Optical Time Domain Reflectometer

Operation Manual

Basic Information

※ Advice

The User Manual specifies the agreements between our company and users regarding the establishment and termination of product quality assurance responsibilities, after-sales service rights and obligations. Please read this manual carefully before using our company's products.

※ Safety Information Laser Safety Information

Warning

Do not install or terminate fiber optic cables when the light source is active. Do not directly peek at the load signal fiber to always protect your eyes.

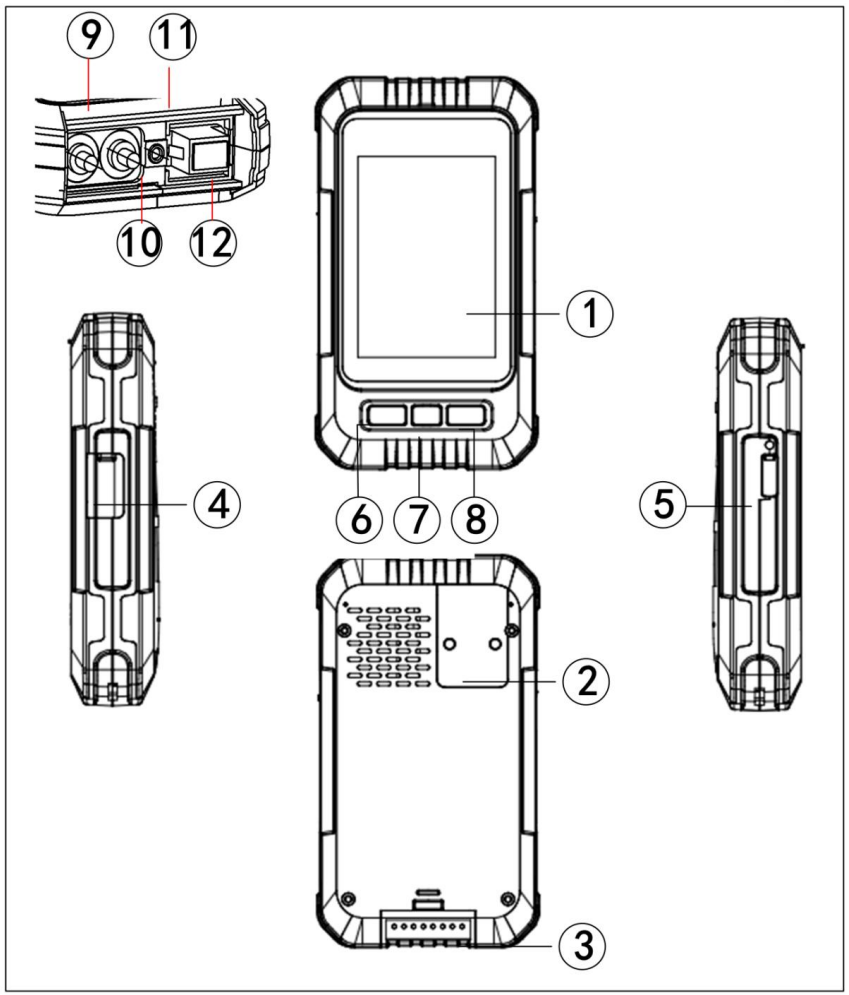
※ Precautions

Battery and adapter: The internal battery is a specialized polymer lithium battery with a charging voltage of 5V/2A and a charging temperature range of -5 ° C~40 ° C. Charging will automatically stop when the ambient temperature is too high. The instrument should be charged every month to avoid long-term storage, as the battery may become unusable due to self discharge. The storage temperature of the battery is -20 ° C~45 ° C

Attention: The charging voltage of this instrument is 5V, and the current must be greater than 2A; Please strictly follow this regulation when using external power sources, otherwise it may cause equipment damage

Attention: Before testing, please clean the end face of the tested fiber optic connector with a cleaning cloth.

Equipment



Main View

① Color LCD

⑥ VFL shortcut keys

⑦ ON/OFF

⑧ Flashlight shortcut key

Top

⑨ OPM

⑩ VFL

⑪ Flashlight

⑫ OTDR/LS

Left

④ RJ45 interface (Optional)

Right

⑤ Type C USB

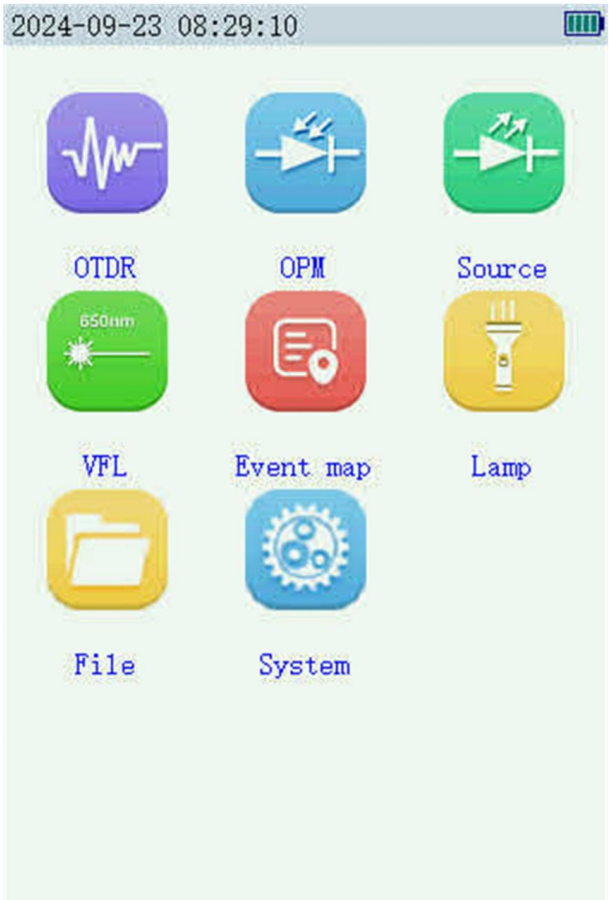
- 1).Charging port
- 2).Connect the computer to copy data
- 3).USB drive for data transfer

Back

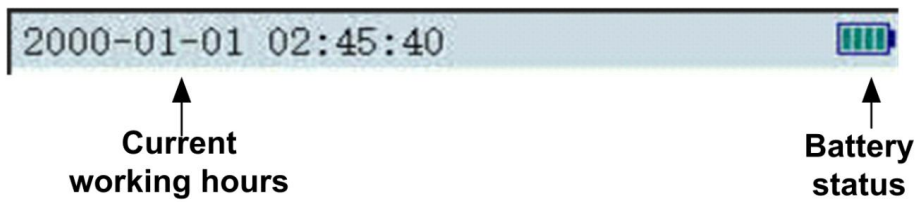
② Flange plate Replaceable module

③ RJ45 testing remote (Optional)

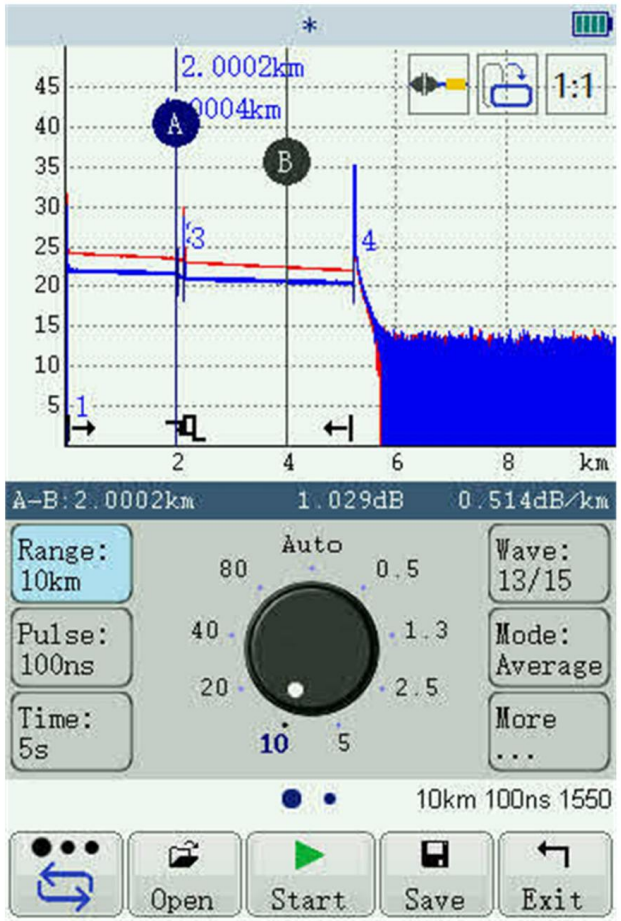
Main interface



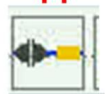
After booting up, enter the menu and touch the corresponding function icon for 8 functional modules to enter the corresponding function interface.



OTDR interface



1.When clicking on "Range"/"Pulse Width"/"Duration", the corresponding knob will appear, select the corresponding parameter.
2.Wavelength: Choose single wavelength measurement or dual wavelength measurement
3.Mode: Average testing and real-time testing.
Support real-time parameter changes during the testing process.


Event map


Horizontal
Vertical

Restore initial curve


Test result conversion

Open a folder

Test button

Save current curve

Return to the previous interface

【Curve operation】
Curve scaling and dragging: touch screen gesture operation

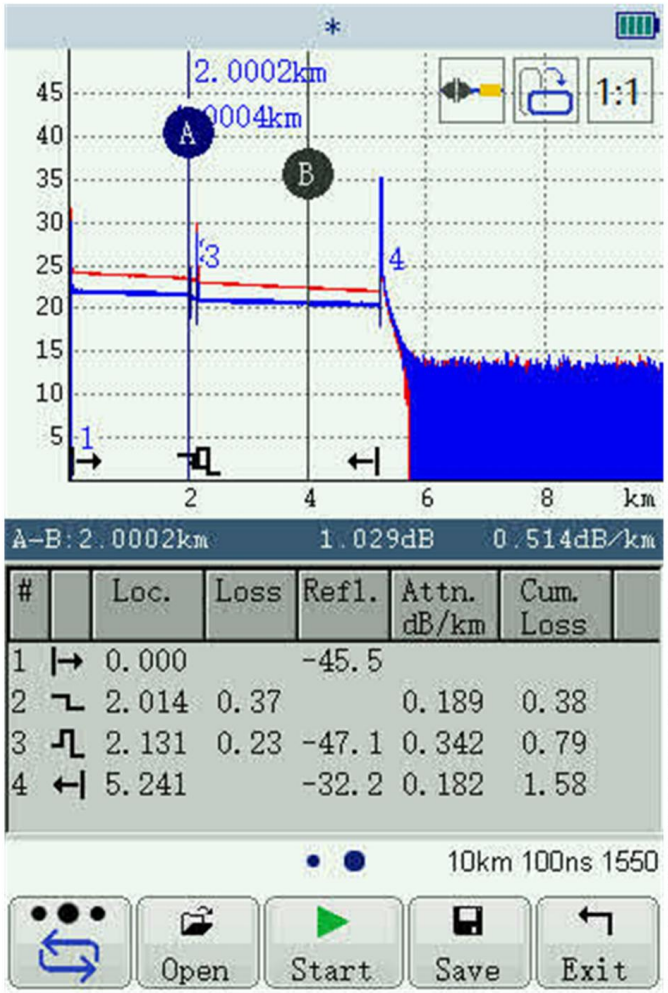
【Open folder instructions】
Can simultaneously open two curves for comparison

【Save Settings Instructions】

1. Every time the computer is turned on, the file name is reset

2. [Automatic Naming] After setting the file name at the same startup, the instrument can be automatically named.

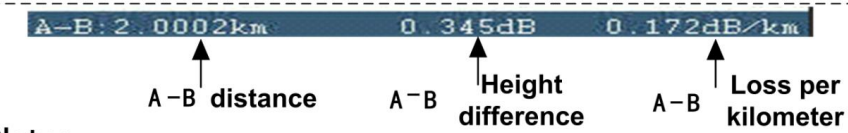
OTDR List



Event List:

Event number of the current trace
Type: The type of the current event point (see list)
Location: The current location of the event point
Insertion loss: the loss at the current event point
Reflection: The reflection value of the current event point
Attenuation: Loss per kilometer from the starting point to the current event point
Cumulative loss: the total loss from the starting point to the current event point

Mobile benchmark: Drag A or B

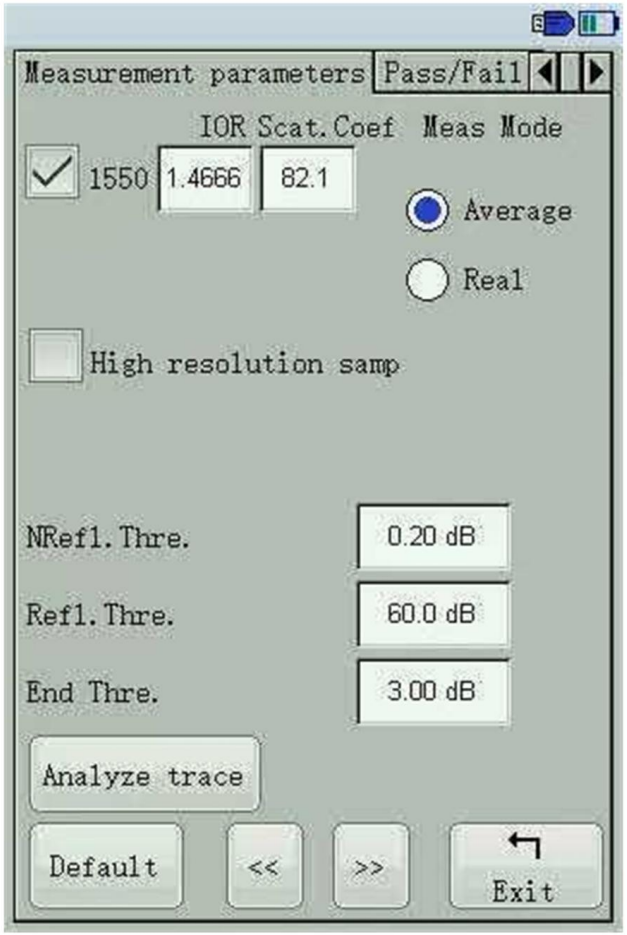


Note:
(A-B) Loss per kilometer= $\frac{\text{(A-B) altitude difference}}{\text{(A-B) distance}}$

Event type

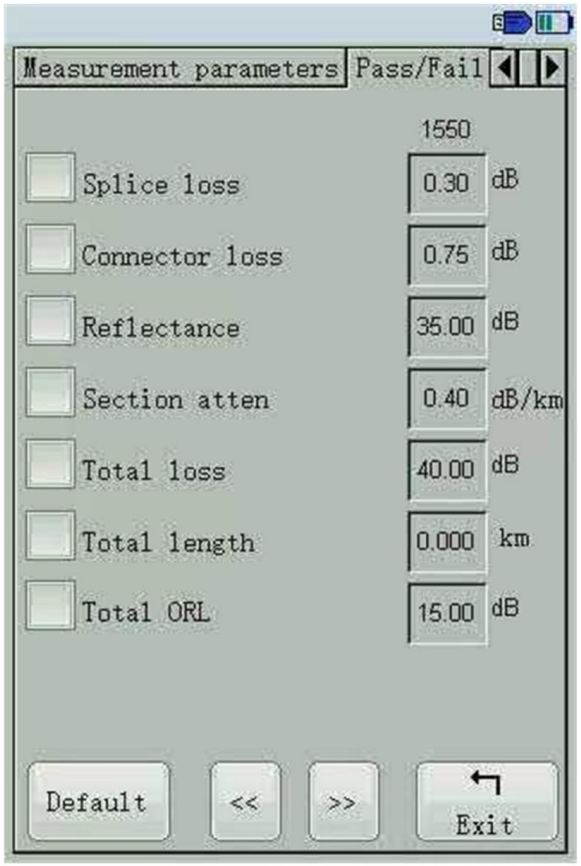
NO.	Marking	Meaning
1	⊢	Starting end of the tested optical fiber
2	⎍	Reflex event
3	⎽	Decay event
4	⎼	Gain event
5	⊣	Termination end of the measured optical fiber

OTDR settings



Fiber parameters: Set the refractive index and backscattering coefficient of the test wavelength.
Note: The refractive index of a fiber is an inherent parameter of the fiber, which is related to the length of the fiber.
Sampling mode: Normal and high sampling resolution. High sampling resolution requires longer time but more accurate testing.
Analyze parameters
Non reflection threshold: Set the loss threshold for fusion points or macro bending events in the link that can be tested. The default value is 0.2dB. Events above this threshold will be displayed in the event list.
Reflection threshold: Set the reflection threshold value that can test the reflection events in the link. Default value -60dB
End threshold: Set the threshold value for detecting the end point in the link.
Default value: 3dB.
Analyze the trace: After resetting the fiber parameters and analysis parameters, click to reanalyze the link.

OTDR settings



Pass/fail threshold setting

Pass/Fail function parameters can be set to determine thresholds for fusion loss, connector loss, reflection, total loss, total return loss, etc. in the link.

Welding loss: used to set the threshold for determining the position loss of the welding point.

Connector loss: used to set the threshold for determining the position loss of the connector.

Reflection: used to set the threshold for determining the size of the reflection value at the connector position to pass

Fiber section attenuation: used to set the threshold for determining the size of fiber loss per kilometer.

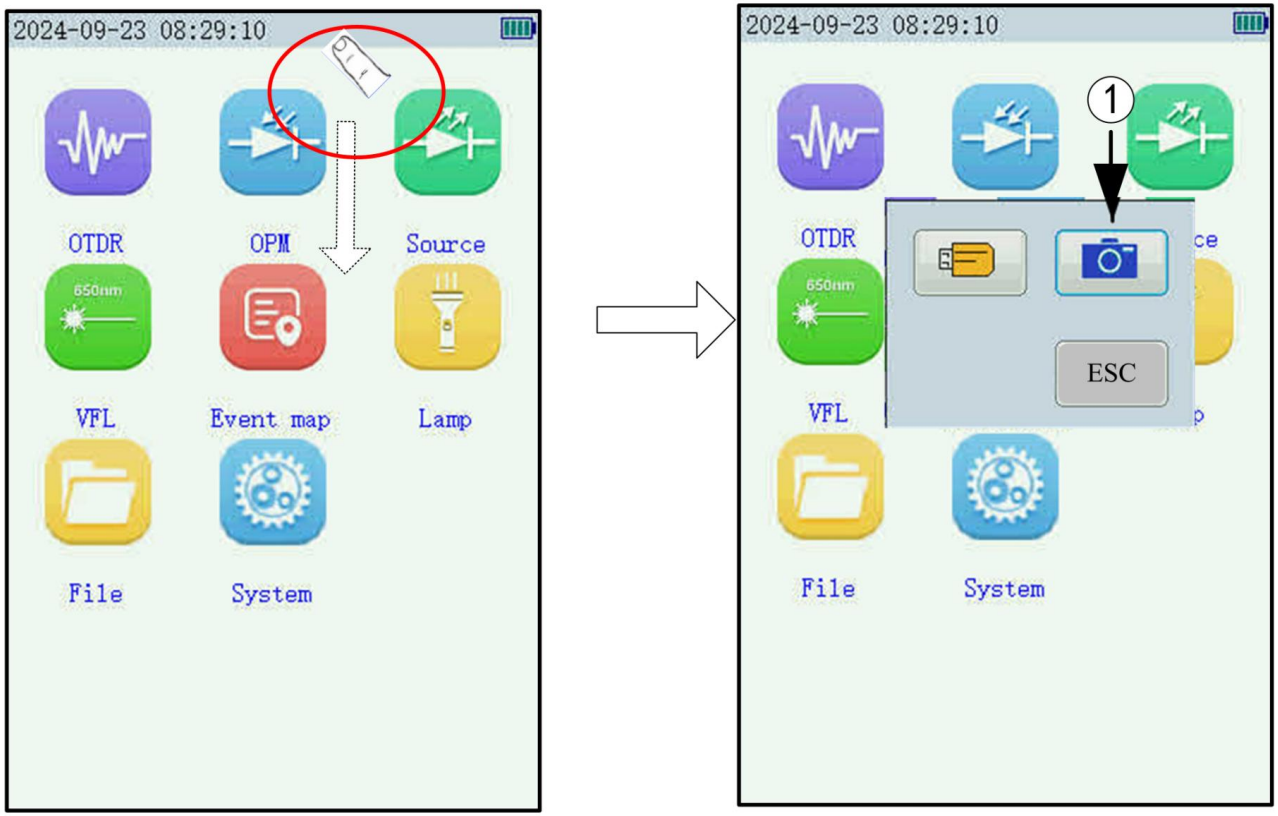
Total loss: used to set the threshold for determining the passing size of the total loss of the optical link

Total length: used to set the threshold for determining the passing size of the total length of the optical link

Total Return Loss: Used to set the threshold for determining the size of the total return loss of the optical link

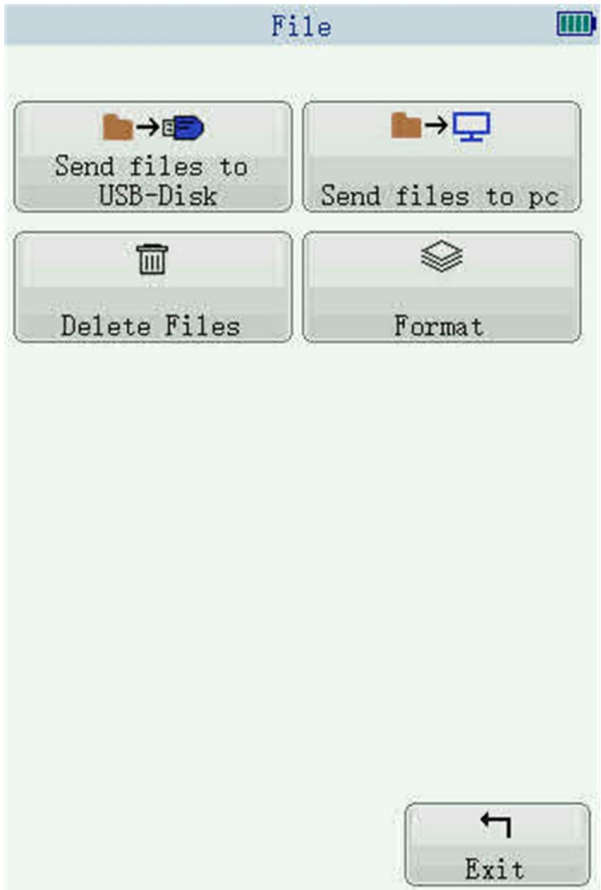
Screenshot

On the 8 major operable interfaces and main interface, use your finger to slide between the time bar and battery display, and the fingertip will slide down to pop up the function bar



① Screenshot: Clicking on this icon will take a screenshot of the current interface

Data transmission/file management

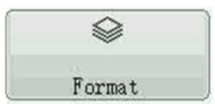


Click on the icon to transfer the data to the selected USB drive and create a test folder

Note: The USB flash drive must be legitimate, otherwise it cannot be recognized

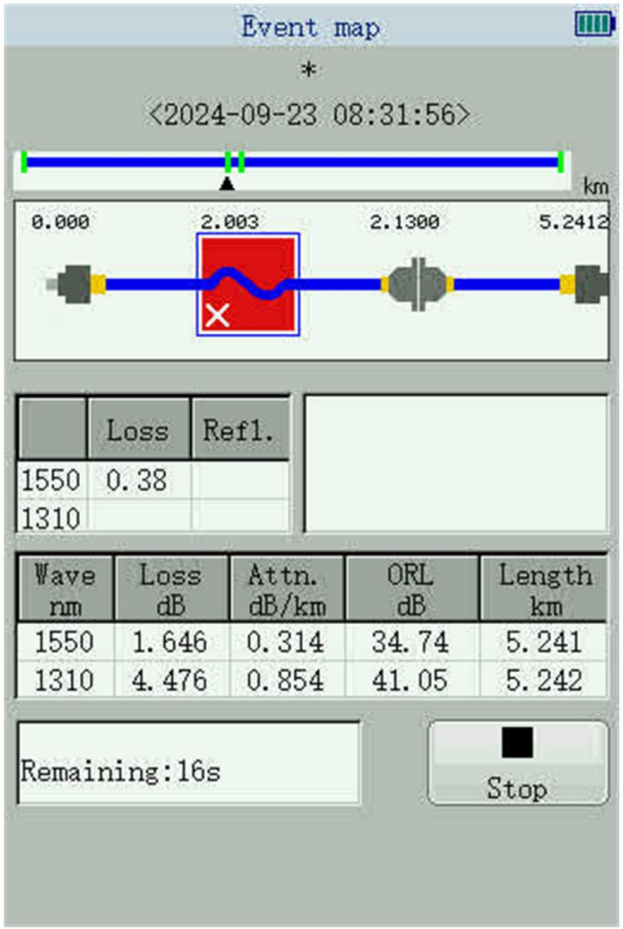
Connect devices to computers using data cables; Click on the icon, and the computer will display the USB drive icon. Copy the data to the computer for processing

Click on the icon to enter the data deletion interface and delete the saved data



Click on the icon to format the memory to prevent too many fragments from affecting the data

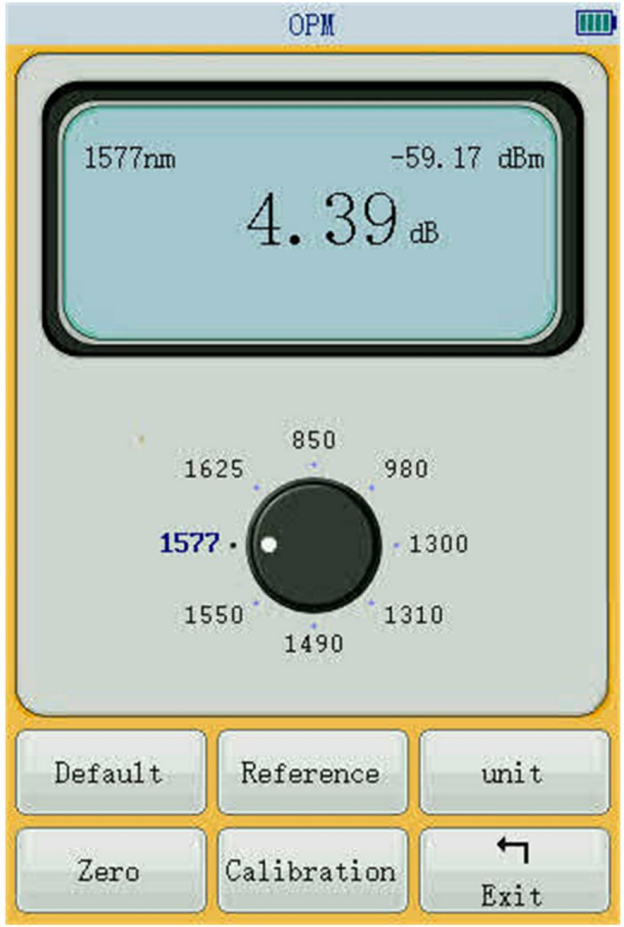
Event map



The event map has a one click testing function, which can quickly and accurately analyze the internal situation in the fiber optic cable; Intuitively reproduce the event points in the fiber optic cable, and analyze in detail the distance, attenuation, reflection, and other conditions of the event points

Symbol	Meaning	Remarks
	Start event	It generally refers to the starting point of the measured optical fiber
	Start event reflection too large	1. Aerial survey 2. The measured optical fiber connector does not match the instrument connector 3. Ceramic core of flange 4. The optical fiber connector is dirty 5. The inner joint of the instrument is seriously worn
	LOSS event	Generally, it is a welding loss event
	Reflection event	It generally refers to the connection of flange plate
	Macro bend event	The macro bending loss is too large
	Reflection event too large	Generally, it is caused by poor connection of flange plate, such as unclean optical connector, mismatch of optical connector, etc
	end event	Generally refers to the end of the optical fiber under test

OPM



Optical power meter is an instrument used to measure the magnitude of optical power, which can be used for direct measurement of optical power or relative measurement of optical attenuation. It is a necessary basic testing instrument for research, development, production, construction, maintenance and other departments in optical fiber communication systems.

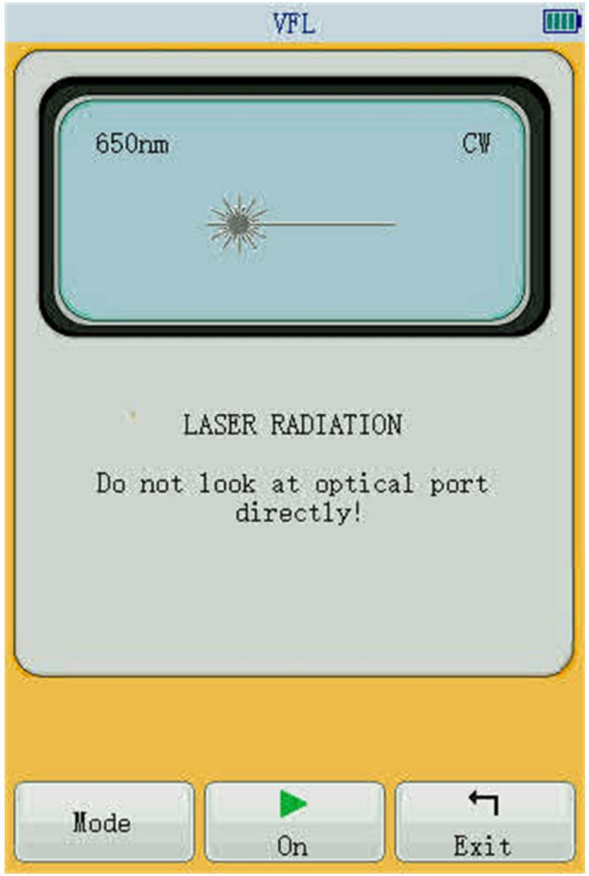
Wavelength: Select the appropriate wavelength through the knob

Reference: Relative testing.

Operation: Click to enter the reference interface, click "Reference" again to select the current test value as the reference value; At this point, the relative value is displayed again
Click on the reference again to exit the relative measurement interface

Calibration: Enter user calibration mode and calibrate the optical power meter in conjunction with the labeled light source

VFL

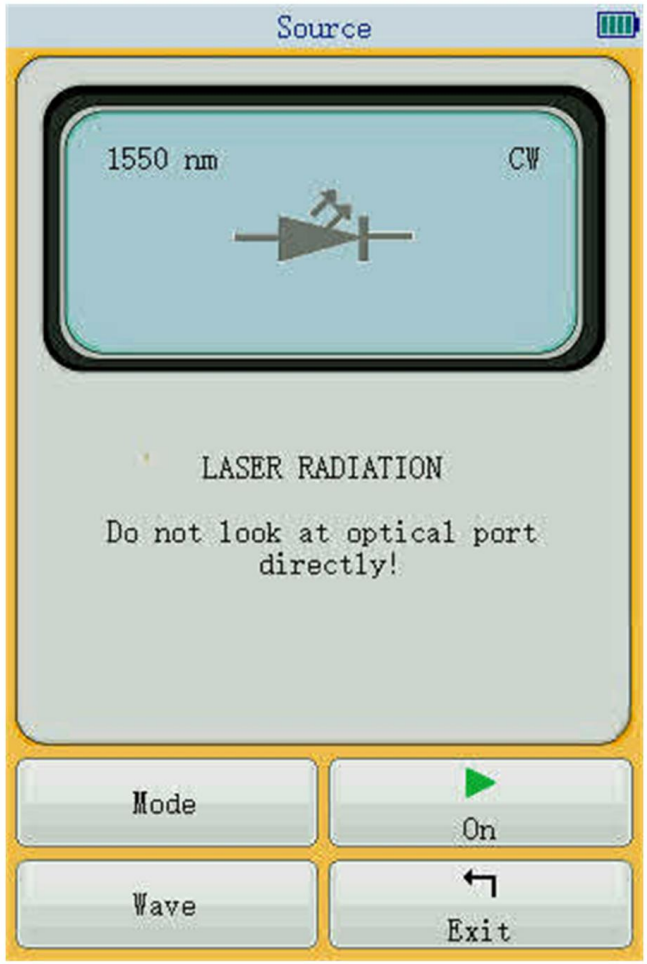


The 650nm laser is a light-emitting device that is driven by a constant voltage and current to emit red light. After being connected to an optical interface, it enters multimode and single-mode optical fibers to achieve fiber fault detection function. It is a beneficial supplement to the blind zone of optical time domain reflectometry

Activate VFL

CW → 1Hz → CW Loop mode

LS



The light source (LS) can output laser with the same wavelength as OTDR, and when combined with an optical power meter, it can measure the optical loss of fiber optic systems. In optical communication technology, optical fiber loss measurement, connection loss measurement, and sensitivity testing of optical receivers all require the use of light sources

Mode: Click to select：CW 270Hz 1KHz 2KHz

Wavelength: This wavelength is the same as the OTDR function wavelength

Do not install or terminate fiber optic cables when the light source is active. Do not directly peek at the load signal fiber to always protect your eyes.

System settings

The system settings include language, automatic shutdown, unit, time, and other settings

Language settings: Set the native language type

Automatic shutdown settings: on/off

Length unit settings: meters, inches, miles

Display contrast: Choose the appropriate LCD brightness

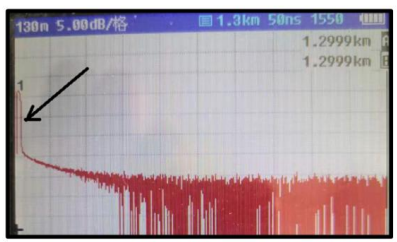
Instrument time: Adjust the time to the current time

Version: The current software version number of the instrument

Equipment issues

Problem	Reason	Solution
The device cannot be turned on	The battery is fully depleted	√ Charging the battery √ Connect the device to an external power source through an AC adapter/ charger √ Long press the power button for 10 seconds; Wait for 10 seconds and press the power button to turn on the device √ Repeat the above steps, but the device still cannot be turned on. At this point, it may be considered that the device or battery is faulty
Shorten the working hours of the equipment		The battery life has been exhausted, replace the battery
		Low battery level, charging the battery
The battery is not fully charged	Inappropriate power adapter	Replace with a suitable charger, power adapter 5V 2A
	The USB charging cable is not suitable	Replace the charging cable
Device restart		Press and hold the power button for 10 seconds; Wait for 10 seconds and press the power button to turn on the device

Test questions

Problem	Reason	Solution
OTDR test without curve	Report light card malfunction	Return to factory
	During testing, there is only noise and no peak values in the curve	
	During testing, there is only the first reflection peak and no curve 	1）.Clean the internal bald head 2）.Clean the tested fiber optic connector 3).Check if the ceramic core of the flange is broken 4).Short distance/small pulse width/dual wavelength test, check for breakpoints or macro bends in the front end 5)The fault point may be within the blind zone, it is recommended to use a red light source for detection
	During testing under low pulse width conditions, there is no curve (with the first reflection point); Increasing the pulse width can test the curve.	Reason for malfunction: Severe wear and tear on the internal optical port; Replace the internal bald head. 

Please pay attention to the following items during the use of the instrument to facilitate better use of the product.

1) It is recommended to use optical jumpers less than 3 meters for testing. (The optical jumper can be placed on the instrument for a long time)

Benefits:

a. Protect the ceramic core in the flange from damage. b. Prevent fiber cross-section wear and ensure OTDR performance does not decrease.

2) Regularly clean the bald head and cross-section:

If the optical jumper in 1 is frequently removed, please clean the optical section and replaceable ceramic core in the optical flange plate irregularly.

The reasons are as follows:

a. Clean the light cross-section to prevent wear and tear (cleaning rod).

b. Clean the ceramic core inside the replaceable flange (please make sure to clean it regularly, as frequent insertion and removal of fiber optic connectors can cause dust to accumulate between the internal and external optical connectors of the instrument, and long-term lack of cleaning can crush the ceramic core).

Attention: Suggestion 1 can avoid the above problems

Daily maintenance of lithium batteries:

1. When users receive the battery, they can directly use it and recharge it after using up the remaining power. After 2-3 normal uses, the lithium battery activity can be fully activated.

2. It should be noted that lithium batteries should not be excessively discharged, as excessive discharge can cause irreversible capacity loss. When the machine prompts low battery, it should start charging immediately.

3. The charging temperature of lithium batteries is between 0 ℃ and 45 ℃, and the discharging temperature is between -20 ℃ and 60 ℃.

d. Do not tap, puncture, step on, modify, or expose the battery to sunlight. Do not place the battery in environments such as microwave or high voltage.

4. Use a legitimate matching lithium battery charger to charge the battery, and do not use inferior or other types of battery chargers to charge the lithium battery.

Due to design and improvement requirements, any changes to the content of this manual will not be notified