FNIRSi 菲尼瑞斯

FNB48P

USB FAST CHARGE TESTER

48P

9.34321 V

3.03492 A

28.3558 W

CATALOG

1.VERSIONS AND UPDATES

This product has many functions with frequent software and hardware updates, so, please be aware that the manual may be updated at any time. Please get the latest information on the official website.

2.OVERVIEW

The FNB48USB tester is a high-reliability, high-safety USB voltage and current detection meter and a mobile communication terminal fast charging trigger. It has a 1.77-inch TFTLCD display and integrated USB-A, Micro-USB, Type-C interfaces. Uses a dedicated 16-bit ADC, PD protocol physical chip. It can be used to measure the power supply or power consumption of products such as USB interfaces, mobile phone chargers, U disks, etc.; it can be used to measure mobile phone charging power and mobile power input and output conditions; it can be used for charger fast charging protocol testing.

This instruction manual includes relevant safety information, warning tips and solutions to common abnormal situations. Please read the relevant content carefully and strictly abide by all warnings and precautions.

3.SAFETY PRECAUTIONS

● Do not connect the monitoring interface to a power supply exceeding 24V.
● Do not connect the PC connection port to a power source exceeding 16V.
● Only one pair of monitoring interfaces (one input port, one output port) can work at the same time. When there is a pair of monitoring interfaces working, it is forbidden to connect to the equipment on other monitoring interfaces. (Except the PC connection port, the PC port can be connected to an external power supply.)
● When using the fast charge trigger module, please do not connect equipment that cannot withstand high voltage to any monitoring interface.
● After using the PD trigger/monitor/conversion/read E-Marker cable function, please turn the PD communication switch in the lower right corner back to the OFF position.
● When working at high power,the temperature of the instrument rises.Please be careful to prevent burns.

●Do not charge the phone after the fast charge is triggered.The manufacturer is not
responsible if the phone is damaged by doing so.

4.PERFORMANCE DESCRIPTION

【4.0.1】 Human-computer interaction

1. 1.77 inch TFT-LCD screen   3.Touch switch
2. Multi-function switch

【4.0.2】 Voltage and Current

1. The highest six-digit display of voltage, current and power, the highest resolution is
   0.00001 (V/A/W).
2. Record the minimum, maximum and average values of voltage, current,and power
   during operation.
3. 10 sets of switchable capacity, power, and time statistics.
4. 1 set of voltage and current curve records, maximum support 9 hours.
5. Support low-speed waveform (voltage, current, D+, D-) drawing, 2sps->100sps
   sampling rate.
6. Support high-speed ripple (voltage, AC coupling) drawing, up to 3.2Msps sampling rate.

【4.0.3】 Fast charge trigger

1. QC2.0,QC3.0 trigger;
2. Huawei FCP,SCP trigger;
3. Samsung AFC trigger;
4. PD2.0/3.0 Trigger;
5. VOOC/WARP Trigger;
6. SuperVOOC Trigger;
7. The above protocols all support automatic monitoring;
8. MTK-PE automatic detection;
9. Support QC2.0->PD2.0 protocol conversion;
10. Support a maximum of 24 hours for a limited time trigger, and automatically close the trigger when the time comes.

【4.0.4】 Wire identification class

1. The internal resistance measurement of the wire by the differential pressure method;
2. E-Marker Cable chip reading;
3. DASH Cable data reading;

1. Record of startup time
2. Onboard temperature measurement
3. Gravity sensor, automatically switch the display direction
4. PD monitor
5. Analog DASH cable
6. Apple 2.4A acceleration

5.STRUCTURE APPEARANCE

1. Input monitoring port: USB-A, 5-PIN male;
2. Input monitoring port: TYPE-C, 24-PIN female socket;
3. Input monitoring port: Micro-USB, 5-PIN female socket;
4. Output monitoring port: TYPE-C, 24-PIN female socket;
5. PD communication switch;
6. Output monitoring port: USB-A, 5-PIN female;
7. Touch switch: BACK button;
8. Multi-function switches: left button, middle button, rightbutton;
9. PC connection port: Micro-USB, 5-PIN female socket.

6.TECHNICAL INDEX

Accuracy: ±(a%(‰) reading + number of words)

Index	Range	Resolution	Accuracy
Monitor voltage	4～24V	0.00001V	±(0.2%+2)
Monitor current	0～6.5A	0.00001A	±(0.5‰+2)
Monitor power	0～156W	0.00001W	±(0.5‰+2)
Load equivalent internal resistance	0～9999.9Ω	0.0001Ω	±(0.5‰+2)
D+/D- voltage	0～3.3V	0.001V	±(1.0‰+2)
Equipment temperature	°C	1°C	±(1.2%+3)
	°F	1°F	±(1.2%+4)
Capacity	0～9999.99Ah	0.00001Ah	
Energy used	0～9999.99Wh	0.00001Wh	
Cable resistance	0～9999.9Ω	0.0001Ω	
Equipmnt running time	99d23h59min59s	1s	
Record time	99d23h59min59s	1s	

7.MAIN PAGE

- Except for special instructions, the left and right buttons switch pages/menus, the middle button confirms, and the BACK button cancels/returns.
- On all pages, long press the BACK button to turn off the screen backlight.

【7.0.1】 Summary page
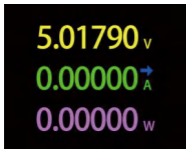
Description
- Only the three key parameters of voltage, current and power are displayed, →indicates the direction of current.
- This page can change the display direction.

Instructions
- Long press the left button: enter the setting menu.
- Click the middle button: switch to 6-bit resolution.
- Long press the middle button: When the setting menu -> general -> gravity direction is recognized as off, switch the screen direction.

【7.0.2】 Record page
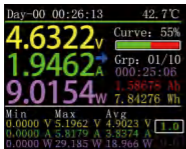
Description
- The top row of data from left to right are boot record time and onboard temperature respectively.
- The uppercase data on the left is voltage, current, and power from top to bottom.
- The curve and progress bar on the right are the remaining storage capacity of the voltage and current curves.
- The groups on the right are from top to bottom, statistics group, current group capacity, power, time value.

- Starting from the lower left corner, the Min, Max, and Avg data are the minimum, maximum and average values of voltage, current, and power respectively. Voltage, current, and power can be distinguished according to the unit.

- There are two text boxes in the lower right corner, the first 1.0 from top to bottom is the setting menu -> recording -> offline recording time, in hours, it is highlighted when recording, otherwise it is grayed out; the second is the setting menu -> record->energy statistics time, unit hour, when the value is 0.0, it means there is no time limit for statistics.

Instructions

- Long press the left button: switch to the capacity/power consumption list (please see the following instructions).
- Click the middle button: start/stop the voltage and current curve recording, it cannot be started when the recording time is 0.
- Long press the middle button: restart the calculation of the minimum, maximum and average values of voltage, current and power.
- Long press the right button: enter the battery capacity calculation tool (please see the subsequent instructions).

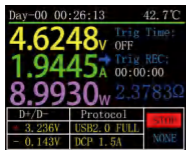## 【7.0.3】 Fast charge recognition page

Description

- The top row of data from left to right are boot record time and onboard temperature respectively;
- The uppercase data on the left is voltage, current, and power from top to bottom;
- The trigger time limit on the right is the setting menu -> trigger-> trigger time value.
- Trigger timing is the timing of trigger time, when the timing reaches the trigger time limit, the meter will stop triggering.

※Note: Please notice that after some protocols stop triggering, the charger will

- The dark blue below the trigger timing is the load resistance.
- The first column of the bottom white table is D+, D- voltage;the second column is the current charging agreement that may be in progress;the third column is the status bar. When the trigger timer starts, it will display `RUN`, and it will display `STOP` when it stops，when the instrument does not trigger any fast charging protocol is displayed as `NONE` , when a certain fast charging protocol has been triggered, such as QC2.0, it is displayed as `QC2.0` .

Instructions

● Long press the left button: prompt to enter the fast charge trigger module, if a certain protocol has been triggered, it will prompt to release.
● Click the middle button: start/stop the trigger timing.
● Long press the middle button: prompt to clear the trigger timing.
● Long press the right button: enter the charging tool menu (please see the subsequent instructions).

【7.0.4】 Curve display page
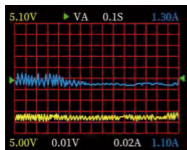
Low-speed voltage and current curve
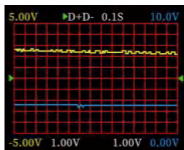
Low-speed D+Dcurve
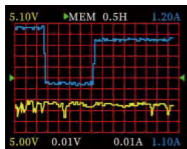
Record offline curve

High-speed voltage ripple (AC coupling)

Instructions

● Long press the left button: time base minus.
● Click the middle button: start/pause drawing the curve. (except in mode 3, it will prompt whether to clear the curve).
● Long press the middle button: switch modes.
● Long press the right button: time base plus.

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Cable Measurement	
Ref : 5.0121 V	0.9789 A
REAL: 4.9436 V	0.9789 A
Diff: 0.0685 V	

Cable Resistance:

0.0700Ω

Description

●FNB48 uses the differential pressure method to measure the internal resistance of the cable, which needs to be used with a constant current load.

Instructions

●Click the middle button: use the current voltage and current value as the reference value.

Measurement procedure

●Connection mode: charger + FNB48 + constant current load (the current is adjusted to about 0.5-1A), and record the reference value.

●Connection method: charger + cable + FNB48 + constant current load (the current is adjusted to about 0.5-1A, which needs to be similar to the current when the reference value is recorded),the system automatically calculates the internal resistance of the cable.

8.RECORD FUNCTION EXPANSION

【8.0.1】 Energy statistics list

Record list		
No	CAP/Ah	NRG/Wh
01	0.64543	3.24279
02	0.00000	0.00000
03	0.00000	0.00000
04	0.00000	0.00000
05	0.00000	0.00000
Time:000:39:06	Now Grp 01	

Description

●In the record page (7.0.2), long press the left button to enter.

●Each line in the list represents a group of parameters, from left to right are group number, capacity, energy, the selected group is displayed in green, and the lower left corner is the selected group Statistics time, the lower right corner is the group number of the current statistics group.

Instructions

●Click the middle button: switch to the selection group.

●Long press the middle button: select whether to clear the selected group.
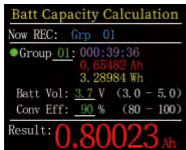
Description

● In the record page (7.0.2), press and hold the right button to enter.

● Select the statistics group,set battery voltage, energy conversion efficiency, the battery capacity can be calculated.Click the middle button to move the green dot on the left between Group, battVol and Conv Eff. Which item the green dot is in, you can change the value of which item by clicking the left/right button.Each item is explained below.

● Group is the statistical group selected for calculation. This instrument can be selected from 1-10 groups, statistical time, capacity,energy.It is displayed in order from top to bottom on the right of the selected group number.

● BattVol is the battery voltage, the default is 3.7V, this parameter can be selected from 3.0-5.0V, the actual value，please check the relevant information yourself.

● ConvEff is the energy conversion efficiency, the default is 90%.

● The red letter is the calculation result. If you want to get the result in mAh, please convert it to x1000 by yourself.

9.QUICK CHARGE PROTOCOL TRIGGER AND DETECTION MENU
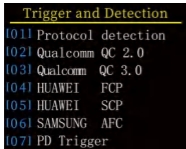
Description

● On the (7.0.3) fast charge recognition page, long press the left button and confirm to enter.

● This meter supports QC2.0/QC3.0, HuaWeiFCP/SCP, SamsungAFC trigger, VOOC/DASH constant pressure mode, PD2.0/3.0 trigger,and QC2.0->PD2.0 protocol conversion.

【9.0.1】 Fast charge protocol automatic detection
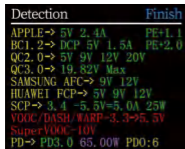
●In this mode,the meter tries to trigger various protocols in turn,display the test results on the screen,**Red is not supported**,**Green is support**.In the process of testing,such as measuring PD chargers.It is normal to restart and continue testing.During the test, it is forbidden to connect to any equipment at the back end.

●It does not respond to any key operation during the test. If you want to exit during the test, please unplug the meter directly.

●After the test is completed, click the middle button to start the test again; click the BACK button to return to the previous page.

【9.0.2】 QC2.0 Trigger
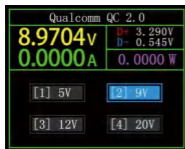
●In QC2.0 trigger mode, use the left and right keys to select the trigger voltage, and click BACK to return.

【9.0.3】QC3.0 Trigger

● In QC3.0 trigger mode,Use the left and right keys to decrease/increase the trigger voltage,click BACK to return.
● Press the left/right keys to quickly decrease/increase the voltage.

【9.0.4】Huawei FCP trigger

The operation method is the same as QC2.0 trigger.

【9.0.5】Huawei SCP trigger

The operation mode is the same as QC3.0 triggert

【9.0.6】Samsung AFC trigger

The operation method is the same as QC2.0 trigger.

【9.0.7】PD Protocol trigger

● Switch the PD communication switch to ON, enter the PD protocol trigger mode.After exiting the PD trigger, switch the PD communication switch to OFF.
● Take the picture as an example. The picture shows a message sent by a charger.There are 6 gears in total, of which gears 1, 2, 3, 4, and 5 are fixed voltage gears.The sixth gear is the adjustable voltage gear (PPS).
● When the left dot stays on Gear,the gear can be switched by the left and right keys. When the gear is switched to PPS gear,then you can switch the step voltage by clicking the middle button,after selecting the step voltage,through the left and right keys (left minus right plus),decrease/increase voltage.

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【9.0.8】 PD Protocol conversion

This function is used for only QC2.0 charger,But want to supply power to PD appliances.

●Before use,switch the PD communication switch to **ON**,then enter the PD protocol conversion mode, after entering,plug in PD appliances,you can perform PD fast charge.

●In this mode,click the middle button and use the left and right buttons to change the maximum power of packets sent by the PD.When changing power, be careful not to exceed the charger power to avoid unnecessary damage.After changing the power, you must click the middle button to confirm.

●Set 5V when no device is connected,avoid high-voltage damage to mobile phones that do not support high-voltage when plugged in.

●QC2.0 only B type charger supports 20V trigger,so when the PD appliance requests 20V voltage,the tester will detect whether the charger successfully triggers QC2.0-20V.If it does not reach 20V,The tester will cancel the 20V gear,and resend the Caps broadcast.

●In addition,some PD appliances will change the D+ and D- voltages whencharging,-Cause QC2.0 to trigger an exception,this type of PD appliances cannot usethis function to charge.

【9.0.9】 VOOC/WARP Constant voltage trigger

The operation method is the same as QC3.0 trigger.

【9.0.10】 SVOOC Trigger

SuperVOOC requires a load greater than 500mA on the back end to deceive, And SuperVOOC only has a voltage of 10.5V.Therefore, you can only press BACK to return to the page, and there is no other operation.

10.CHARGING TOOL

On the (7.0.3) fast charge identification page, long- click the right button to enter the charging tool menu. The functions are:

- ● PD monitor
- ● Read the E-Marker cable
- ● Read the DASH cable
- ● Analog DASH cable
- ● Apple 2.4A acceleration

【 10.0.1 】 PD Listener

※The figure above,The charger is a 65W PD charging head, The curren PD appliance chooses the third gear, Trigger the target voltage 12V, Maximum current 3A.

※Click the middle button,can switch to the page of "View detailed communication process",as shown.

● When using PD listener,Need to turn the PD communication switch to **ON**,And use a power supply not greater than 16V (usually 5V) and a Micro-USB cable,Connect the PC online port,Provide external power.

● Use the PD listener function, need 2 C-C cables, connect the charger and PD electrical appliances from the Type-C IN interface and Type-C OUT interface respectively. When the connection is normal and the PD protocol triggered by the PD consumer is captured, the page is represented as shown. When the PD charger cannot be powered, because the C-C cable has only one-sided CC，and the 2 CCs are not connected, you can flip one of the C-C cable connectors，to solve the problem.

Left column,You can select the message to be viewed by left/key,Such as:

● Now select the message of 410x1882REQ<-. is the message number,In this instrument, the larger the message number, the newer the message.0x1882 is the message header.REQ is the message type, Represents this is a request (Request) message,The request message (Request) is used to apply to the charging head for the gear required for charging (for example, it is 6 gears in this example,request one of them). <- indicates the direction of data transmission.It means that this message was sent by the PD consumer to the PD charging head.

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●The voltage contained in the right column 0x3304B12C when sending a Request message,Information such as current.

●In addition,under this interface,long press the left button,the data buffer can be cleared. Long press the right button to quickly browse the messages.

Note:

●Open the settings menu -> trigger -> block PDCRC, you can turn off the monitoring of CRC.

●For the meaning of various messages in the PD protocol, please refer to the relevant information.

【 10.0.2 】 Read E-Marker cable

●E-Marker cable refers to a cable with an E-Marker chip in the Type-C interface,If the interface does not contain E-Marker chip.The packets from the PD charging head cannot exceed 3A current,and only use the E-Marker cable to trigger the PD protocol,the current can exceed 3A.

●When using PD listener,except that the Type-C interface cannot be used for power supply,PC port, USB-A, Micro-USB interface can all be used for power supply.The PD communication switch needs to be turned ON.

```
        PD E-Marker
VenderID: 0x0000
    Type: Passive
   Speed: USB 3.2 Gen2
  Length: 0-1 m
 Max Vol: 20V
     Cur: 5A
Hardware: 0x0000
Firmware: 0x0000
```

```
        PD E-Marker
 Now CC Pin: CC1
 VDM Header: 0xFF008041
  ID Header: 0x18000000
  Cert Stat: 0x00000000
    product: 0x00000000
     Cable1: 0x00082052
```

●After entering this function, From any Type-C interface, plug in the cable. You can read the message,As shown below.

●Click the middle button to switch to the figure below.

The two pictures above,the picture shows the parsed data,the second picture is the original data,Users can consult the relevant information of the PD agreement by themselves,do your own comparison.

【10.0.3】 Read DASH cable


```
Read DASH Cable Data
ROM 7Bytes + CRC 1Byte:
  09 52 00 bb 11 19 04 57
ADDR 0x20-0x27:
  57 04 19 11 bb 00 52 09
Dash cable found!
Verified!
```

●Enter this function,plug in the DASH cable,you can read the chip-related data,as shown below.

【10.0.4】 Analog DASH cable

This function is used without DASH cable

●The USB-A head of the DASH cable will have one more data pin than the ordinary USB-A data cable.And one more chip,used to identify and start VOOC/WARP flash charge.

●If the phone normally needs to use a USB-A->Type-C DASH cable,but there is no such thread in hand,only FNB48 tester and a C-C cable,but want to trigger VOOC/WARP flash charge.At this time, the function of simulating DASH cable can be started,and use the C-C cable to connect to the phone, you can perform VOOC/WARP flash charging.

※Note:Since this method does not use the original data cable for charging, the charging power is largely affected by the C-C line.If the impedance of the C-C line is high,then the charging power will be reduced a lot.

【10.0.5】 Apple 2.4A acceleration

When the Apple device detects that the charging head D+ and D- are 2.7V,to charge at 5V-2.4A,this function sets D+ and D- to 2.7V.

11.SETTING MENU

| GEN | REC | TRIG | SYS |

[01] Display Bright
[02] Standby Bright
[03] Bright Time
[04] Data Transmission
[05] Temperture Symbol
[06] System Language

● In the settings menu, left click and right click to select menu options, click the middle button to enter/confirm the current option, click the BACK button to return / cancel / exit the current option / menu.

【11.0.1】 General

Set up some general system configurations.

● **Display brightness：**Set the screen brightness, the adjustable range is 1-20.
● **Standby brightness：**Set the standby screen brightness, adjustable range 0-20 level, when set to 0, enter the standby state and turn off the screen directly.
● **Standby time：**Set the standby time, the last time you operate the button to start timing, reach the standby time, enter the standby state.
● **Data transmission：**After closing, you cannot connect to the computer through the PC port.
● **Temperature symbol：**The onboard temperature can be displayed as °C/°F.
● **Language：**Currently only Chinese/English is supported. Due to the character size problem, English will be displayed in the Chinese system, which is a normal phenomenon.
● **Current change wake up：**Set the wake-up current, When the current change exceeds the wake-up current, the meter changes from standby state to normal working state. When set to 0, this function is turned off.
● **Bluetooth switch：**After closing, bluetooth data transmission is not possible.
● **Gravity direction recognition：**When opened, automatically switch page orientation, After closing, unable to automatically switch the page reverse, but you can switch the page direction by long pressing the middle button on the (7.0.1) simple page.
● **Boot page：**Turn on/off the boot page.
● **Reset：**Restore all settings except the recorded data.

【11.0.2】 Record

Set the configuration required for logging data.
- **Curve recording time：**Set the recording time of the voltage and current curve,maximum 9 hours,set to no time record.Every time you change the configuration, the curve will be cleared to 0.
- **Statistical current threshold：**When the current ≥ the threshold,to carry out statistics on capacity, energy, and time,setting range 0-5A.
- **Energy statistics time：**Set to no time,No time limit,Until the statistics reach the maximum value. After setting the time,when the statistical time reaches the set value, the statistics will automatically stop.
- **Clear all records：**Clear all recorded data,including offline curves,and energy statistics.

【11.0.3】 Trigger related configuration

Trigger related configuration.
- **Trigger time：**Set trigger time.
- **Block PD CRC：**After opening,When PD is monitoring,CRC messages can be masked, Off by default.
- **Boot simulation DASH：**After it is turned on, turn on the analog DASH cable function at boot,which is turned off by default.
- **Boot Apple 2.4A：**After opening,turn on the Apple 2.4A acceleration function when booting,off by default.

【11.0.4】 system

You can view information such as the operating times of the instrument, SN serial number, and software version.

12.UPGRADE FIRMWARE INSTRUCTIONS

1.Open the USB Meter upgrade tool.
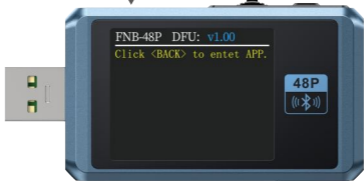
2.When the meter is off, press the middle button to access the PC online port, it will display the connected, device model, and device firmware version. (The connection cable used in the upgrade must have data transmission to be able to connect successfully.)

2. connect to the PC interface   **1.hold down the OK button**

FNB-48P DFU: v1.00
Click <BACK> to entet APP.

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3. Click system `System` **, open the file folder** , **select the firmware to be upgraded , and then click upgraded** . **After the upgrade is complete, the device will automatically restart and enter the main interface.**

13.CONTACT US

Any FNIRSI'users with anyquestions who comes to contact us wiil have our promise to get asatisfactory solution + an Extra 6-Month Warranty to thanks for yoursupport!
By the way, We have created an interesting community, welcome to contact FNIRSI staff to join our community.

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