Insulation Resistance Meter
SME1202A/SME1202B

User Manual

scientiFic

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1) Introduction to Instrument, Unpacking, Installing

This chapter will introduce the basic instrument performance, which is followed by notes of unpacking and installing.

1.1 Introduction to Instrument

With touch, colour LCD screen and unique insulation resistance/leakage current dual test function, SME1202A/B Insulation Resistance Meter is an intelligent measurement instrument that is used for rapid measurements on insulating properties of electronic parts and components (especially the capacitance), dielectric material, equipments, wires, cables, etc.
SME1202A/B is provided with sorting output and external single pulse signal input interface, making it easy for pipeline operation. The quipped communication interface can achieve the off-site operations of all functions of the instrument through microcomputer. The instrument has a powerful anti-jamming capability, which makes the measurement more reliable

1.2 Unpacking

Inspect the shipping container for damage after unpacking it. It is not recommended to power on the instrument in the case of a damage container.
If the contents in the container do not conform to the packing list, notify us or your dealer.

1.3 Power Connection

1) Power supply: 90V to 121Vac (60Hz) or 198 to 242Vac (50Hz).
2) Power supply power range: ≤50VA.
3) L (line wire), N (neutral wire) and E (earth ground wire) of the power supply input socket should correspond to the power plug of the instrument.
4) The instrument has been specially designed for decreasing noise jamming caused by the input in AC power terminal, but it is also recommended to use it in the environment of low noise. If noises cannot be avoided, install a power source filter please.

WARNING: To avoid injury to personnel and damage to the instrument resulting from electric shock, do sure that the earth ground wire is safely grounded.

1.4 Fuse

The fuse is a standard configuration, so use the included custom fuse please.

1.5 Environment

1) Do not store or use the instrument where it could be exposed to many dusts, great vibration, direct sunshine and corrosive gas.
2) The instrument should operate under the temperature ranging from 10℃ to 40℃, relative humidity ≤90%. For high accuracy, use the instrument in the environment as mentioned above .
3) For high accuracy, do not block the left air vent so as to ensure good ventilation.
4) The instrument has been specially designed for decreasing noise jamming caused by the AC power input, but it is also recommended to use it in the environment of low noise. If noise cannot be avoided, install a power filter please.
5) If the instrument is not used for a long time, place it in the original or a similar packing. The environment temperature should be kept in the range of 0℃ to 40℃, and the relative humidity should not be greater than 90%RH. The box should be located in an airy room where it is not exposed to corrosive impurities and direct sunlight.
6) Test leads on the instrument that are connected to DUTs should be kept away from strong electromagnetic fields to avoid interference.

1.6 Use of Test Fixture

It is recommended to use the test fixture or cable supplied with instrument, the use of other test fixtures or cables may result in incorrect measurement results. In addition, for good contact of DUT and fixture, keep the test fixture or cable and pins of DUT clean.
Connect the test fixture or cable to HV (-) and INPUT terminals on the instrument front panel.

1.7 Warm-up

1) For accurate measurement, the warm-up time should be at least 30 minutes.
2) Do not turn on or off the instrument frequently. This may corrupt internal data.

1.8 Other Features

1) Power Consumption: ≤50VA
2) Dimensions (W*H*D): 235mm*104mm*360mm; this dimension is the final packaging size.
3) Weight: Approx. 3.6kg

2) Introduction to Front and Rear Panels

This chapter will describe the basic operation of SME1202A/B. Before using the instrument, please read this chapter carefully.

2.1 Introduction to Front Panel

Figure 2-1 shows the front panel of SME1202A/B.

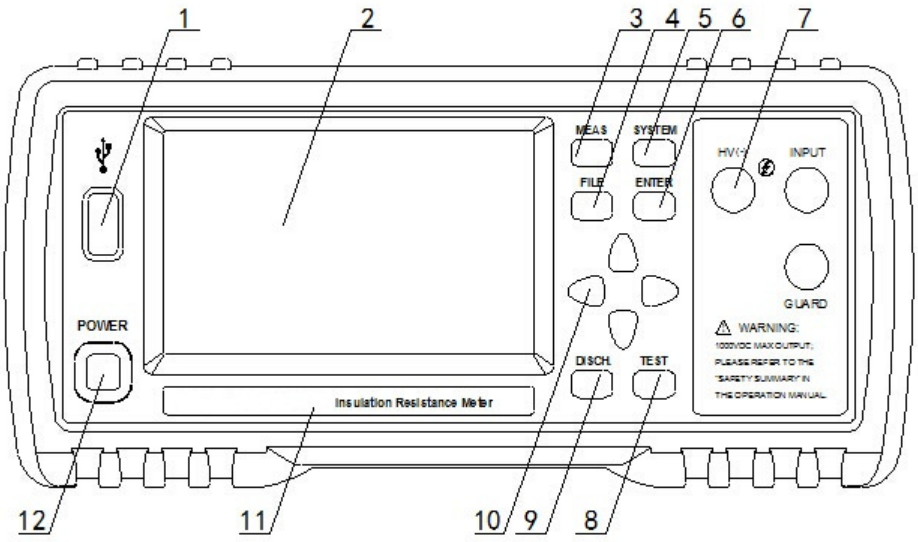


Figure 2-1 Front Panel

1) USB interface

HOST interface of USB

2) LCD and touch screen

480*272 dot-matrix, 24-bit, 4.3-inch TFT and touch LCD is used for measurement setup and result display.

3) [MEAS]

Press [MEAS] to enter into the MEAS DISP page.

4) [FILE]

Press [FILE] to enter into the page of internal and external File Manage.

5) [SYSTEM]

Press [SYSTEM] to enter into the SYSTEM SETUP page.

6) [ENTER]

Press this key to terminate and store input data.

7) Test terminals (HV-), INPUT, GUARD

(HV-): voltage output terminal

INPUT: sampling input terminal

GUARD: ground shield terminal

8) [TEST]

When the trigger mode is set as MANU (manual), pressing this key can trigger the instrument manually.

9) [DISCH.]

Press this key to make the instrument return to discharge state from test state.

10) Universal Arrow Keys

There are four arrow keys: up, down, left and right arrow keys.

11) Model Name and Description

Show instrument model name and description.

12) POWER

Power On/OFF switch.

2.2 Introduction to Rear Panel

Figure 2-2 shows the rear panel of SME1202A/B.

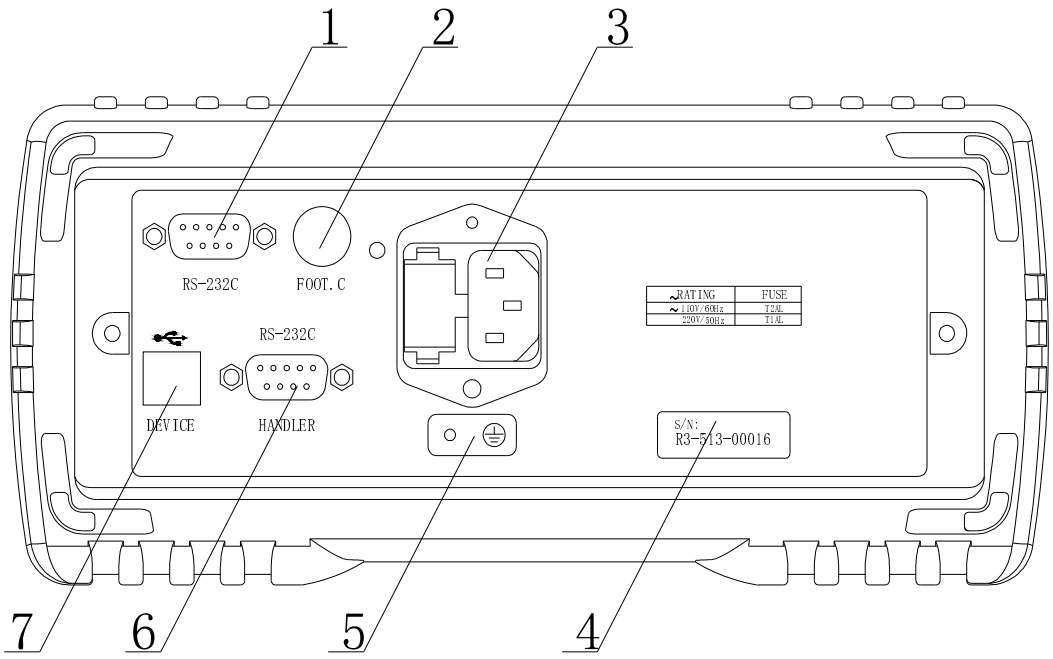


Figure 2-2 Rear Panel

1) RS232C Serial Interface

It realizes serial communication of the instrument with PC.

2) FOOT.C

External trigger signal, foot switch TH1801-001 (optional) can be used to trigger measurement when the trigger source is EXT.

3) Power Socket

It is used to input AC power and it is equipped with fuse socket. Fuse will be placed in fuse socket to protect the instrument.

4) Serial No.

Serial Number of instrument.

5) Ground Terminal

This terminal connects the instrument chassis thus to protect or shield ground connection.

6) HANDLER Interface

Through HANDLER interface, an automatic test system can be conveniently constructed to realize auto test. SME1202A/B will output sorting comparator result signals and link signals. Meantime, “START” signal can be obtained through this interface.

7) USB Interface

PC can remotely control SME1202A/B through USB DEVICE.

2.3 Display Zone

SME1202A/B adopts 24-bit 4.3-inch LCD touch screen with a resolution of 480*272. The display screen is divided into the following zones, as shown in figure 2-3.

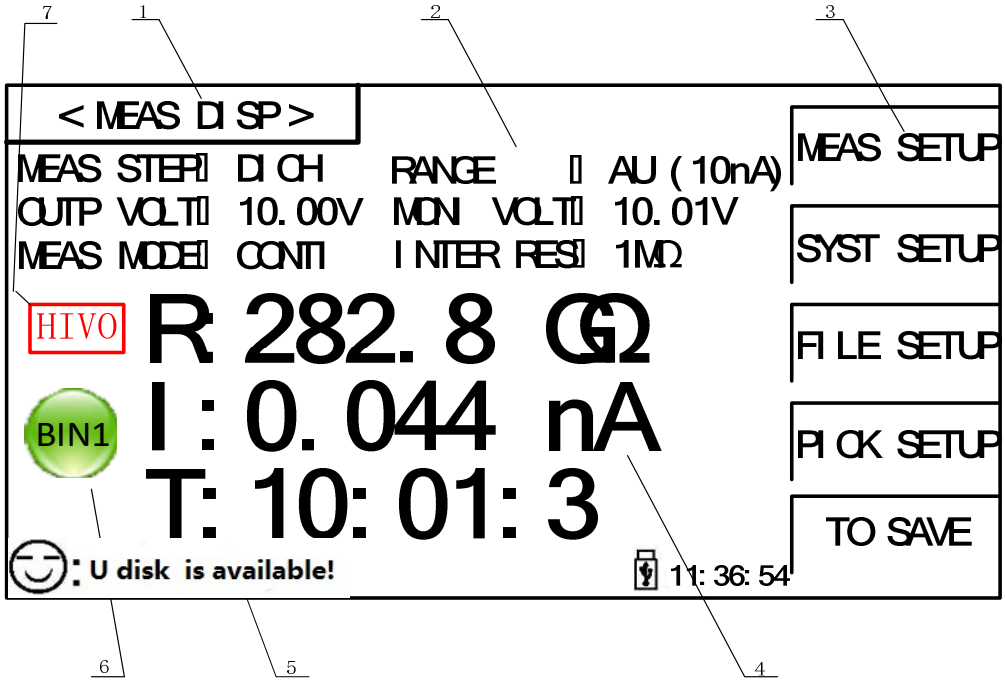


Figure 2-3 Display zone

1. Page name
   This zone shows the current page name.
2. Function zone
   On measurement display page, this zone is used to show the measurement parameters (**parameters can only be displayed, but not changed**); on other page, it is used to change the measurement parameters and **zones after colon** of functional parameters can be touched to change.
3. Soft keys
   This zone displays the function menu corresponding to the cursor-located zone.
4. Result display
   This zone displays the measurement result and the time of each test procedures (counting down).
5. Prompt information
   This zone displays all prompt information.
6. Bin display
   This zone displays sorting results of bins (**when sorting function is ON**).
7. Warning sign
   This zone is used to blinking display some warning information, for example, when HV is displayed, it is warning that there is high voltage in test terminal. The instrument user should be careful.

2.4 Introduction to Buttons on Front Panel

2.4.1 [MEAS]

Press <MEAS> to enter into display homepage. Selectable functions on this page are shown as follows:

<MEAS SETUP>
<SYSTEM SETUP>
<FILE SETUP>
<SORTING SETUP>
<START SAVING>

2.4.2 [SYSTEM]

Press the [SYSTEM] button to enter into the <SYSTEM SETUP> page; the setup items of system can be changed on this page.

2.5 Simple Operation

Simple operation steps for SME1202A/B:

- Use [MEAS], [SYSTEM] or [FILE] or soft keys to enter into the page. (Refer to fig 2-5)
- Use arrow buttons ([←] [↑] [→] [↓]) to move the cursor to desired zone.
- When the cursor is moved to a soft key zone, press ENTER to confirm the selection. If it is required to input a number or a file name, use the keyboard to input and press ENTER to finish entry. You can use arrow buttons to select a number or a letter.

NOTE: DO NOT use sharp tools or nails to touch the screen. Doing so will cause damage to the screen, our company shall not be liable to this case.

2.6 Starting Up

Plug into a 3-wire power socket & ensure the power earth wire is grounded. Press down the power switch on the bottom left corner of the front panel, the instrument will start up and a boot screen is displayed. If the password protection is enabled, you will be asked to input your password. After inputting your password, press [ENTER] to enter into the main menu page.

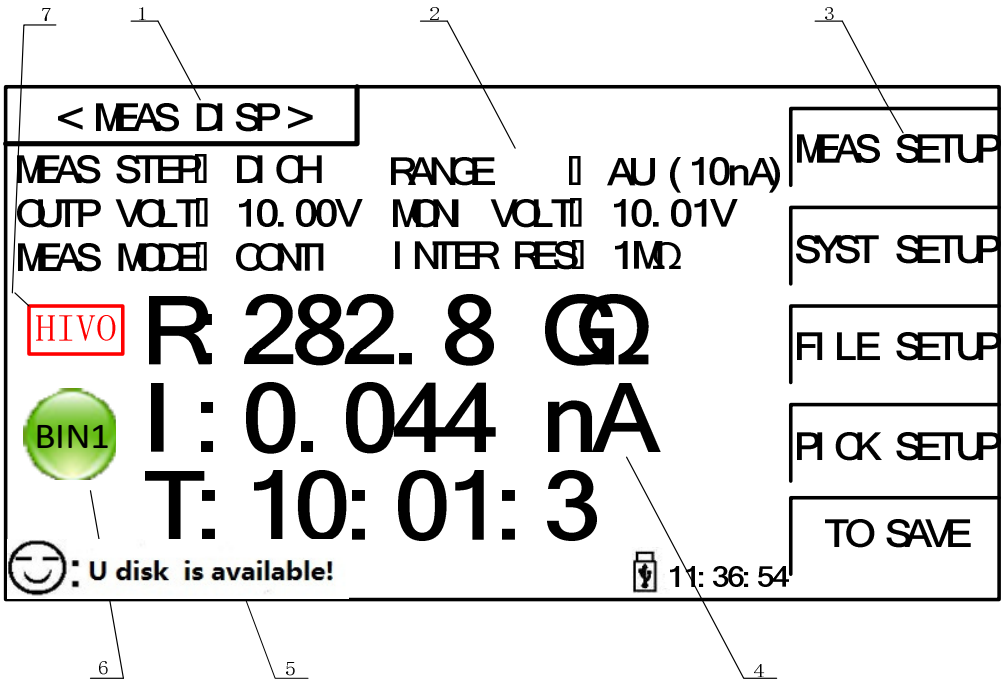


Figure 2-5 SME1202A/B Main Display

3) Basic Operation

3.1 <MEAS DISP>

Touch the screen or press down [MEAS] and then the <MEAS DISP> page will be displayed on the screen shown as figure 3-1.

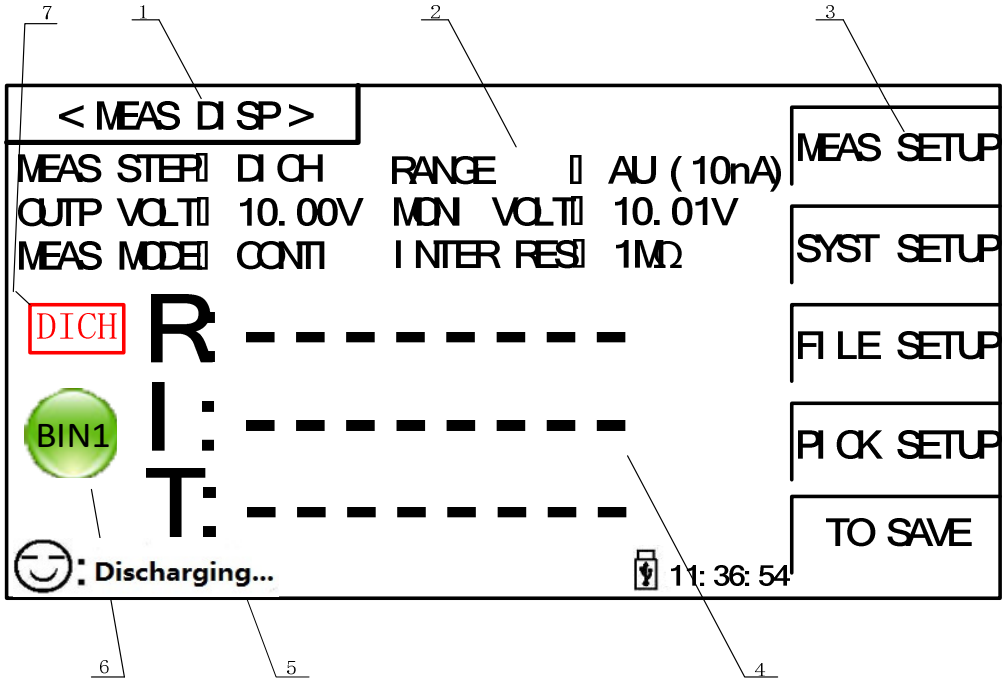


Figure 3-1 Measure Display

The following functions can be achieved by touching the related key in soft key area on this page.

- MEAS SETUP (enter into the measurement setup page)
- SYSTEM SETUP (enter into the system setup page)
- FILE SETUP (enter into the internal file setup page)
- PICKOUT SETUP (enter into the pick out setup page)
- START Save (the current measurement results will be saved to U-disk by pressing this touch key. If there is no U-disk inserted in the interface, the measurement results will not be saved; if there is U-disk, the touch key of START Save will change into STOP Save and it will stop saving the data into U-disk by pressing the touch key of STOP Save).

NOTE: *Be sure to press STOP Save to end saving after START Save. Otherwise, the data may be lost.*

The following test condition information will be displayed in measurement/condition display zone on this page. These conditions (except the measurement internal resistance) can be set on < MEAS SETUP> page.

- MEAS STEP.

- RANGE.
- OUTP VOLT.
- MONI VOLT.
- MEAS MODE.
- INTER RES.

3.1.1 Measurement Functions

Measurable parameters on SME1202A/B are as follows:

Primary Parameters

- **R** (Insulation resistance)
- **I** (Leakage current)

Secondary Parameter

- **T** (Time count value of each procedure)

  The measurement results of primary parameters and secondary parameter are respectively displayed in three lines in the form of large characters. The upper two lines indicate the primary parameters, while the lower line shows the secondary parameter.

Note:

1. Settings and modifications of all functions can be taken by the following steps: 1): **Touch the corresponding function zone and then select the desired function in the soft key zone on the right side of the screen;** 2): **Use arrow buttons and [ENTER] button to set and modify the corresponding function.**
2. **Settings and modifications of all functions can only be taken in discharging state. Only discharging key and start saving function response in measurement state.**

3.2 <MEAS SETUP>

Touch the main menu and then touch the soft key <MEAS SETUP> to enter into the <**MEAS SETUP**> page shown as figure 3-2.

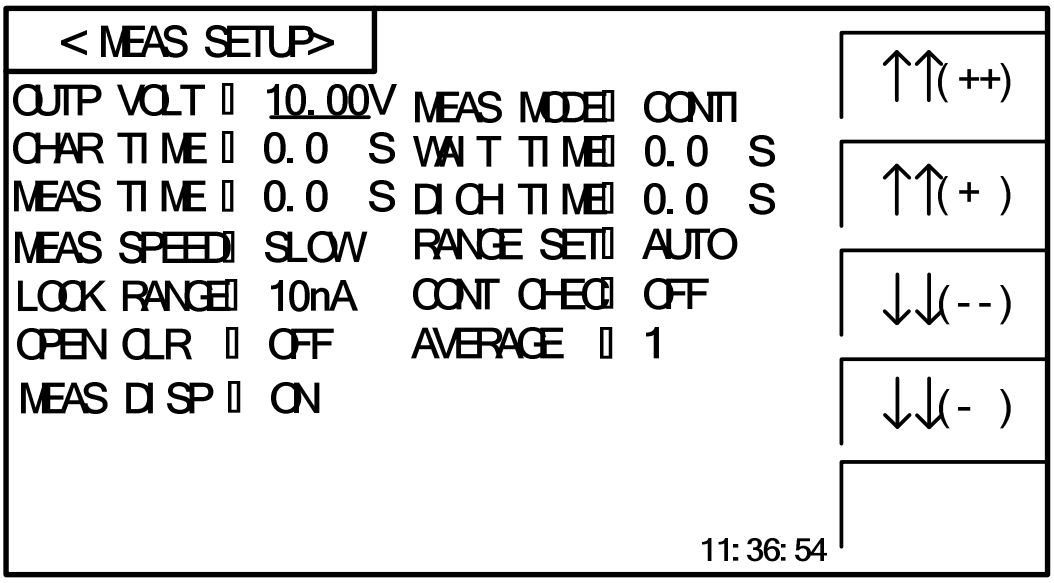


Figure 3-2 Measurement Setup

The OUTP VOLT, MEAS MODE, CHAR TIME, WAIT TIME, MEAS TIME, DICH TIME, MEAS SPEED, RANGE SET, LOCK RANGE, CONT CHEC, OPEN CLR and other functions can be set on this page.

3.2.1 OUTP VOLT

This function is used for setting the voltage at output terminal.

Operation Procedures for setting the OUTP VOLT:

Procedure 1 :

1. Touch this key to select the option and then the colour of this option becomes the colour of the cursor.
2. Touch this key again to enter into the soft keyboard and then input the required voltage through alphanumerical soft keyboard and then press the ENTER key to confirm and return to <MEAS SETUP> page. (The voltage range is 1-1000V for SME1202A, and 1-500V for SME1202B (resolution 4 digits)).

Procedure 2:

Touch the output voltage zone on the screen and the following items will be displayed in the soft key zone.

- ↑↑ (++)
  This is coarse adjustment key to increase output voltage (set value). Touch this key and then the voltage will increase in steps of 1V, 10V, 25V, 50V, 75V, 100V, 125V, 150V, 200V, 250V, 500V (SME1202B), 750V, 1000V (SME1202A/B).
- ↑ (+)
  This is fine adjustment key to increase output voltage (set value). Touch this key and then the voltage will increase by 1V.
- ↓ (-)
  This is fine adjustment key to decrease output voltage (set value). Touch this key and then the voltage will decrease by 1V.
- ↓↓ (--)
  This is coarse adjustment key to decrease output voltage (set value). Touch this key and then the voltage will decrease in steps of 1V, 10V, 25V, 50V, 75V, 100V, 125V, 150V, 200V, 250V, 500V (SME1202B), 750V, 1000V (SME1202A).

3.2.2 MEAS MODE

This function is used for setting the measurement mode of the instrument.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- SINGLE
  It is used for setting the measurement mode of the instrument as SINGLE.
- CONTI
  It is used for setting the measurement mode of the instrument as CONTI (continuous).

Touch the corresponding key in soft key zone to select the relevant function.

3.2.3 CHAR TIME

This function is used for setting the charge time of the instrument.

Operation Procedures for setting the CHAR TIME:

Procedure 1 :

1. Touch this key to select the option and then the colour of this option becomes the colour of the cursor.
2. Touch this key again to enter into the soft keyboard and then input the required charge time (correct to 0.1s) through alphanumerical soft keyboard and then press the ENTER key to confirm and return to <MEAS SETUP> page.

Procedure 2 :

Touch the time zone on the screen and the following items will be displayed in the soft key zone.

- ↑↑ (++)
  Touch this key and the instrument will increase the charge time (set value) rapidly by 0.10s.
- ↑ (+)
  Touch this key and the instrument will increase the charge time (set value) by 0.01s.
- ↓ (-)
  Touch this key and the instrument will decrease the charge time (set value) by 0.01s.
- ↓↓ (--)
  Touch this key and the instrument will decrease the charge time (set value) rapidly by 0.10s.

Steps for setting the WAIT TIME, MEAS TIME and DICH TIME are the same as CHAR TIME. The setting range of CHAR TIME, WAIT TIME, MEAS TIME and DICH TIME is 0-999s. When the time is set as 0s, this step is closed. (refer to 3.4.2 for detail measurement procedures)

3.2.4 MEAS SPEED

This function is used for setting the measurement speed of the instrument.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **FAST**
  It is used for setting the MEAS SPEED as FAST.
- **SLOW**
  It is used for setting the MEAS SPEED as SLOW.

Touch the corresponding key in soft key zone to select the relevant function.

3.2.5 RANGE SET

This function is used for setting the range selection mode of the instrument.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **AUTO**
  It is used for setting the range selection mode as AUTO.
- **LOCK**
  It is used for setting the range selection mode as LOCK.

Touch the corresponding key in soft key zone to select the relevant function.

3.2.6 LOCK RANGE

This function is used for selecting the lock range of the instrument.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **1mA**
  It is used for setting the LOCK RANGE as AUTO.
- **100μA**
  It is used for setting the LOCK RANGE as 100μA.
- **10μA**
  It is used for setting the LOCK RANGE as 10μA.
- **1μA**
  It is used for setting the LOCK RANGE as 1μA.
- **More**
  Touch this key and then the following items will be displayed in the soft key zone:
- **100nA**
  It is used for setting the LOCK RANGE as 100nA.
- **10nA**
  It is used for setting the LOCK RANGE as 10nA.
- **More**
  Return.

Touch the corresponding key in soft key zone to select the relevant function.
NOTE: This option can be modified only when the RANGE SET is set as LOCK.

3.2.7 CONT CHEC

This function is used for setting the contact check of the instrument. As the unique contact check function of SME1202A/SME1202B, this function can well identify the contact performance of components for capacitance, cable and other capacitive materials and reduce the occurring of error test. In addition, the contact check will not increase any measurement time.
When the CONT CHEC function is set as ON, **NO CONT** (NO CONTACT), not R or I will be displayed on the screen if the instrument is in test mode and no capacitive material is detected.
When the CONT CHEC function is set as OFF, the instrument will test the value directly, not check the capacitive material.

Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **ON**
  It is used for setting the CONT CHEC as ON.
- **OFF**
  It is used for setting the CONT CHEC as OFF.

Touch the corresponding key in soft key zone to select the relevant function.

NOTE: The contact check function is useful when testing capacitive materials and the capacity is larger than 100pF.

3.2.8 OPEN CLR

This function is used for operating open clear of the instrument.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **ON**
  It is used for setting the OPEN CLR as ON. If the open clear is successful, the OPEN CLR state changes to ON; if the open clear is failing, the OPEN CLR state keeps OFF.
- **OFF**
  It is used for setting the OPEN CLR as OFF.

Touch the corresponding key in soft key zone to select the relevant function.

NOTE:

If the user operates the open clear successfully, the clear base used in the instrument is the base obtained when operating this open clear; if the user operates the open clear unsuccessfully or sets the OPEN CLR as OFF, the clear base used in the instrument is the Factory Default.

3.2.9 Average

This function is used for setting the test average times of the instrument. The set range is 1-199.

Operation Procedures for setting the Average :

Procedure-1:

Touch this key to select the option and then the colour of this option becomes the colour of the cursor.

Touch this key (cursor) again to enter into the number soft keyboard, input the required average times and then press the ENTER key to confirm and return to <MEAS SETUP> page.

Procedure-2:

Touch the average zone needs to be modified on the screen and the following items will be displayed in the soft key zone.

- **↑↑(+ +)**
  Touch this key and the instrument will increase the average times (set value) rapidly by 10.
- **↑(+)**
  Touch this key and the instrument will increase the average times (set value) by 1.
- **↓(-)**
  Touch this key and the instrument will decrease the average times (set value) by 1.
- **↓↓(- -)**
  Touch this key and the instrument will decrease the average times (set value) rapidly by 10.

NOTE:

1. ***When the MEAS TIME is set as 0s (i.e. this procedure is set as OFF), the Average times can be set as 1-999.***
2. ***When the MEAS TIME is not set as 0s (i.e. this procedure is set as ON), the set***

value of the Average times is subject to the MEAS TIME. Specifically, the following restriction rules are required:

(1) When the MEAS SPEED is set as SLOW, it takes 0.06s to make a measurement, so the restrictive relation between the Average times and the MEAS TIME is:

Average times × 0.06 <= MEAS TIME

(2) When the MEAS SPEED is set as FAST, it takes 0.03s to make a measurement, so the restrictive relation between the Average times and the MEAS TIME is:

Average times × 0.03 <= MEAS TIME

3. For the same reason, when setting the MEAS TIME, the above restriction rules are also required.

3.2.10 MEAS DISP

This function is used for setting the MEAS DISP of the instrument as ON/OFF.

Steps for MEAS DISP:

Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **ON**
  It is used for setting the MEAS DISP as ON.
- **OFF**
  It is used for setting the MEAS DISP as OFF.

Touch the corresponding key in soft key zone to select the relevant function.

3.3 <PICKOUT SETUP>

Touch the soft key **PICKOUT SETUP** to enter into the <**PICKOUT SETUP**> page as shown in figure 3-3.

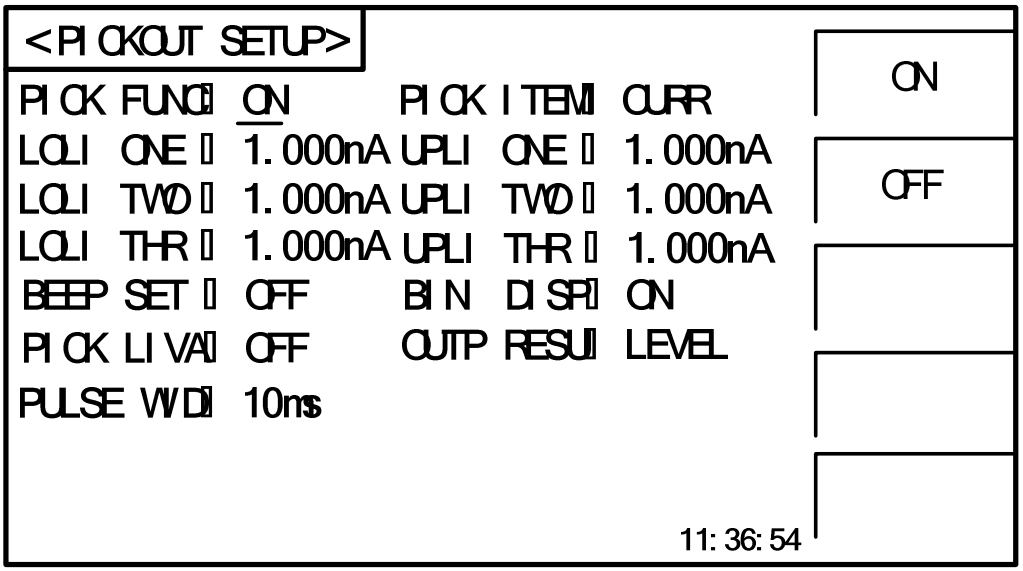


Figure 3-3 PICKOUT SETUP

The comparator functions of the instrument can be set on this page. SME1202A/B can set three groups of limit values for primary parameters.

3.3.1 PICK FUNC

This function is used as sorting & binning of components.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **ON**
  It is used for setting the PICK FUNC as ON.
- **OFF**
  It is used for setting the PICK FUNC as OFF.

Touch the corresponding key in soft key zone to select the relevant function.
NOTE: The following steps can be operated under the premise of setting the PICK FUNC as ON.

3.3.2 PICK ITEM

This function is used for selecting the pick item.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **CURR**
  It is used for setting the PICK ITEM as CURR (current).
- **RESIS**
  It is used for setting the PICK ITEM as RESIS (Resistance).

Touch the corresponding key in soft key zone to select the relevant function.

3.3.3 LOLI ONE

This function is used for setting the lower limit value of the instrument Bin One.

1. Touch this key to select the option and then the colour of this option becomes the colour of the cursor.
2. Touch this key (cursor) again to enter into the number soft keyboard, input the required lower limit value (four-digit significant figures) and then select the unit to confirm and return to <PICKOUT SETUP> page.

The setting methods of UPLI ONE (Upper Limit Bin1), LOLI TWO (Lower Limit Bin2), UPLI TWO(Upper Limit Bin2), LOLI THR(Lower Limit Bin3), and UPLI THR(Upper Limit Bin3) are the same as LOLI ONE, the setting ranges for three groups of lower/upper limit value are:

1. When the PICK ITEM is set as CURR, the range is 1pA—1.25mA.
2. When the PICK ITEM is set as RESIS, the range is 100kΩ-10TΩ.
3. The lower limit value of each bin cannot be larger than the upper limit value, otherwise “please re enter due to over-limit data” will be noticed.
4. The pickout ranges of three bins can be overlapped.

3.3.4 BEEP SET

This function is used for setting the pickout beep of the instrument.
Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **BIN ONE**
  It is used to set buzzer alarm when the test value passes BIN ONE.
- **BIN TWO**
  It is used to set buzzer alarm when the test value passes BIN TWO.

- **BIN THREE**
  It is used to set buzzer alarm when the test value passes BIN THREE.
- **NG**
  It is used to set buzzer alarm when the test value of three bins fail.
- **OFF**
  It is used to set the PICKOUT BEEP as OFF.

Touch the corresponding key in soft key zone to select the relevant function.

NOTE:

1. ***The BIN ONE enjoys the top priority in the three bins, followed by BIN TWO and BIN THREE. BIN TWO and BIN THREE will not compare when BIN ONE passes, and so on, the test fails when all three bins fail.***
2. ***The pickout results will be displayed on the main display interface when the PICK FUNC is set as ON. When one of the three bins passes, the main display interface will light up the green light and indicates BIN1, BIN2 and BIN3. When all three bins fail, the main display interface will light up the red light and indicates FAIL.***

3.3.5 BIN Disp

Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **ON**
  It is used to set the BIN Display as ON.
- **OFF**
  It is used for setting the BIN Display as OFF.

Touch the corresponding key in soft key zone to select the relevant function.

3.3.6 PICK LIVA

Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **ON**
  It is used for setting the PICK LIVA as ON.
- **OFF**
  It is used for setting the PICK LIVA as OFF.

Touch the corresponding key in soft key zone to select the relevant function.

NOTE:

1. ***When the PICK LIVA is set as OFF, if the PICK ITEM is set as RESIS, the upper limit value of BIN1, BIN2 and BIN3 will be set as infinitely great and become unchangeable and drop out of compare, namely, the pickout changes from interval pickout to single-point pickout. If the PICK ITEM is set as CURR, the lower limit value of BIN1, BIN2 and BIN3 will be set as 0 and become unchangeable and drop out of compare, namely, the pickout also changes from interval pickout to single-point pickout.***
2. ***When the PICK LIVA is set as ON, whether the PICK ITEM is set as RESIS or CURR, set the limit value according to the above steps.***
3. ***Whether the PICK LIVA is set as ON or OFF, the priority level of BIN1, BIN2 and BIN3 keeps invariant.***

3.3.7 OUTP RESU

Touch the corresponding zone. The following items will be displayed in the soft key zone.

- **LEVEL**
  It is used for setting the OUTP RESU as LEVEL.
- **PULSE**
  It is used for setting the OUTP RESU as PULSE.

Touch the corresponding key in soft key zone to select the relevant function.

3.3.8 PULSE WID

This function is used to set the pulse width of pulse signal for Handler PICKOUT (***this item can be changed when the OUTP RESU is set as PULSE***). The setting range is 1-25ms.

Operating Procedures for setting the PULSE WID:

Procedure-1:

1. Touch this key to select this option and then the colour of this option becomes the colour of the cursor.
2. Touch this key (cursor) again to enter into the number soft keyboard, input the required pulse width and then press the ENTER key to confirm and return to <PICKOUT SETUP> page.

Procedure-2:

Touch the average zone needs to be modified on the screen and the following items will be displayed in the soft key zone.

- ↑↑ (++)
  Touching this key increases the pulse width (set value) rapidly by 5.
- ↑ (+)
  Touching this key increases the pulse width (set value) by 1.
- ↓ (-)
  Touching this key decreases the pulse width (set value) by 1.
- ↓↓ (--)
  Touching this key decreases the pulse width (set value) rapidly by 5.

3.4 Start Test

3.4.1 Test Method

Please connect the DUT (especially the DUT with polarity, such as the capacitor) according to the method as shown in figure 3-4 before testing.

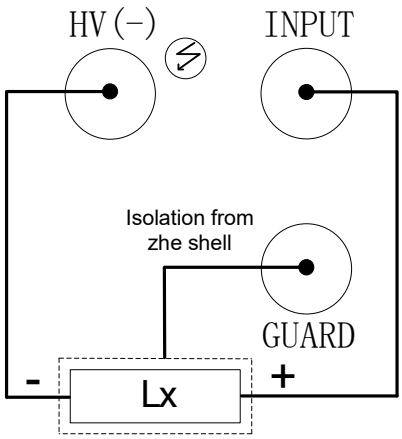


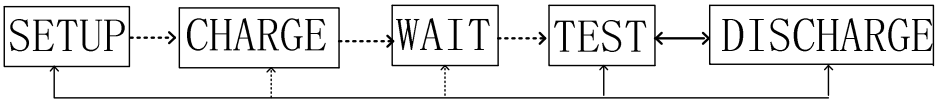
Figure 3-4 Test connection program

NOTE:

- There is voltage output at HV (-) terminal. Please connect the DUT in discharge condition. Beware of electric shock.
- Be sure to connect the DUT with polarity (electrolytic condenser, etc.) according to the positive and negative terminals shown in the program, otherwise it may result in the explosion of components. Take it down after discharging for a few seconds to prevent electric shock.
- Short circuit of the instrument for a long time is not allowed; otherwise it will damage the instrument.
- In order to obtain ideal accuracy and stability, it is highly recommended to operate the instrument in specified environmental conditions.

3.4.2 Operation Process

1. Press TEST key to start the test.
2. Press DISCH. Key to finish testing and return to discharge condition.
   The specific steps are as follow:



Where, the HV mark will blink in the three steps of charging, waiting and testing. The DICH mark will blink when discharging. In addition, the three steps of charging, waiting and testing (when the DICH TIME is set as 0s, only press the DISCH key, the system changes from test status to discharge status) can be set as ON or OFF.

3.4.3 Range Selection

There are six ranges of internal resistance in SME1202A/B. (refer to figure 3-1 below).

Range	Input Internal Resistance
1(1mA)	1kΩ
2(100μA)	10kΩ
3(10μA)	100kΩ
4(1μA)	1MΩ
5(100nA)	10MΩ
6(10nA)	100MΩ

Figure 3-1 Range resistances

When the RANGE SET of the instrument is set as AUTO, for different resistances being measured, the instrument will choose the optimal input resistance to achieve ideal measurement results.

4) System Setup and File Manage

4.1 System Setup

Press **[SYSTEM]** to enter into the <SYSTEM SETUP> page as shown in figure 4-1.

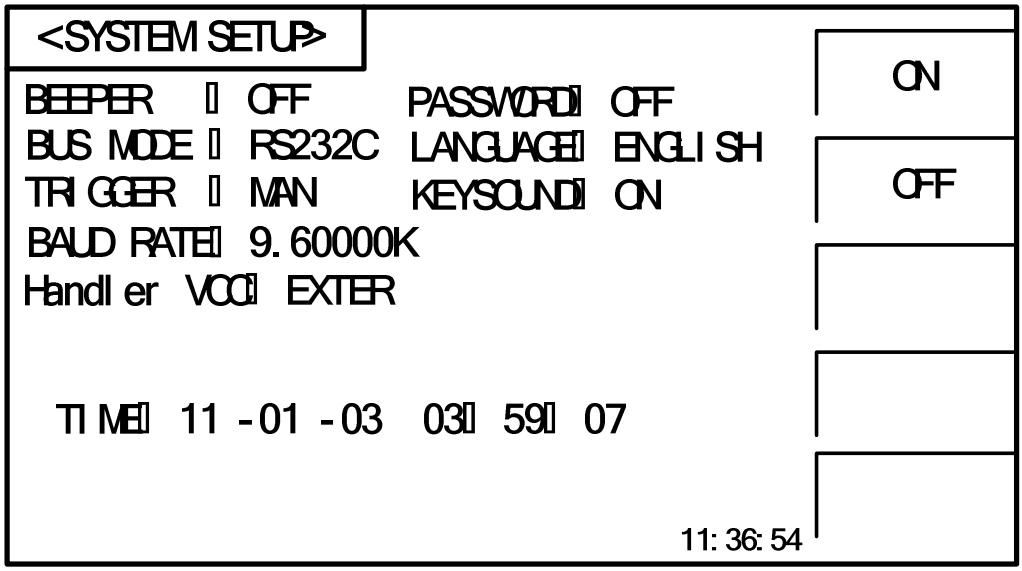


Figure 4-1 System Setup

On this page, the following functions can be set: BEEPER, PASSWORD, BUS MODE, LANGUAGE, TRIGER, KEYSOUND, BAUD RATE, HANDLER VCC AND TIME.

4.1.1 BEEPER

This function is used to control the status of beeper. If the system beeps, it indicates the warning beep of illegal key or touch.

Touch **BEEPER**, the following soft key zone will be displayed:

- **ON**
  Touch this key to turn on the beeper function.
- **OFF**
  Touch this key to turn off the beeper function.

You can touch soft key zone to set corresponding functions.

4.1.2 PASSWORD

This function is used to set the password.

Touch **PASSWORD**, the following soft key zone will be displayed:

- **OFF**
  Touch this key to turn off the password protection function. This function would be disabled only when the preset password is correctly input.
- **LOCK SYSTEM**
  Touch this key to enable the password function. Please input the password which will be required to be input when opening a file or starting up the instrument.

- **LOCK FILE**
  It is used for file protection of users.
- **MODIFY**
  Touch this key to modify the password.

Steps to modify the password:

Touch **MODIFY**, a numeric keyboard will pop up then you should input the original password and press [ENTER] to confirm. Input the new password when the numeric keyboard is shown once again and press [ENTER] to confirm. Then the numeric keyboard will be displayed for the third time, please input the new password. Press [ENTER] to finish the password modification.

NOTE: The default password is 2683.

4.1.3 BUS MODE

This function is used for selecting the communication interface.

Steps for setting the bus mode:

1) Touch **BUS MODE**, the following soft key zone will be displayed:
- **RS232C**
- **RS485**
- **USBTMC**
- **USBVCOM**

2) Touch **RS232C** to select the RS232C interface.
3) Touch **RS485** to select the RS485 interface.
4) Touch **USBTMC** to select the USBTMC interface. The instrument communicates with PC through the USB interface (USB DEVICE) on the rear panel.
5) Touch **USBVCOM** to select the USBVCOM interface. The instrument communicates with PC through the USB interface (USB DEVICE) on the rear panel.

4.1.4 LANGUAGE

This function is used to set the language.

Touch **LANGUAGE**, the following soft key zone will be displayed:

- **English**
  Touch this soft key to set the language as English.

4.1.5 KEYSOUND

This function is used to control the key sound when the users touch the touch screen and press the machine keys.

Touch **KEYSOUND**, the following soft key zone will be displayed:

- **ON**
  Touch this key to turn on the key sound of touch screen.
- **OFF**
  Touch this key to turn off the key sound of touch screen.

You can touch soft key zone to set corresponding functions.

4.1.6 TRIGER

This function is used to select the trigger source for triggering the test.
Touch **TRIGER**, the following soft key zone will be displayed:

- **MAN**
  Press the "**TEST"** key on the panel, the instrument will test a DUT once and display the result. This mode keeps in waiting mode when it is not used.
- **EXT**
  Test a DUT once and display the result when the instrument receives an external "start up" signal from the footswitch of HANDLER interface or FOOT.C interface on the rear panel and then enter into the waiting mode again.
- **BUS**
  The measurement of the instrument will be triggered through the communication interface.

You can touch soft key zone to set corresponding functions.

4.1.7 BAUD RATE

This function is used to select the baud rate of RS232 interface. The following twelve baud rates are selectable: 9.60000k, 19.2000k, 28.8000k, 38.4000k, 48.0000k, 57.6000k, 67.2000k, 76.8000k, 86.4000k, 96.0000k, 105.600k and 115.200k.

Steps for setting the baud rate:

Touch **BAUD RATE**, the following items will be displayed in the soft key zone:

- ↑ (+)
  Touch the key to increase the baud rate.
- ↓ (-)
  Touch the key to decrease the baud rate.

4.1.8 HANDLER VCC

This function is used to control the VCC selection for handler interface of the instrument.
Touch **HANDLER VCC**, the following soft key zone will be displayed:

- **INTER**
  It is used for setting the Handler interface powered by internal VCC.
- **EXTER**
  It is used for setting the Handler interface powered by external VCC.

You can touch soft key zone to set corresponding functions.

4.1.9 Setting Time and Date

This function is used for setting the correct time and date of the local time zone.
For example: 9 o'clock 13 minute and 25 second a.m. on November 12, 2010 will be shown as 10-11-12 09:13:25.
Operations are as follows: Touch the time zone to be modified, the following items will be displayed.

- ↑↑ (++)
  Touch this key and the value will increase rapidly by 5.

- ↑ (+)

Touch this key and the value will increase by 1.

- ↓ (-)
  Touch this key and the value will decrease by 1.
- ↓↓ (--)
  Touch this key and the value will decrease rapidly by 5.

4.2 <File Setup>

SME1202A/B series can save parameters that are set by user to the internal non-volatile memory in the file format. User can load the file to use these parameters instead of resetting.
This section will introduce the information about the function of Save/Recall.
Notation Explanation:
E: Abbreviation of External memory, like U disk.
I: Abbreviation of Internal memory, like internal Flash of SME1202A/B.

4.2.1 Introduction to Save/Recall

By the function of save/recall, user can save measurement results and configuration information to SME1202A/B internal Flash or external U disk; meanwhile user can recall data from SME1202A/B internal Flash or external U disk.
Introduction to Methods and Applications of Save
The table below shows the applicable save methods and applications:

Table 4-1 Methods and Applications of Save

Save method		Recall	Application
Type	File format		
Configuration save (internal Flash)	*.STA	Yes	Save the current configuration to internal Flash.
Configuration save (external U disk)	*.STA	Yes	Save the current configuration to external U disk.
Data save (external U disk)	*.CSV	No	Save measurement results to external U disk.

4.2.2 Structure of File Folder/File in a U Disk

Before saving data to a U disk, you are recommended to save it into a file and folder that have existed in the memory as shown in table 4-2. If you want to save the configuration file into a file folder in PC, you should enter into the folder on the instrument and then take relative file operations.

Table 4-2 Folder in U disk

Folder	Maximum Amount of File	Description
CSV	999	Including measurement result, like *.CSV file.
STA	999	Including configuration data, like *.STA file.

NOTE: CSV and STA folders might be automatically generated when a U disk is

connected.

Structure of Folder/File in a U disk is shown in figure 4-2.

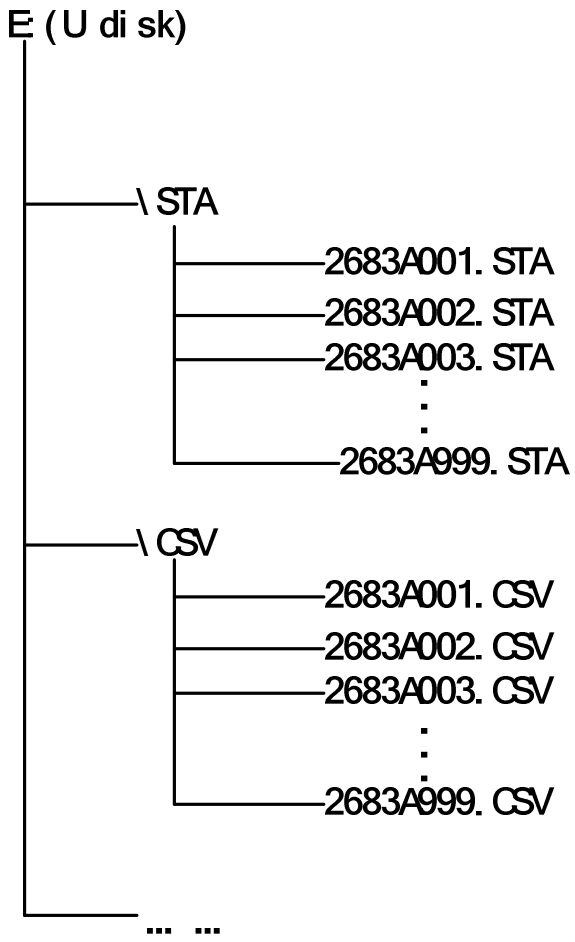


Figure 4-2 file structure in a U disk

When using a U disk on SME1202A/B, you should pay special attention to the following points:

1. Use a U disk with the USB2.0 interface.
2. The U disk file system should be FAT16 or FAT32. FAT16 or FAT32 standard should be used to format the U disk. If the U disk memory exceeds 512M, it is recommended to use FAT32 standard to format the disk.
3. Before a U disk is connected to SME1202A/B, you are recommended to save the data on it and we will not be liable for the data loss.
4. In order to rapidly save the instrument data to a U disk, it is not recommended to store too many files or folders.

Operation Procedures

Touch **FILE SETUP** to enter into the <internal file> page (or directly press the FILE button on the front panel) as shown in figure 4-3 below.

Touch [Internal File] or [External File] to respectively display files stored in the internal FLASH and the external U disk. Touch [Exit] to exit the file setup page.

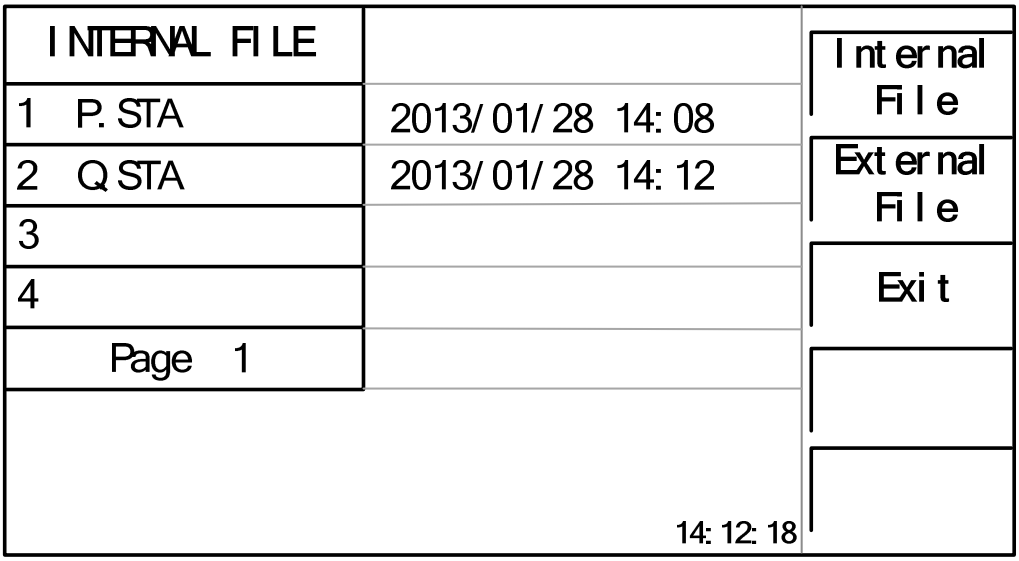


Figure 4-3 internal file page

External file page is shown in figure 4-4 below:

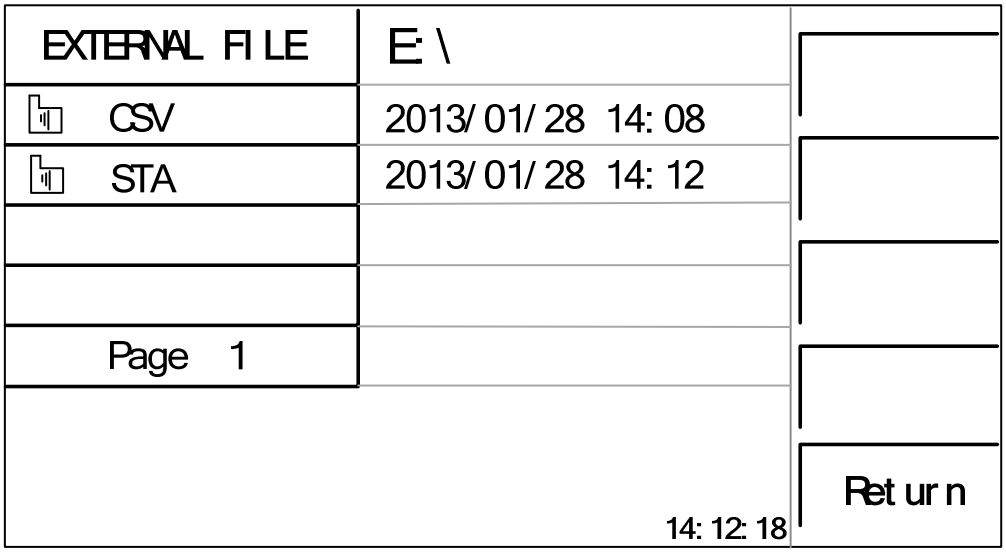


Figure 4-4 external file page

Four files' information will be displayed in the internal file page or the external file page, including file names and time of being saved.

Operations of the internal file and the external file are similar. Take internal file operations as an example to describe the specific procedures of file operations.

Operations on file are as follows:

Touch the file name to be edited (If the file name does not exist in the current page, you can touch [Page 1] and select [Previous Page] and [Next Page] to toggle between file pages, and then select the desired file.), the following items will be displayed.

- **Load**

  Touch this key, if the file name that the cursor locates is not empty, [YES] and [NO] will be displayed in the soft key zone. When [YES] is selected, the instrument will load the setup data in the file; when [NO] is selected, the current operation will be cancelled.

- **Save**

  Touch this key, [YES] and [NO] will be displayed in the soft key zone. When [NO] is selected, the current operation will be cancelled; when [YES] is selected, the numerical keyboard will pop up and then you can input the file name and press [ENTER] to finish. Thus the current settings in all pages will be saved to the file. (NOTE: When storing a file, if the inputting file number already existed, the save operation will overwrite the original file.)
- **Delete**

  Touch “Delete”, if “YES” is selected, the instrument will delete the selected file.
- **Copy to E:**

  Touch “Copy to E”. The instrument will copy the selected file to a U disk.
- **Select**

  Touch “Select”, the tick mark √ will appear on selected file. SME1202A/B can simultaneously copy several selected files to a U disk.

  Touch “Select” once again, the selected file will be cancelled from selection.

Save Measurement Results

In the “MEAS DISP” page, touch “Start Save” in soft key zone to save measurement results to a U disk. Touch “Stop Save”, the instrument will stop saving measurement results.

Operations of External File and Folder

Operations of external file are similar to that of internal file.

Operations of external file folder are as below:

(1) Touch the name of the desired file folder to enter into the corresponding folder;

(2) Touch “PgUp” in the right soft key zone to return to the upper page shown as figure 4-4 above.

(3) Touch “Pgdn” in the right soft key zone to return to the lower page shown as figure 4-4 above.

Total there are 5 pages in <INTERNAL FILE> and 4 files can be stored on each page.

There are 10 pages in each folder of <EXTERNAL FILE> and 4 files can be stored on each pageh

5) Performance Index

5.1 Measurement Function

5.1.1 Measurement Parameters and Notations

R：Resistance
I: Leakage current

5.1.2 Range

Resistance Mode: AUTO, MANU (HOLD, UP, DOWN)

5.1.3 Trigger

Manual, external, bus

Manual : Press the “TRIGGER” button on the panel, the instrument will test a DUT once and display the result. This mode keeps in waiting mode when it is not used.

External: Test a DUT once and display the result when the instrument receives an external “start up” signal from the footswitch of HANDLER interface on the rear panel.

BUS : The measurement of the instrument will be triggered through the communication interface.

5.1.4 Mode of Test Terminal

2-terminal measurement mode

HV (-): DCV output terminal INPUT: Sampling input terminal

5.1.5 Measurement Speed (when MEAS DISP & BIN DISP is set as OFF)

Speed / Parameter	FAST	SLOW
R	Meas/sec ≤ 30ms	Meas/sec ≤ 60ms
I	Meas/sec ≤ 30ms	Meas/sec ≤ 60ms

5.1.6 Display Digits

Item	
Resistance	4-digit significant figures
Leakage current	Range 1：100nA Range 2：10nA Range 3：1nA Range 4：100pA Range 5：10pA Range 6：1pA
Time	0.1s

5.2 Test Signal

5.2.1 Output Voltage Range

Max. output DC Voltage range of SME1202A test terminal: 1 – 1000V.
Max. output DC Voltage range of SME1202B test terminal: 1 – 500V.

5.2.2 Output Voltage Accuracy

Voltage ≥ 10V: 1% ± 1V
Voltage < 10V: 10% ± 0.1V

5.2.3 Maximum Display Range

Parameter	Measurement Display Range		
Resistance test	100.0kΩ - 10.00TΩ		
	Range	Current Range	input internal resistance
Leakage current test	1	100μA ~ 1mA	10kΩ
	2	10μA ~ 100μA	10kΩ
	3	1μA ~ 10μA	10kΩ
	4	100nA ~ 1μA	10kΩ
	5	10nA ~ 100nA	1MΩ
	6	1nA ~ 10nA	1MΩ

5.3 Measurement Accuracy

Measurement accuracy depends on measurement stability, temperature coefficient, linearity, repeatability and correction interpolation error.

Checking the measurement accuracy should be taken under the following circumstances:

a. Warm-up time should be more than 30 minutes.
b. Correctly open the output terminal and perform zero clearing by pressing the start key on the MEAS SETUP page.

5.3.1 Basic Accuracy for Resistance Measurement

SLOW, FAST: (This accuracy is obtained under the temperature of 20±5℃)

Test accuracy	Voltage ≥10V and I＞10nA :±2% Voltage ≤10V or I ≤ 10nA :±5%

6) Remote Control

6.1 RS232C Connection

RS-232 standard, also called as asynchronous serial communication standard, has already been widely used for data communication between computers, computer and external equipment. RS is the English abbreviation of Recommended Standard; 232, the standard number. This standard is issued by EIA in 1969, which rules to send one bit in a data line every time.

As most serial interfaces, the serial interface of SME1202A/B is also not strictly based on RS-232 standard but only uses the smallest subset of this standard. The signals are listed in the following table.

Signal	Code	Connector Pin Number
Transmitted Data	TXD	2
Received Data	RXD	3
Signal Ground Common	GND	5

Table 6-1 RS-232 Signal and Pin Connector

The reason is that the use of three lines is much more inexpensive and much simpler than that of five lines or six lines, which is the biggest advantage of using serial interface for communication.

The connection of the instrument with PC is shown in figure 6-1.

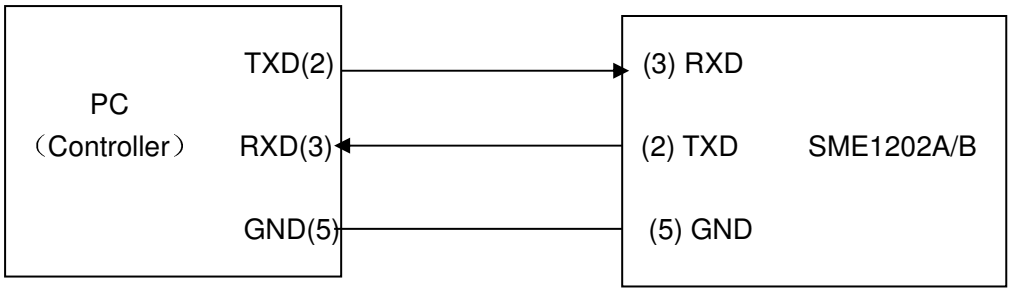


Figure 6-1 Connection of the instrument with PC

Figure 6-1 shows that the serial interface pin definition of this instrument is different from that of 9 pin connector used in the computer. RS232 interface characterizes with a baud rate ranging from 9600 to 115200, no parity, 8-bit data, 1- stop bit stop.

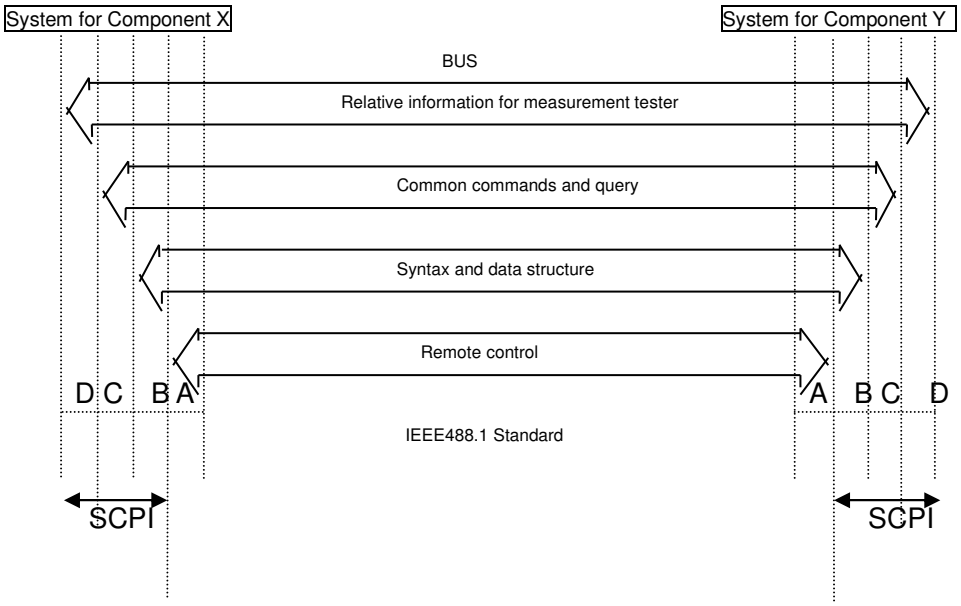
The instrument commands comply with the SCPI standard. When a command string is transmitted to the instrument, it is required to send LF (hexadecimal: 0AH) as the terminating character. Each time the maximum receivable number of SPCI command string is 2kByte.

For result data formats transmitted to a PC from the instrument, see Commands Reference.

6.2 SCPI

(Standard Commands for Programmable Instruments)

SCPI is a new general command based on the IEEE488.2-1987 standard. (SCPI is the same as TMSL, a system language for measurement testers adopted by HP.)



Where：Level D shows the instrument functions
Level C shows the common system functions
Level B shows the information communication functions
Level A shows the interface functions (IF)

Figure 6-2 SCPI functions levels

6.3 USBTMC Remote Control System

USB (Universal Serial Bus) remote control system controls the instrument through the USB interface. This connection conforms to USBTMC-USB488 and USB2.0 protocols.

6.3.1 System Configuration

Connect USB interfaces on PC and SME1202A/B through a USB cable.

6.3.2 Install the Driver

When SME1202A/B is first connected to a PC through a USB cable, the prompt information –Found New Hardware will display on the right bottom of the computer desktop, as is shown below:

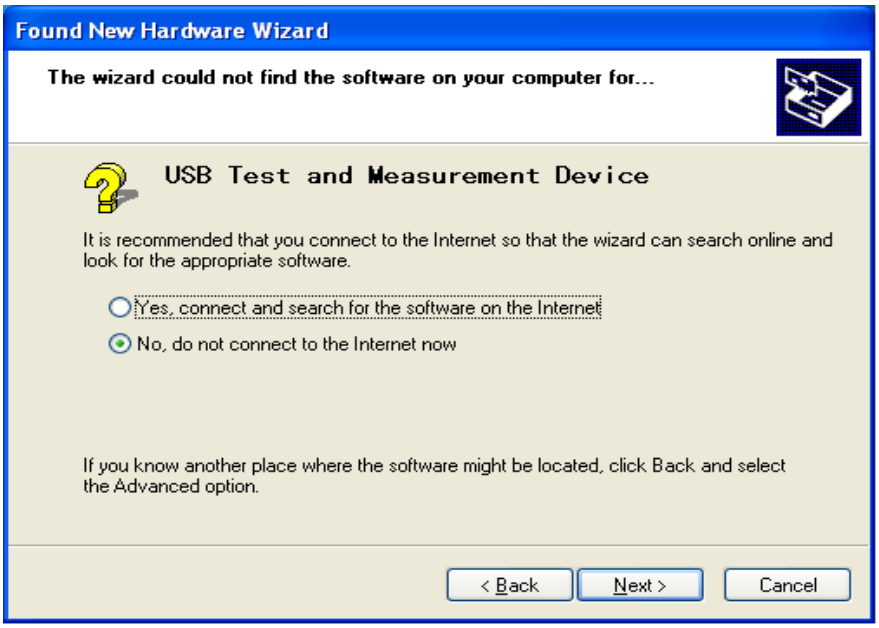


Figure 6-3 Procedure 1 of Installing USB Driver

Click “NEXT”, dialogue 6-4 will pop up. Choose “Install the software automatically (recommended)”.

Figure 6-4 Procedure 2 of Installing USB Driver

When the installation of driver is finished, user can see “usb test and measurement device” in the device manager of PC, as is shown in the following figure.

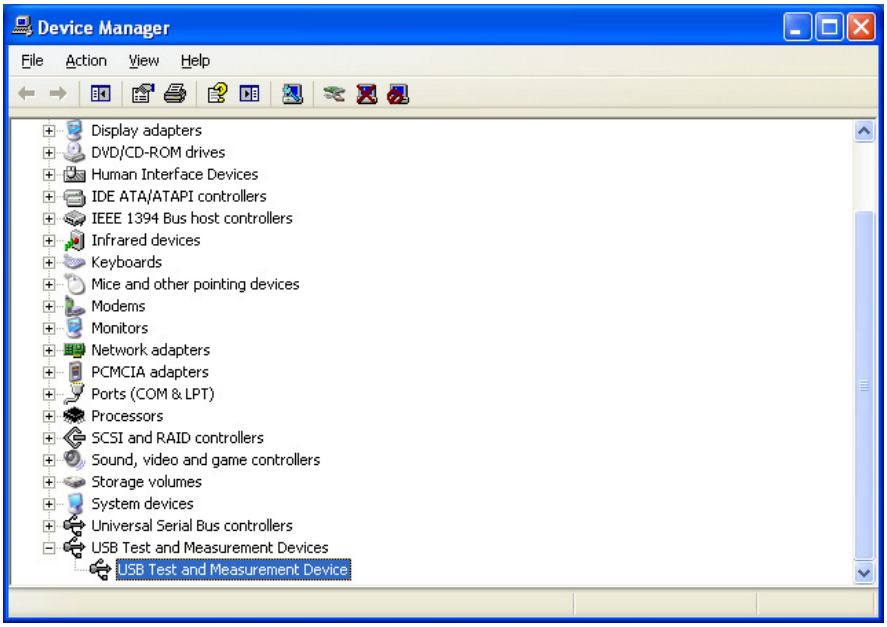


Figure 6-5 USBTMC Display of PC Device Manager

When user is using USBTMC interface, labview software can be used to access the instrument.

6.4 USBVCOM Virtual Serial Port

When “USBVCOM” is selected, the USB interface can be configured as a virtual serial port (VCom).

6.4.1 System Configuration

Connect PC and SME1202A/B to the USB interface through a USB cable.

6.4.2 Installing Driver

Methods of installing USBCDC driver are the same with that of installing USBTMC driver. When the installation of driver is finished, user can see “usb VCom port” in the PC device manager, as is shown in figure 6-6.

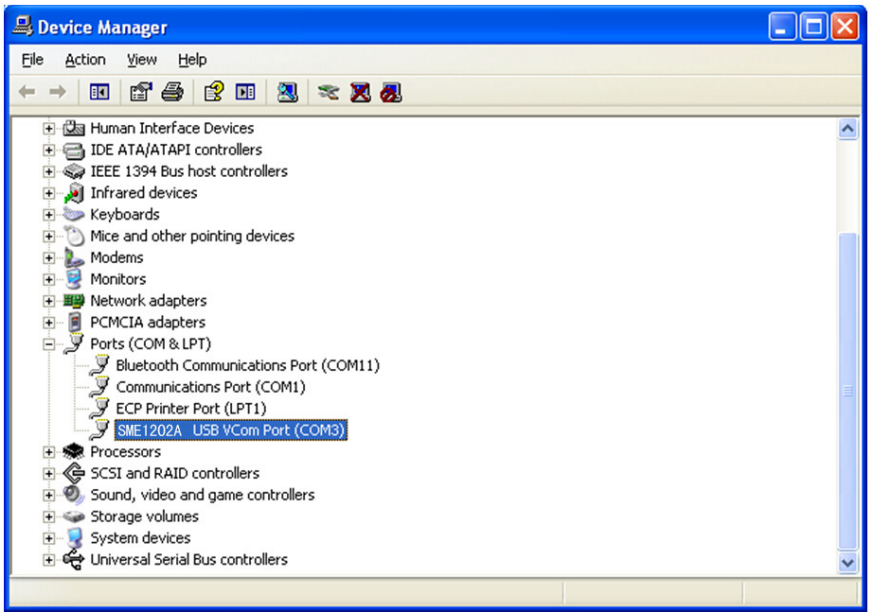


Figure 6-6 VCom Display of PC Device Manager

Now, usb VCom port acts as a serial port. When PC has no serial port, the communication software based on this serial port can be used as USB virtual serial port.

7) SCIP Command Reference

1. Data Conventions of This Manual

NR1 ： integer, for example:123

NR2 ： fixed number, for example: 12.3

NR3 ： floating number, for example: 12.3E+5

NL ：CR character，integer: 10

^END：EOI (end) signal of IEEE-488 bus.

7.1 SME1202A/B Subsystem Commands

●DISPlay ●TRIGger ●COMParator ●DISCharge ●SYSTem

●FUNCtion ●FETCh? ●Mass MEMory

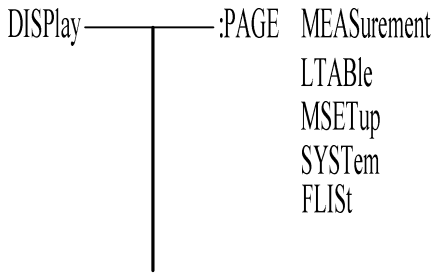
NOTE: All the following commands relating to changing the instrument setup are recommended to be used when the instrument is in discharge condition, otherwise it may result in wrong results.

7.1.1 DISPlay Subsystem Commands

DISPlay subsystem commands are mainly used to set the instrument display page.

The :DISPlay? query returns to the current page.

Command Tree:



The :PAGE command sets the display page.

The DISPlay:PAGE? qurey returns to the current page.

Command Syntax: DISPlay:PAGE <page name>

Functions of <page name> are as follows：

MEASurement Set the display page to measurement display.

MSETup Set the display page to measurement setup.

LTABle Set the display page to pickout setup.

SYSTem Set the display page to system setup.

FLISt Set the display page to (internal) file list.

For example: WrtCmd(“DISP:PAGE MEAS”); Set the display page to measurement display.

Query syntax: DISPlay:PAGE?

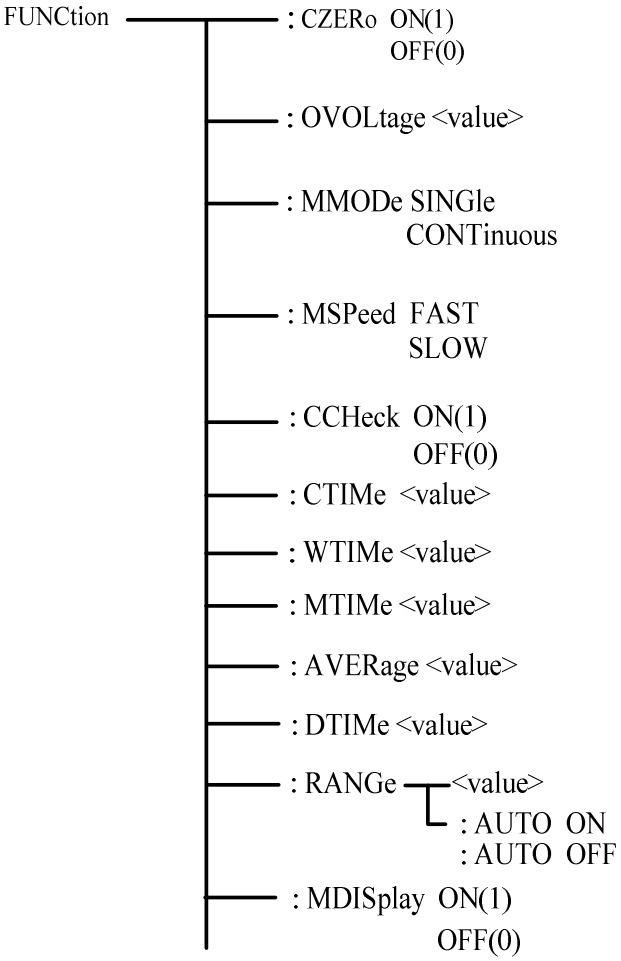
Return format: <page name><NL^END>

<page name> refer to the above set value.

7.1.2 FUNCtion Subsystem Commands

FUNCtion subsystem commands are mainly used to set the items relating to MEAS SETUP: “voltage”, “measurement mode”, “charge time”, “wait time”, “measurement time”, “discharge time”, “range”, “contact check” and “zero clearing”.

Command Tree:



The **:CZERo ON** command is used to execute open clear zero of the instrument, “?” can query the current zero clearing passes or fails. If this zero clearing passes, the zero base used in this measurement is obtained from this open zero clearing; if this zero clearing fails, the zero base used in this measurement is factory default.

The **:CZERo OFF** command is used to cancel the influence of the zero base towards measurement results when users execute zero clearing successfully. At this time, the zero base used in the measurenment is the factory default.

Command syntax: FUNCtion: CZERo ON(1)
OFF(0)

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd(“:FUNC:CZER:ON”); Execute open zero clearing of the instrument.

Query syntax: FUNCtion:CZERo?
Return Format:

SUCCess
FAILed
} <NL^END>

The FUNCtion:CZERo? query returns to the zero clearing result (success or failed).

The : **OVOLtage** command sets the output voltage of the instrument.
The :FUNCtion: OVOLtage? query returns to the current output voltage of the instrument.

Command Syntax: :FUNCtion: OVOLtage <value>
Where, <value> is any real value among the output voltage range (1-1000V) of the instrument.
For example: WrtCmd("FUNCtion:OVOL 12.50"); set the output voltage of the instrument as 12.50V.

Query syntax: FUNCtion: OVOLtage ?
Return Format: <value><NL^END>
The :FUNCtion: OVOLtage? query returns to the current output voltage of the instrument.

The **: MMODe** command sets the measurement mode of the instrument.
The :FUNCtion:MMODe? query returns to the measurement mode of the instrument.

Command Syntax:FUNCtion: MMODe { SINGle / CONTinuous

Where, SINGle and CONTinuous respectively indicate single and continuous measurement.
For example: WrtCmd("FUNCtion:MMOD SINGle"); set the measurement mode of the instrument as SINGle.

Query syntax: FUNCtion: MMODe ?
Return Format: { SINGle / CONTinuous } <NL^END>

The :FUNCtion: MMODe? query returns to the current measurement mode of the instrument.

The : **MSPeed** command sets the measurement speed of the instrument.
The :FUNCtion:MSPeed? query returns to the measurement speed of the instrument.

Command Syntax:FUNCtion: MSPeed { FAST / SLOW

Where, FAST and SLOW are respectively indicate fast and slow measurement.

For example: WrtCmd(“FUNCtion:MSP SLOW”); set the measurement speed of the instrument as SLOW.

Query syntax: FUNCtion: MSPeed ?

Return Format: FAST / SLOW } <NL^END>

The :FUNCtion: MSPeed? query returns to the current measurement speed of the instrument.

The **:CCHeck** command set the contact check switch of the instrument.

The FUNCtion:CCHeck? query returns to the current contact check switch of the instrument.

Commandsyntax: FUNCtion: CCHeck { ON(1) / OFF(0)

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd(“:FUNC:CCH:ON”); set the contact chcek switch of the instrument as “ON”.

Query syntax: FUNCtion:CCHeck?

Return Format:

ON / OFF } <NL^END>

The **:CTTMe** command set the charge time of the instrument.

The FUNCtion:CTTMe? query returns to the current charge time of the instrument.

Command syntax: FUNCtion: CTIMe <value>

Where, <value> is any real value among the charge time range (0-999.0s) of the instrument (correct to 0.1s).

For example: WrtCmd(“FUNCtion:CTTM 12.5”); set the charge time of the instrument as 12.5s.

Query syntax: FUNCtion: CTTMe?

Return Format: <value><NL^END>

The :FUNCtion:CTTMe? query returns to thecharge time of the instrument.

The **:WTIMe** command set the wait time of the instrument.

The FUNCtion:WTIMe? query returns to the current wait time of the instrument.

Command syntax: FUNCtion: WTIMe <value>

Where, <value> is any real value among the wait time range (0-999.0s) of the instrument (correct to 0.1s).

For example: WrtCmd(“FUNCtion:WTIme 12.5”); set the wait time of the instrument as 12.5s.

Query syntax: FUNCtion: WTIMe?
Return Format: <value><NL^END>
The :FUNCtion:WTIMe? query returns to the wait time of the instrument.

The **:MTIMe** command set the measurement time of the instrument.
The FUNCtion:MTIMe? query returns to the current measurement time of the instrument.
Command syntax: FUNCtion: CTIMe <value>
Where, <value> is any real value among the measurement time range (0-999.0s) of the instrument (correct to 0.1s).
For example: WrtCmd("FUNCtion:MTIMe 12.5"); set the measurement time of the instrument as 12.5s.

Query syntax: FUNCtion: MTIMe?
Return Format: <value><NL^END>
The :FUNCtion:MTIMe? query returns to the measurement time of the instrument.

The **:DTIMe** command set the discharge time of the instrument.
The FUNCtion:DTIMe? query returns to the current discharge time of the instrument.
Command syntax: FUNCtion: DTIMe <value>
Where, <value> is any real value among the discharge time range (0-999.0s) of the instrument (correct to 0.1s).
For example: WrtCmd("FUNCtion:DTIMe 12.5"); set the discharge time of the instrument as 12.5s.

Query syntax: FUNCtion: DTIMe?
Return Format: <value><NL^END>
The :FUNCtion:DTIMe? query returns to the discharge time of the instrument.

The **:AVERage** command sets the measurement average time of the instrument.
The :FUNCtion:AVERage? query returns to the current measurement average times of the instrument.
Command syntax: FUNCtion: AVERage <value>
Where, <value> is any integer value among the average times range (1-999) of the instrument.
For example: WrtCmd("FUNCtion:AVERage 12"); set the average times of the instrument as 12.

Query syntax: FUNCtion: AVERage?
Return Format: <value><NL^END>
The :FUNCtion:AVERage? query returns to the average times of the instrument.

The **:RANGe** command sets the range of the instrument.
The FUNCtion:RANGe? query returns to the current range parameters .
Command syntax: FUNCtion: RANGe <value>
Where, <value> can be 1mA、100uA、10uA、1uA、100nA、10nA
For example: WrtCmd("FUNC:RANG 1mA"); Set the range of the instrument as 1mA.

The **:RANGe:AUTO** command sets the range auto selection mode of the instrument.
The FUNCtion:RANGe:AUTO? query returns to the current range mode.
Command syntax:

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

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd("FUNC:RANG:AUTO ON"); Set the range mode of the instrument as AUTO.

Query syntax: FUNCtion:RANGe:AUTO?

Return format: { ON | OFF } <NL^END>

The **:MDISplay** command sets the measurement display switch of the instrument.
The FUNCtion:MDISplay? query returns to the current measurement display switch of the instrument.
Command syntax:

FUNCtion:MDISplay { ON (1) | OFF (0) }

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd("FUNC:RANG:MDIS: ON"); Set the measurement display switch of the instrument as AUTO.

Query syntax: FUNCtion:MDISplay?

Return format: { ON | OFF } <NL^END>

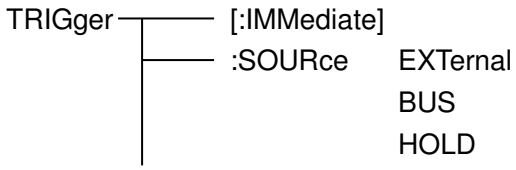
7.1.3 DISCharge Subsystem Commands

DISCharge [:GO]
Set the instrument to discharge.

7.1.4 TRIGger Subsystem Commands

The TRIGger subsystem commands set the instrument trigger source and the delay time after triggering, and triggers instrument measurement.

Command Tree:



The **:IMMediate** command triggers a measurement.
Command syntax: TRIGger[:IMMediate]
For example：WrtCmd(“TRIG”);

The **:SOURce** command sets the mode of trigger source.
The **:SOURce?** query returns to the current mode of trigger source.
Command syntax:

TRIGger:SOURce { EXTernal | BUS | HOLD }

Where,

EXTernal	Be triggered by the HANDLER interface.
BUS	Be triggered by the RS232 interface or the USB interface (DEVICE).
HOLD	Be triggered by pressing the TEST key.

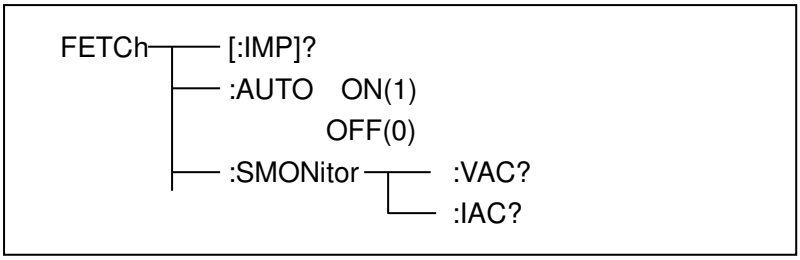
For example: WrtCmd(“TRIG:SOUR BUS”);

Query syntax: TRIGger:SOURce?
Return format:

{ EXT | BUS | HOLD } <NL^END>

7.1.5 FETCH? Subsystem Commands

The FETCh? Subsystem commands are used to get the measurement result of SME1202A/B.
Command Tree:



The [:IMP]? query returns SME1202A/B’s last measurement result to its output buffer.
Query syntax: FETCh[:IMP]?

For example, WrtCmd (“TRIG:SOUR BUS”);
WrtCmd (“TRIG”);
WrtCmd (“FETC?”);

When the PICKOUT function is set as ON:
Data format: < insulation resistance>, < leakage current>, <pickout item>, <pickout comparator results>,< ultralimit>

0 BIN1 passes
1 BIN2 passes
2 BIN3 passes
3 Three bins all failed

The figure below is the range value of ultralimit compare for each range

(**NOTE: lower limit is not compared in range 6**)

Parameter	Compare range
Current	Range 1：95uA ～ 1.05mA Range 2：9.5uA ～ 105uA Range 3：0.95uA ～ 10.5uA Range 4：95nA ～ 1.05uA Range 5：9.5nA ～ 105nA Range 6： ～ 10.5nA

Ultralimit:

0 downlap
1 between the range
2 onlap

When the PICKOUT function is set as OFF:
Data format: <insulation resistance>, <leakage current>, <ultralimit>
Ultralimit:

0 downlap
1 between the range
2 onlap

AUTO command makes SME1202A/B to send each measurement result to its output buffer automatically.

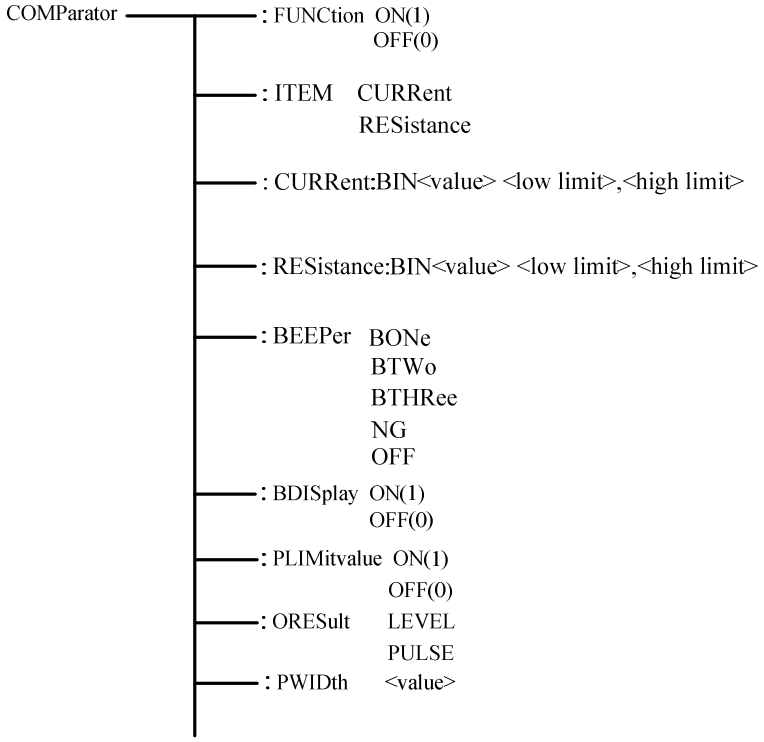
Command syntax：FETCh:AUTO { ON | OFF | 1 | 0 }

For example: WrtCmd(“FETC:AUTO ON”);

The SMONitor command querys the monitor voltage.
Command syntax：FETCh:SMONitor:VOLT?

7.1.6 COMParator Subsystem Commands

COMParator subsystem commands are used to set the pickout function of the instrument, including the setup of pickout switch and pickout list.
Command Tree:



The **:FUNCtion** command is used to set the pickout function as ON or OFF. It can query the current pickout function state.
Command syntax:

COMParator:FUNCtion { ON(1) | OFF(0) }

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd("COMP:FUNC ON")

Query syntax: COMParator:FUNCtion ?
Return format: <NR1><NL^END>

The **:ITEM** command sets the pickout item of the instrument.
COMParator:ITEM? Query returns to the current pickout item.

Command syntax:

COMParator:ITEM { CURRent | RESistance }

Where,

CURRent set the pickout item as CURR

RESistance set the pickout item as RESIS

For example: WrtCmd("COMP:ITEM CURR")

Query syntax: COMParator:ITEM?

Return format:

CURRent
RESistance } <NL^END>

The **:Current:BIN<value> <low limit>,<high limit>** and **:RESistance:BIN<value> <low limit>,<high limit>** commands are used to set the high limit and low limit when the pickout item is set as CURR or RESIS.

Command syntax: COMParator: Current:BIN<value> <low limit>,<high limit>

Where,

<value> is the BIN No. of NR1 data format, input range: 1-3.

<low limit> is the low limit of NR1,NR2 or NR3 data format.

<high limit> is the high limit of NR1,NR2 or NR3 data format.

For example: WrtCmd("COMP: Current :BIN1 12.00n, 50.00n"),the default unit of resistance is Ω and the default unit of current is A.

Query syntax: COMP: Current:BIN<n>?

Return format: <NR3>,<NR3><NL^END>

:BEEPer BONe

BTWo

BTHRee

NG

OFF

The above commands are used to specify the indication of beeper toward pickout results or turn off the beeper function.

Command syntax:

COMParator:BEEPer	BONe	it beeps when the beeper passes BIN1
COMParator:BEEPer	BTWo	it beeps when the beeper passes BIN2
COMParator:BEEPer	BTHRee	it beeps when the beeper passes BIN3
COMParator:BEEPer	NG	it beeps when three bins of the beeper all failed
COMParator:BEEPer	OFF	turn off the beeper function

Query Syntax:

COMParator:BEEPer?

Return format:

BONe, BTWo, BTHRee, NG, OFF

The **:BDISplay** command is used to set the bin display of the instrument as ON or OFF.
The :BDISplay? query returns to the current bin display state.
Command syntax:

COMParator: BDISplay { ON(1) | OFF(0) }

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd("COMP:BDIS ON")

Query Syntax: COMParator: BDISplay?
Return format: <NR1><NL^END>

The **: BLIMitvalue** command is used to set the bin limit value of the instrument as ON or OFF.
The: BLIMitvalue? query returns to the current bin limit value.
Command syntax:

COMParator: BLIMitvalue { ON(1) | OFF(0) }

Where,

Character 1 (integer:49) means ON.

Character 0 (integer: 48) means OFF.

For example: WrtCmd("COMP:BLIM ON")

Query Syntax: COMParator: BLIMitvalue?
Return format: <NR1><NL^END>

The **:ORESultcommand** sets the bin output results type of the instrument.
COMParator:ORESult? query returns to the current bin output results type.

Command syntax:

COMParator:ORESult { LEVel | PULSe }

Where,

LEVel set the bin output results type as LEVel

PULSe set the bin output results type as PULSe

For example: WrtCmd("COMP:ORES LEV")

Query syntax: COMParator:ORES?
Return format:

{ LEVel | PULSe } <NL^END>

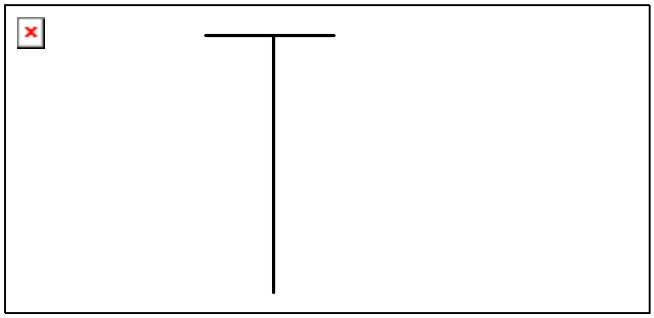
The **:PWIDth** command is used to set the Handler bin output pulse width of the instrument.
The :PWIDth? query returns to the current Handler bin output pulse width.
Command syntax: COMParator: PWIDth <value>
Where,
<value> is any integer value among the range (1-25ms) of Handler bin output pulse width.

For example: WrtCmd (“FUNCtion:PWID 10”); set the Handler bin output pulse width as 10ms..

Query syntax: FUNCtion: PWIDth?
Return format:<value><NL^END>
The command query returns to the current Handler bin output pulse width.

7.1.7 SYSTem Subsystem Commands

Command tree:



The :SYSTem:BEEP OFF (0) and ON (1) commands are used to set and query the system beeper of the instrument.
For example:
SYST:BEEP 0 turn off the beeper
Query Syntax:
SYST:BEEP?
Return format: 0 or 1

SYSTem:VERSion? It can query the current version number of the instrument, for example: Ver 1.00

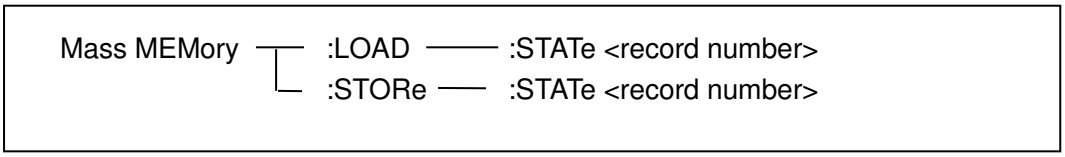
SYSTem:STSTus? It can query the current status of the instrument.
Return format: DISCharging (indicating the syatem is in discharging), TESTing (indicating the system is in test).

The SYSTem:HPOWer INTernal or EXTernalcommands are used to set the Handler interface power.
Command syntax: SYSTem:HPOWer INTernal set the HANDler power as INTernal.

Query Syntax: SYSTem:HPOWer?
Return format: INTernal (indicating the current HANDler power is INTernal), EXTernal (indicating the current HANDler power is EXTernal).

7.1.8 Mass MEMory Subsystem Commands

Mass MEMory subsystem commands are used to set the storing and loading of the files (specific to the internal files).
Command tree:



The **:LOAD:STATe** command is used to load the files stored.
Command syntax: MMEMory:LOAD:STATe <value>
Where,
<value> file sequence number of 1-20 (NR1)
For example, WrtCmd("MMEM:LOAD:STAT 1");

The **:STORe:STATe** command is used to store the current setup of the instrument to a file.
Command syntax: MMEMory:STOR:STATe <value>,<name>
Where,
<value> file sequence number of 1-20 (NR1).
<name> file name (suffix .STA is not required, the length is less than 15 characters).
For example, WrtCmd("MMEM:STOR:STAT 1,ABC");

7.2 GPIB Common Comamnds

●*RST ●*TRG ●*IDN

- The *RST command resets the instrument.
  Command syntax: *RST
  For example: WrtCmd("*RST");
- The *TRG command triggers the measurement and then sends the result to the output buffer.
  Command syntax: *TRG
  For example: WrtCmd("*TRG");
  NOTE: "*trg" will be valid when :INIT:CONT ON and trig:sour bus commands are enabled.
- The *IDN? query returns SME1202A/B's identification string.
  Query syntax: *IDN?
  Return format: <manufacturer>,<model>,<firmware><NL^END>
  Where,
  <manufacturer> Name of Manufacturer
  <model> Instrument Model
  <firmware> Firmware Version (Version 1.0.0)
  For example: WrtCmd("*IDN?");

8) Handler Interface

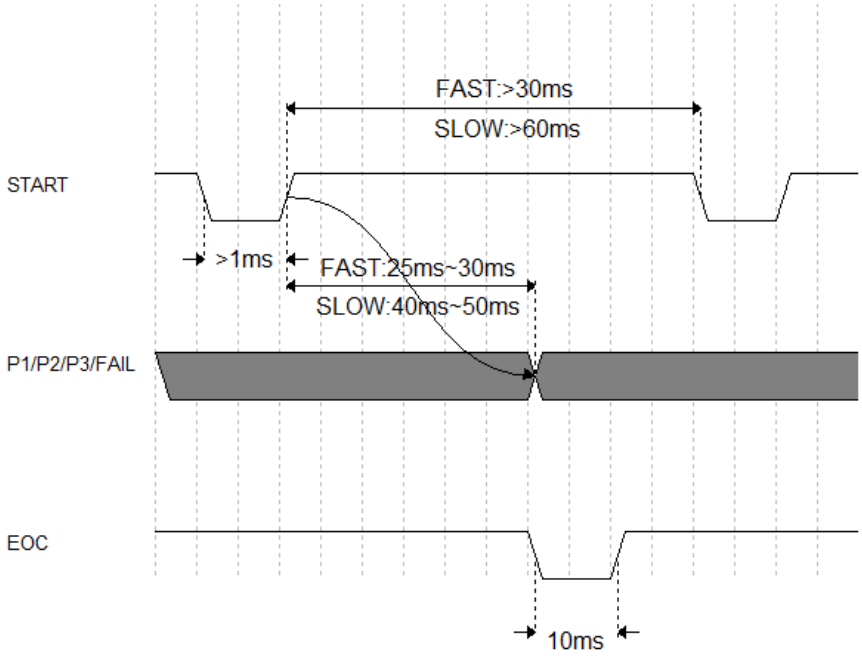
SME1202A/B Insulation Resistance Meter equips with a Handler interface which is mainly used to output the sorting result. When the instrument is applied to an automatic component sorting test system, this interface will output the handshake signal and the sorting result output signal. The sorting result output corresponds to the comparison result output of the current comparator bin.

Terminals and Their Descriptions:

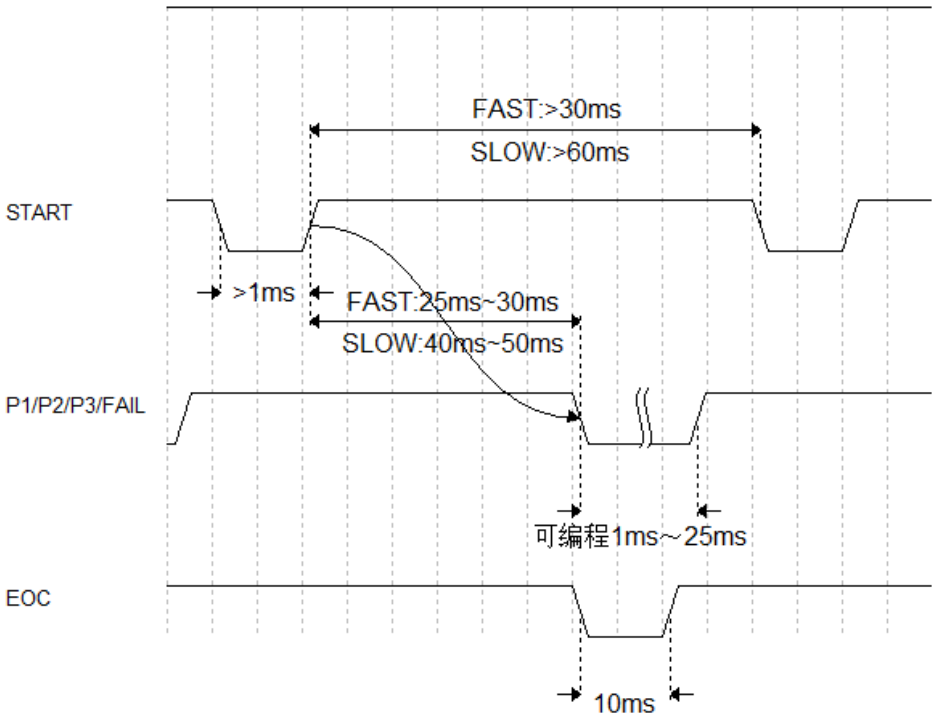
Port No.	Port name	Description
1	/START	Low level pulse, it is valid when in failling edge. When the instrument is in external trigger mode and this signal is valid, the instrument will trigger one measurement.
2	/PASS2	BIN2 passes.
3	/FAIL	BIN failed.
4	VCC	Internal electric source, +5V.
5	EXTV	External power supply, +5V.
6	/PASS1	BIN1 passes.
7	/PASS3	BIN3 passes.
8	/EOC	End of the measurement.
9	COM	External power supply ground.

NOTE: the sequence chart below is obtained when the MEAS DISP and BIN DISP are set as OFF.

Non-programmable Handler sequence chart (OUTP RESU is set as LEVEL)



Programmable Handler sequence chart (OUTP RESU is set as PULSE)



Time	Min. value	Max.value
Trigger pulse width	1ms	---
Tip time when measurement ended (EOC)	10ms	---
Interval time between two triggers	1 Sampling Time	---

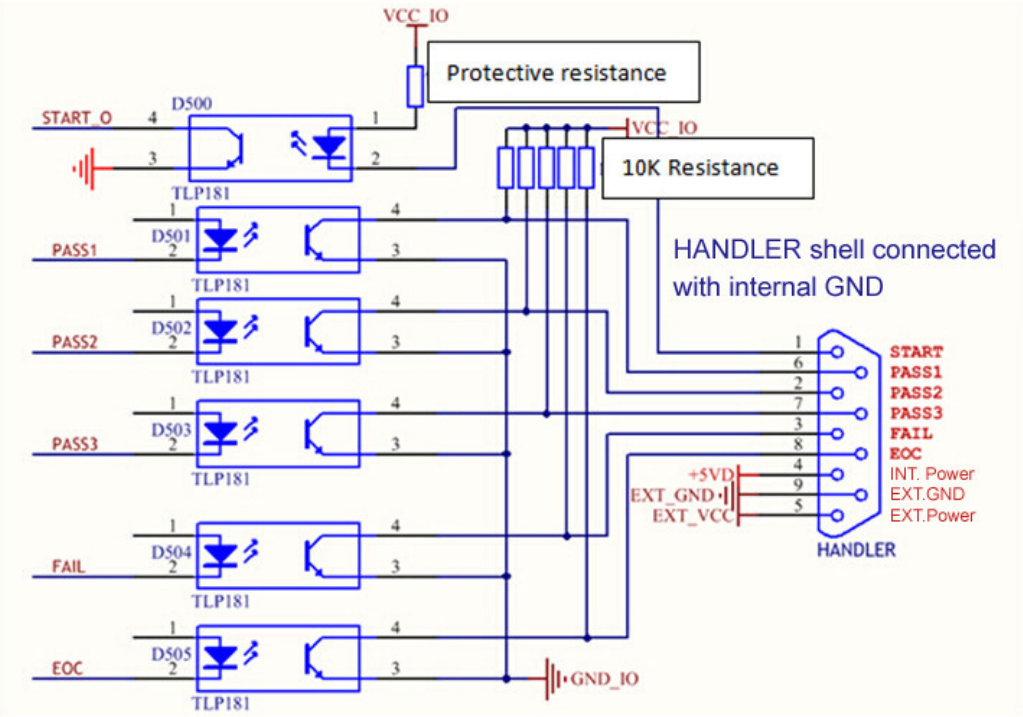
Sampling Time = above 30ms FAST
Above 60ms SLOW

Electrical Characteristics

DC isolated output

Each DC output (pins 1 through 5) is opened by a collector, output and isolated by a photoelectric coupler. The output voltage of each line is set by a pull-up resistor on the handler interface board. The pull-up resistors can be connected to the internally supplied voltage (+5V), or to an externally applied voltage (EXV: +5V) by setting through the setup item on the MEAS SETUP page.

Comparator result output circuit and external control signal input circuit are shown as follows:



VCC_IO: Handler VCC, setting the HANDLER VCC as INTER or EXTER
GND_IO: Handler GND, setting the HANDLER GND as INTER or EXTER

9) Maintenance

There are no user serviceable part inside the instrument. The instrument is thoughtfully engineered for ease of use, accuracy and reliability. It is carefully tested and calibrated using standards traceable to National Laboratories. Take care of your instrument by cleaning the exterior of the instrument regularly with a dusting brush. Dirt which is difficult to remove on the casing & plastic parts, can be removed with a moist cloth (99% water, 1% mild detergent) spirit or washing benzene(petroleum ether) can be used to remove greasy dirt. The display may be cleaned with water or washing benzene (but not with spirit- alcohol solvents), it must then be wiped with a dry clean lint-free cloth. Under no circumstances the cleaning fluid should get into the instrument. The use of cleaning agents can attack the plastic & paint surfaces.

10) Dispatch procedure for service, E-Waste Management

9.1 Dispatch procedure for service

No user serviceable parts are inside the instrument, should it become necessary to send back the instrument to factory for service, please observe the following procedure:

Before dispatching the instrument please write to us at following link giving full details of the fault noticed. https://www.scientificindia.com/services-support/service-request

1. After receipt of your communication, our service department will advise you whether it is necessary to send the instrument back to us for repairs or the adjustment is possible in your premises.
2. Dispatch the instrument (only on the receipt of our advice) securely packed in original packing duly insured and freight paid along with accessories and a copy of the fault details noticed at our Service Center or factory.

9.2 E-Waste Management

We support environmentally sustainable measures and solicit your cooperation in this endeavor by way of sending the equipment to us at the end of the life of the product. The equipment will be sent for recycling through authorised recyclers as per E-Waste Management Rules. Please write to us at support@scientificindia.com for this purpose. Your support will go a long way as each and everybody's action can lead to improve global environment.

11) Warranty

Scientific warrants all its Instruments to be free from defects in material and workmanship when used under normal operating conditions in accordance with the instructions given in the manual for a period of 12 (Twelve) months from date of purchase from Scientific or its authorized dealers. The service during the warranty period will be rendered on return to factory / service center basis.

1. Its obligation under this warranty is limited to repairing or replacing at its own discretion. This warranty shall not apply to any defect, failure or damage caused by accident, negligence, misapplication, alteration or attempt to repair, service or modify in any way.
2. This warranty does not include display, fuses, batteries or accessories. This warranty is only valid with the original purchaser who must have properly registered the product within 15 days from date of purchase. No other warranty is expressed or implied.
3. When it becomes necessary to return the instrument to our Factory facility, kindly pack it carefully in the original carton or equivalent and ship it duly insured, transportation charges prepaid.
4. Your Scientific instrument is a complex electronic device and deserves the best service available by technicians thoroughly familiar with its service and calibration procedures.