OTDR Optical Time Domain Reflectometer

Model: NORDSON NS-6000

User Manual

Safety Attention

External Power Supply

The power adapter input meets the following requirements:
The power adapter output meets the following requirements: The center is positive.
Please use external power supply strictly according to the requirement: otherwise it may cause damage to the instruments.

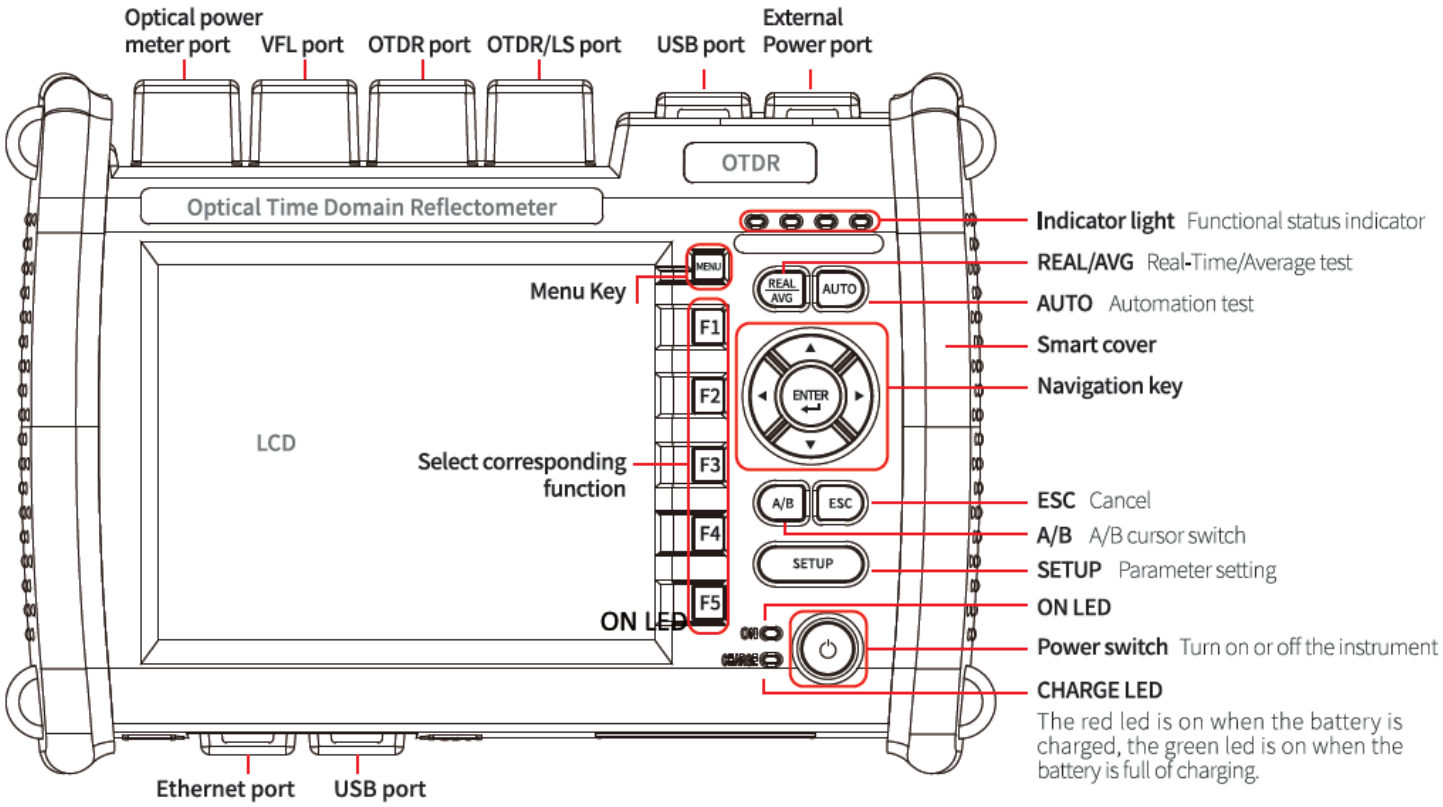
Internal Battery Supply

The battery inside the instrument is a special lithium battery. In order to give full play to the performance of the battery, please use the internal battery power supply when you start using the instrument. The first use of the battery needs to be depleted, and then charging the battery, the first charging time should be no less than 10hours. Battery charging temperature range is 0℃~ 50℃. For your safety, the charge will terminate automatically when the charging temperature is too high. When the instrument is idle for more than two months, it should be charged in time to maintain the battery power. Please don't take out the battery without permission. Please do not let the battery close to the fire source or strong heat. The battery should be removed when the instrument is stored for a long time. The storage temperature range of the battery is -20℃~45℃.

Laser Safety

Please pay attention to avoiding laser output from eyes when using this instrument. Please cover the light output dust cap after the use of the instrument.

Name and function of parts <Front Panel, Top Panel, Bottom Panel>



Display <Instrument main interface>

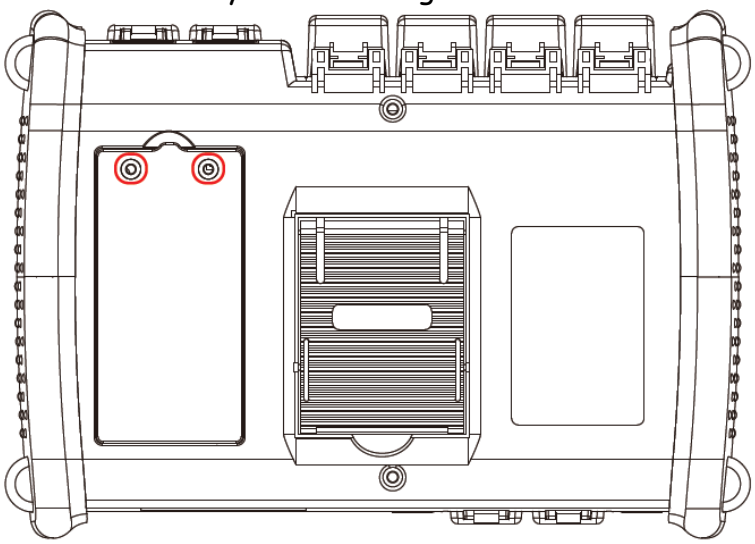
Preparation before use

The external power adapter

AC input: 100-240V, 600mA, 50/60Hz DC output: 19.0V, 1.31A

Battery installation

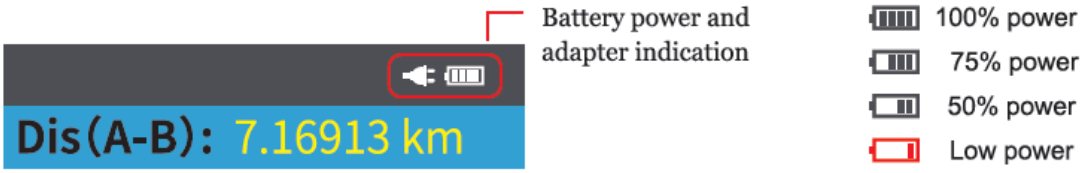
1. Unscrew the two screws on the battery cover (The red circle mark)
2. Remove the battery cover and load the battery
3. Install battery cover and tighten screws



Turn on/off Instrument

Press the button of the switch button, the ON led is on if the instrument starts normally, and the instrument enters the main interface.

When the battery power is too low, warning information will appear, please charge the instrument in time.



Optical fiber connection

The laser output port of the instrument or the tail end of the optical fiber connected to the port is prohibited to face the eye in any case; otherwise the eyes will case the damage which cannot be restored.

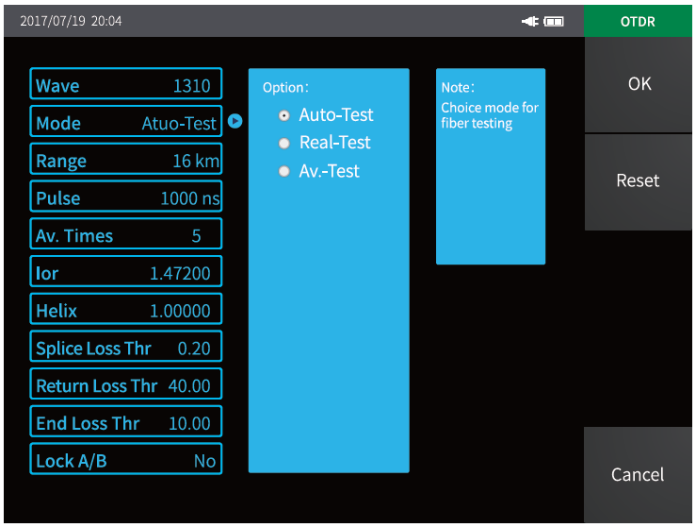
Please confirm whether the connector type matches, whether the end of optical fiber connector cleaned before connecting the optical fiber. The wrong connector type or unclean end of the fiber will cause the test to fail, and may damage the optical interface of the instrument. The correct method of cleaning the optical fiber interface is to clean the end face of the optical fiber connector with anhydrous alcohol, and then connect with the instrument.

The dust cap of the instrument port should be covered so as to prevent dust or other contaminants from polluting the end face of the optical fiber after finishing using.

Setting test parameters

Automatic test

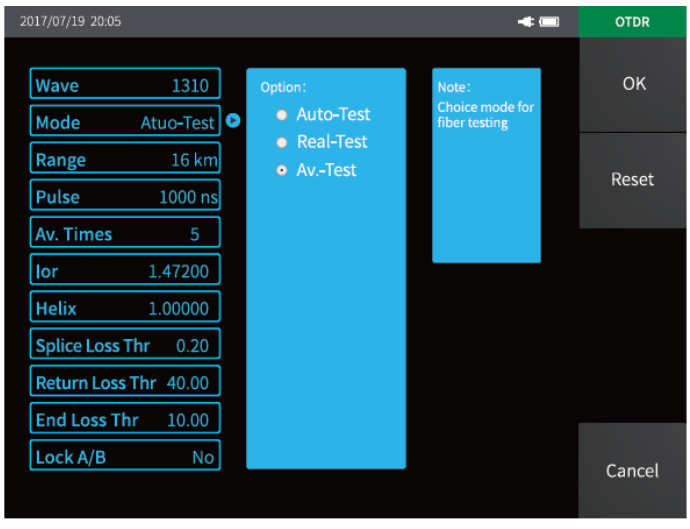
1. Press settings button
2. Select test wavelength
3. Select measurement mode
4. Select automatic test



Manual test

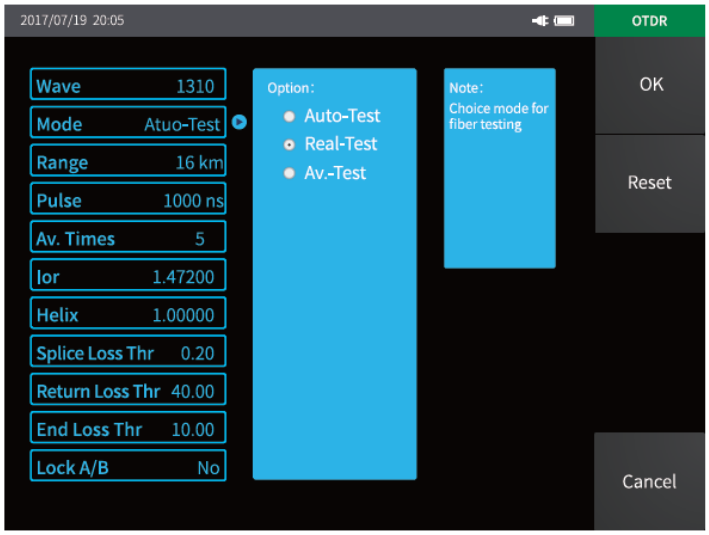
Manual test is a professional test mode, and testers can set test conditions according to the actual situation of the tested optical fiber.

1. Press settings button;
2. Select measurement mode;
3. Select average test;
4. Select the appropriate measurement parameters is beneficial to the accuracy of the test results.



Real time test

1. Press settings button;
2. Select test wavelength;
3. Select measurement mode;
4. Select measurement range;
5. Select pulse width.



Startup measurement

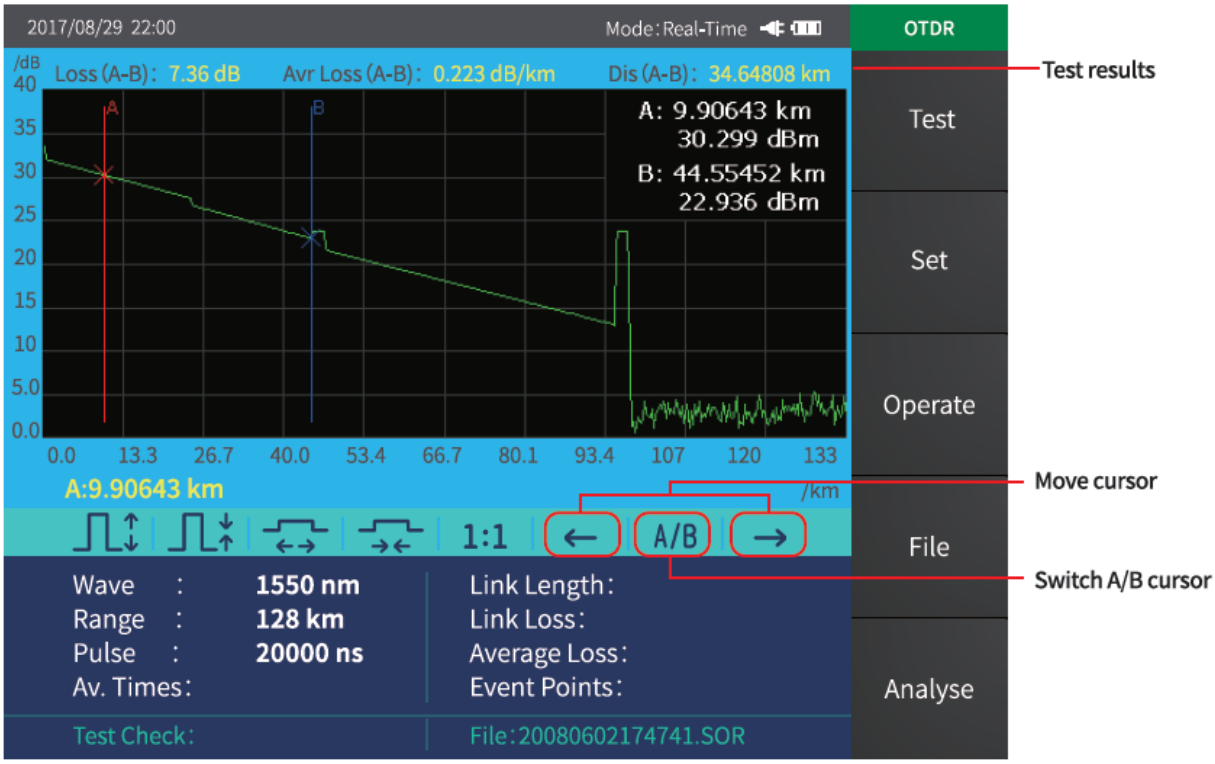
1. Press the test key in the right menu of the OTDR interface to start measurement.
2. Press the "REAL/AVG" button to start real-time or average measurement.
3. Press the "AUTO" button to start automatic measurement.

Look up the curve analysis results

Select an event in the event list and the corresponding positions in the curve will be marked accordingly.

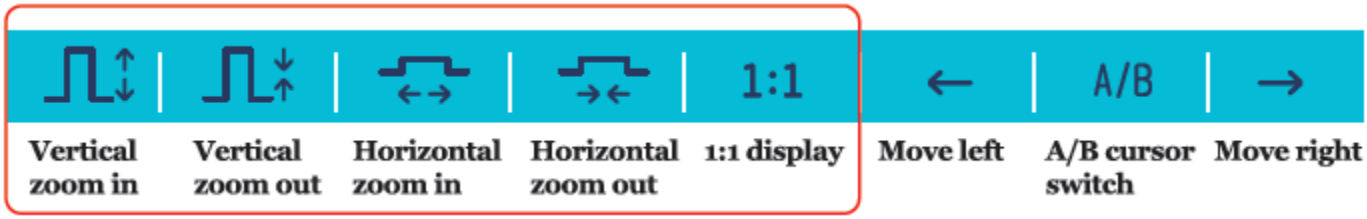
Measuring the distance and average loss between two points

Select the curve target position and the current selected cursor will switch to the target position. The navigation key in the key area can also move the cursor position.

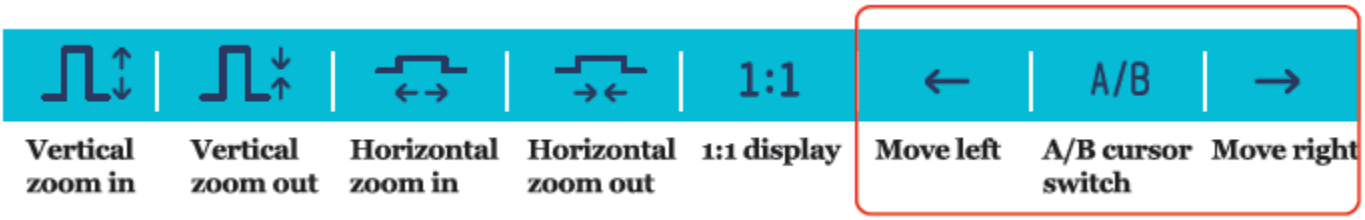


Curve operation

You can do the horizontal and vertical scaling of the curve by the button shown in the figure below, and then restore it in equal proportion.



You can move the A/B cursor left or right by the button shown in the figure below, and switch A/B cursor.

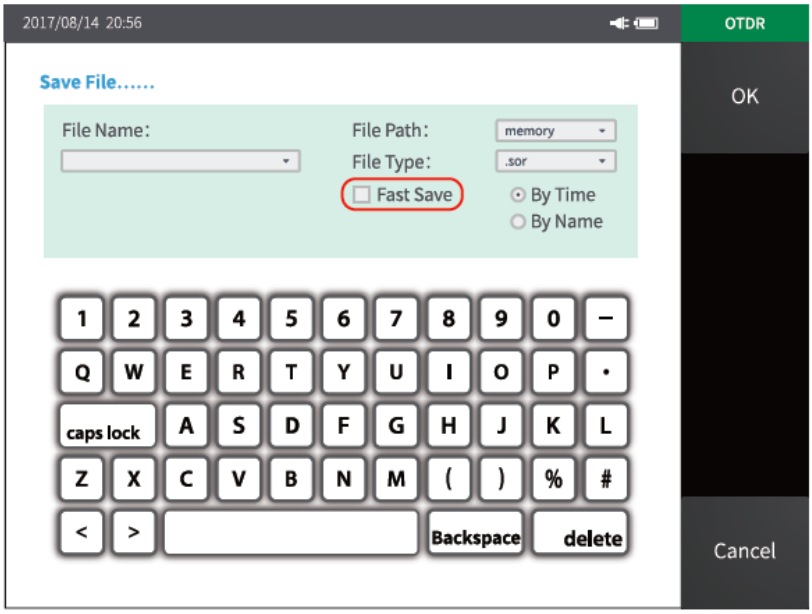


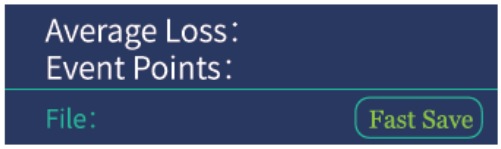
Storage and export of the test results

Storage

Select the file menu under the OTDR interface, and then select Storage button in the pop-up menu, and then pop-up the file save interface which displayed on the right.

Enter the file name and select the path, and then press the "Enter" button to save the file. The red circle shown on the right is a one-click storage function which is valid when selected.

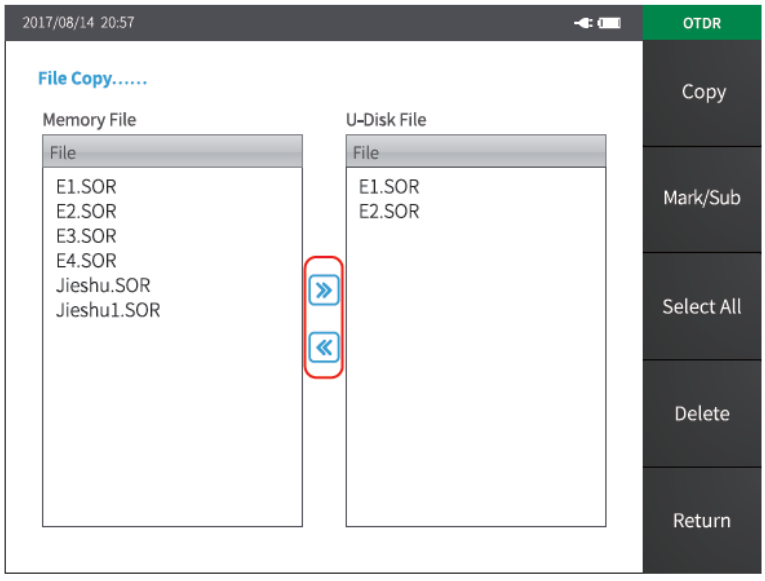




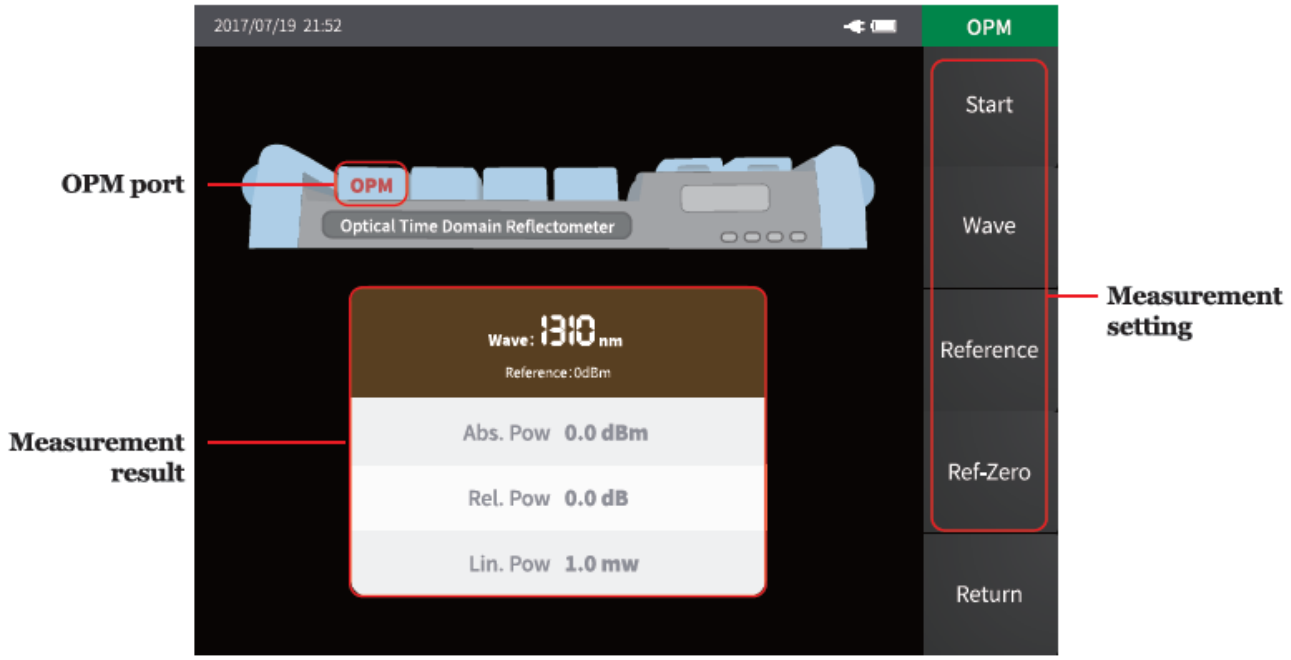
Export

Select the file menu under the OTDR interface, and then select copy button in the pop-up menu, and then pop-up the file move interface which displayed on the right.

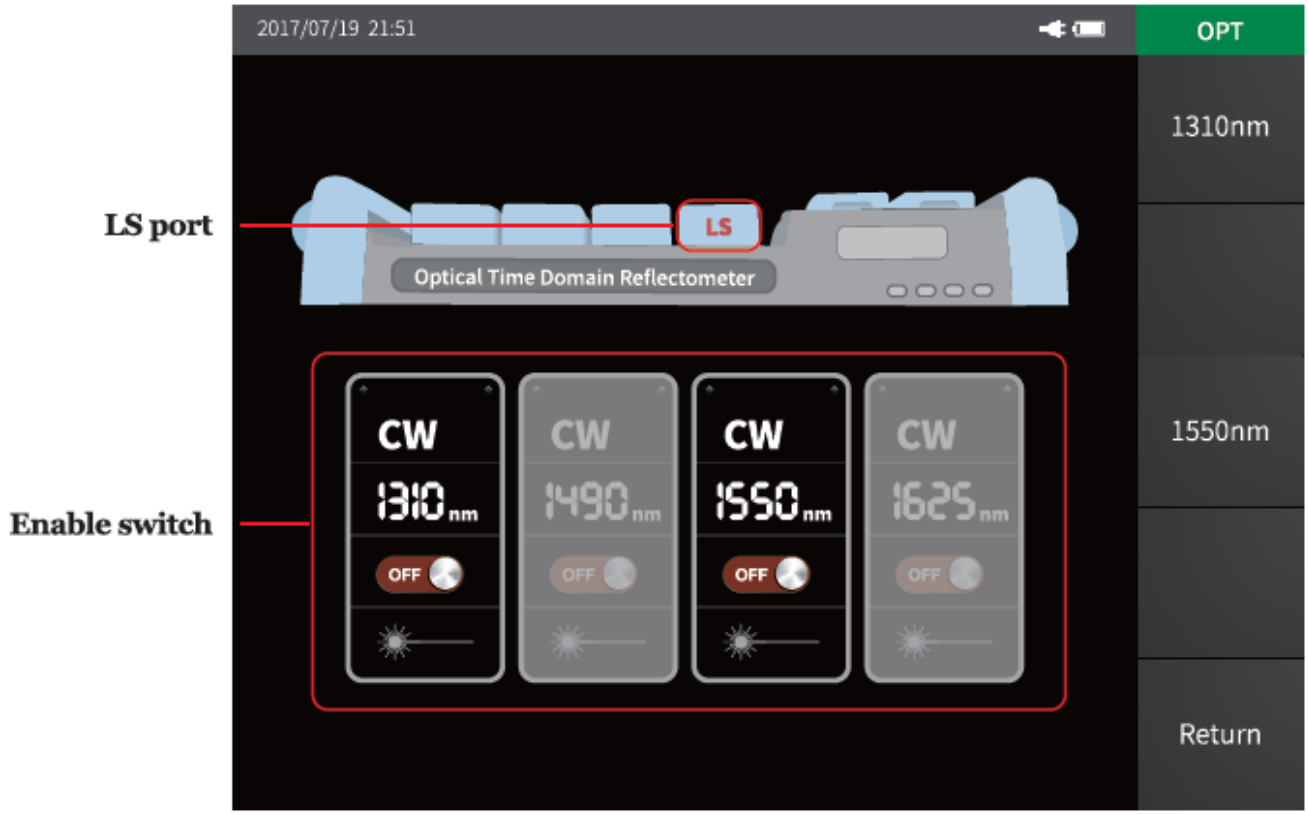
The red circle shown on the right is a shortcut operation which can realize file copy function.



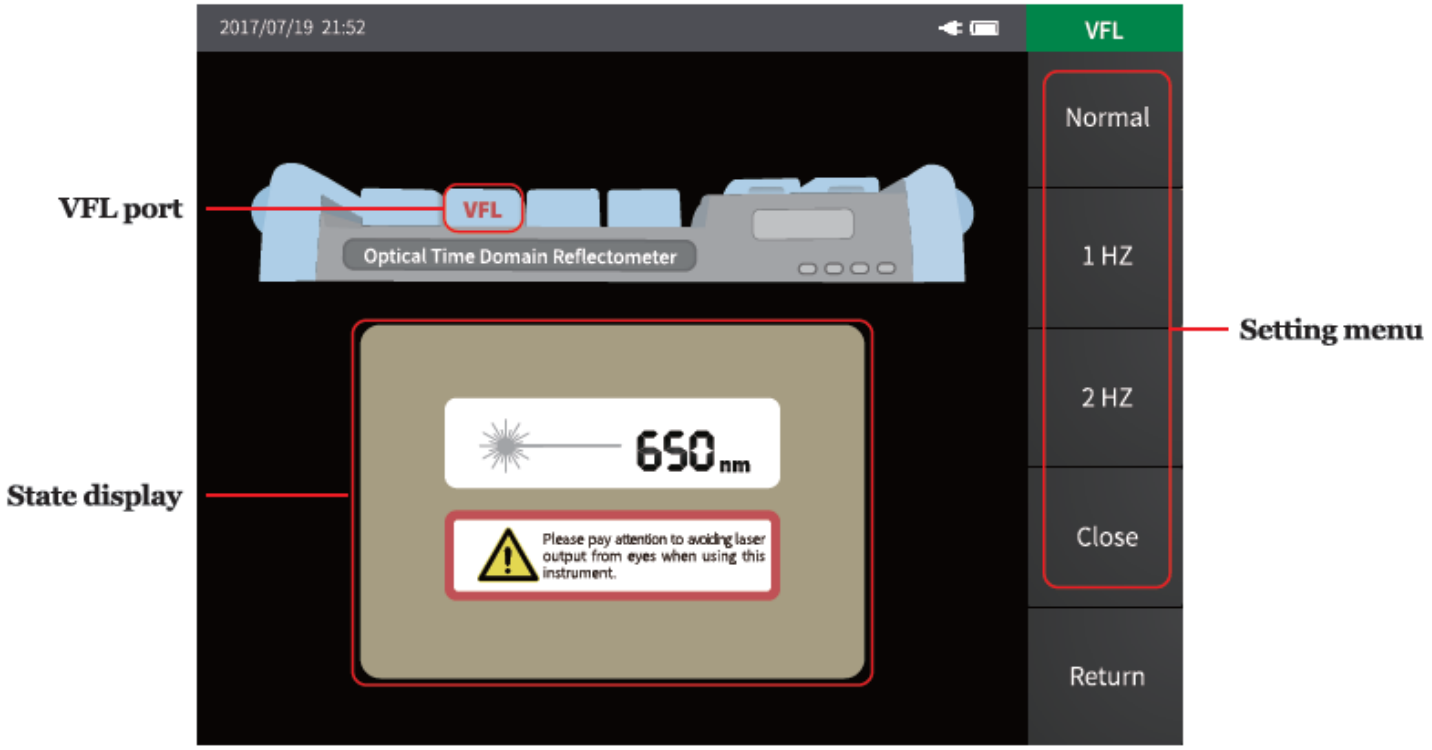
Optical Power Meter (OPM)



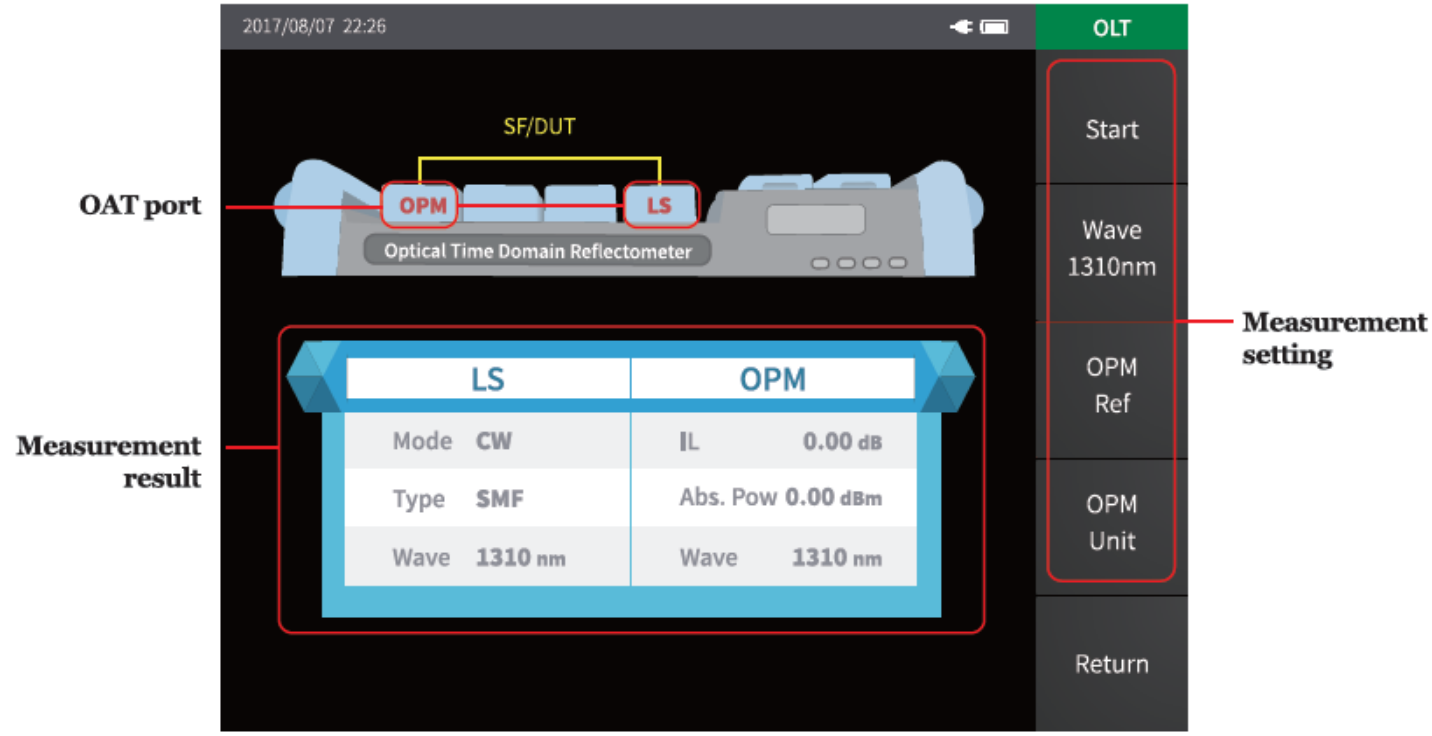
Laser Source (LS)



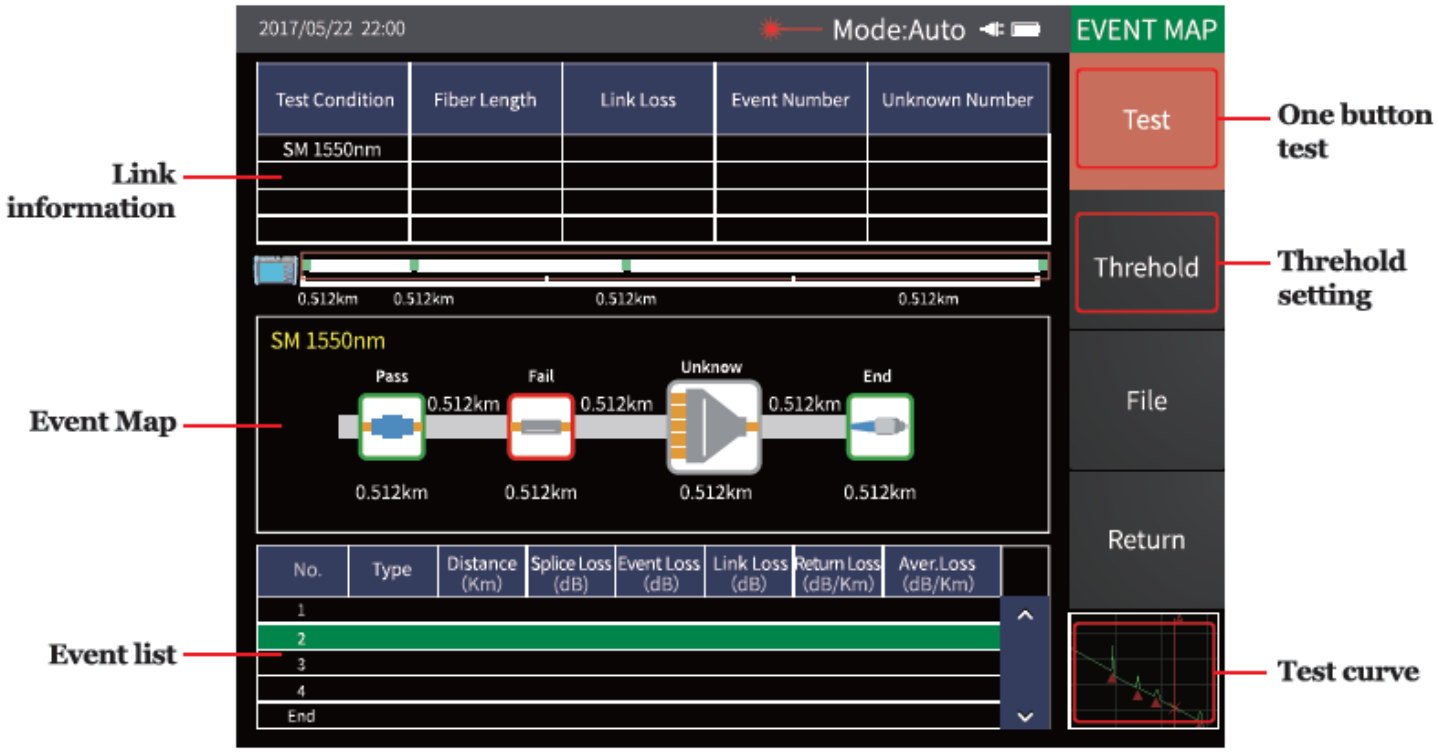
Visual Fault Location (VFL)



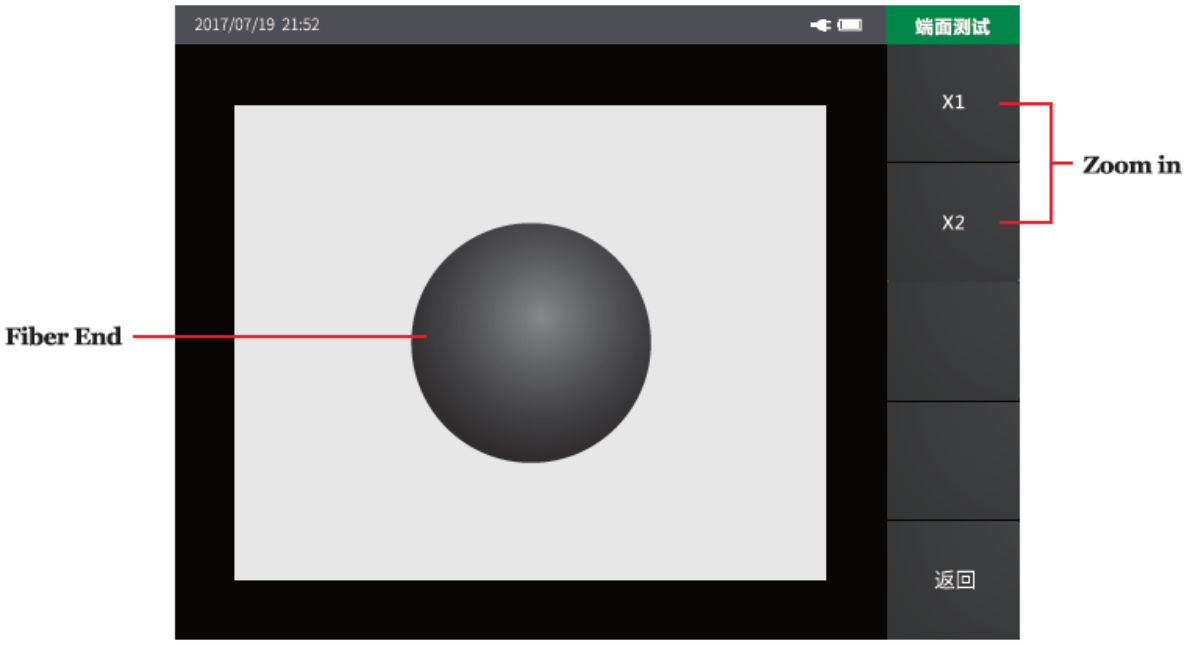
Optical Attenuation Test (OAT)



Event Map (iLOM) --Option



Optical Fiber End Detect --Option



Firmware one button upgrade

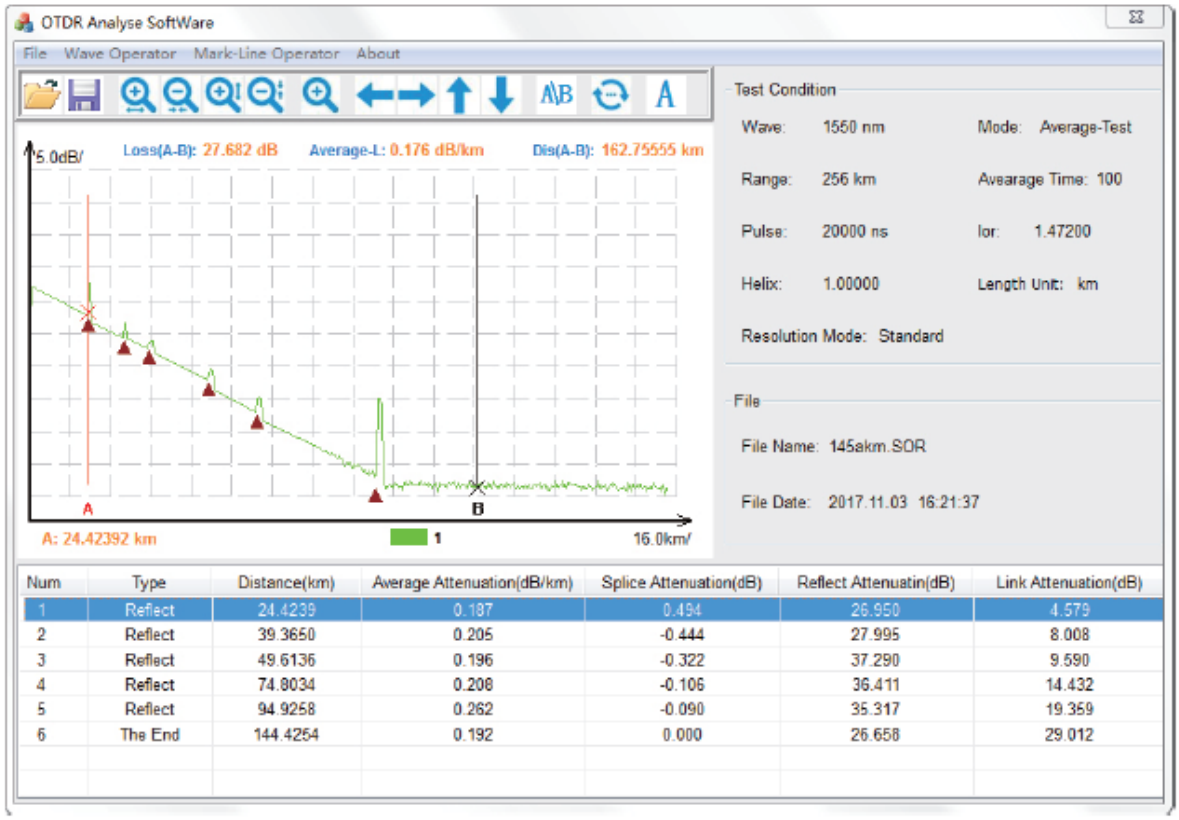
The firmware must be stored in the OTDR folder of the U disk, and then accessing the U disk to the instrument, and then click on the upgrade menu under the system to upgrade the firmware.

Attention:

Please do not turn off the power supply or unplug the U disk during upgrading, otherwise the system will not operate properly.

Client simulation analysis software

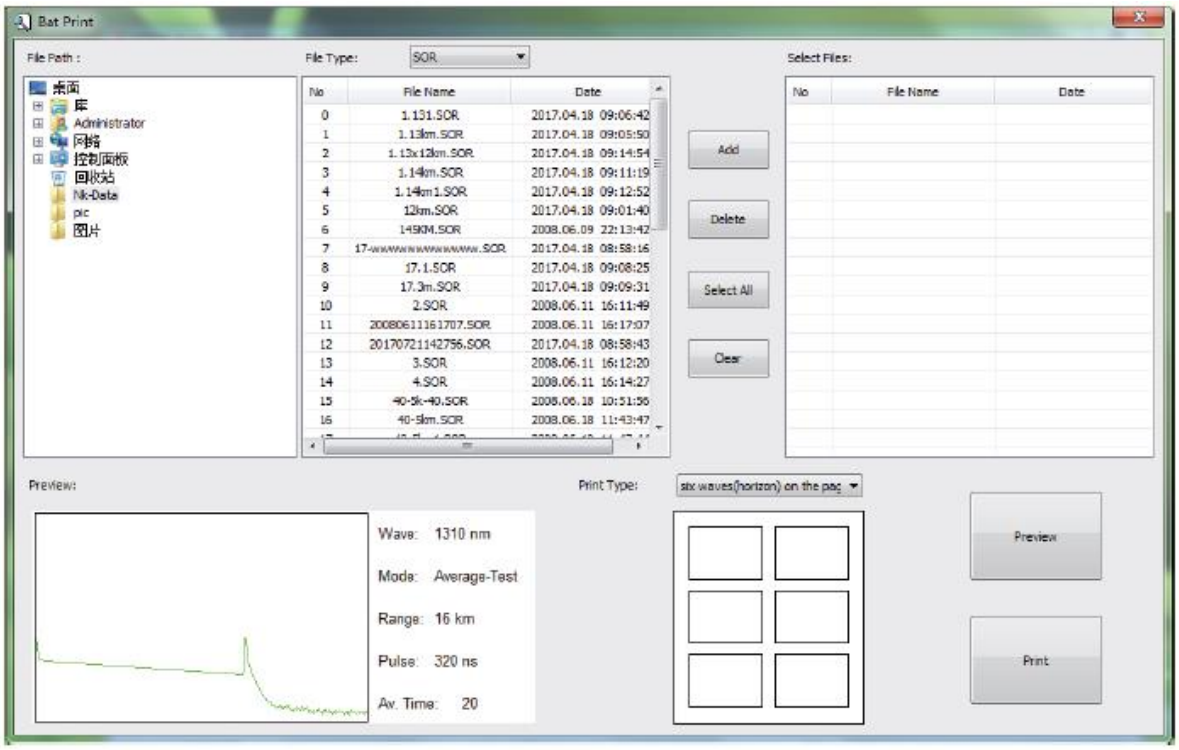
The instrument is equipped with client simulation analysis software. So the waveform preview, offline analysis, print pre- view and batch printing progressing can be done at the computer terminal. This can convenient user management and maintenance of optical fiber link database.



Num	Type	Distance(km)	Average Attenuation(dB/km)	Splice Attenuation(dB)	Reflect Attenuatin(dB)	Link Attenuation(dB)
1	Reflect	24.4239	0.187	0.494	26.950	4.579
2	Reflect	39.3650	0.205	-0.444	27.995	8.008
3	Reflect	49.6136	0.196	-0.322	37.290	9.590
4	Reflect	74.8034	0.208	-0.106	36.411	14.432
5	Reflect	94.9258	0.262	-0.090	35.317	19.359
6	The End	144.4254	0.192	0.000	26.658	29.012

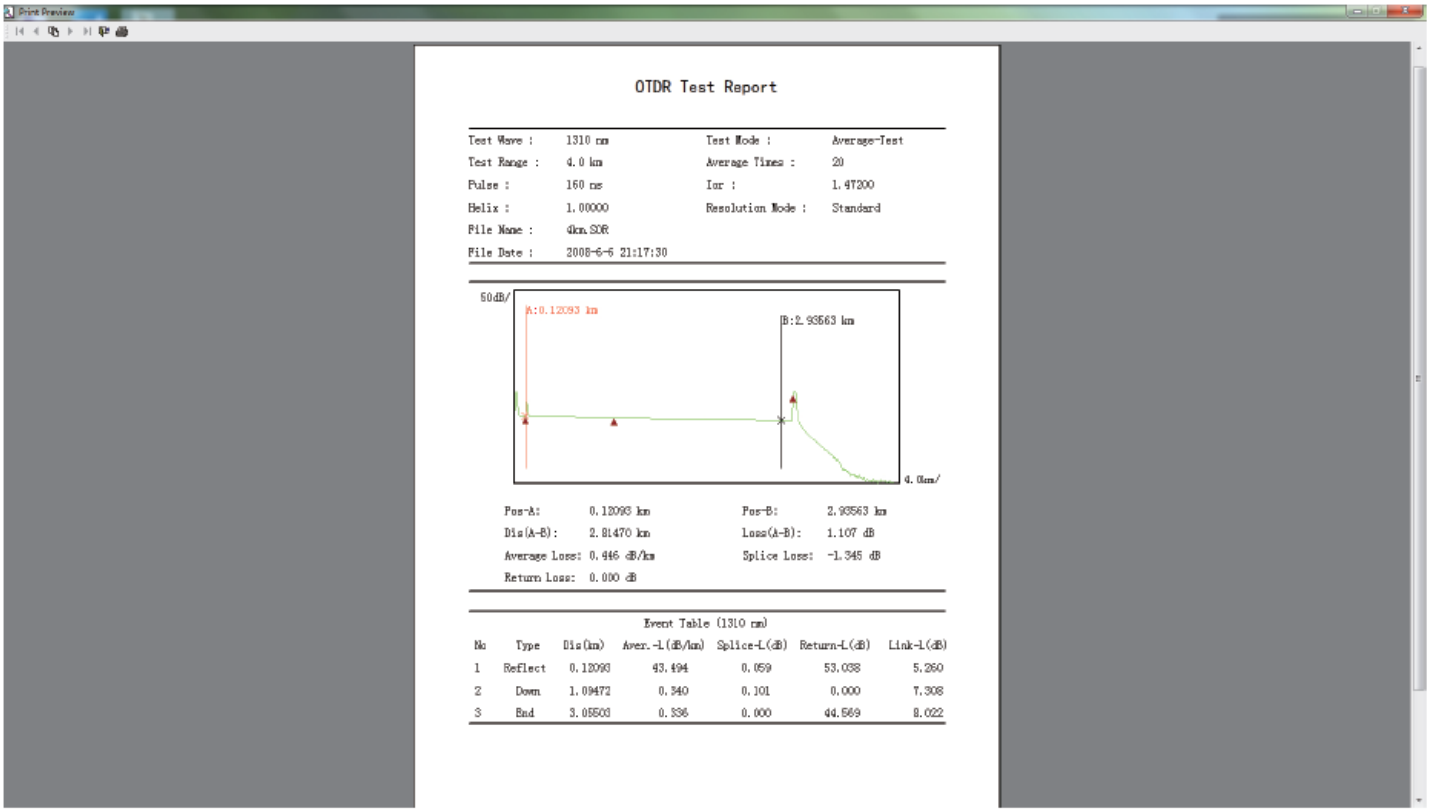
Waveform preview and offline analysis

Select the printed file by previewing the waveform. This can convenient user to submit test report.



Batch printing progressing

You can view test reports by batch print preview. The test reports contains test waveforms, link loss, average loss, event list and other information, and then you can batch print after checking.



OTDR Test Report

Test Wave :	1310 nm	Test Mode :	Average-Test
Test Range :	4.0 km	Average Times :	20
Pulse :	160 ns	Ior :	1.47200
Helix :	1.00000	Resolution Mode :	Standard
File Name :	4km.SOR		
File Date :	2008-6-6 21:17:30		

Pos-A:	0.12093 km	Pos-B:	2.93563 km
Dis(A-B):	2.81470 km	Loss(A-B):	1.107 dB
Average Loss:	0.446 dB/km	Splice Loss:	-1.345 dB
Return Loss:	0.000 dB		

Event Table (1310 nm)

No	Type	Dis(km)	Aver.-L(dB/km)	Splice-L(dB)	Return-L(dB)	Link-L(dB)
1	Reflect	0.12093	43.494	0.059	53.038	5.260
2	Down	1.09472	0.340	0.101	0.000	7.308
3	End	3.05503	0.336	0.000	44.569	8.022

Instrument maintenance and troubleshooting

Connector cleaning

The optical output ports of the instrument are a replaceable universal port. It must ensure the end face clean during using. You should consider the connector clean when the instrument is unable to test or test results are not accurate. Cleaning the end of the optical fiber must be in the state of all functional modules stopped. Please use anhydrous alcohol to clean the end face of optical fiber.

The dust cap of the instrument port should be covered so as to prevent dust or other contaminants from polluting the end face of the optical fiber after finishing using.

Normal maintenance of internal battery

The battery inside the instrument is a special lithium battery. In order to give full play to the performance of the battery, please use the internal battery power supply when you start using the instrument. The first use of the battery needs to be depleted, and then charging the battery, the first charging time should be no less than 10 hours. Battery charging temperature range is 0°C-50°C. For your safety, the charge will terminate automatically when the charging temperature is too high. When the instrument is idle for more than two months, it should be charged in time to maintain the battery power. Please don't take out the battery without permission. Please do

not let the battery close to the fire source or strong heat. The battery should be removed when the instrument is stored for a long time. The storage temperature range of the battery is -20°C~45°C.

Instrument screen cleaning and touch calibration

The display of the instrument is a 5.8 inch color LCD with touch screen. Please do not use sharp objects to click on the screen, otherwise it may lead to damage to the LCD screen. You can clean the LCD screen using soft fabric, but do not use organic solvent.

Instrument calibration

It is recommended that the instrument be calibrated once every two years. Please contact the supplier for specific items.

Common faults and troubleshooting

Common faults	Failure Cause	Troubleshooting
Instrument cannot start normally	Battery low power	Battery charging
Instrument cannot charge properly	Ambient temperature is too high or low	Charge the battery in 0°C~45°C
	Poor battery connect	Check battery connectors
	Instrument problem	Contact supplier
Inaccuracy test results	Incorrect parameter setting	Resetting parameters
	Optical fiber end contamination	Clean the end face of fiber
	Connector type mismatch	Replacing matching connector
	Optical port damage	Replacing fiber connector
Noise too high of test curve	Connector type mismatch	Replacing matching connector
	Pulse width too small	Increasing pulse width
	Incorrect attenuation	Modify attenuation
Saturation of curve front end	Pulse width too large	Decreasing pulse width
	Incorrect attenuation	Modify attenuation
Slowdown of curve front end	Optical fiber end contamination	Clean the end face of fiber
	Optical port damage	Replacing fiber connector
	Connector type mismatch	Replacing matching connector
Unable to measure the end of fiber	Range too small	Increase test range
	Pulse width too small	Increasing pulse width
Event analysis error	Incorrect test conditions	Modify test conditions

Optical fiber length inaccuracy	Incorrect test conditions	Modify test conditions
	Incorrect fiber refractive index	Modify fiber refractive index
	Incorrect optical cable correction coefficient	Modify optical cable correction coefficient
Incorrect average loss	Slowdown of curve front end	Clean the end face of fiber
	Incorrect A/B cursor position	Re-selecting A/B cursor position

- The above description only serves as a reference, please refer to the instructions for detailed use. Please contact the suppliers if you have any questions in the use of the instrument.
- You should not disassemble the instrument without permission; otherwise you will lose the warranty.

Technical specifications and ordering information

Technical specifications

Model / Item	Multi-Function Optical Time Domain Reflectometer									
	S1	**S2**	**S3**	**S4**	**S5**	**T1**	**T2**	**OL1**	**M1**	**SM1**
Fiber type	SMF								MMF	SMF/ MMF
Display	5.8 inch color LCD with touch screen									
Wave-length	1310/1550nm					1310nm/ 1490nm/ 1550nm	1310nm/ 1550nm/ 1625nm		850nm/ 1300nm	850nm/ 1300nm/ 1310nm/ 1550nm
Maximum dynamic range	32/30 dB	35/33 dB	38/36 dB	42/40 dB	45/43 dB	37dB/ 35dB/ 35dB			26dB/ 30dB	26dB/ 30dB/ 37dB/ 35dB
Event blind zone	1m	1m	0.8m	0.8m	0.8m	0.8m	0.8m	0.8m	1m	1m
Attenua-tion dead zone	6m	6m	6m	6m	6m	6m	6m	6m	6m	6m
Measuring range	500m/1km/2km/4km/8km/16km/32km/64km/128km/256km									
Measuring pulse width	5ns/10ns/50ns/160ns/320ns/500ns/1000ns/5000ns/10000ns/20000ns									
Ranging accuracy	± (0.75mm + Sampling interval +0.005% X Test distance)									
Loss precision	±0.05dB/dB									
Reflection accuracy	±3dB									

Data storage	≥2000
Interface type	FC / PC (Replaceable SC,ST)
Communication interface	USB, mini-USB, 10M/100M Ethernet
VFL output	≥2Mw
LS output	≥-5dBm
OPM	+26dBm ~ -50dBm (Replaceable: +6dBm ~ -70dBm)
Power supply mode	AC/DC adapter: AC: 100V ~ 240V, 50/60Hz, 0.6A; Lithium battery: 7.4V 6700mAh
Operating temperature	-50˚C ~ 50˚C
Storage temperature	-20˚C ~ 70˚C
Relative humidity	0 ~ 95% Non-condensation
Weight	≤1.1Kg
Volume	227mm x 160mm x 70mm

Attention:

1. The best condition of the Maximum dynamic range is that which the test ambient temperature is at 25±2, use maximum measured pulse width and average times >300.
2. The test condition of event blind zone is using minimum range and minimum pulse width, and the reflection loss of optical fiber end surface.

Ordering information

Num	Name	Quantity
1	OTDR host	1
2	AC/DC power adapter	1
3	Cortical handle	1
4	U disk (containing client simulation analysis software)	1
5	Touch pen	1
6	Data line	1
7	OTDR SC Transfer interface	1
8	OPM SC Transfer interface	1
9	User's Manual	1
10	Test Report	1
11	Warranty card and Certificate	1
12	Clean cotton swab	1
13	Special backpack for instrument (Containing suspenders)	1