XtendLan

OTDRHD-24VB

(Optical time-domain reflectometer)

User's Manual

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Not taking any safety precautions or the following instructions will violate the safety standards of design, manufacture and application of these instruments.

Symbols：

The WARNING sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personnel injury. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.

The CAUTION sign denotes a hazard. It calls attention to an operating procedure, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a CAUTION sign until the indicated conditions are fully understood and met.

NOTE

The NOTE sign information that may be beneficial during the use and maintenance of the instrument.

NOTE

- Battery for this instrument is disposable alkaline battery. Do not recharge the dry batteries. Do not expose batteries to fire or intense heat. Do not open or mutilate batteries. Make sure the right electrode before putting in the batteries.

- Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified service personnel. Do not expose the instrument to the rain or wet environment, avoiding the danger of fire or lightning.

- OTDR is a laser instrument. Users should avoid looking directly into the optic output. And the use of microscope or magnifier should also be avoided, for the use of such devices can focus a highly intense beam onto the retina, which may result in permanent eye damage.

- The instrument uses LCD. The LCD may be broken if got an intense collision .Avoid touching the liquid in the LCD, which is corrosive and may cause injuries to eyes, skin or damage to clothes.

- Make sure that the optical fiber is not in use and there is no laser beam in the fiber before testing via OTDR.

Otherwise, it may result in imprecise test trace, even permanent damage for the OTDR.

- Safety instructions to be followed before cleaning.

a) Make sure the instrument is power off when cleaning.

b) Any operations contradict to the instructions may result in dangerous laser injuries.

c) Make sure laser source is off, when clean any optic connectors.

d) Be cautious of electric shock and make sure AC power is disconnected with the instrument before cleaning. Always use dry or moistest soft cloth to clean the outside of the instrument, and never clean the inside.

1.1 Brief Introduction

OTDRHD-24VB Cute OTDR combines the industry's leading OTDR technology with power meter functionalities in one powerful handheld unit. It offers several wavelength configurations and a wide range of options, for first-class flexibility and full coverage of short-haul OTDR test applications.

The CuteOTDR makes link assessment a fast, simple task, providing unparalleled ease of use, even for technicians with little background in optical/OTDR testing. Designed for boosting OTDR testing efficiency, whether for multimode or single mode applications, the CuteOTDR software offers:

The CuteOTDR offers a smart software option that provides pass/fail status at all wavelengths, as well as span loss, ORL, fiber length and macro bend locations in a single window. View all your test results at once, and

software in a handheld unit. Focus on what's real: generate a list of all events actually present on the link.

Features

◇Test smart, accurate, and direct fiber link given event type, location and loss information

◇Simple, fast, without complex training, especially for grass-roots project to use

◇Event blind zone less than 5m

◇Attenuation blind zone less than 10m

◇USB-based OTDR, data can be uploaded to the PC via USB, graphics loss curve

◇650nm visible light output

◇Hand-held design, compact and lightweight

◇Anti-seismic, shockproof protective coat is appropriate to measure in field and on-site

◇Auto shutdown power saving design

Applications

◇Construction and maintenance of telecommunications

◇Cabling System

◇Other fiber-optic project

◇CATV construction and maintenance

◇Optical components production and research

1.2 Specifications

Performance	
Wavelength	1310+/-20nm（Type S1） 1550+/-20nm（Type S2） 1310/1550nm（Type D1）
Sensing Fiber	Single mode fibers
Photo detector	InGaAs

Max. Measurement Distance	60km
Dead Zone	5m（Reflective Event） 10m（Non-reflective Event）
Min. Measurable Loss	0.2dB
Visual Light Output	CW/1HZ
Power Supply	1.5V Battery × 3
Data storage	100 Measuring Curves
Features	
Dimensions(L×W×H)	210×120×54mm
Weight	500g
Operating Temperature	0℃~+50℃

Operating Humidity	0~90% R.H. non-condensing
Fiber Connector	FC/APC/PC

1.3 Standard fitting

Please make sure these parts are available according to the following list. If the parts are missing or damaged, contact the technical staff of our company or representatives as quickly as possible.

No.	name	quantity
1	CuteOTDR OTDRHD-24VB main engine	1
2	FC/ST/SC connector	1/1/1
3	User's manual	1

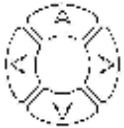
6	1.5V AA battery	3
7	Current adapter	1
8	Cleaning cotton bud	1
9	Portable pack	1

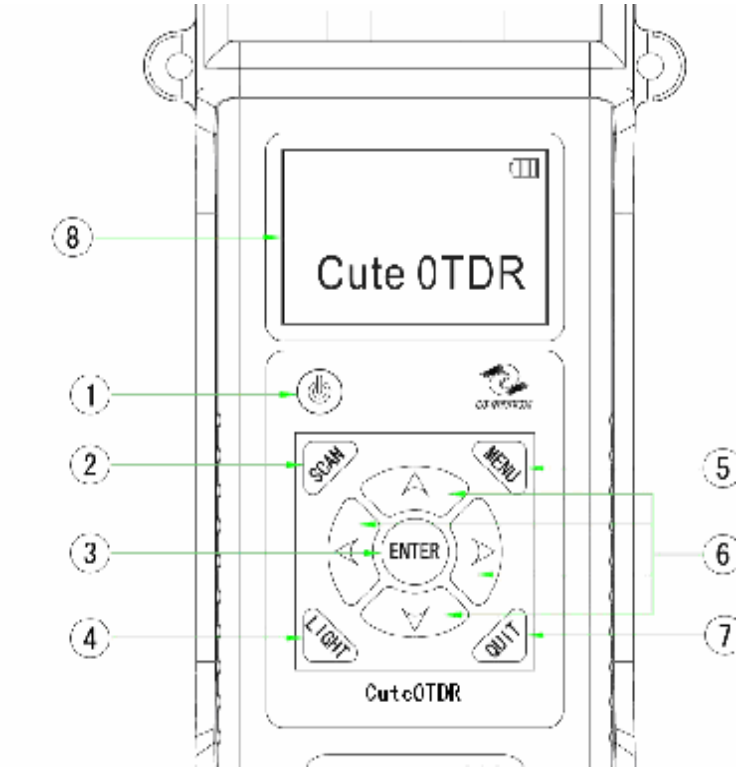
2.1 Foreword

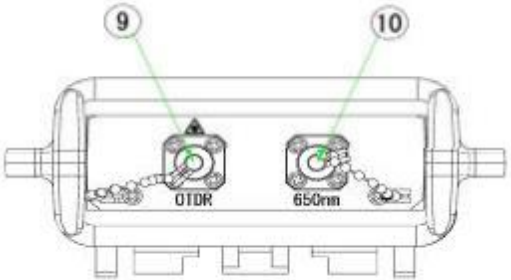
This part introduces the basic operation on the OTDR. Please read this manual carefully for optimal operation. Should you encounter any problems during operation, you are welcome to contact the technical staff of our company or representatives.

2.2 Keypad Functions

No.	key	function
1		Power on or off
2		Press to start measurement. While testing, press this key to stop measurement.

3		Press this key to confirm the current operation
4		Backlight on or off
5		Menu key: press this key to choose menu item
6		Direction key: select an icon or modify parameter
7		Cancel the current operation Exit menu configuration
8	Display space	LCD display space


8
Cute 0TDR
1
2
SCAN
MENU
5
3
ENTER
6
4
LIGHT
QUIT
7
CutcOTDR



No.	interface	function
9	Optic fiber output	A connector is used for optic interface.
10	VLS output	A connector is used for outputting visual light. You can set the output frequency.（CW/1Hz）

(1) Dust caps

The instruments leave the factory with dust caps, which can avoid the connectors being dirty and protect the surface of the connectors. You can remove the dust

There are three kinds of connectors: FC, SC and ST connector.

FC connector

SC connector

ST connector

图 2.2.1 connector

CAUTION! Be careful when changing connectors in order to avoid damaging the connector and adapter.

FC、SC、ST connector can access to respective FC、SC、ST optic fiber adapter.

FC adapter

SC adapter

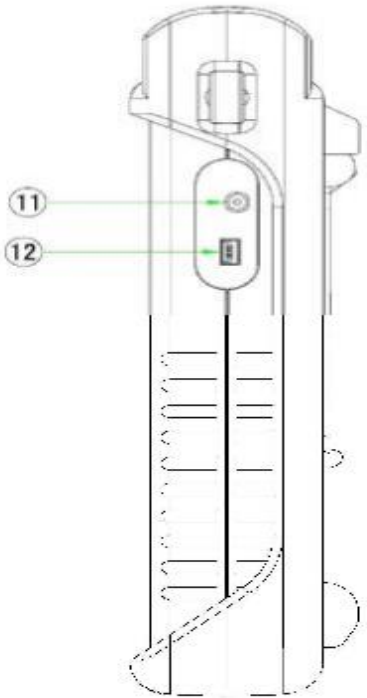
ST adapter

图 2.2.2 adapter

and diameter of dust and other particulates ranges from 1/100 to 1/1/10 um. Comparatively speaking, the size of dust and other particulates can cover part of optic end and therefore degrade the performance of the instrument, which will affect the precision.

Interfaces must be kept clean. Special alcohol may be used to clean optic output. Always replace protective dust caps when the unit is not being used, and keep the protective dust caps clean.

2.4.1 Profile diagram



No.	interface	function
11	Power interface	An interface is used for connecting with the standard power adapter.
12	USB interface	An interface is used for connecting with PC.

NOTE

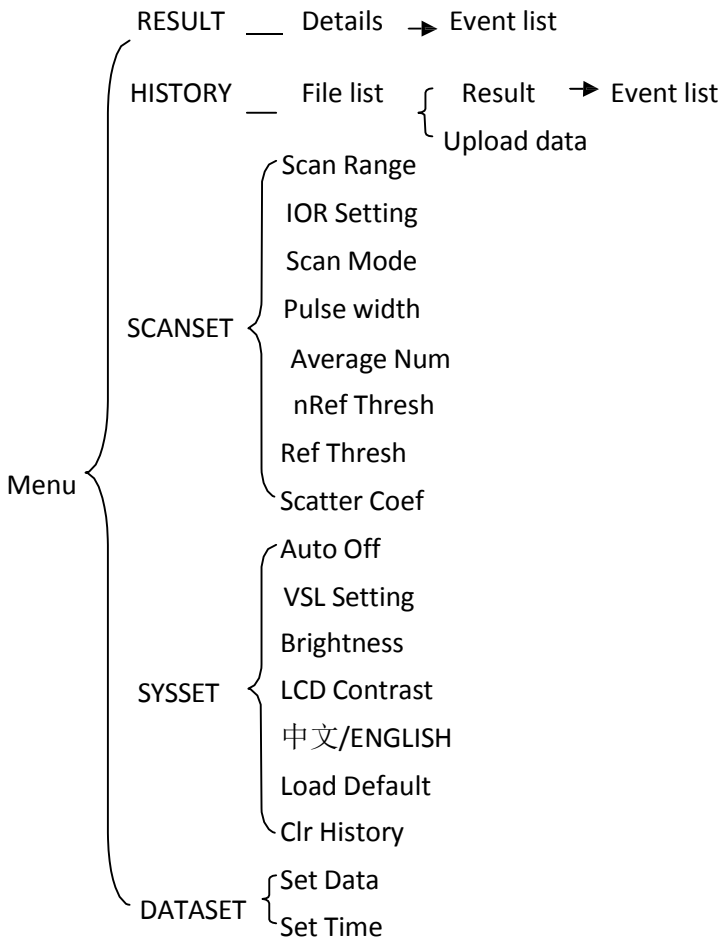
1、power requirement ： 9VDC@1A

2、USB data wire: The instrument can upload the measured data to PC and analyze the data with the self-contained software.

CAUTION!

It may damage the instrument if the power adapter is different type. Please use the power adapter coming with the instrument.

3.1 Menu Bar and window of OTDR



Scan Parameter	Definition of Parameter
Range	Length of optic fiber relevant to the trace
Pulse Width	Width of laser pulse sending out from OTDR to optic fiber
Average Time	To select suitable testing time
Wave length	To select laser wave length for measurement
Measurement Mode	To select mode for measurement
IOR	IOR of optic fiber which affects the transmission speed of laser
Scatter Coefficient	Which affects backward scatter power of laser in fiber
Non reflection threshold	Events whose insertion loss is greater than the threshold displays here
Reflection threshold	Reflection events GE the threshold will be displayed

Auto Off	Auto off function 10min/20min/30min/Off
VLS	Visible laser source on or off
LCD contrast	Adjust the contrast of LCD to select
Language	Choose the language
Load Default	Set all parameters to factory setting
Delete Files	Delete stored trace data in the instrument

3.1.2 Setting of Main Parameter

3.1.2.1 Range

Generally, range will be set according to actual length of optic fiber, so as to insure the accuracy of measurement.

Parameter setting:

5km/10km/20km/30km/60km (manual mode)

range and resolution of measurement trace. With narrow pulse width, there will be higher resolution and smaller dead zone; however, the dynamic range will be decreased. On the contrary, wide pulse width can bring higher dynamic range and measure comparatively long distance, but resolution and dead zone will be affected. Therefore, users should make choice between dynamic range and dead zone.

There will be different pulse width options for reference according to different range of distance being chosen.

Parameter setting: 10ns、20ns、50ns、100ns、200ns、500ns、1000ns (manual mode)

3.1.2.3 Average Time

Average time will affect the SNR directly. The longer the average time is, the higher SNR is, as well as dynamic range. Therefore, in case of measurement of long-distance optic fiber, long average time should be

1310nm and 1550nm.The default setting is 1550nm.

3.1.2.5 Measurement Mode

There are two kinds of measurement mode: auto and manual mode. Besides, there is a PC support real time mode.

Some types of instruments have no “Auto mode”.

Auto mode: “Auto” means the automatic measurement. When this function is selected, the instrument will automatically make an intelligentized selection of adequate range and pulse width for measurement. The whole process of measurement does not need any intervention of the operator.

Manual mode: “Manual” means users set the appropriate range parameter and pulse Width parameter by themselves. Generally, users can choose the auto

self-contained software, we can analyze the measured data curve and save the results.

3.1.2.6 IOR

IOR is a key factor to affect the speed of laser transmission in optic fiber; and in this case, IOR configuration has direct impact on the accuracy of measurement. Generally speaking, the IOR parameter is provided by optic fiber manufacturer, and it can be set to the accuracy of four digits after decimal point between 1.0 and 2.0. The default setting is 1.4666.

3.1.2.7 Scatter Coefficient

Scatter coefficient determines the value of backward scatter power. The configuration affects the calculation of reflection value. The default setting is 52.1dB.

insertion loss events. Only events GE this threshold will be listed. The default setting is 0.20dB.

3.1.2.9 Reflection threshold

This configuration has direct impact on reflection events listing. Only reflection events GE this threshold will be displayed in events list. The default setting is 60.50dB.

3.1.2.10 Time

Time configuration is used to change system time.

3.1.2.11 Auto Off

This function is designed for conserving battery power. If auto off is on, the instrument will auto power off within 10/20/30 minutes of idleness. The default setting is 10min.

3.1.2.12 Language

There are two language options: English and

adjust the contrast according to personal visual habits.

3.1.2.14 Load Default

This function is used to set OTDR parameters to factory settings. Those parameters include: range, pulse width, average time, IOR, non reflection threshold, reflection threshold, scatter coefficient, LCD contrast and backlight.

3.1.3 Types of events

Event of optical fiber is the sudden change in the outliers which causes the loss or reflected power except the addition to the normal scattering of the fiber material itself, including the loss of various types of connection and bend, crack or fracture.

The event points in the trace are the outliers of the trajectory which cause the offset from a straight line.

1		Begin end
2		Reflection event/mix event
3		Attenuation event
4		Fiber end

Begin end: the beginning of measured optical fiber;

Reflection event: When the pulse energy is reflected (for example, in the connector), the reflection events cause spikes on the track;

Attenuation event: Non-reflective events in optical fiber have some loss of signal but no light reflection. Non-reflective events cause a power drop on the track;

Mix event: the mix event includes both reflection event and attenuation event;

there is no laser beam in the fiber before testing via OTDR. Otherwise, it may result in imprecise test trace, even permanent damage for the OTDR.

3.2.1 Power on

Three seconds after pressing the key  , the welcome interface will be displayed on the LCD.

3.2.2 Connect optic fiber

- Connect optic fiber to OTDR optic output directly, no tools needed. Make sure aim at the location hole.
- Clean connectors carefully.
- Clean tie-ins and check whether they are FC/PC tie-ins or not.
- Connect optic fiber to the instrument

For details relating to parameter setting, please refer to 3.1.2, Parameter setting on OTDR Menu Bar. If the parameters are unclear, please use the default parameters of the instrument, however, this may cause an increase of measurements errors.

Operating steps:

Press the key 【MENU】, using the direction key 【▲】and 【▼】to choose the option 【SCANSET】, press the key 【ENTER】.

3.2.3.1 Manual mode

If the operators have full knowledge of measured optic fiber, they can set accurate parameters, and achieve optimal measurement results.

Change “range”: Refer to 3.1.2.1 Range to select adequate range.

【IOR Setting】: Set the IOR of optic fiber;

【Pulse Width】: With narrow pulse width, there will be higher resolution and smaller dead zone; however, the dynamic range will be decreased. On the contrary, wide pulse width can bring higher dynamic range and measure comparatively long distance, but resolution and dead zone will be affected. Therefore, users should make choice between dynamic range and dead zone;

【Average Num】: The longer the average time is, the higher SNR is;

【nRef Thresh】: Only events GE the nRef threshold will be listed;

【Ref Thresh】: Only reflection events GE the Ref threshold will be displayed in events list;

【Scatter Coef】: Scatter coefficient determines the value of backward scatter power.

that the length of optic fiber is unidentifiable. OTDR auto select adequate range for measurement. In this mode, parameter【Scan Range】and 【Pulse Width】will be ignored .Besides, users should set up parameter【IOR Setting】and【Scatter Coef】based on the real optic fiber. Others could choose the default setting.

After setting up, press the key【QUIT】--- choose 【SAVE】--- 【RETURN】

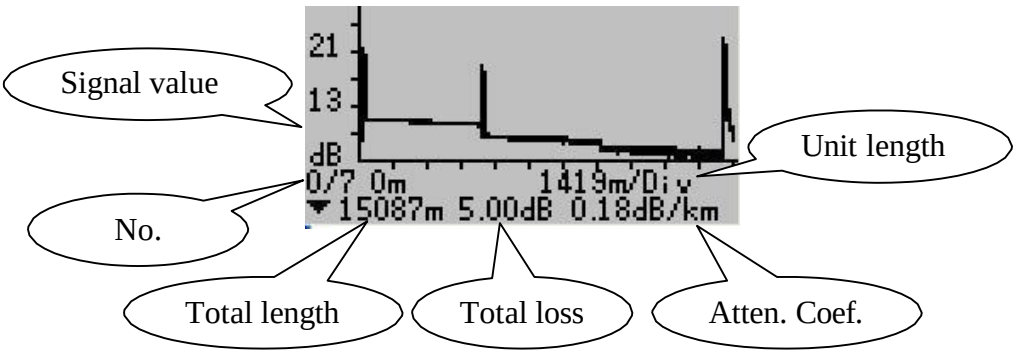
3.2.4 Measuring

Press the key【SCAN】, waiting for the end of measuring progress bar.

3.2.5 View results and save trace

Definition of Trace：After one measurement, reflection power diagram will be displayed as distance

Items of information window:



Signal value: relative power (dB);

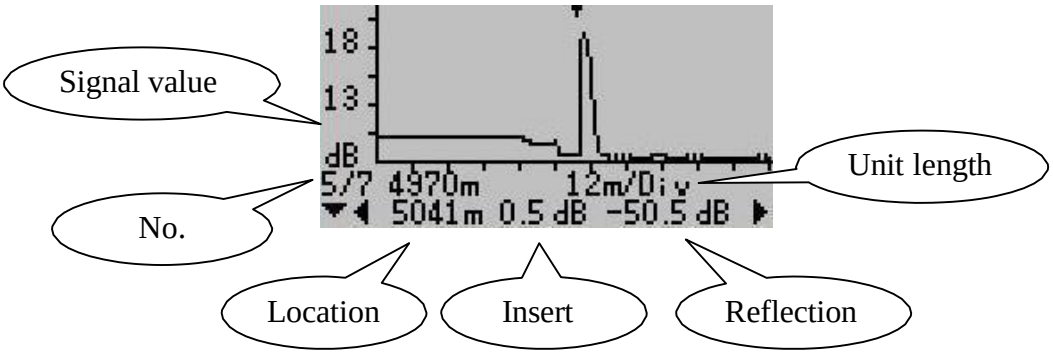
Atten. Coef.: Attenuation coefficient;

Trace of OTDR shows the results include total length of the optical fiber, number of events, total signal loss of the optical fiber and attenuation coefficient.

The y-axis stands for power, and the x-axis stands for distance.

Press the key【ENTER】can view magnifying trace.

In the total trace window, press the key【ENTER】can view the event list. Press the key【▲】and【▼】can view every event.

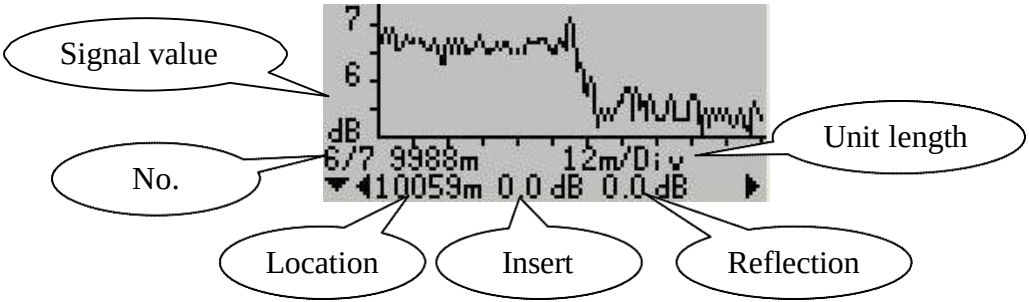


No.: Event sequence order number;

Location: Distance from beginning point to event;

Reflection.： Magnitude of reflection;

Insert.： Loss of Inserted event;



Save the file:

Press the key【QUIT】--- choose【SAVE】--- using the direction key modify time and name ---【ENTER】---【ENTER】---【ENTER】---【ENTER】---【RETURN】

3.2.6 Browse saved traces

【MENU】---【HISTORY】--- 【ENTER】This operation can browse saved traces. Choosing a file through direction key 【▲】and 【▼】---【ENTER】---【Detail】

Saved traces can be uploaded to PC through the associated software “OTDRViewer”, with which traces can be further processed on PC.

- Install the software, and run
- Power on OTDR
- Connect OTDR to PC through USB interface cable
- 【MENU】---【HISTORY】--- 【ENTER】【▲】【▼】---【ENTER】---【Upload】Upload data with the software. The whole process is as in，

3.2.8 Restore default setting

【MENU】---【SYSSET】---【Load Default】---【YES】---【ENTER】---【QUIT】---【SAVE】

3.2.9 Real-time measurement

With the associated software “OTDRViewer”，users

- Connect OTDR to PC through USB interface cable
- Power on OTDR and choose auto or manual mode
- Start measuring
- The software will show the trace after measuring.

3.2.10 Finding fault location by visible light

The instrument can find fault location by visible light. Wave length of the light is 650nm. Frequency of the light is CW/1Hz.

Operating steps:

Press the key 【MENU】--- 【SYSSET】--- 【VFL Setting】--- Changing the 【CW】and【1HZ】 by direction key 【◀】and【▶】 , you can see the visible light outputting though the VLS interface. Changing to the option 【OFF】, the light will be closed.

If measurement failures occur, reasons may be one of the following:

- Events may be too close to each other Shorten the pulse width, and make another try. If failure still occurs, please try to measure at the other end of the optic fiber Low SNR

- Try to use wider pulse or increase average time, and make another try incorrect parameter configuration

- Check parameter configuration, and make another try.

3.3 Supply power mode

There are two kinds of supply power mode: three dry batteries and power adapter. When the instrument is powered by inside disposable alkaline batteries, power volume of batteries is shown on the LCD:


Low power;


More than half power;


Full power.

When the instrument is power on and powered through adapter, the meanings of signal is as follows:


Adapter power supply;

3.3.1 Dry batteries

Do not make the cell electrodes short circuit. Make sure the right electrode before putting in the batteries. Recycle the batteries in a right way.

3.3.2 Power Adapter

The supply power mode of instruments prefers power adapter rather than dry batteries.

It may damage the instrument if the power adapter is different type. Please use the power adapter coming with the instrument.

3.4 Assistant Analysis Software

Before data communication, make sure the driver and application software have been successfully installed.

This instrument is equipped with special analysis software named OTDRViewer.

1) Driver pre-installed

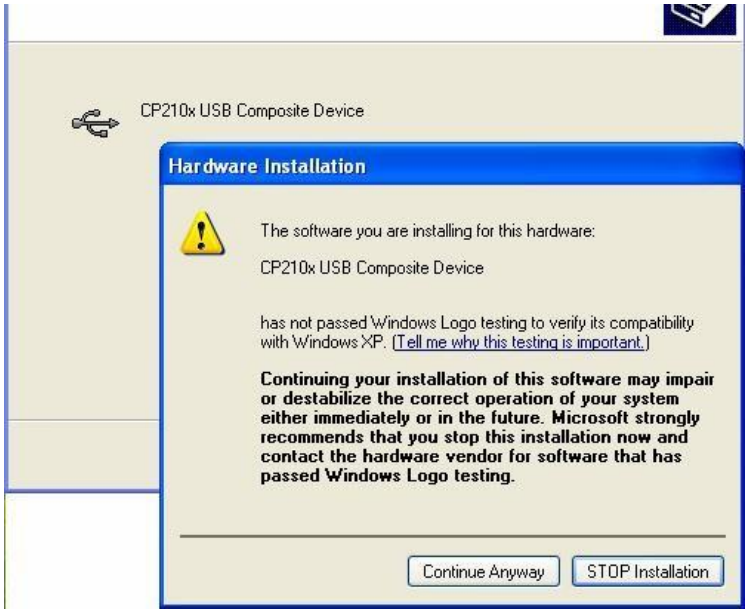
Open the matching CD of the equipment, enter into the "driver" directory, and double-click the "PreInstaller.exe" to start the driver.

Click "Install" to install the program directly.

Click "OK", and complete the installation.

product and connect the device to the PC USB port. Waiting for a moment, system will pop up the driver installation window.

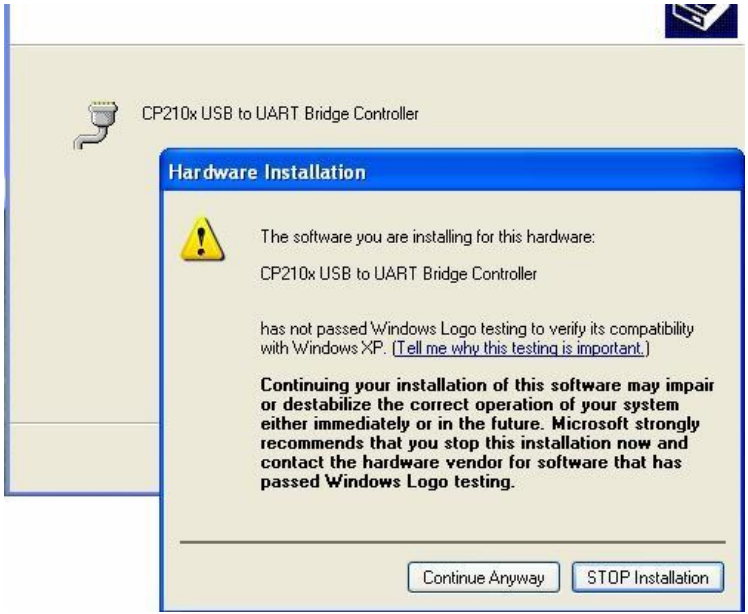
Click "Next" to continue the installation.



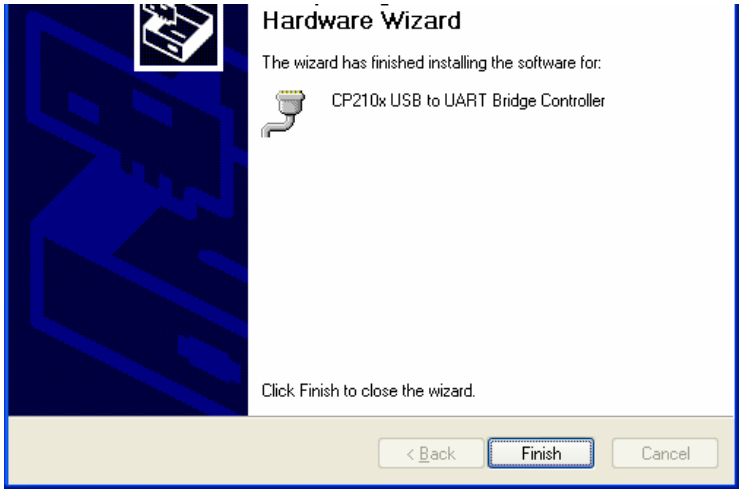
Click "Continue Anyway" to continue the installation.

Click "Finish" to complete the installation of one device driver. Later the system pops up driver installation of another device.

Click "Next" to continue the installation.



Click "Continue Anyway" to continue the installation.



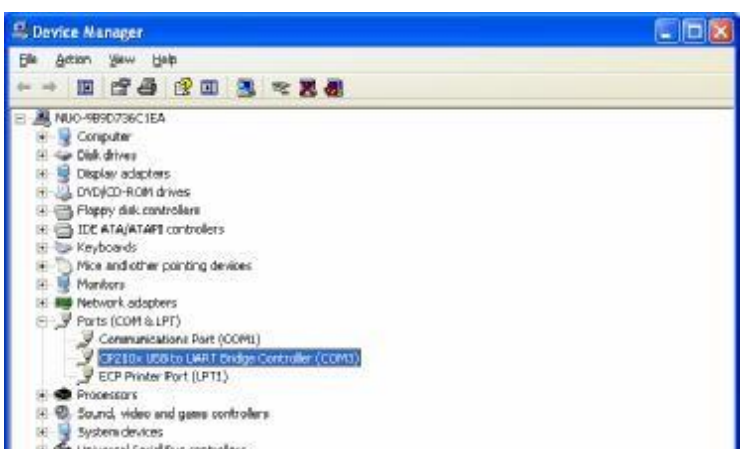
Click "Finish" to complete the installation.

Finally, system pops up successful installation notice at the bottom right corner of the screen.

installation is completed. Confirm the port number as the following method:

Right-click "My Computer":

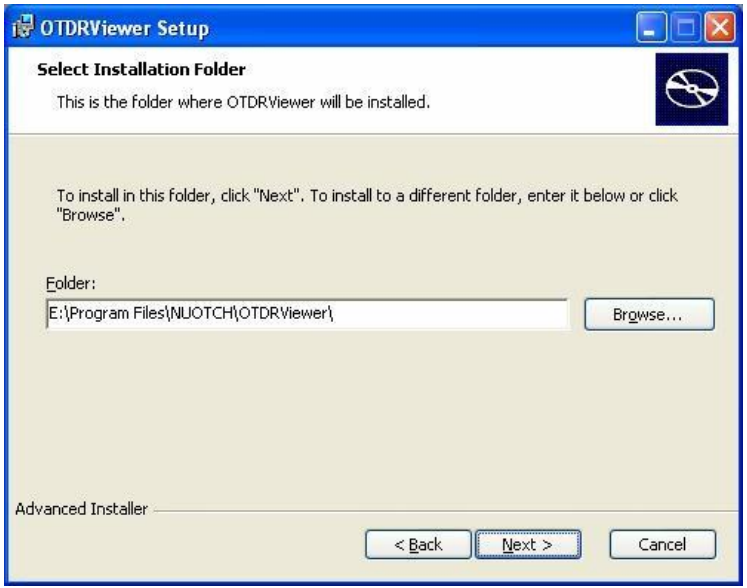
Click on "Device Manager" into the Device Manager interface:



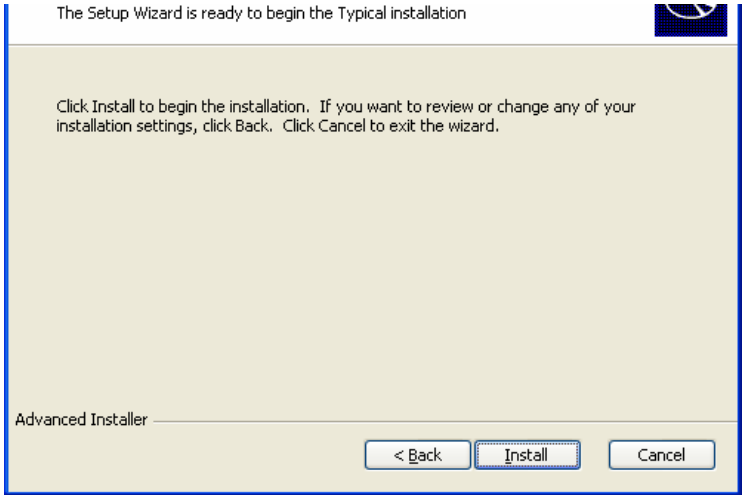
number in the following software port configuration.

3.4.2 Matching software installation

Open the matching CD of the equipment into the "OTDRViewer" directory; run the “OTDRViewer.msi” Installation files. Software installation as follows:



Click “Browse” to select the installation path. Using the default directory, click on "Next" to continue:

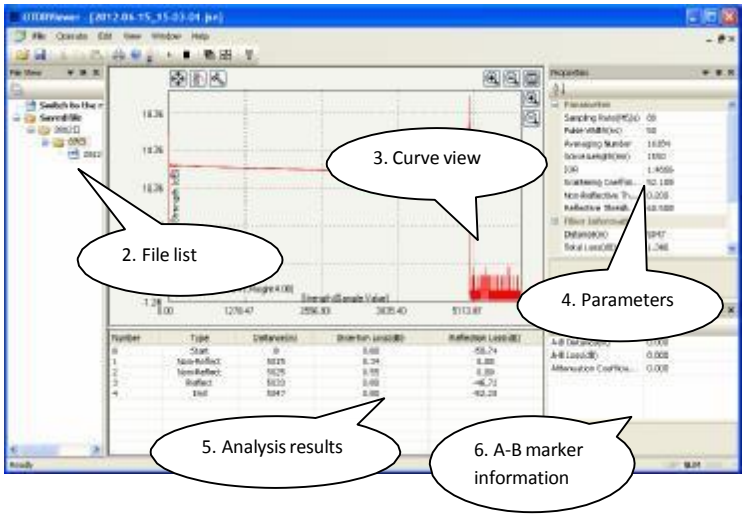


Click "Install" to start the installation, and finally pop up the completed interface. Click "Finish" to complete the installation.

1) Function description

"OTDRViewer" shows the dB data collected by the instrument, displays data of the curve and other information.

Descriptions of main program window as follow:



No.	Function	Description
1	Function button	System's main function buttons, including "start monitoring", "Finish monitoring", “system configuration” and so on.
2	file list	This area displays files received from the device. All these files are ordered and classified by date. Double-click the file can open it.
3	Curve view	This area displays the data curve, X-axis is the distance value, and Y-axis is the dB value.

		configuration information, when the device is collecting data.
5	Analysis results	This list shows analysis results.
6	A-B Marker Information	Marker A and B are two positioning lines, you can move their position. This column will dynamically display information between the two lines.
Function Description of Toolbar buttons		
No.	**Buttons**	**Description**
1		Start the connection with the Cute-OTDR equipment. The first

2		Close the connection with the Cute-OTDR equipment
3		This software supports multiple documents open at the same time, click this button, all windows stacked as overlap style, it is facilitated to select the appropriate window.
4		All windows stacked as non-overlapping tiles style, it is facilitated to select the current window.
5		Open the port configuration interface.

The first time you run the software, you need to re-configure the port. Click the configuration button on the toolbar, popping up configuration interface:

When you configure the port name, please choose the name as section "view of the port number" of chapter "Driver Installation" shows. The baud rate configured as "115200". Click OK to complete the configuration.

3) Start monitoring device

Click "Start Monitoring" button on the toolbar. Before click the button, please confirm that the device is power on and connected with the pc. When

the device picture show as follow:

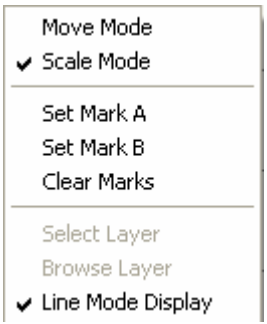
After reception is completed, the interface will display the received data curve and results. The system will automatically save the data ordered by the date. If there is some incorrect of the saved file name, please modify the date and time of the equipment.

4) Operation of data curve view

The curve view is the main tool for manually data analyzing. You can analyze the data characteristics with it. Some view operation instructions as follow:

1	Full screen display	Double-click any place of the view
2	Switch operation mode	There is a switch mode button at the upper left corner of the curve view, and the button icon show the current mode.  (Scale Mode)  (Move Mode)

3	"Move mode" X-axis scaling	attention location. Mouse wheel to scroll up will zoom in X-axis, and scroll down will zoom out.
4	"Move mode" Move the curve	At any place of the view press the left key and move the mouse.
5	"Zoom mode" zoom in attention area data	Press the left key and move the mouse, select one attention area, zoom in the data in selected area. Double-click the view all the data full screen display.

6	A-B Marker locate event	the events list, will locate the event position in the data curve.
7	A-B Marker directly locate	Move the mouse to the place you want to locate, right-click will pop up the following menu, you can drag marker A and B, can still clean them. 

4.1 Common faults

Breakdown	Reasons	Solutions
No display on the LCD	1.power off 2. power is not enough	1.press key 2.change batteries
Wrong measured value	1. Optic fiber connector is dirty. 2.optic fiber is connected improperly	1.clean the connectors 2.reconnect optic fiber

4.2 Maintenance

a) Interfaces must be kept clean.
b) Better use the same optic fiber adapter.
c) Remove the dust caps only when the instrument is in use.
d) Be careful when you plug or pull out the optic clean.