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**Explanation**

The content of this manual is subject to our explanation.
Catalog

SECTION I OVERVIEW ........................................................................................................3

SECTION II MAIN FEATURES ..........................................................................................3

SECTION III APPEARANCE ..............................................................................................7

SECTION IV BEFORE USING ............................................................................................8

SECTION V OPERATION .....................................................................................................9
Section I Overview

ADSL2 + Tester is designed for xDSL (ADSL2 +, ADSL2, READSL, ADSL, etc.) handheld communication instrument that used for the opening of business, maintenance and testing, is intelligent instrument for user front-line installation and maintenance in the communications industry. The tester can not only test the ADSL2 + / ADSL link management layer parameters, but also set the alarm threshold, the physical layer parameters to achieve the alarm analysis; graphics and data queries can be viewed DMT subchannel bit distribution, you can view the current line the error situation; network layer test features can be LAN and WAN Ping test to verify IP-level network link chain continuity. The tester has a flexible keyboard input, testing personnel to facilitate the user name, password, VPI / VCI, alert thresholds and other parameters changes. Multimeter test not only test the line voltage, loop resistance, capacitance and insulation parameters, but also can estimate the line length, installation and maintenance personnel to meet all kinds of first-line user!

Small size, nice, hard shell texture, is suitable for various types of field engineering operations. Economical and practical, which is the best choice for testing.

Section II  Main Features

2.1 xDSL test specifications and functions

2.1.1 Test physical layer parameters

standards, real-time display ADSL line connection status
Test DSL line transmission parameters
display DSL line standard, the frame structure and a good connection mode;
DSL Max Bit Rate (Downstream, Upstream);
DSL Line upstream channel rate: 0～1.2Mbps;
DSL Line downstream channel rate: 0～24Mbps;
DSL LineAtten (Downstream, Upstream): 0～63.5dB;
DSL SNR Margin (Downstream, Upstream): 0～32dB;
DSL Power(Downstream, Upstream);

2.1.2 Set the threshold function
Threshold parameters can be set for each physical layer parameters for alarm analysis, visual display indicators of compliance, enhance work efficiency.

2.1.3 Alarm
Alarm analysis: according to the various physical layer parameters of the test threshold and the results of the current test alarm data analysis, direct display OK or excessive value.at the same time that can show the capacity ratio of line.

2.2 BER testing
After the physical layer connectivity, you can refresh the display by the dynamic test proximal error and distal lines of error messages, the number of statistical error, including: HEC, OCD, CRC(Optional) error.

2.3 Bit distribution function

2.3.1 Graphical display
graphically visualize the DMT subchannel bit distribution.

2.3.1 Data query
way of data query to query each subchannel subchannel number, frequency, and the subchannel allocation on the number of bits.
2.4 PING testing

By sending "Internet Control Message Protocol (ICMP)" echo request message, authentication and another TCP/IP computer's IP-level connectivity. The Ping Test on this test can show the number of packets sent and received, percentage of packet loss and other information.

2.4.1 LAN PING testing

IP PING testing, find out the faultily connected PC and statistic Percentage of PING packet loss.

2.4.2 WAN PING testing

IP or domain ping testing, statistic Percentage of PING packet loss.

2.5 DMM (Optional)

The tester can test the line AC and DC voltage, loop resistance, capacitance and insulation, and other physical parameters, each range of test items and error as follows:

Line voltage testing:
- DC -400V ~ 400V error: ±5%±2V
- AC 0 ~ 290V error: ±5%±2V

Line round resistance testing:
- 0 ~ 20KΩ error: ±3%±2Ω

Insulation resistance testing:
- 0 ~ 1.0M Ω error: ±0.1 M Ω
- 1.0 ~ 50M Ω error: ±10%±0.5 M Ω

Line capacitance testing:
- 0 ~ 10nF error: ±2nF
- 10 ~ 1000nF error: ±3%±2nF

Resistance and capacitance measurements in the ring state according to the results can be automatically convert and test line length for reference.

2.6 Saved the data

2.6.1 View

The tester can save 99 set of test data for user, and can browse the saved 99 data.
according to different number by the machine screen.

2.6.2 Clear
you can clear all the setting records in flash

2.7 parameter setting

2.7.1 Priority standards
Built-in Modem can be set to "Adsl2 + adaptive mode" or "multi-mode" priority adaptation standard, so you can carry out all types of standards-compliant central office.

2.7.2 Authentication information management
The machine can read or modify the built-in dial-tester account and password, the machine read or modify the authentication dial-up PAP / CHAP, management software can also read the background and setting. The tester comes with keyboard input, operational flexibility, according to different customer needs to make changes anytime, anywhere on the authentication information to facilitate the verification of individual user's user name and password for validity.

2.7.3 VPI/VCI management
Users can query the local VPI / VCI parameter and then modify their own in VPI/VCI

2.7.4 Others
You can set the LCD LED backlight display.
In the boot mode, you can always adjust the LCD timing closure, to ensure the observation of liquid crystal display of information in the best condition.
Choose Miscellaneous Settings, restore the factory settings

2.8 Size and weight

2.8.1 Size: 201×92×36mm
2.8.2 Weight: 460g
Section III Appearance

Apperarance

1. ON/OFF
2. ENTER
3. CANCEL
4. ABC
5. NUM
6. ▲
7. ▼
8. ▼
9. ●
10. TAB
11. RX
12. TX
13. PROBE
14. FILTER
15. RJ-45 Port
16. RJ-45 Port
17. Display
1. LCD  2. LNK Indicator
3. ETH Indicator  4. DATA Indicator
5. POWER Indicator  6. On / off key
7. Up Key  8. Down Key
9. Time/Module switch  10. Cancel/ Esc Key
11. OK/ Enter Key  12. Num switching key
13. ABC switching key  14. Tab switching key
15. RJ11  16. RJ45
17. Recharge

- Ethernet indicator: The long bright light, indicating that the Ethernet link is normal; the light flashes, indicating that there is Ethernet traffic;
- **LINK** indicator: The light flashes slowly, indicating the central office is looking for; quick flash, indicating that the link xDSL Modem handshake ongoing training; always light, indicating that the xDSL link establishment and functioning properly;
- **DATA** indicator: The lamp has been lit, indicating that the PPPoE dial-up success;
- **POWER** indicator: The lamps lit in the charge state, said it is charging.

### Section IV Before using

- For the first time, you should observe the battery capacity, the proposed instrument is fully charged before use;
- If abnormal operation occurs, please reboot after shutdown test;
- button operation, a continuous button, the phenomenon may appear too
user in use, the test will be affected, disconnect the client testing;

- PPPoE or PPPoA for dialing, make sure the user name, password, VPI, VCI, and PAP / CHAP is correct;

- We will try to show button prompt on the LCD display, follow the prompt for the correct operation.

- If the loop resistance, capacitance, insulation test, disconnect the line and central office connection.

Instrument input: Press  

- by   tabinput; respectively letters, numbers, symbols, single-page order choices,

- for the single page in reverse order selection;  

confirmation of the selected character input or delete.

Section V  Operation

5.1 Instrument power

Press  <power switch>  key for about 2 seconds, the screen scraper into the manufacturers home page, pause for 4 seconds, the screen displays to enter the main menu shown in Figure 5.1:
5.2 Equipment shutdown

- Instruments in the normal power state, press \textit{ON/OFF} turned off;

5.3 Module switch

After starting the test instrument automatically open the ADSL module.

After starting, press \textcircled{off} to close the module.

In the off state, press \textcircled{on} modules can also be opened again. In the off the state of the module, Press \textcircled{on} to open the module.

5.4 xDSL testing

5.4.1 Line Parameter

Move the cursor to Standard; you can select the item shown as below
Move the cursor to DnTransRate, DnCapacity, DnNoiseMargin, DnLineAtten, UpLineAtten, and press the corresponding key to edit, about the detail of setting, view the Table below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Threshold range</th>
</tr>
</thead>
<tbody>
<tr>
<td>DnTransRate</td>
<td>OFF, No threshold</td>
<td>32~11200 Kbps</td>
</tr>
<tr>
<td>DnNoiseMargin</td>
<td>OFF, No threshold</td>
<td>0~63.5dB</td>
</tr>
<tr>
<td>DnCapacity</td>
<td>OFF, No threshold</td>
<td>1~100%</td>
</tr>
<tr>
<td>UpLineAtten</td>
<td>OFF, No threshold</td>
<td>0~63.5dB</td>
</tr>
<tr>
<td>DnLineAtten</td>
<td>OFF, No threshold</td>
<td>0~63.5dB</td>
</tr>
</tbody>
</table>

This function is used to set various parameters of physical layer test threshold for the various physical layer parameters of the alarm analysis, if the threshold is set incorrectly, or corrupted, you can restore the factory settings miscellaneous default threshold.

### 5.4.2 Line parameter results interface

Line parameter setup is complete, and connected to the ASDL lines, the instrument panel connected LNK light starts blinking, about 30 seconds, such as the line of normal, ADSL2+ line connection is successful, ETH connection on the instrument panel lights to stop flashing, and lights up. In the "Line Parameters" sub-menu window, according to key prompt up or down button to select the "Start Test" to start the test, instrumentation, test results screen interface to switch to the interface.
and displays the line parameter measurement information, as shown in Figure 5.2. The results of line parameter information, including basic analysis, parameter analysis, link analysis, alarm analysis, sub-carrier maps.

**Basic analysis, Tab 9.**

**Parameter analysis, Tab 10.**

**Alarm analysis, Tab 11.**

**Link analysis, Tab 12.**

Table 9 shows basic analysis of line parameters
Table 10 shows line parameters of the parametric analysis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result</td>
<td>FAST(Downstream, Upstream)</td>
<td>Fast Bit Rates</td>
</tr>
<tr>
<td></td>
<td>INTL(Downstream, Upstream)</td>
<td>Interleaved Bit Rate</td>
</tr>
<tr>
<td></td>
<td>MAX(Downstream, Upstream)</td>
<td>Max Bit Rate</td>
</tr>
<tr>
<td></td>
<td>Capability (Downstream, Upstream)</td>
<td>Capability Utilize Rate</td>
</tr>
<tr>
<td></td>
<td>Power(Downstream, Upstream)</td>
<td>Transmit Power</td>
</tr>
<tr>
<td></td>
<td>LineAtten (Downstream, Upstream)</td>
<td>Line Attenuation , downstream range:</td>
</tr>
<tr>
<td></td>
<td>SNR Margin (Downstream, Upstream)</td>
<td>Signal to Noise Ratio Margin</td>
</tr>
</tbody>
</table>

Table 11 Analysis of line parameters of the warning note

<table>
<thead>
<tr>
<th>Result</th>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>Downstream Transmit Speed Threshold</td>
<td>Base on the Alarm Threshold</td>
</tr>
<tr>
<td></td>
<td>Downstream SNR Margin Threshold</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Downstream Channel Threshold</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Downstream Line Attenuation Threshold</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Upstream Line Attenuation Threshold</td>
<td></td>
</tr>
</tbody>
</table>

Table 11 Analysis of line parameters of the warning note
Pay Attention: the alarm analysis is useless when the alarm threshold setting is in the off state.

Link results table shown as below

<table>
<thead>
<tr>
<th>Result</th>
<th>Items</th>
<th>Description</th>
<th>Local</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOP</td>
<td>Loss of Power</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LOS</td>
<td>Loss of Signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SEF</td>
<td>Severe Error Frame</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CRC INTL</td>
<td>Cyclic Redundancy Check (CRC) anomalies INTL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CRC FAST</td>
<td>Cyclic Redundancy Check (CRC) anomalies FAST</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HEC INTL</td>
<td>Header Error Check (HEC) INTL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HEC FAST</td>
<td>Header Error Check (HEC) FAST</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OCD INTL</td>
<td>Out of Cell Delineation (OCD) INTL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OCD FAST</td>
<td>Out of Cell Delineation (OCD) FAST</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SES</td>
<td>Sever Error Second (SES)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ES</td>
<td>Error Second (ES)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BitErr</td>
<td>Bit Error (BE)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12 shows line parameters of link analysis

5.5 Bit distribution

ADSL business is divided into three sections for data and voice transmission: downstream channel, upstream channel and the general voice channel (POTS). POTS, with uplink and downlink channel separator (splitter) separated, so, ADSL transmission does not affect the normal telephone use.

ADSL uses discrete multi-carrier modulation (DMT) technology, including 256 sub-carrier channel, each subcarrier channel accounted for 4.3125kHz bandwidth, total bandwidth of up to $256 \times 4.3125 = 1104$ kHz. ADSL2+ lines for a total of 512
sub-carrier channel occupy a total bandwidth of up to $512 \times 4.3125 = 2208\text{kHz}$.

Bin0 (channel A) for voice transmission; Bin1 ~ Bin5 transition zone occupied by voice segmentation filter; usually start from the Bin6 until Bin30 for uplink transmission; FDM band segmentation filters filtering often takes Bin31 ~ Bin36; Bin37 to Bin255 for downlink transmission (for the ADSL2+ line, Bin37 to Bin511 for downlink transmission), shown in Figure 1.

Each sub-channel using QAM modulation, each sub-channel modulation up to 15 bits, ADSL Modem various frequency bands according to adaptively adjust the signal to noise ratio relative to the number of bits transmitted on sub-channel number. DMT technology is equivalent to using the 256 (ADSL2+ 512) sub-Modem, it can be based on line conditions in real time, close or open a sub-channel or adjust the number of bits transmitted on subchannels. The modulation of each subcarrier is 2 to 15 bits, the more the number of modulation bits, the higher signal to noise ratio requirements.

Menu in the test results, by the number keys to select the "bit distribution" function, as shown in Figure 5.3

(Figure 5.3)
5.5.1 Graphics bit distribution function

![Graph showing bit distribution](image)

(Figure 5.4)

5.5.2 Distribution function data query bit

Data query as shown in Figure 5.5, you can <the upper and lower> key to select the option to browse the sub-channel can also press the Cancel button to return to the main menu

![Data query interface](image)

(Figure 5.5)
Screen displays the following three aspects:
1. The input sub-channel number, you can use the arrow keys on the increase (+10) and the down arrow key to decrease (-1), select the number you want to query the subchannels.
2. Bits: Display the current sub-channel corresponds to the number of bits of the modulation.
3. f: Display the corresponding sub-channel occupied by the current frequency, the frequency of each sub-channel bandwidth occupied by 4.3125KHZ.

5.6 PING testing
5.6.1 LAN ping
The ADSL2+ tester through the HUB / SWITCH access the LAN (LAN), or by direct access through PC cable card, the tester is turned on, ETH indicator light that has been connected properly.
In the main menu by the number keys select the "LAN Ping", press <confirm> button, enter the IP address and correct the PPPoE / PPoA user name, password, shown in Figure 5.6:

(Figure 5.6)

Figure 5.7 Ping test results show, the first of the Ping the IP address or domain name is resolved, and statistics the number of sending and receiving ICMP packets,
and display the last packet loss percentage.

![Realtime](image)

(Figure 7)

Note: 192.168.1.1 is only as an example, in the actual tests show you the actual IP address of the Ping, you can manage the local IP, according to the needs of your LAN IP configuration of this level.

If the Ping test is unsuccessful, check the advanced properties of PC, network firewall is turned off.

Ping results display, you can press "Cancel" button to return.

5.6.2 WAN Ping

Line access to ADSL2+ DSL port tester, the tester power, and other physical layer activation (LNK LED Steady physical layer has been activated), run the dial-up test, according to the local keyboard or writing background management software enter the user name and password to dial-up, dial-up can only proceed after a successful WAN Ping Test (DATA dial indicator Steady success).

In the "Test Settings" menu, select the "WAN PING", press <confirm> to enter into the the "WAN PING" sub-menu as shown in Figure 5.8:

Up or down arrow keys to select and enter the correct IP address and PPPoE / PPPoA user name, password.
Such as the IP address of 58.61.166.142, you can directly enter the target IP address of the keyboard, enter the complete press <confirm> button.

Figure 5.9 Ping test results show, the first of the Ping the IP address or domain name is resolved, and statistics the number of sending and receiving ICMP packets, and display the last packet loss percentage.

5.6.3 Domain name Ping testing

In the "Test Settings" menu, select the "domain name ping", press <confirm> to enter into a "domain name Ping" sub-menu shown in 如图 5.10 所示 Press <confirmation> key, enter the domain name and the correct PPPoE / PPPoA user
name, password, can enter through the keyboard to switch to the English domain name. The tester has three commonly used fixed domain name (Tencent QQ, Sina, 163) are available.

(Figure 5.10)

Enter completely, press <confirmation> key, name Ping test results show the WAN IP address with the Ping test result will be displayed the same interface, and is not described in detail.

5.7 Test records management functions

In the main menu by the arrow keys move the cursor to "document management" function, press the <confirm> button to enter the "document management" sub-menu.

Set and result access
Set the current test instrument with the results in the memory, easy to read the next use. Settings can also be stored out, as the current setting, as shown, the LCD monitor is set to file, store the left column number, the right column is the configuration file to work. The instrument can store a total of 10 settings and results, each page can store 5, click Next to enter the other store pages
1. Save the current settings and results
Settings with the current settings, enter the interface, select a store number, press 3 storage, the results of the current settings are stored in the access file.

2. Read the configuration file
Read the storage options, press 2 more settings, you can view the detailed settings of the read file; at this time does not change the current settings of the content. When read by the test set, the current settings set to read the contents of this file immediately instead.

3. Read results file
Read the storage options, press 2 detailed results, you can view the test results by reading the file, you can see by reading the results of real-time analysis, statistical analysis, user IP information, the results can also be set to view this situation, according to View settings can be set into the details of this file.

4. Delete settings and results files
Move the cursor to the file you want to delete the file name, press 4 to delete.

5. Clear set and results files
Move the cursor to any file stored number, press 5 clear all records.

5.8 DMM (Optional)
Built-in digital multimeter, you can test the line DC / AC voltage, the line loop resistance, capacitance and insulation, and other parameters. Maintenance
personnel can use these functions to test whether there is dangerous voltage on the line, the existence of the telephone line voltage is 48V, in order to help us better determine the cause and location of obstacles.

In the main menu, you can accord to button prompt, through the arrow keys to move the cursor to the "meter" feature, press the "confirm" key to enter sub-menu multimeter 如（图 5.11）所示。

The DSL line tester to test access port, red snakehead test folder on the line to be received, by choosing different test sub-menu, the instrument can be, respectively, voltage, loop resistance, capacitance and insulation tests.

5.8.1 Voltage test

Sub-menu in the meter, use the arrow keys move the cursor to "DC" or "AC voltage" folder access will test the line to be tested, according to <confirm> key to enter into voltage test condition, the tester will be displayed directly on the line DC voltage value.

This test for DC voltage tests on the range of -400 ~ 400V. Use of voltage test circuit can test whether the signal on the regular phone service bundled with the ADSL line, if the line voltage in the low or 0V, it shows that the line does not open or there is a serious business of poor insulation, short circuit, circuit and other fault.
lines, please check the line for maintenance.

This test is used when the AC voltage testing, high voltage AC test circuit, to prevent a dangerous line staff, in case of high voltage when the test fish, carefully remove the clip, so as to avoid electric shock.

This test is limited to AC voltage test, test the range of 0 ~ 290V. The test is completed, press "Cancel" button to return to the main menu state.

5.8.2 Resistance test

First disconnect the circuit under test with the central office, the client's any connection, while the terminal shorting circuit under test, in the multimeter test sub-menu, select "resistance test" will test the fish folder access lines to be tested, according to <confirm> button to enter into resistance test state, the tester will directly show the ring line resistance, and automatically calculate the line length. Resistance test range: 0 ~ 20KΩ.

Resistance test function can be judged by the length of lines; the other hand, if you know the length of the cable, using the measured resistance value of the connecting cable can determine whether it is normal.

\[
L = \frac{R_L}{R_O} (\text{Km}) \quad \text{------------------------①}
\]

①: \(R_L (\Omega), R_O (\Omega)\).

For the average plastic telephone communication cables, specifications for the 0.32mm copper \(R_O = 435.2\Omega\), specifications for the 0.4mm copper \(R_O = 278.5\Omega\), specifications for the 0.5mm copper \(R_O = 178.3\Omega\).

If the insulation resistance of over-range line, the tester will display "> 10 MΩ", that line of insulation in good condition.

The test is completed, press "Cancel" button to return to the "main menu state”

5.8.3 Capacitance test

First disconnect the circuit under test with the central office, the client's any connection, while maintaining the line on both ends of the open circuit under test. Then in the multimeter test menu, select "capacitor test" will test the fish folder access lines to be tested, according to <confirm> button, the tester will directly
reflect the line capacitance and line length. Capacitance test range: 0 ~ 1000nF. Capacitance test feature automatically calculated by the length of line. No bridge taps on the line and no case of flooding, that line through the length of the test capacitor,

\[ L = \frac{C_{ab}}{C_O} \text{(Km)} \]

②: \( C_{ab} \) (nF), \( C_O \) (nF).

Φ0.4mm for all commonly used plastic telephone wire communication cable capacitance per kilometer value of \( C_O = 51 \text{nF} \).

The test is completed, press "Cancel" button to return to the main menu state.

Note: If the loop resistance and capacitance of the test after the test, the calculated line length vary widely, there are barriers that line, response line for maintenance. In general, the line loop resistance is too large that there is poor contact of the joint line; line capacitance is too large that line the bridge tap, or soaking wet.

5.9 Charge the battery

The tester built-in capacity 2000mAh rechargeable lithium-ion polymer battery. In turn, the battery capacity of the upper-right corner will display equipment. When the screen shows the battery charge time should be marked as empty, or when the battery voltage drops to a certain extent, the instrument will automatically shut down.

Charging Method: The charge carried with the charger plug into the top left of the charging socket tester, then the charger into 220V AC power outlet. If the charger charge indicator light (and red), then start charging instrument. Charging time is about 6 to 7 hours; when the indicator light on the charger from red to green when the battery is full, you can remove the charger, charging completed.

In order to ensure the accuracy of test results and protection equipment, charge status, please try not to use the equipment for testing.
Product Warranty Cards

Product Type: ____________________________
Product Serial Number: ____________________________
Buy Date: ____________________________
User Name: ____________________________
TEL: ____________________________ FAX: __________
Address: ____________________________
Zip Code: __________ E—mail: __________
Seal: ____________________________

(Please keep this together, cut the second line and on this basis, send.)

----------------------------------------------------------------

(Please cut along the dotted line and return the company.)

Product Type: ____________________________
Product Serial Number: ____________________________
Buy Date: ____________________________
User Name: ____________________________
TEL: ____________________________ FAX: __________
Address: ____________________________
Zip Code: __________ E—mail: __________

Notes:
User should return this part to the Company in a month, when user purchase the products. Just do that, it’s valid.