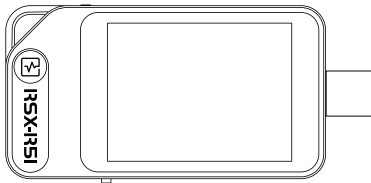


Ransanx R51-USB Tester User Manual



CE FC



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1.Product Overview

1.1 Product Introduction

Ransanx-R51 is a high-precision USB tester, designed for electronic device R&D, production testing, and daily testing for individual users.

Adopting advanced circuit design and data acquisition technology, it can real-time monitor USB voltage, current, power, capacity and other core parameters. Equipped with a 2.4-inch HD display, it presents test data intuitively and delivers accurate and reliable test results.

Application Scenarios:

- Mobile phone charging power test
- Multi-protocol fast charging detection for chargers
- PD protocol device compatibility test
- Mobile power input&output test
- USB interface voltage and current curve recording

⚠ This manual contains safety instructions and warning notices. Please read carefully and follow all warnings and precautions.

1.2 Safety Precautions

- Do not connect any device with voltage over 28V to the monitoring ports.
- Only one set of input and output monitoring ports can work at the same time. Do not connect extra device to other monitoring ports when one group is already in use.
- When the fast charging trigger function is enabled, do not connect devices that cannot withstand high voltage.
- Do not charge incompatible phones after triggering fast charging protocols. The manufacturer shall not be liable for any equipment damage caused by improper operation.

2. Performance Description

2.1 Voltage & Current Category

- Support 6-digit display for voltage, current, and power
- Maximum resolution up to 0.00001 V/A/W.
- 10 groups of switchable records for capacity, power, and timing statistics.
- 1 channel offline voltage & current curve recording, up to 5 hours.
- Support low-speed waveform drawing of voltage, current, D+ and D-.

2.2 Fast Charging Trigger

Support the following protocol detection and triggering:

- QC 2.0 / QC 3.0
- Huawei FCP / SCP
- Samsung AFC
- PD 2.0 / PD3.0 / PPS

2.3 Practical Small Functions

- Running time record
- Onboard temperature measurement
- G-sensor automatic display rotation
- PD protocol monitoring
- USB Cable resistance detection
- USB Disk mode

3.Appearance Structure Description



No	Name	Function Description
①	USB-A Input	Input monitoring port Support USB Serial port and USB Disk mode
②	Type-C Input	24Pin female port, input monitoring port
③	Micro-USB Input	5 Pin female port , input monitoring port
④	Type-C Output	24Pin female port, output monitoring port
⑤	PD Switch Key	PD Switch Key(Green-on , and Red -off) Green = PD detection enabled , QC disabled Red = QC detection enabled, PD disabled
⑥	USB-A Output	5Pin female port , output Monitoring port
⑦	Multi-function Switch Key	Left / OK / Right , support short press and long press
⑧	Back Key	Return to previous menu, or previous page

4. Technical Indicators

Indicator	Range	Resolution
Monitoring Voltage	4.0~28V	0.00001V
Monitoring Current	0~7A	0.00001A
Monitoring Power	0~100W	0.00001W
Load Equivalent Internal Resistance	0~9999.9Ω	0.0001Ω
D+ / D- Voltage	0~3.3V	0.001V
Device Temperature	°C / °F	0.1°C / 1°F
Capacity	0~9999.99Ah	0.00001Ah
Power Consumption	0~9999.99Wh	0.00001Wh
Cable Internal Resistance	0~9999.9Ω	0.0001Ω
Device Running Time	23:59:59	1 second
Record Timing	23:59:59	1 second

5.Homepage Function

5.1 Concise Page

- Display three core parameters: Voltage, Current, Power.
- Press the middle key to switch between running and pausing.
- Real-time onboard temperature display.



5.2 Monitoring Page

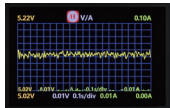
Press the middle button to bring up the menu page

- Switch up / down for page selection.
- Start / stop offline recording.
- Clear offline record data.
- Enable timing countdown.



5.3 Waveform Page

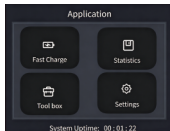
- Long press Left Key: Decrease time base
- Long press Right Key: Increase time base
- Short press OK Key: Pause / resume waveform drawing
- Long press OK Key: Switch waveform mode (V/A, VBUS, D+/D-)
- Short press Left / Right Key: Return to homepage



5.4 Application Page

Includes four modules:

- Fast Charging
- Energy Statistics
- Toolbox
- Settings



6. Fast Charging Application

On the application page, press the middle key to enter Fast Charging. A warning popup will appear; read the prompt carefully and press the middle key to confirm entry.

Use Left / Right Key to select options:

Detect / PD / QC2.0 / QC3.0 / FCP / SCP / AFC



6.1 Auto Detect

Select Auto Detect and press the middle key to start automatic protocol identification. The tester will detect and display all supported fast charging protocols of the charger.



6.2 PD Trigger

Enter to manually trigger PD 2.0 / PD 3.0 / PPS voltage and current output.



6.3 QC2.0 Trigger

Supports manual triggering of QC 2.0 fixed voltage gears.



6.4 QC3.0 Trigger

Supports QC 3.0 continuous voltage adjustment.



6.5 FCP Trigger

Supports Huawei FCP protocol triggering.



6.6 SCP Trigger

Supports Huawei SCP super fast charging protocol triggering.



6.7 AFC Trigger

Supports Samsung AFC fast charging protocol triggering.



7. Energy Statistics

Enter via Application Page → Energy Statistics.

- Energy Statistics list
- Battery Capacity Calculation
- Offline Recording Curve View

7.1 Energy Statistics

- Displays Group number, capacity, energy and statistical time.
- Use Left / Right Key to switch group.
- Press middle key to record or clear selected data.



7.2 Battery Capacity Calculation

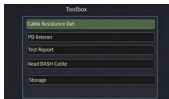
- Select Statistical group 1~10.
- Set nominal battery voltage and conversion efficiency.
- The system automatically calculates actual battery capacity and energy consumption.



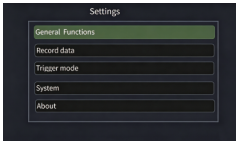
8.Toolbox

Enter via Application Page → Toolbox:

- Cable Resistance Detection
- PD Listener
- Test Report
- Read Dash Cable
- USB Disk Mode



9.Settings



9.1 General

Use Left / Right Key to select and press the middle key to menu options.



- Display Brightness: 1-100 levels adjustable.
- Standby Brightness: 0~100 levels; set to 0 to turn off screen on standby.
- Standby Time: Auto standby after idle time.
- Refresh Rate: Slow / Medium / Fast.
- Temperature Unit: °C/°F switch.
- System Language: Default English.
- G-Sensor: Auto screen rotation on / off .
- Touch Tone: Button sound on / off .

9.2 Record Data



- Curve recording time: maximum up to 5 hours .
- Statistical current threshold: 0~5A.
- Energy statistical timing auto-stop setting.
- Clear all records.

9.3 Trigger

- Protocol trigger time setting.
- Monitor and block PD CRC message (Default: Disabled)

9.4 System

- Restore factory settings.

9.5 About

- View firmware version and device information.

QA list

1.How to set the PD switch of R51 USB Tester?

The PD communication switch must match the fast charge protocol under test.

- Turn the PD switch ON when testing PD fast charge protocols.
- Turn the PD switch OFF when testing QC 2.0 , QC 3.0, FCP, SCP, and AFC protocols.

2.Why does the tester restart automatically during protocol detection?

- Some chargers will restart when switching fast charge protocols. Since the tester is powered by the charger, it will restart synchronously.

3.What should I do if the tester screen is black after connection?

- Check whether the charger and USB cable are properly connected and powered on.
- Re-plug the Type-C input port of the tester.

4.Is it normal to show normal voltage value but 0 current ?

- It is normal to display 0A / 0W under no-load condition.
- If the current remains 0A with a load connected, please check whether the input and output ports are reversed; reversed connection will trigger over-current protection and cut off output.

5.Why the computer can not recognize the tester in USB Disk Mode ?

- Only the USB-A Input port support USB serial and USB Disk functions. Enable USB Disk Mode first, then connect the USB-A Input port to PC.

6.How to export test data?

- Enable USB Disk Mode in the Menu system.
- Connect the USB-A Input port to your PC.
- Copy test files from the tester root folder to your computer .

7.How to upgrade firmware?

- Download the firmware file to your PC.
- Connect the USB-A Input port to your PC,and enable USB Disk Mode.
- Copy the firmware file to the root directory of tester.
- Enable Update Firmware in the Menu; the device will upgrade automatically.

8. How to adjust waveform time base?

Adjust the time base via Multi-function Key :

- Long press Left Key: Decrease time base
- Long press Right Key: Increase time base
- Short press OK Key: Pause / resume waveform
- LLong press OK Key: Switch modes (V/A, VBUS, D+ / D-)
- Short press Left / Right Key: Return to homepage