



Product Name	GAOTek Line Test Equipment
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GAOTek Line Test Equipment



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Introduction

GAOTek Line Test Equipment is a series of portable instruments for operation and maintenance testing designed for communication telecom operators. It integrates xDSL, DMM, TDR, optical power meter, redlight, telephone, tracing, Bluetooth, charging and other functions.

Structure



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No.	Name	Function
1	Receiver	Telephone receiver
2	Indicator	Indicate the conditions of the equipment
3	Display	Screen display
4	Keyboard	Function key
5	MIC	Telephone audio input
6	Battery cover	Fix the battery
7	Dust-proof cap	Protect the optical port from dust and water
8	VFL port	Connect with the fiber interface, use red light test fiber optic connection
9	Optical power port	Connect with the fiber interface, test optical power
10	LAN port	LAN PING test
11	Dust-proof cap	Protect the port from dust and water
12	RJ11 port	Used in xDSL, DMM, TDR, Telephone line tester and cable tracing single output port
13	RJ45 port	Check line sequence single output port
14	USB port	USB port, connect PC or charge
15	Charge port	Charge tester
16	Bottom dust-proof cap	Protect RJ11, RJ45, USB and charge port, protect from dust and water

Keyboard

Key	Name	Function
	Power button	Long press this button can power on or off
	Return button	Used to exit an interface
OK	Enter key	Used for confirm selection
	landline telephone shortcut key	Used to open the landline telephone function under the main interface



xDSL	xDSL test shortcut key	Used to open the xDSL test second level under the main interface
TDR	TDR test shortcut key	Used to open the TDR test function under the main interface
DMM	DMM test shortcut key	Used to open the DMM function under the main interface
OPM	Optical power test shortcut key	Used to open the optical power testing and switch different wavelength
0~9	Digital keys	Used for number and alphabet input; 2 is directional up key; 8 is directional down key; 4 is directional left key; 6 is directional right key.
#	# key	Used for switching numbers, uppercase and lowercase in the input interface

Indicator light:

The three indicators are power indicator, LINK indicator and charging indicator in turn from left to right.

Power indicator: Indicator twinkles when tester is working; LINK indicator: The Modem module is started successfully, it twinkles; when modem synchronization success, the light is always bright;

Charging indicator: When charging, the light is red, when power is full, the light will turn to green.

Features

1. 1, 320*480 3.5 inch LCD
2. 2, Test objects: ADSL; ADSL2; ADSL2+; READSL; VDSL2
3. 3, Fast Copper tests with DMM (ACV, DCV, Loop and Insulation Resistance, Capacitance, Distance)
4. 4, Support VLAN, Vectoring, Compliant with all known DSLAMs
5. 5, Supports Modem emulation and simulating login to Internet
6. 6, Supports ISP login (username / password) and IP Ping test (WAN PING Test, LAN PING Test)



7. Rechargeable Li-ion Battery
8. Support optical power meter, VFL function
9. Support cable tracing, check line sequence, landline telephone function
10. Support cable fault locator (TDR) function

Basic Functions and Specifications

Standards	ITU G.994.1 (G.hs), ITU G.992.5, ITU G.992.5 Annex L. The max distance which can be connected is 6.5km. Be compatible with ADSL, ADSL2 and READSL.
Attenuation:	0~63.5dB
Noise margin	0~32dB
Upstream Channel Rate (interweaved / fast mode)	0~1.2Mbps
Downstream Channel Rate (interweaved / fast mode)	0~24Mbps
The modulating bits in the DMT subchannel	0~15 and each sub-channels' frequency points
The number of error codes	CRC, HEC, FEC, NCD, OCD
Other Parameters	The output power of DSL It can display every condition of the DSL line: lost signal and shutdown of link
VDSL2 Index	
Standards	ITU G.993.2(VDSL2).Be compatible with ADSL2+, ADSL standard.

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Upstream Channel Rate (interweaved / fast mode)	0-100M
Downstream Channel Rate (interweaved / fast mode)	0-100M
The modulating bits in the DMT subchannel	0~15 and each sub-channels' frequency points
The number of error codes	CRC, HEC, FEC, NCD, OCD
Other Parameters	The output power of DSL It can display every condition of the DSL line: lost signal and shutdown of link DSLAM information Error seconds INP pulse protection SNR channel figure Channel noise margin figure
Support profiles:	Profile 8a, 8b, 8c, 8d, 12a, 12b, 17a
DMM Test Index	
DC Voltage	-400 to 400 V; Resolution: 0.1V
AC Voltage	0 to 290 V
Capacitance	0 to 1000nF; Accuracy: 0-10nF: $\pm 2nF$, 10nF-1000nF: $\pm 2\% \pm 2nF$
Loop Resistance	0 to 20K Ω ; Accuracy: 0-100: $\pm 3\% \pm 4\Omega$, 100-500: $\pm 3\%$, 500-20 K Ω : $\pm 2\%$
Insulation Resistance	0 to 50M Ω ; Accuracy: 0-1.0M: $\pm 0.1 M\Omega$, 1.0-30M: $\pm 10\% \pm 0.5 M\Omega$
TDR Index	
General specifications	Check line mix and break fault. Auto and manual distance test
Test Range	8km (4km,16km,32km is optional)
Highest resolution	1km
Dead Zone	0m



Power consumption	1W
VOP Adjusting range	100-300 m/us
Distance test accuracy	≤1m
Pulse test voltage range	≥30V
Cable Tracking Index	
Test cable type	Network cable, twisted pair cable, telephone line, USB cable, coaxial cable.
Line status test	Determine open or short circuit
Voltage polarity detection	Positive and negative of DC voltage
Distance of signal transmission	No less than 3km
DC Voltage	No more than 48V
Check Line Sequence Index	
Function	Support generate network line signal to view the network check line sequence with the receiver
Feature	Easy to operate: determine the line sequence by receiving side lights order
Optical Power Index	
Wavelength range(nm)	800~1700
Photosensing material	InGaAs
Power test range(dBm)	-70~+10 or -50~+26
Error range	±5%
Display distinguishability	Linear display: 0.1%; logarithmic display: 0.01 dBm
Adapters	FC, ST, SC
VFL Index	



VFL	FP-LD
Wavelength	650nm±20nm
Output power	1mw/3mw/5mw/10mw (optional)
Connector	2.5mm universal adapter (SC, FC, ST)
Working mode	CW or 2Hz modulation
Applicable fiber	SM / MM

xDSL specification

VDSL2 Module:

- 1) Standard:ITU G.993.2(VDSL2). Be compatible with ADSL2+, ADSL standard.
- 2) DSL line transmission parameter
 - DSL line attenuation
 - DSL line noise margin
 - DSL line up channel speed (Inter/Fast mode)
 - DSL line down channel speed(Inter/Fast rate)
 - DSL line up/down maximum rate and capacity ratio ● DMT sub channel bit number: 0~15, and each sub channel frequency points
 - DSL line error number (CRC, HEC, FEC, LCD, OCD)
 - DSL line output power
 - State display: signal loss, connection close.
 - Error code second
 - Impulse noise protection (INP)
 - SNR Chart
 - Display channel Hlog and QLN map 3) Support profile 8a, 8b, 8c, 8d, 12a, 12b, 17a.

Dialing test function

You can perform PPP dialing to user twisted-pair (WAN port). After successful dialing, it can get Native IP, local IP, primary DNS server IP, secondary DNS server IP address. The dial function including 3 modules: PPPoE, PPPoA and Bridge.



PING test

It can perform the WAN PING test and LAN PING test. LAN PING test can judge whether the connection with IP addresses success and also confirm LAN work OK or not. WAN PING test can Ping website addresses directly toward local WAN, and check the connectivity of WAN line.

Modem emulation

This tester can replace the user Modem completely. The user could take this tester as modem to dial and login to Internet to check whether the Modem is faulty or not

Data storage and browse

This tester has memory capacity of 20 records. The records include line parameters, channel bit chart and error test.

User can browse the records on the screen through entering different record number.

Modem parameter setting function

- Current Modem standards can be set and other modes or annex M modes can be selected.
- Dial-up mode, attributes, VPI/VCI, encapsulation mode and user name, password can be set.
- Line quality evaluation criteria can be set
- The number of PING and package size can be set

DMM test

- AC Voltage: -400~ 400 V; Resolution: 0.1V
- DC Voltage: 0 ~290 V;
- Capacitance: 0 ~ 1000nF
Accuracy: 0—10nF: $\pm 2\text{nF}$; 10nF-1000nF: $\pm 3\% \pm 2\text{nF}$
- Loop Resistance: 0 ~20K Ω ;
Accuracy: 0-150: $\pm 3\% \pm 6\Omega$; 150—500: $\pm 3\%$; 500—20 K Ω :
 $\pm 2\%$
- Insulation Resistance: 0 ~ 50M Ω ;
Accuracy: 0—1.0M: $\pm 0.1\text{ M}\Omega$; 1.0M—30M: $\pm 10\% \pm 0.5\text{ M}\Omega$ ● Line lengths can be calculated based on loop resistance and capacitance value

TDR test

- Automatic test with waveform
- Fault type: broken line, cross line
- Measurement range: 4km and 8km optional
- Maximum resolution: 1 m
- Dead zone: <1 M

Optical power test

- Wavelength range (nm): 800~1700

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- Detector type: InGaAs
- Power test range (dBm): -70~+3 (-50~+26) ● Uncertainty: ±5%
- Display distinguishability:

Linear display: 0.1%;

Logarithmic display: 0.01 dBm

- Adapters: FC, ST, SC

Visual fault locator

- Emitter type: FP-LD
- Wavelength: 650nm±20nm
- Output power: 1mw/3mw/5mw/10mw (Optional)
- Adaptors: SC, FC, ST
- Working mode: CW or 1Hz modulation ● Applicable fiber: SM/MM

Landline telephone function

This function realizes the function of ordinary telephone. You can call or answer the phone. When testing data, you can detect calls from the phone.

Cable tracking function

It can output tracing signal, cooperate with accessories, carry out line search, judge the direction of line, etc.

Check line sequence function

Cooperate with accessories, it can test the network line sequence and on-off.

System parameter setting function

- Automatic shutdown time, default is 8 minutes; can be set between 5 - 60 minutes
- The keypad tone can be set to turn on or off.
- Bluetooth can be set to turn on or off
- Restoration of factory setting

APP function

App can be installed on Android mobile phone or tablet and to communicate with tester through Bluetooth. And xDSL test, DMM test, TDR test, optical power test, record browsing and upload functions can be realized.



Dimension and weight

- Dimension: 181mm×87mm×45mm
- Weight: <550g

Use conditions

- Temperature: -5°C~+40°C
- Relative humidity: ≤85%
- Atmospheric pressure: 86 kPa~106 kPa
- Power supply: 8200 mAh rechargeable lithium battery, DC5V charger
- Continuous working hours: ≥ 8 hours

Operation Instructions

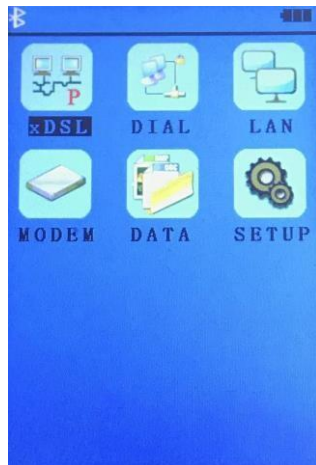
The tester has the functions of xDSL, DMM, TDR, optical power meter, VFL, landline telephone, cable tracing, check line sequence, Bluetooth, charging, etc. It starts by pressing the power key for 3s, and shut down by pressing the power key for 3s.

The main interface is shown as follows:



xDSL test function

Under the main interface of the device, press the "xDSL" button or select the "xDSL" icon through the key, waiting for the model initialized and enter the xDSL test secondary menu, as shown in Figure 4.1-1.



Pic.4.1-1

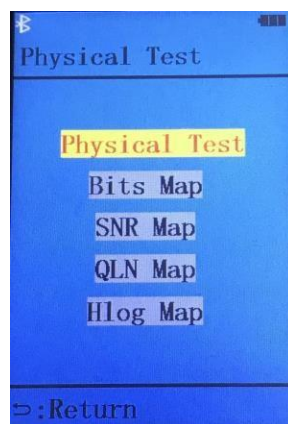
If the Modem initialization failed, the screen prompts "Modem initialization failed", which can be returned to the main menu interface by press the "↩" button. If the

Modem initialization failed many times, please contact the dealer for after-sales to maintenance to ensure the normal function of the instrument.

Press the "↩" button under the interface shown in Figure 4.1-1 to exit the xDSL test function and return to the main menu.

Physical layer parameters test function

Under the secondary menu of xDSL test, select and press the "xDSL" icon, waiting for the synchronization to succeed or press the "↩" key directly to enter the physical test interface, as shown in above Pic 4.1.1-1



Pic 4.1.1-1



Select the "Physical Test" icon and press the "OK" key to enter the physical layer test interface. After successful synchronization, you can browse the current status, service quality, connection mode, up/down channel rate, up/down maximum connection rate, up/down line attenuation, up/down noise margin and up/down output power by screen



through the "2" or "8" key. As Figure 4.1.1-2 show as following:

Pic 4.1.1-2

The last page attenuation value is valid for VDSL connection mode.

Link mode:

ADI: ADI mode of ADSL;

G.dmt: ADSL G.dmt mode, compliance with ITU-T G992.1 standard

G.lite: ADSL G.lite mode, compliance with ITU-T G992.2 standard

T1.413: ADSL T1.413 mode, compliance with ANSI T1.413 issue1 & Issue 2 standard

G.dmt.bis: ADSL2 G.dmt.bis mode, compliance with ITU-T G992.3 standard

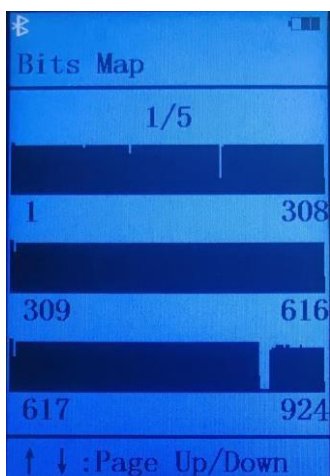
G.dmt.bisplus: ADSL2+ G.dmt.bisplus mode, compliance with ITU-T G992.5 standard

ADSL2/2+: ADSL2+G.dmt.bisplus mode, compliance with ITU-T G992.5 standard.

Service quality: It has 4 levels to show, they are: **Excellent, Good, OK and Poor**. According to physical layer test result to judge whether the line is fit for xDSL service and evaluate current service quality.

Display bit chart

In the interface shown in Figure 4.1.1-1, select the "Bits Map" icon and press the "OK" key to enter the Bit Map test interface. If the Modem is not synchronized, it will show the blank graphics without any graphs. If the Modem is synchronized, it will display like the Figure 4.1.2-1:



Pic4.1.2-1

The first page will show 925 channels, press the "8" button, it will display the bit maps of 925 channels, and then the bit maps of 4096 channels will sequential display. Press the "↩" key to return the physical layer test interface. The number of channel bit maps tested depends on the condition of user line, usually is 512 or 256 channels. If the connection mode is VDSL, there are 4096 channels.

Similar to bit maps display, this tester can also display SNR graphs, Hlog graphs and QLN graphs, the number of channels for each graph is different, usually 512 or 256 channels. If the connection mode is VDSL, there are 4096 channels.

The channel bit maps represents the number of signals carried on each channels, the larger value means more signals carried.

Channel signal-to-noise graph (SNR) characterizes the ratio of signal to noise on each channel. The larger value means the stronger signal; the data transmission is more stable.

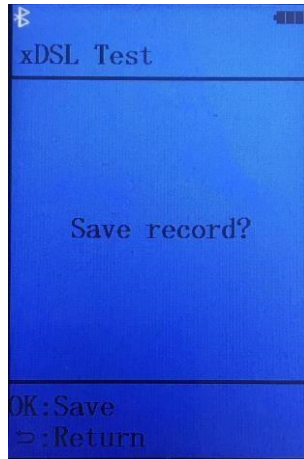
The QLN (Quiet Line Noise) graph represents the line static noise and can represent the crosstalk interference. The smaller value means the crosstalk is small, we use negative coordinate to display.

Hlog graphs help to analyze bridge taps and lines topology.

Test record save function

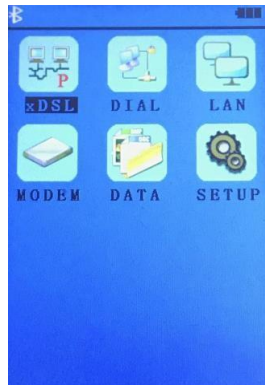
In the physical test and four graphical display interfaces, press the "↩" key, if the Modem is not synchronized, it will return to the physical test interface.

If the modem has been synchronized, the tester will display "save record?" shown as Pic 4.1.3-1:



Pic 4.1.3-1

Press "↩" key will cancel to save record, and it directly return to xDSL test secondary menu (Shown as Pic 4.1-1); if press "OK" button will save this record and this record number will be displayed on screen.



Pic 4.1-1

This tester has a memory capacity of 20 records. Once a record is saved, the record No. will increase by one automatically. When the user tries to save 21th record into the tester, the first record will be overlapped.

The saving contents including line transmission parameters, channel bit maps, Hlog graphs, SNR graphs and QLN graphs.

Operators can view all saved records through "View Data"

(Refer to 4.9 View Data function)

Dial test

Function introduction: PPP (Point-to-Point Protocol) is designed to establish Point-to-Point data-transport by dialing or special line. It has become a common solution scheme between the host, bridge and router. PPP link installation process:

Stage 1: Creating a PPP link;



Stage 2: User authentication;

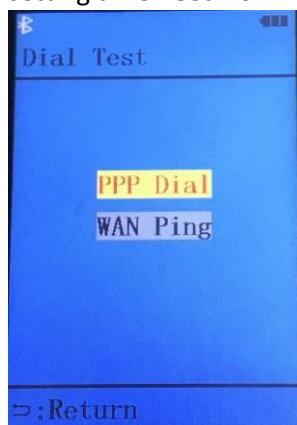
Stage 3: Recall network layer protocol.

Using Ethernet resources, carrying out PPP protocol on Ethernet to test a user authentication method, called PPPoE. PPPoE protect the user's Ethernet resources, also achieve the requirements for xDSL, it is the most extensive technical standards in xDSL application.

Also, running PPP protocol on the ATM (Asynchronous Transfer Mode) to manage user authentication, called PPPoA, the difference is that PPPoA work on ATM internet, the PPPoE work on Ethernet, so it should be suit for ATM standard and Ethernet standard.

Under the “xDSL” secondary menu, choose “DIAL” icon and press “OK” button to enter the Dial test interface.

Before enter Dial Test, it should set up the Modem, the screen will display “setting.... please wait”, this setting time need 10-12 seconds. After success setting, it will show as Pic 4.1.4-1.

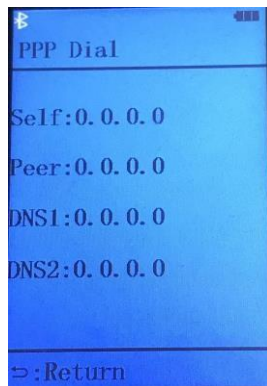


Pic 4.1.4-1

PPP dial

Choose “PPP Dial” icon and press “OK” button in Pic.4.1.4-1; operators can choose dial mode in Modem Setting.

The PPPoA or PPPoE dialing information as Pic.4.1.4.1-1



Pic 4.1.4.1-1

Now, if the Modem synchronization is succeeded, the operator can do PPP dial; if the Modem don't synchronization succeeded, the operator should wait until the synchronization succeed and PPP dial will carry out automatically.

Press "Return" when operator wants to exit, the screen will show "Restoring..." And it will return back to Pic.4.1.4-1 in after 8s.

Dial parameters introduction and modification:

There are 1 group VPI/VCI parameters in the tester, operators can modify them in Modem setting. There is a unique fixed PPP test account in the tester, which can also modified in the Modem setting. Each data center has a common test account, before testing, please confirm the test account and encapsulation mode which fixed in the tester are correct.

When you do PPP dial, if the screen display "Failed to authenticate, please turn off and test later", the reason is the xDSL line break illegal, the LAN end hang up the line in a short time. You can operate the following instruction:

VPI: Virtual Path Identifier

VCI: Virtual Channel Identifier

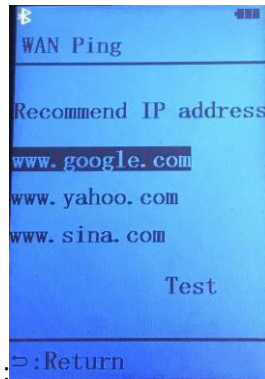
Self: Self IP Address

Peer: Remote IP Address

WAN Ping test

In Pic 4.1.4-1 interface, choose "WAN Ping" icon, Press

"OK", enter the WAN Ping test interface. Shown as Pic



4.1.4.2-1:

Pic 4.1.4.2-1

Modify the URL: Use the “2” or “8” key move to the third option, press “*” to enter the edition interface; press “#” can change the input method, according to the input method type, the numeric key can input numbers, lowercase letters, capital letters, press “↵” key for delete, press “OK” key to exit and save.

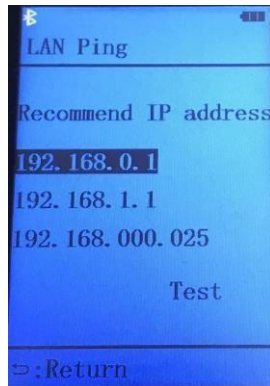
WAN Ping: Use the “2” or “8” key to select the URL, press “OK” key, if it showing “Testing, please wait”, after 8 seconds, the result will come out. Then, the screen can show the result, including the numbers of packets transmit and received, the loss rate and the destination IP address.

If the Dial is failed without PING test, there will be “Please make sure PPP dial success, or the web is correct, and then do Ping test again”. If this prompt appears, you should check whether the dialing is success, if success, then you can do Ping test again.

Sometimes the PPP dial success, but the screen displays “Test failure, please retest”, you can follow the notice.

LAN Ping test

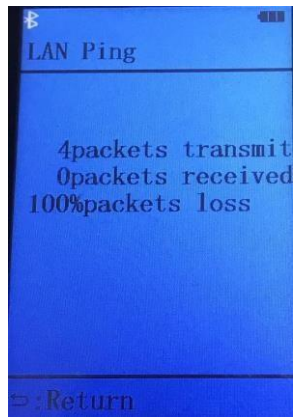
Under the xDSL test secondary menu, select the “LAN” icon and press the “OK” button to enter the LAN Ping test interface. As shown in Pic 4.1.5-1:



Pic 4.1.5-1

Modify the URL: Use the "2" or "8" key move to the third option, press "*" to enter the edition interface; press the "4" or "6" button to select the number you want to edit; press "2" or "8" button to modify the number, press "↵" key for no modification, press "OK" key to exit and save.

LAN Ping: Use the "2" or "8" key to select the URL, press "OK" key, if it showing "Testing, please wait", after 8 seconds, the result will come out. As shown in Pic 4.1.5-2:



Pic 4.1.5-2 Above picture showing:

4 packets transmit

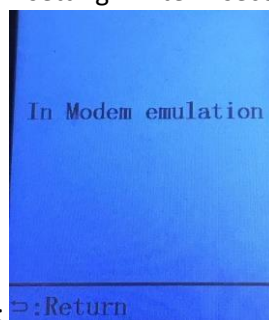
0 packets received

100 % loss

Modem emulation

Function Introduction: If the user cannot access the website, we can use this tester emulate the modem to check whether this modem is good or faulty through dial on PC.

Under the xDSL test secondary menu, select the “MODEM” icon and press the “OK” button. At this time, the screen will prompt “Please wait....setting.” After 4 seconds, the interface will display “In Modem



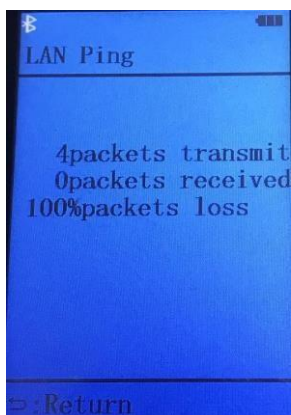
emulation”. As shown in Pic 4.1.6-1:

Pic 4.1.6-1

When testing Modem emulation, the tester works under RFC1483 Bridge mode.

Modem setup

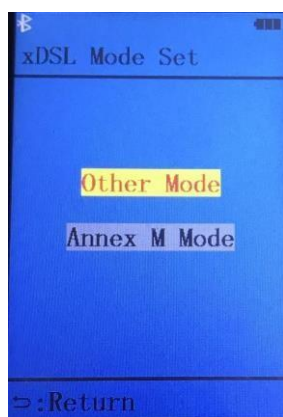
Under the xDSL test secondary menu, select the “SETUP” icon and press the “OK” button to enter the Modem setup interface. As shown in Pic 4.1.7-1:



Pic 4.1.7-1

xDSL mode setting

In the interface of Pic 4.1.7-1, select “xDSL Mode” and press “OK” to enter the xDSL mode setting, as shown in Pic



4.1.7.1-1.

Pic 4.1.7.1-1

Through the “2” or “8” button to select the mode you want to set, press the “OK” button to save the settings, and press “↶” key for no modification.

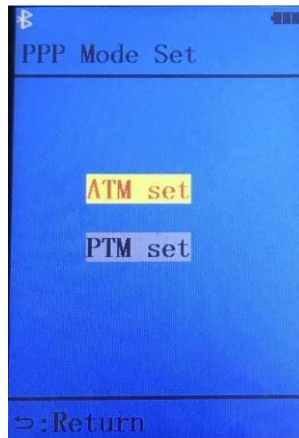
Other modes: Refer to G.Dmt, G.lite, T1.413, ADSL2, Annex L, ADSL2+, VDSL2 standard etc,

Annex M mode: Support ADSL2+ Appendix M, meet downstream rate 24Mbps, upstream rate 3.5 Mbps.

At this time, the built-in xDSL Modem will be connected according to your new setting standard.

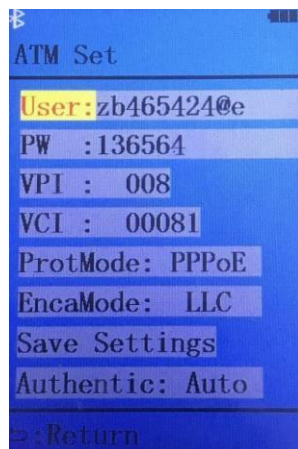
PPP setting

Under Pic 4.1.7-1, select the “PPP Mode” option and press “OK” to enter the PPP set, as shown in Pic 4.1.7.2-1:



Pic 4.1.7.2-1

Use the "2" or "8" key to select the ATM or PTM set. In ATM set, as shown in Pic 4.1.7.2-2:



Pic 4.1.7.2-2

You can set the user name, password, VPI/VCI, protocol mode, and encapsulation mode. Use the "2" or "8" button to select the setting which you need to change, press "OK" button to modify. The method of inputting the user name and password please refer to 4.1.4.2.

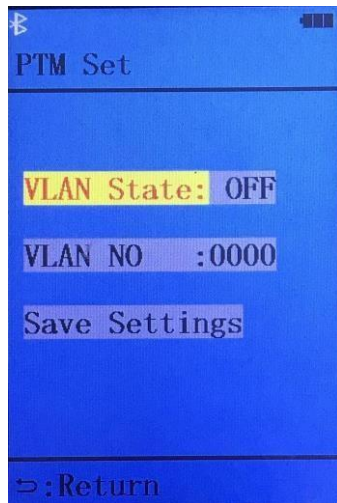
VPI/VCI through press the "4" or "6" button to choose the modify numbers; press the "2" or "8" button to modify the number; press the "OK" or "↵" key to exit.

Protocol mode and encapsulation mode through press the "2" or "8" key to modify setting, press "OK" or "↵" key to exit.

After all settings have been done, in Pic 4.1.7.2-2, use the

"2" or "8" key to move the reverse cursor to "Save Settings". After pressing the "OK" button, you will see "Please wait, modifying" in screen. When the prompt disappear, the tester will display new modified user name and authentication method.

In the PTM set, as shown in Pic 4.1.7.2-3:



Pic 4.1.7.2-3

You can set VLAN state and VLAN NO. Press "2" or "8" key choose the item you want to edit, press "OK" to edit. VLAN state through press "2" or "8" key to set, press "OK" or "↩" key to exit.

VLAN NO, you can choose "4" or "6" button to choose the number you want to change, press "2" or "8" key to edit number, press "OK" or "↩" key to exit.

After all settings have been done, in Pic 4.1.7.2-3, use the

"2" or "8" key to move the reverse cursor to "Save Settings". After pressing the "OK" button, you will see "Please wait, modifying" in screen. When the prompt disappear, the tester will display new modified user name and authentication method.

Qos Set

Under 4.1.7-1interface, choose "Qos Set", press "OK" to enter, as shown in Pic 4.1.7.3-1.



Pic 4.1.7.3-1



Press "2" or "8" key choose the item you want to edit, press "OK" to edit.

Judging service quality is good or poor is according to below four specifications:

Real Noise Margin (Down) < Noise Margin of Threshold, the quality is poor

Real Noise Margin (Down) > Noise Margin of Threshold, operators should judge the attenuation value.

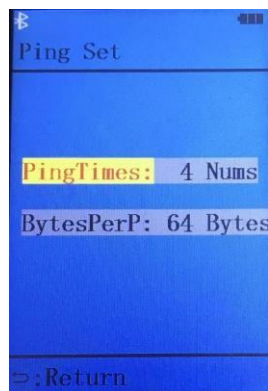
Reference standard:

- Real Down Attenuation < Down Attenuation of Threshold, service quality is Excellent
 - Real Down Attenuation < Down Attenuation of Threshold
1, service quality is Good
 - Real Down Attenuation < Down Attenuation of Threshold
2, service quality is OK
 - Real Down Attenuation > Down Attenuation of Threshold 2, service quality is Poor
- Reference standard:**

Noise Margin Threshold	Down Attenuation Threshold	Down Attenuation Threshold 1	Down Attenuation Threshold 2
6.0	35.5	48.5	62.5

Ping set

Under Pic 4.1.7-1, choose "Ping Set" and press "OK" to enter Ping set, see pic 4.1.7.4-1



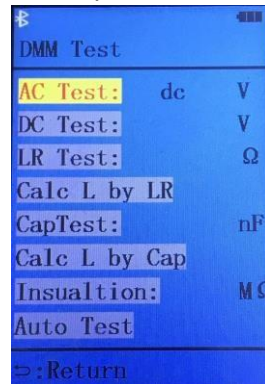
Pic 4.1.7.4-1

Press "2" or "8" key to choose the modification you want and press "OK" to modify. When modifying, press "2" or "8" key choose items, press "OK" or "↩" key to save.



DMM test

Under main interface, press “DMM” shortcut key or choose “DMM” icon, then press



“OK” to enter DMM interface, see Pic 4.2-1.

Pic 4.2-1

Under test interface, press “2” or “8” key to change to AC/ DC voltage, loop resistance test, calculate line length by loop resistance value, capacitance test, calculate line length by capacitance value, insulation test and automatic test. Choose any of them press “OK” can start test. Press "↩" key to exit DMM test and back to main interface.

When exit the DMM test, if the line voltage is higher than safe voltage, in order to protect circuits, tester is not allowed to exit DMM test, there will be “larger than safe voltage, cannot exit from the DMM test” tips. Only eliminate the voltage or line voltage is less than the safe voltage can be returned to the main interface. Usually, the good method is removing the test line.

DC voltage test

Using DC voltage test can judge whether have signal in the line. For ordinary telephone services bundled with xDSL line, if the line voltage is low or equal 0 V, it means the line is not in use or under bad insulation, short circuit or open circuit, need to check and maintain the line.

In this test, the DC voltage range is -400 V ~ +400 V. When over the range of testing, the equipment will show “out of range” in screen.

AC voltage test

Using AC voltage test can check the high-voltage alternating current in the line, in order to protect the field engineers. If encounter high-voltage alternating current please remove the fish clips carefully to avoid electric shock.

This test is only limited to the AC voltage test, the range is 0 ~ 290 V. The equipment will show “out of range” if over this range.



Resistance test

Using resistance test function can determine the length of cable. Conversely, if you know the length of the cable, the resistance test value will show whether the cable connection is good or not.

The formula for calculating the length of the line by loop resistance is:

$$L = RL / RO \text{ (Km) } \dots\dots\dots \textcircled{1}$$

①: RL is loop resistance measurements (Ω), RO is the loop resistance (Ω) per kilometer.

General specification for the 0.32 mm copper, RO = 435.2 Ω ; specification for the 0.4 mm copper, RO=278.5 Ω ; specification for the 0.5 mm copper, RO = 178.3 Ω .

If the equipment tips “out of range” it means test clips not connected or cable not looped or out of resistance range, please check the test clips or retest after loop the cable again.

In this test, if there have voltage (voltage more than 2V) in the line, then it will show “voltage!” It means this line have electricity and cannot test resistance value. Please check the line and test again after cutting the electricity.

Capacitance test

Using capacitance test function can determine the length of line. If there is no bridge tap or no flooding, we can get the cable length from capacitance test result.

Calculation formula:

$$L = Cab / CO \text{ (Km) } \dots\dots\dots \textcircled{2}$$

②: Cab is capacitance test value (nF), CO is capacitance value (nF) per kilometer.

Commonly the telephone cable capacitance per kilometer is CO = 51nF.

If the tester showing “out of range”, it means capacitance value over the range or the cable have faults, please re-test after checking the lines.

When testing, if the line have voltage (voltage more than 2 V), the tester will show “voltage!”, and then return to the test menu. This means the line have electricity and cannot test the capacitance, please check the line and retest after cutting the electricity.

Insulation test

Insulation test can test the insulation status of the line. If the insulation resistance value is small, it means the insulation is not good; it will make the quality of transmission very bad, it is need to repair. Usually, for ADSL line, the insulation resistance value should be more than 10 M Ω .

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When testing, if the line have voltage (voltage more than 2 V), tester will show "voltage!" This means the line have electricity and cannot test the insulation, please check the line and retest without the electricity. If the line resistance over the value range, the tester will show "Out of range", that means the insulation is good.

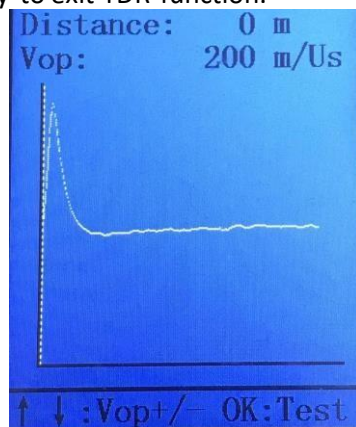
⚠ Notice: When testing insulation, tester will bring a 100V voltage, please operate it very carefully and do not touch the test clips!

TDR Test function

Under main interface, press "TDR" icon and press "OK" to enter TDR test, see Pic 4.3-1

Wave velocity is default 200m/us, press "2" or "8" key to increase or decrease wave velocity, once press "OK" to test. There will show fault type, fault distance and wave picture.

↩ " key to exit TDR function.



Press"

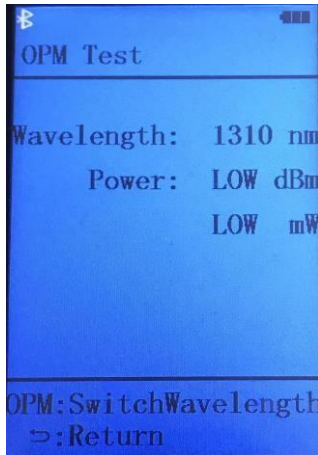
Pic 4.3-1

Optical power meter test function

Under main interface, press "OPM" icon to enter test function, see Pic 4.4-1

Press "OPM" button can change wavelength, press "↩" key to exit optical power meter function and back to main interface.

Optical power meter can support 6 wavelengths: 850nm, 1300nm, 1310nm, 1490nm, 1550nm, and 1577nm/1625nm.



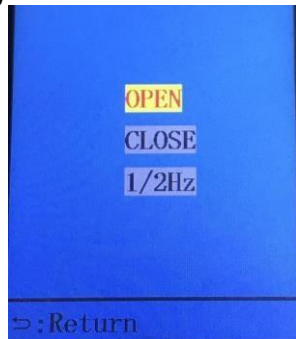
Pic 4.4-1

VFL function

Under main interface, press "VFL" key and press "OK" to enter VFL function, see Pic 4.5-1:

In this test interface, you can choose OPEN, CLOSE, 1/2Hz, there will corresponding status icon appears in status bar.

↩" key to exit VFL function.



Press "

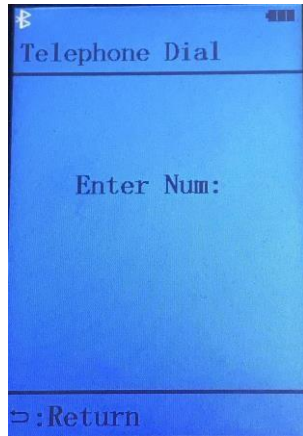
Pic 4.5-1

Landline telephone phone function

Under main



interface, press key to enter interface, see Pic 4.6-1:



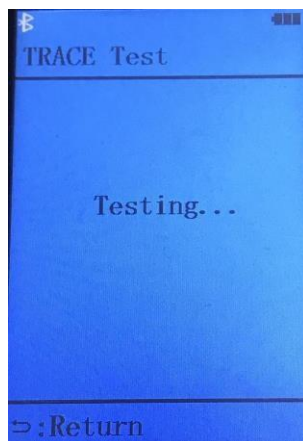
Pic 4.6-1

Under telephone dial interface, you can hear dial tone; at this time you can type numbers to make a call. Press "↵" key to exit and back to main interface.

On main interface, if someone calls you, you can hear ringing bell, and then enter to TEL interface to receive the call.

Cable tracking function

Under main interface of the device, use the arrow keys to select the "TRACE" icon, press the "OK" button to enter the tracing test interface. At this time, the interface displays "Testing...", as shown in Pic 4.7-1:



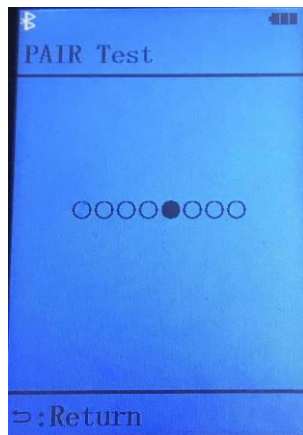
Pic 4.7-1



At this point, insert the telephone line into the tester RJ11 interface, and use the tracking receiver (spares) to walk along the telephone line to achieve tracking. Press "↩" key to exit the tracking test and return to the main interface.

Check line sequence function

In the main interface of the device, use the arrow keys to select the "PAIR" icon, and press the "OK" button to enter the test interface, as shown in Pic 4.8-1:

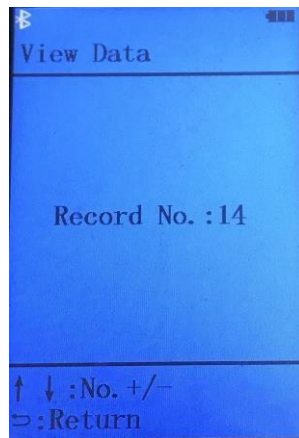


Pic 4.8-1

Plug one end of the network cable into the RJ45 interface under the tester, and another end connect to the receiver (spares). The tester sends the pulse signal sequentially, the line receiver can show cable sequence and on/off status. Press "↩" key exits the test and returns to the main interface.

View data function

In the main interface of the device, use the arrow keys to select the "DATA" icon, and press the "OK" button to enter the record browsing interface. The record number displayed is the latest record numbers saved, as shown in Pic 4.9-1:



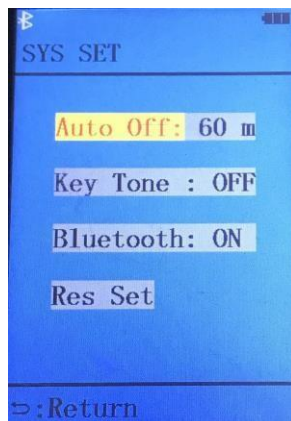
Pic 4.9-1

At this time, press the “U2” or “8” button to select the record number to be browsed. After selecting it, press the “OK” button, and the record of the sequence number will be recalled. The physical layer test, bitmap, SNR map, QLN graph, and Hlog graph in the record can be browsed in turn. The tester can save 20 sets of test records.

After browsing, press " ↵ "key to exit and return to the main interface.

System set

In the main interface of the device, use the arrow keys to select the “SETUP” icon, and press “OK” button to enter the system setting interface, as shown in Pic 4.10-1:



Pic 4.10-1

At this time, press the “2” or “8” button to select the setting that needs to be changed, press the “OK” button to enter the modification, press the “2” or “8” button to modify the setting contents, and press the “OK” or " ↵ "key to save Settings. After the modification is completed, press the " ↵ "key to exit the system settings and return to the main interface.



“Auto Off” sets the auto power off time.

“Key Tone” sets the press button sound to be on or off.

“Bluetooth” sets Bluetooth on or off.

“Res Set” can be restored to factory settings. At this time, Modem also restores the factory settings.

Charging

If the battery voltage is too low, the tester will flash through the battery icon. Please charge battery as soon as possible.

The device can be charged by USB charger or direct charge.

In the charging state, the device charging indicator is red, and the charging time is about 6-7 hours. After the charging is completed, the indicator light turns green.

In order to ensure the correctness of the test results and protect the instrument, please don't use tester when charging.

Use of APP

Before using the app, please turn on the tester Bluetooth. Open the APP and select the device to be connected according to the MAC address in the Bluetooth search interface. See Pic 4.12-1:



Pic 4.12-1

After the connection is successful, enter the main interface. See Pic 4.12-2:



Pic 4.12-2

xDSL test function

To ensure that the phone or tablet is successfully connected to the tester, click the “xDSL” icon. After the modem is successfully started, enter the xDSL test interface, as shown in Pic 4.12.1-1:



Pic 4.12.1-1

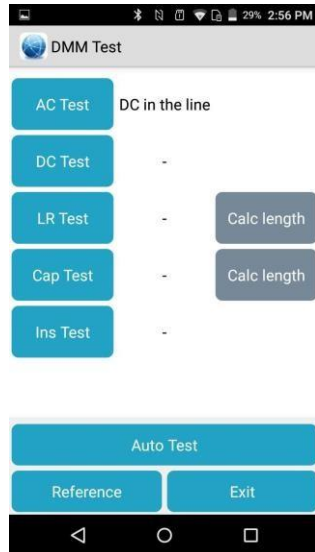
At this point, the tester displays “in software control”, and the tester can only be operated by APP. The test method refers to the test method of “4.1 xDSL test function”. After



the test is completed, press the “” button on the APP return to the main interface, and the tester will also return to the main interface.


DMM test function

To ensure that the phone or tablet is successfully connected to the tester, click the “DMM” icon to enter the DMM test interface, as shown in Pic 4.12.2-1:



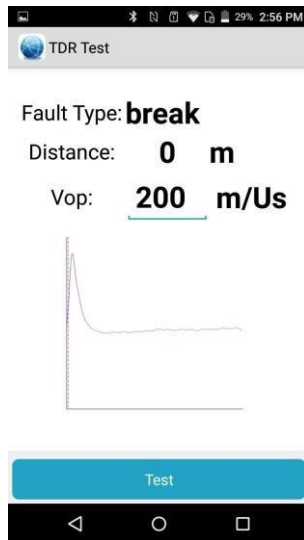
Pic 4.12.2-1

Click to select the corresponding test items and the tester will also display the corresponding test content. After the

test is completed, press the “” button on the APP return to the main interface, and the tester will also return to the main interface.


TDR test function

To ensure that the phone or tablet is successfully connected to the tester, click the “TDR” icon to enter the TDR test interface, as shown in Pic 4.12.3-1:



Pic 4.12.3-1

The Vop can be entered manually, and then click the “Test” button to test once, and the tester will also display the corresponding test content. After the test is completed,

press the “” button on the APP return to the main interface, and the tester will also return to the main interface.

Optical power test function

To ensure that the phone or tablet is successfully connected to the tester, click the “OPM” icon to enter the optical power test interface, as shown in Pic 4.12.4-1:



Pic 4.12.4-1

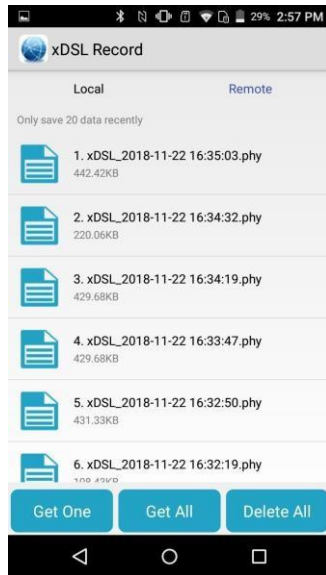
The test can be switched by selecting different wavelengths, and the tester will also display the corresponding test



content. After the test is completed, press the “◀” button on the APP return to the main interface, and the tester will also return to the main interface.

Record browsing and upload function

To ensure that the phone or tablet is successfully connected to the tester, click the “DATA” icon to enter the record browsing interface, as shown in Pic 4.12.5-1:



Pic 4.12.5-1

The content under the “local” list is the record of the mobile phone test. You can save 20 records. Click the record to view it. Long press the record to delete or save the record to the internal memory or memory card.

The content under the “Remote” list is the record uploaded by the tester. Click on the record to view it. Long press the record to delete or save the record to the internal memory or memory card. The “Get One” button below will get a record saved on the tester. The “Get All” button will get all the records saved on the tester.

After viewing, press the “◀” button on the APP, return to the main interface.

Fault Analysis and Elimination

Fault	Reason	Solution
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The device cannot turn on	There is not enough battery power or the time to press the power button is short	<ol style="list-style-type: none">1. Please turn it on again after fully charging.2. Press the power button for more than 3 seconds.
Modem cannot synchronize	<ol style="list-style-type: none">1. Connected correct xDSL line?2. Whether the Modem is successfully started.3. Modem parameter is abnormal.	<ol style="list-style-type: none">1. Confirm the line environment is normal.2. Confirm that the LINK director light is flashing.3. Enter the system set to restore the factory settings.
PPP dialing is unsuccessful	<ol style="list-style-type: none">1. The user name, password, etc. are wrong2. Modem parameter is abnormal.	<ol style="list-style-type: none">1. Re-enter the user name, password and other settings.2. Enter the system set to restore the factory settings.
APP can't connect to device	Whether the device Bluetooth is turn on	Enter system set to open Bluetooth

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