



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 $-10 \sim 50^{\circ}$ 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 $-20 \sim 50^{\circ}$ 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. Overall Layout



ltem	Physical Area		Description			
I	Optical Interface	OTDR, Optical Power Me	eter, Laser Source, VFL			
П	Electrical Interface	AC/DC Adaptor, MINI US	SB,			
	Electrical Interface	USB2.0 Type A, SD card	d socket			
IV	LED Indicator	Green LED ON when the corresponding module is activated				
V	Physical Keys	Menu: Enter main men [Print Screen] , [Real/AVG: Switch betw Auto: Auto-test mode F1~F5: Select relevant ▲▼ ▲► OK: move of ESC: Exit the current m SETUP: Enter testing p FILE: Enter file manage A/B: Switch between cu	u to select [Auto Test] , [Manual Test] , File Management] , [System Settings] veen Real Time and Averaging measurement sub-menu sursor and confirm operation menu parameter setting interface ement ursor A and cursor B			
	Main Menu Area	1. Side menu	Enter relevant sub-menu			
VI		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

In [OTDR] menu, press physical key [SETUP], or in Main Menu, press [F1] or [OTDR] >> [Parameter Settings] to enter OTDR setup menu.

Test Parameter	2024-10-21 14:03	Menu
Test Wave Test Range	Test Wave 1310nm 	Test Parameter
Pulse Width Test Time	 ✓ 1550nm ● 1310nm/1550nm 	Threshold Settings
Resolution		Default Parameter
Launch Cable		Light Calibration
Receive Cable Unit		Back

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.

[Launch Cable]: 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.

[Receive Cable]: Set the length of the receive cable.

[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	500m	2km	5km	10km	20km	40km	80km	120km	200km	240km
3ns	\checkmark	\bigtriangleup	\triangle	\bigtriangleup						
5ns	\checkmark	\checkmark	\triangle	\bigtriangleup	\bigtriangleup	\bigtriangleup	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup
10ns	\checkmark	\checkmark	\checkmark	\triangle	\triangle	\triangle	\triangle	\triangle	\triangle	\bigtriangleup
20ns	\checkmark	\checkmark	\checkmark	\checkmark	\bigtriangleup	\bigtriangleup	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup
50ns	\bigtriangleup	\checkmark	\checkmark	\checkmark	\checkmark	\bigtriangleup	\triangle	\bigtriangleup	\triangle	\bigtriangleup
100ns	\bigtriangleup	\bigtriangleup	\checkmark	\checkmark	\checkmark	\bigtriangleup	\triangle	\bigtriangleup	\triangle	\bigtriangleup
200ns	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup	\checkmark	\checkmark	\triangle	\bigtriangleup	\triangle	\bigtriangleup
500ns	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup	\checkmark	\checkmark	\checkmark	\bigtriangleup	\triangle	\bigtriangleup
1us	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup	\bigtriangleup	\checkmark	\checkmark	\checkmark	\triangle	\bigtriangleup
2us	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup	\bigtriangleup	\bigtriangleup	\checkmark	\checkmark	\checkmark	\bigtriangleup
5us	\bigtriangleup	\bigtriangleup	\triangle	\bigtriangleup	\bigtriangleup	\bigtriangleup	\checkmark	\checkmark	\checkmark	\checkmark
10us	\triangle		\checkmark	\checkmark						
20us	\triangle	\triangle	\triangle	\triangle	\bigtriangleup	\bigtriangleup	\triangle	\checkmark	\checkmark	\checkmark

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 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 [OTDR] menu, press virtual key [Menu] >> [Auto Test] or press 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 which is highlighted in red 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, centered around the selected cursor (A or B, or between A and B)

- 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

File Operations	2019-11-25 09:30	Ÿ 🗎 🗎	Menu
OTD	R-0005.sor		
			Filo
📄 Storage Card	14 Files	Date	operation
20191016	^ OTDR-0015.sor	2019-11-23 14:12	
20191028	^ OTDR-0016.sor	2019-11-23 14:15	
System Volume Inf		2019-11-23 14:46	Load
20191120	~~~ OTDR-0018.sor	2019-11-23 14:46	
20191123	^ OTDR-0019.sor	2019-11-23 14:53	
SINAP	^ OTDR-0020.sor	2019-11-23 15:32	Cours
	^ OTDR-0021.sor	2019-11-23 15:32	Settings
	← M OTDR-0022.sor	2019-11-23 15:32	Geninge
	^ OTDR-0023.sor	2019-11-23 15:36	
	└──_ OTDR-0024.sor	2019-11-23 15:36	
	← M OTDR-0025.sor	2019-11-23 17:12	
	^ OTDR-0026.sor	2019-11-23 17:12	
	CTDR-0005.sor	2019-11-23 23:55	
<	└──√ OTDR-0006.sor	2019-11-23 23:56	Quit
99.8% Free (14.80 G)	Touch screen operation: clic Key operation: press OK to	ck the icon to select select	

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

Save Settings 2019-11-2	5 09:32	Ÿ 🗎 💼	Menu
Storage Device	Storage Device		
File Name	SD		
Optical fiber number			
Create folder by date			
Auto Save			
Filename Type			
Operator			
			Back

- 3.4.2 [Save]: To save current test result
- 3.4.3 [Multi-Curve]: To process one or more curves which are loaded to the screen (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 the selected curve

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

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]

OTD	R		201	9-11-25 1	0:12		Ÿ 🗎 🗎	Menu	0	rdr		2019	9-11-25	10:13		Ÿ 🗎 📋	Menu
	- 11	WL:13	10nm P	W:500n:	s Y:4.5dB	/div (0.00 dB		No	. Туре	Distance (km)	Segment (km)	Loss (dB)	Total Loss (dB)	Slope (dB/km)	Reflect (dB)	
		RL:	B - A	: 0.00m	0.00dB/k	m		Cursor	1	l	6.653	6.653	0.092	2.437	0.363		Cursor
dB 31.50	A B					A:	0.00m 0.00dB	Zoom	2 3 4	l Л	6.743 20.460 22.464	0.090 13.717 2.004	0.133 0.658	2.453 7.634 8.927	0.352 0.373 0.352	 -33.58 -26.74	Zoom
27.00 22.50						B:	0.00m 0.00dB	Event List			22.101	2.004		0.027	0.002	20.71	Event List
18.00					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Full screen									Full screen
13.50 9.00 4.50								Add Event									Add Event
0.00 0.	0 3.0 Type []	6.0 Distance	9.0 1 Segment	12.0 15.0	D 18.0 2	1.0 24.0 Slope	27.0 km Reflect	Remove Event									Remove Event
		(km)	(km)	(dB)	(dB)	(dB/km)	(dB)										
1	1	6.653	6.653	0.092	2.437	0.363											
2	1	6.743	0.090	0.133	2.453	0.352		Back									Back
4	ЛЕ	22.464	2.004		8.927	0.352	-26.74										

- 3.5.3 [Event Editing]: to add/remove an event where the cursor moved to.
- 3.5.4 [Analysis]: to analyze the curve.



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3.6 Event Map

Event map can be used to assist in checking and analyzing fiber links. It 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.

Some analysis parameters need to be set before using event map measurement. If the user is not familiar with the link analysis parameters, it is recommended to use the default values preset directly.



In main menu, press [Event Map] to enter Event Map function.

3.6.1 [Setting]: to setup Test Mode, Test Wavelength, Test Range, Pulse Width, Pass/Fail Thresholds, Splitter Loss, and the lenth of Launch Cable / Receive Cable

The Pass/Fail threshold is used to judge whether the welding junctions and flange connection points are within the acceptable range.

Event Map	2024-10-22 13:20		Menu
Test Mode	Pass/Fail Threshold		
Test Wave	Reflection Event		Test
Test Range	Non Reflection Event	0.5 dB	Default
Pulse Width	Total Loss	0.1 dB	Parameter
Pass/Fail Threshold	Reflect	20 dB	
Splitter		-40 dB	
Launch Cable	Average Loss(dB/km) 1310nm	0.500	
Receive Cable	1550nm	0.400	
			Back

There would be one or more 1*N splitters in PON network with different loss at each splitter point, so, it is necessary to preset the loss value of the splitter. If the loss value is set incorrectly, the accuracy of the event map will be affected.

Event Map	2024-10-22 13:21	<u>i</u>	Menu
Test Mode	Splitter		
Test Wave	1*2Minimum	3.0 dB	Test
	1*2Maximum	3.5 dB	
Test Range	1*4Minimum	6.0 dB	Default
Pulse Width	1*4Maximum	7.0 dB	Parameter
	1*8Minimum	7.2 dB	
Pass/Fail Threshold	1*8Maximum	11 dB	
Splitter	1*16Minimum	12.0 dB	
	1*16Maximum	14.5 dB	
Launch Cable	1*32Minimum	15.0 dB	
Receive Cable	1*32Maximum	17.0 dB	
	1*64Minimum	18.0 dB	Back
	1*64Maximum	21.0 dB	

4. File Management

In main menu, press physical key [FILE] or [F4] 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 edit the files and generate complete reports through PC software.

* In main menu, press the [MENU] in the upper right corner of the screen to enter the quick menu.



5. PC Software

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

Note: The software installation file and operation instructions are stored in the SD card of the device. The files can be transfered to computer through the mini USB cable.



Batch printing:



LOT5200 series

USER GUIDE

OTDR Test Report	OTDR Test Report	OTDR Tea	IT Report	OIDR Test Report
2020-03-31 5	09:41 2020	H03-01 17:09:41	2020-03-31 17:09:41	2020-03-31 17:09:41
Filename: iLON-1550-10us-0000.sor Neasurement date: 2020-02-21 12:17 Operator:	S Filename: iLON-1550-1us-0008.sor Neasurement date: 2000-02- Operator:	-21 12:18:11 Filename: iLOx-1880-2us-0007.sor Operator:	Neasurement date: 2020-02-21 12:18:35	Filename: itON-1550-5us-0008.sor Neasurement date: 2020-02-21 12:16:57 Operator:
Configuration	Configuration	Conti	guration	Configuration
Wave length : 10500m Test range : 120 km Pulse width : 10us Average time : 105 Refrective index : 1.460 Avtenus threshold(20).Auto Reflex threshold(28): Auto Terminal threshold : Auto	Wave length : 1500nm Test range : 120 Pulse width : 1us Average time : 10s Raffrective index : 1.60 Raffe Artman threshold(dB): Auto Raffar threshold(dB): Auto Terminal threshold : Auto	km Wave langth : 1000nn Pulse width : 2us n Affractive indax : 1.469 Reflex threshold(48): Auto	Test range : 120 km Average time : 10s Attemu threshold(dB): Auto Terminal threshold : Auto	Tave langth : 1500km Test range : 120 km Pulse with : 10 Average time : 105 Average time : 1.06 Average timeshold(0). Auto Reflex threshold(08): Auto Terminal threshold : Auto
Trace	Trace	ī	Yace	Trace
Fiber link information(2-2)	Fiber link information (4-9)	Piker link i	aformation (4-2)	The link information (1-10)
Length: 09.472 Nn Total Loss: 19.106 dB Average Loss: 0.322	5/km Langth: 61.612 Km Total Loss: 14.295 dB Average Loss	s: 0.231 dB/km Langth: 61.680 Km Total Loss:	14.380 dB Average Loss: 0.233 dB/im	Length: 61.294 Km Total Loss: 14.186 dB Average Loss: 0.231 dB/km
Event	Event		Yest	Zvent
No. Distance (Kn) Loss (dB) T. Loss (dB) Slope (d)	No. Distance (Mn) Loss (dB) T. Loss (dB) No. 0.044 0.000	Slope (dB/Km) No. Distance (Km) :	Loss (dB) T. Loss (dB) Slope (dB/Km)	No. Distance (Nm) Loss (dB) T. Loss (dB) Slope (dB/Nm)
1000 Karlect(S) 1.592 0.000 - 0.00 2000 000 000 0.000	2007 MPT14CT (5) 0.245 0.000	0.000 110h Karlact(5) 0.367	1.686 0.264 0.228	INon Reflect (S) 0.764 0.000 0.000
3#sflect(F) 41.565 0.220 8.200 0.17	3#aflect(F) 21.015 0.767 5.688	0.187 3#eflect(F) 21.015	0.909 5.625 0.194	Starlact (F) 21.015 0.847 5.410 0.179
OTDR Test Report 2020-05-31 :	OTDR Test Report	OTDR Tes	11 Report 2000-03-31 17:09:41	OTDR Test Report 2000-00-01 17:00-01
OTDR Test Report 2000-01-01 1 7110anne: 11.00-1000-bar-0001 sor Baserment data: 2000-01-01 10:11 Massreement data: 2000-01-01 10:11	OTDE Test Report 09-61 Task 2000 91-62 Task 2000 91-63 Task 2000	OTDR Tes H09-01 17-00-41 10 18-19-12 Planase: 0708-0008.sor Operator:	11 Report Task	07DR Test Report 2000-01-11 17-00-11 filesee: 07DF-0001.scr Baserment des: 2000-01-21 15-01.26 fourner:
0TDE Test Report 100-00-11 : 100 100-00-11 : 100-000-00-11 : 11 0xertion: Contiguention:	00-01 01 01 0 0 0 0 0 0 0 0 0 0 0 0 0 0	OTDR Tea +09-51 17:00-61 10 38:99:82 Prilemans: 0708-0008.sor Operator: Conti	IT Report Tauk	0138 Test Report 2020-01-11 (1:07-01) Paleone: 0100-001, ser Baarment dats 2020-01-36 (1:04).38 Contgoretion
OTDE Test Report Subdrifts of the second of t	OTDE Text Report 2000 01 Take 2000 02 Pillense: 00074000, ser Neurorenet data: 2000-00 03 Pillense: 00074000, ser Neurorenet data: 2000-00 04 Configuration Configuration 100 Configuration 100 Palas Acad 120 Neurosci time data 100 Reference 1200	-129-01 11 00-01 Fileness: DTB-0006 ser Garanzer: 5 10 81-01 12 Fileness: DTB-0006 ser Garanzer: Carti 10 Pres tagets: 1 10006 Refrester index 1 1.489 Refrester index 1 1.489 Carti	11 Report 121 2000-00-01 17:00-01 INARET GATE 2000-00-05 15:17:00 121 2000-00-05 15:17:00 121 2000 121 2000 10	OTDM Test Report Tait 200-01-01 17:01:01 Filenew: Oth-Worl, ser Test report Test report Test report Colspan="2">Colspan="2" Test report Colspan="2">Colspan="2" Test report Colspan="2" Test report Test report Test report Colspan="2" Test report Test report Test report Test report Tes
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DIP THE LEAVE THE THE ADDRESS AND ADDRESS	DTR Text Paper		1000-01-01 1000-01	DIER Teat Depart

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 [Shutdown] or [Quit]. 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]: Turn on and off the OPM Press [λ 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]: Turn on and off the OLS

Press [λ 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]: Turn on and off the OLT

Press [λ 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.