

Optical Time Domain Reflectometer

Model # LOT2200



Preface

Thank you for purchasing LinkU OTDR (Optical Time Domain Reflectometer). This manual contains useful information about this instrument's function, setting, operating procedures and maintenance. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.

*** The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.

Safety Precaution

1. AC/DC Adapter

Power supply Spec.: DC: 9V, 2A; AC: 100 ~ 240V, 50/60 Hz, 0.8A

Using an inappropriate charger/adaptor may result in damage to the instrument.

2. Battery

In order to ensure the performance of batteries, please use internal batteries to supply power when using this instrument for the first time, deplete the battery power, and then recharge the battery. The first charging time should be no less than 4 hours. The charging temperature range is $-10 \sim 50^{\circ}\text{C}$. When the ambient temperature is too high, please stop charging for your safety. When the instrument is idle for more than 2 months, it should be charged in time to maintain the battery power; do not put the battery close to the source of fire; do not open or damage the battery; the temperature range for long-term storage is $-20 \sim 50^{\circ}\text{C}$.

3. Laser Safety

The laser in this equipment is classified as Class 3B. It may result in serious damage to the eyes. Never look directly into the connector on the equipment nor into the end of a cable connected to the equipment.

4. Before testing with OTDR module please ensure there is no active signal in optical network under test, any signal which power is higher than 0dBm will permanently damage this instrument and this damage is not covered by the warranty!



1. The overall layout



Item	Physical Area	Description	
I	Optical Interface	OTDR, Optical Power Meter, Laser Source, VFL	
II	Electrical Interface	AC/DC Adaptor, Micro USB, USB2.0 Type A, SD card, RJ45, LED lighting	
III	Physical Keys	[M] Key: Manual Testing mode ; [A] Key: Auto Testing mode ; ▲▼◀▶ & [OK] Keys: move cursor and confirm operation ESC: Exit the current menu SETUP: in OTDR module, click this key to enter OTDR testing parameter setting interface ⏻ : Power on/off (>2s)	
IV	Main Menu Area	1. Basic Information	Battery level display, Date/Time, Drop-down Menu
		2. Main Menu	Enter relevant module / sub-menu

2. System Setup

2.1 In Main Page, click [Setting] to enter System Setup Menu, use direction keys and [OK] to choose Language, Backlight, Auto power off and System time/date.



2.2 Click [System Info] to check system information of the OTDR

2.3 Click [Upgrade] to upgrade the firmware

Steps:

- 1) Place the upgrade software in the root directory of USB flash drive.
- 2) Turn on the instrument and insert the U disk into the USB port.
- 3) In Main Page, click [Setting] --> [Upgrade] --> [OK], The upgrade process will complete automatically

Note: During the upgrade, to avoid any system software failure, please do not cut off the power or unplug the U disk.

3. OTDR Module

In Main Page, click [OTDR] icon to enter OTDR module.

3.1 OTDR module setup

Click [Parameter Settings] to enter OTDR setup menu.



3.1.1 Parameters Settings

[Test Wave]: Select test wavelength

[Test Range]: Select test distance (selectable only in manual mode). In Automatic mode, OTDR will adopt the most appropriate parameters for the current measurement automatically. ⁽¹⁾

[Pulse Width]: Select proper Pulse Width.

Pulse width refers to the time width of the optical pulse signal, the wider the pulse width, the stronger the optical power injected into the optical fiber, the stronger the backscattering signal of the optical fiber, the farther the OTDR can effectively detect, but the wide pulse width will cause the saturation of the initial reflection signal and cause a large dead zone. Therefore, the choice of pulse width is related to the fiber length. The longer the fiber length is, the wider the pulse width is.

[Test Time]: Select test time for "Average Test" mode or [Real Time] for real time test.

In Average test mode, the longer test time is, the better the signal-to-noise ratio of the signal is and the more accurate the test results are.

In Realtime test mode, OTDR will keep running test until stopped by user, and display the last test result.

[Resolution]: A higher resolution will have more sampling points and higher accuracy, but also increase the amount of data collected.

[Refraction]: Edit the refraction index which is recommended by the fiber manufacture.

[Launch Cable]: Set the length of the launch cable (Guide Fiber).

User could move the first connector out of the dead zone of the OTDR by using a launch cable. The proper length is 100~1000m.

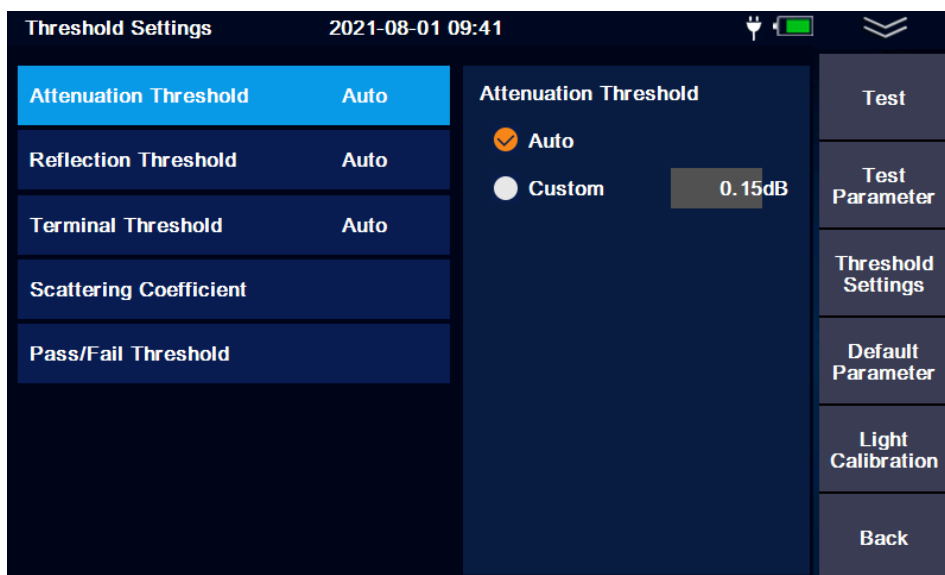
[Unit]: Select distance unit: km / kfeet / mile

(1) OTDR automatically chooses the most suitable pulse width when the test range is manually set in automatic mode. In manual mode, the test range and pulse width can be adjusted manually. The following chart is for reference only:

Test Range \ Pulse width	500 m	2km	5km	10km	20km	40km	80km	120km	200km	240km
3ns	√	△	△	△	△	△	△	△	△	△
5ns	√	√	△	△	△	△	△	△	△	△
10ns	√	√	√	△	△	△	△	△	△	△
20ns	√	√	√	√	△	△	△	△	△	△
50ns	△	√	√	√	√	△	△	△	△	△
100ns	△	△	√	√	√	△	△	△	△	△
200ns	△	△	△	△	√	√	△	△	△	△
500ns	△	△	△	△	√	√	√	△	△	△
1us	△	△	△	△	△	√	√	√	△	△
2us	△	△	△	△	△	△	√	√	√	△
5us	△	△	△	△	△	△	√	√	√	√
10us	△	△	△	△	△	△	△	√	√	√
20us	△	△	△	△	△	△	△	√	√	√

3.1.2 Threshold Setting

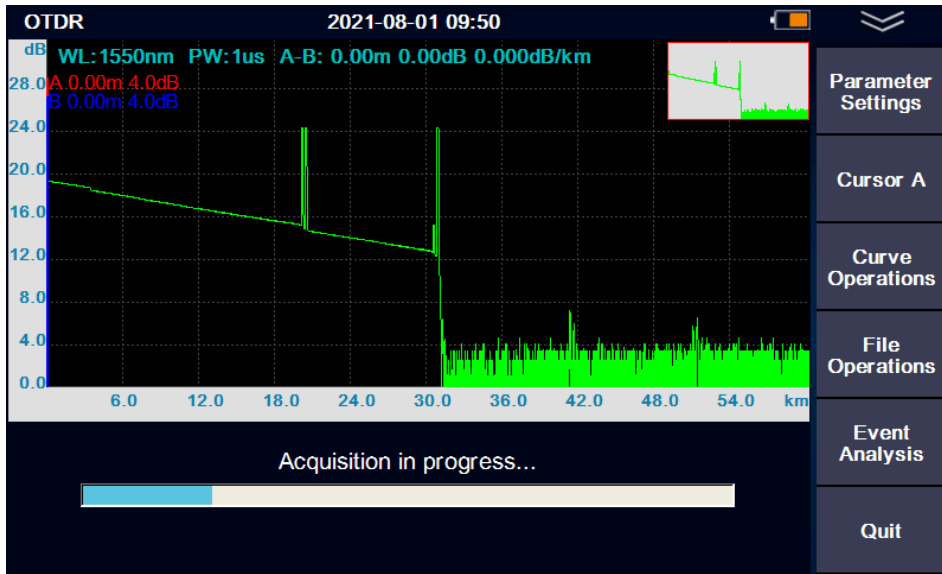
The threshold settings allow user to set the threshold of Attenuation / Reflection / Terminal/Backscatter coefficient are provided by cable or fiber manufacturer.



3.1.3 Default Parameter: Press [Yes] to restore the factory settings.

3.1.4 Light Calibration: Press [Yes] to reset the baseline of the light detection, meanwhile, the OTDR output port must be covered.

3.2 Running Test



3.2.1 Manual Test Mode (Real-time Test Mode)

In OTDR module, click [Parameter Settings] >> [Test Time], choose [RealTime], then pull down the drop-down menu, click [Manual Test] to run real time test.

3.2.2 Manual Test Mode (Average Test Mode)

In OTDR module, click [Parameter Settings] >> [Test Time], set test time (10s,15s, 30s or customized), then pull down the drop-down menu, click [Manual Test] to run averaging test.

3.2.3 Auto Test Mode

In main menu, pull down the drop-down menu, click [Auto Test] to run auto test.

3.2.4 Test Results Display



There are 4 icons below the test curve coordinates:



displays test curve and events list



displays test curve only



displays events list only



displays the parameters set for this test, user can move the cursors to review more test information

- The measuring results could be auto-saved once the measurement is finished.

3.3 Cursor selection and Curve Operations

3.3.1 In OTDR module, select cursor “A”, “B”, or “AB” by clicking [Cursor A] repeatedly, the selected cursor(s) can be moved by using ◀ & ▶ keys

3.3.2 Click [Curve Operations], the curve can be zoom in or zoom out horizontally or vertically by using physical direction keys.



3.4 File Operations

In OTDR module, click [File Operations]

3.4.1 [Load]: To select and process saved files



3.4.1.1 [File operation]: To copy, cut, paste, delete, rename the selected file

3.4.1.2 [Load]: To load the selected file to the screen

3.4.1.3 [Save Settings]: To choose storage device, edit file information



3.4.2 [Save]: To save current test result

3.4.3 [Switch]: To switch different curves, the selected curve will be highlighted

3.4.4 [Remove]: To remove selected curve

3.4.5 [Save Settings]: To choose storage device, edit file information

3.5 Event Analysis

In OTDR module, click [Event Analysis]



3.5.1 Click [Cursor A], select cursor “A”, “B”, or “AB” by clicking [Cursor A] repeatedly, the selected cursor(s) can be moved with finger, or by using ◀ & ▶ keys

3.5.2 Click [Curve Operations], the curve can be zoom in or zoom out horizontally or vertically by using physical direction keys.

3.5.3 [Add Event]: to add event where the cursor moved to

3.5.4 [Remove Event]: to remove the selected event

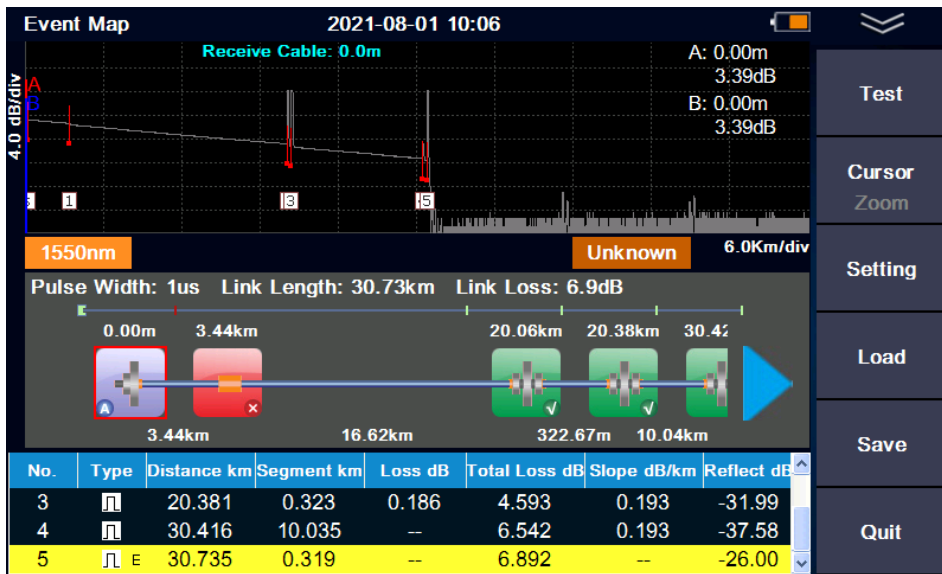
4. Event Map

In main menu, click the [Event Map] icon to enter event map module.

The event map translates the connection of the whole fiber link directly into the physical schematic diagram, such as fusion connection, flange connection, splitter, fiber start, fiber end, bending, etc.

In Event Map module, click [Test] to run a measurement, click [Cursor / Zoom] to move the cursors and zoom in/out.

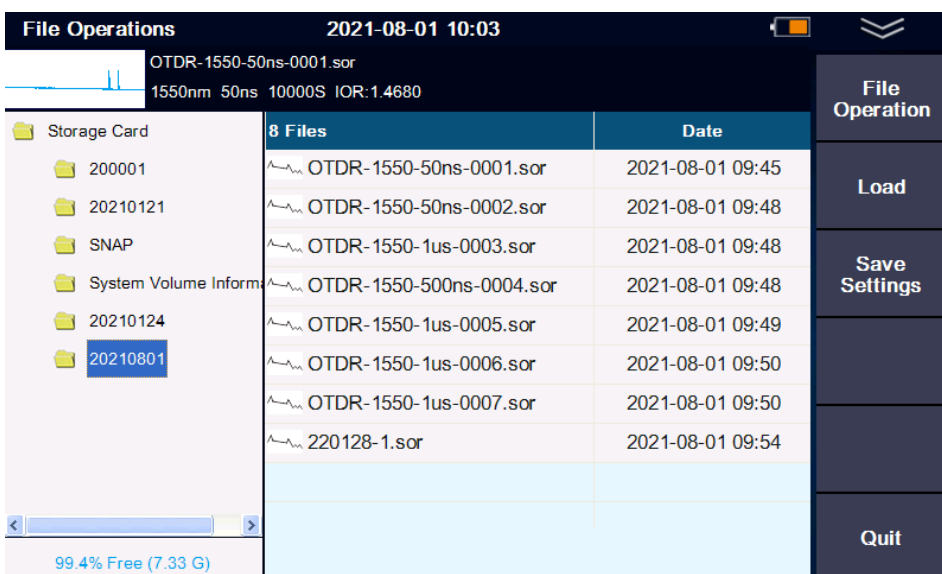
Some analysis parameters need to be set before running event map measurement. It is recommended to use the default value, if user is not familiar with the link analysis parameters.



5. File

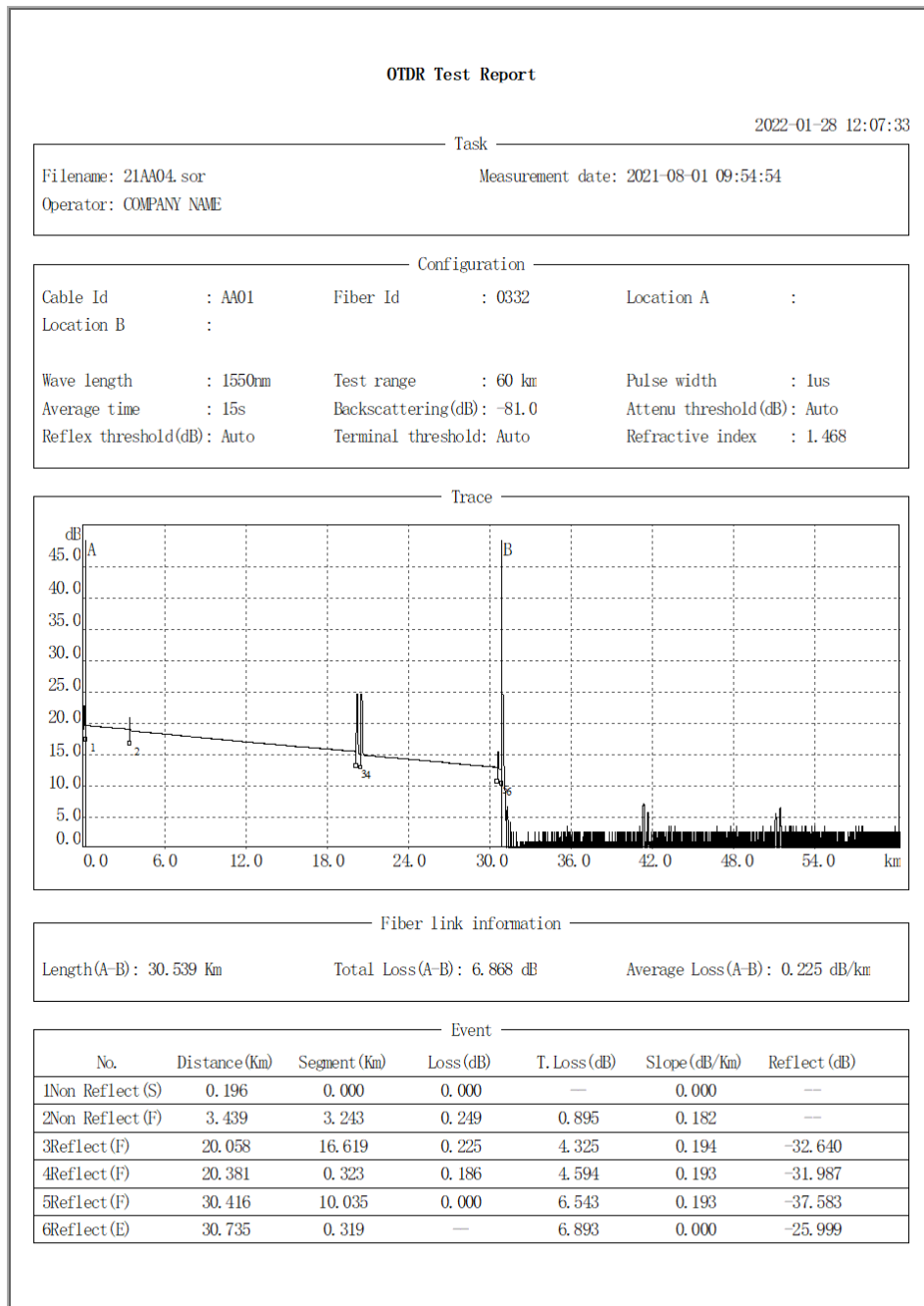
In main menu, click the [FILE] icon, or pull down the drop-down menu and click [FILE] to enter File Management.

The results of each measurement could be automatically saved to SD card or USB disk, and marked with information such as time, date and serial number for easy access. User can name, number, annotate and so on for each measurement, and can also generate complete reports through PC software.



6. PC Software

User can carry out multi-trace comparison / analysis by using PC software after upload the traces to a computer, and print the report easily.

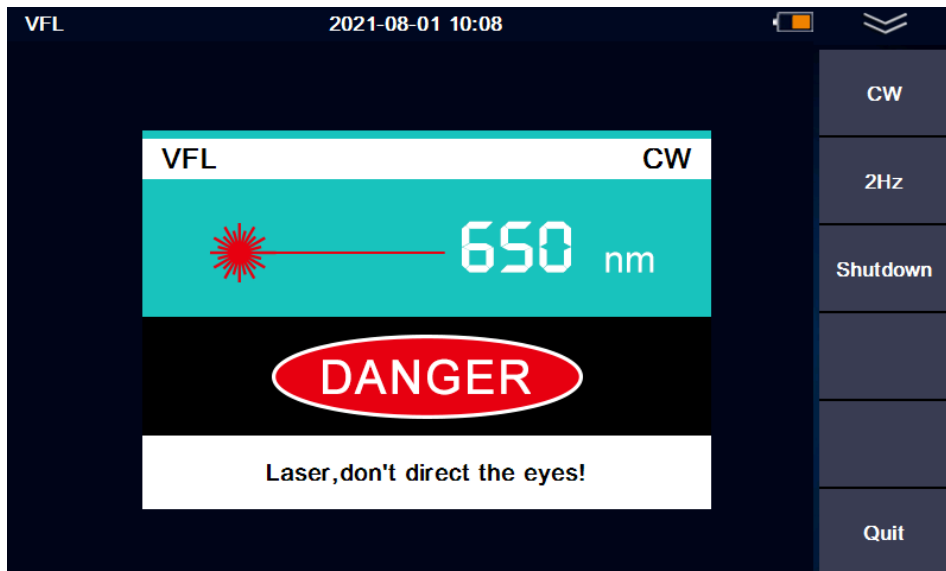


7. Other Modules

7.1 Visual Fault Locator (VFL) Module

The 650nm VFL module is used to identify fiber and locate a break (or macrobend) point. It works in 2 selectable modes: CW and 2 Hz modulation.

Click [CW] or [2Hz] to turn on the VFL, it can be turned off by clicking [Shutdown] or [Quit]. When the VFL module is activated, do not stare into the beam directly, otherwise it may cause irreversible injury!



7.2 Optical Power Meter (OPM) Module

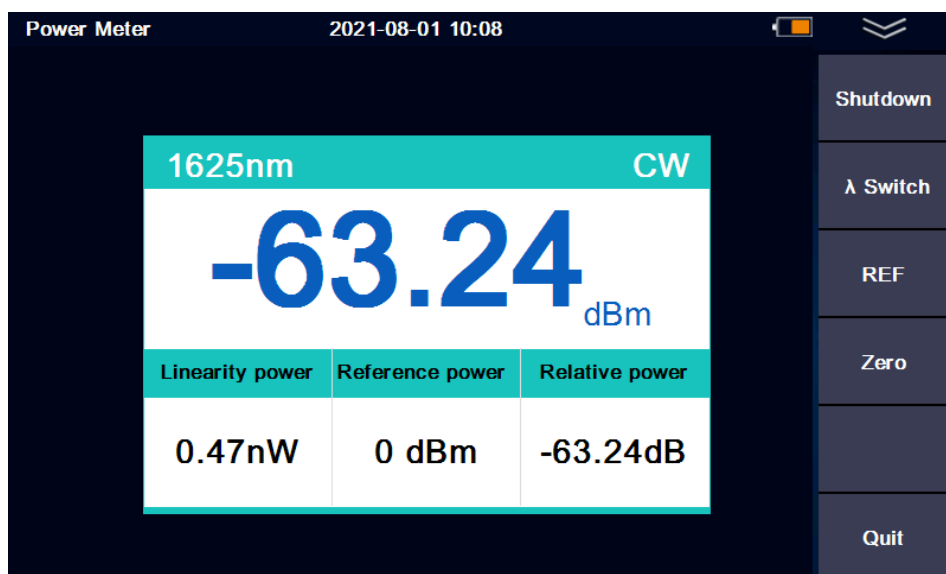
The OPM has the frequency identification function of 270Hz/1kHz/2kHz.

Click [Start/Shutdown]: Turn on and off the OPM

Click [λ Switch]: Switch the wavelength

Click [REF]: Set the current value as the reference value

Click [Zero]: Reset the reference value to “zero”



7.3 Optical Laser Source (OLS) Module

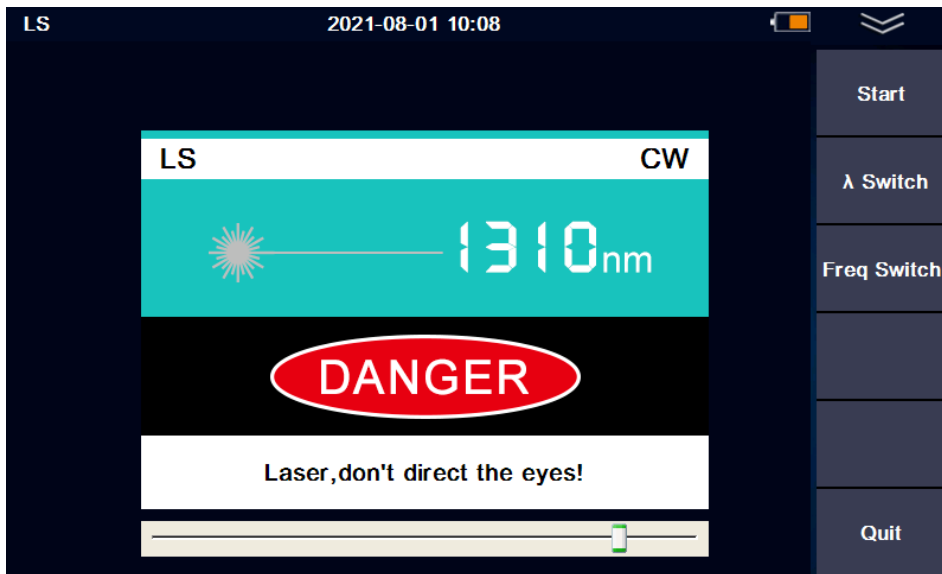
The OLS module has same wavelengths as OTDR, and use the same optical port.

Click [Start/Shutdown]: Turn on and off the OLS

Click [λ Switch]: Switch the current wavelength

Click [Freq Switch]: Switch the output frequency of CW/270Hz/1kHz/2kHz

Output Power: -4dBm~-10dBm \pm 2dB, it can be adjusted by moving the sliding block located at the lower part of the display area.



7.4 Optical Loss Test (OLT) Module

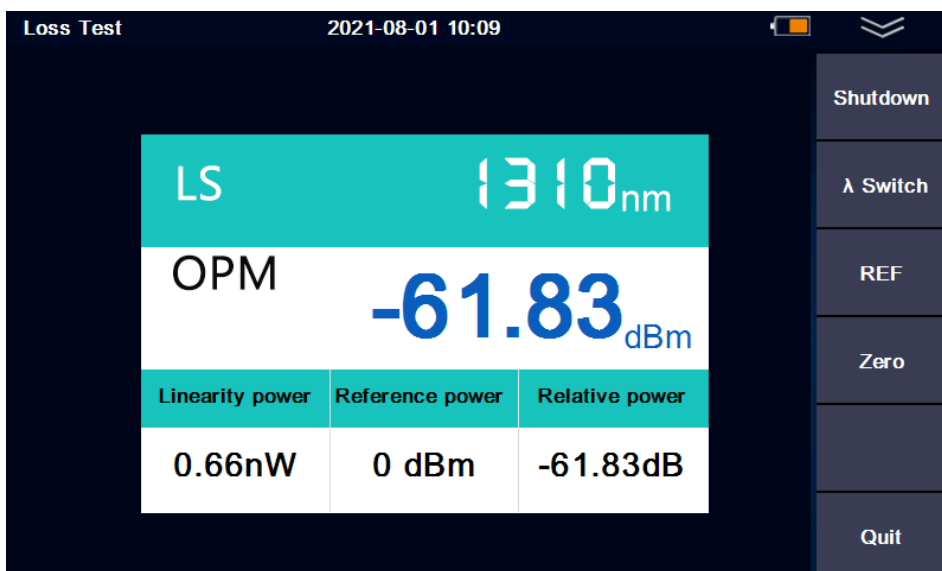
The OLT module will be activated when both OLS and OPM modules are available.

Click [Start/Shutdown]: Turn on and off the OLT

Click [λ Switch]: Switch the current wavelength

Click [REF]: Set the current value as the reference value

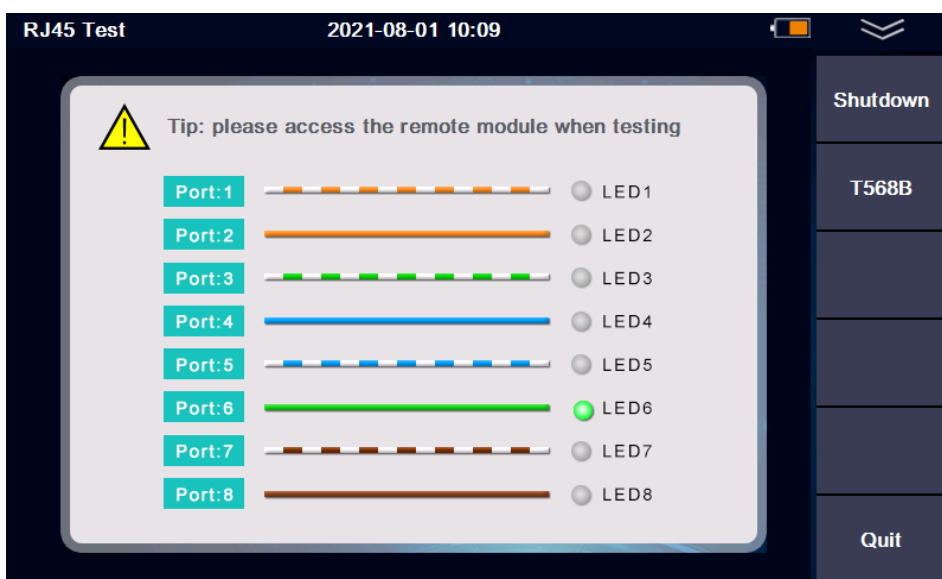
Click [Zero]: Reset the reference value to “zero”



7.5 Network Cable Test Module

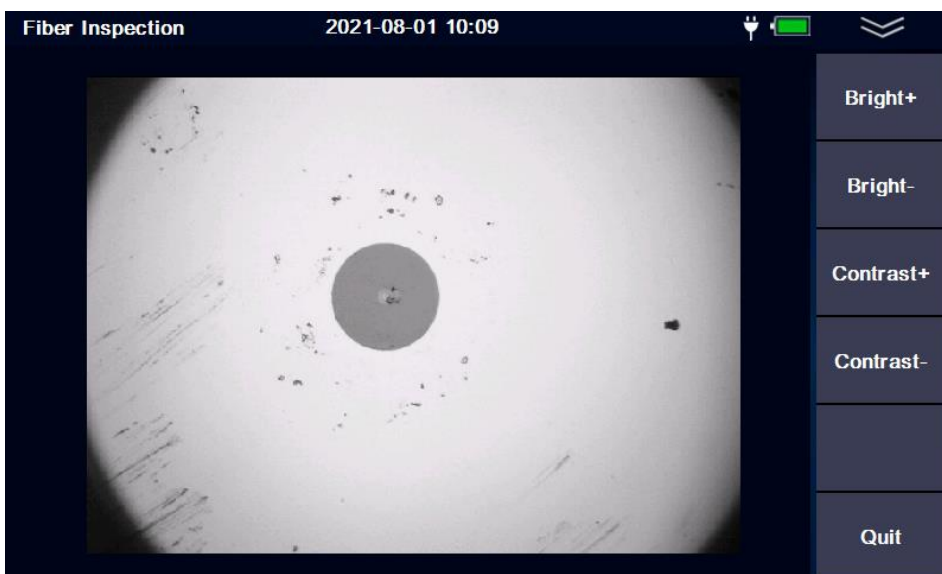
This module is used for the line sequence test and line alignment test of RJ45 standard network cable. It can check whether the network cable is connected and whether the line sequence is correct. It's a convenient function for terminal installation / maintenance personnel to judge the network link condition.

- Click [Start]: Turn on and off the OLT
- Click [T568A/T568B]: Select test mode




7.6 Fiber Inspection Module

The instrument can be externally connected with a specified fiber inspector.



7.7 LED Lighting Module

The instrument is equipped with LED lighting for user to operate in dark environment.

There are 2 ways to turn on/off the LED lighting: After the instrument is powered on, briefly press  key, or, click [LED] in the drop-down menu.

8. Instrument Maintenance

8.1 Connector Cleaning

The output interface of the LOT2200 series OTDR is an interchangeable 2.5mm universal interface, which must be kept clean. When the test results are inaccurate or abnormal, the first action is to check and clean the connector. When cleaning, make sure that OTDR and VFL modules are turned off. Unscrew the output interface and wipe the endface with a dust-free paper towel or cotton swab wetted by alcohol.

Also, please keep the dust cap clean and put on the output interface after use.

8.2 Screen Cleaning

The LOT2200 series OTDR comes with a 4.3-inch TFT color LCD touch screen. Don't stab the LCD screen with sharp object. To clean the LCD screen, please use soft paper/cloth. Do not use organic solvent to wipe the LCD screen.

8.3 Instrument Calibration

It is suggested that the OTDR should be calibrated every two years.

Users are strictly forbidden to dismantle the machine without permission, otherwise the manufacturer has the right to refuse to provide the warranty service.



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