OPERATION MANUAL

TH2826/A High Frequency LCR Meter

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Annousment:

The description in the manual doesn't mean all contents in instrument.Tonghui reserves the rights to change the performance, function, inner structure, appearance, accessory and package without any inform! So please contact us by the address on the cover if you are confused by the difference between manual and instrument.

Chapter 1 The introduction and installation

Thanks for purchasing our products! The basic performance will be introduced firstly in this chapter, then the necessary inspection after you receive the instrument, and also the conditions before installing the instrument.

1.1 Introduction

TH2826 series component tester is the new generation impedance tester in China which meets the LXI standard，it can fit all test requirement of component and material with its 0.1% basic accuracy and 20Hz ～ 5MHz frequency. It can test low ESR capacitor and high Q inductor and also be applied in analyze of the electrical performance in microphone, oscillator, inductor, ceramic capacitor, LCD, variode, transformer.etc.

TH2826 series is a powerful tool for electrical component design, inspection,QC and manufacture. It can be more suitable for point inspector, curve analyze of frequency response of piezoelectric component .etc in auto production line with its high test speed. Its variable impedance-outputting mode can fit to different standards. With its promitable performance ,TH2826 series can realize the different tests of commercial and military standards as IEC and MIL.

1.2 Inspection

Please check if the instrument was worn out in the transportation, we don't recommend you to charge the instrument if the cover of instrument is worn out.

1.3 Power connection

（1） Feed voltage range：100 ～ 120 V ac or 198 ～ 242 V ac. In relate with the power setup on the rear panel.

（2） Feed frequency range：47 ～ 63 Hz.

（3） Feed power range：No less than 80 VA.

（4） Power inputting phase line L, null line N and ground line E should be same as plug.

（5） The instrument is designed to reduce the clutter interference from AC power input，please use it in the low-noise environment, if not ignore, please install power filter.

Warning：In order to prevent leakage or people being hurt, user has to connect the ground line to the ground.

1.4 Fuse

The fuse is available, be sure to use our own fuse.

Warning：The position of fuse should fit the feed voltage range.

1.5 Environment

（1）Please do not operate the instrument in the place that is vibrative, dusty, under direct sunlight, or where there is corrosive air.

（2）Although the instrument has been specially designed for reducing the noise caused by ac power, a place with low noise is still recommended. If this cannot be arranged, please make sure to use power filter for the instrument.

（3）Please store the instrument in the place where temperature is between 5℃ and 40℃, humidity is less than 85% RH. If the instrument will not be put in use for a time, please have it properly packed with its original box or a similar box for storing.

（5） The instrument and the test lead of DUT should be far away from strong electromagnetic field.

1.6 The use of test fixture

Please use the standard test fixture or cable， the user-made or other ones can lead incorrect test result. The fixture or cable should be kept clean， as well as the pin of DUT, to assure the DUT connect well with fixture.

Connect fixture or cable to Hcur、Hpot、Lcur、Lpot on the front panel. As for the DUT with shielding case， then use shielding layer to connect with "⊥".

1.7 Warm up

（1） To assure the accuracy, the warm up should be more than 15 min.

（2） Don't turn on and off the instrument frequently, doing so will lead to the loss of the calibrated data and the data saved by users.

1.8 Other feature

（1） Consumption：≤80VA。

（2） Dimension（W*H*D）：400mm*132mm*385mm；

（3） Weight：about 10kg；

Chapter 2 Panel and operation

In this chapter, it introduces the basic operational feature of TH2826 series. Before using TH2826 series，please read this chapter to help you learn how to operate TH2826.

2.1 Front panel

In figure 2-1 the front panel of TH2826 is introduced briefly.

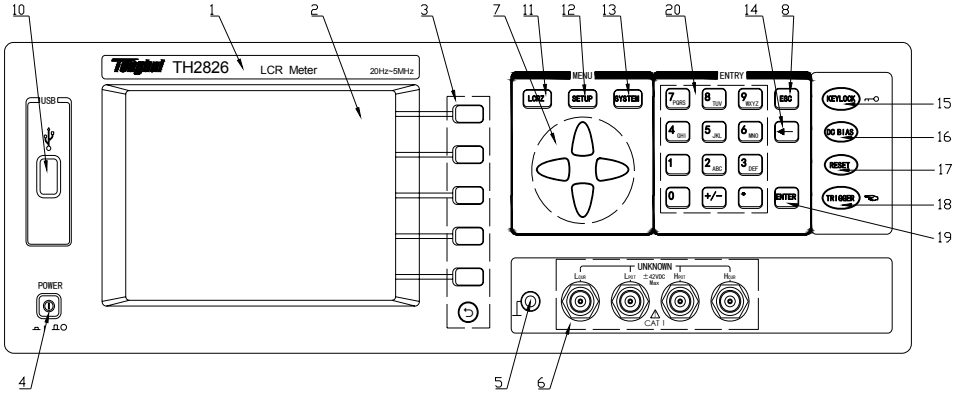


Figure 2-1

⑴ Brand and model

The brand and model of instrument

⑵ LCD

320×240 dot-matrix LCD displayer，it displays the testing result and condition .etc.

⑶ Softkey

Six softkeys can be used to select the control and parameter，and there is corresponding definition on the left of each softkey which changes as different displayed page.

The function of circle softkey at the bottom is below：

1） When the page displays More in corresponding softkey zone, the circle softkey has the function of turning page up.

2） When the page displays Esc in corresponding softkey zone, the circle softkey has the function of quitting page.

⑷ POWER

⑸ Ground

The terminal is connected with the case of instrument which can be used to protect and shield the ground terminal.

⑹ UNKNOWN

Four terminal pair test terminal which is used to connect four terminal pair fixture or cable.
Current driving high terminal(Hcur)；
Voltage sampling high terminal(Hpot)；
Voltage sampling low terminal(Lpot)；
Current driving low terminal(Lcur).

(8) ESC

ESCAPE

⑻ CURSOR

The key is used to select between zone and zone in LCD. When cursor is moved to some zone, it will displayed as inverse

⑽ USB

For connection USB storage device.

⑾ [LCRZ]

Press [LCRZ] to enter“component test display” page.

⑿ [SETUP]

Press [SETUP] to enter “Setup” page.

⒀ [SYSTEM]

Press [SYSTEM] to enter “system”page.

⒁ [←]

BACKSPACE. Press it to delete the last number of input value.

⒂ [KEYLOCK]

Press [KEYLOCK]，[KEYLOCK] will be light，which means the function of key is locked；press [KEYLOCK] again, [KEYLOCK]will be off， which means the keyboard is unlocked. If the password function is set as “ON”， you should input the correct password when unlocking the keyboard, otherwise the keyboard can’t be unlocked.

[KEYLOCK] will be light under the control of RS232. Press [KEYLOCK] again, [KEYLOCK]will be off， which means return to the local keyboard unlock status.

⑯ [DC BIAS]

[DC BIAS] is used to allow or forbidden the AC bias output. [DC BIAS] is light， which means DC bias output is available；press [DC BIAS] again，[DC BIAS] is off，which means DC bias output is forbidden. The key has no any function where there is no DC BIAS page.

⑰ [RESET]

[RESET] key, function-reserved key.

(18) [TRIGGER]

When the trigger mode is set as MAN(Manual)， press this key to trigger instrument manually.

(19) [ENTER]

[ENTER] is used to stop data being input，confirm and save the data displayed in inputting line（the bottom line in LCD）.

2.2Rear panel

In figure 2-2 the rear panel of TH2826 is introduced briefly。

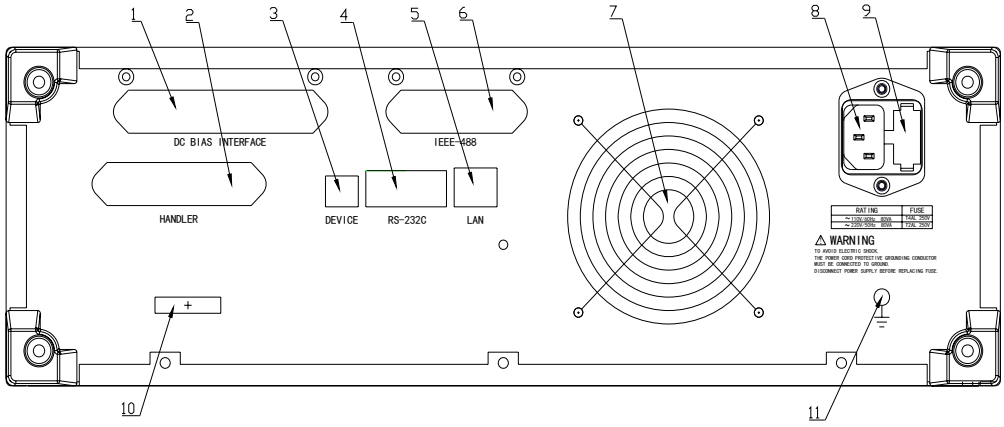


Figure 2-2

(1)DC BIAS INTERFACE(optional)

Connect bias source and instrument.

(2)HANDLER（optional）

The auto test system can be made via HANDLE Interface. The instrument can output the signal of bin compare and connection signal，also the “setup” signal can be obtained.

(3)USBDEVICE

TH2826 can be controlled by computer via USBDEVICE interface.

(4)RS232C

Realize the communication with computer.

(5)LAN

Realize the communication with computer by network.

(6)GPIB（optional）

GPIB can realize the communication with computer，building GPIB test system.

(7)Fan

Maintain the normal working temperature.

(8)Power socket

For inputting AC power.

(9)Fuse holder

For installing power fuse to protect instrument.

(10)Nameplate

For installing power fuse to protect instrument，switch 110V/220V by changing the direction of internal core.

Warning：The position of fuse should fit the feed voltage range.

---

(11)Ground

The terminal is connected with case of instrument for protecting or shielding ground connection.

2.3Definition of displayed zone

TH2826 adopts 320×240 LCD，and the displayed content is divided as the following zones，in figure 2-3.

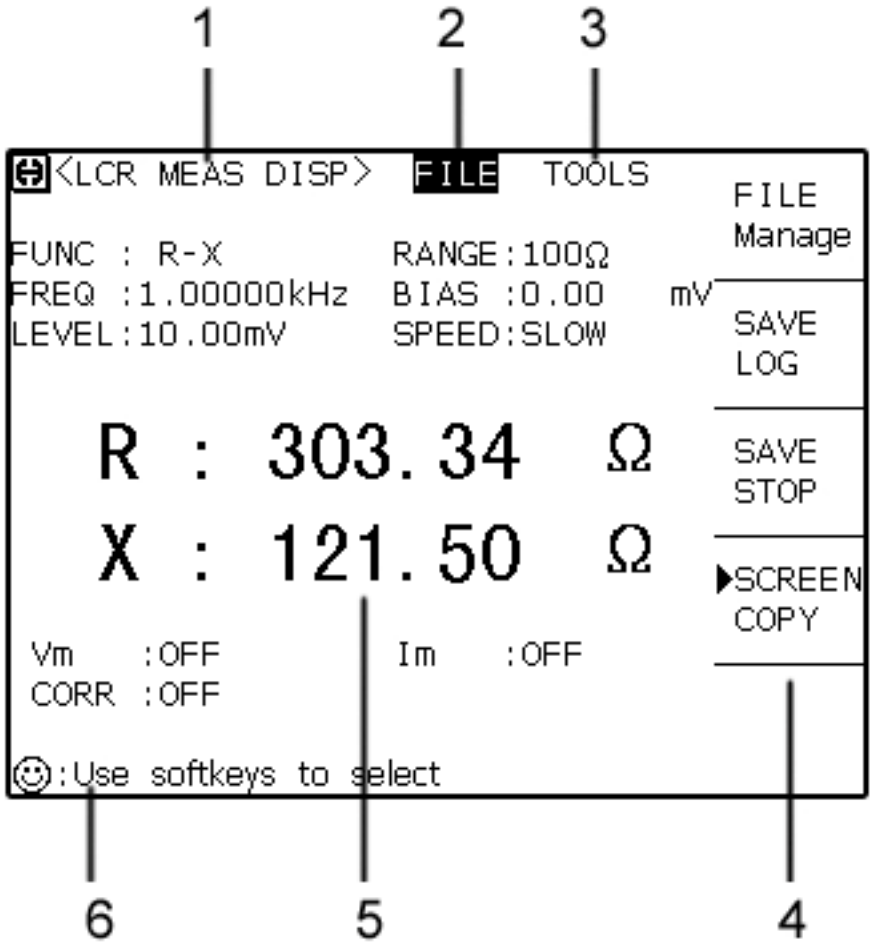


Figure 2-3

1) Display zone
   Indicates the name of page.
2) File zone
   Move cursor to this zone to operate file management, which includes：load, save and delete.
3) Tools zone
   Where some uncommon functions are listed，not displaying in corresponding zone.
4) Softkey zone
   Display the functional definition of softkey, which changes as different position of cursor.
5) Test result/condition zone
   Display the test result and condition.

6) Assistance and data inputting zone

The zone is used to display the system notice and the input data.

2.4Main menu and corresponding displayed page

2.4.1 [LCRZ]

Start key about the capacitance, resistance, inductance and impedance，which includes：

<LCRZ>

<Bin No.>

<Bin Count>

<List sweep>

<Test>

<Correction>

<Limit list>

<List sweep>

2.4.2 [SYSTEM]

For entering system setting page, about the start key of system setting and file list function, the function pare includes：

System setting

2.5Basic operation

The basic of TH2826 is listed as below：

- Use（[LCRZ],[SETUP],[SYSTEM]）and softkey to select the displayed page you need.（In figure 2-5）
- Use ([←][↑][→][↓]) to move cursor to the zone needs setting. When cursor is moved to some zone, then it will display by inverse, the so-called zone means the zone where the cursor can be set.
- The function of softkey in the zone where there is cursor will be displayed in “Softkey”.Select and press the demanded softkey. Numeric key, [BACKSPACE] and [ENTER] key is used to input data.

  After pressing a numeric key，softkey zone will display the available unit softkey. You can press unit softkey or [ENTER] to end data-inputting. When using [ENTER] to end data-inputting，data unit is the default unit of the parameter in corresponding zone：Hz, V or A. For example, the default unit of frequency is Hz.

2.6Open

Insert 3 line power plug，note：the feed voltage should be 198V～242V，the frequency should be 47.5～52.5Hz. The phase line L, null line N, earth line E in power input should be the same as that in power plug.

Turn on the power, and press the power switch at the left corner on the front panel，the

instrument is set up, and the open picture is displayed.

Just as that shown in figure 2-4，which is the humorous edition of our brand，there is a capacitor in the middle of the earth combined by two **T and a H**，also the model （TH2826） is displayed，as well as edition number（Ver 1.0.0）.

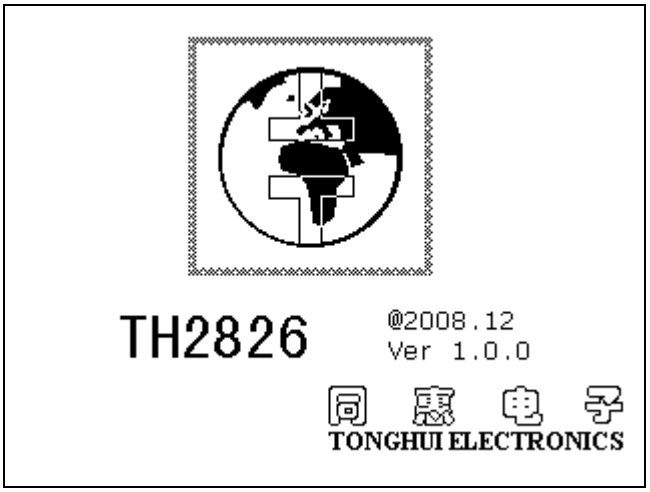


Figure 2-4 TH2826

If user sets the password protection，then inputting password is required，input the password according to the note in screen，press [ENTER] to enter main menu.

Notice： *in this series, the password is set，the default password is**2826**，but the password can be amended in the process of using the instrument. More password item in <system>.*

Chapter 3[LCRZ]

3.1 <LCRZ> page

After pressing [LCRZ]，<LCRZ> will be displayed on the screen.

As figure 3-1：

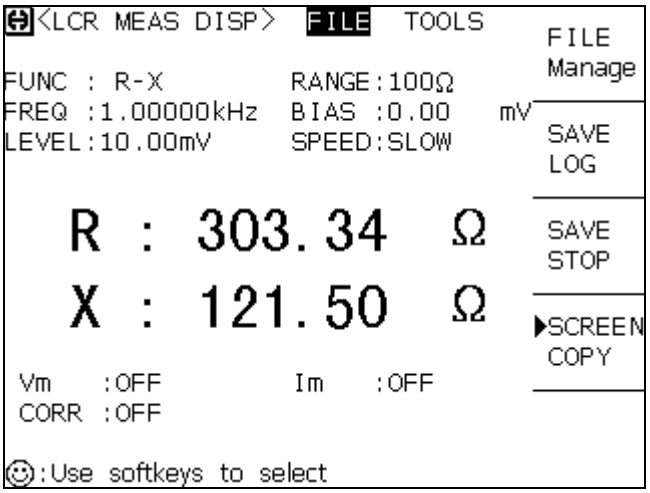


Figure 3-1

On the page above，the test result is displayed by large character. The following parameters can be set on this page.

- Test function（**Function**）
- Test range（**Range**）
- Test frequency（**Frequency**）
- Test level（**Level**）
- DC Bias（**Bias**）
- Test speed（**Speed**）
- File management（**File**）
- Other tools（**Tool**）

There are 9 zones，which are：**LCRZ**，**Function**，**Range**，**Frequency**，**Level**，**Bias**，**Speed**，**File** and **Tool**. Each control function will be discripted in the following sections.

The test result / condition displays the following information. These conditions can be set on <Measure> or <Correction> page.

- Signal source voltage / current monitor（**Vm**,**Im**）
- Open，short，load correction ON/OFF setting（**Correction**）

3.1.1Measure

In TH2826, two parameters of impedance component can be tested meanwhile：Primary parameter and secondary parameter. The parameter is as below：

Primary parameter

- |Z| (Module of impedance)
- |Y| (Module of admittance)
- L (Inductance)
- C (Capacitance)
- R (Resistance)
- G (Conductance)
- DCR (DC resistance)

Secondary parameter

- D (Dissipation factor)
- Q (Quality factor)
- Rs (Equivalent series resistance)
- Rp (Equivalent parallel resistance)
- X (Reactance)
- B (Admittance)
- Θ (Phase angle)

The test result of primary parameter and secondary parameter can be displayed with two lines of large character. The primary parameter is displayed on the first line，and secondary parameter is displayed on the second line.

Operation step of measure setting：

1) Move cursor to Function zone. The following softkeys are displayed。
   - Cp-D
   - Cp-Q
   - Cp-G
   - Cp-Rp
   - More 1/7
2) Select and press a softkey to set measure function. If the softkey you require is not displayed on the page, press More 1/7 to display the following softkeys.
   - Cs-D
   - Cs-Q
   - Cs-Rs
   - More 2/7
3) Select and press a softkey to set measure function. If the softkey you require is not displayed on the page, press More 2/7 to display the following softkeys.

- Lp-D
- Lp-Q
- Lp-G
- Lp-Rp
- More 3/7

4) Select and press a softkey to set measure function. If the softkey you require is not displayed on the page, press More 3/7 to display the following softkeys.
   - Ls-D
   - Ls-Q
   - Ls-Rs
   - More 4/7
5) Select and press a softkey to set measure function. If the softkey you require is not displayed on the page, press More 4/7 to display the following softkeys.
   - R-X
   - Z-Θº
   - Z-Θ r
   - Rs-Q
   - More 5/7
6) Select and press a softkey to set measure function. If the softkey you require is not displayed on the page, press More 5/7 to display the following softkeys.
   - G-B
   - Y-Θº
   - Y-Θ r
   - Rp-Q
   - More 6/7
7) Select and press a softkey to set measure function. If the softkey you require is not displayed on the page, press More 6/7 to display the following softkeys.
   - DCR
   - More 7/7
8) Select and press a softkey to set measure function. Press More 7/7, the softkey of step 1 will be displayed. If you forget tp select the measure function, just reset the function from step 1to 8.

3.1.2Range

The range can be selected according to the impedance value of LCR component.

TH2826 has 10 AC ranges：1Ω, 10Ω, 30Ω, 100Ω, 300Ω, 1kΩ, 3kΩ, 10kΩ、100kΩ and 1MΩ.

TH2826 has 10 DCR ranges： 1Ω, 10Ω, 30Ω,100Ω, 300Ω, 1kΩ, 3kΩ, 10kΩ,、100kΩ and 1 MΩ.

Operation step of range setting：

1) Move cursor to Range. The following softkeys will be displayed.
   - AUTO The softkey is used to set range AUTO mode
   - HOLD The softkey is used to switch AUTO to HOLD. When the range is set as HOLD mode，the range is locked in the current range. And the current range is displayed on the Range zone.
   - ↑(+) The softkey is used to increase range in the mode (HOLD).
   - ↓(-) The softkey is used to decrease range in the mode (HOLD)。
2) Use softkey to set range.

3.1.3Frequency

The test frequency of TH2826 is from 20 Hz to 5MHz, and test frequency of TH2826 A is from 20 Hz to 2MHz, the resolution is：0.01 Hz. When the test function is set as DCR，Frequency zone displays"----"

Operation step of frequency setting：

TH2826 has two kinds of frequency setting. One is using softkey，the other is using numeric key.

1) Move cursor to Frequency zone. The following softkeys will be displayed.
   - ↑(++)
     The key is used to increase frequency roughly. Press this key, the frequency will be increased to the next 10 times frequency point after 20 Hz.
   - ↑(+)
     The following softkeys will be displayed exactly. Press this key, the frequency will be increased to a higher frequency point. 10 frequency points can be set among 10 times frequency point.
   - ↓(-)
     The key is used to decrease frequency exactly. Press this key, the frequency will be increased to a lower frequency point. 10 frequency points can be set among 10 times frequency point. The frequency point can be set is the same as ↑(+)。
   - ↓(--)
     The key is used to decrease frequency roughly. Press this key, the frequency will be increased to the next 10 times frequency point. The frequency point can be set is the same as ↑(++).
2) Use softkey or numberic key to select or set frequency. When using numeric key to input the frequency value, the frequency units are (Hz, kHz, and MHz), which can be used to input unit and data. When using [ENTER] to input frequency，the default unit is Hz.

3.1.4Test level

The test level of TH2826 is set as the valid value of sine wave. The frequency of sine signal is

defined as test frequency，which is generated by internal oscillator. You can set voltage value and current value as well. There are 4 kinds if signal source input impedance in TH2826. When test function is selected as DCR，Frequency zone displays"----".

Note: *In TH2826, the current is the output current value when the tested terminal is shorted. The voltage is the output voltage value when the tested terminal is open.*

The auto level control function of TH2826 can realize the measurement of constant voltage or current. Auto level control function can be set as ON on <Measure> page. After the auto level control function is on，"*" is displayed after the current level value. Detailed information, please refer to<Measure> page.

Operational step of level setting:

TH2826 has two kinds of level setting. One is using softkey，the other is using numeric key.

1） Move cursor to Level zone. The following softkeys will be displayed

- ↑(+)
  Press this key to increase the signal source output level.
- ↓(-)
  Press this key to decrease the signal source output level.

2） Use softkey or numeric key to select or set level. When using numeric key to input the required level value，the available level unit (mV, V, μA, mA and A) are displayed, which can be used to input unit and data. When using [ENTER] to input level，the default unit is V or A.

Note: *when you want to switch level between current and voltage，you must use numeric key and unit key.*

3.1.5DC bias

TH2826 provides internal DC bias voltage of -5V～+5V. when the function is selected as DCR，Bias zone displays"----".

Operational step of DC bias setting:

TH2826 has two kinds of level setting. One is using softkey，the other is using numeric key.

1) Move cursor to **Bias**. The following softkeys will be displayed

- ↑(+)
  Press this key to increase DC bias output level.
- ↓(-)
  Press this key to decrease DC bias output level.

2) Use softkey or numeric key to select or set DC bias. When using numeric key to input the required level value，the available DC bias unit (mV, V, μA, mA and A) are displayed. which can be used to input unit and data. When using [ENTER] to input bias value，the default unit is V or A.

Note: *when you want to switch DC bias level between current and voltage，you must use numeric key and unit key.*

Press [DC BIAS] key on the front panel，allows outputting DC bias. When DC bias is allowed to output，the DC bias output mark is displayed on the last line on display screen.

3.1.6Speed

The speed of TH2826 is mainly determined but the following factors：

- Integral time(A/D switch)
- Average time(Average test times)
- Delay(Time from setup to test beginning)
- Displayed time of test result

Generally speaking，in slow testing，the test result is more fixed and accurate. You can select FAST, MED and SLOW.

Operational step of speed setting：

1) Move cursor to speed zone, the following softkeys will be displayed
   - FAST
   - MED
   - SLOW
2) Select the softkey above to set speed.

3.1.7File management

Refer to 4.2<File management>.

3.1.8Other tools

In TH2826, the test result is displayed with 5 digits of floating point. The arithmetic point lock function can make TH2826 output result by means of fixed point position. This function is used to change the displayed digit of test result.

Operational step of tool：

Set arithmetic point fixed display mode according to the following steps，and the font size of displayed digit.

1) Move cursor to **Tool** zone. The following softkeys will be displayed.
   - **Arithmetic point lock A**
   - **Arithmetic point lock B**

Press **Arithmetic point lock A** to lock the position of arithmetic point in primary parameter result. When the arithmetic point is locked,"▲" is displayed. Press **Arithmetic point lock A** once，the last digit will be deleted, and the displayed digit will be reduced by one.

2) Press **Arithmetic point lock B** to lock the position of arithmetic point in secondary parameter result. When the arithmetic point is locked,"▲" is displayed. Press **Arithmetic point lock B** once，the last digit will be deleted, and the displayed digit will be reduced by one

---

Note: *Under the circumstances below, the arithmetic point lock function will be recovered to floating point status.*

- *The test function is changed.*
- *In deviation test，deviation test mode is changed（ΔABS,Δ%,OFF）.*

3.2 <Bin No.Display> page

Press **[LCRZ]**, and press **Bin No.** to enter**<Bin No.Display>** page**.** On **<Bin No.Display>** page, bin No. is displayed with large font，and the current test result is displayed with normal small font.

As figure 3-2：

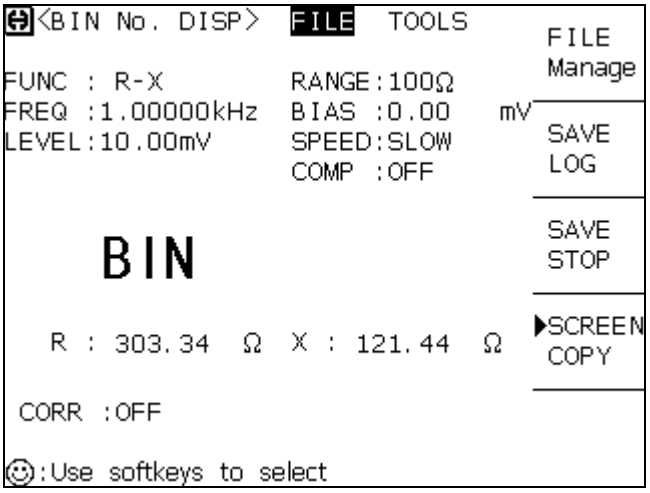


Figure 3-2

The following parameters can be set on **<Bin No. Display>**.

- Compare function ON/OFF(**Compare**)
- File management（**File**）

- Other（**Tool**）

On this page，there are：**Bin No. Disp**，**Compare**，**File** and **Tool**. Each control function zone will be introduced briefly below.

The test result/condition zone displays the information below. The monitor zone can,t be set on this page, but can be set on **<Measure>**，**<LCRZ>** or**<Correction>** page**.**

- Test function（Function）
- Test range（**Range**）
- Test frequency（**Frequency**）
- DC Bias（**Bias**）
- Test level（**Level**）
- Test speed（**Speed**）
- Open，short，load correction ON/OFF setting（**Correction**）

3.2.1Comparator function

The internal compare function of TH2826 can be divided into 10 bins at most（BIN1 to BIN9 and BIN OUT）. 9 pairs of primary parameter limit and a pair of secondary bin limit can be set. If the primary parameter of DUT is within the bin limit range, but its secondary one is not, then the DUT is sorted to subsidiary bin. After TH2826 installs HANDLER interface，the compare result is output to auto test system. These limit setting only on **<Limit list setting>** page**. Compare** zone allows you to set compare function ON or OFF.

Operational step of compare function：

1) Move cursor to **Compare** zone，the following softkeys will be displayed.
   - **ON**
   - **OFF**
2) Use softkey to set compare setting as ON or OFF.

3.2.2File management

Refer to 4.2<File management> function.

3.2.3Other tools

There is no this operation on <Bin display> page.

3.3 <Bin count display> page

Press **[LCRZ]**, and then**Bin count** to enter**<Bin count display>** page. The count value of each bin is displayed on **<Bin count display>.**

As figure 3-3：

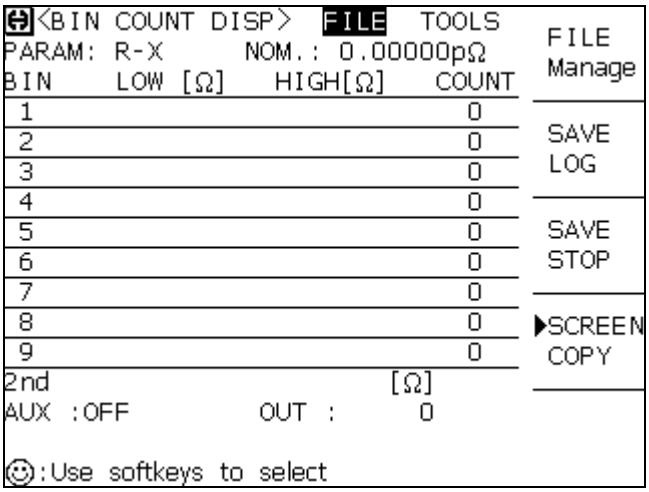


Figure 3-3

The following parameters can be set on **<Bin count display>**

- File management（**File**）
- Other tools（**Tool**）

There are 3 zones，which are ： **Bin No. count display**， **File** and **Tool.** Each function will be introduced below.

The test result/condition zone displays the information below. The monitor zone can't be set on this page, but can be set on **<Limit list setting>** page**.**

These monitor zone can be set on **<Limit list setting>** page**.**

- Nominal value（**Nominal**）
- Test parameter（**Parameter**）
- Bin limit value（**High**/**Low limit**）

3.3.1Parameter

Parameter zone monitors the "Function" parameter，if user selects primary and secondary 如 parameter swap compare mode，its parameter will display the swap of current "Function" parameter，such as，"Cp-D" is displayed as "D-Cp"，which means D is compared as primary parameter，and Cp is compared as secondary parameter.

3.3.2Nominal

Nominal parameter monitors the nominal value of compared bin.

3.3.3Bin

The bin serial number of limit list is displayed."2nd" means the limit of secondary parameter.

3.3.4High and low limit

High and low limit value of limit list is monitored.

3.3.5Count

Bin count value is displayed.

3.3.6 (AUX)

Bin count value of current auxdiary bin is displayed.

3.3.7(OUT)

Bin count value of current out bin is displayed.

3.3.8File management

Refer to 4.2<File management> function.

3.3.9Auxdiary tools

TH2826 has the function of bin count. The compare function is sorted as different bins, when the component of each bin is counted. The Max. value 999999 can be displayed. When the count value is over this value，the screen displays"----". However, the internal counter can count nominally, so the count value can be read via IEEE488 interface.

Operational step of bin count function：

Execute the following operation，set bin count ON/OFF function on **<Bin count display>**。

1) On **<Bin count display>** page，move cursor to tools zone. The following softkeys will be displayed.
   - **Count**
   - **No count**
   - **Rs count**
2) Press **Count** to open count function. "►" will be displayed at the left of "Count"
3) Press **No count** to turn off count function. "►" will not be displayed at the left of "Count"
4) Press **Rs count**，"☺：Re count confirm?" will be displayed.
   - **YES**
   - **NO**
5) Press **YES**，all bib count value will be reset as 0.
6) Press **NO**，cancel the reset operation.

3.4 <List sweep display> page

In TH2826 Max.10 points of frequency，level or DC bias can be output on **<List sweep setting>** page. Each list sweep test point can be set high and low value, which will be tested automatically; also the result is compared with limit value.

Press **[LCRZ]**,then **List sweep**，to enter **<List sweep display>** page. As figure 3-4：

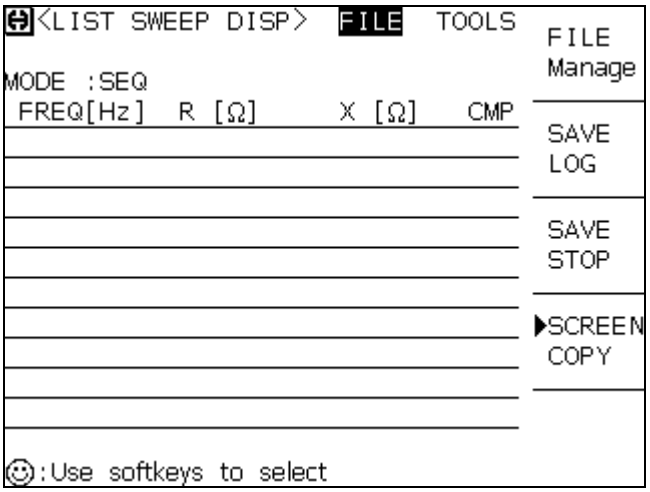


Figure 3-4

On this page, the test point can be tested automatically，the test result is compared with limit value. In the process of list sweep test，"►" indicates the current sweep point. The following parameters can be set on **<List sweep display>** page.

- Sweep mode（**Mode**）
- File management（**File**）
- Other tools（**Tool**）

There are 4 zones, which are：**List sweep display**，**Mode**，**File** and **Tools**. List sweep point can't be set on this page，can only be on **<List sweep setting>.**

3.4.1 Sweep mode

In TH2826, Max. 10 points of frequency, level or DC bias can be tested automatically. There are two types of list sweep mode in TH2826：SEQ and STEP. In SEQ mode，press **[TRIGGER]** once，all list sweep points are tested for once. In STEP，press **[TRIGGER]** once, only test a sweep point.

Note: *when the trigger mode is INT，SEQ mode and STEP mode is not controlled by **[TRIGGER]**. When the trigger mode is MAN，then use **[TRIGGER]**to trigger list sweep test.*

Operational step pf list sweep mode setting

Execute the following operation，set sweep mode on **<List sweep display>** page：SEQ/STEP

1) On **<List sweep display>** page，move cursor to **Mode**. The following softkeys will be

displayed.

- **SEQ**
- **STEP**

2) Press **SEQ**，select SEQ mode.

3) Press **STEP**, select STEP mode.

3.4.2 Frequency(Hz)

The current parameter mode and unit are displayed. The parameter item of sweep list is 其正 displayed.

3.4.3 Cp[F] D[ ]

The "function" parameter and unit are displayed. The sweep result is displayed.

3.4.4 CMP（compare）

The compare result of current sweep point is displayed. "L" means low over，"H" means high over，" "means not high or low over.

3.4.5 File management

Refer to 4.2<File management> function

3.4.6 Auxdiary tool

There is no such operation on this page.

<Measure setting>

Press **[LCRZ]**,then **More 1/3** to enter **<Measure setting>** page. As figure 3-5：

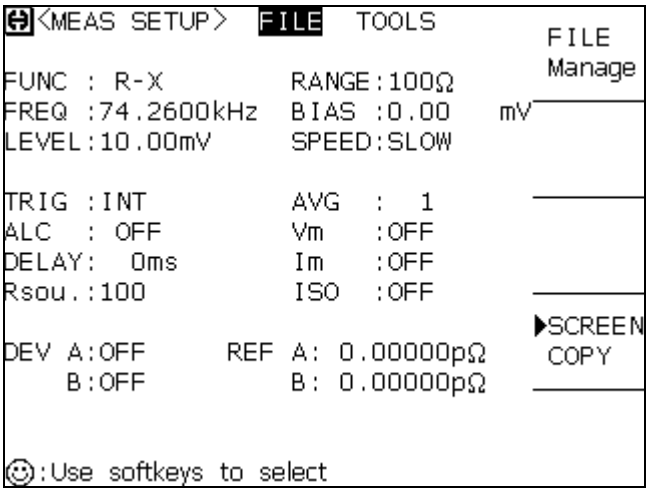


Figure 3-5

On **<Measure setting>** page，the following parameters can be set.（what in brackets are available setting zone）

- Test function（**Function**）
- Test range （**Range**）

- Test frequency（**Frequency**）
- Test level （**Level**）
- DC bias （**Bias**）
- Test speed （**Speed**）
- Trigger mode（**Trigger**）
- Auto level control（**Constant level**）
- Bias current isolation ON/OFF (**ISO**)
- Average time（**Average**）
- Voltage level monitor ON/OFF (**V_m**)
- Current level monitor ON/OFF (**I_m**)
- Delay time（**Delay**）
- Output resistance（**Internal resistance**）
- File management（**File**）
- Auxdiary tools（**Tools**）
- Deviation test mode A（**Deviation A**）
- Deviation test mode B （**Deviation B**）
- Deviation test reference A （**Reference A**）
- Deviation test reference B （**Reference B**）

Some setting zones on**＜Measure setting＞** page is the same as that on**＜LCRZ＞** page，listed as below, which is introduced before. Other setting zones on ＜Measure setting＞ page will be introduced briefly below.

- Test function（**Function**）
- Test range （**Range**）
- Test frequency（**Frequency**）
- Test level （**Level**）
- DC bias （**Bias**）
- Test speed （**Speed**）

3.4.7 Trigger mode

In TH2826 there are 4 types of trigger mode：INT(internal trigger)，MAN(manual trigger)，EXT(external trigger) and BUS(bus trigger).

When the trigger mode is set as INT mode，TH2826 can test constantly.

When the trigger mode is set as MAN mode, press **[TRIGGER]** once，TH2826 performs a test.

When the trigger mode is set as EXT mode, once HANDLER receives a trigger signal of positive pulse，TH2826 performs a test.

When the trigger mode is set as BUS mode，once IEEE488 receives a ”**TRIGGER**”，TH2826

performs a test. BUS trigger mode can't be set on the front panel.

Note: *when TH2826 is in the process of test，a trigger signal is received, it will be ignored. TH2826 send trigger signal after test ends.*
When triggering TH2826 by HANDLER interface，the trigger mode is set as EXT.

Operational step of setting trigger mode

Set the trigger modes except BUS trigger mode based on the operation below. If the instrument is set as BUS mode，then send "**TRIGger:SOURce BUS**" command via IEEE488 interface.

1) Move cursor to **Trigger** zone. The following softkeys will be displayed below.
   - **INT**
   - **MAN**
   - **EXT**
2) Use the softkeys above to set trigger mode.

3.4.8 Auto level control function

Auto level control function can adjust the actual test level （the voltage or current of DUT）to the level value you set. Use this function to keep the voltage or current constant.

When the auto level control function is adopted，the available range limit is as below：

Constant voltage setting range：10 mV_{rms} to 5V_{rms}, based on the internal resistance.

Constant current setting range：100 μA_{rms} to 100 mA_{rms}, based on the internal resistance.

Note: *当 when constant level function is valid，if level setting is over the range above，constant level function is set as OFF automatically. The current set level value is non-constant level value.*

Operational step of auto level control function

Set constant level function as ON or OFF according to the operation below.

1) Move cursor to **Constant level** zone. The following softkeys will be displayed.
   - **ON**
   - **OFF**
2) Press **ON** to open auto level control function
3) Press **OFF** to turn off auto level control function.

3.4.9 Bias current isolation function

Reserved function

3.4.10 Average time

The average function of TH2826 can calculate the result of 2 tests or more in average. The setting range is from 1 to 255 with the stepper of 1.

Operational step of average setting

Set average time according to the operation below.

1) Move cursor to **Average** zone. The following softkeys will be displayed.
   - ↑ (+)
     The key is used to increase the average times.
   - ↓ (-)
     The key is used to decrease the average times.
2) Use the softkeys above to set average times，or use numeric key and **[ENTER]** to enter average time directly.

3.4.11 Level monitor function

Level monitor function can help you monitor the actual voltage or current value of DUT. The voltage monitor value is displayed on **Vm** monitor zone on **<LCRZ>** page. The current monitor value is displayed on **Im** monitor zone on **<LCRZ>** page.

Note: *The correction function can affect the level monitor function, so when the correction data is changed, the level monitor value is also changed. The ON/OFF status of correction function OPEN/SHORT/LOAD can also affect the level monitor value.*

Operational step of level monitor function setting

Set level monitor function ON or OFF according to the operation below.

1) Move cursor to **Vm** zone. The following softkeys are displayed.
   - **ON**
   - **OFF**
2) Press **ON** to set voltage level monitor function as ON. Press **OFF** to set voltage level monitor function as OFF.
3) Move cursor to **Im** zone. The following softkeys are displayed.
   - **ON**
   - **OFF**
4) Press **ON** to set current level monitor function as ON. Press **OFF** to set current level monitor function as OFF.

3.4.12 Delay

Delay time means the time lasted from trigger to test. You can set trigger delay time. When the list sweep function is available，the set delay time is delayed at each sweep point. The trigger

delay time is within the range：0 s to 60 s，with the stepper of 1 ms. When the instrument is applied in auto test system，the trigger delay function is available. When the instrument is triggered by HANDLER interface，the trigger delay time can assure the reliable contact of DUT and test terminal.

Operational step of setting delay function

Set delay time according to the operation below.

1) Move cursor to **Delay** zone.
2) Use numeric key to input delay time. After pressing a numeric key，the following unit softkeys are displayed. Use these keys to replace**[ENTER]** to input delay time.
   - **msec**
   - **sec**

3.4.13 Signal source internal resistance

TH2826 provides 4 kinds of signal source internal mode：30 Ω、100 Ω、10 Ω/CC（Constant Current）and 50 Ω. When the inductance is tested，in order to compare the data of other tester, the signal source internal mode should be same.

30 Ω compares with：107X/GR1689

100 Ω compares with：HP4284A/E4980/chroma3250

10 Ω/CC compares with：106X/WK3245

50 Ω compares with：HK3532

Operational step of setting output resistance

Set the output resistance according to the operation below.

1) Move cursor to **Internal resistance** zone. The following softkeys are displayed.
   - **100 Ω**
   - **30 Ω**
   - **50Ω**
   - **10Ω/CC**
2) Press **100 Ω** to select 100 Ω output resistance. Press **30 Ω** to select 30 Ω output resistance.etc.

3.4.14 Deviation test function

Deviation test function can make the deviation value display on the screen instead of actual test value. The deviation value is equal to the actual value subtracts the pre set reference value. This function can help observe the changed condition of parameter by temperature, frequency and bias.etc. The deviation function can be used for primary or secondary parameter, or primary and secondary parameter. The instrument provides two modes below：

- ΔABS mode（Absolute deviation mode）
  The current displayed deviation is the difference of test value and set reference value. The formula of calculating ΔABS is as below：

ΔABS＝X－Y

Where， X: The test value of current DUT.

Y: Preset reference value.

- Δ% mode（percentage deviation mode）

  The deviation is the percentage one: the deference of test value and preset reference value divides the reference value. The formula of calculating Δ% is as below：

  Δ%＝(X－Y）/Y ×100 [%]

  Where， X: The test value of current DUT.

  Y: Preset reference value.

Operational step of deviation test function

Set deviation test according to the operation below.

1) Move cursor to **Reference A** zone to input the reference value of primary parameter. The following softkeys are displayed.
   - **Measure**

     When the component is connected to the test terminal，press **Measure**. TH2826 tests the component, and the result is output automatically to be the value of reference A and B.
2) Use softkey**Measure** or numeric key to input the reference value of primary parameter.
3) Move cursor to **（Reference）B** zone to input the reference value of secondary parameter. The following softkeys are displayed.
   - **Measure**

     When the component is connected to test terminal， press **Measure**. TH2826 can test reference component， the result is input as reference A and B.
4) Use softkey **Measure** or numberic key to input the reference value of secondary parameter. If the primary and secondary parameter have been set on step 2，skip this step.
5) Move cursor to **Deviation A** zone. The following softkeys are displayed.
   - **ΔABS**
   - **Δ%**
   - **OFF**
6) Use the softkey above, set the deviation mode of primary parameter.
7) Move cursor to **（Deviation）B** zone. The following softkeys are displayed.
   - **ΔABS**
   - **Δ%**
   - **OFF**
8) Use the softkey above to set the deviation mode of secondary parameter.

3.4.15 File management

Refer to 4.2<File management>.

3.4.16 Auxdiary tools

On **<Measure>,** the tools provides the function of system reset and clear setting. The system reset can restart TH2826.

The operational step

Execute the operation to reset TH2826 and load the setting parameter on **<Measure> .**

1) Move cursor to **Tool** zone，the following softkeys are displayed.
   - **System reset**
   - **Clear**
2) Press **System reset** to reset TH2826，press **Clear** to recover the parameter setting to the default status **.**

3.5 <Correction> page

Press **[LCRZ]**, and **More 1/3**，then**Correction** to enter**<Correction> page.**

Figure 3-6：

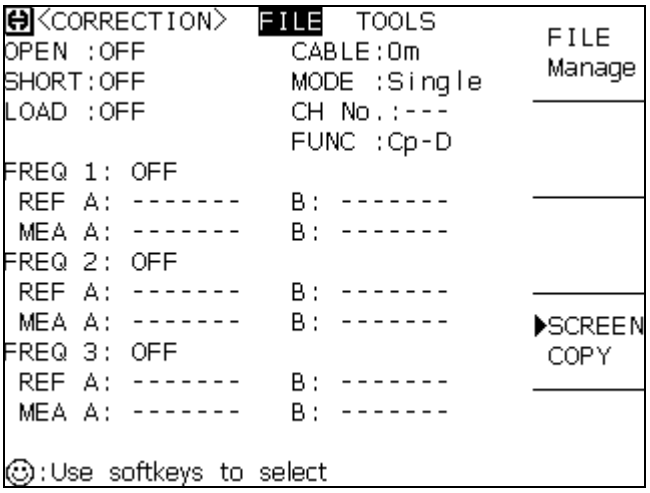


Figure 3-6

TH2826 provides two modes, the following parameter can be set on **<Correction>** page.

- （**Open**）
- （**Short**）
- （**Load**）
- （**Cable**）
- （**Mode**）
- （**Function**）
- （**Freq 1**，**Freq 2** and **Freq 3**）
- （**Reference A**,**B**）
- （**File**）
- （**Tool**）

The test result of load correction.（**Measure A**，**Measure B**）

- In multi way correction mode，the current channel number(**Channel**)

The actual result of load correction can be tested on **Freq 1**，**Freq 2** and **Freq 3** zone.

3.5.1 Open correction

The open correction of TH282 can clear the error caused by scattering admittance. Shown as figure 3-7.

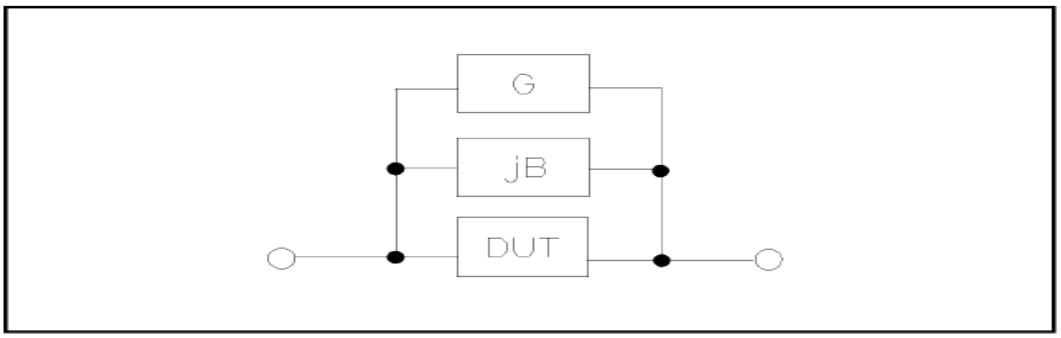


Figure 3-7

TH2826 adopts two open corrections for data.

- TH2826 can correct the following 55 fixed frequency points. Except the following points，the instrument can calculate the open correction data. Move cursor to **Open**，use **Open full clear** to execute the open correction. Shown as the figure 3-1.

Figure 3-1

			20	25	30	40	50	60	80	[Hz]
100	120	150	200	250	300	400	500	600	800	[Hz]
1	1.2	1.5	2	2.5	3	4	5	6	8	[kHz]
10	12	15	20	25	30	40	50	60	80	[kHz]
100	120	150	200	250	300	400	500	600	800	[kHz]
1	1.2	1.5	2	2.5	3	4	5			[MHz]

- TH2826 can set 3 open correction frequency point：Freq 1，Freq 2 and Freq 3. Move cursor to **Freq 1**，**Freq 2** or **Freq 3** ，use **open single clear** to correct 3 set frequency.

Operational step of open correction

1) Move cursor to **Open**，the following softkeys are displayed.
   - **ON**
   - **OFF**

- **Open full clear**
- **DCR open**

2) Connect fixture to test terminal.
3) Press **Open full clear**，TH2826 can test open admittance of 41frequency points. It costs 75 seconds for open correction. The following softkeys are displayed.
   - **Drop**

     The softkey can cancel the current open correction. The former data is reserved.
4) Press **DCR open**，TH2826 can test open resistance.
5) Press **ON**, the open correction is valid，TH2826 then perform open correction calculation . If frequency1，frequency 2 and frequency 3 is set as OFF, the insert method is adopted to calculate the date. If frequency1，frequency 2 and frequency 3 is set as ON, meanwhile the test frequency is equal to frequency1，frequency 2 or frequency 3，then open data of frequency1，frequency 2 and frequency 3 is used to calculate the open correction.
6) Press **OFF**，turn off the correction function.

3.5.2 Short correction

The open correction of TH282 can clear the error caused by parasitic admittance.（R, X）,shown as figure 3-8.

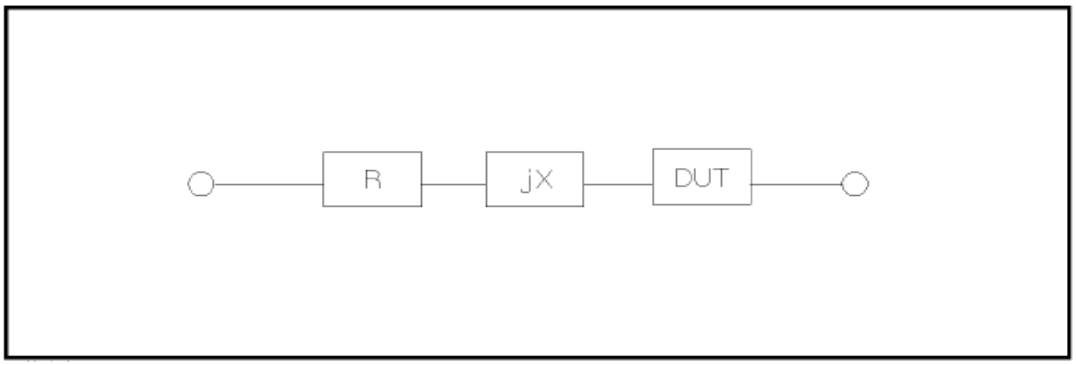


Figure 3-8

TH2826 adopts two open corrections for data.

- TH2826 can correct the following 41 fixed frequency points. Except the following points，the instrument can calculate the open correction data. Move cursor to **Short**，use **Short full clear** to execute the short correction. The 41 fixed frequency points is the same as open correction.
- TH2826 can set 3 open correction frequency points：**Freq 1**，**Freq 2** or **Freq 3** Move cursor to **Freq 1**，**Freq 2** or **Freq 3.** Use **Short single clear** to correct 3 set frequency.

Operational step of open correction

1) Move cursor to **Short**，the following softkeys are displayed.
   - **ON**
   - **OFF**
   - **Short full clear**
   - **DCR Open**

2）Connect fixture to test terminal.

3) Press **Short full clear**，TH2826 can test short admittance of 41frequency points. It costs 75 seconds for open correction. The following softkeys are displayed.

   Drop

   The softkey can cancel the current open correction. The former data is reserved.

4) Press **DCR open**，TH2826 can test short resistance

5) Press **ON**, the short correction is valid，TH2826 then perform short correction calculation . If frequency1，frequency 2 and frequency 3 is set as OFF, the insertation method is adopted to calculate the date. If frequency1，frequency 2 and frequency 3 is set as ON, meanwhile the test frequency is equal to frequency1，frequency 2 or frequency 3，then open data of frequency1，frequency 2 and frequency 3 is used to calculate the short correction.

6) Press **OFF**，turn off the correction function.

3.5.3 Load correction

Operational step of load correction

1) Move cursor to **Freq1**，**Freq 2** or **Freq 3**. the following softkeys are displayed.
   - **ON**
     The current test date of open/short/load correction is valid.
   - **OFF**
     The current test date of open/short/load correction is invalid.
   - **Open single clear**
     Execute open test of frequency 1，2 or 3.
   - **Short single clear**
     Execute short test of frequency 1，2 or 3.
   - **Load correction**
     Execute load test of frequency 1，2 or 3.

2) Press **ON**, the former open/short/load is displayed.

3) Press numeric key to input frequency

4) Connect fixture to test terminal.

5) Use fixture to open.

6) Press **Open single clear** to open correct the set frequency.
7) Move cursor to **Open**.
8) Press **ON**.
9) Move cursor to **Freq 1**，**Freq 2** or **Freq 3.**
10) Use fixture to short.
11) Press **Short single clear** to short correct the set frequency.
12) Move cursor to **Short**.
13) Press **ON**.
14) Prepare standard component.
15) Move cursor to**Func.**
16) Set the parameter of standard component.
17) Move cursor to**Ref A**.
18) Use numeric key and unit key to input reference value of primary parameter of standard component.
19) Move cursor to**（Ref）B**.
20) Use numeric key and unit key to input reference value of secondary parameter of standard component.
21) Move cursor to**Freq 1**，**Freq 2** or **Freq 3**.
22) Connect standard component to fixture.
23) Press **Load correction**，the instrument executes a correction. The actual test result of component is displayed on **Meas A** and **（Meas）B.**
24) Move cursor to **Load.**
25) Press **ON**.

3.5.4 Load correction test function

Operational step of load correction test

Refer to 3.1.1

3.5.5 Cable selection

The selectable cable is 0 m.

3.5.6 Single/multi correction selection

Refer tp the operation of scanning interface.

3.5.7 File management

Refer to 4.2 <File management>.

3.5.8 Auxdiary tool

No.

3.6 <Limit list setting> page

Press **[LCRZ]**,then**More 1/3**，and **Limit setting**，to enter**<Limit list setting>** page.

As figure 3-9：

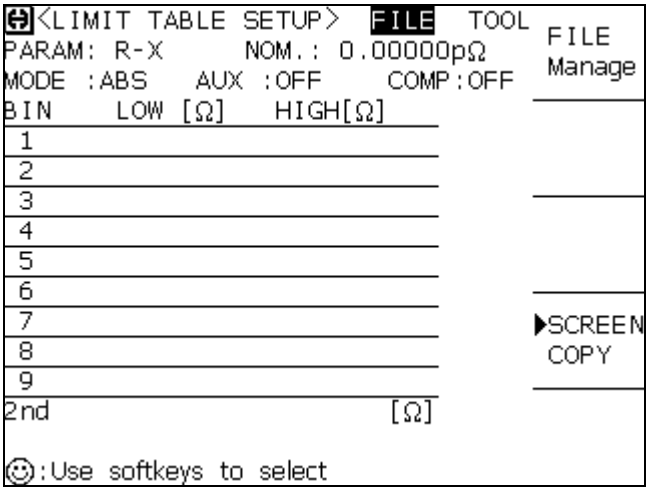


Figure 3-9

TH2826 can set bin limit of 9 primary parameters and bin limit value of a secondary parameter. The test result can be sorted into 10 bins at most（BIN1 to BIN9 and BIN OUT）. If the primary parameter is within BIN1 to BIN9，but its secondary is not，now the DUT is sorted to Aux bin. When TH2826 installs HANDLER interface， applying auto test sorting system, the compare function is available. The limit parameter can only be set on **<Limit list setting>** page.

- （**Parameter**）
- （**Mode**）
- （**Nominal**）
- **(Aux)**
- **(Compare)**
- （**Low limit**）
- （**High limit**）

3.6.1 Swap parameter

This function can swap the primary parameter and secondary parameter. When the parameter is：Cp-D, the parameter swap function can change the parameter as：D-Cp, now D can set 9 pairs of compare limit but Cp can set 1 pair of compare limit.

Operational step of swap parameter function

Execute the following steps to swap primary and secondary parameter.

1) Move cursor to **Parameter**， the following softkeys are displayed.
   - **Swap parameter**
   - Press **Swap parameter** to swap primary and secondary parameter.
2) Then press **Swap parameter** to swap primary and secondary parameter to return to the

former setting.

3.6.2 Compare function limit mode

Compare function provides two modes. As figure 3-10.

- Tolerance mode

  Set the tolerance value of nominal value as compare limit value. There are two modes：one is percentage tolerance and the other is absolute value one.

- Sequential mode

  The test range is set as compare limit value. The compare limit value must be set based on the sequence from small to large.

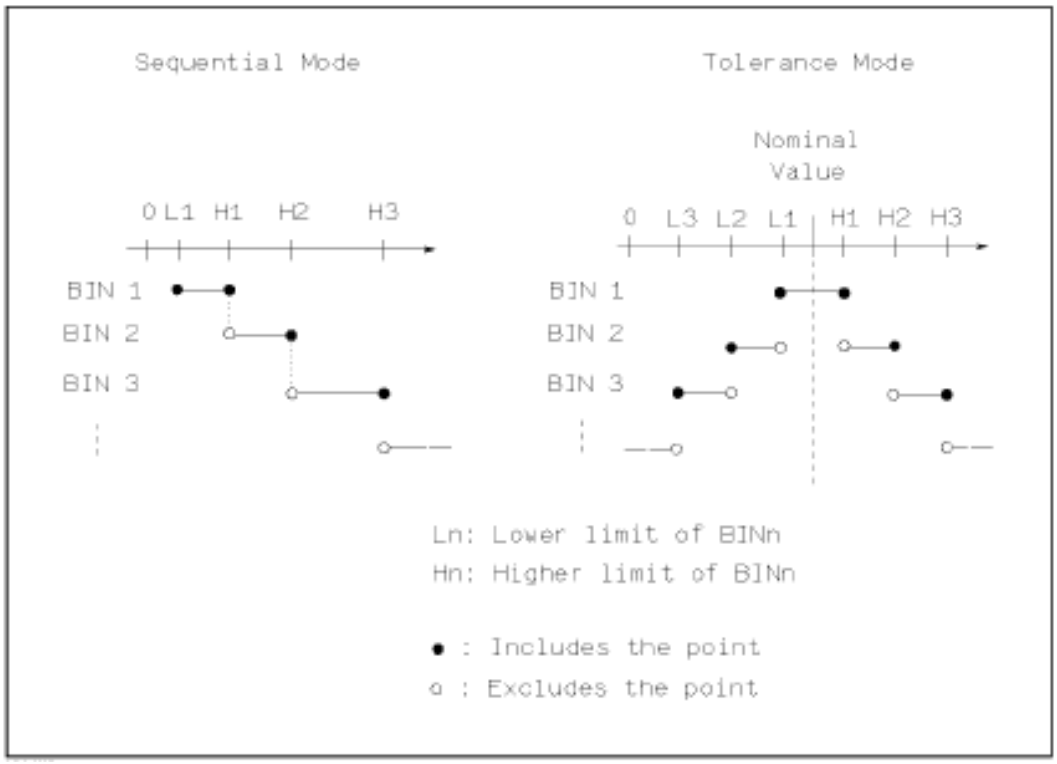


Figure 3-10

Note：*当 when setting limit value of tolerance mode，the range should be from small to large. If the tolerance range of BIN1 is the largest，ten all DUTs are sorted to BIN1.*

Step pf setting compare limit mode

1) Move cursor to **mode**，the following softkeys are displayed.
   - **% TOL**
     The key is used to set limit mode as：Tolerance mode of percentage.
   - **ABS TOL**
     The key is used to set limit mode as：Tolerance mode of absolute.
   - **SEQ MODE**
     The key is used to set limit mode as：Sequential mode
2) Select the softkeys above，set limit mode.

3.6.3 Nominal value setting

Operational step of setting nominal value

1) Move cursor to **Nomi**.
2) Use numeric key to input nominal value.

3.6.4 Compare function ON/OFF

TH2826 can set bin limit of 9 primary parameter and bin limit value of a secondary parameter. The test result is sorted to 10 bins at most（BIN1 to BIN9 and BIN OUT）.

Operational step of setting compare function ON/OFF

1) Move cursor to **Comp**.
   - **ON**
   - **OFF**
2) Use the softkeys above to set compare function as ON or OFF

3.6.5 Aux bin ON/OFF

For secondary parameter sorting，there are 3 conditions as below：

- On **<Limit list setting>** page，no setting high and low limit value
- On **<Limit list setting>** page，high and low limit value is set. However, **Aux** is set as OFF.
- On **<Limit list setting>** page，high and low limit value is set. However, **Aux** is set as ON.

Operational step of setting aux function ON/OFF

1) Move cursor to **Aux**.
   - **ON**
   - **OFF**
2) Use the softkeys above to set aux function as ON or OFF

3.6.6 High and low limit

TH2826 can set bin limit of 9 primary parameter and bin limit value of a secondary parameter. The test result is sorted to 10 bins at most（BIN1 to BIN9 and BIN OUT）.

Operational step of setting high and low limit

1) Set **Param**，**Nomi** and **Mode.**
2) Move cursor to **Tool**.
3) Move cursor to **Low limit** of Bin 1. if you select tolerance mode, execute step 4 to step 7；if you select sequentional mode, execute step8 to 12.
4) Use numeric key to input low limit value of Bin 1，after inputting data，use （**p**, **n**, **μ**, **m**, **k**, **M**, ***1**）to replace **[ENTER]** to input limit value. When use **[ENTER]** to input limit value，the default unit of limit value is the same as that of last input. When pressing ***1**，F，H or Ω is the default unit. After inputting limit value of bin 1，the low limit of bin 1is set as -(absolute limit)，high limit of bin 1is +(absolute limit).
5) Cursor is jumped to **Low limit** of bin 2，repeat step 4 to limit value of bin 9. Then cursor is jumped to **Low limit** of bin 2.
6) After inputting low limit value of secondary parameter，cursor is jumped to **High limit** of bin 2
7) Input the high limit value of secondary parameter.
8) Use numeric key to input low limit value of Bin 1，after inputting data，use （**p**, **n**, **μ**, **m**, **k**, **M**, ***1**）to replace **[ENTER]** to input limit value. When use **[ENTER]** to input limit value，the default unit of limit value is the same as that of last input. When pressing ***1**，F，H or Ω is the default unit.
9) After inputting low limit value of bin 1，cursor is jumped to **High limit** of bin 1.
10) Cursor is jumped to **High limit** of bin 2.
11) Repeat step 10 till the input of bin 9, then cursor is jumped to **Low limit** of 2nd. Input the low limit of secondary parameter.
12) Cursor is jumped to **High limit** of 2nd.Input the high limit of secondary parameter.

3.6.7 File management

Refer to 4.2<File management>.

3.6.8 Auxdiary tool

Execute the following step to clear the limit parameter on <Limit list setting> page.

1) Move cursor to**Tool**.
   - **Clear table**
2) Press **Clear table**，clear all bin limit value.

3.7 <List sweep setting> page

Press **[LCRZ]**,then **More1/3**，and **List setting** to enter **<List sweep setting>** page.

As figure 3-11：

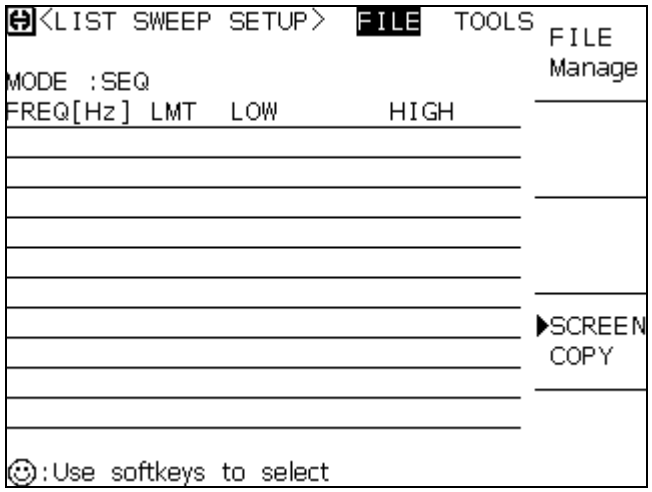


Figure 3-11

TH2826 can test 10 frequency，level or bias voltage. The following sweep parameters can be set on **<List sweep setting>.**

- （**Mode**）
- （ [Hz], level [V], level [I], bias [V], bias [I]）
- (sweep point)
- (**LMT**)
- （**Hi limit**，**Lo limit**）

3.7.1 Mode

Same as that on <List sweep display>.

3.7.2 Optional item

The sweep parameter can be：[Hz], level voltage mode [V], level current mode [I], bias voltage mode[V], bias current mode[I].

Step：

1) Move cursor to the bottom line in mode，the following softkeys are displayed：
   - FREQ [Hz]
   - LEVEL [V]
   - LEVEL [A]
   - BIAS [V]
   - BIAS [A]
2) Press any softkey to select the parameter.

3.7.3 Sweep parameter setting

Move cursor to each parameter to set ： on **（HZ）**、**LMT**、**Hi limit** and **Lo limit,** use numeric key to input data

3.7.4 File

Refer to 4.2<File management>.

3.8 <Trace sweep setting>

Press [SETUP]，Measure，Correction，Limit setting，List setting and Trace setting are displayed.

Press Curve setting. The following page is displayed.

As figure 3-12：

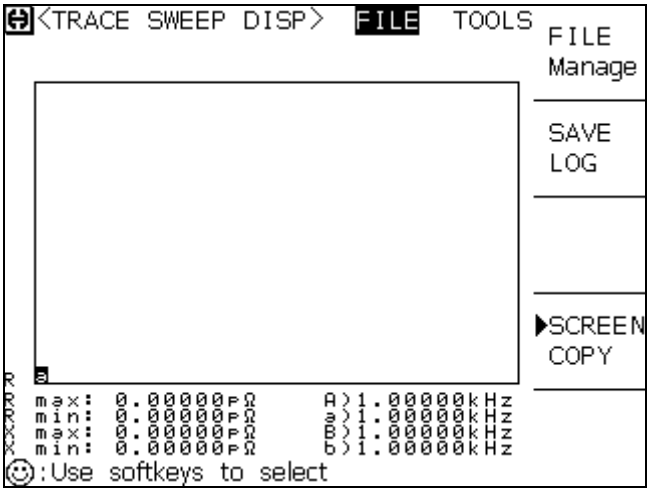


Figure 3-12

3.8.1 Mode

"Mode" includes [Hz], level [V], level [A], bias [V], bias [A].

Operation：Move cursor to Mode，and select corresponding softkey.

3.8.2 Start

Select the number you need on keyboard（0～9/+、-/.），and press enter key or select a corresponding unit.

3.8.3 End

Select the number you need on keyboard（0～9/+、-/.），and press enter key or select a corresponding unit.

3.8.4 Coordination range setting

The coordination range includes **A Min**、**A Max**、**B Min**、**B Max**，which is the coordination range of primary and secondary parameter, which is used to formulate the frequency response curve drawing range.

Move cursor to zone，input operation：Select the number you need on keyboard（0～9/+、-/.），and press enter key or select a corresponding unit.

3.8.5 File management

Refer to 4.2<File management>.

3.9 <Trace sweep display>

Press [LCRZ]，Measure，Correction，Limit setting，List setting and Trace setting are displayed

Press Trace sweep. The following page is displayed.

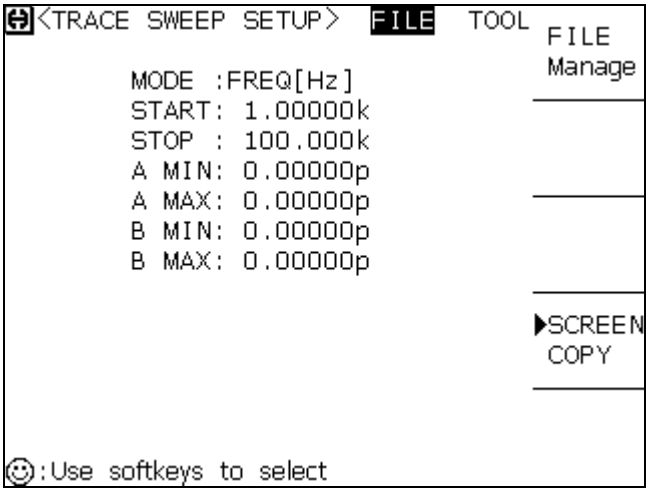


Figure 3-13

Press 【TRIGGER】to start sweeping.

3.9.1 A max and A）value

3.9.2 A min and a）value

3.9.3 B max and B）value

3.9.4 B min and b）value

3.9.5 File management

3.9.6 "Tools"

Move cursor to **Tool**，Coordinate：linearity，Ratio：auto，load，resweep and More 1/2 are displayed：

1) Coordinate：

- Linearity Press Coordinate：Log，it display Coordinate：Linearity，now the sweep mode is increasing as linearity way，vertical coordinate is distributed as linearity way.
- Log Press Coordinate：Linearity，it displaysCoordinate：Log，now the sweep mode is increasing as the log way with the base of 10，vertical coordinate is distributed as the log way with the base of 10.

2) Ratio：

- Auto PressRatio：lock，it displays Ratio：Auto，now system can adjust the ratio

of curve for each sweep；

- Lock Press Ratio：Lock，it displays Ratio：Auto，now system locks the display ratio of curve.

3） Load

Press Load ，it displays ▶ Load ，which means load data status. Now the following figure is displayed：：

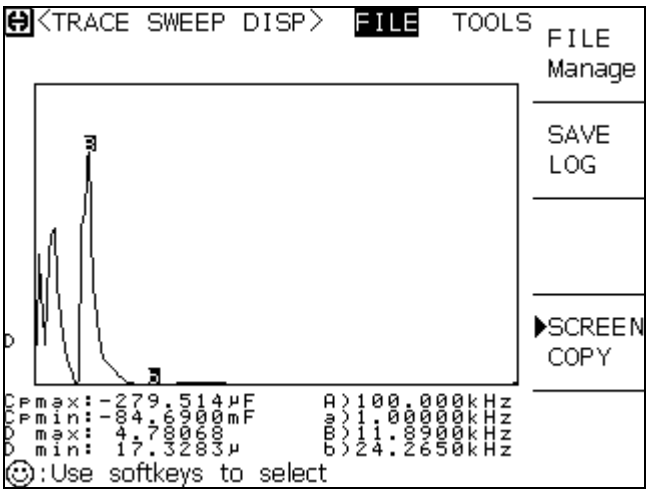


Figure 3-14

Shown as figure 3-14，now the value below can be loaded：

- FUNC:Z- θ r.
- FREQ:34.1290kHz.
- Z : 1.50434kΩ.
- θ: 1.52379 r.

The operation is as below：Use direction key. Where [↓] is used to move to high terminal（right)；[↑] is used to move to low terminal（left)；[→] is used to move to high terminal（right） one by one； [←] is used to move to low terminal （Left）one by one.

3) Resweep

Press Resweep ， the instrument can sweep from beginning and draw curve.

Press More 1/2 ； Coordinate：FAST，Trigger：INT，Point：201，Curve setting and More 2/2 are displayed.

1) Coordinate：

- Press Speed：FAST ，the zone displays Speed：MED， now it costs 20ms to sweep.
- Press Speed：MED ，the zone displays Speed：SLOW，now it costs 80ms to sweep.
- Press Speed：SLOW ，the zone displays Speed：FAST，now it costs 10ms to sweep.

2) Trigger：

- Press Trigger：INT，the zone displays Trigger：MAN，whicn means manully trigger

sweep，when user presses [TRIGGER] once，then the instrument sweeps curve.

- Press Trigger：MAN，the zone displays Trigger：EXT，which means external trigger sweep，when the external interface or computer triggers once, then instrument sweeps curve.
- Press Trigger：EXT，the zone displays Trigger：INT，which means internal trigger sweep，after instrument sweeps curve, it performs next time automatically.

3) Point：

System sets the point as 101，201，401，801. The more points, the more precision of the drawed figure, but the sweep time will be longer. The default point is 201.

Operation：press Point： to select the corresponding point.

4) Curve setting

Press More 2/2 ,Coordinate：linearity，Ratio：auto，Load，Resweep and More 1/2 are displayed.

When user selects sweep parameter as frequency and impedance，the instrument displays some parameters of component，the detailed parameter is as below：

- Capacitance value when Ct：1kHz.
- Capacitance value when Dt：1kHz.
- Z_{min} and f_s,(point a in figure).
- $Z_{max}$and f_p,(point A in figure).
- $k_p \approx \sqrt{\frac{f_p - f_s}{f_s} \times 2.51}$.
- $Q_m \approx \frac{f_p^2}{2\pi f_s Z_{\min} C^T (f_p^2 - f_s^2)}$.
- ΔF = fp – fs

As figure 3-15：

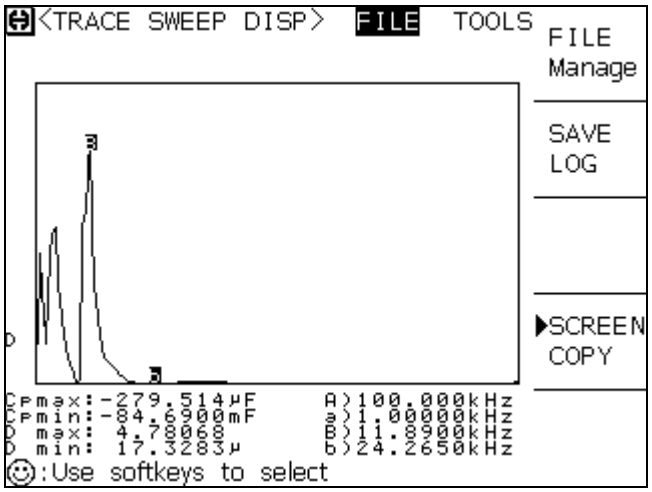

<TRACE SWEEP DISP> FILE TOOLS
FILE Manage
SAVE LOG
▶SCREEN COPY
Cpmax:-279.514μF
Cpmin:-84.6900mF
D max: 4.78068
D min: 17.3283μ
A)100.000kHz
a)1.00000kHz
B)11.8900kHz
b)24.2650kHz
:Use softkeys to select

Figure 3-15

Chapter 4 [SYSTEM] menu and file

4.1<System>

Press [SYSTEM]，then [System setting] to enter <System setting> page.
Shown as figure 4-1：

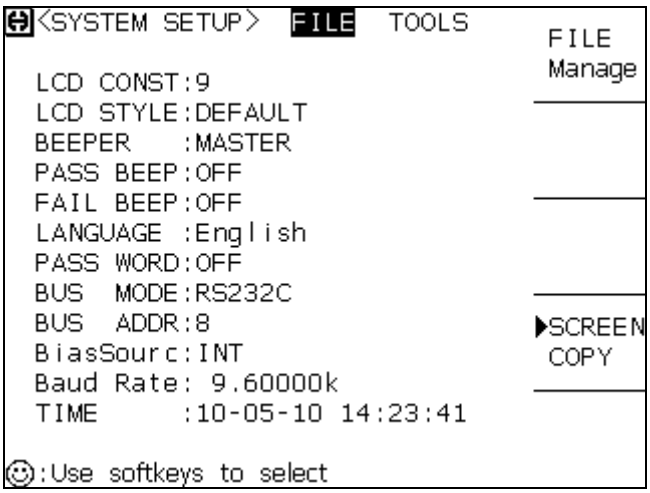


Figure 4-1

This page includes LCR contrast，beeper，alarm，language，password，bus mode，bus address .etc.

4.1.1LCR contrast

Operational step of LCR contrast：

Move cursor to**LCR cont.** The following softkeys are displayed.

- ↑ (+)
  The key is used to increase contrast.
- ↓ (-)
  The key is used to decrease contrast.

4.1.2Style

Operational step of setting LCR style：

Move cursor to **LCR style**zone. The following softkeys are displayed.

- **CLASSIC**
- **DEFAULT**

4.1.3Pass beeper

Operational step of setting pass beeper：

Move cursor to **Pass beeper** zone. The following softkeys are displayed.

- **HIGH LONG**
- **HIGH SHORT**
- **LOW LONG**
- **TWO SHORT**
- **OFF**

4.1.4Fail beeper

The zone is used to control and display the test result as beeper mode when interior products are tested.

Operational step of setting fail beeper：

Move cursor to**Pass beeper**. The following softkeys are displayed.

- **HIGH LONG**
- **HIGH SHORT**
- **LOW LONG**
- **TWO SHORT**
- **OFF**

4.1.5Language

The zone is used to control and display the language mode.

Operational step：

Move cursor to **Language**. The following softkeys are displayed.

- **English**
- 中文

4.1.6Password

The zone is used to display the password protection mode.

Operational step of setting password：

Move cursor to **Password**. The following softkeys are displayed.

- **OFF**
- **Lock system**
- **Lock file**
- **Modify password**

Note：the default password is *2826*

4.1.7Bus mode

Operational step of setting bus mode：

1) Move cursor to**Bus mode** zone. The following softkeys are displayed.

- **RS232C**
- **GPIB**
- **LAN**
- **USBTMC**
- **USBCDC**

2) Press **RS232C** to select RS232C interface bus.
3) Press **GPIB** to select GPIB bus.
4) Press **LAN** to select LAN bus.
5) Press **USBTMC** to select USBTMC bus.
6) Press **USBCDC**to select USBCDC bus.

4.1.8Bus address

Operational step of setting bus address：

Move cursor to **Bus addr** zone. The following softkeys are displayed.

- ↑ (+)
- ↓ (-)

4.1.9Bias source

- INT mode
- OPT mode：
- EXT mode：

Operational step of setting bias source：

1) Move cursor to**Bias source** zone. The following softkeys are displayed.
   - **INT**
   - **OPT**
   - **EXT**
2) Press **INT** to select INT bias source.
3) Press **OPT** to select OPT bias source.
4) Press **EXT** to select EXT bias source

4.1.10Baud rate

Operational step of setting baud rate：

Move cursor to**Baud rate**. The following softkeys are displayed

- ↑ (+)
- ↓ (-)

4.1.11Time

Set the correct local time.

4.2<File management> page

In this chapter, the information about save and load of TH2826 is introduced.

Symbol：

E: is the abbreviation of External，which means the external storage，as：U disk.

I: is the abbreviation of Internal，which means the internal storage，that is internal Flash.

4.2.1Introduction of save/load function

Save and function

Figure 0-1

Save		Load available?	Function
Type	Format		
Configuration save（Internal Flash）	*.STA	Yes	Save the configuration status of TH2826 to internal Flash.
Configuration save（External U disk）	*.STA	Yes	Save the configuration status of TH2826 to internal U disk.
Data save（External U disk）	*.CSV	No	Save the test result to U disk.
Screen save（External U disk）	*.BMP	No	Save the screen picture of TH2826 to U disk.

4.2.2Folder /structure in U disk

It is suggested that user should build a file and folder，shown as figure 4-2. if user wants to save the file to the new folder, enter the folder firstly then operate.

Figure 0-2 Folder in U disk

Folder	The Max. file	Description
CSV	999	Include the test result such as *.CSV file.
STA	999	Include the configuration information, such as *.STA file.
BMP	20	Include the serene picture as *.BMP file.

Note : The folder of CSV，STA and BMP can be valid when U disk is connected to TH2826.

The folder and file structure in U disk is shown as Figure 4-2:

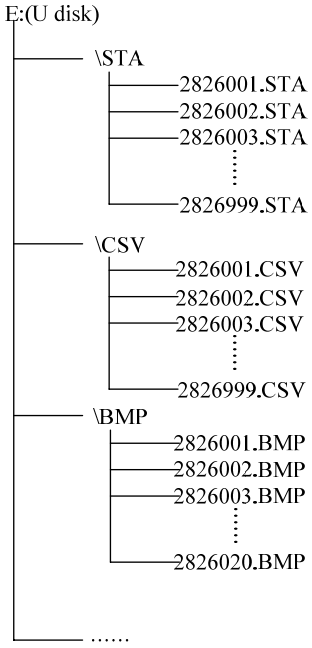


Figure 4-2

4.2.3（*.STA）

The instrument can save 20 groups of *.STA file.

Use File manage function in **File** menu，the following data will be saved or loaded in the form of file，which is called *.STA.

- The set parameter on <Measure> page
  - Function(parameter)
  - Frequency
  - Range
  - Level
  - DC bias
  - Average
  - Delay
  - Trigger mode（INT/MAN/EXT）
  - Auto level control (ON/OFF)
  - Voltage level monitor (ON/OFF)
  - Current level monitor (ON/OFF)
  - A/B mode (ΔABS/Δ%/OFF)
  - A/B reference value
- The set parameter on <Bin Count Disp> page
  - Bin count (Yes/No)

- The set parameter on <Limit list> page
  - Function(Swap parameter)
  - Nominal value(Reference value)
  - Compare mode（%-TOL/ABS-TOL/SEQ-MODE）
  - Aux Bin (ON/OFF)
  - Compare function (ON/OFF)
  - High and low limit value of each bin
- The set parameter on <List sweep > page
  - List sweep mode（SEQ/STEP）
  - List sweep parameter（Frequency/level/bias）
  - Test point of sweep parameter
  - High and low limit of all test points，including limit parameters (LIMIT-DATA A/LIMIT-DATA B）
- The current displayed format
- The set parameter on <Frequency response > page
  - Start frequency
  - End frequency
  - Max. and Min. range of A/B
  - Sweep points（101/201/401/801）
- The set parameter on <Frequency response measure> page
  - Displayed coordinate（Linearity /log）
  - Displayed ratio（Auto / lock）

4.2.4 Operational step of file management

A. Check the existed file

Press File manage to enter <File management > page.

User can switch in "I：(Internal file list)" and "E:(External file list)"by[←] [→].

Use [↑] [↓] to check one by one.

Shown as figure 4-3.

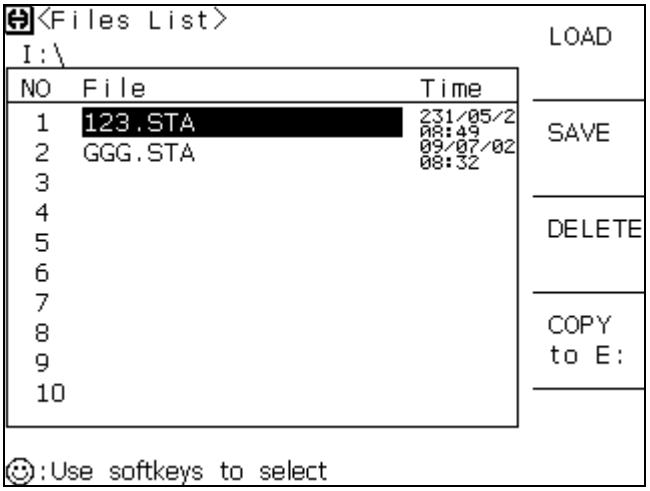


Figure 4-3Internal file list

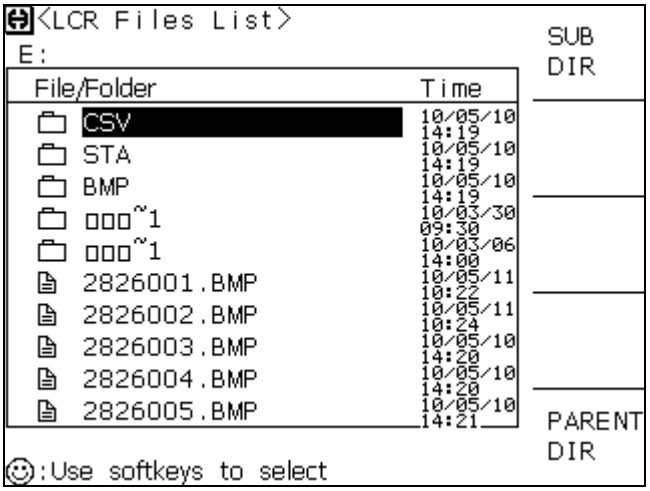


Figure 4-4 External file list

4.3 <Network setting> page

Press [SYSTEM]，then [System]，and Net setting to enter <Net setting> page.

As figure 4-5：

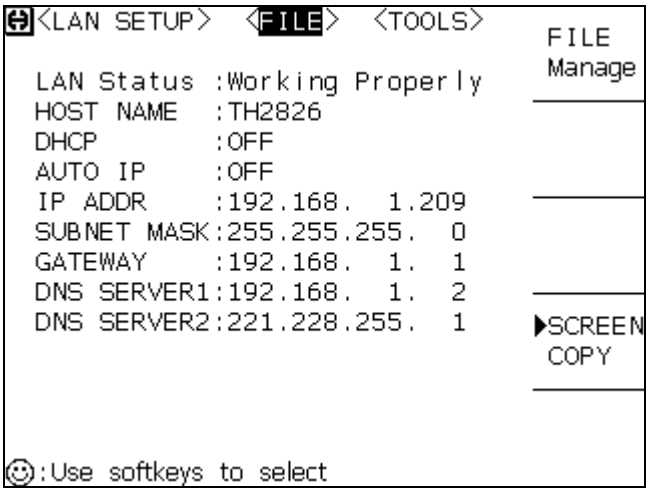


Figure 4-5

This page includes most net menus，including DHCP，auto IP，IP address，sub net mask off code，gateway，first choice DNS server，stand by DNS server.

4.3.1Network card status

Indicates if the new card of TH2826 works normal.

4.3.2Host name

Name of TH2826 in LAN，which is used to identify TH2826.

4.3.3DHCP

DHCP is the abbreviation of Dynamic Host Configuration Protocol.

Operation of setting DHCP：

Move cursor to**DHCP**. The following softkeys are displayed.

- **ON**
  Turn on DHCP
  Note：there must be a DHCP server in LAN，TH2826 can obtain a correct net parameter.
- **OFF**
  Don’t use DHCP.

4.3.4Auto IP

When DHCP is available，select auto IP，TH2826 can obtain a correct net parameter.

Operation of setting auto IP：

Move cursor to**Auto IP** zones, The following softkeys are displayed.

- **ON**
  Obtain IP automatically.
- **OFF**
  Use static IP.

4.3.5 IP Add

Operation of setting IP address：

(1)Move cursor to **IP add**. Move cursor to where the IP address is modified.

(2)The following softkeys are displayed.

- ↑ (+)

  Increase the value of IP address.

- ↓ (-)

  Decrease the value of IP address.

  Or you can input the IP address， then press enter.

4.3.6Sub net mask off code

Operation of setting sub net mask off code：

(1)Move cursor to sub net mask off code.

(2) The following softkeys are displayed.

- ↑ (+)

  Increase the value of sub net mask off code.

- ↓ (-)

  Decrease the value of sub net mask off code.

  Or you can input sub net mask off code by numeric key.

4.3.7Gateway

Operation step of setting gateway：

(1)Move cursor to Gateway zone

(2)The following softkeys are displayed.

- ↑ (+)

  Increase the value of gateway.

- ↓ (-)

  Decrease the value of gateway.

  Or you can input the value of gateway by numeric key.

4.3.8First choice DNS, stand by DNS

Operation step of setting first choice DNS and stand by DNS address：

(1)Move cursor to first choice DNS and stand by DNS address.

(2) The following softkeys are displayed.

- ↑ (+)

  Increase DNS。

- ↓ (-)

  Decrease DNS。

  Or use numeric key to input DNS.

Chapter 5 Measurement procedure and examples

This chapter covers basic measurement procedures and examples. It also offers various measurement hints.

5.1Clear (CORRECTION OPERATION)

To prevent the stray capacitance from disturbing the measurement accuracy, you must do the OPEN/SHORT CORRECTION. You can choose one of the methods below.

5.2 Frequency sweep clear

a) Press [LCRZ], and press the softkey MORE1/3. MEAS SETUP, CORRECTION, LIMIT TABLE, LIST SETUP, MORE2/3 will be displayed in the softkey area.

b) Press CORRECTION. The CORRECTION page will be displayed.

c) Move the cursor to OPEN field. ON, OFF, MEAS OPEN will be displayed in the softkey area.

d) Keep the test fixture open, press MEAS OPEN, wait until the bottom line prompts “OPEN measurement completed”.

e) Press ON, enable the open correction function.

f) Connect shorting bar (TH26010) to the test fixture.

g) Move the cursor to SHORT field. ON, OFF, MEAS SHORT will be displayed in the softkey area.

h) Press SHORT CORRECTION, wait until the bottom line prompts “SHORT measurement completed”.

i) Press ON, enable the short correction function.

j) Move the cursor to LOAD field. ON and OFF will be displayed in the softkey area.

k) Press OFF. Close the load correction function.

l) Move the cursor to FREQ 1 field. ON, OFF, MEAS OPEN, MEAS SHORT and MEAS LOAD will be displayed in the softkey area.

m) Press OFF, close the dot frequency clear function for frequency 1.

n) Move the cursor to FREQ 2 field. ON, OFF, MEAS OPEN, MEAS SHORT and MEAS LOAD will be displayed in the softkey area.

o) Press OFF, close the dot frequency clear function for frequency 2.

p) Move the cursor to FREQ 3 field. ON, OFF, MEAS OPEN, MEAS SHORT and MEAS LOAD will be displayed in the softkey area.

q) Press OFF, close the dot frequency clear function for frequency 3.

5.2.1 Dot frequency clear (for single frequency)

Dot frequency clear for single frequency is recommended.

Suppose that the frequency in you test is 5.5KHz.

a) Press [LCRZ], and press MORE1/3. MEAS SETUP, CORRECTION, LIMIT TABLE, LIST SETUP, MORE2/3 will be displayed in the softkey area.

b) Press the softkey CORRECTION. The CORRECTION PAGE will be displayed.

c) Move the cursor to OPEN field. ON, OFF and MEAS OPEN will be displayed in the softkey area.

d) Press ON, enable the open correction function.

e) Move the cursor to SHORT field. ON, OFF and MEAS SHORT will be displayed in the softkey area.

f) Press ON, enable the short correction function.

g) Move the cursor to the LOAD field. ON and OFF will be displayed in the softkey area.

h) Press OFF, close the load correction function.

i) Move the cursor to FREQ 1 field. ON, OFF, MEAS OPEN, MEAS SHORT and MEAS LOAD will be displayed in the softkey area.

j) Press ON, enable the dot frequency clear function for frequency 1.

k) Press key [5],[.][5], +5.5 will be displayed in the bottom line of the screen, and the usable units (Hz, kHz, and MHz) will be displayed in the softkey area. Press the softkey kHz, the frequency 1 will be changed to 5.5000 kHz which is the same to the test frequency.

l) Keep the test fixture open, press the softkey MEAS OPEN to perform open correction.

m) Connect the shorting bar (TH26010) to the test fixture.

n) Press the softkey MEAS SHORT to perform short correction.

5.3The right connection between the test fixture and the DUT

Generally, any mutual inductance, interference of the test signals, or unwanted residual factors in the connection method incidental to ordinary termination methods will have a significant effect on measurement, especially at high frequency. The TH2826 employs a four-terminal pair measurement configuration that permits easy, stable, and accurate measurement while avoiding the negative influences inherent in the above factors. These are the UNKNOWN Terminals used to connect a four-terminal pair test fixture or test leads for measuring the device under test.

HD: High current drive

HS: High potential sense

LS: Low potential sense

LD: Low current drive

The every test terminal has its own shielding layer.

HD, HS, LD. LS must be connected to the corresponding lead wire of the DUT to make up of the four terminal test.

If you do the test with high accuracy, to use the test fixture is recommended.

No matter you use the test fixture provided by Tonghui Company, Kelvin test leads or the test fixture made by yourself, the following requirement must be met:

1) The distributed resistance must be decreased to the minimum, especially when the high resistance DUT is tested.
2) The contact resistance must be decreased to the minimum.
3) Short correction and open correction can be performed between the two contact points.

Note: 1) When the DUT has the polarity, the high potential terminal should be connected to "+" or HD, HS terminal, the low potential terminal should be connected to "-"or LD, LS terminal on the front panel.
2) Do the discharge before the DUT is tested to avoid the damage to the instrument.

5.4Eliminate the disturbance of the stray capacitance

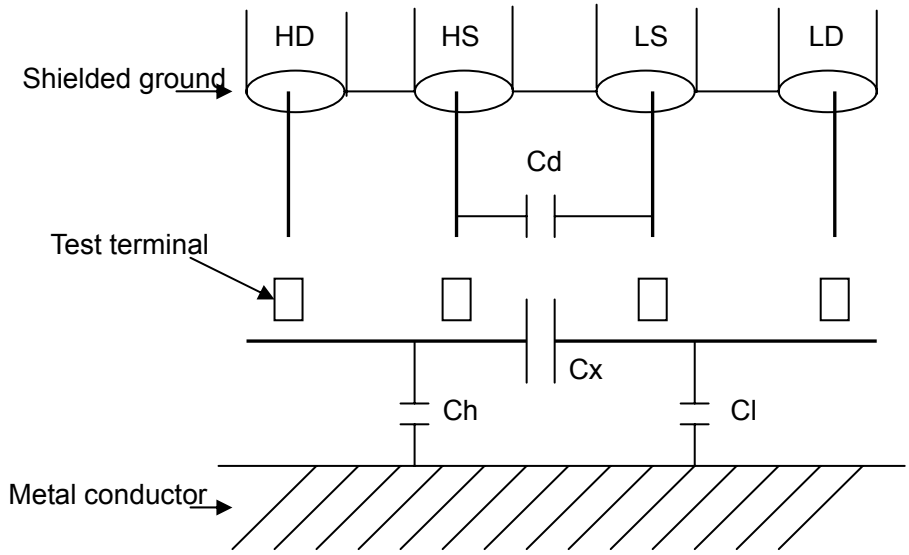


Figure 5-1 the disturb of the stray capacitance

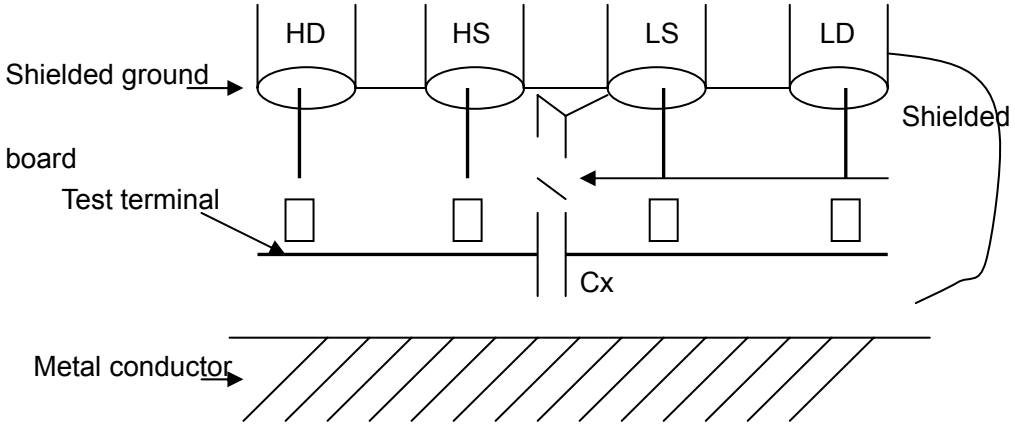


Figure 5-2 the method of eliminating the disturb of the stray capacitance

When the DUT is High Impedance (e.g.: small capacitance), the disturbance of the stray capacitance should not be neglected. In figure 5-1, when there is a conductor board below the DUT, the test result will be error. But when a grounded conductor is placed between the HS and the LS, Cd can be reduced to the smallest. At the same time, if the grounded conductor is placed between the LD and Metal conductor, the effect of the Ch and the Cl will be eliminated.

When the DUT is low impedance (e.g.: small inductance, big capacitance), the main source

of the test error is electromagnetic coupling between the test leads. TH2826 employs a four-terminal pair measurement configuration to eliminate the effect of the coupling. Because the current in HD, LD and the one in the shielding terminal are the same size, but the opposite direction, the magnetic fields are eliminated.

5.5Inductance test example

measurement conditions:

function: Ls-Q

frequency:5.5kHz

level:1.5Vrms

internal resistance:100Ω

Procedures:

1) Turn on the TH2826.

2) Set the basic parameters:

a) Press [LCRZ], LCR MEAS DISP page will be displayed.

b) Move the cursor to FUNC field by using the direction keys on the front panel. The FUNC field displays Cp-D. At this time, Cp-D, Cp-Q, Cp-G, Cp-Rp and MORE 1/6 will be displayed in the softkey area, which is on the right of the screen.

c) Press MORE 1/6. Cs-D, Cs-Q, Cs-Rs and MORE 2/6 will be displayed.

d) Press MORE 2/6. Lp-D, Lp-Q, Lp-G, Lp-Rp and MORE 3/6 will be displayed.

e) Press MORE 3/6.Ls-D,Ls-Q,Ls-Rs and MORE 2/6 will be displayed.

f) Press Ls-Q to select Ls-Q test function.

g) Move the cursor to FREQ. the current frequency displayed is 1.0000kHz.

h) Press key[5][.][5], +5.5 will be displayed in the bottom line of the screen. The softkey area will display the usable units (Hz, kHz and MHz).Press kHz, the FREQ field will be changed to 5.5000kHz.

i) Move the cursor to LEVEL field. The current level displayed is 1.000V.

j) Press[1][.][5]. +1.5 will be displayed in the bottom line of the screen, and the softkey area will display the usable units (mV, V, uA, mA and A).Press ENTER, the level will be changed to 1.5V.

k) Press [LCRZ], and then press MORE 1/3, MEAS SETUP page will be displayed.

l) Move the cursor to Rsou field. 100Ω and 30Ω will be displayed in the softkey area.

m) Press the softkey 100Ω to select 100Ω as the internal resistance of the signal source.

3) Connect the test fixture (TH26005) to TH2826's test terminals.

4) Perform the clear. (To avoid the disturbance of the stray capacitance, you should do OPEN/SHORT CORRECTION. Refer to Dot frequency clear in this chapter.)

5) Insert the test capacitance to test fixture.

6) Perform the measurement.

Press [LCRZ], TH2826 will display LCR MEAS DISP page.TH2826 can test continually and display the test result in the middle of the screen as figure 5-3 shows.

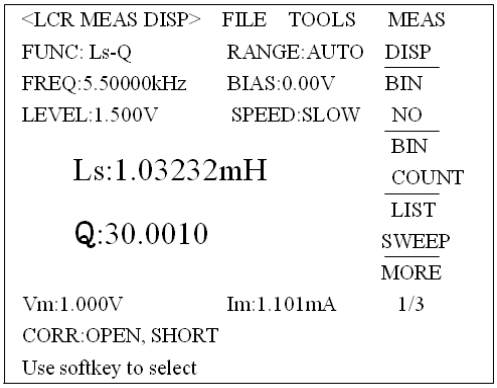


Figure 5-3 LCR MEAS DISP page

7) If the test result is error evidently, please perform the following steps:

(a) Check whether the capacitance is connected to the test fixture reliably

(b) Check whether the test fixture is connected to the test terminal of the instrument reliably.

(c) Do open correction and short correction again.

Note: when you use frequency sweep open/short correction, the dot frequency correction

function should be OFF. Please refer to 5.1 in this chapter.

5.6Multi-frequency List sweep for capacitance test

Measurement conditions:

Function: Cp-D

Level:1Vrms

The other parameters are shown in table 5-1:

Table 5-1 the related parameters of the capacitance test

frequency	Compared parameter	upper limit	lower limit
1kHz	Cp	325.0nF	333.0nF
10kHz	D	0.0001	0.0003
100kHz	D	0.0060	0.0100

Beep: HIGH

Alarm mode: out

Procedures:

1) Turn on the TH2826.

2) Set the basic parameters:

a) Press [LCRZ], LCR MEAS DISP page will be displayed.

b) The FUNC field is Cp-D, the LEVEL field is 1.000V. At the same time, MEAS DISP, BIN NO, BIN COUNT, LIST SWEEP and MORE 1/3 will be displayed in the softkey area.

c) Press MORE 1/3. MEAS SETUP, CORRECTION, LIMIT TABLE, LIST SETUP and MORE 2/3 will be displayed in the softkey area.

d) Press LIST SETUP. LIST SWEEP SETUP page will be displayed.

e) Move the cursor to (sweep parameter) field. The field displays FREQ [HZ].

f) Press [⇩].Move the cursor to the parameter area of sweep point 1. The parameter area displays .

g) Press [1], +1 will be displayed in the bottom line of the screen. The softkey area will display the usable units (Hz, kHz and MHz). Press kHz. The value of this field will be changed to 1.0000k.

h) Press [⇨], move the cursor to the LMT field of sweep point. The field displays . The softkey area will display LIMIT DATA A, LIMIT DATA B and OFF.

i) Press LIMIT DATA A to select the main compared parameter Cp, the LMT field will display A, the cursor will be moved to the LOW field

automatically.

j) Press [3][2][5], +325 will be displayed in the bottom line of the screen. The usable units (p, n, u, m and MORE 1/2) will be displayed in the softkey area. Press n, the value of the field will be changed to 325.000n. The cursor will be moved to the HIGH field of the sweep point 1 automatically.

k) Press [3][3][3], +333 will be displayed in the bottom line of the screen. The usable units (p, n, u, m and MORE 1/2) will be displayed. Press n, the value of this field will be changed to 333.000n. The cursor will be moved to the parameter area of the sweep point 2.

l) Press [10], +10 will be displayed in the bottom line of the screen. The usable units (Hz, kHz and MHz) will be displayed in the softkey area. Press kHz, the value of this field will be changed to 10.0000k.

m) Press [⇨]. Move the cursor to the LMT field of the sweep point 2. Current field displays , the softkey area will display LIMIT DATA A, LIMIT DATA B and OFF.

n) Press LIMIT DATA B to select the secondary compared parameter D. The field will display , the cursor will be moved to the LOW field of the sweep point 2 automatically.

o) Press [0][.][0][0][0][1], +0.0001 will be displayed in the bottom line of the screen. The usable units (p, n, μ, m and MORE 1/2) will be displayed in the softkey area. Press MORE 1/2. k, M, *1 and MORE 2/2 will be displayed. Press *1, the value of this field will be changed to 100.000μ. The cursor will be moved to the HIGH field of the sweep point 2 automatically.

p) Press [0][.][0][0][0][3], +0.0003 will be displayed in the bottom line of the screen, the usable units (k, M, *1 and MORE 2/2) will be displayed in the softkey area. Press *1, the value of the field will be changed to 300.000μ. The cursor will be moved to the parameter area of the sweep point 3.

q) According to steps l to p, Input the parameters of sweep point 3 in turn: 100 kHz, B, 0.0060 and 0.0100.

3) Setting for alarm

(a)Press [SYSTEM]. The SYSTEM SETUP page will be displayed.

(b)Move the cursor to beep field. The current field displays LOW. OFF, LOW and HIGH will be displayed in the softkey area.

(c)Press HIGH to select beep with high sound

(d)Move the cursor to ALARM MODE field. The current field displays OUT

4) Connect the test fixture (TH26005) to TH2826's test terminals.
5) Perform the clear. (To avoid the disturbance of the stray capacitance, you should do OPEN/SHORT CORRECTION by referring to Dot frequency clear in this chapter.)
6) Insert the capacitance to test fixture.
7) Perform the following measurement.

Press [LCRZ], and press LIST SWEEP.TH2826 will display LIST SWEEP DISP page. The continually sweep test will be performed. The test and compared result will be displayed. The beep will sound when the compared result is H (greater than the high) and L(less than the low). Figure 5-4 shows the LIST SWEEP DISP page.

8) If the test result is error evidently, please perform the following steps:
(a)Check whether the capacitance is connected to the test fixture reliably
(b)Check whether the test fixture is connected to the test terminal of the instrument reliably.
(c)Do open correction and short correction again.

Note: when you use frequency sweep open/short correction, the dot frequency correction function should be OFF. Please refer to 5.1 in this chapter.

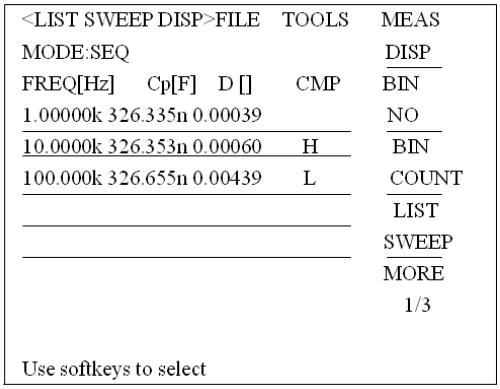


Figure 5-4 the LIST SWEEP DISP page

5.7Operation example for load correction

Procedures:

Suppose the test conditions are below:

frequency:100kHz
standard Cp:11nf
standard D:0.0005

(a)Press [LCRZ], and then press MORE 1/3. MEAS SETUP, CORRECTION, LIMIT TABLE , LIST SETUP and MORE 2/3 will be displayed in the softkey area.
(b)Press the softkey CORRECTION. CORRECTION page will be displayed.

(c)Move the cursor to OPEN field. ON, OFF and MEAS OPEN will be displayed in the softkey area.
(d)Press ON to enable the open correction.
(e)Move the cursor to SHORT field. ON, OFF and MEAS SHORT will be displayed in the softkey area.
(f)Press ON to enable the short correction.
(g)Move the cursor to LOAD field. ON and OFF will be displayed in the softkey area.
(h)Press ON to enable the load correction.
(i)Move the cursor to FUNC field. The current field will display Cp-D. Cp-D, Cp-Q, Cp-G, Cp-Rp and MORE 1/6 will be displayed in the softkey area.
(j)Press Cp-D to select Cp-D.
(k)Move the cursor to FREQ 1 field. ON, OFF, MEAS OPEN, MEAS SHORT and MEAS LOAD will be displayed in the softkey area.
(l)Press ON to enable the dot frequency correction for FREQ 1.
(m)Press[1][0][0], +100 will be displayed in the bottom of the screen, the usable units(Hz, kHz and MHz) will be displayed. Press kHz. The value of FREQ1 will be changed to 100.000kHz which is the same to test frequency.
(n)Move the cursor to REF A field below FREQ1. Press [1][1], +11 will be displayed in the bottom line of the screen. The usable units (p, n, μ, m and MORE 1/2) will be displayed in the sotfkey area. Press n. the value of this field will be changed to 11.0000 nF .
(o)Move the cursor to B: field below FREQ 1. Press [0][.][0][0][5], +0.0005 will be displayed in the bottom line of the screen, the usable units (p, n, μ, m and MORE 1/2) will be displayed in the softkey area. Press *1, the value of this field will be changed to 0.00050.
(p)Move the cursor to FREQ 1 field. ON, OFF, MEAS OPEN, MEAS SHORT and MEAS LOAD will be displayed in the softkey area.
(q)Keep the test fixture open, and keep your hands and other disturbance source far from the test fixture. Press MEAS OPEN to perform open correction.
(r)Insert the shorting bar (TH26010) to the test fixture to ensure the shorting bar and the test fixture contact close.
(s)Press the softkey MEAS SHORT to perform short correction.
(t)Insert the standard capacitance to the test fixture.
(u)Press the softkey MEAS LOAD to perform load correction.

Note:
(a) The displayed softkey information may be not identical to the one described in this book because the software version is different.
(b)Load correction is effective to the instrument with the same specification. If the specification is changed, the load correction should be done again.

Chapter 6 Performance and test

This chapter describes the performance of TH2826. The related parameters for TH2826 are illuminated.

6.1Measurement function

6.1.1 Measurement parameter and sign description

C: Capacitance L：Inductance

R：Resistance Z：Impedance Y：Admittance

X：Reactance B：susceptance G：conductance

D：dissipation θ：phase angle Q：quality factor

DCR：DC resistance

6.1.2 Test combination

Eleven test parameters and Lk can be combined as the following methods:

Table 6-1 the combination methods for the test parameters

Main parameter	Z，Y	L，C	R	G
Auxiliary parameters	θ（degree），θ（radian）	D，Q，RS，RP，G	X	B

Note: DCR has no test combination

6.1.3Math operation

ΔABS=R-S;

Δ%=(R-S)/S*100%.

(R: test value S: standard value)

6.1.4Equivalent mode

Parallel, serial

6.1.5Range

Auto, manual (hold, increase and decrease)

6.1.6Trigger

Inner, outside, manual

Inner: the DUT is tested continually and the result is displayed.

Manual: Press “START” on the panel to perform the test once and the result is displayed. At the other time, the instrument is on the waiting state.

Outside: when the instrument HANDLER interface receives the “START” signal, one test is performed, and then the instrument is on the waiting state.

6.1.7Delay time

0-60 s is programmable stepped by 1ms.

6.1.8The unknown terminal

HD: High current drive

HS: High potential sense

LS: Low potential sense

LD: Low current drive

6.1.9Measurement speed

Fast: approximately 200 times/s

Medium: approximately 25 times/s

Slow: approximately 5 times/s

The medium speed and the fast speed will be reduced when the frequency is slower than 1kHz.

6.1.10Average

1 to 255 programmable

6.1.11Display digits

5 digits, the maximum is 99999.

6.2 Test signal

6.2.1Test signal frequency

Test signal: sine wave, the accurate of the frequency: 0.02%.

The range of the test frequency of TH2828: 20~5MHz

The minimum resolution: 0.01Hz

6.2.2Signal mode

Normal: test the voltage by programming in the MEAS DISP page. The voltage in the unknown terminal may be lower than the set one according to the tested resistance.

Constant voltage: the DUT voltage is consistent with the set voltage by adjusting the internal voltage.

6.2.3The test signal level

Table 6-2 the test level of the signal

	mode	range	accurate	step
voltage	normal constant	10mVRMS—5VRMS 5mVRMS—1VRMS	±（10%×set value+2mV） ±（20%×set value +2mV）	1mV
current	Normal constant	10μARMS —100mARMS 10μARMS	± （ 10%×set value +10μARMS） ± （ 20%×set value	1mV

		—20mARMS	+10μARMS）	

6.2.4Internal resistance mode

10/CC（Constant Current）、30Ω、50Ω、100Ω

6.2.5Test signal level monitor

Figure 0-3

Mode	Range	Accuracy
Voltage	$0V_{RMS}$—$5V_{RMS}$	±（10%×Reading+10mV）
Current	$0A_{RMS}$—$100mA_{RMS}$	±（10%×Reading+10μA）

6.2.4The maximum range of the test and display

Figure 0-4

Parameter	Displayed range
L、Lk	0.01nH ～ 9.9999kH
C	0.0001pF ～ 9.9999F
R、X、Z、DCR	0.1mΩ ～ 99.999MΩ
Y、B、G	0.0001nS ～ 99.999S
D	0.0001 ～ 9.9999
Q	0.0001 ～ 99999
θ	Deg -179.99°～179.99° Rad -3.14159 ～ 3.14159

6.2.5The test voltage for DC resistance

±1.4VDC

Accuracy：±5%

Internal resistance：50Ω±5%

6.2.6 The internal DC voltage bias

-5v~+5V, ±(10%+10mV), 1mV by stepper

6.3Test accuracy

The relation of test accuracy and basic accuracy is shown as below：

$$\text{Test accuracy} = \text{Basic accuracy} \times C \times D + E \qquad (1)$$

C： Speed factor

D：Cable length factor

E：Temperature factor

6.3.1 Basic accuracy

Basic accuracy is calculated by A, B in basic accuracy factor table.

Note：

(1) when frequency is larger than 1.001MHz，basic accuracy must multiply (f(MHz)+3)/4；

(2)In the mode of constant voltage or current

When range>=100Ω

Basic accuracy Z(%) or $\theta(°)$ $= \pm(A + \frac{B \times |Zx[\Omega] - Range[\Omega]|}{Range[\Omega]})$ (2)

When range <100Ω

Basic accuracy Z(%) or $\theta(°) = \pm(A + \frac{B \times |Range[\Omega] \times 10 - Zx[\Omega]|}{Range[\Omega]})$ (3)

In (2)、(3)，

Zx: sample value of |Z|

The sample value of impedance is considered as test result or caculated by the formula below：

$|Zx|(\Omega) = \omega L(H) \quad (\theta = 90°)$

$= 1/\omega C(F) \quad (\theta = -90°)$

$= R(\Omega) \quad (\theta = 0°)$

Test condition of basic accuracy :

1. Use TH26048 test fixture;
2. Test speed:SLOW
3. Cable length factor:0m
4. Temperature and humidity：20±5℃， (RH)<=80%
5. Warm up:60 Min
6. Before testing, perform open and short correction

6.3.2Test speed factor(C)

Speed	(FAST)	(NORMAL)	(SLOW)
C	5	2	1

6.3.3Cable length factor

Cable length	0m	1m
D	1	(100kHz max)1.5+0.015*f[kHz]
		(100.1kHz min)1.5+0.3*f[kHz]

6.3.4 Temperature factor

Temperature	Operation temperature=T℃
E	0.1*basic accuracy*(T-20)

Basic accuracy table 1(0.010V to 0.049V)

When range>=100Ω

$$\text{Basic accuracy } = \pm(A + \frac{B\times|Zx[\Omega]-Range[\Omega]|}{Range[\Omega]})$$

When range <100Ω

$$\text{Basic accuracy} = = \pm(A + \frac{B\times|Range[\Omega]\times 10 - Zx[\Omega]|}{Range[\Omega]})$$

Zx:sample value of impedance Z

A,B:Basic accuracy factor

Accuracy factor of Z(%)： value A，B in group 1

Accuracy factor of θ (°)：value A，B in group 2

When $f >= 1.001MHz$,basic accuracy must multiply (f[MHz]+3)/4.

Table 6-5 Basic accuracy 1(0.010V to 0.049V)

*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
	1MΩ						
	100kΩ	A=1.5 B=1	A=1 B=0.5	A=1 B=0.5			
		A=2 B=0.3	A=0.5 B=0.1	A=0.5 B=0.1			
	10kΩ	A=0.8 B=0.5	A=0.5 B=0.2	A=0.5 B=0.2	A=1.5 B=0.5		
		A=0.5 B=0.01	A=0.2 B=0.02	A=0.2 B=0.02	A=0.6 B=0.05		
	3kΩ	A=0.8 B=0.5	A=0.5 B=0.2	A=0.5 B=0.2	A=1.5 B=0.5		
		A=0.5 B=0.01	A=0.2 B=0.02	A=0.2 B=0.02	A=0.6 B=0.05		

6month	1kΩ	A=0.6 B=0.05	A=0.25 B=0.01	A=0.25 B=0.01	A=1 B=0.2		
		A=0.5 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.5 B=0.02		
	300Ω	A=0.6 B=0.05	A=0.25 B=0.01	A=0.25 B=0.01	A=1 B=0.2		
		A=0.5 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.5 B=0.02		
	100Ω	A=0.6 B=0.05	A=0.25 B=0.01	A=0.25 B=0.02	A=0.5 B=0.02	A=2 B=0.5	
		A=0.5 B=0.01	A=0.15 B=0.02	A=0.15 B=0.01	A=0.5 B=0.02	A=2 B=0.5	
	30Ω	A=0.6 B=0.05	A=0.25 B=0.01	A=0.25 B=0.02	A=0.5 B=0.02	A=2 B=0.5	
		A=0.5 B=0.01	A=0.15 B=0.02	A=0.15 B=0.01	A=0.5 B=0.02	A=2 B=0.5	
	10Ω	A=0.6 B=0.05	A=0.25 B=0.02	A=0.25 B=0.02	A=0.5 B=0.02	A=2 B=0.5	
		A=0.5 B=0.02	A=0.15 B=0.02	A=0.15 B=0.02	A=0.5 B=0.02	A=2 B=0.5	
	1Ω	A=1 B=0.2	A=0.4 B=0.2	A=0.4 B=0.2	A=1 B=0.2	A=3 B=1	
		A=0.5 B=0.5	A=0.3 B=0.05	A=0.3 B=0.05	A=0.6 B=0.1	A=3 B=1	
*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
1year	1MΩ						
	100kΩ	A=2.25 B=1.5	A=1.5 B=0.75	A=1.5 B=0.75			
		A=3 B=0.45	A=0.75 B=0.15	A=0.75 B=0.15			
	10kΩ	A=1.2 B=0.75	A=0.75 B=0.3	A=0.75 B=0.3	A=2.25 B=0.75		
		A=0.75 B=0.015	A=0.3 B=0.03	A=0.3 B=0.03	A=0.9 B=0.075		
	3kΩ	A=1.2 B=0.75	A=0.75 B=0.3	A=0.75 B=0.3	A=2.25 B=0.75		
		A=0.75 B=0.015	A=0.3 B=0.03	A=0.3 B=0.03	A=0.9 B=0.075		
	1kΩ	A=0.9 B=0.075	A=0.375 B=0.015	A=0.375 B=0.015	A=1.5 B=0.3		
		A=0.75 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.75 B=0.03		
	300Ω	A=0.9 B=0.075	A=0.375 B=0.015	A=0.375 B=0.015	A=1.5 B=0.3		
		A=0.75 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.75 B=0.03		
	100Ω	A=0.9 B=0.075	A=0.375 B=0.015	A=0.375 B=0.015	A=0.75 B=0.03	A=3 B=0.75	
		A=0.75 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.75 B=0.03	A=3 B=0.75	
	30Ω	A=0.9 B=0.075	A=0.375 B=0.015	A=0.375 B=0.015	A=0.75 B=0.03	A=3 B=0.75	
		A=0.75 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.75 B=0.03	A=3 B=0.75	
	10Ω	A=0.9 B=0.075	A=0.375 B=0.03	A=0.375 B=0.03	A=0.75 B=0.03	A=3 B=0.75	
		A=0.75 B=0.03	A=0.225 B=0.03	A=0.225 B=0.03	A=0.75 B=0.03	A=3 B=0.75	
	1Ω	A=1.5 B=0.3	A=0.6 B=0.3	A=0.6 B=0.3	A=1.5 B=0.3	A=4.5 B=1.5	
		A=0.75 B=0.75	A=0.45 B=0.075	A=0.45 B=0.075	A=0.9 B=0.15	A=4.5 B=1.5	

Basic accuracy table 2(0.050V to 0.100V)
When range>=100Ω

$$\text{Basic accuracy} = \pm(A + \frac{B\times|Zx[\Omega]-Range[\Omega]|}{Range[\Omega]})$$

When range <100Ω

$$\text{Basic accuracy} = = \pm(A + \frac{B\times|Range[\Omega]\times 10-Zx[\Omega]|}{Range[\Omega]})$$

Zx:sample value of impedance Z

A,B: Basic accuracy factor

Accuracy factor of Z (%)：value A，B in group 1

Accuracy factor of θ (°)：value A，B in group 2

When $f >= 1.001MHz$, basic accuracy must multiply (f[MHz]+3)/4.

Table 6-6 Basic accuracy 2(0.050V to 0.100V)

*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
6month	1MΩ						
	100kΩ	A=1 B=0.2	A=0.5 B=0.05	A=0.5 B=0.05	A=1 B=0.2		
		A=1.5 B=0.2	A=0.25 B=0.05	A=0.25 B=0.05	A=1 B=0.1		
	10kΩ	A=0.5 B=0.01	A=0.2 B=0.01	A=0.25 B=0.01	A=0.5 B=0.05	A=3.5 B=2	
		A=0.35 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.3 B=0.05	A=1.5 B=1	
	3kΩ	A=0.5 B=0.01	A=0.2 B=0.01	A=0.25 B=0.01	A=0.5 B=0.05	A=3.5 B=2	
		A=0.35 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.3 B=0.05	A=1.5 B=1	
	1kΩ	A=0.5 B=0.01	A=0.2 B=0.01	A=0.2 B=0.01	A=0.3 B=0.02	A=0.8 B=0.2	
		A=0.35 B=0.01	A=0.1 B=0.01	A=0.1 B=0.01	A=0.2 B=0.02	A=1 B=0.3	
	300Ω	A=0.5 B=0.01	A=0.2 B=0.01	A=0.2 B=0.01	A=0.3 B=0.02	A=0.8 B=0.2	
		A=0.35 B=0.01	A=0.1 B=0.01	A=0.1 B=0.01	A=0.2 B=0.02	A=1 B=0.3	
	100Ω	A=0.5 B=0.01	A=0.2 B=0.01	A=0.2 B=0.01	A=0.3 B=0.02	A=0.6 B=0.05	A=2.5 B=0.4
		A=0.35 B=0.01	A=0.15 B=0.01	A=0.1 B=0.01	A=0.2 B=0.02	A=0.4 B=0.05	A=2 B=0.2
	30Ω	A=0.5 B=0.01	A=0.2 B=0.01	A=0.2 B=0.01	A=0.3 B=0.02	A=0.6 B=0.05	A=2.5 B=0.4
		A=0.35 B=0.01	A=0.15 B=0.01	A=0.1 B=0.01	A=0.2 B=0.02	A=0.4 B=0.05	A=2 B=0.2
	10Ω	A=0.5 B=0.02	A=0.2 B=0.02	A=0.2 B=0.02	A=0.3 B=0.02	A=0.6 B=0.05	A=2.5 B=0.2
		A=0.35 B=0.02	A=0.1 B=0.02	A=0.1 B=0.02	A=0.2 B=0.02	A=0.4 B=0.05	A=2 B=0.2
	1Ω	A=0.6 B=0.1	A=0.35 B=0.04	A=0.35 B=0.04	A=0.35 B=0.04	A=1 B=0.5	A=4 B=1.5
		A=0.4 B=0.2	A=0.2 B=0.05	A=0.2 B=0.05	A=0.3 B=0.05	A=1 B=0.3	A=3.5 B=1
*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
	1MΩ						

1year	100kΩ	A=1.5 B=0.3	A=0.75 B=0.075	A=0.75 B=0.075	A=1.5 B=0.3		
		A=2.25 B=0.3	A=0.375B=0.075	A=0.375 B=0.075	A=1.5 B=0.15		
	10kΩ	A=0.75 B=0.015	A=0.3 B=0.015	A=0.375 B=0.015	A=0.75 B=0.075	A=5.25 B=3	
		A=0.525 B=0.015	A=0.225B=0.015	A=0.225 B=0.015	A=0.45 B=0.075	A=2.25 B=1.5	
	3kΩ	A=0.75 B=0.015	A=0.3 B=0.015	A=0.375 B=0.015	A=0.75 B=0.075	A=5.25 B=3	
		A=0.525 B=0.015	A=0.225B=0.015	A=0.225 B=0.015	A=0.45 B=0.075	A=2.25 B=1.5	
	1kΩ	A=0.75 B=0.015	A=0.3 B=0.015	A=0.3 B=0.015	A=0.45 B=0.03	A=1.2 B=0.3	
		A=0.525 B=0.015	A=0.15 B=0.015	A=0.15 B=0.015	A=0.3 B=0.03	A=1.5 B=0.45	
	300Ω	A=0.75 B=0.015	A=0.3 B=0.015	A=0.3 B=0.015	A=0.45 B=0.03	A=1.2 B=0.3	
		A=0.525 B=0.015	A=0.15 B=0.015	A=0.15 B=0.015	A=0.3 B=0.03	A=1.5 B=0.45	
	100Ω	A=0.75 B=0.015	A=0.3 B=0.015	A=0.3 B=0.015	A=0.45 B=0.03	A=0.9 B=0.075	A=3.75 B=0.6
		A=0.525 B=0.015	A=0.15 B=0.015	A=0.15 B=0.015	A=0.3 B=0.03	A=0.6 B=0.075	A=3 B=0.3
	30Ω	A=0.75 B=0.015	A=0.3 B=0.015	A=0.3 B=0.015	A=0.45 B=0.03	A=0.9 B=0.075	A=3.75 B=0.6
		A=0.525 B=0.015	A=0.15 B=0.015	A=0.15 B=0.015	A=0.3 B=0.03	A=0.6 B=0.075	A=3 B=0.3
	10Ω	A=0.5 B=0.02	A=0.2 B=0.02	A=0.2 B=0.02	A=0.3 B=0.02	A=0.6 B=0.05	A=2.5 B=0.2
		A=0.35 B=0.02	A=0.1 B=0.02	A=0.1 B=0.02	A=0.2 B=0.02	A=0.4 B=0.05	A=2 B=0.2
	1Ω	A=0.9 B=0.15	A=0.525 B=0.06	A=0.525 B=0.06	A=0.525 B=0.06	A=1.5 B=0.75	A=6 B=2.25
		A=0.6 B=0.3	A=0.3 B=0.075	A=0.3 B=0.075	A=0.45 B=0.075	A=1.5 B=0.45	A=5.25 B=1.5

Basic accuracy 3(0.101V to 0.500V)
When range >=100Ω

$$\text{Basic accuracy} = \pm(A + \frac{B\times|Zx[\Omega]-Range[\Omega]|}{Range[\Omega]})$$

When range <100Ω

$$\text{Basic accuracy} = = \pm(A + \frac{B\times|Range[\Omega]\times 10-Zx[\Omega]|}{Range[\Omega]})$$

Zx:sample value of impedance Z
A,B:basic accuracy factor
Accuracy factor of Z (%)：value A，B in group 1
Accuracy factor of θ (°)：value A，B in group 2

Wehn $f >= 1.001MHz$, basic accuracy must multiply (f[MHz]+3)/4.

Table 6-9 Basic accuracy 3(0.101V to 0.500V)

*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz

	1MΩ	A=1 B=1	A=0.7 B=0.5	A=0.7 B=0.5	A=1.2 B=1		
		A=2 B=0.2	A=0.3 B=0.2	A=0.3 B=0.2	A=1.2 B=0.5		
	100kΩ	A=0.45 B=0.05	A=0.3 B=0.05	A=0.3 B=0.05	A=0.5 B=0.08		
		A=0.35 B=0.2	A=0.2 B=0.02	A=0.2 B=0.02	A=0.5 B=0.08		
	10kΩ	A=0.4 B=0.01	A=0.15 B=0.01	A=0.2 B=0.01	A=0.3 B=0.04	A=2 B=1.5	
		A=0.3 B=0.01	A=0.008 B=0.01	A=0.1 B=0.01	A=0.25 B=0.03	A=1 B=0.5	
	3kΩ	A=0.4 B=0.01	A=0.15 B=0.01	A=0.2 B=0.01	A=0.3 B=0.04	A=2 B=1.5	
		A=0.3 B=0.01	A=0.008 B=0.01	A=0.1 B=0.01	A=0.25 B=0.03	A=1 B=0.5	
6month	1kΩ	A=0.4 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.25 B=0.02	A=0.5 B=0.05	A=2 B=1
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.7 B=0.3	A=1.5 B=0.2
	300Ω	A=0.4 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.25 B=0.02	A=0.5 B=0.05	A=2 B=1
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.7 B=0.3	A=1.5 B=0.2
	100Ω	A=0.4 B=0.02	A=0.15 B=0.02	A=0.15 B=0.01	A=0.25 B=0.02	A=0.5 B=0.03	A=2 B=0.2
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.05	A=1.5 B=0.2
	30Ω	A=0.4 B=0.02	A=0.15 B=0.02	A=0.15 B=0.01	A=0.25 B=0.02	A=0.5 B=0.03	A=2 B=0.2
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.05	A=1.5 B=0.2
	10Ω	A=0.4 B=0.02	A=0.15 B=0.02	A=0.15 B=0.02	A=0.25 B=0.02	A=0.5 B=0.03	A=2 B=0.2
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.05	A=1.5 B=0.2
	1Ω	A=0.5 B=0.1	A=0.3 B=0.04	A=0.3 B=0.04	A=0.3 B=0.04	A=0.6 B=0.1	A=2.5 B=1.5
		A=0.35 B=0.2	A=0.15 B=0.03	A=0.15 B=0.03	A=0.2 B=0.03	A=0.6 B=0.1	A=3 B=1
*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
	1MΩ	A=1.5 B=1.5	A=1.05 B=0.75	A=1.05 B=0.75	A=1.8 B=1.5		
		A=3 B=0.3	A=0.45 B=0.3	A=0.45 B=0.3	A=1.8 B=0.75		
	100kΩ	A=0.675 B=0.075	A=0.45 B=0.075	A=0.45 B=0.075	A=0.75 B=0.12		
		A=0.525 B=0.3	A=0.3 B=0.03	A=0.3 B=0.03	A=0.75 B=0.12		
	10kΩ	A=0.6 B=0.015	A=0.225B=0.015	A=0.3 B=0.015	A=0.45 B=0.06	A=3 B=2.25	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.15 B=0.015	A=0.375 B=0.045	A=1.5 B=0.75	
	3kΩ	A=0.6 B=0.015	A=0.225B=0.015	A=0.3 B=0.015	A=0.45 B=0.06	A=3 B=2.25	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.15 B=0.015	A=0.375 B=0.045	A=1.5 B=0.75	
1year	1kΩ	A=0.6 B=0.015	A=0.225B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=0.75 B=0.075	A=3 B=1.5
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=1.05 B=0.45	A=2.25 B=0.75
	300Ω	A=0.6 B=0.015	A=0.225B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=0.75 B=0.075	A=3 B=1.5
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=1.05 B=0.45	A=2.25 B=0.75
	100Ω	A=0.6 B=0.015	A=0.225B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=0.75 B=0.045	A=3 B=0.3
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.075	A=2.25 B=0.3
	30Ω	A=0.6 B=0.015	A=0.225B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=0.75 B=0.045	A=3 B=0.3

		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.075	A=2.25 B=0.3
	10Ω	A=0.6 B=0.03	A=0.225B=0.03	A=0.225 B=0.03	A=0.375 B=0.03	A=0.75 B=0.045	A=3 B=0.3
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.075	A=2.25 B=0.3
	1Ω	A=0.75 B=0.15	A=0.45 B=0.06	A=0.45 B=0.06	A=0.45 B=0.06	A=0.9 B=0.15	A=3.75 B=2.25
		A=0.525 B=0.3	A=0.225B=0.045	A=0.225 B=0.045	A=0.3 B=0.45	A=0.9 B=0.15	A=4.5 B=1.5

Basic accuracy 4(0.501V to 1.000V)

When range>=100Ω

$$\text{Basic accuracy} = \pm(A + \frac{B \times |Zx[\Omega] - Range[\Omega]|}{Range[\Omega]})$$

When range<100Ω

$$\text{Basic accuracy} = = \pm(A + \frac{B \times |Range[\Omega] \times 10 - Zx[\Omega]|}{Range[\Omega]})$$

Zx:sample value of impedance Z

A,B:basic accuracy factor

Accuracy factor of Z (%)：value A，B in group 1

Accuracy factor of θ (°)：value A，B in group 2

Wehn $f >= 1.001MHz$, basic accuracy must multiply (f[MHz]+3)/4.

Table 6-10Basic accuracy 4(0.501V to 1.000V)

*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
6month	1MΩ	A=0.8 B=0.4	A=0.4 B=0.2	A=0.4 B=0.2	A=1 B=0.5		
		A=1 B=0.2	A=0.25 B=0.1	A=0.25 B=0.1	A=1 B=0.5		
	100kΩ	A=0.4 B=0.05	A=0.15 B=0.05	A=0.15 B=0.05	A=0.3 B=0.08	A=3 B=1	
		A=0.3 B=0.1	A=0.15 B=0.02	A=0.15 B=0.02	A=0.3 B=0.08	A=3 B=0.5	
	10kΩ	A=0.35 B=0.01	A=0.08 B=0.01	A=0.15 B=0.01	A=0.25 B=0.04	A=0.4 B=0.3	A=2 B=0.5
		A=0.25 B=0.01	A=0.05 B=0.01	A=0.08 B=0.01	A=0.15 B=0.02	A=0.3 B=0.3	A=2 B=0.3
	3kΩ	A=0.35 B=0.01	A=0.08 B=0.01	A=0.15 B=0.01	A=0.25 B=0.04	A=0.4 B=0.3	A=2 B=0.5
		A=0.25 B=0.01	A=0.05 B=0.01	A=0.08 B=0.01	A=0.15 B=0.02	A=0.3 B=0.3	A=2 B=0.3
	1kΩ	A=0.35 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.2 B=0.02	A=0.3 B=0.03	A=1.5 B=0.2
		A=0.25 B=0.005	A=0.05 B=0.005	A=0.05 B=0.005	A=0.08 B=0.02	A=0.15 B=0.02	A=1 B=0.2
	300Ω	A=0.35 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.2 B=0.02	A=0.3 B=0.03	A=1.5 B=0.2
		A=0.25 B=0.005	A=0.05 B=0.005	A=0.05 B=0.005	A=0.08 B=0.02	A=0.15 B=0.02	A=1 B=0.2
	100Ω	A=0.35 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.2 B=0.02	A=0.3 B=0.03	A=1.5 B=0.2

		A=0.25 B=0.005	A=0.05 B=0.005	A=0.05 B=0.005	A=0.08 B=0.02	A=0.15 B=0.02	A=1 B=0.2
	30Ω	A=0.35 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.2 B=0.02	A=0.3 B=0.03	A=1.5 B=0.2
		A=0.25 B=0.005	A=0.05 B=0.005	A=0.05 B=0.005	A=0.08 B=0.02	A=0.15 B=0.02	A=1 B=0.2
	10Ω	A=0.35 B=0.02	A=0.08 B=0.02	A=0.08 B=0.02	A=0.2 B=0.02	A=0.3 B=0.03	A=1.5 B=0.2
		A=0.25 B=0.01	A=0.05 B=0.01	A=0.05 B=0.01	A=0.08 B=0.02	A=0.15 B=0.02	A=1 B=0.2
	1Ω	A=0.4 B=0.04	A=0.2 B=0.03	A=0.2 B=0.03	A=0.2 B=0.03	A=0.4 B=0.1	A=2 B=1
		A=0.3 B=0.1	A=0.1 B=0.02	A=0.1 B=0.02	A=0.15 B=0.02	A=0.3 B=0.05	A=2 B=0.5
*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
1year	1MΩ	A=1.2 B=0.6	A=0.6 B=0.3	A=0.6 B=0.3	A=1.5 B=0.75		
		A=1.5 B=0.3	A=0.375 B=0.15	A=0.375 B=0.15	A=1.5 B=0.75		
	100kΩ	A=0.6 B=0.075	A=0.225B=0.075	A=0.225 B=0.075	A=0.45 B=0.12	A=4.5 B=1.5	
		A=0.45 B=0.15	A=0.225 B=0.03	A=0.225 B=0.03	A=0.45 B=0.12	A=4.5 B=0.75	
	10kΩ	A=0.525 B=0.015	A=0.12 B=0.015	A=0.225 B=0.015	A=0.375 B=0.06	A=0.6 B=0.45	A=3 B=0.75
		A=0.375 B=0.015	A=0.075B=0.015	A=0.12 B=0.015	A=0.225 B=0.03	A=0.45 B=0.45	A=3 B=0.45
	3kΩ	A=0.525 B=0.015	A=0.12 B=0.015	A=0.225 B=0.015	A=0.375 B=0.06	A=0.6 B=0.45	A=3 B=0.75
		A=0.375 B=0.015	A=0.075B=0.015	A=0.12 B=0.015	A=0.225 B=0.03	A=0.45 B=0.45	A=3 B=0.45
	1kΩ	A=0.525 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.3 B=0.03	A=0.45 B=0.045	A=2.25 B=0.3
		A=0.375 B=0.075	A=0.075B=0.0075	A=0.075 B=0.0075	A=0.12 B=0.03	A=0.225 B=0.03	A=1.5 B=0.3
	300Ω	A=0.525 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.3 B=0.03	A=0.45 B=0.045	A=2.25 B=0.3
		A=0.375 B=0.075	A=0.075B=0.0075	A=0.075 B=0.0075	A=0.12 B=0.03	A=0.225 B=0.03	A=1.5 B=0.3
	100Ω	A=0.525 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.3 B=0.03	A=0.45 B=0.045	A=2.25 B=0.3
		A=0.375B=0.0075	A=0.075B=0.0075	A=0.075 B=0.0075	A=0.12 B=0.03	A=0.225 B=0.03	A=1.5 B=0.3
	30Ω	A=0.525 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.3 B=0.03	A=0.45 B=0.045	A=2.25 B=0.3
		A=0.375B=0.0075	A=0.075B=0.0075	A=0.075 B=0.0075	A=0.12 B=0.03	A=0.225 B=0.03	A=1.5 B=0.3
	10Ω	A=0.525 B=0.03	A=0.12 B=0.03	A=0.12 B=0.03	A=0.3 B=0.03	A=0.45 B=0.045	A=2.25 B=0.3
		A=0.375B=0.015	A=0.075B=0.015	A=0.075 B=0.015	A=0.12 B=0.03	A=0.225 B=0.03	A=1.5 B=0.3
	1Ω	A=0.6 B=0.06	A=0.3 B=0.045	A=0.3 B=0.045	A=0.3 B=0.045	A=0.6 B=0.15	A=3 B=1.5
		A=0.45 B=0.15	A=0.15 B=0.03	A=0.15 B=0.03	A=0.225 B=0.03	A=0.45 B=0.075	A=3 B=0.75

Basic accuracy 5(1.001V to 5.000V)

When range>=100Ω

$$\text{Basic accuracy} = \pm(A + \frac{B\times|Zx[\Omega] - Range[\Omega]|}{Range[\Omega]})$$

When range <100Ω

$$\text{Basic accuracy} = = \pm(A + \frac{B\times|Range[\Omega]\times 10 - Zx[\Omega]|}{Range[\Omega]})$$

Zx:sample value of impedance Z

A,B:basic accuracy factor

Accuracy factor of Z (%)：value A，B in group 1

Accuracy factor of θ (°)：value A，B in group 2

Wehn $f >= 1.001MHz$, basic accuracy must multiply (f[MHz]+3)/4

Table 6-11Basic accuracy 45(1.001V to 5.000V)

*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
6month	1MΩ	A=1 B=0.4	A=0.5 B=0.2	A=0.5 B=0.2	A=1.2 B=0.5		
		A=2 B=0.3	A=0.3 B=0.1	A=0.3 B=0.1	A=1.2 B=0.5		
	100kΩ	A=0.5 B=0.1	A=0.2 B=0.05	A=0.2 B=0.05	A=0.5 B=0.08	A=3.2 B=1	
		A=0.4 B=0.2	A=0.2 B=0.02	A=0.2 B=0.02	A=0.5 B=0.08	A=3.2 B=0.5	
	10kΩ	A=0.4 B=0.01	A=0.15 B=0.01	A=0.2 B=0.01	A=0.3 B=0.04	A=1 B=0.3	
		A=0.3 B=0.02	A=0.08 B=0.01	A=0.1 B=0.01	A=0.2 B=0.03	A=0.5 B=0.3	
	3kΩ	A=0.4 B=0.01	A=0.15 B=0.01	A=0.2 B=0.01	A=0.3 B=0.04	A=1 B=0.3	
		A=0.3 B=0.02	A=0.08 B=0.01	A=0.1 B=0.01	A=0.2 B=0.03	A=0.5 B=0.3	
	1kΩ	A=0.4 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.25 B=0.02	A=0.7 B=0.05	
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.02	
	300Ω	A=0.4 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.25 B=0.02	A=0.7 B=0.05	
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.02	
	100Ω	A=0.4 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.25 B=0.02	A=0.5 B=0.05	
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.02	
	30Ω	A=0.4 B=0.01	A=0.15 B=0.01	A=0.15 B=0.01	A=0.25 B=0.02	A=0.5 B=0.05	
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.02	
	10Ω	A=0.4 B=0.02	A=0.15 B=0.02	A=0.15 B=0.02	A=0.25 B=0.02	A=0.5 B=0.05	
		A=0.3 B=0.01	A=0.08 B=0.01	A=0.08 B=0.01	A=0.1 B=0.02	A=0.2 B=0.02	
	1Ω	A=0.5 B=0.04	A=0.25 B=0.04	A=0.25 B=0.04	A=0.25 B=0.04	A=0.7 B=0.1	
		A=0.35 B=0.2	A=0.15 B=0.02	A=0.15 B=0.02	A=0.2 B=0.02	A=0.4 B=0.05	
*1	Range	20Hz-99.9Hz	100Hz-1kHz	1.001kHz-10kHz	10.01kHz-100kHz	100.1kHz-1MHz	1.001MHz-5MHz
	1MΩ	A=1.5 B=0.6	A=0.75 B=0.3	A=0.75 B=0.3	A=1.8 B=0.75		
		A=3 B=0.45	A=0.45 B=0.15	A=0.45 B=0.15	A=1.8 B=0.75		
	100kΩ	A=0.75 B=0.15	A=0.3 B=0.075	A=0.3 B=0.075	A=075 B=0.12	A=4.8 B=1.5	
		A=0.6 B=0.3	A=0.3 B=0.03	A=0.3 B=0.03	A=0.75 B=0.12	A=4.8 B=0.75	
	10kΩ	A=0.6 B=0.015	A=0.225 B=0.015	A=0.3 B=0.015	A=0.45 B=0.06	A=1.5 B=0.45	
		A=0.45 B=0.03	A=0.12 B=0.015	A=0.15 B=0.015	A=0.3 B=0.045	A=0.75 B=0.45	
	3kΩ	A=0.6 B=0.015	A=0.225 B=0.015	A=0.3 B=0.015	A=0.45 B=0.06	A=1.5 B=0.45	
		A=0.45 B=0.03	A=0.12 B=0.015	A=0.15 B=0.015	A=0.3 B=0.045	A=0.75 B=0.45	

1year	1kΩ	A=0.6 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=1.05 B=0.075	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.03	
	300Ω	A=0.6 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=1.05 B=0.075	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.03	
	100Ω	A=0.6 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=0.75 B=0.075	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.03	
	30Ω	A=0.6 B=0.015	A=0.225 B=0.015	A=0.225 B=0.015	A=0.375 B=0.03	A=0.75 B=0.075	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.03	
	10Ω	A=0.6 B=0.03	A=0.225 B=0.03	A=0.225 B=0.03	A=0.375 B=0.03	A=0.75 B=0.075	
		A=0.45 B=0.015	A=0.12 B=0.015	A=0.12 B=0.015	A=0.15 B=0.03	A=0.3 B=0.03	
	1Ω	A=0.75 B=0.06	A=0.375 B=0.06	A=0.375 B=0.06	A=0.375 B=0.06	A=1.05 B=0.15	
		A=0.525 B=0.3	A=0.225 B=0.03	A=0.225 B=0.03	A=0.3 B=0.03	A=0.6 B=0.075	

6.4Safety requirement

6.4.1insulation resistance

Referring to the working condition, the insulation resistance of the power terminal and the case should not be less than 50MΩ.

Under the damp and heat condition, the insulation resistance should not be less than 2 MΩ.

6.4.2insulation intension

Referring the working condition, the power terminal and the case should can load the AC voltage with 50Hz in frequency and 1.5kV in rated voltage for 1 minute, and should have no breakdown and arcing.

6.4.3Leakage current

The leakage current should not be more than 3.5mA (the AC effective value).

6.5The EMC requirement

The transient sensitivity of the instrument power meets the GB6833.4.

The conduction sensitivity of the instrument meets the GB6833.6.

The radiated interference of the instrument meets the GB6833.10.

6.6Performance test

6.6.1Working condition

The test should be done referring to the condition described in chapter 1. we test the main performance. The other performance (e.g.: the parameter of the transformer) can be tested by yourself referring to the condition described in chapter 1.

6.6.2The experiment instruments

The experiment instruments are shown in table 6-10

NO	The instrument name		requirement
1	Standard capacitance	100pF	0.02％ (the loss D has been known)
		1000pF	
		10000pF	
		10nF	
		0.1uF	
		1uF	
2	AC standard resistor	10Ω	0.02％
		100Ω	
		1kΩ	
		10kΩ	
		100kΩ	
3	DC standard resistor	0.1Ω	0.02％
		1Ω	
		10Ω	
		100Ω	
		1kΩ	
		10kΩ	
		100kΩ	
4	Standard capacitance	100μH	0.02%
		1mH	
		10mH	
		100mH	
5	Frequency meter		（0～1000）MHz
6	digital multimeter		0.5％
7	Insulation resistance meter		500V 10 levels
8	withstanding voltage and leakage meter		0.25kW （0～500）V

6.6.3Check the Function

The keys, the display and the terminals can work normally. The other functions are right.

6.6.4The test signal level

When the test signal level is tested, the digital multimeter is used. Adjust the range of the

multimeter to AC, connect one test stick to the HCUR terminal of the instrument, and the other to the ground terminal. Change the level to 20mv, 100mv, 200mv, 1V and 2 V in turn, the test result must meet the requirement described in this chapter.

6.6.5 Frequency

Connect the ground terminal of the frequency meter to that of the instrument, and the test terminal of the frequency meter to the HCUR terminal of the instrument. Change the frequency to 20Hz, 100Hz, 1kHz, 10kHz, 100kHz and 200kHz in turn. The test result must meet the requirement described in this chapter.

6.6.6The test accuracy

The main test parameters: R, L, C, D. the other parameters can be acquired from the parameters above.

6.6.7The capacitance C and the loss D accuracy

function: Cp-D
the test frequency: 100Hz ,1kHz ,10kHz,100kHz
level: 1V
range: AUTO
bias: 0V
speed: slow

Short correction and open correction should be done before the test. Connect the standard capacitance (100pF, 1000pF, 10000pF, 10nF, 10nF, 0.1uF and1uF) to the test fixture. Change the test frequency. The capacitance error between the test result and the standard value must be in the range of the C accuracy. The error of the loss D must be in the range of the D accuracy referring to this chapter.

6.6.8The inductance L accuracy

Test condition：
Function: Ls-Q
Test frequency: 100Hz , 1kHz ,10kHz and 100kHz
Level: 1V
Range: AUTO
Bias: 0V
Speed: slow

Short correction and open correction should be done before the test. Connect the standard inductance (100μH, 1mH, 10mH and 100mH) to the test fixture. Change the test frequency. The error between the test result and the standard value must be in the range of the L accuracy referring to this chapter.

6.6.9The resistance Z accuracy

Test condition:
Function: Z-θ

Test frequency: 100Hz, 1kHz ,10kHz and 100kHz
Level: 1V
Range: AUTO
Bias: 0V
Speed: slow
Short correction and open correction should be done before the test. Connect the standard resistor (10Ω, 100Ω, 1kΩ, 10kΩ, and 100kΩ) to the test fixture. Change the test frequency. The error between the test result and the standard value must be in the range of the |Z| accuracy referring to this chapter.

6.6.10The DCR accuracy

Test condition：
Function: DCR
Test frequency: -----
Level: -----
Range: AUTO
Bias: -----
Speed: slow
Short correction and open correction should be done before the test. Connect the standard resistor (0.1 Ω , 1Ω, 10Ω, 100Ω, 1kΩ, 10kΩ, and 100kΩ) to the test fixture. The error between the test result and the standard value must be in the range of the DCR accuracy referring to this chapter.

Chapter 7 Remote control

7.1TH2826 RS232C

RS232 interface is asynchronous serial communication interface

Like the most serial interface used in the world, the serial interface on TH2826 doesn't meet RS-232 strictly, but provides one set shown in table 7-1.

Table 7-1 TH2826 RS232 interface

signal	abbreviate	pin number
Send data	TXD	2
Receive data	RXD	3
Ground	GND	5

The connection between the TH2826 and the computer is shown in figure 7-1:

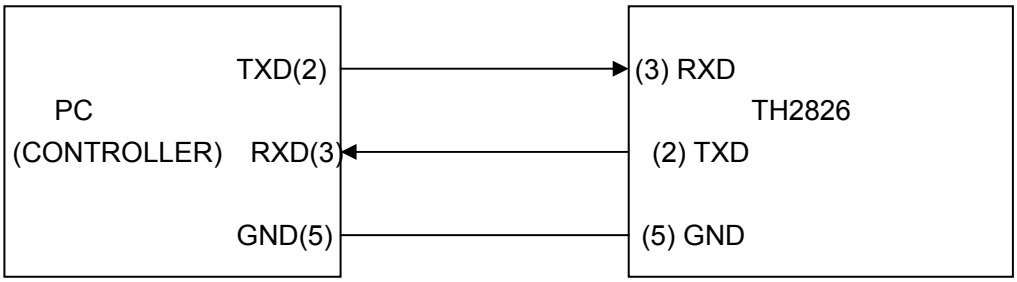


Figure 7-1

Figure 7-1 shows that the pin definition of the TH2826for serial interface is different from that of IBM AT PC. You can buy the cable for the serial interface from Tonghui Company.

The baud rate can be selected from 9600 to 115200. The frame has no parity, 8 data bits and 1 stop bit.

7.2TH2826 GPIB

GPIB (General Purpose Interface Bus) is an interface standard for connecting computers and the peripherals, which supports the IEEE 488.2. The GPIB interface allows you to control the TH2826 from an external computer. The computer sends commands and instructions to the TH2826 and receives data sent from the TH2826 via the GPIB.

If you use the GPIB on TH2826, you should pay attention to the following points:

(1) The length of the cable for bus system should not be more than 2 m, and the total length of the cable should not be more than 20 m.

(2) 15 test instruments can be connected to the same bus at most.

(3) To add only 4-back-connecter to one instrument is recommended.

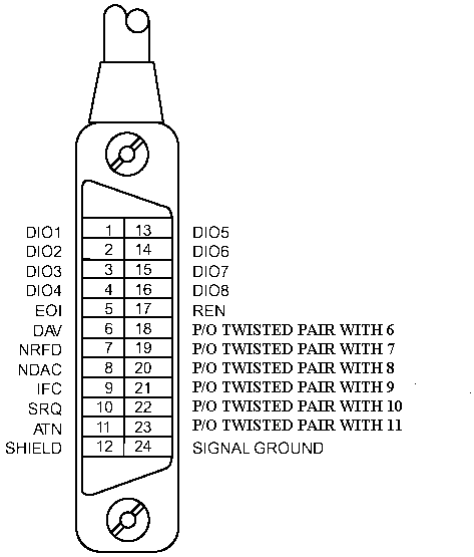


Figure 7-2 the GPIB connector

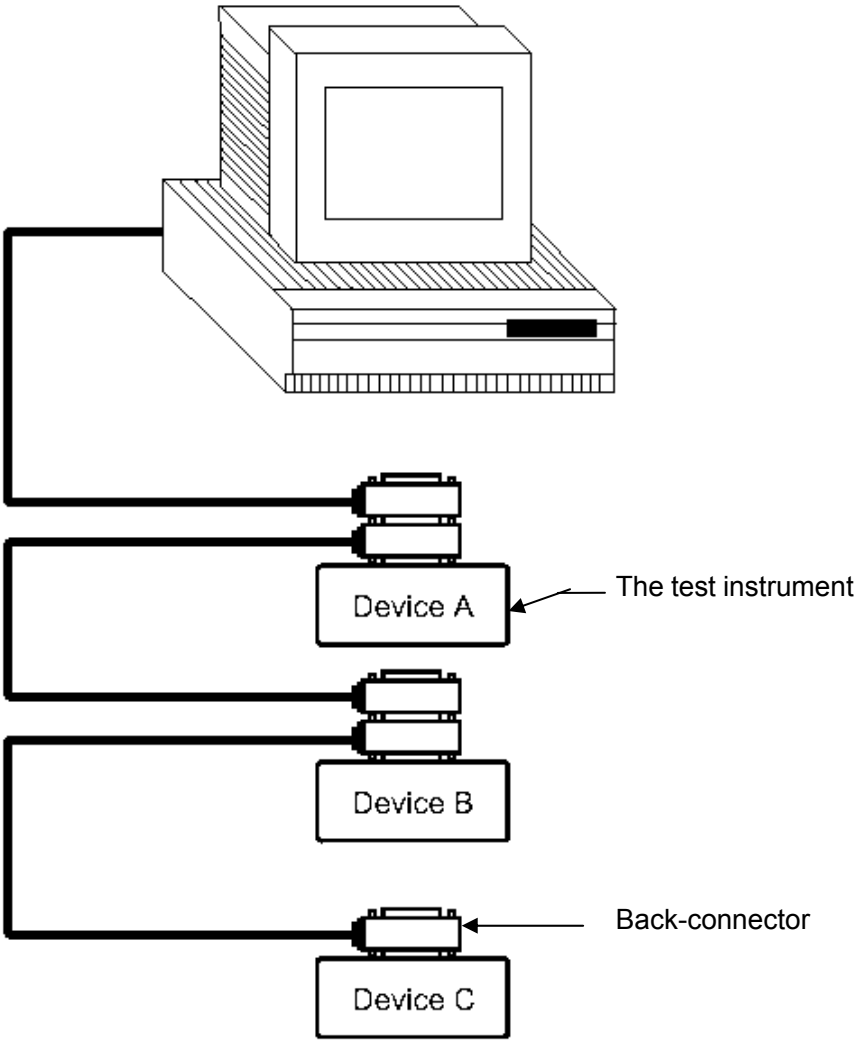


Figure7-3 the two- back-connector superposition

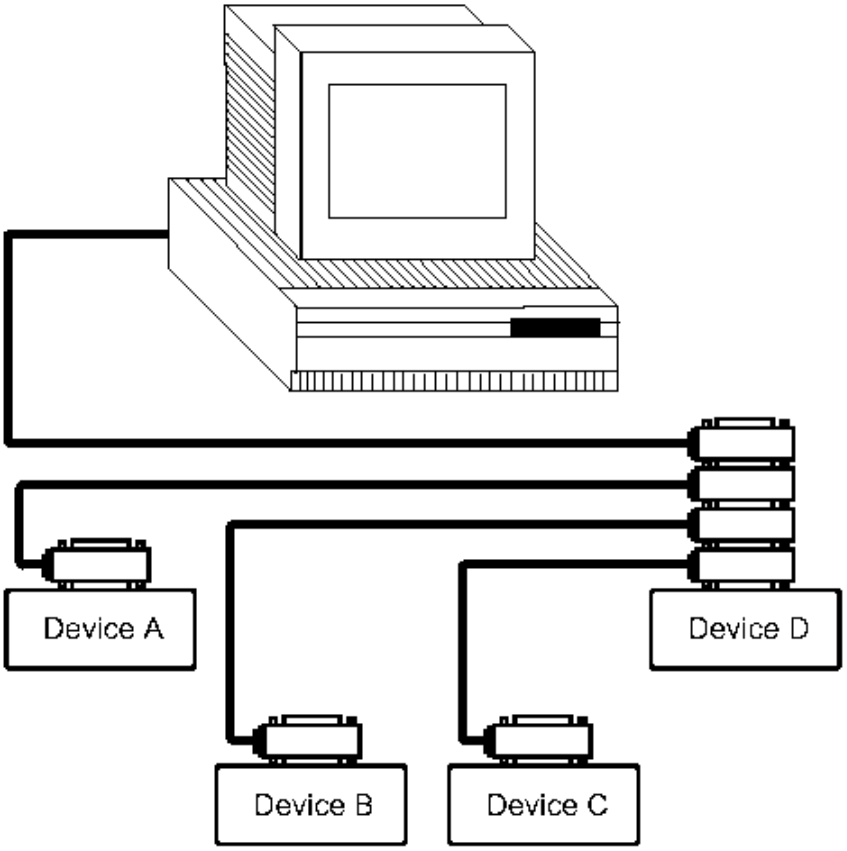


Figure7-4 the four- back-connector superposition

7.2.1GPIB GPIB interface function

GPIB interface provides various function, the instrument can send and receive the data and the command by the GPIB interface and the corresponding bus, which is shown in table 7-2：

Figure 0-7

code	Interface function	description
SH1	Data source communication	Three-line communication
AH1	Data destination communication	Three-line communication
T5	Speaking	Send instrument information
L4	Listening	Receive instrument information
SR1	Service request	Request the service
RL1	Remote/local change	Remote/local change
DC1	Reset the instrument	Send “clear signal”

DT1	Instrument trigger	Send trigger signal
C0	control	Send control information

7.2.2GPIB address

The range of the GPIB address on TH2826 is from 1 to 31.the setting for GPIB can refer to the bus address field on the SYSTEM SETUP page with the SYSTEM menu key being pressed.

7.2.3 GPIB Bus Function

The GPIB bus function is completed by the following commands:

- ABORT I/O (IFC): stop the bus working. Don't receive the instrument information, and reset the interface to the idle state.
- CLEAR LOCKOUT/SET LOCAL: control the instrument. The instrument can work at a remote place.
- DEVICE CLEAR (SDC or DCL): clear the selected instruments or all the instruments.
- LOCAL (GTL): return the local control.
- LOCAL LOCKOUT (LLO): lock the local command. When the remote instrument receives this command, the local command will be locked.
- REMOTE: set the instrument to remote mode.
- SPOLL: configure the bus state.
- SERVICE REQUEST: request the control signal.

7.2.4（SCPI）

SCPI is new universal commands based on IEEE488.2-1987. (SCPI is equivalent to TMSL that is Test and Measurement System Language used by HP Company in America.)

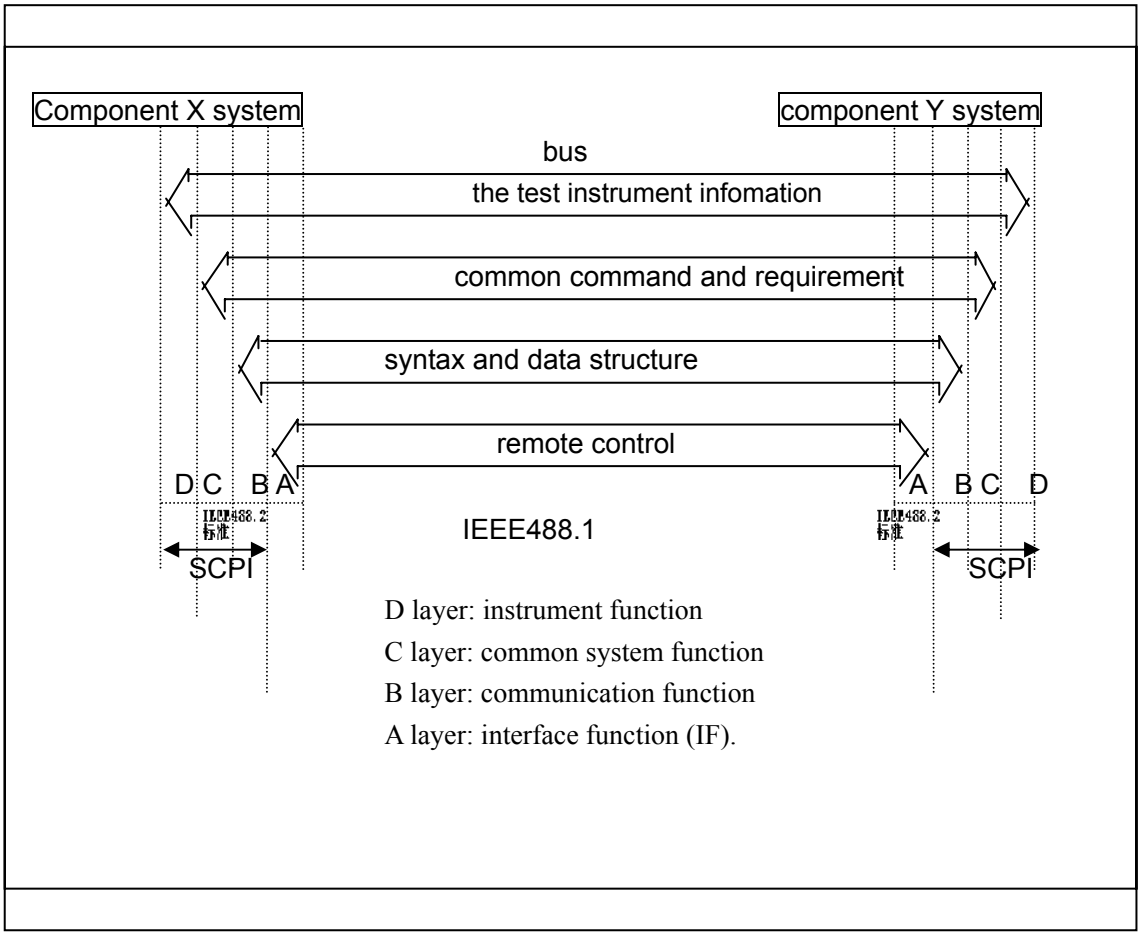


Figure 7-5 the function layers

7.3 LANRemote control system

LAN remote control system provides two methods to visitTH2826.

(1)By browser;

(2)By labview;

System configuration

Use cross cable to connect TH2826 with computer. If TH2826 is connected by router，then use equal cable.

Parameter setting

Move cursor to ”system”, press Net setting to enter net parameter setting.

Now you can set DHCP、IP、SUB MASK、DNS, parameter setting reference and net parameter setting. Such as ： the net parameter is shown as 7-5：

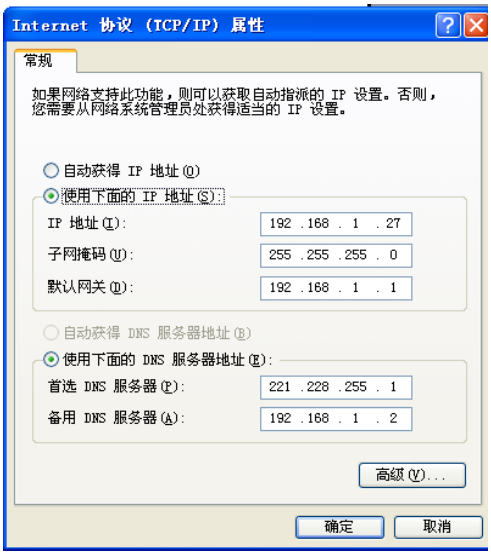


Figure 7-6

Reference setting of TH2826 parameter is shown as figure 7-6：

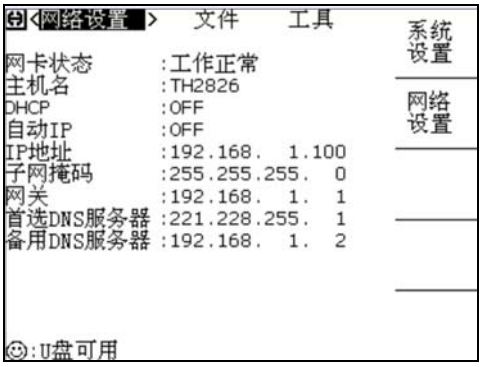


Figure 7-7

7.3.1 visit TH2826 by browser

When visiting TH2826 by browser,TH2826 is like a WEB server. User can visit TH2826by Internet Explorer（IE6.0or advanced edition）.

The operation step of visiting TH2826 by browser:(if ip=192.168.1.100)

(1) setup Internet Explorer。

(2) input http://192.168.1.100/ and press Enter.

(3) the screen of Web server， shown as Figure 7-7.

Figure 7-8

(4) Click the left button to enter page.

7.3.2 Visit TH2826 by labview

User can control TH2826 by labview provided by Tonghui.

7.4USB Remote control system

USB remote control system can control device by USB interface, which fits the protocol of USBTMC-USB488 and USB2.0.

7.4.1System configuration

Use USB cable to connect the USB interface on the rear panel to USB port.

7.4.2Install drive

When using USB to connect TH2826 with computer at first time，the computer will note：“New hardware is found”，then as figure 7-8：

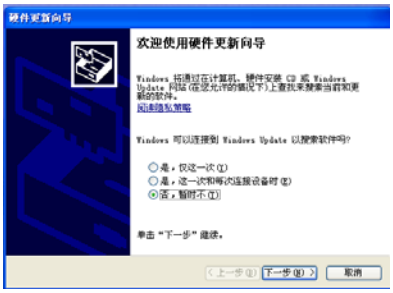


Figure 7-9

Press “Next”，as shown in figure 7-9，select “Install from list or appointed position”。

Figure 7-10

Then press"Next"，select the correct path(niusbtmc.inf)，as Figure 7-10，press "Next", the installation is finished.

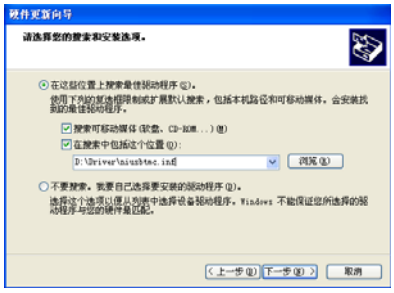


Figure 7-11

After the drive is installed，user can see "usb test and measurement device". Shown as Figure 7-11：

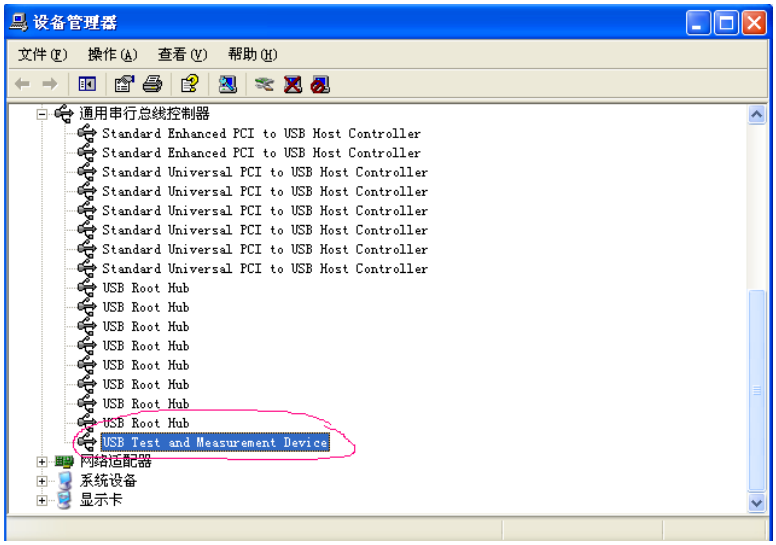


Figure 7-12

7.5USBCDCVirtual port

By selecting bus mode"USBCDC"， USB can be a virtual port (VCom)。

7.5.1 system configuration

Use USB cable to connect the USB interface on the rear panel of TH2826 to the USB port in host computer.

7.5.2 Install drive

The method of installing USBCDC drive is the same as that of USBTMC， but when selecting driving file

Select the path of usbVCom.inf， as Figure 7-12。

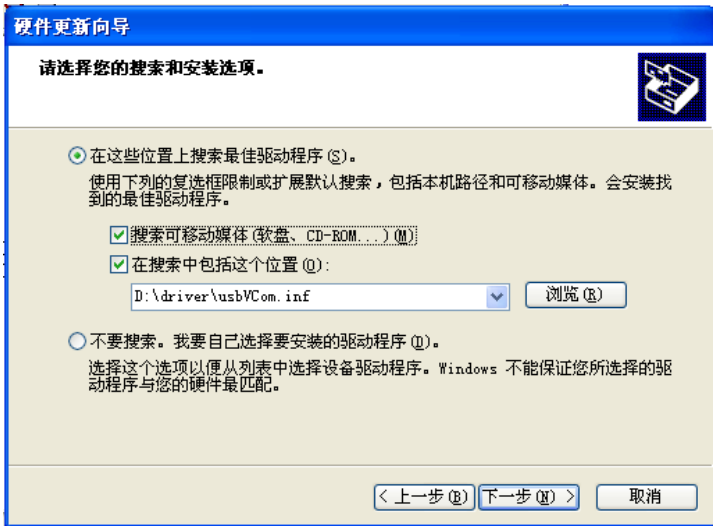


Figure 7-13

After the drive is installed， user can see ”usb VCom port”. Shown as Figure 7-13：

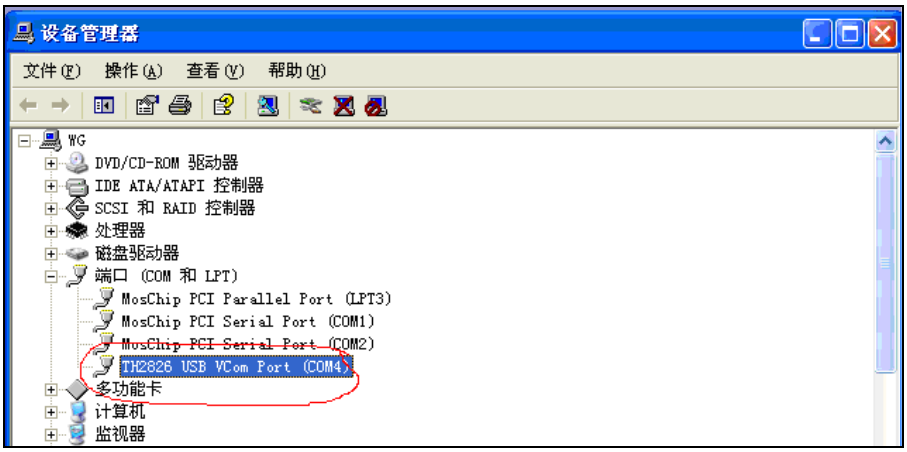


Figure 7-14

Now，usb VCom port is like a serial port. When PC has no serial port，user can use the communication software based on serial port in this mode.

Chapter 8 TH2826 commands

This chapter describes the commands specific for TH2826

The signs in this manual are as follows:

NR1: integer, e.g.: 123

NR2: fix-point number, e.g.:12.3

NR3: floating-point number, e.g.:12.3E+5

NL: carriage key, ASCII code: 10

END: EOI signal in IEEE-488

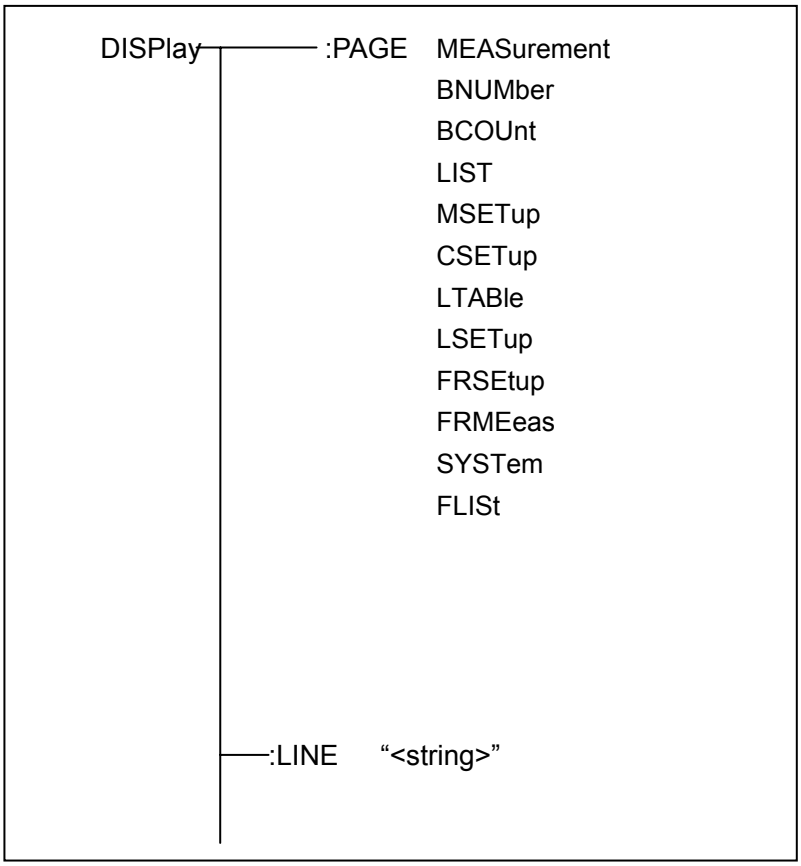
8.1Subsystem commands for TH2826

●DISPlay ●ORESister ●TRIGger ●CORRection
●FREQuency ●BIAS ●INITiate ●COMParator
●VOLTage ●FUNCtion ●FETCh? ●Mass MEMory
●CURRent ●LIST ●ABORT ●TRAN
●AMPLitude ●APERture ●STATus ●FRES

8.1.1 DISPlay subsystem command set

DISPLAY subsystem command set is used to set the display page.

Command hierarchical chart:



——:RFONt LARGe, TINY , OFF

:PAGE is used to set the display page. Char '?'can can be used to query the current page.

Command syntax:DISPlay:PAGE <page name>
The following value can be selected for <page name>:

MEASurement: set the page to LCR Measurement display.
BNUMber: set the page to BIN Number display.
BCOUnt: set the page to BIN Count.
LIST: set the page to List Sweep.
MSETup: set the page to Measurement setup.
CSETup: set the page to Correction.
LTABle: set the page to Limit Table
LSETup: set the page to List Setup
SYSTem: set the page to System Setup
FLISt: set the page to File List.

E.g.:WrtCmd("ISP:PAGE MEAS"); set the page to LCR Measurement display.

Query syntax: DISPlay:PAGE?
return： <page name><NL^END>
The following value can be selected for <page name>:

<LCR MEAS DISP>: the current page is LCR Measurement display
<BIN No. DISP>: the current page is BIN Number display
<BIN COUNT DISP>: the current page is BIN Count
<LIST SWEEP DISP>: the current page is List Sweep
<MEAS SETUP>: the current page is Measurement setup
<CORRECTION>: the current page is Correction
<LIMIT TABLE SETUP>: the current page is Limit Table
<LIST SWEEP SETUP>: the current page is List Setup
<SYSTEM SETUP>: the current page is System Setup
<FILE LIST>: the current page is File List

:LINE is used to set the measurement theme. The maximum length of the theme string is 20. Char '?'can can be used to query the current measurement theme.The theme string will be displayed in the file list page, and saved as the file name.

Command syntax: DISPlay:LINE”<string>”
<string> is the ASCII string(the maximum length is 20).
e.g.：WrtCmd(“DISP:LINE ”Resistor meas””);

query syntax： DISPlay:LINE?
return： <string><NL^END>

:ResultFONt is used to set the font of the measurement result. Char’?’can be used to query the current font of the measurement result.

Command syntax： DISPlay:RFONt <font>
The following value can be selected for <font>：
LARGe:display the measurement result with the large size, the hold time is 12 ms.
TINY:display the measurement result with the small size, the hold time is 5 ms.
OFF:don’t display the measurement result, but the result can be read from the bus.
Query syntax：DISPlay:RFONt?
return：<font><NL^END>
the following value can be selected for <font>：
LARGE
TINY
OFF

8.1.2FREQuency subsystem command set

FREQuency subsystem command set is used to set the test frequency. Char ‘?’can be used to query the test frequency.
Command syntax:

FREQuency { <value> | MIN | MAX }

<value>: NR1,NR2 or NR3 format with Hz,kHz or MHz as the postfix
MIN: set the test frequency to 20Hz
MAX:set the test frequency to 200kHz
e.g.：WrtCmd(“FREQ 1KHZ”); set the test frequency to 1000Hz.

Query syntax： FREQuency?
return： <NR3><NL^END>

8.1.3VOLTage subsystem command set

VOLTage subsystem command set is used to set the voltage level of the measurement instrument. Char '?' can be used to query the current level of the test voltage.

command syntax：

VOLTage { <value> | MIN | MAX }

<value>: NR1,NR2 or NR3 format with V as the postfix.

MIN: set the level to 5mV

MAX: set the level to 2V

e.g.：WrtCmd("VOLT 1V"); set the level to 1V

query syntax： VOLTage?

return：<NR3><NL^END>

8.1.4CURRent subsystem command set

Current subsystem command set is used to set the current level. Char '?' can be used to quety the current level of the test instrument.

command syntax：

CURRent { <value> | MIN | MAX }

<value>: NR1,NR2 or NR3 format with mA as the postfix.

MIN: set the level to 50μA

MAX:set the level to 20mA

e.g.：WrtCmd("CURR 10MA"); set the level to 10mA。

query syntax： CURRent ?

return：<NR3><NL^END>

8.1.5AMPLitude subsystem command set

AMPLitude subsystem is used to set the Auto Level control(ALC). Char '?' can be used to query the state of the ALC.

Command syntax：

AMPLitude:ALC { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON

char '0'(48) is equivalent to OFF.

e.g.：WrtCmd("AMPL:ALC 0"); set the ALC close

query syntax：AMPLitude:ALC?

return：<NR1><NL^END>

8.1.6Output RESister subsystem command set

Output RESister subsystem command set is used to set the output internal resistance mode. Char '?'can be used to query the output internal resistance state.

command syntax：

ORESister { 30 | 100

e.g.：WrtCmd("ORES 30");set the output internal resistance to 30 OHM

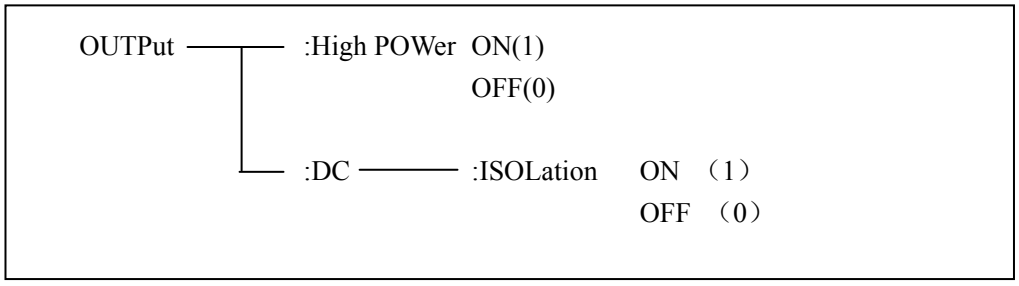
query syntax：ORESister?

return：<NR1><NL^END>

8.1.7OUTPut subsystem command set

OUTPut subsystem command set is used to set the DC 100mA/10V bias source, and the DC isolation.

Command hierarchical chart:



:HPOWer is used to set the DC 100mA/10V bias ON/OFF. Char '?' cand be used to query the state of the bias source.

You must ensure that you have bought the DC 100mA/10V bias source (optional) from Tonghui company before you perform this command.

Command syntax：

OUTPut:HPOWer { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON
char '0'(48) is equivalent to OFF.

query syntax： OUTPut:HPOWer?
return： <INT> <NL^END> or <OPT1><NL^END>, OPT1 shows that the DC 100mA/10V bias source is used，or not used.

:DC:ISOLation is used to set DC isolation ON/OFF of the DC 100mA/10Vbias source. Char '?'can be used to query the DC isolation ON/OFF. You must ensure that you have bought the DC 100mA/10V bias source (optional) from Tonghui company before you perform this command.

command syntax：

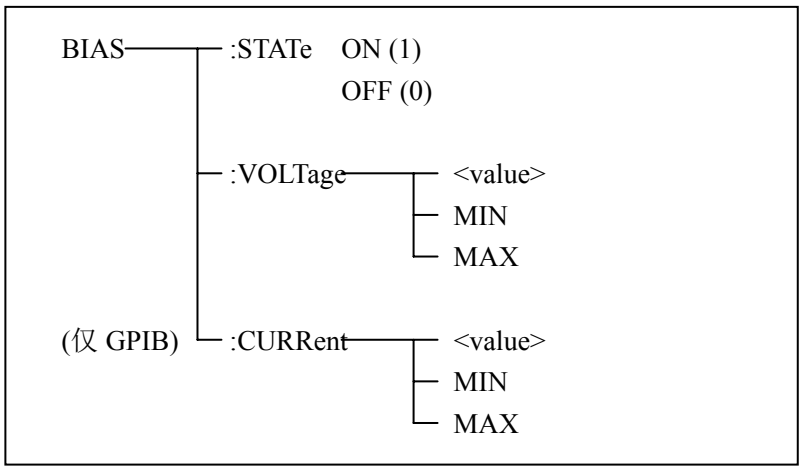
OUTPut:DC:ISOLation { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON
char '0'(48) is equivalent to OFF.

query syntax： OUTPut:DC:ISOLation?
return： <NR1> <NL^END>.

8.1.8BIAS subsystem command set

BIAS subsystem command set is used to set the internal bias voltage.
Command hierarchical chart:



:STATe is used to set the bias ON/OFF. Char '?' can be used to query the state of the bias.

Command syntax:

BIAS:STATe { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON

char '0'(48) is equivalent to OFF.

e.g.: WrtCmd("BIAS:STATe 0"); set the DC bias close.

query syntax: BIAS:STATe?

return: <NR1><NL^END>

:VOLTage is used to set the bias voltage. Char '?' is used to query the current bias voltage.

Command syntax:

BIAS:VOLTage { <value> | MIN | MAX }

<value>: NR1,NR2 or NR3 format

MIN: set the bias voltage to 0V

MAX: set the bias voltage to 2V

e.g.: WrtCmd("BIAS:VOLT MIN");set the bias voltage to 0V

query syntax: BIAS:VOLTage?

return：<NR3><NL^END>

:CURRent (only for GPIB) is used to the external bias current. Char '?' is used to query the bias current. Because the external bias current is controlled by serial interface, this command is supported only by GPIB.

command syntax：

BIAS: CURRent { <value> | MIN | MAX }

<value>: NR1,NR2 or NR3 format

MIN: to set the bias current to 0A

MAX :to set the bias current to 10A

e.g.：WrtCmd("BIAS:CURR MIN"); set the bias current to 0A

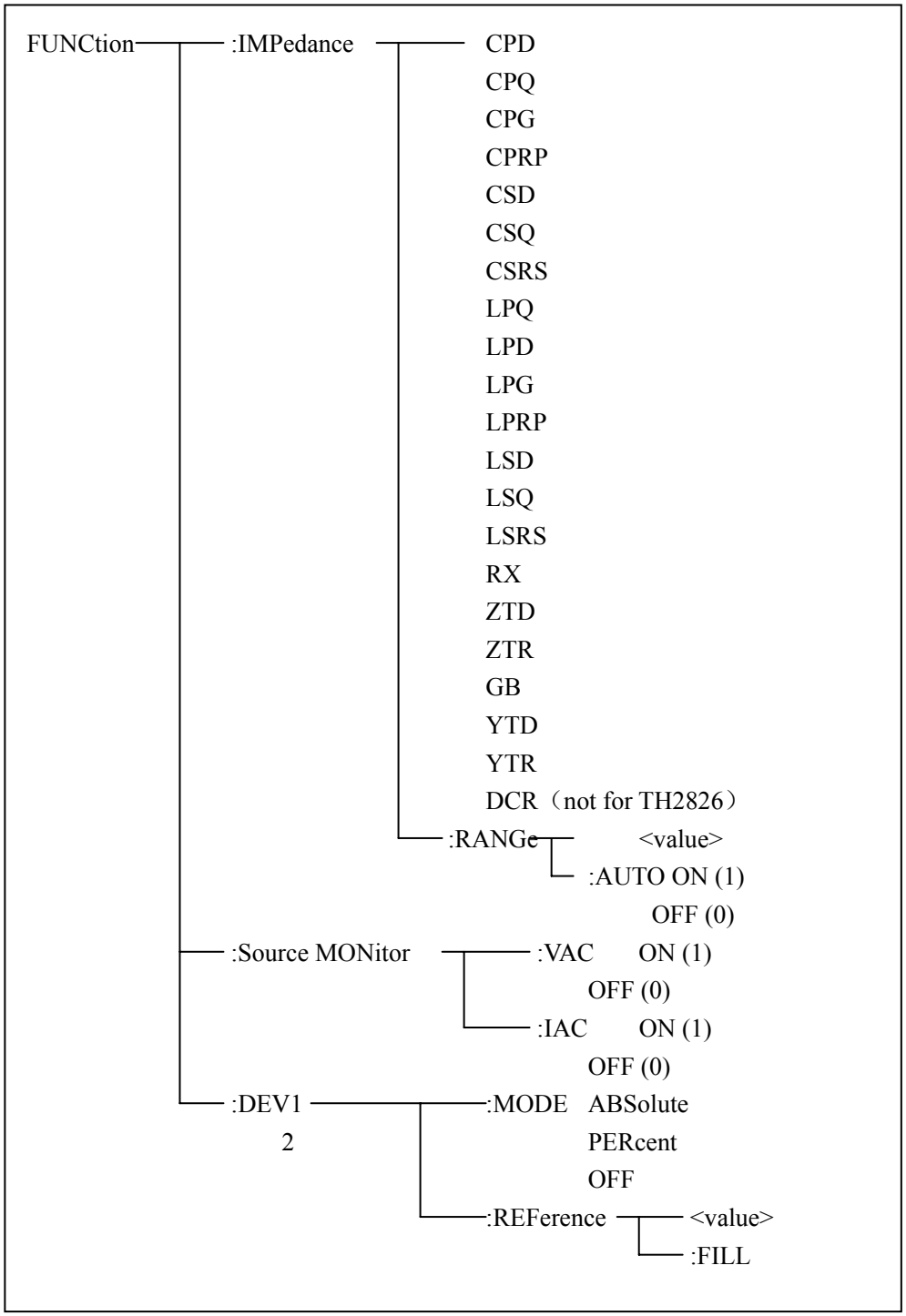
quety syntax：BIAS: CURRent?

return：<NR3><NL^END>

8.1.9FUNCtion subsystem command set

FUNCtion subsystem command set is used to set the measurement function, range function, monitor for current and voltage, deviation display mode and standard value setting.

Command hierarchical chart:



:IMPedance is used to set the function. Char '?' is used to query the current function

parameter.

command syntax： FUNCtion:IMPedance <function>

the following value can be selected for <function>

CPD: set the function to Cp-D	LPRP: set the function to Lp-Rp
CPQ: set the function to Cp-Q	LSD: set the function to Ls-D
CPG: set the function to Cp-G	LSQ: set the function to Ls-Q
CPRP: set the function to Cp-Rp	LSRS: set the function to Ls-Rs
CSD: set the function to Cs-D	RX: set the function to R-X
CSQ: set the function to Cs-Q	ZTD: set the function to Z-θ°
CSRS: set the function to Cs-Rs	ZTR: set the function to Z-θr
LPQ: set the function to Lp-Q	GB: set the function to G-B
LPD: set the function to Lp-D	YTD: set the function to Y-θ°
LPG: set the function to Lp-G	YTR: set the function to Y-θr

e.g.：WrtCmd(“FUNC:IMP RX”); : set the function to R-X

query syntax： FUNCtion:IMPedance?

return：<function><NL^END>

:IMPedance:RANGe is used to set the range. Char ‘?’ is used to query the current range

command syntax： FUNCtion:IMPedance:RANGe <value>

<value> can be the resistance of the DUT, or the NR1,NR2,NR3 format with OHM,KOHM as the postfix.

e.g.：WrtCmd(“FUNC:IMP:RANG 1KOHM”); set the range to 1kOHM。

Query syntax： FUNCtion:IMPedance:RANGe?

return：<value><NL^END>

the following value can be selected for <value>：

10	30	100
300	1000	3000
10000	30000	100000

:IMPedance:RANGe:AUTO is used to select AUTO range. Char ‘?’ can be used to query the current range.

command syntax：

FUNCtion:IMPedance:RANGe:AUTO { ON (1) / OFF (0) }

char ‘1’(49) is equivalent to ON

char '0'(48) is equivalent to OFF.

e.g.：WrtCmd("FUNC:IMP:RANG:AUTO ON"); set the range to AUTO

query syntax：FUNCtion:IMPedance:RANGe:AUTO?
return：<NR1><NL^END>

:Source MONitor:VAC is used to set the monitor for voltage. Char '?' can be used to query the state of the voltage monitor.
Command syntax：

FUNCtion:SMONitor:VAC { ON (1) / OFF (0) }
char '1'(49) is equivalent to ON
char '0'(48) is equivalent to OFF.

e.g.：WrtCmd("FUNC:SMON:VAC ON"); set the voltage monitor ON.

query syntax：FUNCtion:SMONitor:VAC?
return：<NR1><NL^END>

:Source MONitor:IAC is used to set the current monitor. Char '?'can be used to query the state of the current monitor.
command syntax：

FUNCtion:SMONitor:IAC { ON (1) / OFF (0) }
char '1'(49) is equivalent to ON
char '0'(48) is equivalent to OFF.

e.g.：WrtCmd("FUNC:SMON:IAC ON"); set the current monitor ON

query syntax：FUNCtion:SMONitor:IAC?
return：<NR1><NL^END>

: DEV<n>:MODE is used to set the deviation measurement mode. Char '?' is used to query the state of the deviation measurement mode.
command syntax：

FUNCtion:DEV<n>:MODE { ABSolute | PERCent | OFF }

ABSolute:absolute deviation display

PERCent:percent deviation display

OFF : the direct display for the test value

<n>:

char '1'(49): set the deviation mode of the main parameters

char '2'(50):set the deviation mode of the secondary parameters

e.g.: WrtCmd("FUNC:DEV1:MODE ABS");

query syntax: FUNCtion:DEV<n>:MODE?

return: { ABS | PERC | OFF } <NL^END>

:DEV<n>:REFerence is used to set the standard deviation. Char '?' is used to query the current standard deviation.

command syntax: FUNCtion:DEV<n>:REFerence<value>

<value>:NR1,NR2 or NR3 format

<n>:

char '1'(49):set the standard deviation of the main parameters

char '2'(50):set the standard deviation of the secondary parameters

e.g.: WrtCmd("FUNC:DEV1:REF 10");

query syntax: FUNCtion:DEV<n>:REFerence?

return: <NR3><NL^END>

:DEV<n>:REFerence:FILL is used to set the standard deviation, which controls the instrument only for one time. And copy the main and the secondary parameters as the standard deviation.

command syntax: FUNCtion:DEV<n>:REFerence:FILL

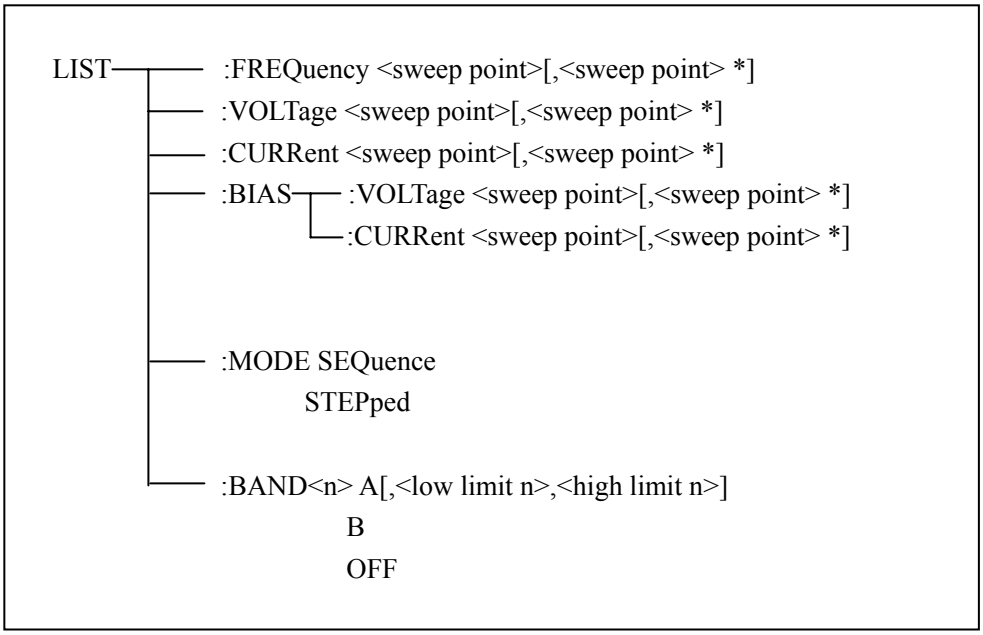
<n>: char '1'(49) or char '2'(50) can be used to set the standard deviation for the main parameters and the secondary parameters.

e.g.: WrtCmd("FUNC:DEV1:REF:FILL");

8.1.10LIST subsystem command set

LIST subsystem command set is used to set the List Sweep, the sweep point, the sweep mode and limit comparison.

Command hierarchical chart:



:FREQuency is used to clear the previous sweep point and set the frequency of the sweep point.

command syntax： LIST:FREQuency <value> [,<value> *]

note：” *” shows that the sweep points are 10 points at most.

<value> : NR1, NR2 or NR3 format

<value>: must be in the range of 20HZ to 300KHZ（20HZ-200KHZ for TH2826）, or return “error”.

e.g.：WrtCmd(“LIST:FREQ 1E3,2E3,3E3,4E3”);set the frequency of sweep point to 1KHZ；

;set the frequency of sweep point to 2KHZ；

;set the frequency of sweep point to 3KHZ；

;set the frequency of sweep point to 4KHZ

note：HZ（hertz）is postfix unit, MAHZ and MHZ are MHz(1E6 Hz)。

query syntax：LIST:FREQuency?

return：<NR3>[,<NR3> *]<NL^END>

：VOLTage is used to clear the previous list sweep level and set the sweep leve.

command syntax：LIST:VOLTage <value>[,<value> *]

note：” *” shows that the sweep points are 10 points at most.

<value> : NR1，NR2 or NR3 format

e.g.：WrtCmd(“LIST:VOLT 1.5”) ; set the sweep point 1’s level to 1.5V.

WrtCmd(“LIST:VOLT 1E-2,2E-2,3E-2,4E-2”) ;set the level of the point 1,2,3 and 4 to 10mV,20mV,30mV and 40mV in turn.

Note:this command can be added the postfix V.

query syntax：LIST:VOLTage?

return：<NR3>[,<NR3> *]<NL^END>

note:the list sweep leve must be in the range of 5mv to 2V, or the return value will be “error”.

:CURRent is used to clear the current in the list sweep table before and set the test current of the sweep point.

command syntax：LIST:CURRent <value>[,<value> *]

note：” *” shows that the sweep points are 10 points at most.

<value> :NR1，NR2 or NR3 format

e.g.：WrtCmd(“LIST:CURR 100MA”) ;set the current of the sweep point 1 to 100mA

WrtCmd(“LIST:CURR 1E-2,2E-2,3E-3,4E-3”) ;set the current of the sweep point 1,2,3 and 4 to 10mA,20mA,3mA and 4mA in turn.

Note:this command can be added the postfix A(ampere).

query syntax：LIST:CURRent?

return：<NR3>[,<NR3> *]<NL^END>

note:the list sweep current must be in the range of 50uA to 20mV, or the return value will be “error”.

：BIAS:VOLTage is used to clear the DC bias voltage in the list sweep points before and set the the DC bias voltage.

command syntax：LIST:BIAS:VOLTage <value>[,<value> *]

note：” *” shows that the sweep points are 10 points at most.

<value> :NR1，NR2 or NR3 format

e.g.：WrtCmd(“LIST:BIAS:VOLT 1.5V”) ;set the DC bias voltage of the sweep point 1 to 1.5V.

query syntax：LIST:BIAS:VOLTage?

return：<NR3>[,<NR3> *]<NL^END>
note:the DC bias voltage must be 0 V, 1.5 V and 2 V, or the return value will be “error”..

:BIAS:CURRent is used to clear the DC bias current in the list sweep points before and set the DC bias current.
Command syntax：LIST:BIAS:CURRent <value>[,<value> *]
note：” *” shows that the sweep points are 10 points at most.
<value>:NR1，NR2 or NR3 format
e.g.：WrtCmd(“LIST:BIAS:CURR 100MA”) ;set the DC current of the sweep point 1 to100mA
WrtCmd(“LIST:BIAS:CURR 1E-2,2E-2,3E-2,4E-2”) ;set the DC current of the sweep point 1,2,3 and 4 to 10mA，20mA，30mA and 40mA

quety syntax：LIST:BIAS:CURRent?
return：<NR3>[,<NR3> *]<NL^END>
note: because TH2826 and TH2826 have no internal DC bias current source, the instrument must be used with the external DC bias source(TH1773, must be bought.) together.

:MODE is used to set the list sweep mode.
command syntax：
LIST:MODE { SEQuence | STEPped }

SEQuenc: sequence mode
STEPped: stepped mode
e.g.：WrtCmd(“LIST:MODE SEQ”)

query syntax：LIST：MODE?
return： { SEQ | STEP } <NL^END>

:BAND<n> is used to set the limit data in the list sweep table.
command syntax：LIST:BAND<n><parameter>[,<low limit n>,<high limit n>]
<n> 1 to 10（NR1 format）：sweep point in the line n
<parameter>: A compare the main parameter of the measurement result with the high limit and the low limit.
B compare the sencondary parameter of the measurement result

with the high limit and the low limit.

OFF : don't do the comparison.

<low limit n>: NR1,NR2 or NR3 format，the low limit data in the line n

<high limit n>: NR1,NR2 or NR3 format，the high limit data in the line n.

e.g.：WrtCmd("LIST:BAND1 A,10,20")

WrtCmd("LIST:BAND3 OFF")

query syntax：LIST:BAND<n>?

return：<parameter>,<low limit n>,<high limit n>

8.1.11APERture subsystem command set

APERtures subsystem command set is used to set the measurement speed, the average times. Char '?' can be used to query the current speed, the average times.

command syntax：

APERture { FAST | MEDium | SLOW } [,<value>]

FAST： fast, 30times/s

MEDium： medium, 10 times/s

SLOW： slow, 2 times/s

<value> 1 to 128(NR1 format), the average times.

e.g.：WrtCmd("APER MED,55");

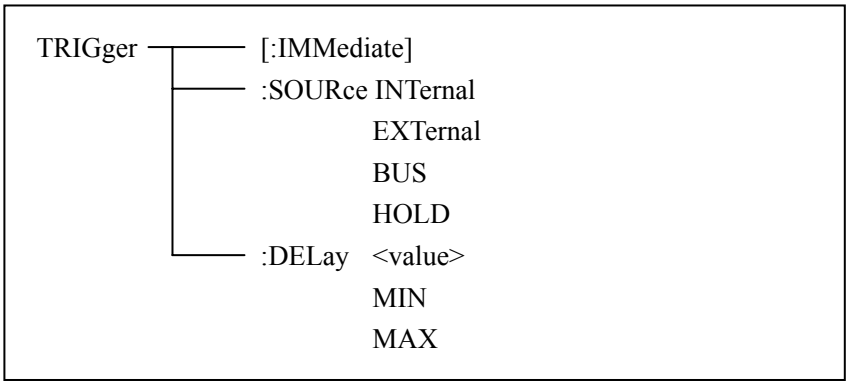
query syntax：APERture?

return： { FAST | MED | SLOW } ,<NR1><NL^END>

8.1.12TRIGger subsystem command set

TRIGger subsystem command set is used to set the trigger source, the delay time after the trigger and trigger instrument test.

Command hierarchical chart:



:IMMediate is used to trigger the instrument only one time.

command syntax： TRIGger[:IMMediate]

e.g.：WrtCmd("TRIG");

:SOURce is used to set the trigger source mode. Char '?' can be used to query the current mode of the trigger source

command syntax：

TRIGger:SOURce { INTernal | EXTernal | BUS | HOLD }

INTernal :triggered by the instrumetn itself automatically. It is the default setting.

EXTernal:triggered by the HANDLER interface.

BUS:triggered by RS232 or GPIB interface.

HOLD: triggered by the TRIGGER key in the front panel.

e.g.：WrtCmd("TRIG:SOUR BUS");

query syntax： TRIGger:SOURce?

return： { INT | EXT | BUS | HOLD } <NL^END>

:DELay is used to set the delay time after the instrument is triggered. Char '?' can be used to query the delay parameter.

command syntax：

TRIGger:DELay { <value> | MIN | MAX }

<value>: NR1,NR2 or NR3 format，0 to 60 s with 1ms as the resolution.

MIN: set the delay time to 0 s.

MAX:set the delay time to 60 s.

e.g.：WrtCmd(“TRIG:DEL 5S”); set the delay time to 5 s.

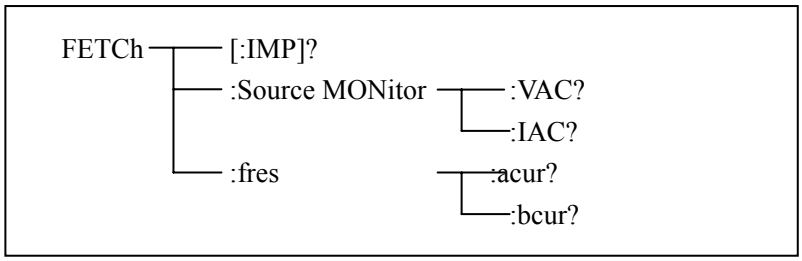
query syntax：TRIGger:DELay?

return：<NR3><NL^END>

8.1.13FETCh? subsystem command set

FETCh? subsystem command set is used to transmit a test result.

Command hierarchical chart:



[:IMP]? is used to notify the TH2826 to transmit the test result to the buffer.

query syntax：FETCh[:IMP]?

e.g.： WrtCmd(“TRIG:SOUR BUS”);

WrtCmd(“TRIG”);

WrtCmd(“FETC?”);

TH2826 transmits the result with ASCII, the more details are below:

SN.NNNNNESNN	,	SN.NNNNNESNN	,	SN	,	SN or SNN	NL^END
<DATA A>		<DATA B>		<state>		<BIN NO.>	

Figure 8-1 the ASCII format 1

<DATA A>,<DATA B> format： <DATA A>（the main parameter），<DATA B>（the secondary parameter）are ASCII code with 12 bits：

SN.NNNNNESNN

（S：+/-，N：0 to 9，E：Exponent Sign）

<state>format: when the following value is selected，<state> will display the test state.

state	description
-1	no data in buffer
0	normal test data
+1	analog bridge is imbalance
+2	ADC can't work.
+3	signal l source overload
+4	the constant voltage can't be adjusted.

The data format for <state> is ASCII code with 2 bits:

SN（S：+/-，N：0 to 4）

Note: when the <state> is -1,1 or 2, the test data is 9.9E37. when the <state > is 0,3 or 4, the test data will out of range.

<BIN>format: the data displays the sorted result:

data	selected result
0	Over the standard
+1	BIN 1
+2	BIN 2
+3	BIN 3
+4	BIN 4
+5	BIN 5
+6	BIN 6
+7	BIN 7
+8	BIN 8
+9	BIN 9
+10	Auxiliary BIN

Only when the comparison function is ON, <BIN>data will be displayed.

<BIN> data is the ASCII code with 2 or 3 bits:

SN or SNN（S：+/-，N：0 to 9）

The ASCII data output format in the list sweep page is below:

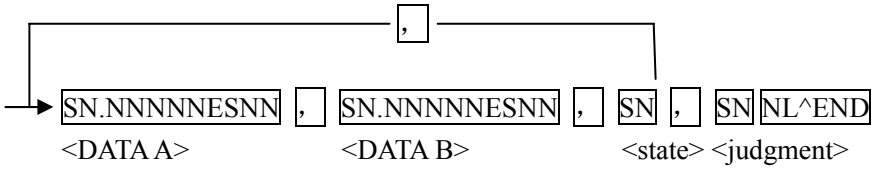


Figure 8-2 ASCII format 2(for list sweep)

<DATA A>,<DATA B>,<state> are the same to the ones above，< judgment > is described as follows：<input/output>format：display the comparison function for list sweep.

data	result
-1	lower
0	good
1	higher

When the comparison function for list sweep is OFF, <input/output> the output is 0.
<input/output>data format is ASCII code with 2 bits:

SN（S：+/-，N：0 to 1）

On the test display page for the single transformer, the ASCII format is as follows:

SN , SN.NNNNNESNN , SN.NNNNNESNN , SN NL^END
<Sequence No.> <DATA A> <DATA B> <state>

Figure 8-3 ASCII format 3(for single transformer)

<sequence NO.> is shown in table 8-1:

Table 8-1 the sequence NO. and the description

Sequence NO.	description
1	TURN
2	Lx
3	LK
4	DCR

<DATA A> is the same to the one above.

<DATA B>(the secondary parameter) has two formats：

When the test parameter is TURN, <DATA B> is the phase. The format is: +(same phase), -(reversed phase).

When the test parameter is Lx, <DATA B> is quality factor, the description is the same to <DATA A>.

At the same time, when the sequence number is greater than 3, there is no secondary parameter, and the state is displayed directly.

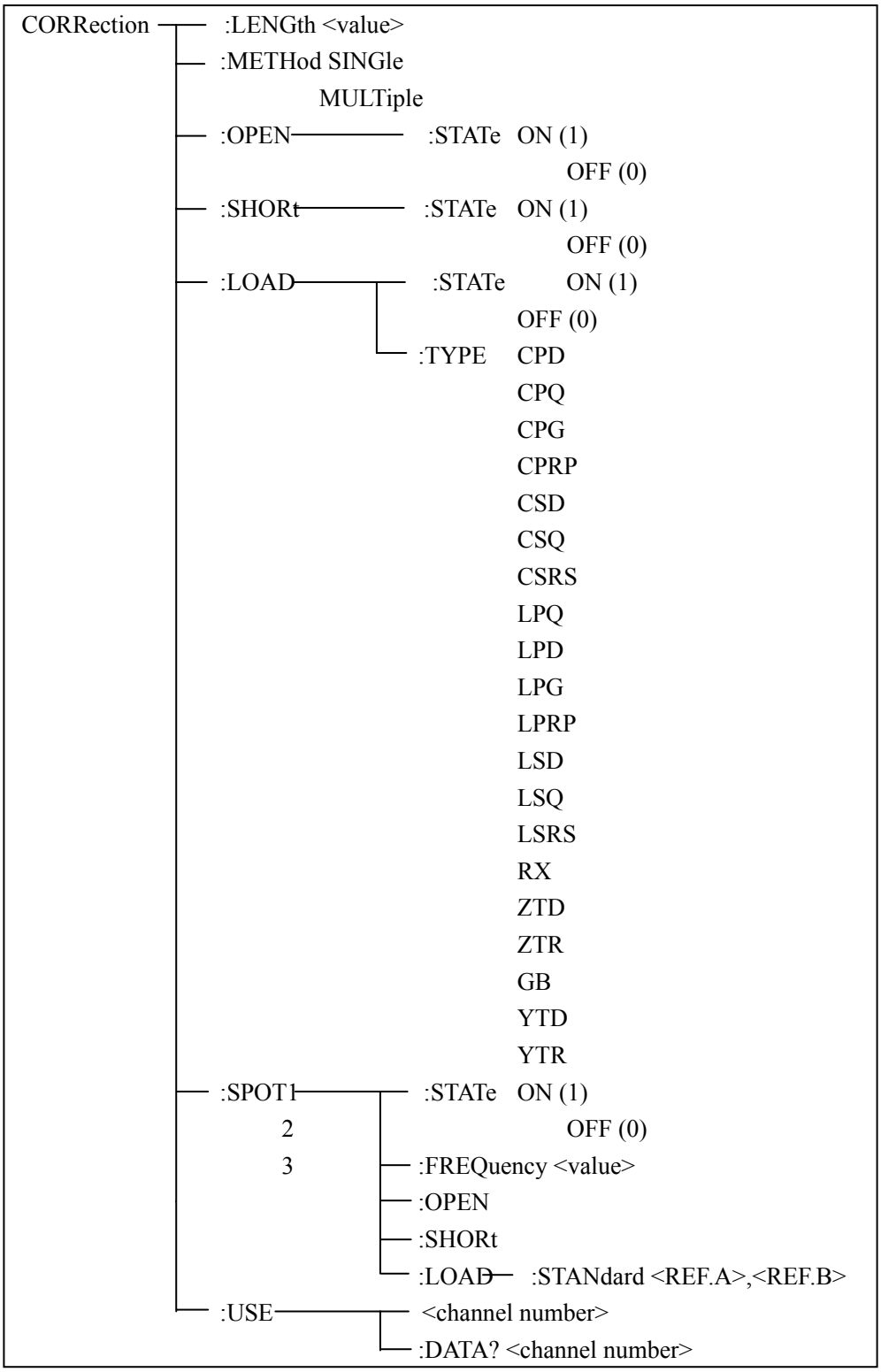
SN: +/-；N:0/1, described as the table below:

state	description
-1	lower
0	good
1	higher

8.1.14CORRection subsystem command set

CORRection subsystem command set is used to set the correction function(short, open or load correction).

Command hierarchical chart:



:LENGth is used to set the length of the correction cable. Char '?' is used to query the current

length of the cable.

command syntax：CORRection:LENGth <value>

<value>:0, 1 or 2 with the unit m as the postfix.

e.g.：WrtCmd(“CORR：LENG 1m”) :set the cable length to 1m.

query syntax：CORRection:LENGth?

return：<NR1><NL^END>

:METHod is used to set the correction mode. Char ‘?’ can be used to query the correction mode. command syntax：CORRection:METHod

{ MULTi | SINGle }

SINGle:set or return the single channel mode.

MULTi: set or return the multi-channel mode.

e.g.：WrtCmd(“CORR:METH MULT”) ;set the instrument to multi-channel mode

query syntax：CORRection:METHod?

return： { SINGle | MULTi } <NL^END>

:OPEN is used to perform the correction data of 41 preset test points.

command sytax：CORRection:OPEN

e.g.：WrtCmd(“CORR:OPEN”)

:OPEN:STATe is used to set the open correction function. Char ‘?’ is used to query the state of the open correction.

command syntax：

CORRection:OPEN:STATe { ON | OFF | 1 | 0 }

char ‘1’(49) :enable the open correction, which is equivalent to ON

char ‘0’(48): forbid the open correction, which is equivalent to OFF.

e.g.：WrtCmd(“CORR:OPEN:STAT ON”)

query syntax：CORRection:OPEN:STATe?

return：<NR1><NL^END>

:SHORt is used to perform the short correction data of 41 preset test points.

command syntax：CORRection:SHORt

e.g.：WrtCmd(“CORR:SHOR”)

:SHORt:STATe is used to set the short correction function. Char ‘?’ is used to query the state of the short correction.

Command syntax:

CORRection:SHORt:STATe { ON | OFF | 1 | 0 }

char ‘1’(49):enable the short correction, which is equivalent to ON.

char ‘0’(48):forbid the short correction, which is equivalent to OFF.

e.g.：WrtCmd(“CORR:SHOR:STAT ON”)

query syntax：CORRection:SHORt:STATe?

return：<NR1><NL^END>

:LOAD:STATe is used to set the load correction function. Char ‘?’ is used to query the state of the load correction.

command syntax：

CORRection:LOAD:STATe { ON | OFF | 1 | 0 }

char ‘1’(49):enable the load correction, which is equivalent to ON.

char ‘0’(48):forbid the load correction, which is equivalent to OFF.

e.g.：WrtCmd(“CORR：LOAD：STAT ON”)

query syntax： CORRection:LOAD:STATe?

return：<NR1><NL^END>

:LOAD:TYPE is used to set the combination parameter function for the load correction. Char ‘?’is used to query the type of the combination parameter.

Fuction：

CPD: set the function to Cp-D

CPQ: set the function to Cp-Q

LPRP: set the function to Lp-Rp

LSD：set the function to Ls-D

CPG: set the function to Cp-G
CPRP: set the function to Cp-Rp
CSD: set the function to Cs-D
CSQ: set the function to Cs-Q
CSRS: set the function to Cs-Rs
LPQ: set the function to Lp-Q
LPD: set the function to Lp-D
LPG: set the function to Lp-G
LSQ: set the function to Ls-Q
LSRS: set the function to Ls-Rs
RX: set the function to R-X
ZTD: set the function to Z-θ°
ZTR: set the function to Z-θr
GB: set the function to G-B
YTD: set the function to Y-θ°
YTR: set the function to Y-θr

e.g.：WrtCmd(“CORR:LOAD:TYPE CPD”)

query syntax：CORRection:LOAD:TYPE?
return：<function><NL^END>

:SPOT<n>:STATe is used to set the particular frequency point. Char ‘?’ is used to query the state of the current frequency point(frequency 1, frequency 2 or frequency 3.)

command syntax：

CORRection:SPOT<n>:STATe { ON | OFF | 1 | 0 }

char ‘1’(49) is equivalent to ON
char ‘0’(48) is equivalent to OFF
<n>:
1:frequency point 1
2:frequency point 2
3:frequency point 3

e.g.：WrtCmd(“CORR:SPOT1:STAT ON”)

query syntax：CORRection:SPOT<n>:STATe?
return：<NR1><NL^END>

:SPOT<n>:FREQuency is used to set the frequency of the particular frequency point 1, 2 and 3. char ‘?’ is used to query the current frequency of the frequency point.

command syntax：CORRection:SPOT<n>:FREQuency <value>

<value> : NR1,NR2 or NR3 format with HZ, KHZ and MHZ as the shortfix.
<n>:
1:frequency point 1
2:frequency point 2
3:frequency point 3

e.g.： WrtCmd("CORR:SPOT1:FREQ 2KHZ") ;set frequency 1 to 2 kHz
note：the range of <value> must be 20Hz to 200kHz, or the return value will be "error".

query syntax：CORRection:SPOT<n>:FREQuency?
return：<NR3><NL^END>

:SPOT<n>:OPEN is used to perform the open correction for the particular frequency points(point 1,point 2 and point 3).
command syntax：CORRection:SPOT<n>:OPEN
<n>:
1:frequency point 1
2:frequency point 2
3:frequency point 3

e.g.：WrtCmd("CORR:SPOT1:OPEN") ;perform the open correction for frequency point 1.

:SPOT<n>:SHORt is used to perform the short correction for the particular frequency points(point1, point 2 and point 3).
command syntax：CORRection:SPOT<n>:SHORt
<n>:
1:frequency point 1
2:frequency point 2
3:frequency point 3

e.g.：WrtCmd("CORR:SPOT1:SHOR") ;perform the short correction for point 1

:SPOT<n>:LOAD:STANdard is used to perform the load correction for the particular frequency points(point 1, point 2 and point 3) under the standard reference value.
command syntax：CORRection:SPOT<n>:LOAD:STANdard <*REF.A*>,<*REF.B*>
<n>:

1:frequency point 1
2:frequency point 2
3:frequency point 3

<*REF.A*> : NR1，NR2 or NR3 format, is the standard reference value for the main parameter

<*REF.B*> : NR1，NR2 or NR3 format, is the standard reference value for the secondary parameter

e.g.:WrtCmd("CORR:SPOT1:LAOD:STAN 100.7,0.0002")

query syntax：CORRection:SPOT<n>:LOAD:STANdard?

return：<NR3>,<NR3><NL^END>

:USE is used to set the channel number for multi-channel. Char '?' can be used to query the used channel number.

command syntax： CORRection:USE <channel number>

<channel number>:the channel number from 1 to 127(NR1, NR2 or NR3 format).

e.g.：WrtCmd("CORR:USE 10") ;set the channel number to 10

query syntax：CORRection:USE?

return：<channel number><NL^END>

:USE:DATA? is used to query the test data of the open/short/load correction for the particular frequency point 1,2 or 3.

query syntax：CORRection:USE:DATA? <channel number>

<channel number>:1 to 127 (NR1 format)

return：<open1 A>,<open1 B>,<short1 A>,<short1 B>,<load1 A>,<load1 B>,

<open2 A>,<open2 B>,<short2 A>,<short2 B>,<load2 A>,<load2 B>,

<open3 A>,<open3 B>,<short3 A>,<short3 B>,<load3 A>,<load3 B>,

<open1/2/3 A>:NR3 format, the open correction data of the main parameter for frequency point 1/2/3.

<open1/2/3 B>:NR3 format, the open correction data of the secondary parameter for frequency point 1/2/3.

<short1/2/3 A>:NR3 format, the short correction data of the main parameter for frequency point 1/2/3.

<short1/2/3 B>:NR3 format, the short correction data of the secondary parameter for frequency point 1/2/3.

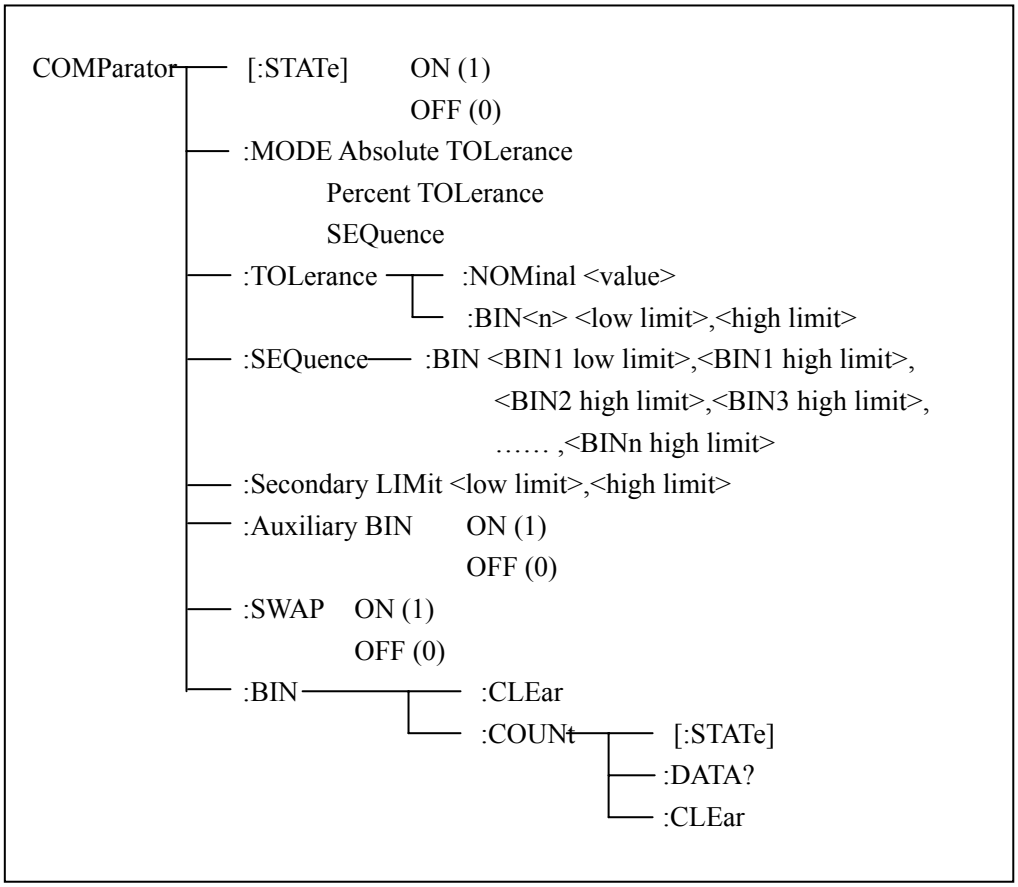
<load1/2/3 A>:NR3 format, the load correction data of the main parameter for frequency point 1/2/3.

<load1/2/3 B>:NR3 format, the load correction data of the secondary parameter for frequency point 1/2/3.

8.1.15COMParator subsystem command set

COMParator subsystem command set is used to set the BIN comparator, including setting the compator ON/OFF, setting the limit list.

Command hierarchical chart:



[:STATe] is used to set the comparator ON/OFF,

command syntax:

COMParator[:STATe] { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON

char '0'(48) is equivalent to OFF

e.g.: WrtCmd("COMP ON")

query syntax: COMParator[:STATe]?

return: <NR1><NL^END>

:MODE is used to set limit mode for comparator. Char '?' is used to query the limit mode.

command syntax： COMParator:MODE { ATOLerance | PTOLerance | SEQuence }

ATOLerance:set the absolute error mode

PTOLerance:set the relative error mode

SEQuence:set sequence mode

e.g.：WrtCmd(“COMP:MODE ATOL”)

query syntax：COMParator:MODE?

return： { ATOL | PTOL | SEQ } <NL^END>

:TOLerance:NOMinal is used to set the standard value of the error mode for the comparator(this mode is effective only when the limit mode is error mode.).

command syntax：COMParator:TOLerance:NOMinal <value>

〈value>:the standard value with NR1, NR2 or NR3 format

e.g.：WrtCmd(“COMP:TOL:NOM 100E-12”)

query syntax：COMParator:TOLerance:NOMinal?

return：<NR3><NL^END>

:TOLerance:BIN<n> is used to set the low limit and the high limit of every BIN on the comparator error mode(this function is effective only when the limit mode is set to the error mode.)

command syntax：COMParator:TOLerance:BIN<n><low limit>,<high limit>

<n>:1 to 9 (NR1 format) , BIN number

<low limit>: NR1, NR2 or NR3 format, the low limit

<high limit>: NR1, NR2 or NR3 format, the hight limit

Note: the low limit should be less than the high limit, or the error message will be prompted.

e.g. ：WrtCmd(“COMP:TOL:BIN1 -5,5”)

WrtCmd(“COMP:TOL:BIN2 –10,10”)

query syntax：COMParator:TOLerance:BIN<n>?

return：<low limit>,<high limit><NL^END>

:SEQuence:BIN is used to set the high limit and the low limit of the comparator on the sequence mode(this function is effective only when the limit mode is set to sequence mode.).

command syntax：COMParator:SEQuence:BIN <BIN1 low limit>,<BIN1 high limit>,
<BIN2 high limit>,…, <BINn high limit>

<BIN1 low limit>: NR1, NR2 or NR3 format，the low limit of BIN 1.

<BIN1 high limit>: NR1, NR2 or NR3 format，the high limit of BIN 1.

<BINn high limit>: NR1, NR2 or NR3 format，the high limit of BIN n(the maximum value of n is 9).

Note:the low limit should be less than the high limit

e.g.： WrtCmd(“COMP:SEQ:BIN 10,20,30,40,50”)

query syntax：COMParator:SEQuence:BIN?

return：<BIN1 low limit>,<BIN1 high limit>,<BIN2 high limit>,…,
<BINn high limit><NL^END>

:Secondary LIMit is used to set the high limit and the low limit of the secondary parameter for the comparator.

command syntax：COMParator:SLIMit <low limit>,<high limit>

<low limit>: NR1, NR2 or NR3 format, the low limit.

<high limit>: NR1, NR2 or NR3 format, the high limit.

Note:the high limit should be greater than the low limit, or the error message will be prompted.

e.g.：WrtCmd(“COMP:SLIM 0.001,0.002”)

query syntax：COMParator:SLIMit?

return：<NR3>,<NR3><NL^END>

:***Auxiliary BIN*** is used to set the auxiliary BIN ON/OFF of the BIN Count. The state of the auxiliary BIN can be queried.

command syntax：

COMParator:Auxiliary BIN { ON | OFF | 1 | 0 }

char ‘0’(48) is equivalent to OFF

char '1'(49) is equivalent to ON .

e.g.: WrtCmd("COMP:ABIN ON")

query syntax: COMParator:Auxiliary BIN?

return：<NR1><NL^END>

:SWAP is used to set the swap comparator mode ON/OFF of the main parameter and the secondary parameter.

e.g.:function:Cp-D; SWAP mode: ON; the function will be changed to D-Cp.At the same time, the limit setting on BIN 1 to 9 is the high limit and the low limit for D, the setting of BIN 2 is the Cp limit. The meaning is that if ON is selected, the main parameter and the secondary parameter will be compared by being interchanged; if OFF is seleccted, the parameters will be compared by the primary order. The state of the swap compatator mode can be queried.

command syntax：

COMParator:SWAP { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON

char '0'(48) is equivalent to OFF

e.g.：WrtCmd("COMP:SWAP ON")

query syntax：COMParator:SWAP?

return：<NR1><NL^END>

:BIN:CLEar is used to clear the setting limit of every BIN in the limit list.

command syntax：COMParator:BIN:CLEar

e.g.：WrtCmd("COMP:BIN:CLE")

:BIN:COUNT[:STATe] is used to set the BIN counter ON/OFF. The state of the BIN counter can be queried.

command syntax：

COMParator:BIN:COUNt[:STATe] { ON | OFF | 1 | 0 }

char '1'(49) is equivalent to ON

char '0'(48) is equivalent to OFF

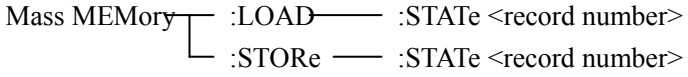
e.g.：WrtCmd(“COMP:BIN:COUN ON”)
query syntax：COMParator:BIN:COUNt[STATe]?
return：<NR1><NL^END>

:BIN:COUNt:DATA? is used to query the BIN count result.
query BIN：COMParator:BIN:COUNt:DATA?
return：<BIN1 count>,<BIN2 count>,…,<BIN9 count>,<OUT OF BIN count>,
<AUX BIN count><NL^END>
<BIN1-9 count>:NR1 format, is the count result of BIN 1 to 9.
<OUT OF BIN count>: NR1 format，is the count result of over the standard.
<AUX BIN count>: NR1 format，is the count result of the auxiliary BIN.

:BIN COUNT:CLEar is used to clear all the count result.
command syntax：COMParator:BIN:COUNt:CLEar
e.g.：WrtCmd(“COMP:BIN:COUN:CLE”)

8.1.16Mass MEMory subsystem command set

Mass MEMory subsystem command set is used to save and load the file.
Command hierarchical chart:



:LOAD:STATe is used to load the saved file.
command syntax：MMEMory:LOAD:STATe <value>
<value>:the file sequence number of 0 to 9 (NR1 format).
e.g.： WrtCmd(“MMEM:LOAD:STAT 1”);

:STORe:STATe is used to save the current setting for the instrument as one file.
command syntax：MMEMory:STOR:STATe <value>
<value>: the file sequence of 0 to 9 (NR1 format).
e.g.： WrtCmd(“MMEM:STOR:STAT 1”);

8.2The GPIB common command for TH2826

●*RST ●*TRG ●*IDN ●*TST
●*ESE ●*SRE ●*ESR ●*STB
●*OPC ●*CLS

- *RST is used to reset the instrument.
  command syntax：*RST
  e.g.：WrtCmd(“*RST”);
- *TRG is used to trigger the measurement instrument, and transmit the test result to the output buffer.
  command syntax：*TRG
  e.g.：WrtCmd(“*TRG”);
- *CLS is used to clear the state register of the standard events and the service request.
  command syntax：*CLS
  e.g.：WrtCmd(“*CLS”);
- *IDN? is used to return the ID of the TH2826.
  query stynax：*IDN？
  return：<manufacturer>,<model>,<firmware><NL^END>
  <manufacturer> :manufacturer name.(e.g.:Tonghui).
  <model> :the instrument type.(e.g.:TH2826)
  <firmware>:the software version.(e.g.:VER2.3.7)
  e.g.：WrtCmd(“*IDN?”);
- *TST? is used to query self-checking, to perform internal self-checking and generate the error message report. For TH2826, if the query result is “0”, there is no error.
  query syntax：*TST?
  return：0<NL^END>
  0:0(NR1 format).
  e.g.：WrtCmd(“*TST?”).
- *ESE (standard Event Status Enable command) is used to set the open bits of the standard event status register). This query command returns the open bits setting state of the event staus register.
  Command syntax：*ESE<value>
  <value> :NR1 format, the decimal for every bit of the state regisiter.

The definition for event status register is shown in the table below.

bit	description
7	Power On(PON) Bit
6	User Request(URQ) Bit
5	Command Error(EME) Bit

4	Execution Error(EXE) Bit
3	Device Dependent Error(DDE)
2	Query Error(QYE) Bit
1	Request Control(RQC) Bit
0	Operation Complete(OPC) Bit

query syntax：*ESE?
return：<value><NL^END>
e.g.：WrtCmd("*ESE?");

- *SRE （Service Request Enable command） is used to set the open bits of the status byte register. This query command returns the current setting status of the status byte register.
command syntax：*SRE<value>
<value>: NR1 format, the decimal for the the status byte register.
The definition for the status byte register is shown in the table below.

bit	description
7	Operation Status Register Summary Bit
6	RQS(Request Service) Bit
5	Standard Event Status Register Summary Bit
4	MAV(Message Available) Bit
3-0	Always 0(zero): 0

query syntax：*SRE?
return：<value><NL^END>
e.g.：WrtCmd("*SRE?");

- *ESR? Returns the value of the event status register.
query syntax：*ESR?
return：<value><NL^END>
<value>: NR1 format, the decimal for the value of the event status register.
The definition for event status register is shown in the table below.

bit	description

7	Power On(PON) Bit
6	User Request(URQ) Bit
5	Command Error(EME) Bit
4	Execution Error(EXE) Bit
3	Device Dependent Error(DDE) Bit
2	Query Error(QYE) Bit
1	Request Control(RQC) Bit
0	Operation Complete(OPC) Bit

e.g : WrtCmd("*ESR?");

- *STB? reads the value of the service status register. It has no effect to the value of the service status register.

  query syntax：*STB?

  return：<value><NL^END>

  <value>:NR1 format, the decimal for the value of the status register.

  The definition for the status word is shown in the table below:

bit	discription
7	Operation Status Register Summary Bit
6	RQS(Request Service) Bit
5	Standard Event Status Register Summary Bit
4	MAV(Message Available) Bit
3-0	Always 0(zero): 0

  e.g.：WrtCmd("*STB?");

- *OPC is used to set the OPC bit of the event status register when TH2826 has finished the test task. At the same time, this command will notify the instrument that the buffer of the instrument shouble be set to 1(ASCII).

  command syntax：*OPC

  e.g.：OUTPUT 717;"*OPC"! ;set the OPC bit when the previous command has be finished.

  query syntax：*OPC?

  return：1<NL^END>

  char '1': 1(ASCII), 49 (decimal)）

  e.g.：WrtCmd("*OPC?")

Chapter 9 The description for Handler (optional)

This chapter will show you the Handler interface On TH2826.

The TH2826 provides the Handler interface for you. The interface is mainly used for the output of the sorted result. The interface offers the communication signal and the signal for the output of the sorted result. The separator result is corresponding to the output of BIN 10. The design for the Handler interface is very smart with the status of the output signal can be defined according to your application target.

9.1The technology description for TH2826 Handler

Table 9-1 shows the description for TH2826 HANDLER.

Table 9-1 the HANDLER description

The output signal: low effective, open collector output, optoelectronic isolation
Output signal judgment:
BIN comparator: good, over the standard, not good
list sweep comparator: IN/OUT for every sweep point and pass/fail for all the compared result.
INDEX: ADC ended
EOC: end of one test and comparison
Alarm: alarm for circuit interruption
The input signal: optoelectronic isolation
Keylock: lock the keys on the front panel
External Trigger: pulsewidth≥1μS

9.2The operation description

9.2.1The definition for the signal line

The Handler interface has 3 signal: comparison output, control output and control input. The signal line's definition for the BIN comparison and list sweep comparison is below:

Comparison signal lines:

- Comparison output signal

/BIN1 - /BIN9, /AUX , /OUT, /PHI(the main parameter is higher)，/PLO(the main parameter is lower)， /SREJ(the secondary parameter is not good). The signal line distribution for comparison out is shown in figure 9-1.

- Control output signal

/INDEX(analog test finished signal), /EOM(test ended and the compared data effective),

/ALARM(the circuit interruption)

- Control input signal

  /EXT.TRIG(external trigger signal) , /Keylock(the key lock).

The signal distribution for the pins is described in table 9-2.

Table 9-2 The signal distribution for the pins

pin	signal name	description
1 2 3 4 5 6 7 8 9 10 11	/BIN1 /BIN2 /BIN3 /BIN4 /BIN5 /BIN6 /BIN7 /BIN8 /BIN9 /OUT /AUX	BIN sorted result /BIN(BIN number) output are all open collector output.
12 13	/EXT.TRIG	External trigger: when the trigger mode is EXT.TRIG, TH2826 will be triggered by the positive-edge in this pin.
14 15	EXT.DCV2	External DC voltage 2: The DC provider pin for the optoelectronic coupling signal(/EXT_TRIG, /KeyLock, /ALARM，/INDEX，/EOM)
16 17 18	+5V	The internal power +5V: to use the internal power is not recommended. If you use the internal power, please ensure that the current is lower than 0.3A and the signal line is far from the disturbance source.
19	/PHI	The main parameter is higher: the test result is greater than the high limit in BIN1 to BIN9.
20	/PLO	The main parameter is lower: the test result

		is less than the low limit in BIN1 to BIN9.
21	/SREJ	The secondary parameter is not good: the test result is not in the range of the high limit and the low limit.
22 23 24	NC NC NC	Not connect.
25	/KEY LOCK	When this single is effective, the keys in the front panel are locked.
27 28	EXT.DCV1	The external DC voltage 1：the pull-up DC power provider pin for optoelectronic coupling signal(/BIN-/BIN9,/AUX，/OUT，/PHI，/PLO，/SREJ).
29	/ALARM	When circuit is interrupted, /ALARM is effective.
30	/INDEX	When the analog test is finished and the UNKNOWN terminal can be connected to another DUT, /INDEX is effective. But the comparison signal is effective until /EOM is effective.
31	/EOM	End Of Measurement：when the test data and the compared result are effective, this signal is effective.
32,33	COM2	The reference ground for external power EXTV2.
34,35,36	COM1	The reference ground for external power EXTV1.

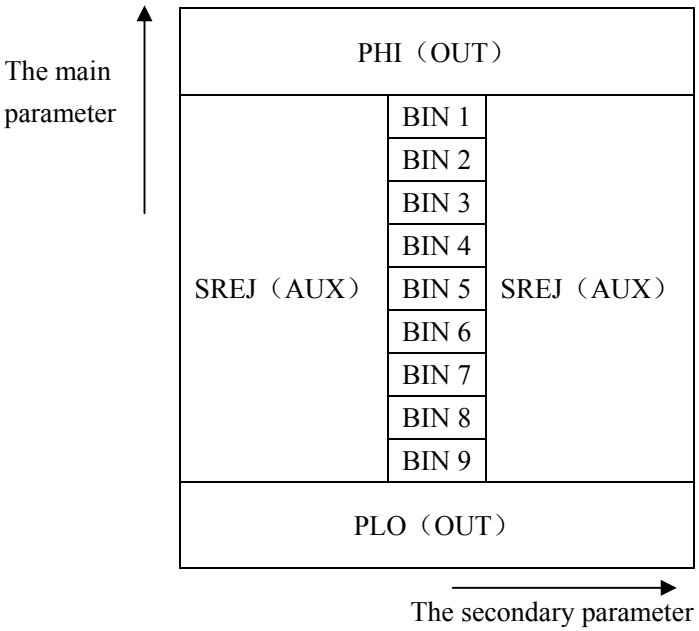
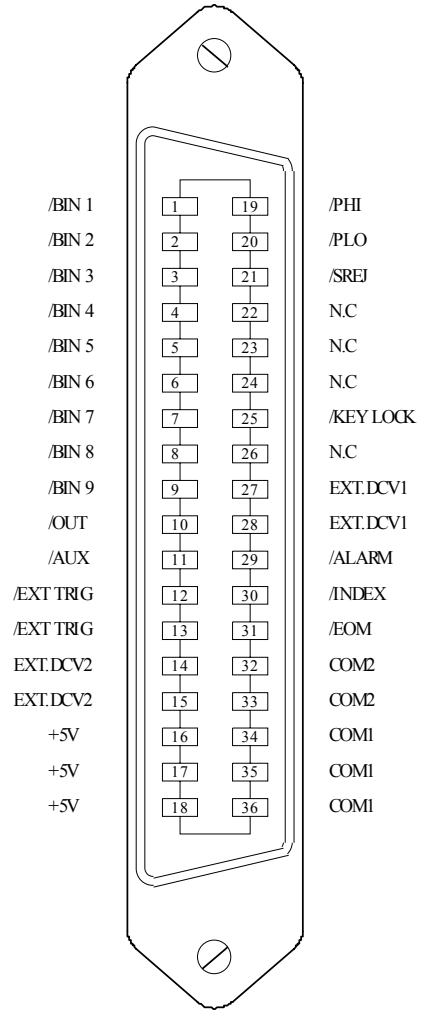
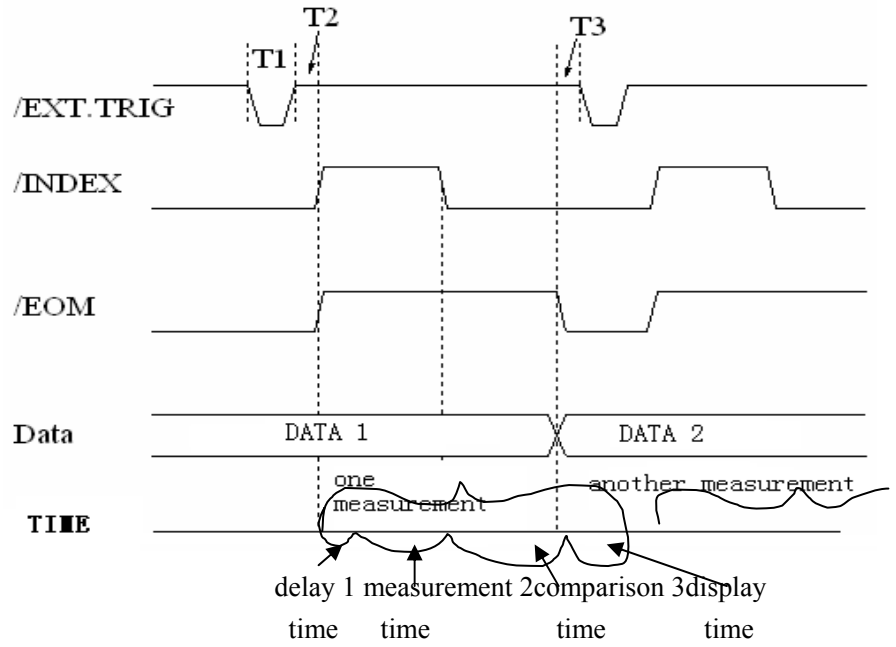


Figure 9-1 the /PHI，/PLO，/SREJ signal distribution for BIN comparison



Note: the signal to /BIN1 - /BIN9, /OUT, /AUX, /PHI, /PLO and /SREJ in the list sweep comparison is different from that in the BIN comparison.

Figure 9-2 the pin definition for HANDLER



time	the minimum	the maximum
T1: trigger pulse-width	1us	---
T2:delay time	200us	Display time[3] + 200us
T3:the trigger waiting time after /EOM output	0us	---

1. for the measurement time, please refer to the operation manual;
2. the typical comparison time is approximately 1ms；
3. the display time for every display page is below:

   MEAS DISPLAY： 8ms;

   BIN NO.DISPLAY：5ms;

   BIN COUNT DISPLAY：0.5ms

Figure 9-3 the timing chart

List sweep comparison signal line

The definition for list sweep comparison is different from that for the BIN comparison.

- Comparison output signal

/BIN-/BIN9 and /OUT show the IN/OUT (good or over the standard) judgment (figure

9-4). /AUX shows PASS/FAIL judgement.

When a sweep test is finished, these signal will be the output signal.

- Control

/INDEX(analog test finished), /EOM(the test ended).

The timing is below when /INDEX and /EOM are effective：

SEQ sweep mode：

/INDEX is defined as the effective signal when the last sweep point of the analog test is finished.

/EOM is defined as the effective signal when all the test results are effective after every list sweep task is finished.

STEP sweep mode：

/INDEX is defined as the effective signal when the analog test of every sweep point is finished.

/EOM is defined as the effective signal when the test and the comparison of every step are finished.

The pin distribution for list sweep is shown in table 9-3 and figure 9-2. (the pin definition for the list sweep comparison is the same to that for the BIN comparison). The timing chart is shown in figure 9-5.

Table 9-3 the pin distribute for the list sweep comparison

pin	signal	description
1	/BIN1	out of the limit of sweep point1
2	/BIN2	out of the limit of sweep point2
3	/BIN3	out of the limit of sweep point3
4	/BIN4	out of the limit of sweep point4
5	/BIN5	out of the limit of sweep point5
6	/BIN6	out of the limit of sweep point6
7	/BIN7	out of the limit of sweep point7
8	/BIN8	out of the limit of sweep point8
9	/BIN9	out of the limit of sweep point9
10	/OUT	out of the limit of sweep point10
11	/AUX	/AUX is defined as the effective signal when at least one is not good in the list.

30	/INDEX	SEQ：When the analog test of the last sweep point is finished and the UNKNOWN terminal can be connected to another DUT, /INDEX is effective. But the comparison signal is effective until /EOM is effective. STEP：When the analog test of the last sweep point is finished, /INDEX is effective. But the comparison signal is effective until /EOM is effective.
31	/EOM	Test ended： SEQ：when the test is finished and the compared results are effective, this signal is effective. STEP： When the test of every sweep point is finished, /EOM is finished. the comparison result signal is effective until /EOM is effecive.
others		The definition is the same to that of the comparison.

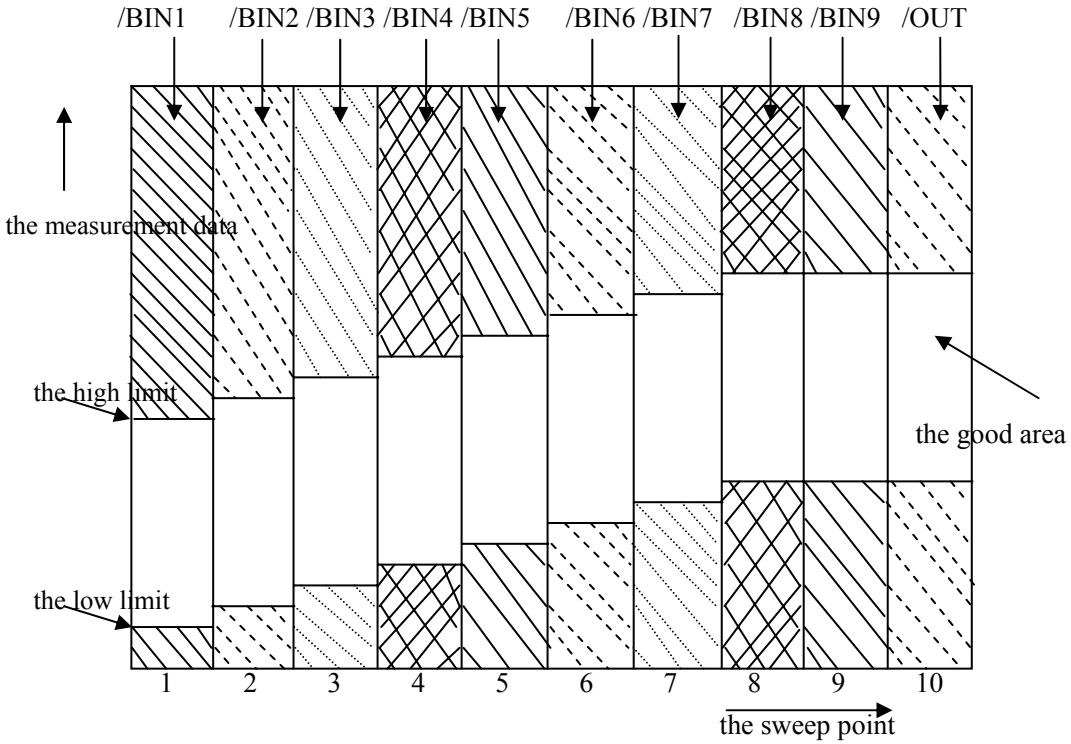
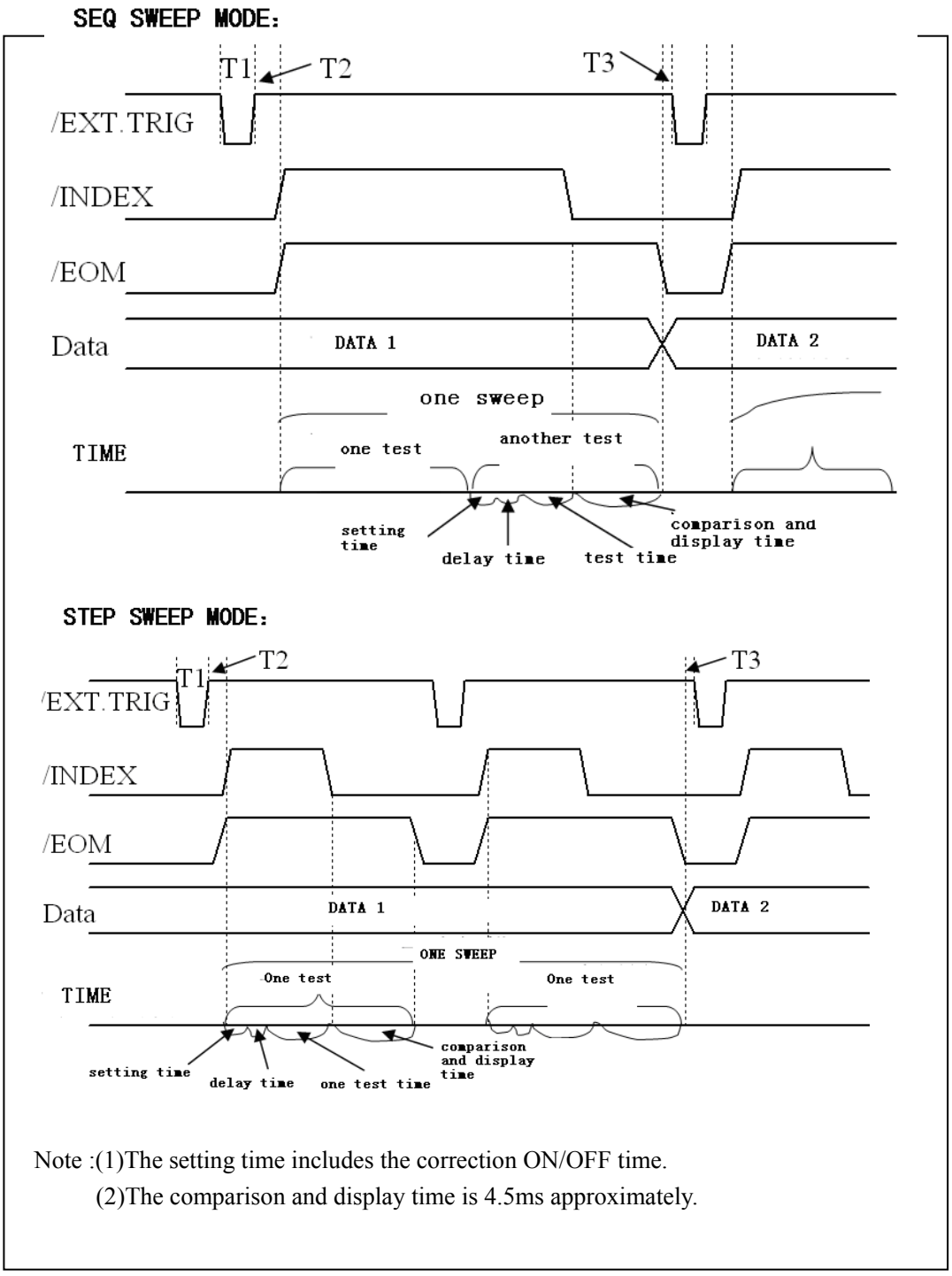


Figure 9-4 the signal area of the list sweep comparison



Note :(1)The setting time includes the correction ON/OFF time.

(2)The comparison and display time is 4.5ms approximately.

Figure 9-5 the time counting

9.2.2Electrical feature

As it is shown above, the signal definition for the comparison and the list sweep

comparison are different. But the electrical feature is same. So the description can be applied to BIN comparison and list sweep comparison.

DC isolation output: the DC isolation output (pin1 to pin16) generates the isolation by the optoelectronic coupler with the collector open. The output voltage on every line is set by the pull-up resistance on the HANDLER interface board. The pull-up resistance is connected to the internal voltage (+5v). or the external voltage(EXTV:+5v).

The electrical feature of the DC isolation output can be divided into 2 types shown in Table 9-4.

Table 9-4 the electrical feature of the DC isolation output

the output signal	the output rated voltage		the maximum current	the reference ground for the circuit
	LOW	HIGH		
compared signal /BIN1 - /BIN9 /AUX /OUT /PHI /PLO	≤0.5V	+5V--+24V	6mA	Internal pull-up voltage: TH2826 GND EXTV1： COM1
control signal /INDEX /EOM /ALARM	≤0.5V	+5V--+24V	5mA	Internal pull-up voltage : TH2826 GND EXTV2： COM2

9.2.3HANDLER Interface board circuit

The output circuit for the comparison result is shown in the figure 9-6 below.

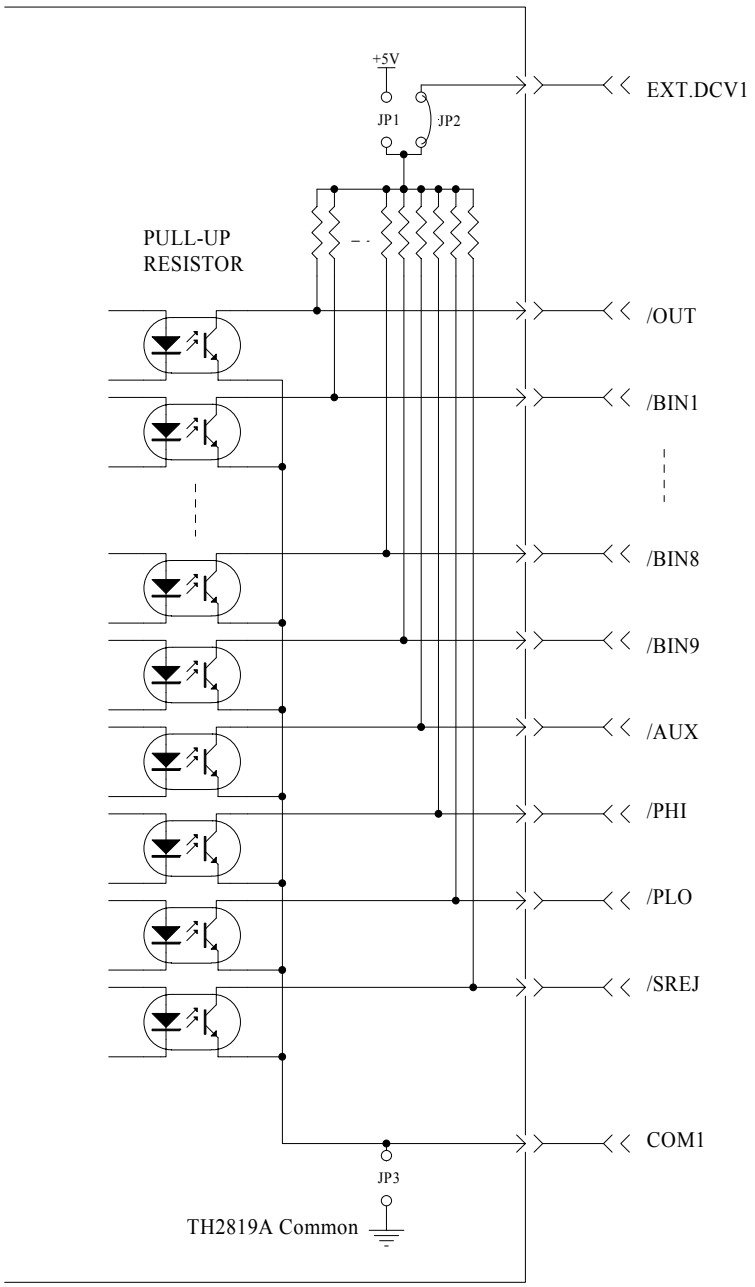


Figure 9-6 the output circuit for the comparison result

The output circuit for control signal is shown in the figure 9-7 below.

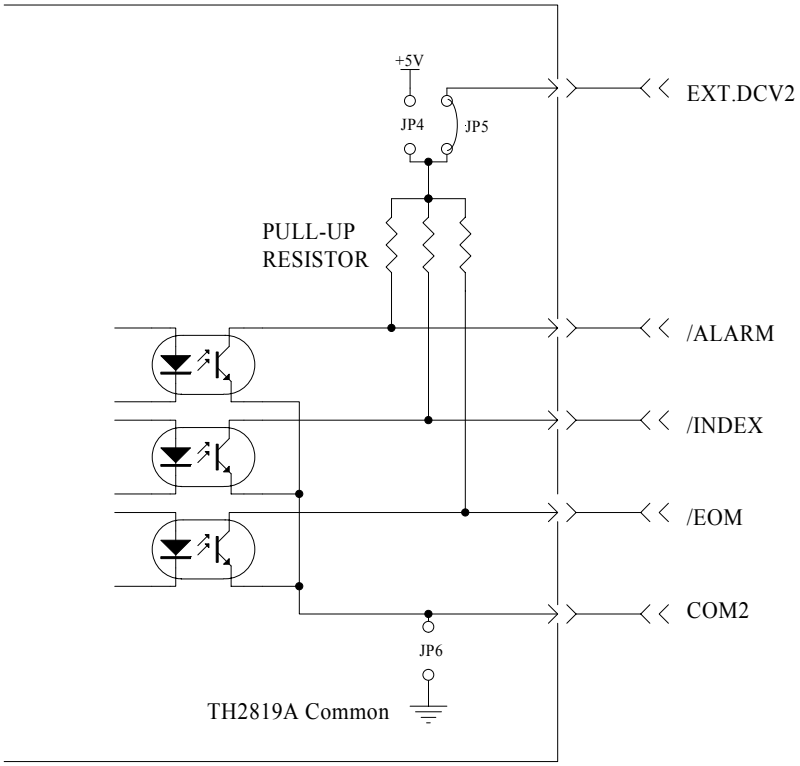


Figure 9-7 the output circuit for control signal

The input circuit for control signal is shown in the figure 9-8 below.

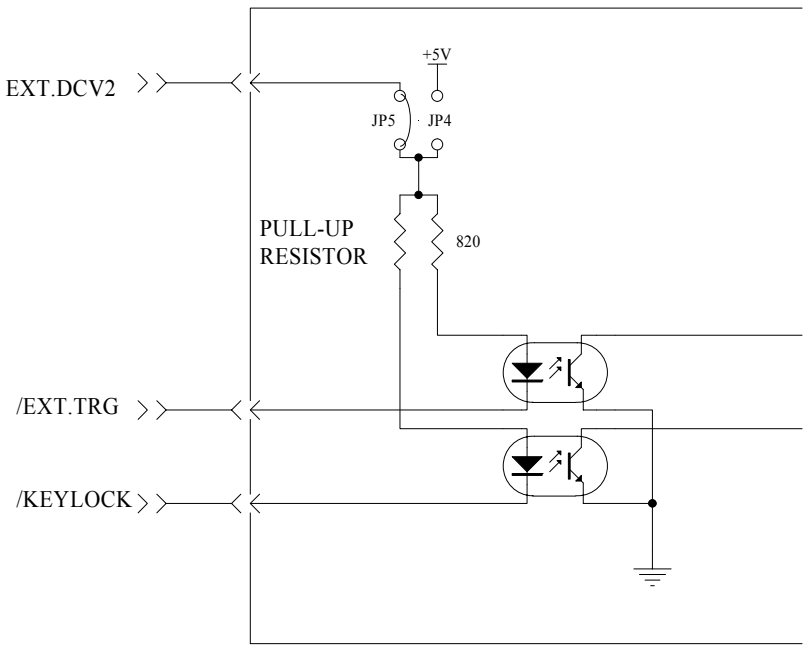


Figure 9-8 the input circuit for control signal

9.2.4operation

Before you use the HANDLER function, you should ensure that your instrument has install the HANDLER interface board.The following procedure will show you how to use the interface comparison and the list sweep comparison.

The procedure for comparison setting :

(1) Press the softkey [LIMIT TABLE]. LIMIT TABLE SETUP page will be displayed.

(2) Set the standard value and the high limit and the low limit in LIMIT TABLE SETUP. Refer to the LCR menu key description to see more details.

(3) Move the cursor to COMP field. The softkey area will display :

- ON
- OFF

(4) Press the softkey ON to enable the comparison function.

(5) Press [LCRZ], and then press the sotfkey BIN NO. or BIN COUNT, the DUT will be tested; at the same time, you can set the counter for the DUT and the auxiliary.

Note: COMP ON/OFF can be set in BIN COUNT page.

The procedure for list sweep comparison:

(1)Press LIST SETUP, LIST SWEEP SETUP page will be displayed.

(2)Set the sweep mode, sweep frequency point, reference value, the high limit and the low limit. Refer to the LCR menu key description to see more details.

(3)Press [LCRZ].and then press the softkey LIST SWEEP, LIST SWEEP DISP page will be displayed. Refer to the LCR menu key description to see more details.

Note: the following methods can be used to improve the speed:

(1)Set the range to the maximum that the capacitance may be, and lock this range.

(2)Set Vm: OFF and Im: OFF in the MEAS SETUP page.

(3)Test the DUT in the BIN COUNT page.