



10 Gigabit Ethernet Tester User Manual

Model Name: T3000A



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Safety instructions

The following general safety measures must be taken at all stages of operation of this instrument. Failure to take these safety precautions or to comply with specific warnings stated elsewhere in this manual violates the safety standards of the design, manufacture, and use of the instrument. No liability is accepted for the consequences of the client's violation of these requirements.

General principles

This product is a Class 2 safety instrument. If this product is used not in accordance with the operating manual, its protective functions may become invalid.

Working environment

This instrument (excluding AC/DC adapter) is Class II safety equipment and is suitable for use in outdoor environments with pollution level 2. Maximum relative humidity 93% (non-condensing). See the specification sheet for AC power supply voltage requirements and operating ambient temperature.

Before turning on the power

Verify that the product is set to match the available mains voltage, has suitable fuses installed and all safety measures are taken. The external power supply requires DC 15V/5A.

Do not operate in explosive environments

Do not use the instrument in the presence of flammable gases or fumes.

Do not disassemble the instrument case

Operators should never disassemble the instrument casing. Replacement parts and internal adjustments should only be made by qualified service personnel.

Laser safety precautions

This product is a laser device. Please pay attention to the following laser safety matters:

Users should always avoid looking directly into the laser output, especially when testing is in progress. Users cannot use microscopes, magnifying glasses and other equipment to observe the light source output port. Otherwise, if the energy of the laser beam is concentrated on the retina, it will cause permanent damage to the eyes.

After use, please pull out the SFP/SFP+ optical module and cover it with the dust cover.

Electrical Safety Precautions

If you need to ensure that the device is completely powered off, unplug the power cord and remove the battery.

1. Only use the AC/DC power adapter indoors.
2. The equipment should be placed so that surrounding air can circulate freely.
3. Using any electrical tool near flammable gases or in smoke poses a significant threat to safety.
4. To avoid electric shock, do not operate the device if any part of the outer surface (upper cover, panel, etc.) is damaged.
5. Only approved professionals may perform live commissioning, maintenance or repair on opened equipment.
6. Even if the power to the device is turned off, capacitors within the device may remain charged for a period of time.

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1 Overview

1.1 Contents of this manual

Thank you for choosing our company's products. Please read this manual carefully before use, especially the warning and caution information, to avoid personal injury to the user or instrument damage due to incorrect use.

This manual contains necessary information for the correct operation and maintenance of the product, as well as troubleshooting guides and information on obtaining technical support and service.

1.2 Product Introduction

This product is a field test tool designed for next-generation metropolitan area networks and IP bearer networks. It is a complete test solution for voice, data and video services carried on Ethernet. This product can support traditional SONET/SDH test functions and extend to next-generation network services based on IP and OTN, providing various test functions at the same time by integrating on one platform.

Product design features:


- Lightweight, compact and durable, it can be flexibly used in laboratory environments and outdoor field environments.
- High-resolution color touch screen, no matter what the lighting environment, you can handle it calmly
- Graphical user interface, touch screen, and navigation buttons provide clear and simplified operation.
- Support PC remote control management
- Provide intelligent detection and remote control to achieve online testing
- Provides test configuration file import and export, test report generation, and transmission through FTP or USB interface, allowing engineers to master the test process and obtain test results in a timely manner
- More comprehensive Ethernet testing capabilities, including RFC2544 and Y.1564 testing capabilities
- Built-in high-capacity lithium battery, capable of supporting up to 4 hours of continuous testing and displaying battery capacity in real time

Product functional features:

- Supports 2 10/100/1000BASE-T RJ45 electrical ports, 2 100/1000BASE-X SFP optical ports and 2 10GE SFP+ optical ports
- Able to generate 10M~10Gb/s traffic and support LAN/WAN mode
- Supports layer 1~4 bit error rate testing

- Supports up to 16 business traffic generation for multi-service testing
- Supports standard RFC2544 testing, packet throughput, delay, back-to-back and frame loss
- Supports standard Y.1564 testing, including configuration testing and performance testing
- Supports VLAN testing, priority configuration, and VLAN Q-in-Q testing
- Supports MPLS testing and level 3 MPLS nested testing
- Support business service interruption time measurement
- Support CoS and ToS/DSCP service priority testing
- Ability to perform statistical analysis on various data results
- Support IP testing for network connectivity testing
- Capable of capturing and analyzing various data packets
- Supports intelligent detection and remote loopback testing
- Supports optional multiple function modules:

1.3 Product Illustration

The  (power switch) button is lower than other buttons to avoid misoperation.

1.4 Front panel indicator light description

Indicator light	Indicator status	Description
Power Indicator (Left LED light)	Red always on	Shut down and charge
	Yellow always on	Power on and charge
	Flashing yellow and green	Powered by external adapter
	Steady green	Battery powered
Alarm indicator light (Right LED light)	OFF	Off state
	green flash	Program runs normally
	red light	There is an alarm

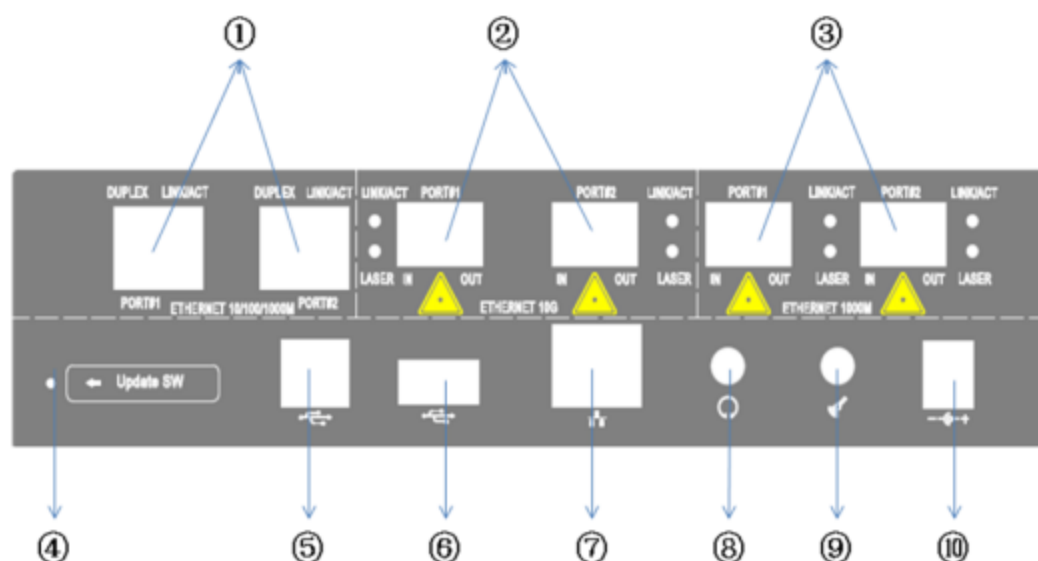
1.5 Front panel function button description



Button name	Function description
	Power on button, short press after power on to enter the shutdown interface, long press to force shutdown;
	Backlight key to adjust backlight brightness;
	Short press to take a screenshot, long press to enter the screen calibration interface;
	Interface switching;
	Store test report
	Up and down arrow keys;
	Left and right arrow keys
	Confirm input;
	None
	Test start and end switching;
	Delete the character before the cursor, press and hold to delete continuously;
	Delete the character selected by the cursor
	Number, letter and symbol input buttons can input numbers 0-9;

1.6 Interface description

Top interface



No.	Interface name	Description
①	Ethernet electrical interface	10/100/1000M electrical interface connected to RJ-45 connector
②	10G Ethernet optical interface	10Ge optical interface connected to SFP+ connector
③	1000M Ethernet optical interface	1000M optical interface connected to SFP connector
④	Restore default system button	Press and hold this button to turn on the system. The system will be restored to the factory state. Use with caution
⑤	USB slave interface	device and computer for data transmission
⑥	USB main interface	connect USB storage devices
⑦	Electrical interface	10/100M electrical interface connected to RJ-45 connector
⑧	Audio output interface	connect headphones
⑨	Audio input interface	Connect microphone
⑩	Power interface	External power adapter

Interface indicator light

Ethernet electrical interface indicator:

Indicator light	Indicator status	Description
DUPLEX	Open	Full duplex mode
	Close	Half duplex mode

Indicator light	Indicator status	Description
	flashing	Conflict detected
LINK/ACT	Open	Ethernet link up
	Close	Ethernet link down
	Flashing	There is signal transmission

Ethernet optical interface indicator:

Indicator light	Indicator status	Description
LINK/ACT	Open	Link connection
	Close	Link down
	Flashing	There is signal transmission
LASER	Open	Laser on
	Close	Laser off

Pay attention to invisible laser radiation: During the measurement process of the optical fiber system, invisible laser will be emitted to the optical port from time to time. Be careful to avoid looking at the open optical fiber, optical fiber interface, optical fiber connection point and other light sources, otherwise it will cause Eye damage from contact with the laser being transmitted.

- When the equipment is working, do not look directly at the laser output port.
- After use, unplug the optical module and cover it with the dust cover.

1.7 Power supply description

This device uses the following power sources:

- AC adapter (connects to standard electrical outlet – indoor use only).
- Lithium-ion rechargeable battery (automatically powers when AC adapter is disconnected).
- When using the device, the battery cover must be locked.
- Can switch between AC adapter and battery power without affecting operation.
- When the AC/DC adapter is connected, the built-in lithium-ion rechargeable battery will be automatically charged.

When only using lithium battery for power supply, the following situations may cause the instrument to automatically shut down or fail to turn on normally:

- During use, when the battery power is less than 15%, there will be a buzzer alarm. The alarm will stop after 1 minute and the panel alarm indicator will turn red. When the battery power is seriously insufficient, the battery symbol on the display will turn red (indicating low voltage).), the device may automatically shut down at this time.
- If the battery power is insufficient due to long-term use, the instrument may not be able to

turn on normally during use; at this time, you should connect the power adapter and turn it on again, while also charging the battery.

1.8 Use of rechargeable batteries

- The product uses a built-in replaceable lithium-ion rechargeable battery.
- A full charge of a depleted battery takes approximately 4 hours.
- When the meter is charged by the AC/DC adapter, the power indicator light on the left side of the front cover of the meter is solid red (off state), or solid yellow (on state). The indicator light will flash after it is fully charged.
- When the meter is turned on for charging, the LCD screen will also display the charging status.

Notice:

The battery powered by this product is a rechargeable lithium-ion battery. If the device will not be used for a long time, please charge the battery to 50%~70% before storing.

Please do not let the battery get close to fire or strong heat; do not disassemble the battery or short-circuit the positive and negative terminals of the battery.


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2 Basic equipment operation


This section introduces the basic operation methods of the equipment. Detailed usage methods are described in detail in the later chapters of this manual. In order to better apply the product equipment, please read this manual carefully. If you have any questions during use, please contact the technical support personnel of our company or agent.

2.1 Turn the device on or off

To turn on the device:

Press the ‘’ (POWER switch) button until the power indicator LED on the front panel lights up.

To turn off the device:

Press and hold the ‘’ (POWER switch) button until the shutdown menu is displayed on the interface. Select shutdown to start the shutdown process.

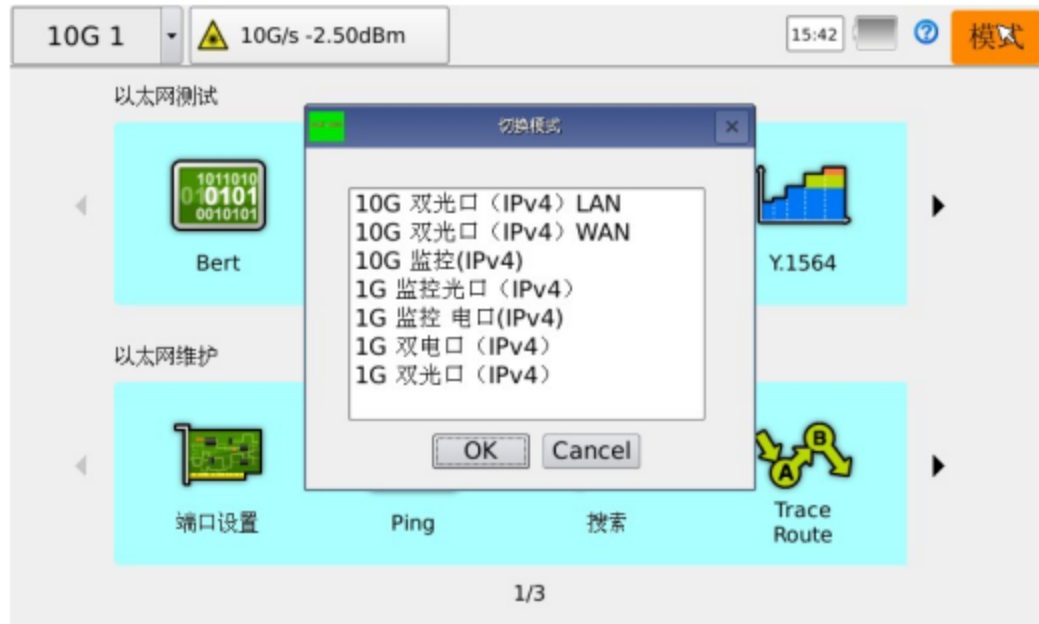
2.2 Select test mode

After the device is powered on, the system will automatically start the main program and automatically enter the port 1 test main interface. As shown below.



System main interface

Click ‘Mode’ in the upper right corner to select test mode.



Switch test mode

2.3 Turning on and off the laser

There are two ways to turn on/off the laser:

1. Enter the port setting interface and turn on the laser.
2. Click the laser icon in the upper left corner of the test interface. If the color of the laser icon is yellow, it means the laser is on, and if it is gray, it means the laser is off;



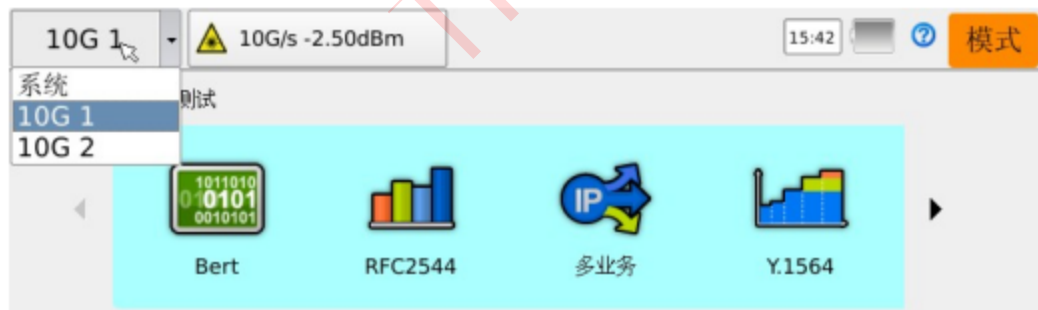
2.4 Start the application

After normal booting or switching to test mode, the test interface will be entered, as follows:



You can start any test application in this interface, and click the corresponding icon to enter the global settings interface of the application.

To switch between different test port interfaces and the system interface, click on the port in the upper left corner and select the corresponding port to enter:



2.5 Virtual keyboard

According to different input requirements, the instrument provides two virtual keyboards: full character keyboard and hexadecimal keyboard.

- Full character keyboard: generally used to save file names, numbers 0~9, letters A-F (upper and lower case supported) and commonly used characters can be entered; There is a character input length limit above the input box.



- Hexadecimal keyboard: In addition to file names, other inputs use the hexadecimal keyboard, such as time, value, percentage, IP address, MAC address, mask, etc.

There is an input interval limit above the input box.

2.6 Start/stop testing

After opening the test application, there is a start/stop button in the toolbar on the right side of the interface. Click 'Start' to start the test when the test has not started, and click 'Stop' during the test to stop the test.

2.7 Check link connectivity (Ping)

There is a [Ping] button on the right side of each test application interface. After clicking it, you can check the connectivity with the remote device without closing the test application. (The destination IP defaults to the IP set by the remote control.)

2.8 Test report

Except for loopback, all other test applications can generate test reports after testing. After the test is completed, click the 'Save' button in the toolbar on the right side of the interface to store the relevant settings and test results of this test as a test report. , the report save type is html and PDF format, and the default name is the current time.

For the saved test report, you can click 'Test Report' from the test tool on the main test interface to open and view it under the corresponding test application category.



3 System common information settings

After the system is turned on, you can enter the system interface. The main interface of the system has 7 buttons: [] System, [] Network, [] Screen Calibration, [] Power Management, [] Storage Management, [] System Upgrade, and [] Help File. Click each button to view or set related information respectively;

System main interface



3.1 System settings

In the main interface after booting, press the icon button [] to enter the system interface, which includes system information, time/date settings, and optional function introduction.

3.1.1 System information

Basic information of the instrument can be viewed in the system information.

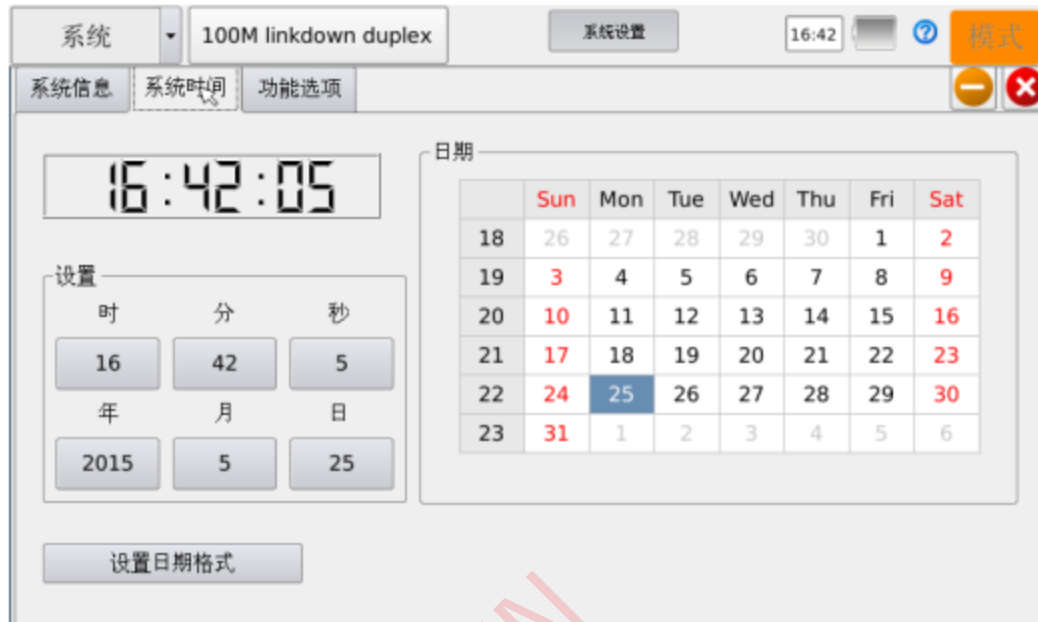
On the upper right side is the instrument's software and hardware information, including product serial number, platform and test board version number, software version, and FPGA software version information.

The middle and lower part on the right is the host name information, which can be customized.

After the settings are completed, click the [Modify] button to take effect. The system language is shown on the lower right side. Select the language you want to switch directly from the drop-down list.

3.1.2 System time/date settings

In the interface setting area, the system time and date can be set separately. The [Set Date Format] button can switch the date display order (year month day, month day year, day month year) according to the needs, as shown in the following figure:



Time/date settings

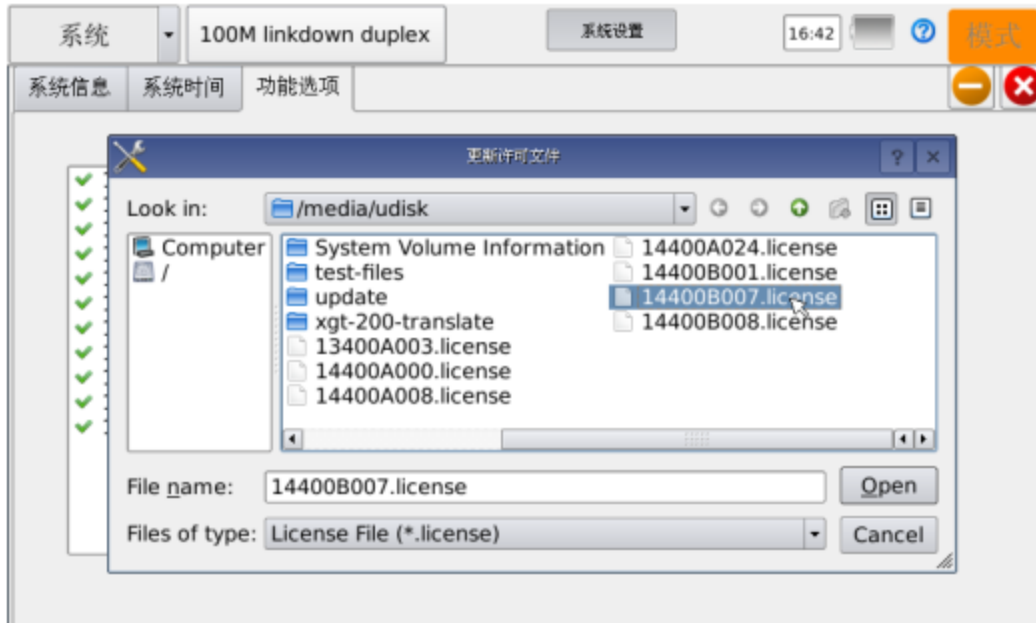
3.1.3 Optional functions

This interface lists all the test application modules that can be implemented by the modified product, and briefly introduces each item. A green ✓ on the front end indicates that the function has been purchased, as shown in the following figure:



Optional function interface

Enter the [Installation License] interface and select the license file to update the supported system functions.



3.2 Network settings



In the main interface after booting, press the icon button [🌐] to enter the network interface. In this interface, you can set the auxiliary network interface (10/100M electrical interface connected to the RJ-45 connector) and select DHCP (Dynamic Host Configuration) protocol) to automatically obtain an IP address, or you can choose to manually configure the IP address, subnet mask, and default gateway statically. As shown below:




Network settings interface

Note: Click the 'Connect' button after changes are made to take effect.

3.3 Screen calibration

If you find that your touch screen is behaving strangely (for example, it is currently difficult to select an item), you may need to recalibrate it. In the main boot interface, press [] or long press the button [] to enter the screen calibration interface. Click the 'cross' on the screen with the stylus to calibrate. Click five times to complete this calibration. The touch screen calibration can be repeated.

3.4 Power management


After booting, press [] in the main interface to enter the power management interface. You can set the screen standby time in the two power supply modes of external power supply and battery power supply. You can also set the backlight brightness. After completing the settings, click 'Apply' to make this modification. If you want to cancel this operation, click 'Cancel' to exit, as shown in the figure below:



Power management interface

Note: When the screen is in standby, press any button or click anywhere on the screen to release the screen from standby.

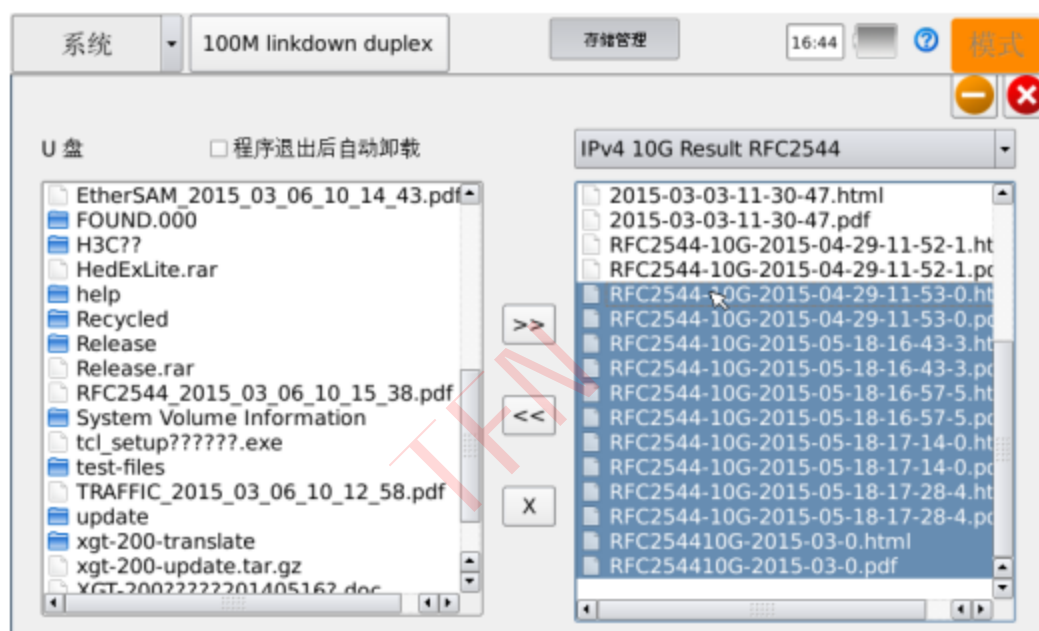
3.5 Storage management

After booting, press [] in the main interface to enter the storage management interface. You can copy parameter configuration files, test reports, screenshots and other information to an external U disk, or import files in the U disk into the table. You can also Delete files in the table.

The left side of the interface is the external memory card file, the right side is the file stored in the table, and the drop-down list on the upper right can select the path of the file.


Delete files: In the storage management interface, select the file to be deleted and click the 'X' button in the middle. Only one file can be deleted at a time;

Copy files: After inserting the U disk, (double-click 'U Disk' on the right to open the U disk, and you can view the contents of the U disk, it means the reading is successful, otherwise re-insert it), select the folder to be copied from the right file, then select U disk (storage location), click ' < < ' to complete the copy. If you copy the files from the USB disk to the folder in the table, you need to click ' > > ' .



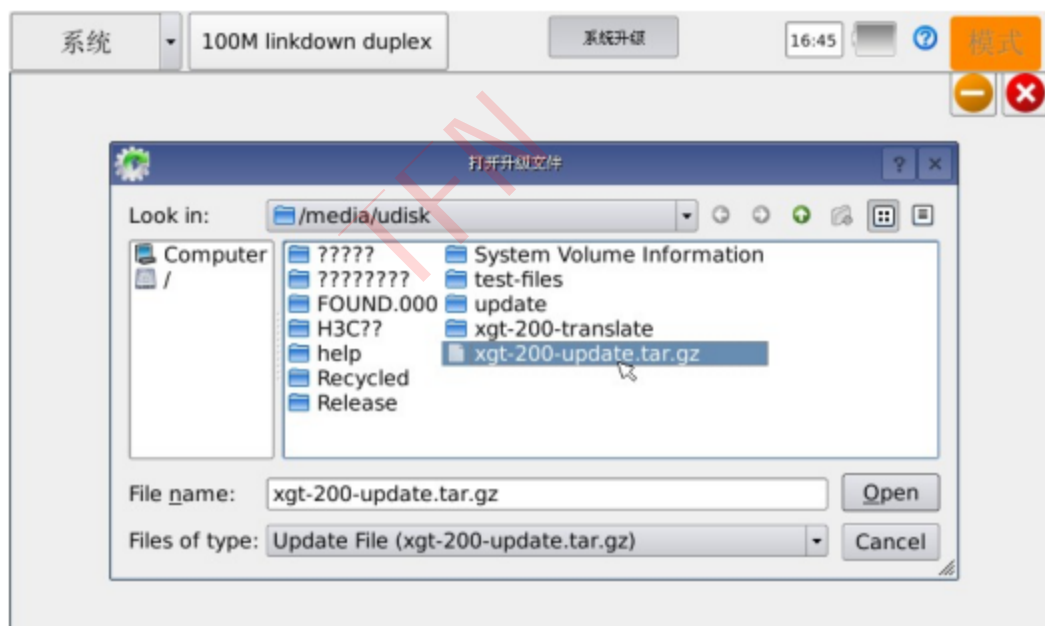
Note: Before pulling out the U disk, select 'Automatically uninstall after program exits' and close this interface, then pull out the U disk.

3.6 System upgrade

- **Regular upgrade:** Insert the U disk with the upgrade software into the USB interface of the instrument, press [] in the system main interface to enter the system upgrade interface, open the folder where the upgrade program is located, select the upgrade program, confirm to exit, and click 'Upgrade' button, the system will automatically restart to upgrade.




System upgrade interface



Note: System upgrade can only be performed when the battery has sufficient power or there is an external power supply and the battery is working properly, and it will automatically restart after the upgrade.

- Quick upgrade: Copy the upgrade program to the root directory of the U disk, insert it into the USB interface of the instrument, press the power button, and select system upgrade from the pop-up power switch option to perform the upgrade operation.


3.7 Help

Press [] on the system main interface to open the help file.



4 Common parameter configuration

4.1 Port settings

Select Interface Settings [] on the main test interface to set the test port network configuration and other information. The interface setting includes two parts: port information setting and network information setting.

The optical port setting interface is as follows:



SFP/SFP+信息	
光功率	-2.20dBm
波长	1310nm
速度	10G
模块ID	SFP+
制造商	FINISAR CORP.
零件编号	FTLX1471D3BCL
序列号	UHP03WY
版本	A
连接类型	LC

SFP/SFP+ parameters:

SFP/SFP+ is an optical transceiver inserted into an optical interface. The 10/100/1000M optical interface uses SFP modules.

The 10G optical interface uses SFP+ optical module.

Optical power: received optical power

Wavelength: 850nm, 1310nm, 1550nm

Speed: 1000M, 10G, etc.

Module identification: SFP or SFP+

Manufacturer: Optical module manufacturer name

Part number: Factory setting

Serial number: Factory set

Version number: Factory set

Connector type: LC

Type: SW, SR, LR, ER

Mode: Single-Mode Fiber or Multi-Mode Fiber

Type: LAN/WAN mode, switchable by modifying the test mode.

Flow control: Off by default (cannot be modified).

Laser: Optionally turn the laser on or off. The laser needs to be turned on during testing. The default is on. After changing the above settings, select 'Confirm' to confirm the modification, or select 'Cancel' to abandon the modification.

- The electrical port setting interface is as follows:



Type: 1G electrical port (cannot be modified).

Flow control: Off by default (cannot be modified).

Auto-negotiation: Settings should be consistent with the connection port.

Duplex: The default is full duplex (cannot be modified).

After changing the above settings, select 'Confirm' to confirm the modification, or select 'Cancel' to abandon the modification.

4.2 Network settings

In the interface setting interface, select the Network Settings tab to enter the network setting interface, as shown below:



Preset value: You can select previously saved parameter settings from the preset value, or save the current setting information.

IP: You can choose static IP or DHCP (dynamic host configuration). When DHCP is selected, all parameters are values automatically obtained by DHCP. When static is selected, IP address information needs to be entered manually.

IP address: Click the address box to open the input interface for editing, ranging from '0.0.0.0' to '255.255.255.255'.

Subnet mask: Click the address box to open the input interface for editing, ranging from '0.0.0.0' to '255.255.255.255'.

Default gateway: You can choose to enable or disable the default gateway. Select the previous check box to enable it. It is disabled by default. Click the address box to open the input interface for editing, ranging from '0.0.0.0' to '255.255.255.255'.

[Note] After the configuration is completed, select 'Connect' to perform this change. If you close this interface directly after modification, the modification will not take effect.

5 Bert


Bert: Bit error rate testing is mainly used to verify the bit errors of data transmission when Ethernet carries SDH/OTN/DWDM/dark fiber transparent transmission.

This product supports layer 1~4 BERT testing in VLAN and MPLS environments. Engineers can set the number of layers, frame length, bandwidth, MAC address, IP, UDP, and pseudo-random pattern of the payload area of the BERT test data frame. In addition to supporting standard pseudo-random patterns (PRBS9, PRBS11, PRBS15, PRBS 20, PRBS23, PRBS29, PRBS31 and flipping types), it can also support stress test patterns such as CJPAT and CRPAT, and engineers can customize different pattern simulations application environment. During the Bert test, you can use the fault injection mode on the operation interface to insert different faults, such as: Bit, CRC, IP errors, UDP errors, Pattern lost, to verify the processing of abnormal network frames by the network under test or the point under test ability.

Summary of test setup and results:

- Can provide 1~4 layer bit error rate test,
- Customizable frame length, setting range is 64 to 9600 bytes;
- The test pattern is optional and supports pseudo-random code patterns (PRBS9, PRBS11, PRBS15, PRBS 20, PRBS23, PRBS29, PRBS31 and flip type), as well as CRPAT and CJPAT stress test patterns, and you can also customize the code pattern;
- The test flow mode supports five test methods: fixed bandwidth, incremental bandwidth, burst (two bandwidth cycles), single burst (fixed number of frames), and mixed frame length;
- Rx filtering: select specific fields to filter received frames, and the receiving end only counts frame information that meets the specified conditions;
- During the test process, you can use the fault injection mode on the operation interface to insert different errors (Bit, CRC, IP errors, UDP errors, Pattern lost) to verify the ability of the tested network to handle abnormal frames;
- Test results include statistics based on bit errors, service interruption, frame loss, and traffic;

5.1 Configure Bert test parameters

Before configuring this test parameter, it is recommended to set the interface network information first, and select Interface Settings [] on the main test interface. For details, see Interface and Network Parameter Configuration.

5.1.1 Global settings



- Configuration file: You can select a pre-stored configuration file. It is recommended to save the commonly used setting conditions for subsequent testing. If you want to delete the configuration file, select it from the drop-down item and select [X] to delete it. To save the configuration file, select [Save] and set it. Confirm to exit after saving the name.
- Frame type: select the number of test layers: unFramed, Framed, Ethernet, UDP, MPLS-TP;
- VLAN: Select the number of VLAN layers to be configured, up to 3 layers;
- MPLS: Select the number of MPLS layers to be configured, up to 3 layers;
- Test time: Select the check box to enable scheduled testing and set the test duration. Set the time range from '00:00:05' to '23:59:59'. The default is no time limit test and you can manually stop the test at any time;
- Business interruption threshold: Set the business interruption time judgment threshold. When the test value exceeds this value, it can be judged that the test has failed.
- Pattern loss (%): Set the code pattern loss threshold. When the test value exceeds this value, it can be determined that the test has failed;

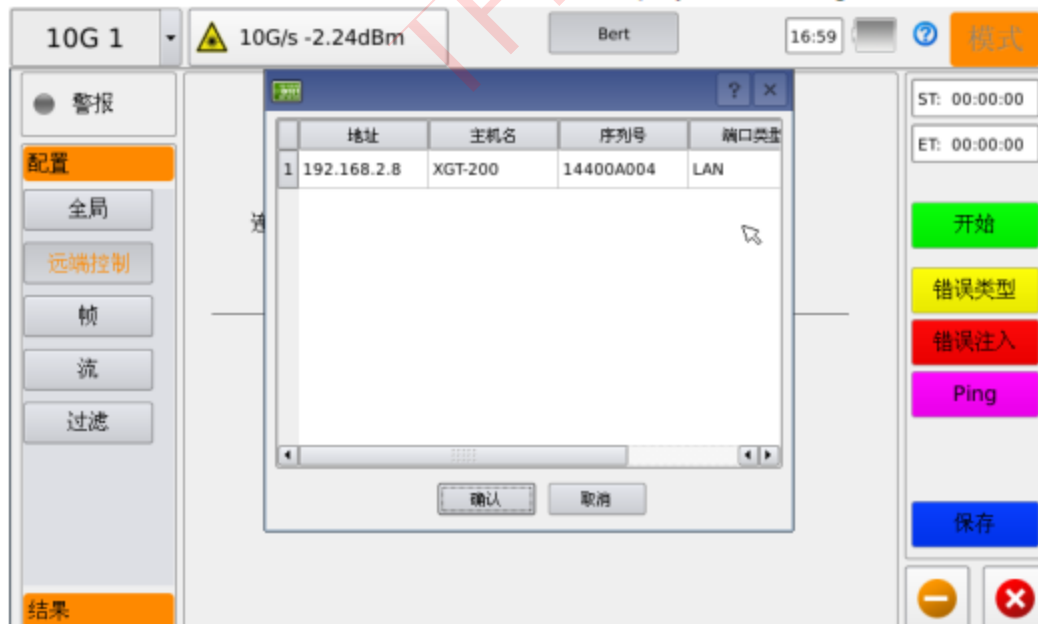
5.1.2 Remote control settings

Control the remote device for loopback.



Target device: There are two ways to lock the remote device. One is to directly enter the IP address of the remote device, which is suitable for situations where the remote IP address is determined; the other is to select the required IP address or device from the 'search results'. The premise of the

operation is that you need to perform a search [] first, find the target device, select the device, confirm and exit, and the IP address of the device will be displayed in the target address bar.



After entering the IP address of the target device, click "Connect" to set the remote device to loopback mode. During testing, the local module sends the test stream to the remote module for loopback, and the test stream returns to the local module for reception and analysis.

5.1.3 Frame settings

MAC:

The screenshot shows the MAC configuration window. On the left, a sidebar has buttons for '配置' (Configuration), '全局' (Global), '远端控制' (Remote Control), '帧' (Frame), '流' (Flow), and '过滤' (Filter). The '配置' button is highlighted. The main area has tabs for 'MAC', 'IP', 'UDP', and '载荷' (Payload). The 'MAC' tab is selected. It contains two rows: '目的' (Destination) with a text field '90:59:AF:37:AF:BE' and an 'ARP' button; and '源' (Source) with a text field 'D0:39:72:99:E9:42' and a '默认' (Default) button. On the right, there are two time fields 'S: 00:00:00' and 'L: 0:00:00:00', a '开始' (Start) button, a '错误类型' (Error Type) button, a '错误注入' (Error Injection) button, a 'Ping' button, and a '保存' (Save) button. At the bottom right are minus and plus icons.

Destination MAC address: You can enter it manually or click the 'ARP' button after entering the correct destination IP address to resolve the MAC address corresponding to the destination IP address;

Source MAC address: You can enter it manually or press the 'Default' button to set the default MAC address of the machine as the source MAC address.

VLAN:

The screenshot shows the VLAN configuration window. On the left, a sidebar has buttons for '配置' (Configuration), '全局' (Global), '远端控制' (Remote Control), '帧' (Frame), '流' (Flow), and '过滤' (Filter). The '配置' button is highlighted. The main area has tabs for 'MAC', 'VLAN', 'IP', 'UDP', and '载荷' (Payload). The 'VLAN' tab is selected. It contains three sections: 'VLAN #1 (C-VLAN)' with fields 'ID 1', 'Priority 111', and 'Type 8100'; 'VLAN #2 (S-VLAN)' with fields 'ID 2', 'Priority 111', 'Type 8100', and a 'Drop Eligible' checkbox; and 'VLAN #3 (P-VLAN)' with fields 'ID 3', 'Priority 111', 'Type 8100', and a 'Drop Eligible' checkbox. On the right, there are two time fields 'S: 00:00:00' and 'L: 0:00:00:00', a '开始' (Start) button, a '错误类型' (Error Type) button, a '错误注入' (Error Injection) button, a 'Ping' button, and a '保存' (Save) button. At the bottom right are minus and plus icons.

ID: VLAN identification, the value range that can be entered is 0~4095;

Priority: VLAN priority, from low to high, the selectable range is 0~7, expressed in binary;

Type: VLAN type, the available VLAN types are 8100, 88A8, and 9100;

Drop Eligible: can be discarded;

Note: After enabling VLAN in global settings, you can configure VLAN parameters and enable up to layer 3 VLAN.

MPLS:

Label: label value field, a pointer used for forwarding, the range of input values is 0~1048575;

CoS: Service type, 3 bits, selectable value range is 0~7;

S: stack bottom identifier, cannot be set manually;

TTL: Time to live, specifies the number of network segments that a data packet is allowed to pass before being discarded by the router. The TTL is set by the sending host to prevent packets from looping endlessly across the IP internetwork. Routers are required to reduce the TTL by at least 1 when forwarding IP packets.

MPLS Type: You can select MPLS type 0X8847 or 0X8848.

Note: MPLS parameters can be configured only after MPLS is enabled in the global settings. Up to three layers of MPLS can be enabled.

IP:

The screenshot shows the configuration window for the T3000A device. The 'UDP' tab is selected. The 'Destination IP' is set to 192.168.10.5, and the 'Source IP' is set to 192.168.10.41. The 'IP TOS' is set to 00000000, and the 'TTL' is set to 128. The interface includes a sidebar with '配置' (Configuration), '全局' (Global), '远端控制' (Remote Control), '流' (Flow), and '过滤' (Filter). The main area has tabs for 'MAC', 'MPLS', 'IR', 'UDP', and '载荷' (Payload). The 'UDP' tab is active, showing the configuration fields. The right sidebar has buttons for '开始' (Start), '错误类型' (Error Type), '错误注入' (Error Injection), 'Ping', '保存' (Save), and '结果' (Result).

Destination IP address: You can manually enter the IP address of the device under test, or you can press the 'Control from Remote' button to set the remote IP address set in the 'Control' settings as the current destination IP address;

Source IP address: You can manually enter the IP address of the test port, or you can press the 'From Interface' button to set the IP address in the interface settings as the current source IP address;

IP TOS: The type of service (8 bit) field includes a 3-bit priority subfield, a 4-bit TOS subfield and a 1-bit reserved bit. The 4-bit TOS represents: minimum delay, maximum throughput, maximum reliability and minimum cost. If all 4 bits are 0, it means normal service.

Parameter	Value	Default value
Priority	000 (Regular), 001 (Priority), 010 (Immediate), 011 (Flash), 100 (Flash Overwrite), 101 (CRITIC/ECP), 110 (Internet Control), 111 (Network network control)	000 (normal)
Delay	0(normal), 1(low)	0(normal)
Throughput	0(normal), 1(high)	0(normal)
Reliability	0(normal), 1(high)	0(normal)
Cost	0(normal), 1(low)	0(normal)
Reserved bits	0, 1	0

TTL: Time to live, specifies the number of network segments that a data packet is allowed to pass before being discarded by the router. The TTL is set by the sending host to prevent packets from looping endlessly across the IP internetwork. Routers are required to reduce the TTL by at least 1 when forwarding IP packets. The limited setting range is 0~255.

UDP:



Set the source UDP port number and destination UDP port number. The value range that can be entered is 0~65535;

Load:



Bit error rate test pattern, the selection range of each layer test is:

- When 'Framed' is selected for 'Frame Type' in the global settings, the payload can be selected as CRPAT (long continuous random test pattern) or CJPAT (long continuous jitter test pattern);
- When 'Frame Type' in global settings is selected as Ethernet, IP, TCP or UDP, the payload can be selected from PRBS9, PRBS11, PRBS15, PRBS 20, PRBS23, PRBS29, PRBS31 and user-defined patterns. The user-defined setting range is 00000000 to FFFFFFFF ;

Flip: Select to invert all bits 0 and 1 of the load setting; (CRPAT and CJPAT are not available)

5.1.4 Stream settings

Fixed: Continuous testing with fixed bandwidth and frame length.

The screenshot shows the 'Fixed' testing mode configuration. The top bar includes a dropdown for '10G 1', a power indicator '10G/s -1.73dBm', a 'Bert' button, a clock '16:03', and a '模式' (Mode) button. On the left, there is a sidebar with '警报' (Alarm), '配置' (Configuration), '全局' (Global), '远端控制' (Remote Control), '帧' (Frame), '流' (Stream), and '过滤' (Filter). The main area has tabs for '固定' (Fixed), '递增' (Incremental), '突发' (Burst), '单突发' (Single Burst), and '混合' (Mixed). Under the '固定' tab, '帧长' (Frame Length) is set to 1518 and '固定带宽' (Fixed Bandwidth) is set to 10.000%. On the right, there are time fields 'S: 00:00:00' and 'L: 0:00:00:00', a '开始' (Start) button, '错误类型' (Error Type), '错误注入' (Error Injection), 'Ping', and a '保存' (Save) button. At the bottom right are minus and plus buttons.

Frame length: Set the test frame length, which can support a maximum frame length of 9600 bytes;

Fixed bandwidth: Set the test bandwidth;

- Incremental test: Ladder traffic test, configure a series of burst traffic, start sending at the specified minimum frame rate, gradually increase to the maximum frame rate, and then cycle.

The screenshot shows the 'Incremental' testing mode configuration. The top bar is identical to the previous one. The '递增' (Incremental) tab is selected. The main area shows '帧长' (Frame Length) set to 128, '起始带宽' (Start Bandwidth) set to 10.000%, '结束带宽' (End Bandwidth) set to 100.000%, '步进带宽' (Step Bandwidth) set to 10.000%, and '步进时间(s)' (Step Time(s)) set to 5. The right sidebar and bottom buttons are also identical to the previous one.

Frame length: Set the test frame length, which can support a maximum frame length of 9600 bytes;

Start bandwidth: Set the step start bandwidth;

End bandwidth: Set the step end bandwidth;

Step bandwidth: Set the step bandwidth, which is the difference between two adjacent test bandwidths;

Step time: Set the test time of each ladder step, the unit is s, the time range is 3~1000s;

- Burst test: Configure two bandwidths, send each burst traffic at the specified frame rate, and cycle the test between the two bandwidths.



Frame length: Set the test frame length, which can support a maximum frame length of 9600 bytes;

Burst 1 bandwidth: Set the first burst test bandwidth;

Burst 1 time: Set the test time of burst 1, the unit is s, the time range is 3~1000000s;

Burst 2 bandwidth: Set the second burst test bandwidth;

Burst 2 time: Set the test time of burst 2, the unit is s, the time range is 3~1000000s;

- Single burst test: sending a specific number of frames at a fixed bandwidth.

Frame length: Set the test frame length, which can support a maximum frame length of 9600 bytes;

Number of frames: Set the number of frames sent;

Bandwidth: Set the test bandwidth;

- Mixed test: 64, 594, 1518 three frame lengths are mixed, the bandwidth ratio of each frame length is fixed, and the total bandwidth is adjustable.

Total bandwidth: set the test bandwidth;

5.1.5 Receive filter settings

Filter the received frames according to the set conditions. The receiving end only counts frames that meet the specified conditions. This filtering setting will only take effect if the check box before the setting is selected.

- Destination MAC address: Filter out the frames whose destination MAC address matches this setting from the received frames. Source MAC address: Filter out the frames whose source MAC address matches this setting from the received frames.
- VLAN ID: Filter out the frames whose outermost VLAN ID matches this setting from the received frames. For example, when only layer 1 VLAN is enabled, it represents the ID of C-VLAN; when layer 2 VLAN is enabled, it represents the ID of S-VLAN. , indicates the ID of P-VLAN when layer 3 VLAN is enabled.
- VLAN priority: Filter out the frames whose outermost VLAN priority matches this setting from the received frames. For example, when only layer 1 VLAN is enabled, it indicates the priority of C-VLAN; when layer 2 VLAN is enabled, it indicates S- The priority of VLAN, when layer 3 VLAN is enabled, indicates the priority of P-VLAN.
- TOS: Filter out the frames whose TOS matches this setting from the received frames.
- Destination IP address: Filter out the frames whose destination IP address matches this setting from the received frames.
- Source IP address: Filter out the frames whose source IP address matches this setting from the received frames.
- Destination port: Filter out the frames whose destination port address matches this setting from the received frames.
- Source port: Filter out the frames whose source port address matches this setting from the received frames.

5.2 Bert test results

5.2.1 Summary



- Tx represents the sending end information, Rx represents the receiving end information, the precision can set the accuracy of the frame rate and data rate, the unit is selected from K/M/G, the default is 'auto' ;
- Line rate: test line line rate;
- Frame rate: the frame rate sent/received;
- Data rate: data rate sent/received;
- Utilization: the percentage of the test bandwidth sent/received to the line rate;
- Total number of bytes: the total number of bits of sent/received data;
- Total number of frames: total number of frames sent/received statistics;
- Error frame: Number of bit errors in sending/receiving statistics;
- Frame loss: Number of frames not received.

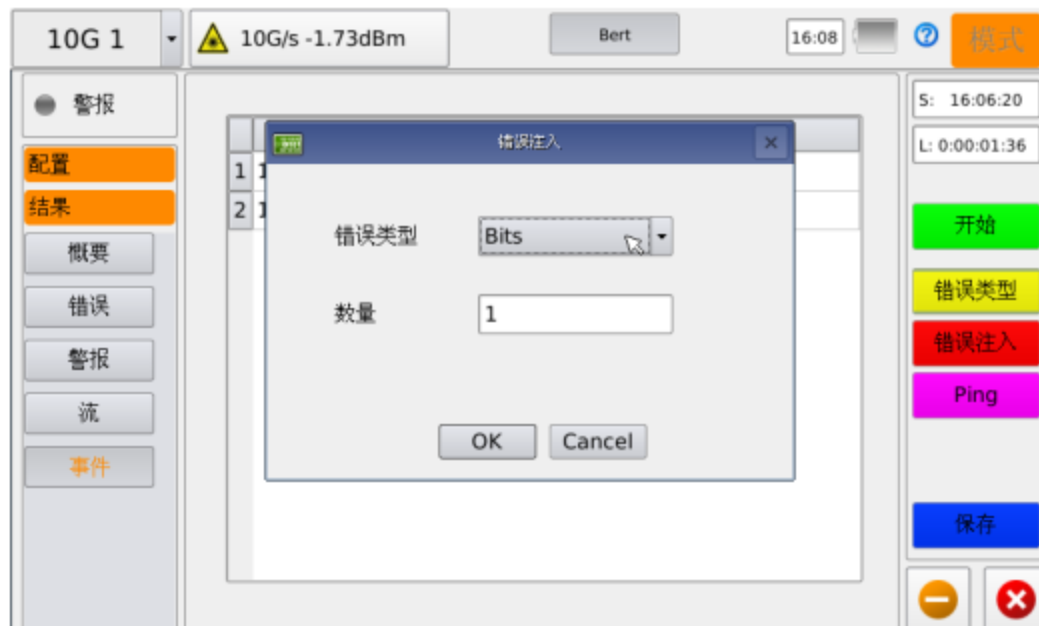
5.2.2 Error



- Number of bit errors: the number of bit errors received;
- Bit error rate: the ratio of received erroneous bits to the total number of received bits, expressed as a negative power of 10;
- FCS/CRC: Number of invalid FCS/CRC frames received;
- FCS/CRC(%): The ratio of the number of invalid FCS/CRC frames received to the total number of frames received;
- IP Error: Number of invalid IP error frames received;
- IP error (%): the ratio of the number of invalid IP error frames received to the total number of frames received;
- UDP errors: Number of invalid UDP error frames received;
- UDP Error (%): The ratio of the number of invalid UDP error frames received to the total number of frames received;
- Symbol: When an invalid code group is detected in the sent code, it is a symbol error.
- Location: The number of frames received that were not an integer number of bytes in length.
- Jumbo Frames: The number of frames received that are larger than 1518 (no VLAN), 1522 (Layer 1 VLAN), 1526 (Layer 2 VLAN), or 1530 (Layer 3 VLAN) bytes.
- Very Short Frames: The number of received frames smaller than 64 bytes.
- Frames lost: Number of frames not received.
- Frame loss rate: the ratio of the number of unreceived frames to the total number of frames sent.

Manually insert errors:

The error type and quantity of each insertion can be set in the 'Error Type' on the toolbar on the right side of the interface:



Confirm to exit after the setting is completed. Press the 'Error Insert' button during the test to insert the set number of errors into the sending stream.

5.2.3 Alert



- LOS (Link Outage): The time when the optical port signal is lost, in ms, which can display the current interruption time and accumulated interruption time;
- Pattern loss: an alarm when the error code exceeds the limit value. The limit value is set in the global setting interface;
- Business interruption: can count the current or last business interruption time, total business interruption time, longest business interruption time, shortest business interruption time, and number of business interruptions;

5.2.4 Traffic Statistics

Frame type

	#	%
单播	432988539	100.000
广播	0	0.000
多播	37	0.000

- Unicast: The number of unicast frames received and the percentage of the total frames;
- Broadcast: The number of broadcast frames received and the percentage of the total frames;
- Multicast: The number of multicast frames received and the percentage of the total frames;
- Pause frames: The number of Pause frames received and the total frames percentage of number;

Frame length

	#	%
<64	0	0.000
64B-127B	436550662	90.823
128B-255B	245	0.000
256B-511B	434	0.000
512B-1023B	40667576	8.461
1024B-1518B	3443403	0.716
>1518B	6	0.000

<64: Frame with a frame length less than 64 bytes

64-127: Frame length from 64 bytes to 127 bytes

128-255: Frames with a frame length of 128 bytes to 255 bytes

256-511: Frame length from 256 bytes to 511 bytes

512-1023: Frame length from 512 bytes to 1023 bytes

1024-1518: Frames with a frame length of 1024 bytes to 1518 bytes

>1518: Frame with a frame length greater than 1518 bytes

Protocol:

Number and rate of received TCP, UDP and other protocol frames.

10G 1 10G/s -1.74dBm Bert 16:07 模式

警告

配置

结果

概要

错误

警报

流

事件

	#	%
TCP	0	0.000
UDP	528386744	100.000
Other	0	0.000

S: 16:06:20

L: 0:00:01:08

停止

错误类型

错误注入

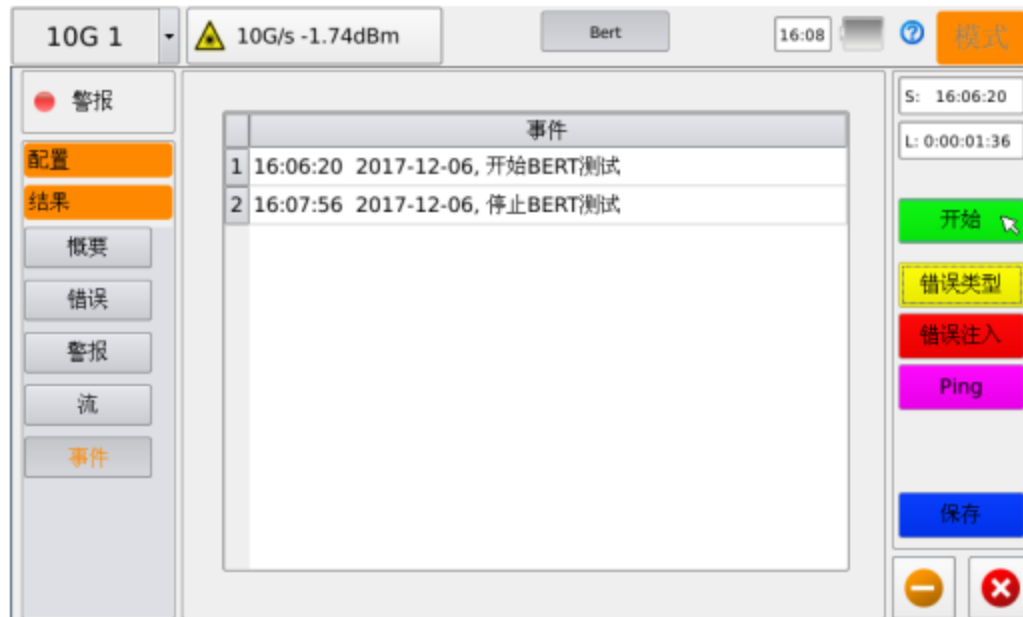
Ping

保存

-

×

5.2.5 Event




6 RFC2544

RFC2544 testing uses throughput, delay, packet loss rate, and back-to-back testing to evaluate and verify the performance of the network or network device under test. The RFC2544 test suite supports 7 predefined frame lengths (64, 128, 256, 512, 1024, 1028, 1518), MIX (64/594/1518) and user-defined lengths. Smaller frame sizes will increase transmission. The number of frames therefore increases the stress on the network under test or the network under test.

- Throughput rate: the maximum transmission rate when the number of frames sent is consistent with the number of frames transmitted through the line under test;
- Delay: For storage and forwarding equipment, the time difference between the last bit of a test frame arriving at the input port and the first bit of the frame leaving the output port is called delay;
- Frame loss rate: The percentage of data frames that cannot be forwarded due to lack of network resources and the total data frames under stable network conditions;
- Back-to-back: The maximum number of burst frames that the device under test can handle without frame loss.

6.1 Configure RFC 2544 test parameters

Before configuring this test parameter, it is recommended to set the interface network information first, and select Interface Settings [] on the main test interface. For details, see Interface and Network Parameter Configuration.

6.1.1 Global settings



Configuration file: You can select a pre-stored configuration file. It is recommended to save the commonly used setting conditions for subsequent testing. If you want to delete the configuration

file, select it from the drop-down item and select [✕] to delete it. To save the configuration file, select [💾] and set it. Confirm to exit after saving the name.

Frame type: Select the number of test layers: Ethernet, UDP, MPLS-TP; VLAN: Select the number of VLAN layers to be configured, up to 3 layers;

MPLS: Select the number of MPLS layers to be configured, up to 3 layers;

Test sub-items: including throughput, delay, frame loss, and burst. Selecting this item means testing this item.

6.1.2 Remote control setting



Destination module: There are two ways to lock the remote device. One is to directly enter the IP address of the remote device, which is suitable for situations where the remote IP address is determined; the other is to select the required IP address or device from the 'search results', the

prerequisite for this operation is to perform a search [📶] first, find the target device, select the device, confirm and exit, and the IP address of the device will be displayed in the target address bar.

Select test mode: You can choose one of uplink, downlink, uplink and downlink, or loopback. After the settings are completed, click Connect to connect the local module to the remote device;

Loopback: Set the remote device to loopback mode, and the local frame type setting layer number is consistent with the remote loopback layer number. During testing, the local module sends the test stream to the remote module to perform loopback, and the test stream is returned to the local module for local reception and analysis.

Uplink: Set the remote device to uplink mode, and the local module only performs analysis of uplink

data.

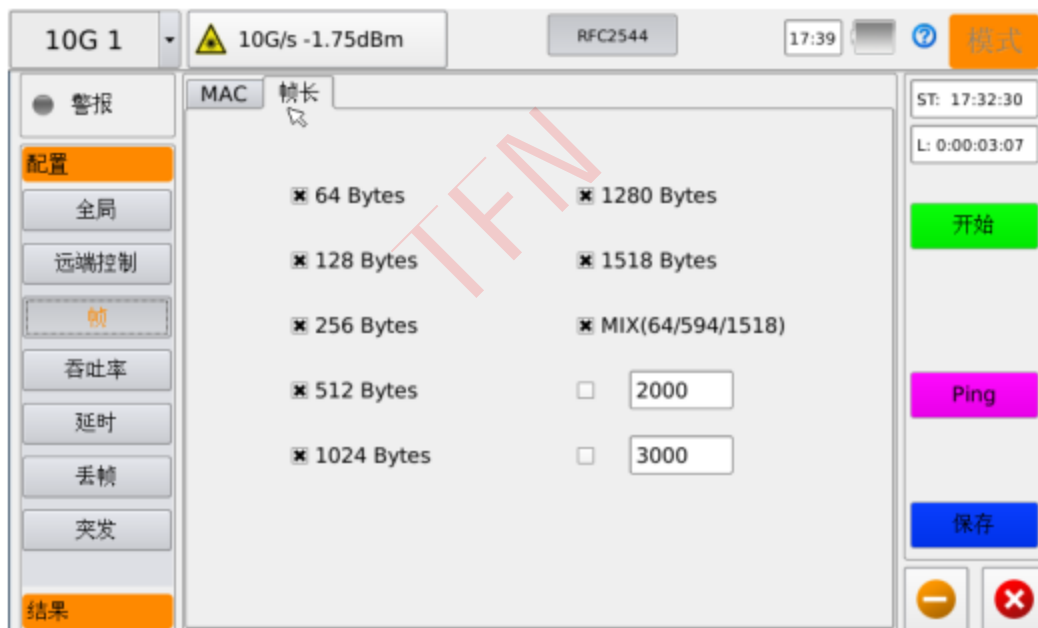
Downlink: Set the remote device to downlink mode, and the local module only performs analysis of downlink data.

Uplink and downlink: Set the remote device to uplink and downlink mode, and the local module performs analysis of uplink and downlink data respectively.

Note: When selecting uplink and downlink testing, the parameters of throughput, frame loss and back-to-back need to be set separately for uplink and downlink.

6.1.3 Frame setting

The configuration of MAC, VLAN, MPLS, IP, TCP, and UDP information is consistent with the corresponding configuration in Bert test. Please refer to 5.1.2 Frame Settings. For RFC2544 test, you also need to choose to set the test frame length, as shown below:



Note: MIX (64/594/1518) is a mixed frame length, and the bandwidth ratio of each frame length is fixed.

6.1.4 Throughput rate setting

10G 1 10G/s -1.76dBm RFC2544 17:40 模式

● 警报

配置

全局

远端控制

帧

吞吐量

延时

丢帧

突发

结果

环回

最大速率 100.000 %

分辨率 1.000 %

持续时间(s) 5

重复次数 1

阈值 92.979 %

开始

Ping

保存

— ×

According to the connection mode, it is divided into loopback, uplink and downlink. The parameters in the two directions must be set separately during the uplink and downlink tests.

- Maximum rate: Set the maximum rate at which throughput starts;
- Accuracy (resolution): Test accuracy setting, the accuracy is determined based on the Ethernet line rate, not the configured "maximum rate";
- Duration: Set the test duration, the time range is 5~1000s;
- Threshold: Set the test threshold. If the throughput of the test is greater than or equal to the set threshold, it will be judged as passing, otherwise it will not pass;

6.1.5 Delay setting

- Maximum rate: You can directly select the maximum rate value for reference throughput; you can also select the user rate to reset;
- Duration: Set the test duration, the value range is 5~1000s;
- Threshold: Set the delay threshold. If the delay of all test frames is less than or equal to the set threshold, it will be judged as passing, otherwise it will not pass. The value range is 0~99.99ms;

6.1.6 Frame loss settings

According to the connection mode, it is divided into loopback and up/downlink. The parameters in the two directions must be set separately during the uplink and downlink tests.

- Maximum rate: Set the maximum rate of the test;
- Step length: Set the test step value. If the test fails at the maximum rate, the test rate will be decreased by this step from the set maximum rate until the test passes. The value range is 1~50% of the maximum rate;
- Duration: Set the test duration, the value range is 5~1000s;
- Threshold: Set the frame loss threshold. If the frame loss of all test frames is less than or equal to the set threshold, it will be judged as passing, otherwise it will not pass;

6.1.7 Burst (back-to-back) setup

According to the connection mode, it is divided into loopback and up/downlink. The parameters in the two directions must be set separately during the uplink and downlink tests.

- Maximum duration: Set the maximum burst time, you can enter a value between 2 and 5 seconds;
- Precision: The unit is frame, and a value between 1 and 100 can be entered;
- Number of repetitions: range from 1 to 100 times;
- Threshold: Set the back-to-back threshold. If the ratio of the back-to-back number of all test frames to the theoretical value is greater than or equal to the set threshold, it will be judged as passing, otherwise it will not pass;

6.2 RFC 2544 test results

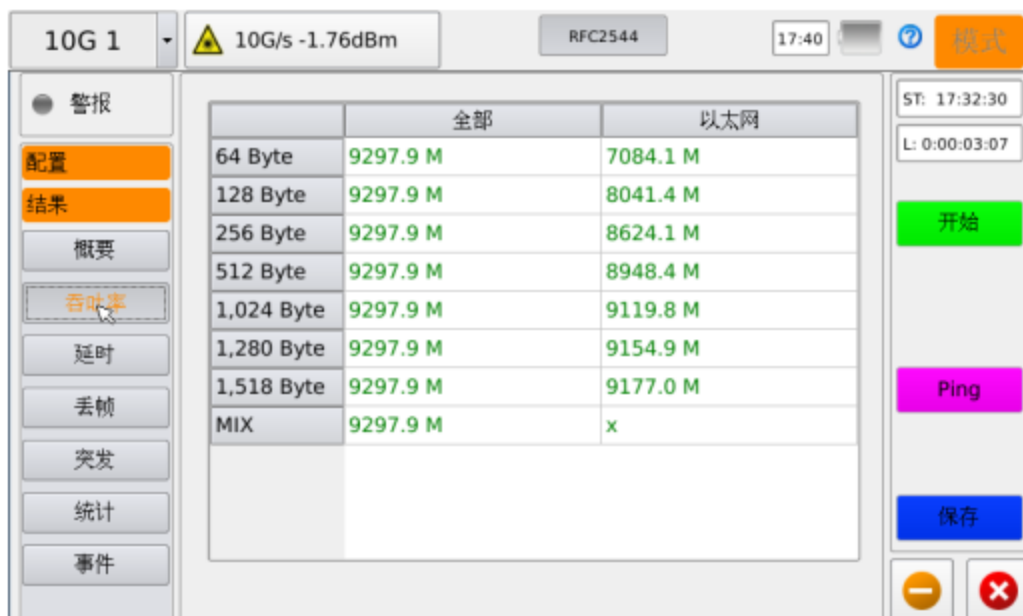
6.2.1 Summary



In the result summary interface, you can visually view the test progress and results of each self-test. The test order is throughput, delay, frame loss, and back-to-back. Each test is tested in sequence according to the set frame length. If the test passes, a green 'passed' is displayed. , if it fails, the red 'failed' will be displayed;

6.2.2 Throughput rate

The throughput test results of each frame length, the fonts that passed the test are in green, and the fonts that failed are in red.



All: Indicates line utilization;

Ethernet: Indicates the frame rate, minus the frame gap rate.

6.2.3 Delay

The delay of each frame length test, the fonts that pass the test are in green, and the fonts that fail are in red.

Frame Size	Delay
64 Byte	9.088 us
128 Byte	9.186 us
256 Byte	9.396 us
512 Byte	9.806 us
1,024 Byte	10.625 us
1,280 Byte	11.035 us
1,518 Byte	11.414 us
MIX	9.121 us

6.2.4 Frame loss

Frame Size	Frame Loss
64 Byte	0.000% (BW=100.000%)
128 Byte	0.000% (BW=100.000%)
256 Byte	0.000% (BW=100.000%)
512 Byte	0.000% (BW=100.000%)
1,024 Byte	0.000% (BW=100.000%)
1,280 Byte	0.000% (BW=100.000%)
1,518 Byte	0.000% (BW=100.000%)
MIX	0.000% (BW=100.000%)

Note: The test starts at the set maximum rate. When the frame loss exceeds the set threshold, the bandwidth is reduced step by step, and the test continues until the test passes or the bandwidth drops to the minimum value;

6.2.5 Back to back

Back-to-back results for each frame length, the fonts that passed the test are in green, and the fonts that failed are in red.

The screenshot shows the 'Back to back' test results. The main table displays the following data:

Frame Length	Result
64 Byte	74404760
128 Byte	42229725
256 Byte	22644925
512 Byte	11748120
1,024 Byte	5986590
1,280 Byte	4807690
1,518 Byte	4063715
MIX	x

The right-hand control panel includes buttons for '开始' (Start), 'Ping', '保存' (Save), and a '模式' (Mode) button. It also displays 'ST: 17:32:30' and 'L: 0:00:03:07'.

6.2.6 Statistics

You can view the number of frames sent and received and the number of bit errors for each sub-test separately.

The screenshot shows the 'Statistics' test results. The main table displays the following data:

Frame Length	发送帧 (Sent Frames)	接收帧 (Received Frames)	错误帧 (Error Frames)
64 Byte	69193091	69193091	0
128 Byte	39271239	39271239	0
256 Byte	21058524	21058524	0
512 Byte	10925093	10925093	0
1,024 Byte	5567184	5567184	0
1,280 Byte	4470888	4470888	0
1,518 Byte	3786753	3786753	0
MIX	44903405	44903405	0

The right-hand control panel includes buttons for '开始' (Start), 'Ping', '保存' (Save), and a '模式' (Mode) button. It also displays 'ST: 17:32:30' and 'L: 0:00:03:07'.

6.2.7 Events

10G 1 10G/s -1.75dBm RFC2544 17:41 模式

● 警报

配置

结果

概要

吞吐率

延时

丢帧

突发

统计

事件

事件		
1	17:32:30	2017-12-06, 开始吞吐量测试
2	17:33:19	2017-12-06, 停止吞吐量测试
3	17:33:19	2017-12-06, 开始延迟测试
4	17:34:07	2017-12-06, 停止延迟测试
5	17:34:07	2017-12-06, 开始丢包率测试
6	17:34:55	2017-12-06, 停止丢包率测试
7	17:34:55	2017-12-06, 开始背靠背测试
8	17:35:37	2017-12-06, 停止背靠背测试
9	17:35:37	2017-12-06, 停止2544测试

ST: 17:32:30

L: 0:00:03:07

开始


Ping

保存

— ×



7 Multiple businesses

7.1 Configure multi-stream test parameters

Before configuring this test parameter, it is recommended to set the interface network information first, and select Interface Settings [] on the main test interface. For details, see Interface and Network Parameter Configuration.

7.1.1 Global settings




Configuration file: You can select a pre-stored configuration file. It is recommended to save the commonly used setting conditions for subsequent testing. If you want to delete the configuration file, select it from the drop-down item and select [] to delete it. To save the configuration file, select [] and set it. Confirm to exit after saving the name.

- **Number of streams:** Set the number of test streams, you can select 1-16 streams.
- **Frame type:** select the number of test layers, there are 3 options: Ethernet, UDP, MPLS-TP;
- **VLAN:** Select the number of VLAN layers to be configured, up to 3 layers;
- **MPLS:** Select the number of MPLS layers to be configured, up to 3 layers;
- **Test time:** Select the check box to limit the test time, the time range is 00:00:05 to 23:59:59
- **Business interruption threshold:** Set the business interruption time judgment threshold. When the test value exceeds this value, it can be judged that the test has failed.
- **Pattern loss:** Set the code pattern loss threshold, ranging from 1-99. When the result exceeds this value, the result is judged as failed.

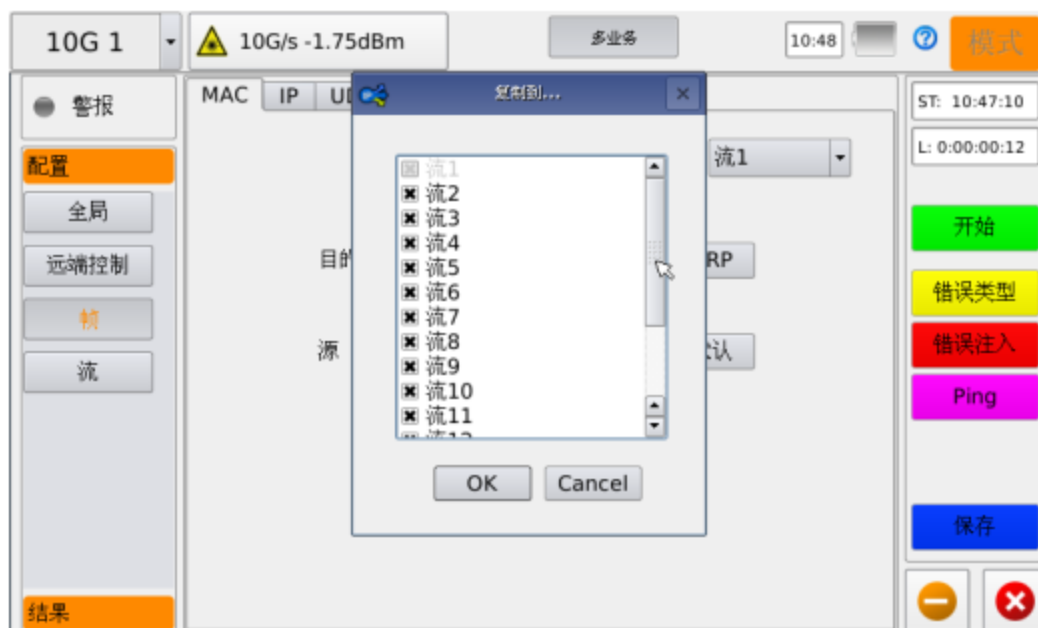
7.1.2 Remote control setting



Target device: There are two ways to lock the remote device. One is to directly enter the IP address of the remote device, which is suitable for situations where the remote IP address is determined; the other is to select the required IP address or device from the 'search results'. The premise of the operation is that you need to perform a search [] first, find the target device, select the device, confirm and exit, and the IP address of the device will be displayed in the target address bar. After entering the IP address of the target device, click "Connect" to set the remote device to loopback mode. During testing, the local module sends the test stream to the remote module for loopback, and the test stream returns to the local module for reception and analysis.

7.1.3 Frame settings

The MAC, VLAN, MPLS, IP, UDP, and load information configurations are consistent with the corresponding configurations in the Bert test. See 5.1.2 Frame settings. It should be noted that each service flow in the multi-flow test needs to be configured separately. You can also select 'Copy to ...' Copy the configuration of a certain flow to other business flows.



7.1.4 Stream settings



Frame length: Set the test frame length, which can support a maximum frame length of 9600 bytes;

Fixed bandwidth: Set the test bandwidth;

7.2 Multi-service (traffic generation) test results

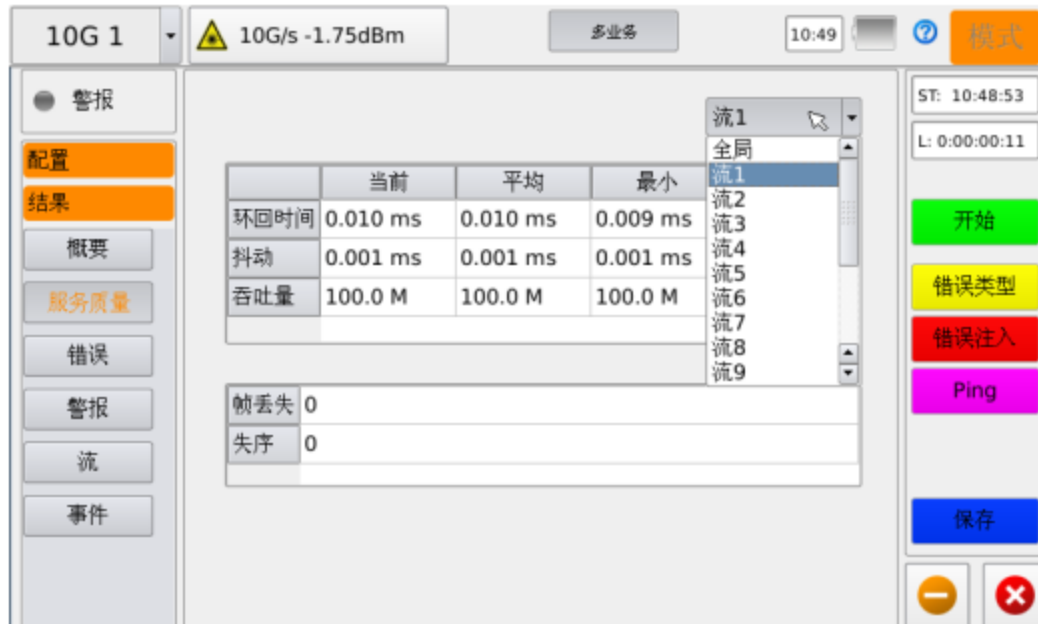
7.2.1 Summary

View the basic information of the sender and receiver. The statistical content is consistent with the Bert test. See 5.2.1 Bert result summary. The overall results are displayed by default. If you want to view the test results of each stream, please select it from the tab in the upper right corner, as shown below:

	Tx	Rx
线速率	10.000G	10.000G
帧速率	9.227G	9.227G
数据速率	7.448G	7.448G
利用率	100.000%	100.000%
总字节数	8993628842	8993628842
总帧数	37693250	37693250
错误帧	-	0
帧丢失	-	0

7.2.2 Service quality

Select 'Results' - 'Quality of Service' in the main interface of the multi-stream test to view QoS indicators: loopback delay, jitter, throughput, frame loss and out-of-order.



7.2.3 Error

View the number of errors received by the receiving end and their proportion to the total number of received frames. You can view the current number of errors received and the cumulative number in real time. Most of the statistical content is consistent with the Bert test. See 5.2.2 Bert test error statistics. It is displayed by default. Overall results, if you want to view the test results for each stream, please select in the upper right tab.



Manually insert errors:

Press the 'Error Type' button on the toolbar on the right side of the interface to set the business flow for inserting errors, the error type and the number of errors inserted each time.

Confirm to exit after the setting is completed. During the test process, press the 'Error Insert' button below to insert the set number of errors into the set business flow.

7.2.4 Alert

View the alarm information that appears during the test. For explanation of each content, see 5.2.3 Bert Test Alarm Information.

10G 1 10G/s -1.75dBm 多业务 10:49 模式

● 警报

配置 结果 概要 服务质量 错误 警报 流 事件

	当前	总共
链路中断(ms)	0.000	0.000
图案丢失(s)	0	0

业务中断	
当前(ms)	0.000
总共(ms)	0.000
最大(ms)	0.000
最小(ms)	0.000
次数	0

ST: 10:48:53
L: 0:00:00:11

开始 错误类型 错误注入 Ping 保存

7.2.5 Traffic Statistics

Including statistical results according to different frame types, frame lengths, and protocols. For explanation of each content, please refer to 5.2.4 Bert test traffic statistics.

10G 1 10G/s -1.76dBm 多业务 10:50 模式

● 警报

配置 结果 概要 服务质量 错误 警报 流 事件

流类型 帧长 协议

	#	%
单播	48226318	100.000
广播	0	0.000
多播	0	0.000

ST: 10:50:12
L: 0:00:00:11

停止 错误类型 错误注入 Ping 保存

The top screenshot shows the 'Flow Type' tab. The table displays the following data:

	#	%
<64	0	0.000
64B-127B	0	0.000
128B-255B	48462278	71.638
256B-511B	0	0.000
512B-1023B	19072544	28.194
1024B-1518B	113746	0.168
>1518B	0	0.000

The bottom screenshot shows the 'Protocol' tab. The table displays the following data:

	#	%
TCP	0	0.000
UDP	87022771	100.000
Other	0	0.000

7.2.6 Events

Displays the events logged during the test.



8 Y.1564

ITU-T Y.1564 is a new test standard introduced for operator Ethernet service provisioning and later troubleshooting. It is a formal test method for Ethernet service provisioning. This test method is mainly used to verify commercial and bearer Ethernet services. Network services in business mode, configuration correctness and performance reliability; compared with RFC2544 testing, Y.1564 testing can more accurately identify whether the service quality of each Ethernet service meets all its SLA parameters. Y.1564 testing is divided into two phases, namely service configuration testing and service performance testing.


- Service configuration testing

Service configuration testing verifies that the service is deployed appropriately and that all specific SLA parameters are met.

- Service performance testing

After the service configuration test is completed, the quality of all services will be identified simultaneously through service performance testing.

8.1 Configure Y.1564 test parameters

Before configuring this test parameter, it is recommended to set the interface network information first, and select Interface Settings [] on the main test interface. For details, see Interface and Network Parameter Configuration.

8.1.1 Global configuration



Configuration file: You can select a pre-stored configuration file. It is recommended to save the commonly used setting conditions for subsequent testing; if you want to delete the configuration

file, select it from the drop-down item and select [✕] to delete it; save the configuration file. Select [💾], set the save name and confirm to exit.

Number of streams: Set the number of test streams. You can select 1-16 streams to test simultaneously.

Frame type: select the number of test layers, there are 3 options: Ethernet, UDP, MPLS-TP;

VLAN: Select the number of VLAN layers to be configured, up to 3 layers; MPLS: Select the number of MPLS layers to be configured, up to 3 layers;

Service configuration test: This test is performed when the checkbox is selected.

Service performance test: This test will be performed after selecting the check box. The test time needs to be set, ranging from 00:00:05 to 23:59:59.

8.1.2 Remote control setting



Target device: There are two ways to lock the remote device. One is to directly enter the IP address of the remote device, which is suitable for situations where the remote IP address is determined; the other is to select the required IP address or device from the "search results". The premise of the operation is that you need to search [📶] first, find the target device, select the device, confirm and exit, and then the IP address of the device will be displayed in the target address bar.

Select test mode: You can choose one of uplink, downlink, uplink and downlink, or loopback. After the settings are completed, click Connect to connect the local module to the remote device;

Loopback: Set the remote device to loopback mode. During testing, the local module sends the test stream to the remote module to perform loopback, and the test stream returns to the local module for local reception and analysis.

Uplink: Set the remote device to uplink mode, and the local module only performs analysis of uplink data.

Downlink: Set the remote device to downlink mode, and the local module only performs analysis of

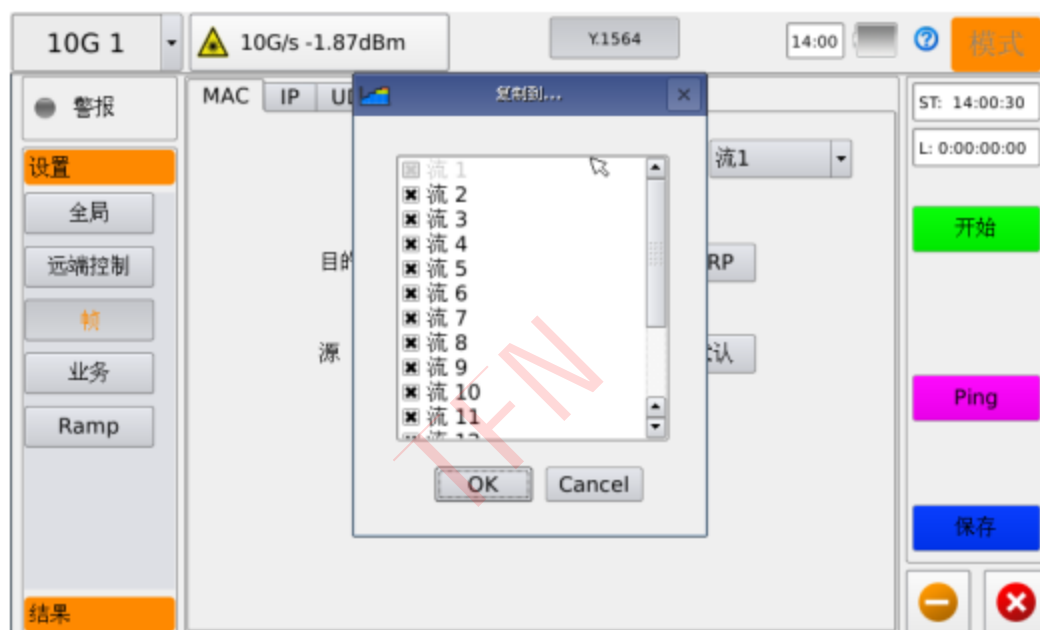
downlink data.

Uplink and downlink: Set the remote device to uplink and downlink mode, and the local module performs analysis of uplink and downlink data respectively.

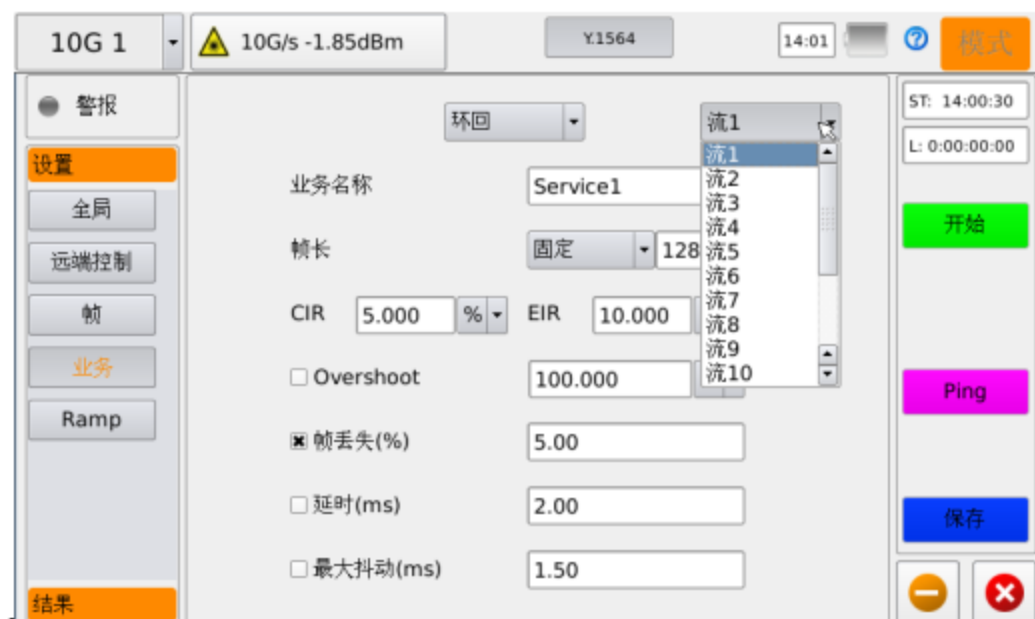
Note: When selecting uplink and downlink testing, the service configuration also needs to be set separately.

8.1.3 Frame setting

The information configuration of MAC, VLAN, MPLS, IP, TCP, and UDP is consistent with the corresponding configuration in Bert test. Please refer to 5.1.2 Frame settings. The frame information of each flow needs to be configured separately. You can also press the 'Copy to...' button to Configuration of one stream is copied to other streams.



8.1.4 Business setting



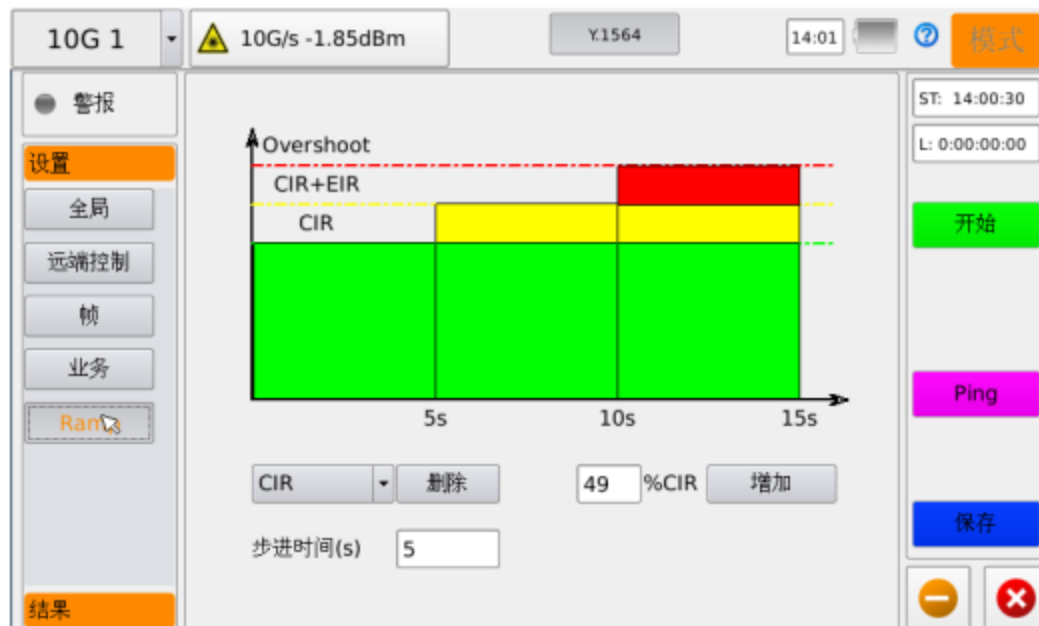
- Test mode: According to the state of the remote device, it is divided into loopback, uplink, and downlink. When uplink and downlink testing is selected, the uplink parameters and downlink parameters need to be configured separately.
- Business flow: According to the number of business flows set in the global options, you can select different business flows from the drop-down list for business configuration;
- Business name: The name displayed in the results can be customized as needed. The default names are 'Service 1' to 'Service 16' ;
- Frame length: Set the test frame length, the maximum frame length can support up to 9600 bits; CIR: Set the committed information rate, that is, the service rate guaranteed by SLA; EIR: Set the excess information rate, that is, the maximum achievable rate of the service; Overshoot: Set Overshoot rate, which is the rate limit of the network;

The rate setting principle is $CIR + EIR \leq \text{Overshoot} \leq \text{line rate}$; and the total sending rate of all service flows should be less than or equal to the line rate

Threshold limit:

- Frame loss: frame loss percentage, select this option, if the value of test frame loss is greater than the set threshold, the test is judged to have failed. The setting range is 0~50%;
- Delay: Round trip delay, select this option, if the test round trip delay value is greater than the set threshold, the test will be judged to have failed. The setting range is 0.015~8000ms;
- Maximum jitter: Maximum jitter. If this option is selected, if the value of the maximum jitter in the test is greater than the set threshold, the test will be deemed to have failed. The setting range is 0.0015~8000s;

8.1.5 Ramp setting



You can divide several steps before CIR to step to CIR, and set the step time. This setting will only be reflected in the business configuration test results;

Delete: You can select the test time period (refer to the graph) where the ladder you want to delete is located and press 'Delete' to delete the ladder. Only ladders below CIR can be deleted;

Add: Enter the CIR percentage value and press 'Add' to add a new ladder step. Only 7 steps can be added at most;

Step time: Set the time for each step test, the range is 5~60s;

8.2 Y.1564 test results

8.2.1 Summary

You can view the service configuration test results and service performance test results. The two results need to be switched in the drop-down table.

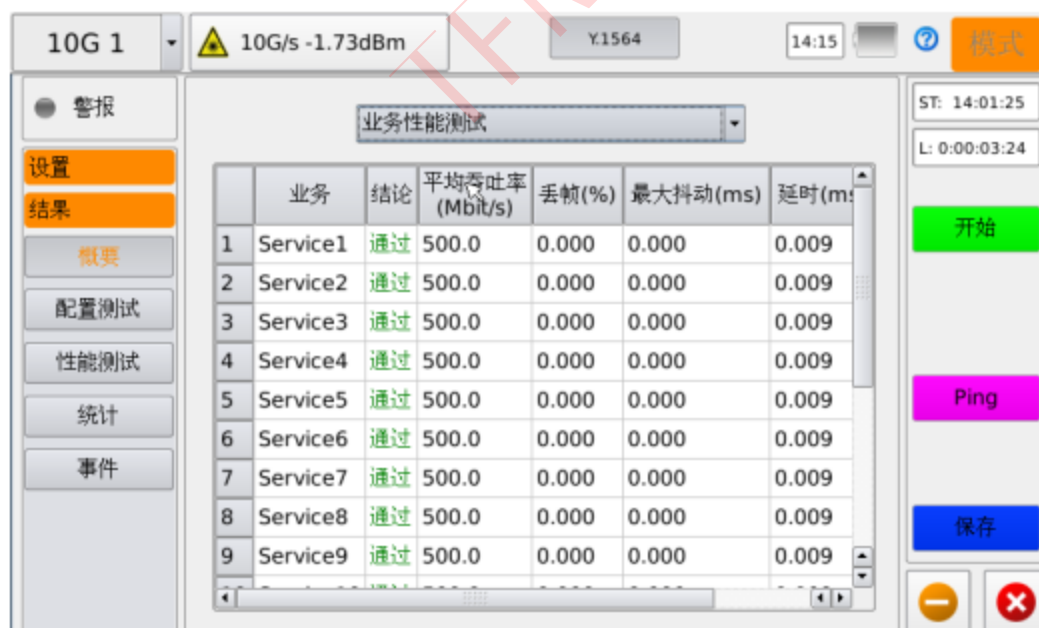
Business configuration test results:

It can display the maximum throughput, frame loss rate, maximum jitter, delay of each service flow configuration test, and the judgment of whether the service flow test passes. If the test passes, the judgment result displays 'passed', and if it fails, it displays 'failed';



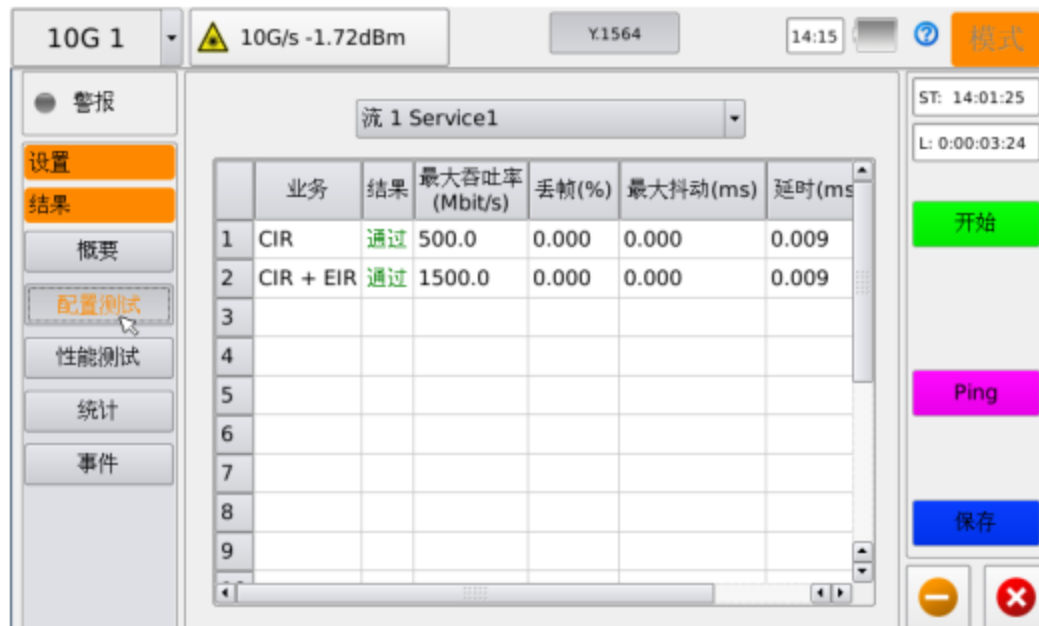
Business performance test results:

It can display the average throughput, frame loss rate, maximum jitter, delay of each service flow performance test, and the judgment of whether the service flow test passes. If the test passes, the judgment result displays 'passed', and if it fails, it displays 'failed';



8.2.2 Service configuration test results

You can view the test results of each step of each business flow, and the upper tab allows you to select the business flow to perform the test.



- Business: Based on the set step value, display the set steps from minimum bandwidth to overshoot;
- Maximum throughput: the maximum throughput of each ladder test
- Frame loss rate: frame loss rate for each ladder test
- Maximum jitter: the maximum jitter of each ladder test
- Delay: Delay for each ladder test
- Result: Compare with the set threshold to determine whether the test passes. If it passes, it will be displayed as 'passed', if it failed, it will be displayed as 'failed'.

8.2.3 Business performance test results



8.2.4 Statistics

You can view the number of frames sent and received and the number of bit errors for each sub-test separately.

业务	发送帧	接收帧	错误帧
1 CIR	2119168	2119168	0
2 CIR + EIR	6357161	6357161	0
3 Overshoot	0	0	0
4 性能测试	4243336	4243336	0

8.2.5 Events

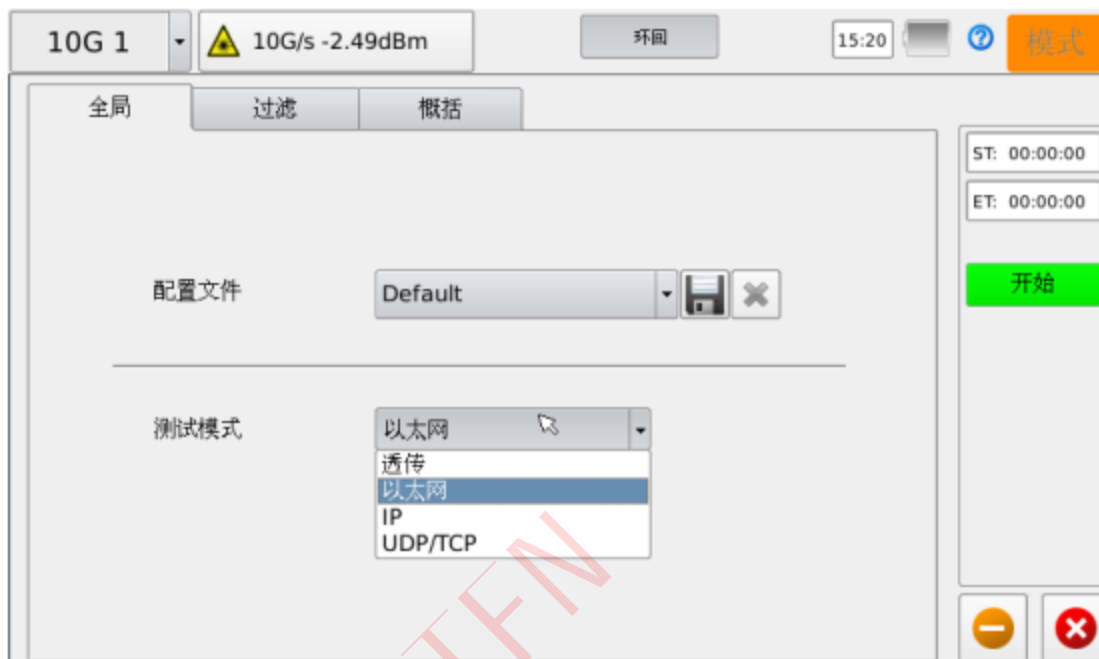
View events logged during testing.

序号	时间	描述
1	14:01:24	2017-12-07, 开始Y.1564测试
2	14:01:25	2017-12-07, 开始配置测试
3	14:04:38	2017-12-07, 停止配置测试
4	14:04:38	2017-12-07, 开始性能测试
5	14:04:49	2017-12-07, 停止性能测试
6	14:04:49	2017-12-07, 停止Y.1564测试

9 Loopback

9.1 Global settings

In the main test interface, click the loopback test icon [] in the test application to enter the loopback test global settings interface, as shown below:



Configuration file: You can select a pre-stored configuration file. It is recommended to save the commonly used setting conditions for subsequent testing; if you want to delete the configuration file, select it from the drop-down item and select [] to delete it; to save the configuration file, select [], and set Confirm to exit after saving the name.

- Test mode: Layer 1~4 loopback can be selected, which are transparent transmission, Ethernet, IP, and TCP/UDP. The frame loss strategy for each layer of loopback is as follows:
- Transparent transmission: The received data is looped back directly without any processing;
- Ethernet: discard bad CRC and loop back after swapping MAC addresses;
- IP: discard bad CRCs, IP errors, and loop back after swapping MAC and IP addresses;
- TCP/UDP: Discard bad CRCs, IP errors, TCP/UDP errors, and exchange MAC addresses, IP addresses,
- Loopback after TCP/UDP port number.

9.2 Loopback filtering settings

In the main loopback test interface, select the filtering tab to enter the loopback filtering interface, as shown below:

Set filter conditions and select the check box before the condition to loop back the received frames that meet the set conditions.


9.3 Summary of results

After turning on loopback, you will enter the loopback result summary interface. The information items displayed in the result summary are the same as those in the Bert test. See Bert result summary. As shown below:

	发送	接收	单位
线速率	10.000G	10.000G	
帧速率	8.649G	8.649G	自动
数据速率	7.432G	7.432G	自动
利用率	99.999%	99.999%	
总共字节	6372203904	6372219904	
总共帧	49782843	49782968	

10 Ethernet Test Tools

10.1 Ping

The Ping test is used to check whether the device under test can be connected, and to test the network speed based on the delay. Select Ping[



发出	收到	结果
5	5	
当前延时	0.258 ms	
平均延时	0.253 ms	
最大延时	0.267 ms	
最小延时	0.246 ms	


Set up:

- Destination address: Fill in the destination IP address of the device under test.
- Frame length: Set the sending frame length. The frame length setting range is 64~1500 bits.
- Number of Pings: Set the number of frames sent.
- After the setup is complete, press 'Start' to test.

Result:

- Send: Count the number of frames sent.
- Receive: Count the number of frames received.
- Current delay: The round-trip time of the currently received frame.
- Average latency: The average round-trip time of received frames.
- Maximum delay: The longest round-trip time of a received frame.
- Minimum delay: The shortest round-trip time of a received frame.

10.2 Search

The search function is used to find our company's products on a certain IP segment, for each test application to use "Control Settings" to find remote loopback devices. Select Search [

10G 1 10G/s -2.49dBm 搜索 15:23 模式

从 192.168.2.1 到 192.168.2.10

100%

	地址	主机名	序列号	端口类型
1	192.168.2.8	XGT-200	14400A004	LAN

开始

Enter the starting and ending IP address segment, select "Start" to search, and filter out all our company's products in this IP address segment.

10.3 Trace route

Path tracing is used to measure the number of network segments that the machine passes before reaching the destination address. Select path tracing [📶] on the main test interface. After entering, enter the destination IP address and press 'Start' to trace the destination, as shown below:

10G 1 10G/s -2.48dBm Trace Route 15:23 模式

Trace Route

目的: 192.168.2.8

HOP	TTL	地址
1	0	192.168.2.8

开始

11 Warranty information

11.1 Warranty period

For all our company's products, our company will provide a free warranty within one year from the date of shipment of the product due to faults caused by its materials or production reasons. During the warranty period, any faulty product can be repaired or replaced by our company, but in any case, our liability will be limited to the original price of the product when purchased.

This warranty commitment does not include accessories or options for the products provided by our company.

11.2 Exceptions

Various accessories, including but not limited to fuses, indicators, batteries and universal interfaces (EUI) used in the product, are not covered by this warranty.

If the malfunction is caused by the following conditions, the product will not be covered by the warranty:

Repair or modify without permission;

- Misuse, neglect or accident.
- Improper use or installation, normal wear and tear, accidents, illegal operation, negligence, fire, flooding, lightning or other natural accidents, reasons outside the product or other reasons beyond our company's control.
- The Company reserves the right to make changes to any product produced at any time without any obligation to replace or alter products already sold.

11.3 Warranty registration

The original packaging of the product comes with a warranty registration card. After purchasing the product, please fill in the card and send it back or fax it to our company's local customer service center so that the warranty items of the product you purchased can be confirmed.

11.4 Product returns

If you need to return the product due to annual product calibration or other reasons, please contact the company's local customer service center in advance, request an RMA# (product return authorization number), and briefly explain the reason for the product return, so that the company can provide you with More efficient service.

When a product needs to be returned for repair, calibration or other maintenance, please note the following:

- Wrap the instrument with a thin, soft pad such as polyethylene to protect the instrument case perfectly.
- Please use the original hard packaging box. If you use other packaging, make sure there is at least 3 cm thick soft material around the meter.
- Correctly fill out and return the product repair card, including company name, postal address, contact person, contact number, email address, problem description, etc.
- Seal the packaging box with special tape.
- Reliably transport it to the agent responsible for supplying you or our company's repair center.

Contacting Customer Service

Please check our website (www.tfngj.com) for updates to this manual and additional application information. If you need technical or sales support, please contact local TFN Technologies Customer Service.

TFN Technologies (China), Inc.:
Tel / WhatsApp: +86-18765219251
Email: fattsales1@163.com

Thank you for choosing our company's products