USER'S MANUAL

Programmable DC power supplier

Models M88XX Series

(Including M8811/M8812/M8813/M8851/M8852/M8853/

M8871/M8872/M8873/M8874)

Content

Chapter 1 Introduction

M88XX Series power suppliers are high performance single-output programmable DC power suppliers with communication interface, possessing the character of fast rise time speed (The rise speed of M8811 power supplier can be less than 10mS and that of M8851 can be less than 20mS) The combination of bench-top and system features in these power suppliers provides versatile solutions for your design and test requirements. The M88XX Series can not only be programmed through the keyboard on the panel, but also be functioned as voltmeter and milliohmmeter, which will bring great convenience to the users. As a regeneration product of ordinary programmable power suppliers, M88XX Series power suppliers are more cost-effective.

M88XX Series power suppliers' features

- Low Periodic And Random Deviation (PARD) and noise
- High resolution and accuracy (0.1mV/0.01mA)
- Installing a high-accuracy 5 1/2 voltmeter and milliohmmeter
- Supporting high-accuracy and dynamic programming output
- High –luminance VFD screen and two lines& four ways display
- Smart fan will be automatically initiated according to the temperature.
- Supporting remote voltage compensation and multidata storage
- Supporting external trigger input and output.
- Power-on-self-test，software calibration and standard designed instrument stand
- Supporting TTL level Serial communication interface

Chapter2 Technical Specifications

2.1 Main Technical Specification

M881X Series power suppliers technical specification table

Model		M8811	M8812	M8813
Input Rating	Voltage	0-30V	0-75V	0-150V
	Current	0-5A	0-2A	0-1A
Load Regulation	Voltage	＜0.01%+0.5mV	＜0.01%+0.5mV	＜0.01%+0.5mV
	Current	＜0.01%+0.1mA	＜0.01%+0.1mA	＜0.01%+0.1mA
Setting Value Resolution	Voltage	0.5mV	1mV	2mV
	Current	0.1mA	0.05mA	0.01mA
Readback Value Resolution	Voltage	0.1mV	0.1mV	1mV
	Current	0.01mA	0.01mA	0.01mA
Setting Value Accuracy	Voltage	0.01%+2mV	0.01%+5mV	0.01%+15mV
	Current	0.05%+1mA	0.05%+0.5mA	0.05%+0.1mA
Readback Value Accuracy	Voltage	0.02%+5mV	0.02%+12mV	0.02%+25mV
	Current	0.1%+5mA	0.05%+2mA	0.05%+1mA
Periodic And Random Deviation	Voltage	3mvp-p	5mvp-p	10mvp-p
	Current	2mA rms	1mA rms	0.5mA rms
Voltmeter Accuracy	0-12V Accuracy: 0.02%+2mV; 0-50V Accuracy: 0.02%+5mV			
Milliohmmeter Accuracy	10W. 0-1000mΩ Accuracy: 0.2%+3 mΩ; 1000-10000 mΩ Accuracy: 0.2%+6 mΩ			
Working Condition	0-40℃; 0-90% RH			
Power Required	AC 110V/220V±10%; 50/60 HZ			
Weight	9Kg			
Dimension	108X214X365mm			

M885X Series power suppliers technical specification table

Model	M8851	M8852	M8853
Input Rating	0-6V	0-30V	0-75V
	0-60A	0-20A	0-8A
Load Regulation	＜0.01%+1mV	＜0.01%+1mV	＜0.01%+1mV
	＜0.01%+0.1mA	＜0.01%+0.1mA	＜0.01%+0.1mA
Setting Value Resolution	0.1mV	0.5mV	1mV
	1mA	0.5mA	0.2mA
Readback Value Resolution	0.1mV	0.1mV	0.1mV
	0.1mA	0.1mA	0.1mA
Setting Value Accuracy	0.01%+1mV	0.01%+5mV	0.01%+10mV
	0.05%+6mA	0.05%+2mA	0.05%+1mA
Readback Value Accuracy	0.02%+2mV	0.02%+5mV	0.02%+12mV
	0.05%+30mA	0.05%+15mA	0.05%+8mA
Periodic And Random Deviation	3mvp-p	5mvp-p	7mvp-p
	15mA rms	7mA rms	4mA rms
Voltmeter Accuracy	0-12V Accuracy: 0.02%+2mV; 0-50V Accuracy: 0.02%+5mV		
Milliohmmeter Accuracy	10W. 0-1000mΩ Accuracy: 0.2%+3 mΩ; 1000-10000 mΩ Accuracy: 0.2%+6 mΩ		
Working Condition	0-40℃; 0-90% RH		
Power Required	AC 120V/230V±10%; 50/60 HZ		
Weight	28Kg		
Dimension	428X103.5X453.5mm		

M887X Series power suppliers technical specification table

Model	M8871
Input Rating	0-15V, 0-60A
Load Regulation	<0.01%+1mV, <0.01%+0.1mA
Setting Value Resolution	0.1mV, 1mA
Readback Value Resolution	0.1mV, 0.05%+6mA
Readback Value Accuracy	0.03%+5mV, 0.05%+45mA
Ripple	4mvp-p, 10mA rms
Voltmeter Accuracy	0-12V Accuracy: 0.02%+2mV; 0-50V Accuracy: 0.02%+5mV
Milliohmmeter Accuracy	10W 0-1000mAuracy:0.2%+3mΩ;1000-10000mΩ Acuracy:0.2%+6 mΩ
Working Condition	0~40°C; 0~90% RH
Power Required	AC 100V/120V/220V+10%; 50/60 HZ
Weight	38Kg
Dimension	583mm (W)*180mm(H)*445mm(D)

Model	M8872
Input Rating	0-30V, 0-35A
Load Regulation	<0.01%+1mV, <0.01%+0.1mA
Setting Value Resolution	0.5mV, 0.5mA
Readback Value Resolution	0.1mV, 0.05%+2mA
Readback Value Accuracy	0.03%+5mV, 0.05%+25mA
Ripple	5mvp-p, 5mA rms
Voltmeter Accuracy	0-12V Accuracy: 0.02%+2mV; 0-50V Accuracy: 0.02%+5mV
Milliohmmeter Accuracy	10W 0-1000 mΩAccuracy:0.2%+3 mΩ; 1000-10000mΩ Accuracy:0.2%+6 mΩ
Working Condition	0~40°C; 0~90% RH
Power Required	AC 100V/120V/220V+10%; 50/60 HZ
Weight	38Kg
Dimension	583mm (W)*180mm(H)*445mm(D)

Model	M8873
Input Rating	0-75V, 0-15A
Load Regulation	<0.01%+1mV, <0.01%+0.1mA
Setting Value Resolution	2mV, 0.2mA
Readback Value Resolution	0.1mV, 0.05%+1mA
Readback Value Accuracy	0.03%+15mV, 0.05%+15mA
Ripple	6mvp-p, 3mA rms
Voltmeter Accuracy	0-12V Accuracy: 0.02%+2mV; 0-50V Accuracy: 0.02%+5mV
Milliohmmeter Accuracy	10W 0-1000 mΩAccuracy:0.2%+3 mΩ;1000-10000mΩ Accuracy:0.2%+6 mΩ
Working Condition	0~40°C; 0~90% RH
Power Required	AC 100V/120V/220V$\pm$10%; 50/60 HZ
Weight	38Kg
Dimension	583mm (W)*180mm(H)*445mm(D)

Model	M8874
Input Rating	0-100V, 0-11A
Load Regulation	<0.01%+1mV, <0.01%+0.1mA
Setting Value Resolution	2mV, 0.2mA
Readback Value Resolution	1mV, 0.05%+1mA
Readback Value Accuracy	0.03%+25mV, 0.05%+12mA
Ripple	8mvp-p, 2.5mA rms
Voltmeter Accuracy	0-12V Accuracy: 0.02%+2mV; 0-50V Accuracy: 0.02%+5mV
Milliohmmeter Accuracy	10W 0-1000 mΩAccuracy:0.2%+3 mΩ;1000-10000mΩ Accuracy:0.2%+6 mΩ
Working Condition	0~40°C; 0~90% RH
Power Required	AC 100V/120V/220V$\pm$10%; 50/60 HZ
Weight	38Kg
Dimension	583mm (W)*180mm(H)*445mm(D)

2.2 Supplemental Characteristics

State Storage Memory: 50 user-configurable stored states

Recommended Calibration Interval: Once/ Year

AC Input Ratings (selectable via switch on the rear panel)

Option 01: 220VAC ± 10%, 47 to 63 Hz

Option.02: 110 VAC ± 10%, 47 to 63 Hz

Cooling: forced cooling

Operating Temperature：0 to 40 °C

Storage Temperature：-20 to 70 °C.

Environmental Conditions：Designed for indoor use with pollution degree 2 environment. Designed to operate at maximum relative humidity of 95%.

2.3 M88XX Power Suppliers Dimension

The dimension of M881X Series is 256mmW x 108mm H x 365mm L. Please refer to the following figure：
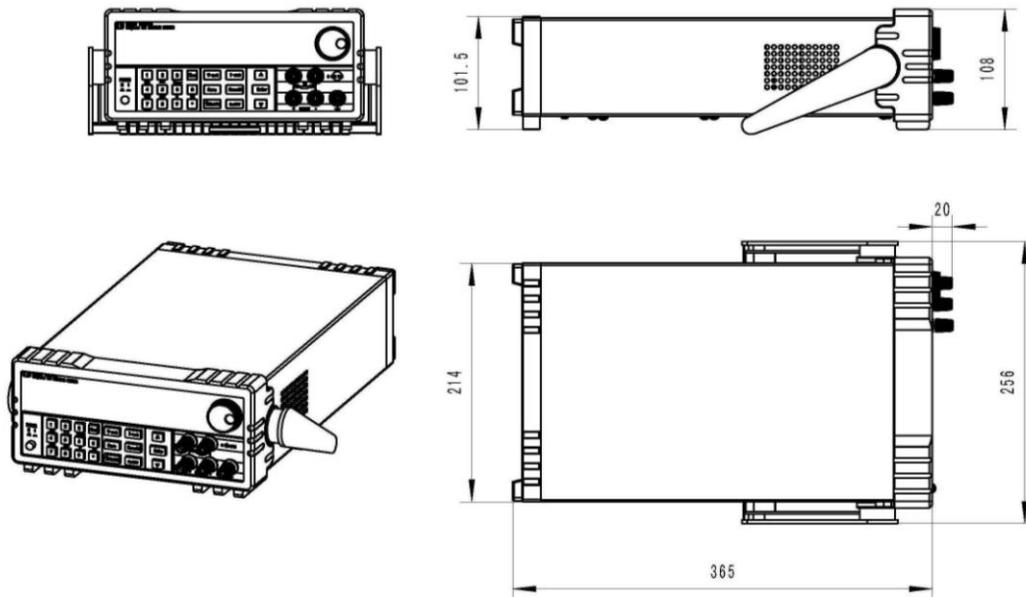

Figure 2.1: M881X Power Suppliers Dimension Figure

The dimension of M885X Series is 428mmW×103.5mmH×453.5mmL，Please refer to the following figure：
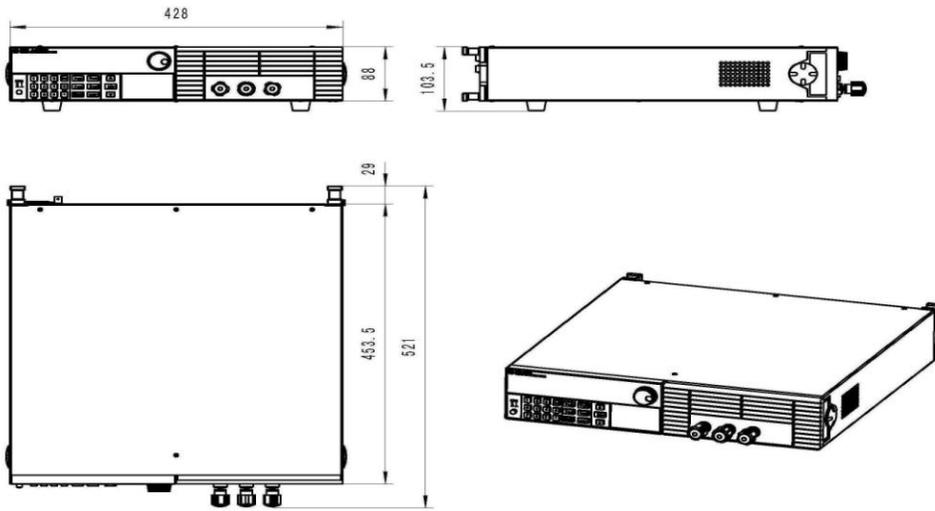
Figure 2.2:　M885X Power Suppliers Dimension Figur

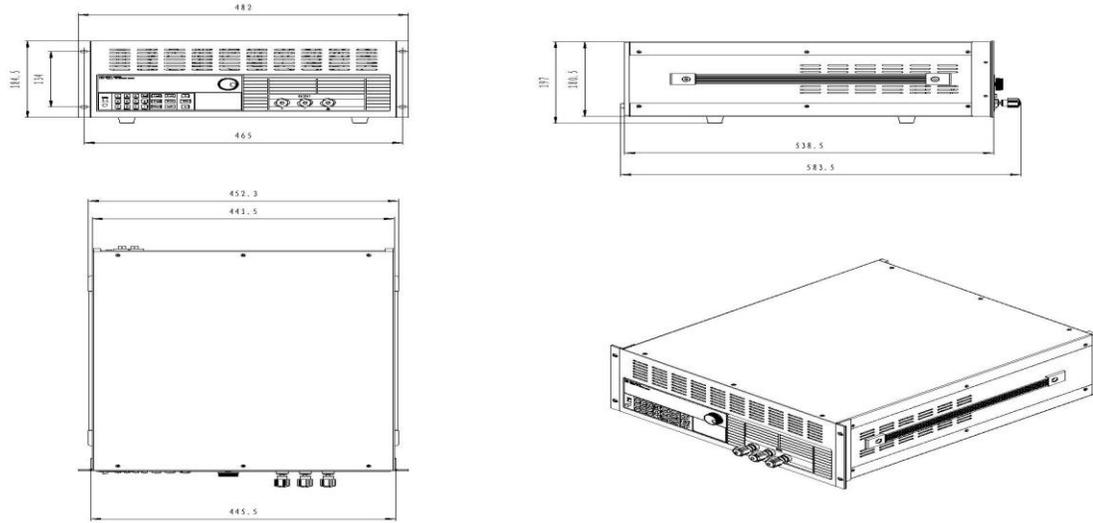The dimension of M887X Series is　482mmW×184.5mmH×583.5mmD. Please refer to the following figure：

Figure 2.3:　M887X Power Suppliers Dimension Figur

Chapter 3 Quick Start

This chapter mainly focuses on the brief introduction of the surface appearance and basic functions of M88XX Series power suppliers so that both experienced and inexperienced users can be acquainted with the new products quickly. Meanwhile, the chapter also clarifies some preliminary checkout that should be made prior to operation to make sure the normal running of the products.

3.1 Front-panel and Rear-panel

The front panel layout of M881X Series power supplier is as follows:
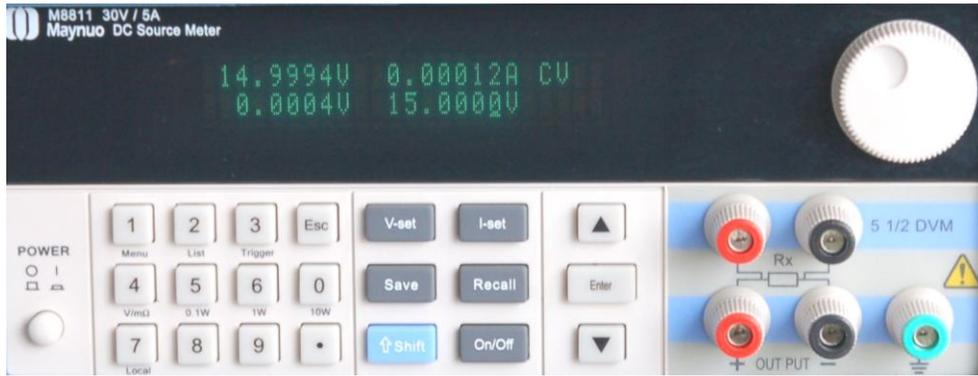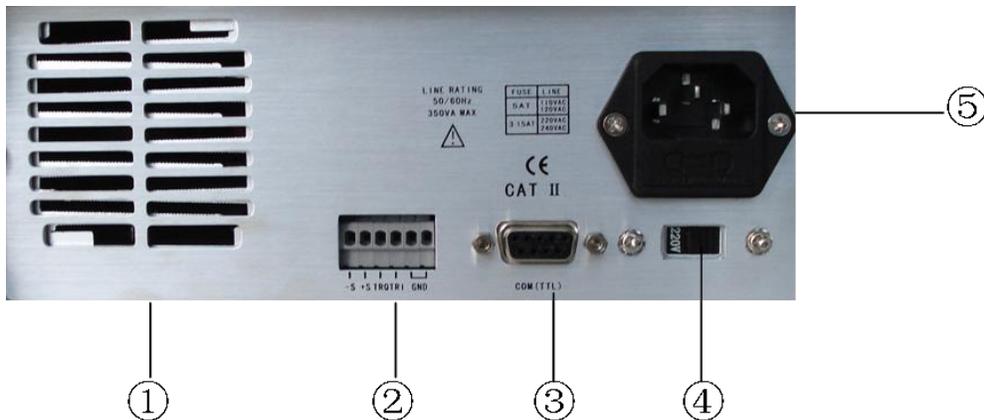

Picture 3.1: The Front Panel of M881X Series Power Suppliers

The upper half is black VFD display screen and knob

The bottom half, left side to right side, is Numberic keys 0-9, ESC key, Function keys, Up-Down keys, Enter key, Input terminall and Output terminal.

The rear-panel layout of M881X is as follows:

Picture 3.2: The Rear Panel of M881X Series Power Suppliers

① Cooling Window

② Multifunction Interface Connector

③ 9 Pin COM Interface

④ Power Switch Key (110V / 220V)

⑤ Power Socket

3.2 Preliminary Checkout

The following steps help you verify that the power supplier is ready for use

1. Check the list of supplied items

Verify that you have received the following items with your power supplier. If anything is missing, contact your nearest Sales Office.

□ One power cord for your location

□ The user's manual

□ One CD(only when you have bought communication accessories)

□ One communication cable (only when you have bought communication accessories)

□ One testing line（only M8811 ,M8812 ,M8813 have the testing line ）

2. Connect the power cord and turn on the power supplier.

When you turn on the power supplier, the VFD display screen will light up briefly and the power supplier performs its power-on self-test. Please check if there is any stroke loss on VFD display.

⚠ **Warning**：The power supplier is shipped from the factory with a power-line cord that has a plug appropriate for your location. Your power supplier is equipped with a 3-wire grounding type power cord. The power supplier is grounded only when the power-line cord is plugged into an appropriate receptacle. Do not operate your power supplier without adequate cabinet ground connection.。

3.3 If the Power supplier Does Not Turn On

Use the following steps to help solve problems you might encounter when turning on the instrument.

1. Verify that there is AC power to the power supplier.

First, verify that the power cord is firmly plugged into the power receptacle on the rear panel of the power supplier. You should also make sure that the power source you plugged the power supplier into is energized. Then, verify that the power supplier is turned on.

2. Verify the power-line voltage setting.

The line voltage is set to the proper value for your country (110VAC or 220VAC) when the power supplier is shipped from the factory. Change the voltage setting if it's not correct.

3. Verify that the correct power-line fuse is installed.

If the fuse was damaged, please see the table below to replace the fuse for your power supplier.

Model	Fuse Description（110VAC）	Fuse Description（220VAC）
M8811	T5A 250V	T3.15A 250V
M8812	T5A 250V	T3.15A 250V
M8813	T5A 250V	T3.15A 250V
M8851	T10A 250V	T6.3A 250V
M8852	T10A 250V	T6.3A 250V
M8853	T10A 250V	T6.3A 250V
M8871	T15A 250V	T10A 250V
M8872	T15A 250V	T10A 250V
M8873	T15A 250V	T10A 250V
M8874	T15A 250V	T10A 250V

4. How to replace the power-line fuse

Open the plastic cover which locates at below the power input socket in the rear panel of the power suppliers by screwdriver, then you will see the fuse. Please replace the damaged fuse with the matched fuse.

3.4 How to Adjust the Carrying Handle

To adjust the position, grasp the handle by the sides and pull outward. Then, rotate the handle to the desired position. There are following three positions for you to choose:
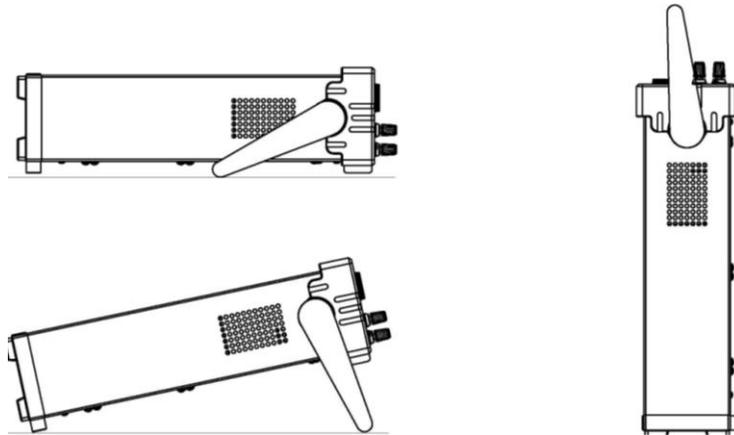
Picture 3.3 M88XX Series Power Suppliers Viewing Positions

3.5 How to Rackmount the Instrument

The power supplier can be mounted in a standard 19-inch rack cabinet and be easily applied to your testing system. If you want to rackmount the M88XX Series, please buy MR01 rack kit.

Note：Remove the carrying handle, the rubber coating, and the foot on the rear panel before rackmounting the instrument.
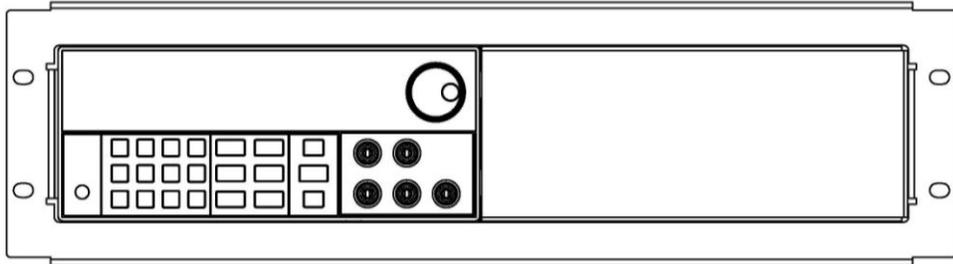
Picture 3.4: To Rackmount a Single Instrument
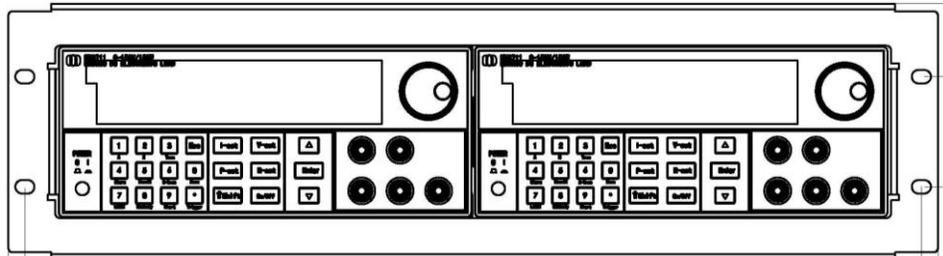
Picture 3.5 To Rackmount Two Instruments Side by Side

Chapter 4 Panel Operation

This chapter mainly introduces the front-panel operation in detail from the following parts:

Voltage Set Operation

Current Set Operation

Saving and Recalling Operation

Menu Operation

Output ON/OFF Operation

Remote Measurement Function

Milliohmmeter Function

Voltmeter Function

4.1 Key Layout
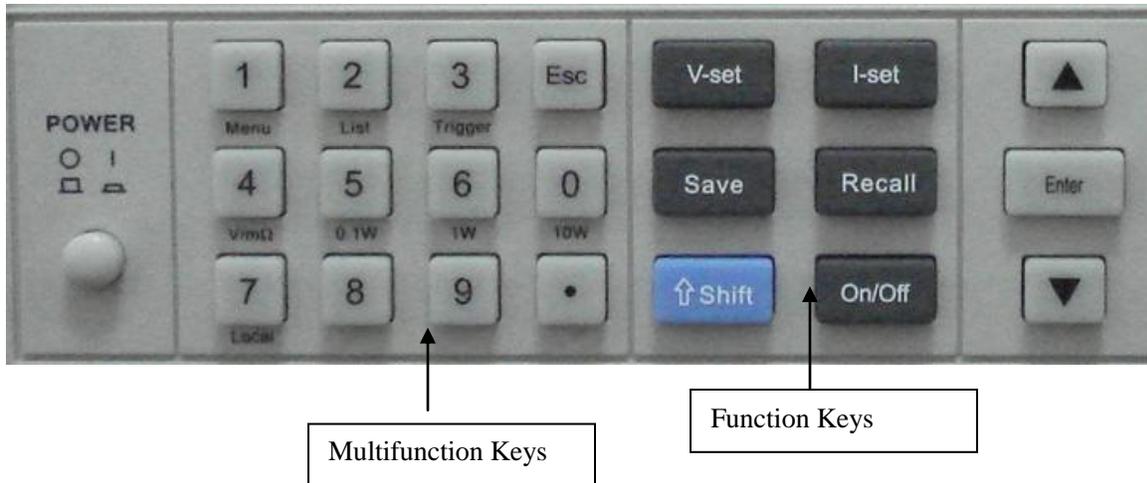
Picture 4.1 Operation Panel Picture

Multifunction Keys Directions

0~9	Numberic keyss
Menu	Menu operation key
List	List output operation
Trigger	Trigger key
V/mΩ	Voltmeter and milliohmmeter switch button
0.1W	Choosing 0.1W power output operation when the instrument is used as milliohmmeter
1W	Choosing 1W power output when the instrument is used as milliohmmeter
10W	Choosing 10W power output when the instrument is used as milliohmmeter

Local	Local operation
Esc	Esc key (can be exited from any working condition)

Function Keys Direction

V-set	Setting the voltage value
I-set	Setting the maximum current value
Save	Saving the current settings to a particular storage locations
Recall	Recalling the saved settings
Menu	Menu operation: setting the parameter
On/Off	Control the output state
Shift	Used together with multifunction key to perform diversity functions and applications(for example: **shift+Menu** can perform menu function）
▲	Up-key: choosing menu item in menu operation or to increase the output voltage
▼	Down-key: choosing menu item in menu operation or to reduce the output voltage
Enter	Confirm key
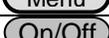
4.2 Front-panel Operation Overview

The following section describes an overview of the front-panel keys before operating your power supplier.

The power supplier is shipped from the factory configured in the front-panel operation mode. At power-on, the power supplier is automatically set to operate in the front-panel operation mode. When in this mode, the front panel keys can be used.

When the power supplier is in remote operation mode, you cannot use the front-panel. A change between front-panel and remote operation modes will not result in any change in the output parameters. You can change the front-panel and remote operation modes by PC.

The output of the power supplier can be enabled or disabled from the front panel by pressing the key On/Off .
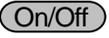
The VFD display shows the current operating status of the power supplier with annunciators. When it is powered on, the VFD will display two lines of data. The first line shows the actual voltage value, actual current value and power supplier's status while the second line shows the voltage value that can be measured by voltmeter and output setting value of the M88XX Series power suppliers.

4.3 Constant Voltage Operation

The constant voltage range is from 0V to the maximum voltage value of each model. It is very easy for you to set the constant voltage output.

Solution One：Press the ▲ and ▼ keys to change the value when the M88XX Series power

suppliers are powered on.

Solution Two: Step1. Power on the M88XX series instrument.

Step2. Press (V-Set) key.

Step3. Press the numeric keys (0) to (9) to enter the voltage value you wanted.

Step4. Press (Enter) to confirm the value

Close knob lock function when you in config menu,also can use following two operations:

1) Use upper revolving encoder directly to adjust voltage;

2) Press V-set button then use upper revolving encoder to adjust voltage

4.4 Constant Current Operation

The constant current output range is from 0A to the maximum current value of each type. It is very easy for you to set the constant current output.

Step1. Power on the M88XX series instrument

Step2. Press (I-Set) key

Step3. Use the numeric keys (0) to (9) to enter the voltage value you wanted.

Step4. Press (Enter) key to confirm the value

IF you close knob lock function in config menu,can use following operation:

Press V-set button then use upper revolving encoder to adjust voltage

4.5 Saving and Recalling Operation

You can store up to 50 different output states in storage register locations so that you can recall the saved settings quickly. This kind of store operation can be performed by the keys (Save) and (Recall) located in the front panel. When the fast recalling is activated, you can press the numberic keys (0) to (9) to invoke the corresponding data.

Each output state includes 1. Constant voltage value, 2.Constant current value, 3.Maximun voltage setting value, 4.Maximum output voltage value.

Step1. After you setting an output state (CV value, CC value and Maximum voltage), press the (Save) key

Step2.Use the numeric keys (0) to (9) or ▲ and ▼ keys to select the memory location (the range is 1 to 50) which you want to store in.

Step3. Press (Enter) to confirm the memory location.

Step4. Press (Recall) key.

Step5. Use numeric keys (0) to (9) or ▲ and ▼ keys to select the states which you want to recall.

Step6. Press (Enter) key to confirm. Then the saved settings will come out

4.6 Menu Operation

4.6.1 Menu Description

Press the key (MENU) to access to the menu function and at the moment theVFD display screen

shows the menu items. You can select the menu items by pressing the ▲ and ▼ keys or by rotating the knob, and then press the key (ENTER) to enter in the menu item you wanted. Or you can press the key (Esc) to get back to the higher level menu.

The first level menu includes：

> ***Config***
> ***System set***
> ***List Set***
> ***Auto test***
> ***Output Timer***

When accessing to ***Config*** item，the following menu items will be displayed on the VFD display screen by pressing the keys ▲ and ▼.

Init:All set for factory value

Output Recall：

On	Setting the output to OFF state when the power supplier is powered on.
Off(Default)	Setting the same state as last time you turned off the power supplier.

Key Sound Set:

On（Default）	The buzzer will sound when any key was pressed.
Off	the buzzer will not sound when any key was pressed

Knob Lock Set:

On	The knob is locked and rotating the knob will not cause any change of the setting value.
Off（Default）	The knob is unlocked and rotating the knob will cause change of the setting value.

Flemote Meas.:

On	Activating the remote meas. mode (Rear-panel meas. mode)
Off（Default）	Activating the front-panel meas. mode

Current Unit Set:

mA	Current unit mA
A(Default)	Curren unit A (Default)

Match Power:

50HZ	Match 50HZ (50HZ Default)
Off(Default)	Match 50HZ

Baudrate Set:

4800	Setting the baudrate as 4800bps
9600(Default)	Setting the baudrate as 9600bps
19200	Setting the baudrate as 19200bps
38400	Setting the baudrate as 38400bps

Comm. Parity:

None(Default)	Setting no parity bit
Even	Setting comm. parity as even parity bit
Odd	Setting comm. parity as odd parity bit

Port Mode:

Trigger(Def)	Trigger mode
RI/DFI	
Digital I/O	Digit port

Key Lock Set:

Password=	Entering password and then pressing the key ***Enter*** to unlock the password

Exit：

When accessing to ***System Set*** item，the following menu items will be displayed on the VFD display screen by pressing the keys ▲ and ▼.

Max Volt. Set:

Max=	Setting the maximum output voltage

Step Volt Set:

Step=	Inputting the voltage step value and pressing ***up-down*** keys to change it

Exit

When accessing to the ***List Set*** item，the following menu items will be displayed on the VFD display screen by pressing the keys ▲ and ▼.

Load List File: Read list

Edit List File:

Continuous	Continuous mode: once:; repeat
Step	Single-step mode, once: repeat:

Edit File Format:

Exit:

8X25 Steps	Setting list file as 8X25step
4X50 Steps	Setting list file as 4X50step
2X100 Steps	Setting list file as 2X100 step
1X200 Steps	Setting list file as 1X200 step

When accessing to the ***Auto Test*** item，the following menu items will be displayed on the VFD display screen by pressing the keys ▲ and ▼.

Load Atest File:

Edit Atest File:

Exit:

When accessing to the ***Menu Timing*** item, you can see the item ***Close Delay,*** which means to set the output timing.

Note: When accessing to the menu item, you can press (Esc) to exit the menu operation.

No matter which function the instrument is performing, you can exit the function operation status by pressing the key (Esc)

4.6.2 Menu Function

Initiating the Output State (>Output Setup)

This instruction can initiate the output state when the power supplier is powered on. If you select the item **On**, the power supplier will initiate the output to OFF state when the power supplier is powered on. If you select the item **Off**, the output will remain the same state as last time you turned off the power supplier

Setting the Key Sound (Key Sound Set)

This instruction can switch on/off the buzzing sound when you press any key, If you select the item **On**, the buzzer will sound when any key was pressed. If you select **Off**, the buzzer will not sound when the keys were pressed. Default setting is the item **On**; the buzzer will sound when you press any key.

Fast Recalling Function (>Fast Recall)

This instruction can help you recall the saved data very fast when it is set as **On** condition. The detailed operations are as follows: first you need to save several often used voltage value and current value, then use the **Recall** key to recall those data.

Press the keys ⟨Shift⟩ and ⟨MENU⟩ to access to the menu function. When VFD display screen shows the item **Config,** press the key ⟨ENTER⟩ to confirm。

Press the keys▲ and ▼to select the item **Fast Recall**, and then confirm by pressing the key ⟨ENTER⟩.

Press the keys▲ and ▼to select the item **On.**

Press the key ⟨ESC⟩ twice to exit the menu operation.

Press the keys ⟨V-set⟩ and ⟨I-set⟩ to set your favored voltage value and current value. After you setting an output state (CV value, CC value and Maximum voltage), press the ⟨Save⟩ key e numeric keys ⟨0⟩ to⟨9⟩ or ▲ and ▼ keys to select the memory location (the range is 1 to 50) which you want to store in.

. Press⟨Enter⟩ key to confirm the memory location.

. Press ⟨Recall⟩ key.

Use numeric keys ⟨0⟩ to ⟨9⟩ or ▲ and ▼ keys to select the states which you want to recall.

. Press⟨Enter⟩ key to confirm. Then the saved settings will come out

Overcurrent Protection (>OCP Set)

M8811, M8812, M8813, M8851, M8852, M8853 are not available of this function for while.

Setting the Baudrate (>Baudrate Set)

This instruction can change the communication baud rate of the power supplier; the baud rate range is 4800bps，9600bps，19200bps，38400bps. Before the communication, you must make sure that there is same baud rate between the power supplier and the host computer. Default baud rate is 9600bps.

Setting Address (>Sour. Address)

This instruction can set the communication address of each power supplier. The address range is from 0 to 30。Before the communication, you must make sure that there is same address between the power supplier and the host computer. Default address is 0.

Operation steps：

Press the keys (Shift) and (MENU) to access to the menu function. When the VFD display screen shows the item **Config**., press the key (ENTER) to confirm.

Press the keys ▲ and ▼ to get the item **Sour. Address**，then press the key (ENTER) to confirm.

When the VFD display screen shows **Address=٭٭**, choose the number keys from (0) to (9) to set the address, followed by pressing the key (ENTER) to confirm.

Press the key (ESC) twice to exit the menu operation.

Port Mode (>Port Mode):

M8811, M8812, M8813, M8851, M8852, M8853 are not available of this function for while.

Trigger Operation (Shift+Trigger)

Just as described above, the trigger operation can also be applied to the list output operation.

There are three trigger modes for the power supplier. Before performing the trigger function, users need to select one trigger mode.

Trigger by keyboard (pressing the keys (Shift) and (Trigger))：The trigger operation will be initiated once when pressing the keys (Shift) and (Trigger) under the condition that the trigger by keyboard is effective.

Remote Control Function (>Output Contr.)

There are three modes under the remote control function: **LATCHED**、**FOLLOW**、**OFF**.

LITCHED Mode：The output of power supplier will be turned off when testing out the change in voltage level from high to low from TRQ port.

FOLLOW Mode：M88XX series power suppliers are not available of this function for while.

OFF Mode：The output status of M88XX series power suppliers are not affected by RI input level.

Fault Indication Function (>DFI Status)

DFI results from following five sources: Quest, OPER, StEV, Requ., Off.

Setting Password for Function Keys (>Key Lock Set)

This instruction can set a password (1 through 4 digits) to lock the function keys operation. After setting the password, all the function keys on the front panel will be locked except the key $\boxed{\text{On/Off}}$. You must enter the correct password to unlock them, and then you can continue to do the function key operation. If you don't want to lock the function keys, please don't press any number key when you enter the *Key Lock Set* item, just press $\boxed{\text{Enter}}$ key to unlock it.

Note: When shipped from factory, there is no password and function keys. The start bit of your desired password shouldn't be 0.

List Operation (>List Set)

You can set every single-step value and duration time by new list operation so as to get different output list. The parameters of the list operation include the name of the list file which are input, input single-step numbers (200steps at most), single-step duration time (1mS at least) and the setting value of every single-step.

When list operation is under *continuous* mode, the power supplier will begin the list operation until the list operation is finished or until receiving the next trigger signal.

Before editing the list, if you want to change the file storage format,please operate as the following steps:

1) Press the keys $\boxed{\text{Shift}}$ and $\boxed{\text{Menu}}$ to access to the menu function.

2) When VFD display screen shows the item *Config,* press the key ▼to select the item *List Set,* press the key $\boxed{\text{Enter}}$ to confirm.

3) When VFD display screen shows the item *Load ListFile,* Press the key▼twice, select the item E*dit File Format,* press the key $\boxed{\text{Enter}}$ to confirm.

4) When VFD display screen shows *8*25 Steps,* Press the key▼twice, select a list mode you want from *1*200 Steps,2*100 Steps, 4*50 Steps.*

2*100 Steps means to set a two100 steps of list file.

1*200 Steps means to set a one 200steps of list lie..

8*25 Steps means to set an eight 25 steps of list file.

4*50 Steps means to set a four 50 steps of list file.

5) Press ▼ to select the item *Edit List File,* press the key $\boxed{\text{Enter}}$ to confirm.

6) When VFD display screen show the item *Edit List File 1*，press the key ▲ and ▼ to select sequential

number you want to edit, press the key **Enter** to confirm.

7) When VFD display screen show the item List x Steps=　xxx，press numberic keys to set the total list steps(x). Press the key **Enter** to confirm.

8) When VFD display screen show the item *List File x Loop Mod*e, press the key ▲ and ▼ to select operation mode:

　　　Loop Mode means to looping execute list file

　　　Continuous means to execute all steps in the list file once a triggle

　　　Step Mode means one triggle one step

9) When VFD display screen show the item *Step 1 Time= xxxxx mS*, press numberic keys to set time for step 1, press the key **Enter** to confirm.

10) When VFD display screen show the item *Step 1 Volt= xxxxx V*, press numberic keys to set voltage, press the key **Enter** to confirm.

11) When VFD display screen show the item *Step 1 Curr= xxxxx A*, press numberic keys to set current, press the key **Enter** to confirm.

12) Repeat step 9, 10, 11 to complete all steps in list file

13) Repeat step 5 to 15 to edit other list files if needed

14) Press ▼ to select *Load List File*, press the key **Enter** to confirm.

15) Electronic load is in the LIST MODE. VFD display screen shows OFF in the right when output is on. VFD display screen shows List1 in the right when output is off. Press key *On/Off* to execute. Press key *Shift+2* or *Esc* to exit. Press key *Shift+2 direct to excute the last list file.*

16) Under loop mode, electronic load looping executes automatically. Please find the following table at Continuous Mode and Step Mode.
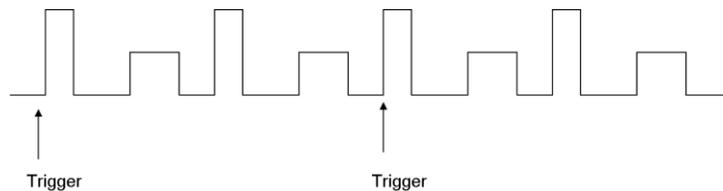
Picture 4.2 Repeat Trigger with 2 Times Cyclical Pattern

When the list operation is under the single step mode, the power supplier will not be changed to next step until receiving a trigger signal. Please refer to the following picture

Trigger01   Trigger03

Trigger02   Trigger04
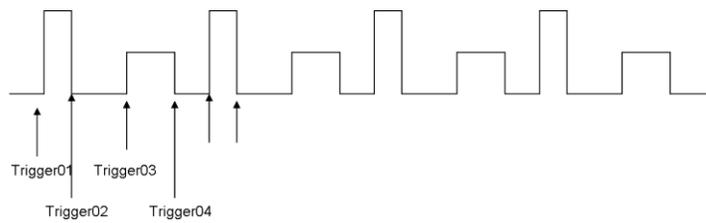
Picture 4.3 Single-Step Trigger

Automatic Test (>Atest Set)

You can check if the equipment is qualified by editing the automatic test files, such as the value set, comparison parameters, delay time, inputting the step No.(50 steps at most). 4 data of automatic test files can be edited.

How to edit automatic test files

17) When the VFD display shows the item *Menu Config* , press the key ▼to select the item *Atest Set* , followed by pressing the key **Enter** to confirm.

18) When the VFD display shows the item *Load Atest File* , press the key▼ twice and choose the item *Edit List File*, followed by pressing the key **Enter** to confirm.

19) When the VFD display shows the item *Edit Atest File 1* , press the keys ▲ and ▼ and select the sequential number that need to be edited, followed by pressing the key **Enter** to confirm.

20) When the VFD display shows *Atestx Steps=   xxx* , press the numeric keys to set the steps of list files, followed by pressing the key **Enter** to confirm.

21) When the VFD display shows *Step 1   Test Curr*, press the keys ▲ and ▼ to select one of the following testing types:

    a)   Curr means to test the current.

    b)   Volt means to test the output voltage.

    c)   DVM   means to test voltmeter input.

22) When the VFD display shows *Step 1 Time= xxxxx S* , press the numeric keys to set the test delay time, followed by pressing the key **Enter** to confirm. Please note that the delay time range is 0.2S-25.5S. If delay time is set as 25.5S, the power supplier will be automatically in the pause mode and go on testing only when another trigger is input.

23) When the VFD display shows *Step 1 Volt= xxxxx V* , press the numeric keys to set the voltage,

followed by pressing the key <kbd>Enter</kbd> to confirm.

24) When the VFD display shows **Step 1 Curr= xxxxx A** , press the numeric keys to set the current,

followed by pressing the key <kbd>Enter</kbd> to confirm.

25) When the VFD display shows **Step 1 Max= xxxxx X** , press the numeric keys to set the maximum

value for the qualified test, followed by pressing the key <kbd>Enter</kbd> to confirm.

26) When the VFD display shows **Step 1 Min= xxxxx X** , press the numeric keys to set the minimum

value for the qualified test, followed by pressing the key <kbd>Enter</kbd> to confirm.

27) Repeat from step 21 to step 26 to set all the other steps.

28) Repeat from step 18 to step 27 to edit other automatic test files according to your need.

29) Press the key▼ to select the item **Load Atest File**, followed by pressing the key <kbd>Enter</kbd> to confirm.

30) Then the electronic load enter into the automatic test mode, showing **AUTO1** at the right upper corner of the VFD display and **OFF** at the right lower corner of the VFD display. That means to wait for a trigger.

31) There are three trigger modes for automatic test

    d) Press the key **On/Off** to trigger.

    e) Press the key **Shift+3** to trigger.

    f) Become the high voltage level to the low voltage level by **Trig_in** at the rear panel and last more than 5mS.

32) When the power supplier is having the automatic test, the word **Wait** will be showed at the right lower corner of the VFD display. When in pause mode, the word **Stay** will be showed at the right lower corner of the VFD display. When one test is finished, the test result Pass or Fail will be showed at the right lower corner of the VFD display.

33) When one test is finished, users can press the up-down keys to make one single step worked manually. At the moment, **step n** will be showed on the VFD display, indicating the step which is working; then **Han** is showed, indicating that the load is in hand-operated single step test state, followed by the test results being showed at the right lower corner of the VFD display.

4.7 Output On-Off Operation

When in front-panel operation, you can press the key <kbd>On/Off</kbd> to control the output on-off state. When in remote control, you can send SCPI order（Output: ON | OFF）to control the output sate. The current setting values will not be changed because of the output on-off operation.

4.8 Remote Measurement Function

When the load consumes high current, the power supplier will produce voltage drop in the connecting wire between power supplier and load terminals. In order to guarantee the measurement

accuracy, remote measurement terminals is installed at the rear-panel of the power supplier. Users can measure the output terminals voltage of the instrument under test by these terminals.

Before performing the remote measurement function, you need to set the power supplier as the remote measurement mode.

Please refer to the picture 4.4 for the trigger terminals and measurement terminals.

-S   +S   TRQ   TRI   GND
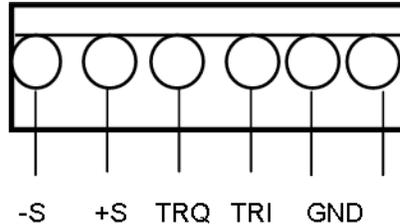
Piccture4.4 Remote Measurement Terminals

-S and +S are remote measurement terminals; TRQ and TRI are trigger terminals，the last two terminals are ground terminals.

The output of power supplier will be turned off when testing out the change in voltage level from high to low from TRQ port which is under the latched mode of the remote control function. As a multifunction extended port, TRI port is designed for future expanded.
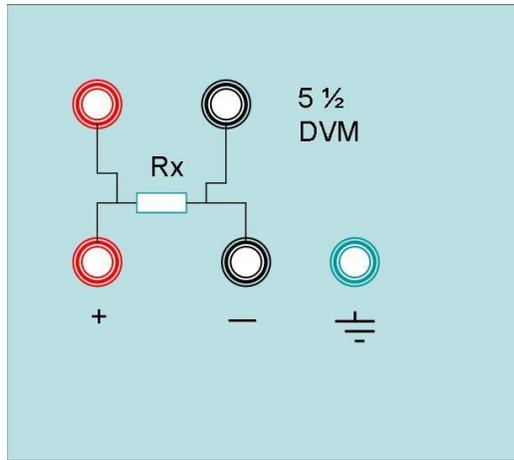
4.9 Milliohmmeter Function

Source Meter provides the four-line electrical resistance measurement，just as showed in following picture 4.5, which can measure accurately the low resistance and the maximum measurement resistance is 10Ω。In order to avoid the damage of the resistance under test, please make sure the resistance under test is within the measurement rang.

Three measurement ranges can be optional: 0.1W、1W、10W。

Operation Method

1) Press the keys $\boxed{\text{Shift}}$ and *V/m*Ω （VFD display screen shows----, --mΩ ，Range:0.1W）to measure the resistance.
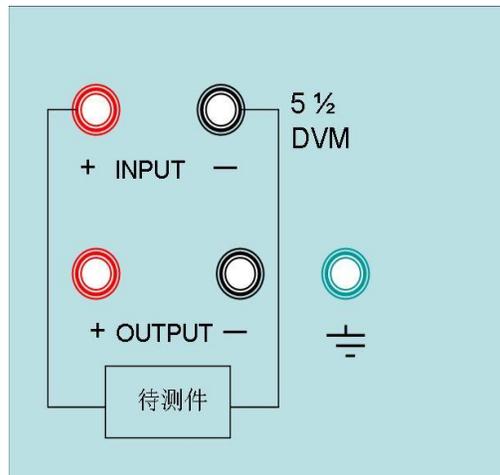
2) Press the keys $\boxed{\text{Shift}}$ and *0.1W* or *1W* or *10W* to set different measurement range of Milliohmmeter.

Picture 4.5 Milliohmmeter Measuring Electrical Resistance

4.10 Voltmeter Function

The voltage of the instrument under test can be measured if the wires are connected together just as the picture 4.6.

Picture 4.6 Measuring the Voltage of the Instrument under Test

Chapter 5 Remote Operation Mode

The DB9 interface connector on the rear panel of the power supplier can be transferred to RS232 interface through the voltage level shift cable（M-131）, the following information will tell you how to use the computer to control the output of the power supplier. Before carrying out the remote operation mode, please use the voltage level shift cable（M-131）provided by our company, for M-131 can not only transform TTL voltage level into RS232 signal, but also connect the DB9 interface connector with computer's serial interface.

5.1 M-131Communication Cable

The DB9 interface connector on the rear panel of power supplier is TTL voltage level; you can use the communication cable (M-131) to connect the DB9 interface connector of the power supplier and the RS-232 interface connector of computer for the communication. Please refer to the following picture for M-131.

Picture 5.1 M-131

Note：It will not work if you connect the DB9 interface connector of the power supplier to the RS232 interface connector of computer directly by a standard RS232 cable. Please use IT-E131 to connect them.

5.2 Communication between Power Supplier and PC

The DB9 interface connector on the rear panel of the power supplier can be transferred to RS232 interface through the voltage level shift cable（M-131）. The following instructions can help you understand how to control the output of power supplier by PC.

1. Communication Setting

Before using the remote operation mode, please make sure that the baudrate and communication address in power supplier are the same as that in the computer software; otherwise, the communication will fail. You can change the baud rate and communication address from the front panel or from computer.
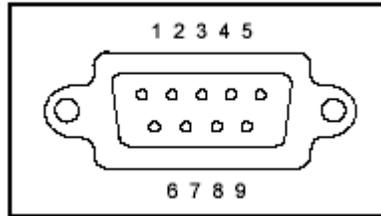
(1) Baud rate: 9600(4800, 9600, 19200, 38400, which are selectable from the menu on the front-panel.)

(2) Data bit: 8

(3) Stop bit: 1

(4) Parity: (none, even, odd)

2. DB9 Serial Interface

DB9 Serial Interface

The output of DB9 interface on the rear-panel of the power supplier is TTL voltage level, so the voltage level shift cable（M-131） must be applied before connecting the DB9 interface with the serial interface on PC.

Power Supplier	M-131 Voltage Level Shift Cable		PC
VCC	1	1	VCC
RXD	2	2	RXD
TXD	3	3	TXD
NC	4	4	DTR
GND	5	5	GND
NC	6	6	NC
NC	7	7	RTS
NC	8	8	NC
NC	9	9	NC

Note：It will not work if you connect the DB9 interface connector of the power supplier to the RS232 interface connector of computer directly by a standard RS232 cable. Please use IT-E131 to connect them.

Chapter 6 SCPI Communication Protocal

6.1 Communication command introduction

M88 series programmable DC power supply supports SCPI communication protocol. SCPI communication protocol is a standard commands for programmable instruments, which defines a standard set of communication commands.Command for M88 series power supply can be divided into two categories: basic commands (IEEE-488.2 Common Command Set) and command specified by M8800 software. SCPI is case-insensitive, namely commands are not case sensitive and each command has an EOI end: Instruction end <LF> (that ASCII code character ' n', that is, line breaks decimal ASCII code 10, hex 0x0A).

Note: All of the following commands to send back all require add <LF>. The following statement appears in [:] represents a semi-colon (:), the character can be written in commands, or you can not write.

6.2 Commomly used relevant command description

6.2.1 Basic command (IEEE-488.2 Common Command Set)

Basic command inclues all IEEE-488.2 includes all general functions in IEEE-488.2. These functions are usually applied to support the IEEE488.2 standard measuring instruments. The group command begin at an asterisk (*)and has no hierarchy.

Command * IDN?
Command * IDN is used to read the relative information of power supply, including manufacture, product model number, serial number, and version number.
Return command: return parameter contains four fields separated by comma(,).

Example:
If you sending command * IDN?, the corresponding expressed as a hexadecimal is 0x2A 0x49 0x44 0x4E 0x3F 0x0A. The return command is MAYNUO，M8812，881201096006118000, V1.0. It means:

  MAYNUO   manufacture
  M8812   product model number
  881201096006118000   product serial number
   V1.0   software version number

6.2.2 Command specified by M8800 software

This command is ordered arrangements of tree constructs. Each command contains a number of strings (mnemonic) . Layers separated by a colon (:). At the top of the command in the command tree known as the "root shell" or simply "root." Access to the next command, you must specify a path. Ordered tree is structured as follows:
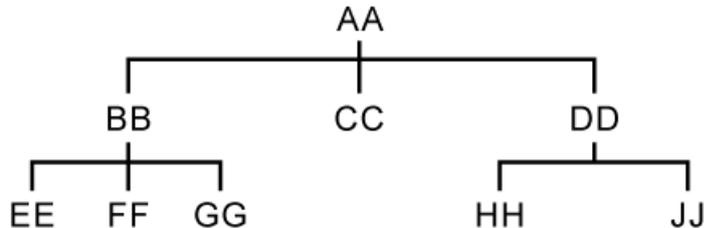
In the above table: AA represents the root path; BB, CC, DD represents the root path of the direct sub-path. EE, FF, GG said that the path is a sub-sub-path under the BB. HH, JJ said that the path is a sub-sub-path under DD.

Command description:

1) **[:] AA: CC**   means the current root path for the AA, visit the AA under the CC.

2) **[:] AA: BB: FF**   means the current root path for the AA, visit the AA path to the root path of the sub-BB under the FF.

3) **[:] AA: DD: HH**   means the current root path for the AA, visit the AA path to the root path of the sub-DD under the HH.

Command specified by M8800 software also can send more than one order in a message and use a semicolon (;) between each order.

Example:
[:]AA:BB:EE;FF;GG means access to BB under the EE, FF, GG.
[:]AA:BB:FF;:AA:DD:HH means access to BB under the FF and DD under the HH.
SCPI language mnemonic or keywords has a long format and short format. Short format is actually short for long format. It uses the following rules:
Short format mnemonic is the first four characters of long format mnemonic. If the length of the long-form mnemonic characters less than or equal to 4, then the length of the mnemonic the same.
If the length is greater than the length of 4 mnemonic, and the fourth character is a vowel, short mnemonic will discard the fourth vowel characters and become the third characters.

Example:
short-type mnemonic of ERRor is ERR, rather than the ERRO

Some command needs parameters. Setting command, for example. There is a space (ASCII code is 32) between the command and the first parameter.

Example:

setup voltage value command *[:] VOLT 12.000*

There is a space (ASCII code is 32) between 12.00 and VOLT

System command

Commands described in this section are under the root path [:] SYSTem commands. The following commands are used short-type mnemonic format.

Command [:]SYSTem：ERRor?

Command *[:]SYSTem*：ERRor is used to read the error code and error message.

Return command: Error Code, error message.

Example:

If you send command *[:] SYST: ERR?* , the return command ought to be"0, 'No Error'", or "50, 'Error Para Count'", or "70, 'Invalid Command'" etc..

Command [:] SYSTem: REM

Command *[:] SYSTem: REM* is used to set remote control mode, namely the PC control mode.

Return command: None

After sending command successfully, the power supply has been in the remote control mode when "REM"appears in the right corner front panel.Otherwise the previous operation is not valid. And please return the front panel control model by pressing Shift + the number 7 key, or sending the command *[:] SYST: LOC*.

Command [:] SYSTem: LOC

Command *[:] SYSTem: LOC* is used to set the front panel control mode..

Return command: None

Example:

Sending command *[:] SYST: LOC* in the remote control (PC) mode,

After sending successfully, the power has been in the front panel control mode when "REM"disappears from the right corner of front panel.

Command [:] SYSTem: SENSe <bool>

Command *[:] SYSTem: SENSe <bool>* is used to check the power is under remote mode.

Return command: None

Parameters: bool-type parameters, (0-OFF, 1-ON)

Example:

Sending command *[:] SYST: SENS* 1, If sending successfully, the power supply is in the remote mode.

6.2.3 Measurement Command

Commands described in this section are under the root path *[:] MEASure* commands. The following commands are used short-type mnemonic format.

Command [:] MEASure: VOLTage?

Command *[:] MEASure: VOLTage ?* is used to read output voltage value.

Return command: Numeric

Return parameters Unit: V

Example:

Sending command *[:] MEAS: VOLT?*, if return command is 12.560, it means the current output voltage is 12.560V.

Command [:] MEASure: CURRent？

Command *[:] MEASure: CURRent ?* is used to read output current value.

Return command: Numeric

Return parameters Unit: A

Example:

Sending command *[:] MEAS: CURR?*, if return command is 1.245, it means the present output current is 1.245A.

Command [:] MEASure: DVM？

Command *[:] MEASure: DVM？* is used to read input voltage of the voltmeter in the power supply

Return command: Numerical

Return parameters Unit: V

Example:

If sending command *[:]MEAS:DVM?*, if return command is12.560, it means the current voltmeter input voltage is 12.560V.

6.2.4 Setting Command

Command [:] OUTPut <bool>

1.Command *[:] OUTPut <bool>* is used to set the output ON/OFF status.

Return command: None

Parameters: bool-type parameters, (0-OFF, 1-ON)

Example:

If sending command *[:] OUTP 1*, the power supply output is ON if you set successfully.

2.Related command: to query output status of power supply.

Return command parameter: <bool>.

Command [:] MODE <mode>

1. Command *[:] MODE <mode>* is used to select the power operating mode. That is command set mode or sequential list mode, or milliohmmeter mode.

Parameter: mode has three following modes,

   FIXed command set mode

   LIST   sequential list mode

   DRM   milliohmmeter mode

Return command: None

Example:

Sending command *[:] MODE LIST*, the power supply is in sequential list mode.

2. Related command: to query working mode of power supply. *[:] MODE?*

Return command parameter: <mode>

Command [:]VOLTage <Value>

1.This command is used to set the setup voltage value of power supply.

Parameters：numeric |MAX|MIN

Unit: V

Return Command：None

Example：

1) Sending command *[:]VOLT 30<LF>*

means the current setup voltage value of the power supply is 30V.

2) Sending command *[:]VOLT MAX*

Providing the maximum output voltage is 76.000V, it means the current maximum voltage value is the maximum setup voltage, 76.000V.

Providing the return comman is 76.0000, it means the maximum setup voltage is 76.0000V.

3) Sending command *[:]VOLT MIN*

Providing the minimum output current is 0.000V, it means the current minimum voltage value is the minimum setup voltage, 0.000V.

 2.Related Command：the command is used to query the setup voltage value , the maximu setup

voltage value and the minimum setup voltage value.   ***[:]VOLT? MAX|MIN***

Return command parameters: numeric

Example：

1) If you want to query the setup voltage value, please send command ***[:]VOLT?***,

If the return command is：10.0000，it means the setup voltage of power supply is 10.0000V.

2) If you want to query the maximum setup voltage value, please send command ***[:]VOLT? MAX***,

If the return command is76.0000，it means the maximum setup voltage value of power supply is

76.0000V.

3) If you want to query the minimum setup voltage value, please send command ***[:]VOLT? MIN***,

If the return command is :0.0000 ,it means the minimum setup voltage value of the power supply

is 0.0000V.

Command   [:]CURRent <Value>

1. This command is used to set the setup current value.

Parameters：numeric |MAX|MIN

Unit: A

Return command：none

Example：

1) Sending command ***[:]CURR*** 3, it means to set the current setup current value as 3A.

2) Sending command ***[:]CURR MAX***

Providing the maximum setup current value of the power supply is 2.0000A，it means to set the

current setup current value as the maximum current value 2.0000A.

3) Command sent ***[:]CURR MIN***

Providing the current minimum setup current is 0.0000A, it means to set the current setup current

as the minimum current 0.0000 A.

2.Related Command：the command used to query the setup current value, the maximum setup

current value and the minimum setup current value   ***[:]CURR? MAX|MIN***

Return command parameters: numerical value

Example：

1) If you want to query the setup current value, please send command ***[:]CURR?***,

If the return command is1.0000，it means the setup current of power supply is 10.0000A.

2) If you want to query the maximum setup current value, please send command **[:]CURR? MAX**, If the return command is 2.0000，it means the maximum setup current value of power supply is 2.0000A

3) If you want to query the minimum setup current value, please send command **[:]CURR? MIN**, If the return command is：0.0000，it means the minimum setup current value of the power supply is 0.0000A.

Command　[:]VOLTage:PROTection <Value>

1. This command is used to set the upper limit voltage of the power supply, namely the maximum output voltage.

Parameters： numeric |MAX|MIN

Unit: V

Return command：none

Example：

1) If sending command *[:]VOLT:PROT 30*, it means to set 30.000V as the upper limit voltage of the power supply.

2) If sending command **[:]VOLT:PROT MAX**, it means to set the maximum output voltage value as the upper limit voltage of the power supply.

3) If sending command *[:]VOLT:PROT MIN*, it means to set the minimum output voltage value as the upper limit voltage of the power supply.

2. Related command：to query the upper limit voltage

[:]VOLTage:PROTection? [MAX]

Return command parameters: numerical value

Example：

1）If sending command *[:]VOLT:PROT?*, If the return command is 20.000， it means the upper limit voltage of the power supply is 20.000V.

2）If sending command *[:]VOLT:PROT? MAX*, If the return command is 76.000，it means the maximum setup voltage value of the power supply is 76.000V.

6.2.5 List Operation（LIST）Related Command

Command [:]LIST:AREA <num>

1. This command is used to set the list location division mode.

Parameter：1|2|4|8

        1. Set 1 file of 200 list steps in the list operation；

        2. Set 2 files of 100 list steps in the list operation；

        4. Set 4 files of 50 list steps in the list operation；

        8. Set 8 files of 25 list steps in the list operation；

Example：

If sending command sent *[:]LIST:AREA*　8, it means to set 8 files of 25 list steps .

2. Related command：query the location division mode of the list operation.　　*[:]LIST:AREA?*

Return parameters：<num>

Command [:]LIST:RCL <num>

This command is used to recall the saved files from a certain location so as to make them executed in the list.

Parameter：1～8

Return command：none

Example:

If sendin command *[:]LIST:RC l, 2,* it means to recall the list file from the storage register location 2 and make the file executed.

Command　[:]LIST:COUNt <count>

1.This command is used to set the step number of list operation file.

Parameter：　count range : 1～200

Return command：none

Example：

If sending command *[:]LIST:COUN* 20, it means the step number of the list operation file is set as 20.

2.Related command：to query the step number of the current list files

[:]LIST：COUNt?

Return parameter：<count>

Command   [:]LIST:MODE <mode>

1. This command is used to set the working mode of the list operation files.

Parameters: ***mode has 3 types:***

CONTinuous: continuous mode

STEP: 1 step mode (once mode)

LOOP: loop mode

Return command: none

Example：

if sending command ***[:]LIST:MODE*** CONT, it means the working mode of list files is set as continuous mode.

2. Related command：to query the working mode of the current list files

<div align="center">

[:]LIST:MODE?

</div>

Return parameters: <mode>

Command   [:]LIST:VOLTage <count>,<value>

1. This command is used to set the setup voltage value of the appointed step in the list operation file.

Parameter：count is appointed step number; value is the setup voltage.

Unit: V

Return command: none

Example：

If sending command ***[:]LIST:VOLT*** *1,5*, it means to set the setup voltage value of the first step of the list file as 5.000V.

2. Related command：to query the setup voltage value of the appointed step in the list file.

<div align="center">

[:]LIST:VOLTage? <count>

</div>

Return parameters：<value>

Example：

If sending command ***[:]LIST:VOLT? 1***, it means to query the setup voltage value of the first step in the current list file.

Command   [:]LIST:CURRent <count>,<value>

1.This command is used to setup currentvalue of the appointed step in the list operation file.

Parameters：count is appointed step number; value is the setup current.

Unit：A

Return command：none

Example：

If sending command **[:]LIST:CURR** 1,2, it means to set the setup current value of the first step in the list file as 2.000A.

2. Related command：to query the setup current value of the appointed step in the list file

[:]LIST:CURRent? <count>

Return parameter：<value>

Example：

If sending command **[:]LIST:CURR?** 1, it means to query the setup current value of the first step in the current list file.

Command   [:]LIST:WIDTh <count>,<time>

1. This command is used to set the delay time of the appointed step in the operation files.

Parameters：count is the appointed step number; time is the setup delay time.

Unit：mS

Return command：none

Example：

If sending command **[:]LIST:WIDT** 1,2000 ,it means to set the delay time of the first step of the list file as 2000mS.

2. Related command：to query the delay time of the appointed step in the current list files.

[:]LIST:WIDTh? <count>

Return parameters：<time>

Command [:]TRIGger

When the trigger source is set as communication command trigger mode(Comm.), this command will give out a trigger signal. **Command [:]TRIGge**r has the same funtion like *TRIG**.**

This function can also be realized by pressing the keys **Shift+3** located in the front panel.

Return command：None

Example：

Command sent *[:]TRIG*

Command [:]TRIGger:SOURce <mode>

This command is used to set the trigger mode of the power supplier.

Parameter：mode has 3 types:

    IMMediate: keyboard trigger mode.

    EXTernal: external signal(TTL voltage level) mode

    BUS: communication command trigger mode.

Return command：none

Example：

If sending command *[:]TRIG:SOUR IMM*, it means the triger mode of power supply is set as keyboard trigger mode.

Quick Reference

Safety

Please donot install any spare or repair the instrument without permission. In order to make sure the normal work of the instrument, please have it mended in the maintenance department designated by our company.

Pease review the following safety precautions before operating our equipment.

Safety Symbols

Please keep in mind the following items which may result in injuries on your body.

Connect it to safety earth ground using the wire recommended in the user manual.

High voltage danger (Non-professionals are forbidden to open the instrument）

The symbol on an instrument indicates that the user should refer to the operating Instructions located in the manual.

Certification and Warranty

M881X Series power suppliers meet its published specifications at time of shipment from the factory.

Warranty

This instrument product is warranted against defects in material and workmanship for a period of one year from date of delivery.

Maintenance Service

This product must be returned to maintenance department designated by our company for repairing. Customer shall prepay shipping charges (and shall pay all duty and taxes) for products returned to the supplier for warranty service. Except for products returned to customer from another country, supplier shall pay for return of products to customer.

Limitation of Warranty

The foregoing warranty shall not apply to
1. Defects resulting from improper or inadequate maintenance by the Customer,
2. Customer-supplied software or interfacing,

3. Unauthorized modification or misuse,

4. Operation outside of the environmental specifications for the product, or improper site preparation and maintenance.

5. Defects resulting from the circuit installed by clients themselves

Attention

No inform will be given for any changes in the content of the user's guide.