Optical Time Domain Reflectometer

Model # LOT5100

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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: 12V, 3A~4A ;　AC: 100 ~ 240V, 50/60 Hz, 1.6A
    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 ~50℃. 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 -20~50℃.

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. Overall Layout

Item	Physical Area	Description	
I	Optical Interface	OTDR, Optical Power Meter, Laser Source, VFL	
II	Electrical Interface	AC/DC Adaptor, MINI USB,	
III	Electrical Interface	USB2.0 Type A，SD card socket	
IV	LED Indicator	Green LED ON when the corresponding module is activated	
V	Physical Keys	Menu: Enter main menu to select [Auto Test] , [Manual Test] , [Print Screen] , [File Management] , [System Settings] Real/AVG: Switch between Real Time and Averaging measurement Auto: Auto-test mode F1~F5: Select relevant sub-menu ▲▼ ◀▶ OK: move cursor and confirm operation ESC: Exit the current menu SETUP: Enter testing parameter setting interface FILE: Enter file management A/B: Switch between cursor A and cursor B ⏻ : Power on/off (>2s)	
VI	Main Menu Area	1. Side menu	Enter relevant sub-menu
		2. Function Modules	Enter relevant module
		3.Basic Information	Display battery power/charging condition and time

2. System Setup

2.1   In Main Page, press [F5] or [System Settings] to enter System Setup Menu, use direction keys and [OK] to choose Language, Backlight, Auto power off and System time/date.
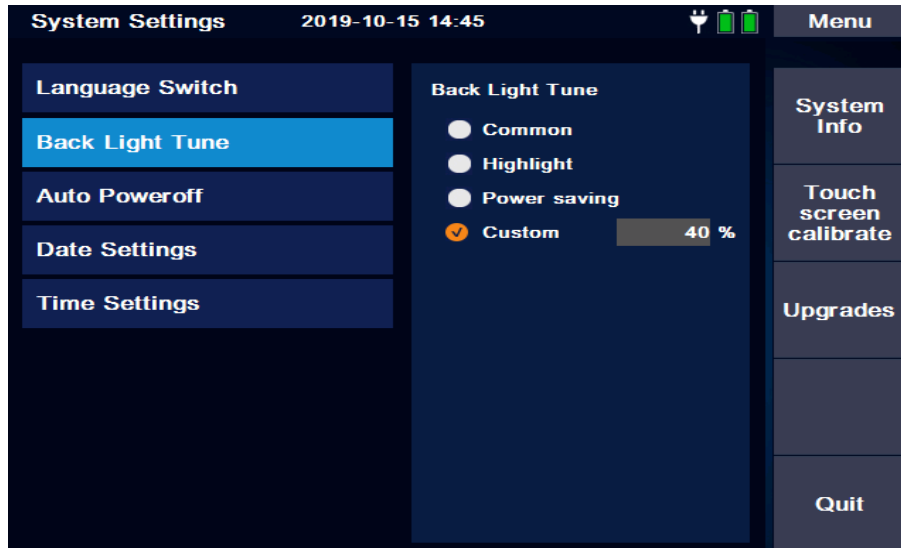
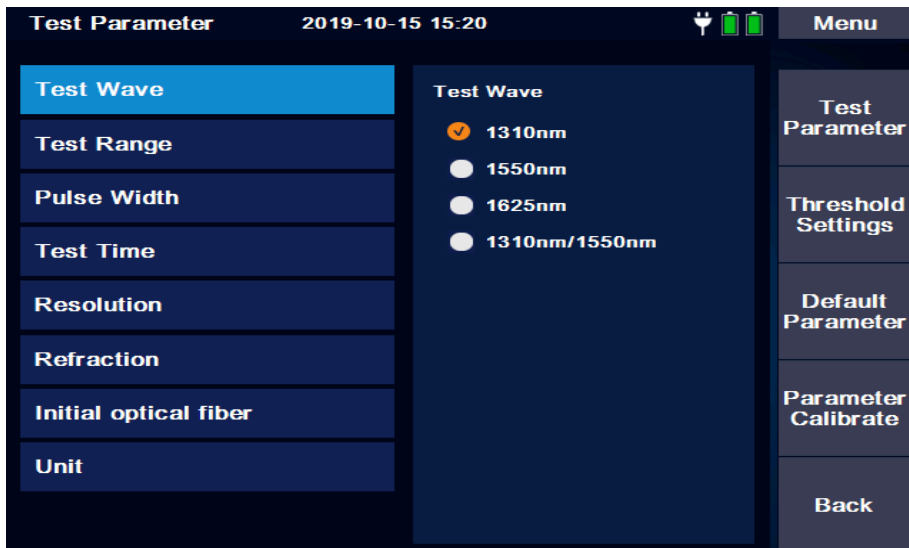2.2   Press [F1] or [System Info] to check system information of the OTDR

2.3   Press [F2] or [Touch Screen Calibrate to calibrate the touch screen

2.4   Press [F3] or [Upgrade] to upgrade the OTDR software / firmware

3. OTDR Module

3.1 OTDR module setup

Press physical key [SETUP], or in Main Page, press [F1] or [OTDR] >> [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 (Average Test) or [Real Time]

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.

[Initial Optical Fiber]: Set the length of the Initial Fiber (Guide Fiber).

User could move the first connector out of the dead zone of the OTDR by using an initial fiber. Proper length of Guide fiber 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:

Pulse width \ Test Range	500m	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.
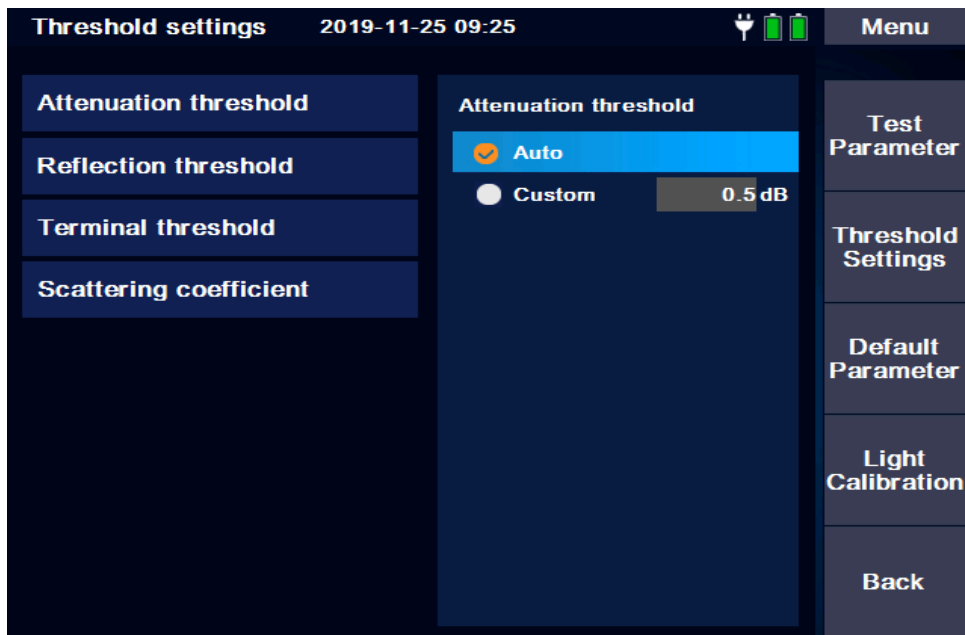
3.1.3 Default Parameter : Press [Yes] to restore the factory settings.

3.1.4 Parameter Calibrate : 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 Real-time Test Mode
In main menu, press [F1] or [OTDR] >> [Parameter Settings] >> [Test Time] to choose [RealTime], then press the [REAL/AVG] key to run real-time test.

3.2.2 Average Test Mode
In main menu, press [F1] or [OTDR] >> [Parameter Settings] >> [Test Time] to choose Test time, then press the [REAL/AVG] key to run averaging test.
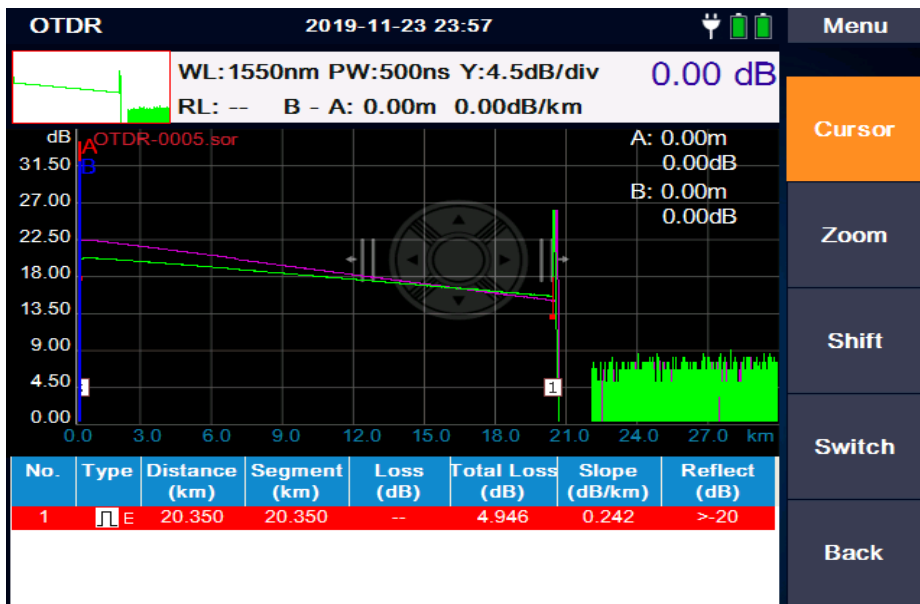
3.2.3 Auto Test Mode
In main menu, press virtual key [Menu] >> [Auto Test] or physical key [Auto] to run auto test.

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

3.3 Curve Operations

In main menu, press [F1] or [OTDR] >> [Curve Operations]

3.3.1 [Cursor]: To select cursor A or B by using physical key [A/B], and move the Selected cursor by using physical direction keys

3.3.2 [Zoom]: To zoom in or zoom out the curve horizontally or vertically by using physical direction keys
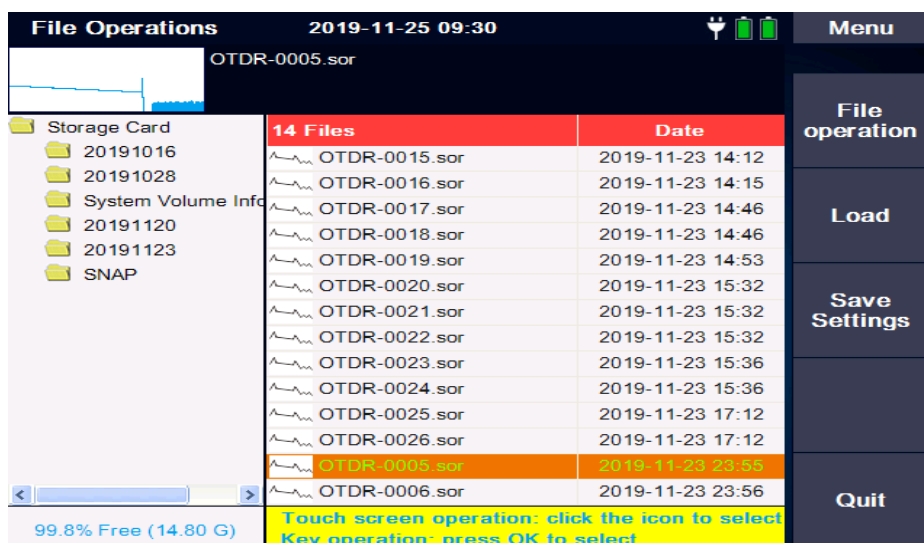
3.3.3 [Shift]: To move the curve horizontally or vertically by using physical direction keys

3.3.4 [Switch]: To switch different curves by using physical direction keys, the selected curve will be highlighted

3.4 File Operations

In main menu, press [F1] or [OTDR] >> [File Operations]

3.4.1 [Load]: To select (by using [▲] / [▼] /[OK]) and process saved files
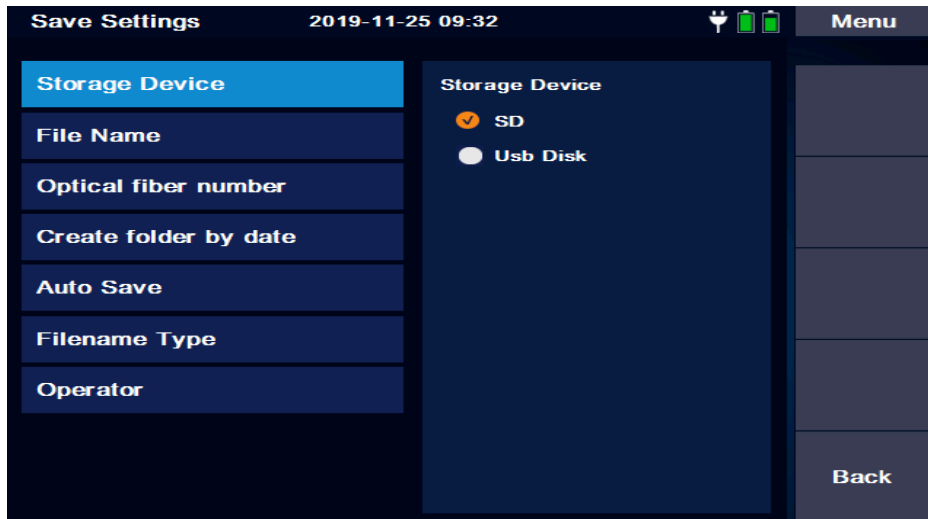

3.4.1.1 [File operation]: To copy, cut, paste, delete, rename the selected file

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 [Multi-Curve]: To compare different curves (up to 8 curves)

3.4.3.1 [Cursor/Zoom]: to activate cursors and zoom function, switched by [F1]

3.4.3.2 [Shift]: To move the selected curve horizontally/vertically by using direction keys

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

3.4.3.4 [Remove]: To remove selected curve

3.5 Event Analysis

In main menu, press [F1] or [OTDR] >> [Event Analysis]

3.5.1 [Cursor/Zoom]: to activate cursors and zoom function, switched by [F1]

3.5.2 [Event List/Full Screen]: to list the events below the curve or full screen display, switched by [F2]

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

3.5.4   [Remove Event]: to remove the selected event

4. File

In main menu, press physical key [FILE] or [f4] to enter File Management.

This OTDR provides a full function of file storage and transit. 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 trace, and can also generate complete reports through PC software.

5. 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.

6. Other Modules

6.1 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.

The VFL can be turned off by pressing virtual key: [Shutdown] or [Quit], or physical key [ESC]. When the VFL module is activated, do not stare into the beam directly, otherwise it may cause irreversible injury!
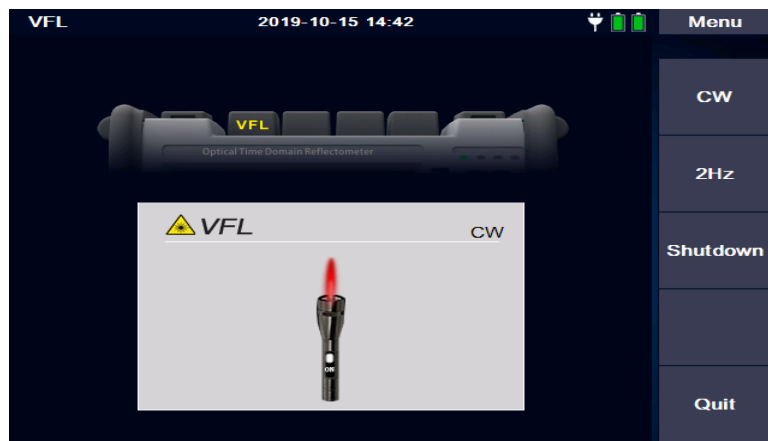
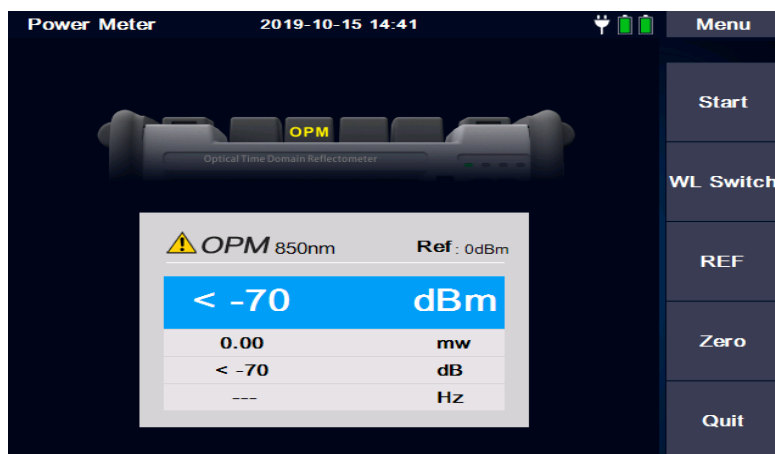## 6.2 Optical Power Meter (OPM) Module

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

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

Press [WL Switch]: Switch the wavelength

Press [REF]: Set the current value as the reference value
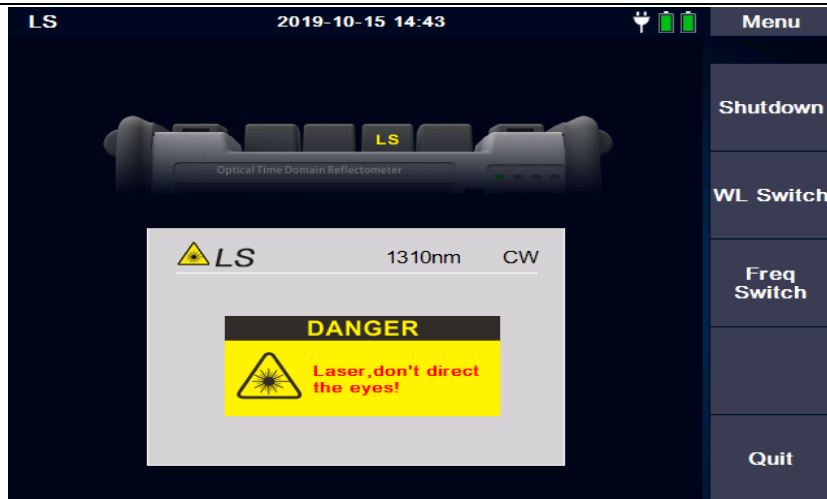
Press [Zero]: Reset the reference value to "zero"

6.3 Optical Laser Source (OLS) Module

The OLS module (output power: -5dBm±2dB) has same wavelengths as OTDR, and use the same optical port.

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

Press [WL Switch]: Switch the current wavelength

Press [Freq Switch]: Switch the output frequency of CW/270Hz/1kHz/2kHz
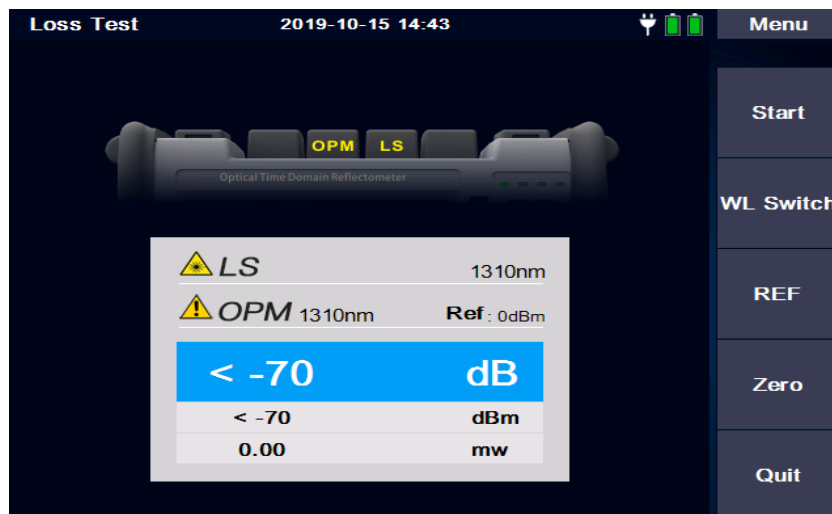
6.4 Optical Loss Tester (OLT) Module

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

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

Press [WL Switch]: Switch the current wavelength

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

Press [Zero]: Reset the reference value to "zero"

7. Firmware Update

Firmware upgrade is processed by inserting an U disk in the USB port (the upgrade file must be in the root directory).

Upgrade Steps:

1) Put the software upgrade file in the U disk root directory

2) Turn on the instrument and insert the U disk into the USB port.

3) Enter Main Interface - > System Settings - > Software Upgrade

4) Upgrade automatically after entering the upgrade interface

Note: Do not turn off the instrument during the upgrade, do not unplug the U disk, these wrong operations may cause system software damage and instrumentation cannot start normally, once this situation occurs, please contact the manufacturer or the authorized after-sales service agent for system repair.

8. Instrument Maintenance

8.1 Connector Cleaning

The output interface of the LOT5100 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 end-face 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 LOT5100 series OTDR comes with a 5.6-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.

Shanghai LinkU Telecom Tech Co.,Ltd

☎ +86-21-5787 7996

✉ info@linkutel.com

◎ Room 401, Building 3, No.655 Jiujing Road,
Songjiang District, Shanghai,China