

Shenzhen SKYSHL Technology Co.,LTD. www.skyshl.net V2019.03

# Foreword

Thank you for purchasing SKYSHL SS313T Series OTDR (Optical Time Domain Reflectometer). This manual mainly contains information of the general operation and maintenance of the OTDR, as well as the common troubleshooting guides. To ensure correcting use, please read carefully before beginning operation and follow the instructions in this manual.

This manual is for use only in conjunction with this instrument. Any unit or individual that is not authorized by our company may not tamper with, copy or distribute the contents of this manual for commercial purposes.

The contents of this manual are subject to change without notice. If you have any questions, please call the supplier, we will be happy to provide you with the best quality service!

## Safety Tips

#### Charger:

Input:AC 100V~240V, 50/60Hz;@0.3A~0.5A.

Output:DC 8.4V,0.5A~1A,Polarity: positive inside, negative outside

Please use the charger in strict accordance with the specifications, or it may cause damage to the equipment

#### Battery:

Special lithium battery is used in the instrument. In order to fully utilize the performance of the battery, when using the OTDR for the first time, please exhaust the battery and then charge the battery. The first charging time should be no less than 8 hours. The charging temperature of the internal battery is from 0 °C to 50 °C. When the ambient temperature is too high, please terminate the charging for your safety. When the instrument is unused for more than 2 months, it should be charged in time to maintain the battery power; do not remove the battery; please do not let the battery close to the fire source or strong heat; do not open or damage the battery; Temperature for long-term storage of the battery is -20 °C ~ 45 °C.

#### Laser Safety:

When using the OTDR, please pay attention to avoid direct view of the laser output port, and do not look directly at the end of the fiber during testing; After used the OTDR, please cover the dust cap. When the visible fault locator function is turned on, please do not look directly at the output port of the VFL; and do not look directly at the end of pigtail connected to VFL port to avoid the damage to eyes.

#### Features:

- 1. Multi-wavelength: 1310/1550/1625/1490/850/1300nm
- 2. Multiple dynamic range: 42/40/38/35/32/30/26dB
- 3. 7 inch LCD screen
- 4. Capacitive touch screen, sensitive control
- 5. Data save as SOR format

6. OTDR, Optical Power Meter, Optical Light Source, Visual Fault Locator, Event Map, Fiber Microscope, all-in-one function

7. Equipped with PC data analysis and simulation software, can process, generate and print test reports in batch.

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# Catalogue

Foreword	1
Safety Tips	1
Charger	1
Battery	1
Laser Safety	1
Features	1
1. Specifications	3
2. Interface and Functions	4
2.1 Front Panel	4
2.2 Top OTDR/OLS/OPM/VFL Interface	4
2.3 Top USB and Charger Interface	4
3. LCD Display	4
4. Operations	5
4.1 ON/Off&Charge	5
4.2 Connect the Fiber	5
4.3 Setting measurement conditions	5
4.3.1 Auto Test/Manual Test	5
4.3.2 Real Timel Test	6
4.4 Test	7
4.5 Checking curve analysis test result	7
4.6 Measure Distance and Average Loss	7
4.7 Save& Browse&export record	7
4.7.1 Save record	7
4.7.2 View Record	8
4.7.3 Export record	8
5. Optical Power Meter(OPM)	9
6. Visual Fault Locator(VFL)	9
7. Optical Light Source(OLS)	10
8. Event map	10
9. Upgrade software	11
10. Simulation analysis software	12
10.1 Batch read and storage of test data	12
10.2 OTDR Test Report Print	12
11. Maintenance and troubleshooting	13
11.1 Clean connectors	13
11.2 Clean Display	13
11.3 Calibration	13
11.4 Trouble Shootings	14

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# 1.Specification

Туре	SS313T-2A	SS313T-2	SS313T-2MM	SS313T-3D	SS313T-4A			
Wavelength(nm)	1310/1550	1310/1550	850/1300	1310/1550/1650	850/1300/1310/1550			
Dynamic range(dB)	32/30	37/35	20/26	35/33/32	20/26/42/40			
Туре	SS313T-2B	SS313T-2	SS313T-3A	SS313T-3E	SS313T-4B			
Wavelength(nm)	1310/1550	1310/1550	1310/1550/1625	1310/1490/1550	850/1300/1310/1550			
Dynamic range(dB)	35/33	40/38	35/33/33	38/35/36	35/33/20/26			
Event Dead Zone	0.8m	1m	1m	1m	1m			
Attenuation Dead Zone	4m	4m	5m	4m	5m			
Pulse Width	3ns, 5ns, 10ns, 20ns, 50ns, 100	ns, 200ns, 500n	s, 1µs, 2µs, 5µs, 10µs, 20µs					
Testing Distance	500m, 2km, 5km, 10km, 20km, 4	40km, 80km, 120	0km, 160km					
Measurement Time	Use-defined (smart link) ; with re	eal-time measure	ement function					
Linearity	≤0.05dB/dB							
Loss Threshold	0.01dB							
Loss Resolution	0.001dB							
Distance Resolution	0.01m							
Sampling Resolution	minimum 0.25m							
Sampling Point	Maximum 128,000 points							
Distance Accuracy	±(1m+measuring distance×3×10-5+sampling resolution )							
VFL	10mw, CW/2Hz							
Stable laser source	>-5dBm							
DataStorage	80000 groups of curve	80000 groups of curve						
Interface	3 USB port							
Display	7 inch capacitive touching scree	n						
Battery	7.4V/6.6Ah lithium battery, conti	nuous 8-10 hour	S					
Working Temp	-10℃~+50℃							
Storage Temp	-20℃~+75℃							
Relative Humidity	≤90%, non-den							
Dimension	230×185×70mm / 1.5kg							
Accessories	Main unit, 8.4V power adapter, Lithium battery, FC adapter, USB cord, User guide, CD disk, carrying case							
Option	SC/ST, Bare fiber adapter							

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#### 2. Interface and Function (360 degree Video: https://youtu.be/Jb4yUz3eYX0)

#### 2.1 Front panel

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#### 2.2 Top OTDR/OLS/OPM/VFL Interface



#### 2.3 Top USB and Charger Interface

USB data transmission interface, device charging interface.

3. LCD display----Main Page

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(UI introduction video: https://youtu.be/ISYOqHV3UoE)



# **SKYSHL** 4. Operation 4.1 ON/OFF & Charge

**Turn on:** Press  $\bigcirc$  on the front panel for 2 seconds. If the instrument starts normally, the PWR indicator will light and the LCD will display the main interface.

Turn Off: Press the OFF button, the display shows: Confirm to turn it off? Yes: OK; NO: ESC

**Turn off by force:** when the tester works abnormally, press  $\bigcirc$  for 6 seconds to turn off the tester by force.

During normal use, the battery level will be displayed at the upper right corner of the OTDR. When the battery level is too low, the battery level symbol will turn red as warning. Please charge it with the charger provided by factory. The remaining charge will be displayed at the top of the screen. The red color of LED on the charger indicates that charging is in progress, and the green color means it is already fully charged.

After turning on the OTDR, please enter into the system settings from the main menu, set the parameters like date, time, backlight, brightness, auto power off time, button tone and other information.

#### 4.2 Connect the fiber

**Note**: Light is emitted from the light source port of the instrument. In any case, the optical interface of the OTDR and the end of the pigtail connected to the optical interface are not facing the eyes of the operator or other personnel, otherwise the eyes may be injured. Even blind!

Before connecting the fiber, please check whether the connector type matches or not, and also check whether the connector is clean or not; both the unmatched connectors and the contaminated connectors can cause inaccurate measurements and can even damage the the instrument. The correct way is to clean the jumper, especially the surface with absolute alcohol before inserting the fiber optic connector (jumper). After the alcohol has evaporated, connect it to the instrument.

If the light source port is not connected to the fiber optic cable, immediately cover the dust cover to prevent dust from adhering to the light output port of the instrument.

#### 4.3 Setting measurement conditions

#### 4.3.1 Auto Test / Manual Test

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actual condition of the fiber.

Auto Test: Click[OTDR]->[Setting]->[Test]->[Test Mode]->[Auto]->[OK/Save] / [Start Testing].

**Manual Test: Click**[OTDR]->[Setting]->[Test]->[Test Mode]->[Manual]->[OK/Save] / [Start Testing]. The manual test is a professional test mode, and operators can set the test conditions according to the

SS313T Series OTDR User's Manual

OTDR/Setting			2019-09-17 09:51 Tuesday	
Test	Threshold			Start Testing
Test Mode	: Auto		🗌 Manual	
Wave	: 1550nm	►	✓ Auto	
Range	: Auto			OK / Save
Pulse Width	: Auto			
Test Time	: 10s			Restore Default
Resolution	: Standard			
Unit	: Meter			
Color Mode	: Black			

Experienced engineers can select the most suitable measurement parameters; according to the accumulated experience of the measurement and the situation of the field curve, which can improve the measurement efficiency and quickly find the fault point.

#### 4.3.2 Real Time Test (Video: https://youtu.be/DEzOGuz9gXY)

Click[OTDR]->[Setting]->[Test]->[Test Time]->[Real Time]->[OK/Save] / [Start Testing].

OTDR / Setting		2021-04-08 08:27 Thursday	🖴 🖞 🖊 🚥
Test	Threshold		Start
Test Mode	: Auto 🕨	_ 10S	resting
Wave	:1550nm 🕨		
Range	:120m 🕨	_ 20S	OK / Save
Pulse Width	:5ns 🕨	<b>30</b> S	
Test Time	:RealTim	60S	Postoro
Resolution	:Standard		Default
Unit	:Meter 🕨	✓ RealTime	
Color Mode	:Black 🕨		

Real time testing can monitor data from the fiber optic link in real time.



#### 4.4 Test (Video: https://youtu.be/igNGeX9dZZI)

1.After setting the test parameters, Click [OTDR] -> [Start] to start the test.

2.Click [OTDR] -> [Setup] -> [Start Testing] to start the test.

#### 4.5 Checking curve analysis test result.

After the test is completed, measuring the curve, Measuring information results and events, The list will be displayed, The corresponding event on the curve will be marked accordingly.

OTD	R/Ana	lyse_					2019	-09-17	09:51	Tuesday		
			Length Range	10.64	1	15.0 (km)	Loss Slop	<b>2</b> .	67 <sup>(B)</sup>	0.25 (dB/km)		A/B Cursor AB
dB 24.00 20.00	A:0.0	0m	: 15.32di	3	B: 1	5.32dB Wave: 16 Pulse Wid	25nm Ith: 100ns	-A:0.00dl	8 0.000	Okm		Add Event
16.00 12.00 8.00	В:0.0	Um					: 10s	(				Delete Event
4.00 0.00 (	0.0	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	km	
No.	Туре	Dista	ance km	Segment	km	Loss dB	T.Loss dB	Slope	dB/km	Reflect. dl	3	
1	ΛE	10	).641	10.64	1		2.671	0	.249	-30.620	)	
								-			_	

#### 4.6 Measure Distance and Average Loss

(Video: https://youtu.be/ukTx\_XeYFUU )

Click[OTDR]->[Cursor], choose cursor A , cursor B, or cursor AB, move the cursors to left or right through press the direction keys, the distance and average loss between B-A will display in the gray area above the curve

#### 4.7 Save& Browse&Export record

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#### 4.7.1 Save record (Video: https://youtu.be/p2U51BONFW4 )

After the curve testing is completed, click [File]->[Save], or [Save As] to pop up the measurement result save prompt box. You can edit the file name prefix according to the test position through the keyboard, input the file name start number according to the line number, and directly press [Save]. The [Save] button will automatically add 1 to the line number.





SS313T Series OTDR User's Manual

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#### 4.7.2 View Record

Save the recorded local browsing into the main menu of this instrument / File Management will open as shown on the below

	File Manage	2019-09-17 09:51 Tuesday	
	E Storage Card	1Count Files Size Type Date	Open
	<mark></mark> 20190917		Сору
			Paste
			Delete
Files			Rename
			Directory

#### 4.7.3 Export record

1. Export test records via U disk: Connect U disk to the top of OTDR, click [File]-> [Copy]/ [Paste] to export test records to U disk.

2. Export test records via USB cable: Connect OTDR to computer with USB cable. After turning on the OTDR, the computer will automatically recognize the memory of the OTDR tester. All test records are stored in memory. User can export, copy and delete test records.





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### 5.Optical Power Meter(OPM)



Proceed the test setting on the right side of the list and the test results are intuitive. When there is a deviation, clean the connector first.

## 6.Visual Fault Locator (VFL)



CW: continuous light; OFF: turn off the light; 1Hz: Slow Blink; 2Hz: Fast Blink

**Reminder:** When using the VFL function, Do not see directly to the optical interface of the instrument and the end of the pigtail connected to the optical interface , otherwise it may hurt the eyes or even blind!





## 7. Optical Light Source(OLS)



According to the test requirement, choose the suitable wavelength.

CW:Continuous light output, 0Hz.

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270Hz, 1kH and 2kHz are Non-continuous light output, Simulate actual data signal transmission.

### 8. Event map

By importing the corresponding SOR file(**[Event Map]->[Import]**), the event map graphically displays the link status of the fiber according to the event list. The connector type is displayed as accurately as possible by setting the attenuation threshold of the corresponding connection point.



## 9. Upgrade software

The OTDR can be upgraded by plugging in a USB disk (the upgrade software must be in the root directory) on the USB interface

step:

1. Computer downloads the update file to the USB disk;

2. Connect the USB disk into the OTDR USB interface;

3. Turning on the OTDR and entering the system settings menu, press([Setting]->[Software Upgrade]) to confirm the automatic upgrade.

	Setting	2019-09-17 09:51 T	uesday 🔟
	Backlight *		Auto Calibrate
			User Guide
	Date Setting	9/17/2019	Restore Default
	Time Setting	9:51:29 AM	Software Upgrade
Setting	Auto PowerOff	Never 1 Min 5 Min 10 Min 30 Min 6	0 Min
	Language Select	tion English Chinese	OFF

Upgrading Upgrading, Please don't power off	
Upgrading, Please don't power off	Upgrading
	Upgrading, Please don't power off

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### 10. Simulation analysis software

#### (Download weblink: www.mediafire.com/folder/kk634o94dlmax/SS313T)

The device is equipped with simulation analysis software, which can preview the curve from computer, offline curve analysis and preview and print the curve. It is convenient for operators to manage and maintain the data of fibre link.

#### 10.1 Batch read and storage of test data

The terminal simulation analysis software has a data batch processing function, which can perform batch printing processing on user test data.

Turn on the OTDR and entering into the main menu / file management / copy, paste the test record saved by the OTDR into the USB disk. Connect the USB disk to the computer and select the print file through curve preview. Report can be printed in batch after the selection is completed. It is convenient for users to submit test data.

#### **10.2 OTDR Test Report Print**

Can check the OTDR test report through print preview. The test report contains the information such as test conditions, test curves, link loss, average loss, event list, etc., and the test reports can be batch printed after confirmation.



The software can open, print preview, and print curves through files. Through the report wizard, you can set to print multiple test curves per page. The test report is shown as below:



DTDR v2.23					20	019-09- <mark>17 12:00:1</mark>
Job ID : 900 Contractor: Customer :			Job File Date Operat	: 1550nm_10km.sc : 2019-09-17 08 pr:	or 51:18	
			- Configuration			
Wavelength(nm): Pulse(ns): Origin Location: 1 Cable : 1 Fiber : 1 Color : 1	1550 100	Range(m) Average Tim End Location: Cable : Fiber : Color :	: 15000 e(s): 10 2 2 2 2	Bac Los Ref End	kscatter coeff(dB) s threshold(dB) lectance threshold(d of fiber threshold ractive Index	: Auto : Auto ED: Auto : Auto : 1.468
			- Trace -			
dB 44.9						
15.0 10.0 g 5.0 0.0		91 dBkån			ſġŗŧŧĸŧĬ <mark>ŗĸĸċijġĸŗŢĔġ</mark> ŗŗŢ	
0.0 1	.5 3.0	4.5 6.	0 7.5	9.0 1	0.5 12.0	13.5 km
Event Type 1NonReflect(S)	Distance(km) 0.025	Segment(km) 0.000	Loss(dB) 	Total Loss(dB) 	Attenuation(dB/km) 	Reflectance(dB)
2NonReflect(E)	9.990	9.966	( <del>)</del>	1.929	0.191	-28.400

OTDR REPORT

## 11. Maintenance and troubleshooting

#### **11.1 Clean connectors**

The optical output interface of this OTDR is a replaceable universal interface, the connector should be kept clean during using. When the device fails to test the normal curve, or the test result is inaccurate, please consider cleaning the connector firstly.

When cleaning, be sure to turn off the OTDR and VFL functions. Unscrew the connector and wipe the connecting end face with a special dust-free paper towel or cotton swab moistened with alcohol.

At the same time, after using the instrument, please cover the dust cap to keep the connector clean.

#### 11.2 Screen Cleaning

The screen of this OTDR adopts 7inch touching LCD screen. Please don't use the sharp things to click, otherwise will damage the LCD screen. When cleaning, operators can wipe the LCD screen with a soft

paper. Do not wipe the LCD with an organic solvent, as this may cause damage to the LCD .

#### 11.3 Calibration

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The OTDR does not require calibration, but it is recommended that you clean the OTDR at least once a year in order to obtain more accurate test data.

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#### **11.4 Trouble shootings**

Fault	Reasons	Solutions		
Can't turn on	Low power	Charge the battery and observe the charger indicator. If CHR LED is red continue charging. Otherwise, contact the supplier.		
Can't be charged properly	The use environment does not meet the charging conditions	Charge the device in an environment of 0 $^\circ$ C ~ 50 $^\circ$ C		
	Battery problem, or internal circuit problem	Contact the supplier to replace the battery		
	Parameter settings are incorrect	Reset the correct test parameters		
Unable to measure normal curve	The end of the fiber is contaminated	Clean the end face of fiber		
	Connector of device is damaged	Change the connector		
	Connectors do not match	Change the matched connector		
The test curve has a large	Adapter connection error	Reconnect the appropriate output connector		
burr.Waveform is not smooth	Pulse width is too low	Increase value of pulse width		
Saturated (flat top) phenomenon at the front end of the test curve	Pulse width setting is too large	Reduce value of pulse width		
At the beginning of the test curve,	The end of the fiber is	Clean the end face of fiber		
the reflection peak drops slowly	Connector of device is damaged	Change the connector		
and tailing occurs.	Connectors do not match	Change the matched connector		
Unable to test reflection peak of	Range of setting too low	Increase value of range		
fiber end	Pulse width is too low	Increase value of pulse width		
False report of test curves	Quality of test curve is bad; Event threshold setting is too small	Increase value of test pulse width and increase the value of event threshold		
The measured fiber length is not	Parameter settings are incorrect	Reset the appropriate parameters		
accurate	Refractive index setting is not accurate	Reset fiber refractive index		
The measured average fiber loss value is not accurate	The front end of the test curve is too long	Clean end face of fiber interface		
	The cursor position is not set	Reset cursor position		

• The above description is for reference only. Please refer to the new instructions for detailed usage. If you have any questions during the use of the device, please contact the supplier to resolve it.

• During the use of the OTDR, It is forbidden to disassemble the device without authorization, otherwise the warranty will be lost!

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Scan the QR code to download the product documents

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If there are any issues with the product, please contact the above email directly before leaving a review so we can take care of any issues inmmediately.