order to decrease the trace horizontally to keep pressed [  ] and later [  ].
- In order to increase the trace vertically to keep pressed [  ] and later [  ].
- In order to decrease the trace vertically to keep pressed [  ] and later [  ].

#### 4.5 Reanalyze the trace

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

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

#### 4.6 Save Trace

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

- 1 Under **GUI** of figure below, use [  ] and [  ] to highlight  , and press [  ] to enter, as shown in figure below.

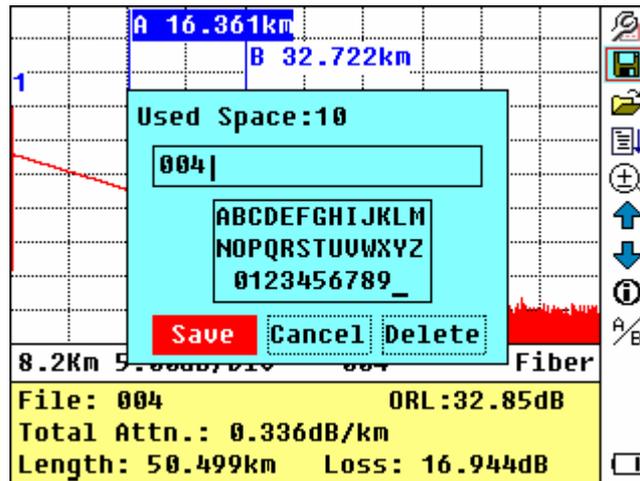


Figure 32.- Save Trace

- 2 Input filename: use [Up], [Down], [Left] and [Right] to choose the alphanumeric character one by one, and press [Enter] to confirm. The length of filename will not exceed 8 characters alphanumeric.
- 3 Save file: use [Up], [Down], [Left] and [Right] to highlight "OK", press [Enter] to save.
- 4 Cancel saving file: use [Up], [Down], [Left] and [Right] to highlight "cancel", press [Enter] to cancel the operation of "save file".
- 5 Delete alphanumeric character: use [Up], [Down], [Left] and [Right] to highlight "Delete", press [Enter] to delete the alphanumeric character.
- Memory space: 10 means that total memory space is 1000 files; it has already saved 10 files so far.



## 4.7 Browse Saved Traces

Use [▲] and [▼] to highlight , press [Enter] to confirm.

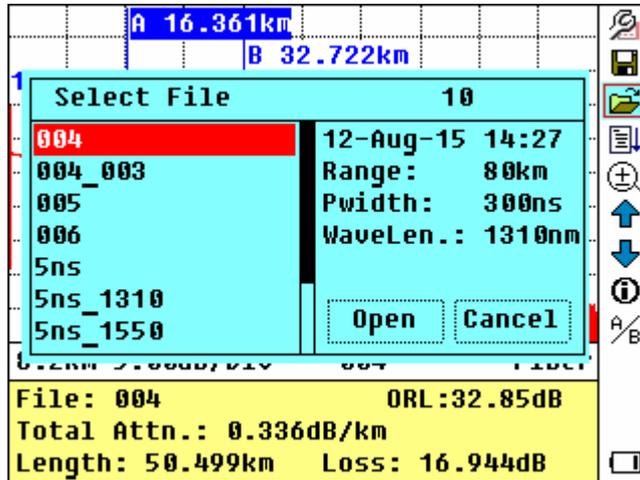


Figure 33.- Browse Saved Traces

- 1 Use [▲] and [▼] to select a certain trace, in the right part of the screen appears general information about the trace selected. Use [←] and [→]. Press [Enter] to confirm.



## 4.8 Upload Saved Traces

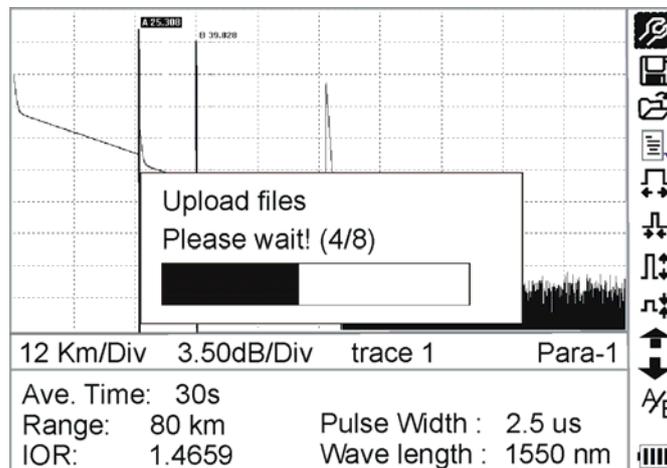
Saved traces can be uploaded to PC through the associated software of trace manager, with which traces can be further processed on PC.

### ■ We suggest at first upload traces through USB interface cable

- 1 Connect PC and **PROLITE-50** with USB interface cable.
- 2 Power on **PROLITE-50**.
- 3 Click "Computer" on PC, find the "removable disk" and click it. Then enter into the "trace" document folder which saved measurement traces, you can freely copy, paste or delete them.

### ■ Upload with USB interface cable and software

- 1 Install the software, and run.
- 2 Power off **PROLITE-50**.
- 3 Connect **PROLITE-50** to PC through USB interface cable.
- 4 Power on **PROLITE-50**, and upload data with the software.



**Figure 34.-** Upload Saved Traces

**NOTE:** Make sure the instrument is power off when connecting to PC through USB data cable; Make sure it's fastened, then power on.

USB sustains the electrification hot plug. However USB operation rules must be obeyed while connecting to PC. To install USB driver correctly is necessary before uploading the data; Make sure USB is pulled out safely. Otherwise it will result in losing data.

This operation cannot be applied under GUI of parameter configuration, save trace, browse saved traces, and measuring in progress.



### 4.9 Alter Measurement Parameters in Realtime Testing

To alter measurement in realtime testing, follow these steps.

Use [▲] and [▼] to highlight the  icon, later press [Enter]. A parameter will appear at the bottom of the screen.

Use [◀] and [▶] to toggle between the parameters to be change (figure below) and then press [Enter].

Use [▲] and [▼] to change the Ref value. Select "Averaging" to select averaging testing.

Press "OK" to exit the parameter configuration menu.

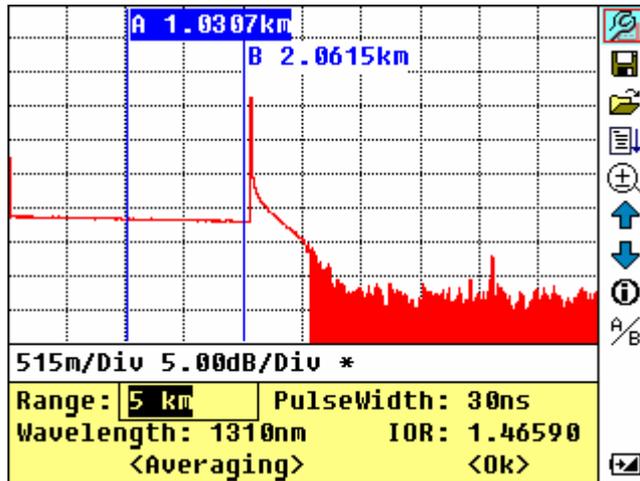


Figure 35.- Real-time testing



## 5 SYSTEM CONFIGURATION

### 5.1 Time Configuration

Time configuration is used to change system time.

Under parameter configuration, use [▲] and [▼] to highlight "Time"; press [Enter] to change, as shown in figure below. Press [↶] to exit.

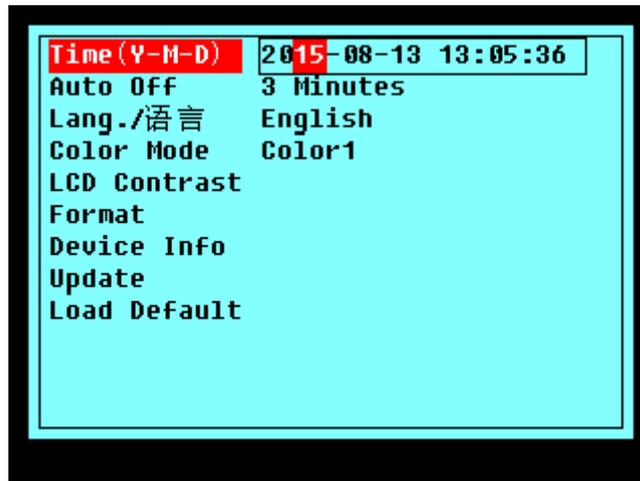


Figure 36.- Time Configuration

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



## 5.2 Auto off Configuration

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

Under parameter configuration, use [▲] and [▼] to highlight "Auto off"; press [Enter] to switch, as shown in figure below. Press [↶] to exit.

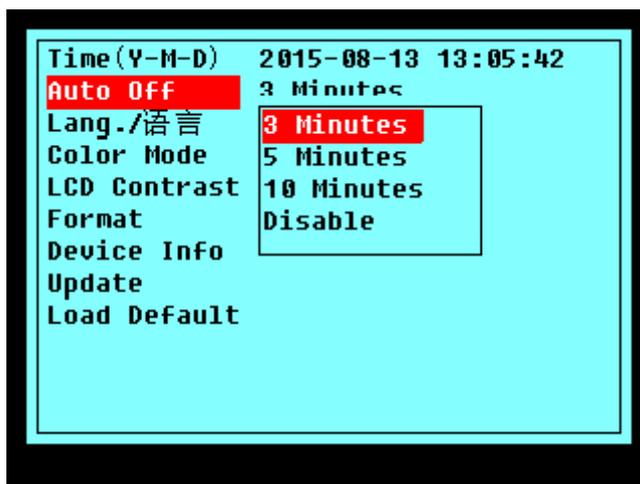


Figure 37.- Auto Off configuration

**NOTE:** The default setting is «auto off» on.



### 5.3 Language Configuration

Under parameter configuration, use [▲] and [▼] to highlight "Language"; press [Enter] to switch, as shown in figure below. Press [↩] to exit.

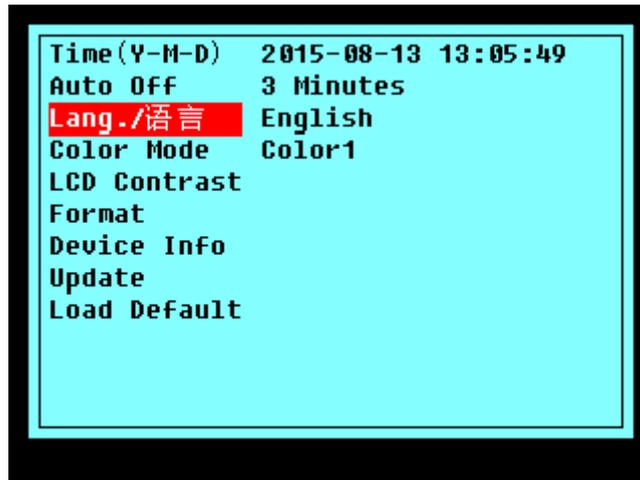


Figure 38.- Language Configuration



## 5.4 Color Mode Configuration

This configuration allows choosing between four combinations of different colours. Use [▲] and [▼] to select "Colour mode", press [Enter] to choose between the different combinations of colour. Press [↵] to quit.

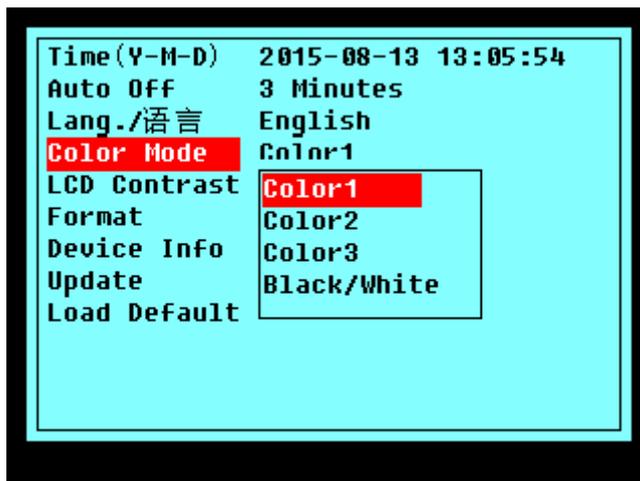


Figure 39.-. Color Mode Setting

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



## 5.5 Contrast Adjustment of LCD Display

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

Under parameter configuration, use [▲] and [▼] to highlight "LCD Contrast"; press [◀] and [▶] to adjust and press [Enter] to confirm. Press [↶] to exit.

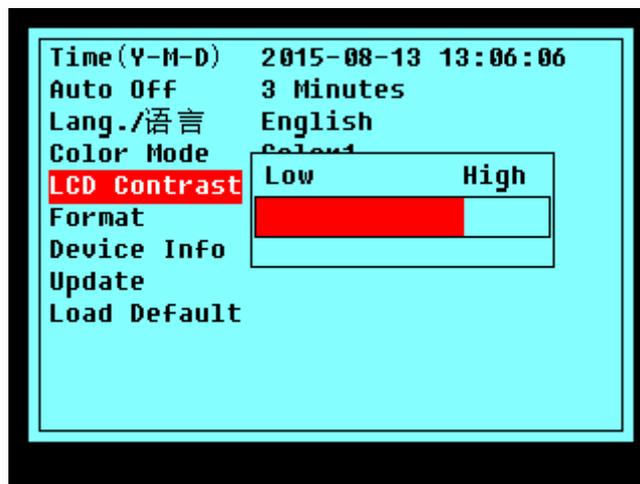


Figure 40.-. Contrast adjustment of LCD display



## 5.6 Formatting Operation

Formatting operation will clear all the contents stored in the body.

Under parameter configuration, use [▲] and [▼] to highlight "Format"; and press [Enter] to choose Yes or No, as show in figure below. Press [↶] to exit.

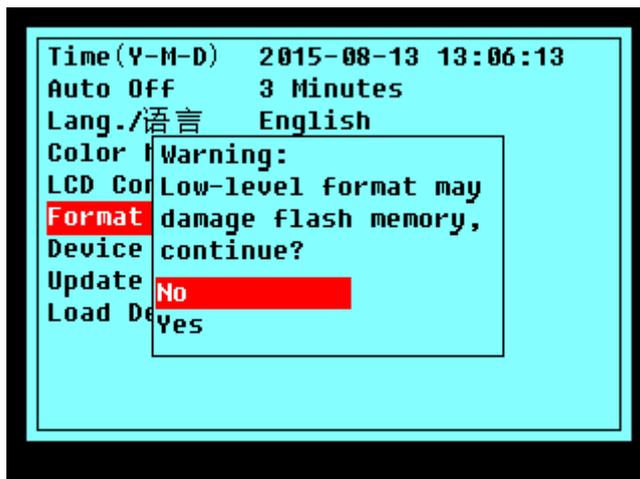


Figure 41.-. Format Operation



## 5.7 Device Information

Device info will show the model and the version.

Under parameter configuration, use [▲] and [▼] to highlight "Device Info"; and press [Enter] to choose Yes or No, as show in figure below. Press [↶] to exit.

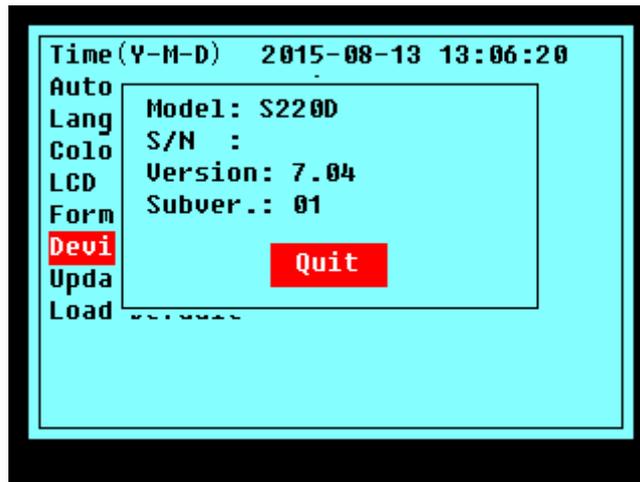


Figure 42.-. Device Info



## 5.8 Update Information

This function is to update the firmware or language.

Under parameter configuration, use [▲] and [▼] to highlight "Update"; and press [Enter] to choose Yes or No, as show in figure below. Press [↶] to exit.

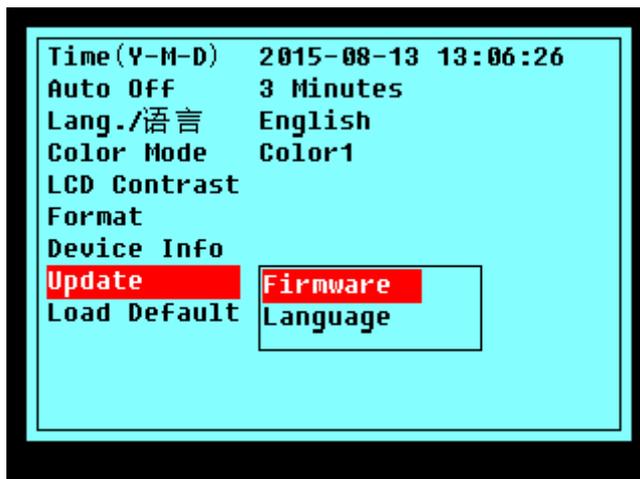


Figure 43.-. Update



## 5.9 Load Default

This function is used to set **PROLITE-50** parameters to factory settings. Those parameters include: range, pulse width, average time, **IOR**, non reflection threshold, reflection threshold, end threshold, and scatter coefficient. Under parameter configuration, use [▲] and [▼] to highlight "**Load defaults**"; press [Enter] to enter, as shown in figure below. Press [↶] to exit.

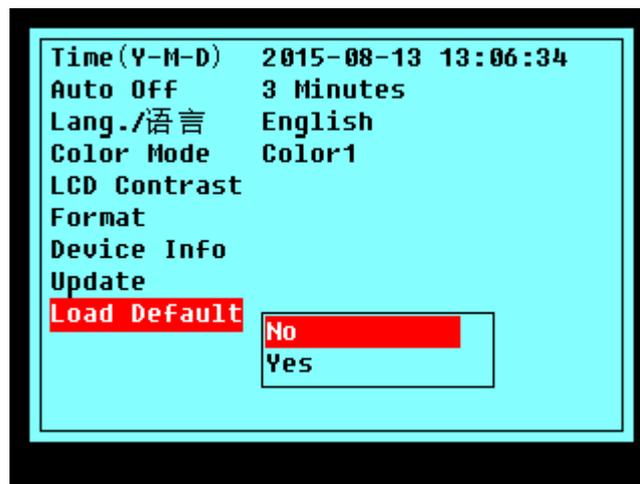


Figure 44.- Load Defaults

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



## 6 SPECIFICATIONS

<b>Wavelength (nm)</b>	
<b>PROLITE-50</b>	1310/1550 nm.
<b>Dynamic Range (dB)<sup>1</sup></b>	
<b>PROLITE-50</b>	24 dB.
<b>Event Dead Zone</b>	
<b>PROLITE-50</b>	10 m.
<b>Attenuation Dead Zone<sup>2</sup></b>	
<b>PROLITE-50</b>	25 m.
<b>Connector Type</b>	SC / APC (interchangeable FC, ST).
<b>Fibre Type</b>	Monomode.
<b>Pulse Widths</b>	5 nS / 10 nS / 12 nS / 30 nS / 100 nS / 275 nS / 300 nS / 1 µS / 2.5 µS / 10 µS / 20 µS.
<b>Selectable Ranges</b>	0.3 / 1.3 / 2.5 / 5 / 10 / 20 / 40 / 80 / 120 / 160 / 240 km.
<b>Distance Measure Accuracy</b>	± (1 m + 5 x 10 <sup>-5</sup> x Distance + reference space).
<b>Reflection Measure Accuracy</b>	± 4 dB.
<b>Attenuation Measure Accuracy</b>	± 0.05 dB / dB.
<b>Memory Capacity</b>	
<b>PROLITE-50</b>	300 curves of test.

<sup>1</sup> The dynamic range is measured at maximum pulse width within average time of 3 minutes.

<sup>2</sup> As conditions for the Blind: The reflection phenomena occur within a distance of 4 km, the reflected intensity is less than - 35 dB, and the blind zone is measured on the minimum pulse width.



<b>Connectivity</b>	USB.
<b>Internal Power</b>	Rechargeable Battery NI MH.
<b>Power Supply</b>	External 13.8 V / DC 1.2 A.
<b>Battery Life</b>	8 hours continuous operation; 20 hours standby (on one charge).

### OPERATING ENVIRONMENTAL CONDITIONS

<b>Altitude</b>	Up to 2000 m.
<b>Temperature range</b>	0 °C to +40 °C (Automatic disconnection by excess of temperature).
<b>Max. relative humidity</b>	Max 80%, without condensation.

### MECHANICAL FEATURES

<b>Dimensions</b>	220 (H) x 110 (W) x 70 (T) mm.
<b>Weight</b>	1 kg.

### ACCESORIES

<b>AL005</b>	Power Supply AC 100 V / 240 V 50 / 60 Hz. Carrying Bag.
<b>0 DG0226</b>	Quick User's Guide. Communication software. (Latest version of software available on the download PROMAX website area). Communication with PC Cable.
<b>AD500</b>	Adapter ST (Optional).

### RECOMMENDATIONS ABOUT THE PACKING

It is recommended to keep all the packing material in order to return the equipment, if necessary, to the Technical Service.



## 7 MAINTENANCE

### 7.1 Instructions for returning by mail

Instruments returned for repair or calibration, either within or out of the warranty period, should be sent with the following information: Name of the Company, name of the contact person, address, telephone number, receipt (in the case of coverage under warranty) and a description of the problem or the service required.

### 7.2 Maintenance of Batteries

Battery for this instrument is rechargeable NiMH battery.

#### NOTES FOR MAINTENANCE OF BATTERIES IN THE INSTRUMENT:

In order for the **PROLITE-50** (including the batteries) to meet specifications, the storage temperature should be within 15 °C to 30 °C. And the instruments should be stored in low humidity environments.

If the instrument is left unused for a long time (idle for over 2 months), it is recommended to recharge the battery every other month.

#### Cautions during Operation:

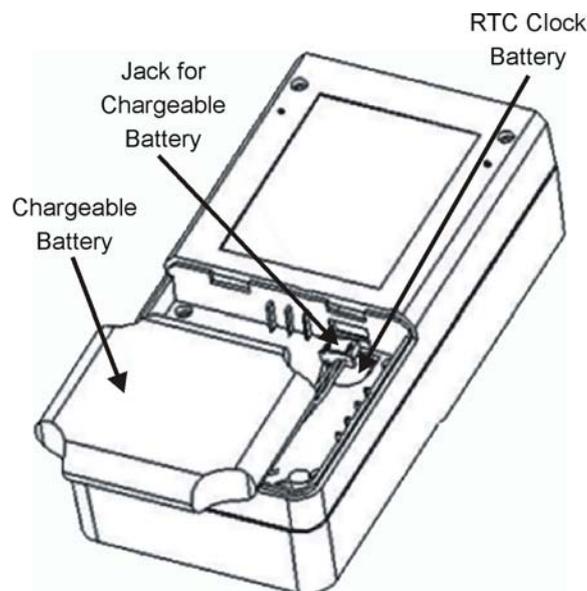
The following may bring auto power off of the instrument:

- 1 The instrument will be auto power off when there is insufficient power during operation and low power will be shown on the LCD.
- 2 If unused for a long time and cause insufficient power, the instrument will be power off several seconds after powering on so as to protect the batteries in case of excessive discharging. The inside batteries should be recharged immediately through adapter.



### Procedure of replacing batteries

- 1 To take off cover of the battery chamber.
- 2 Remove the battery and draw out socket from the jack of chargeable battery, then change the battery if necessary.
- 3 Under the battery is the backup battery for internal clock. Replace if necessary it must be of type button cell 3V Li CR1220.
- 4 Connect and replace the NiMH battery.



**Figure 45.-** Replacing batteries

## 7.3 Cleaning of Interfaces

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

In addition, flanges must be kept clean periodically.

### Effects of Clearing Interfaces and Connectors

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

In addition, power density may burn dust into optic fiber and induce further damage (for example,  $0\text{ dBm}$  optic power may produce about  $16000000\text{ W/m}^2$  power density in single mode fiber). In this case, measurement will be inaccurate and irreversible.



## ■ Safety Instructions to be Followed before Cleaning

- 1 Make sure the instrument 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 clean any optic connectors.
- 4 When the instrument is in operation, please always avoid looking directly into optic output. Although laser radiation is invisible, it may do serious injury to eyesight.
- 5 Be cautious of electric shock and make sure AC power is disconnected with the instrument before cleaning. Always use dry or moistest soft cloth to clean the outside of the instrument, and never clean the inside.
- 6 Please do not add any accessory to optic instrument or adjust the instrument at discretion.
- 7 For maintenance, always go to qualified or certified professionals.

## ■ Tools for Cleaning Interfaces and Connectors

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

## ■ Preferred Procedure for Cleaning Interfaces and Connectors

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



#### 7.4 **Cleaning of Cover**

Do not use scented hydrocarbons or chlorized solvents. Such products may attack the plastics used in the construction of the cover.

To clean the cover, take care the instrument is disconnected.

The cover should be cleaned by means of a light solution of detergent and water applied with a soft cloth.

Dry thoroughly before using the system again.

#### 7.5 **Calibration Requeriments**

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