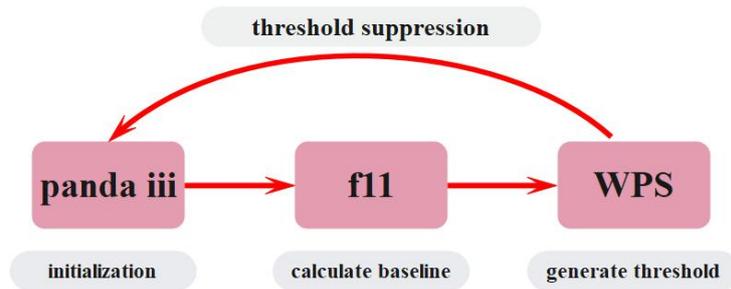


# HERD 2021 beam test TRD host computer software operating instructions

The software needs to be configured before formal data acquisition. Detailed description in the [Section 1](#) to [Section 5](#).

After configuration, you only need to click three buttons named **data acquisition**, **Trig Gen Off** and **stop** to complete data acquisition.

There is a brief block diagram about the host computer operation.



Please refer to the following for specific operation.

## Section 1:

There is a file named **TRD** on the desktop, then click it and open software.



### Step 1. Click *initialization*

*system configuration*

**1**  
*initialization*

系统配置 DAQ调试 波形显示 基线测试 关于软件

FECs Select

|       |     |     |
|-------|-----|-----|
| V3 SF | OFF | OFF |
| SFP 1 | OFF | OFF |
| SFP 2 | OFF | OFF |
| SFP 3 | OFF | OFF |
| SFP 4 | OFF | OFF |
| SFP 5 | OFF | OFF |
| SFP 6 | OFF | OFF |
| SFP 7 | OFF | OFF |
| SFP 8 | OFF | OFF |

Ethernet OFF DDR3 SDRA OFF GTX init OFF

Refresh  ALL

FEC Configure

Sample Rate: 5MHz CFig PLL

Trig Select: Self Trig Trig Delay: 80us Trig Gen Off

Vicn: 1.35V Gain CSA: 120fc Shaping Time: 1us

AGET Thres: 4% Test Cap: 120fF Calib Channel: 0

Mode Sel: normal CH Thres: 0000 AGET Test

SCA Channel: 1-68 Start SCA

DAC Thres: 0 CFig DAC Auto Calib

Data Mode: Event data AGET ON/O

Data Thres: 400 Data Mode Set

Trig speed ct: 23 Hz  Trig Speed Lim  Trig Mode Set

Burst trig m: 10  Busrt Trig En  Burst Trig

Gen Trig Spee: 10Hz Gen Trig Off Single Trig

Controls

初始化 FEC Reset iber RX Rese

Clear FIFO DAQ Reset iber TX Rese

TX BERT OFF RX BERT OFF 数据采集

Data Sa  Data Sa

Data status OFF

Data speed OFF

Packet size OFF

Commands Dialogue

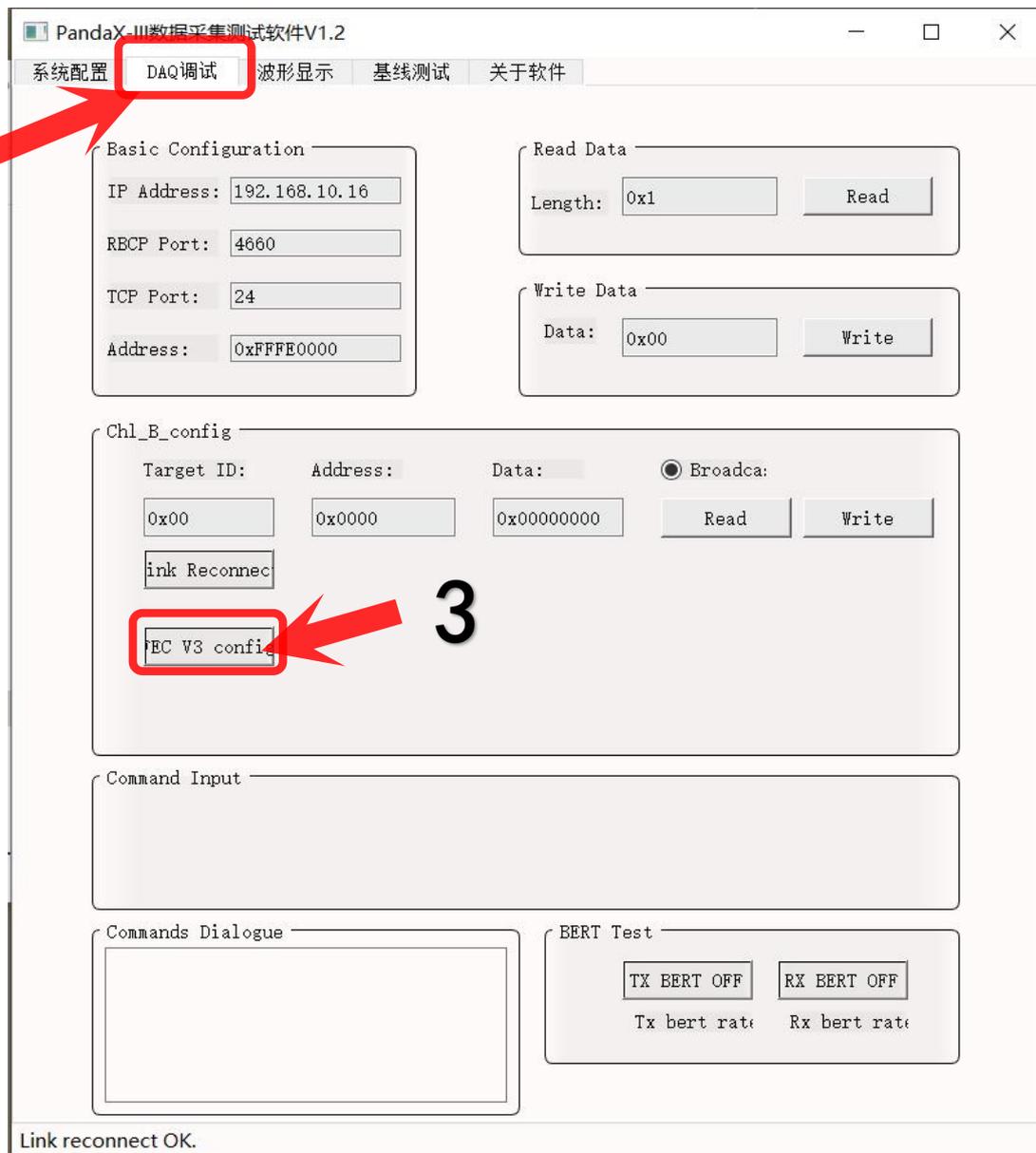
Reset Successful!  
Fiber RX reset successful!

Fiber RX reset successful!

Step 2. Click *DAQ debug*

Step 3. Click *FEC V3 config*

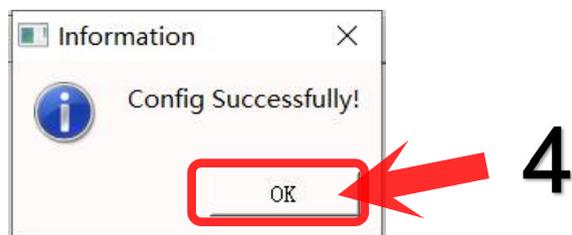
**2**  
*DAQ debug*



Choose  `FECV3ConfigFileNew.txt` in the path of `/Desktop/TRD/software`, then wait for a few minutes.



Step 4. Click *ok*

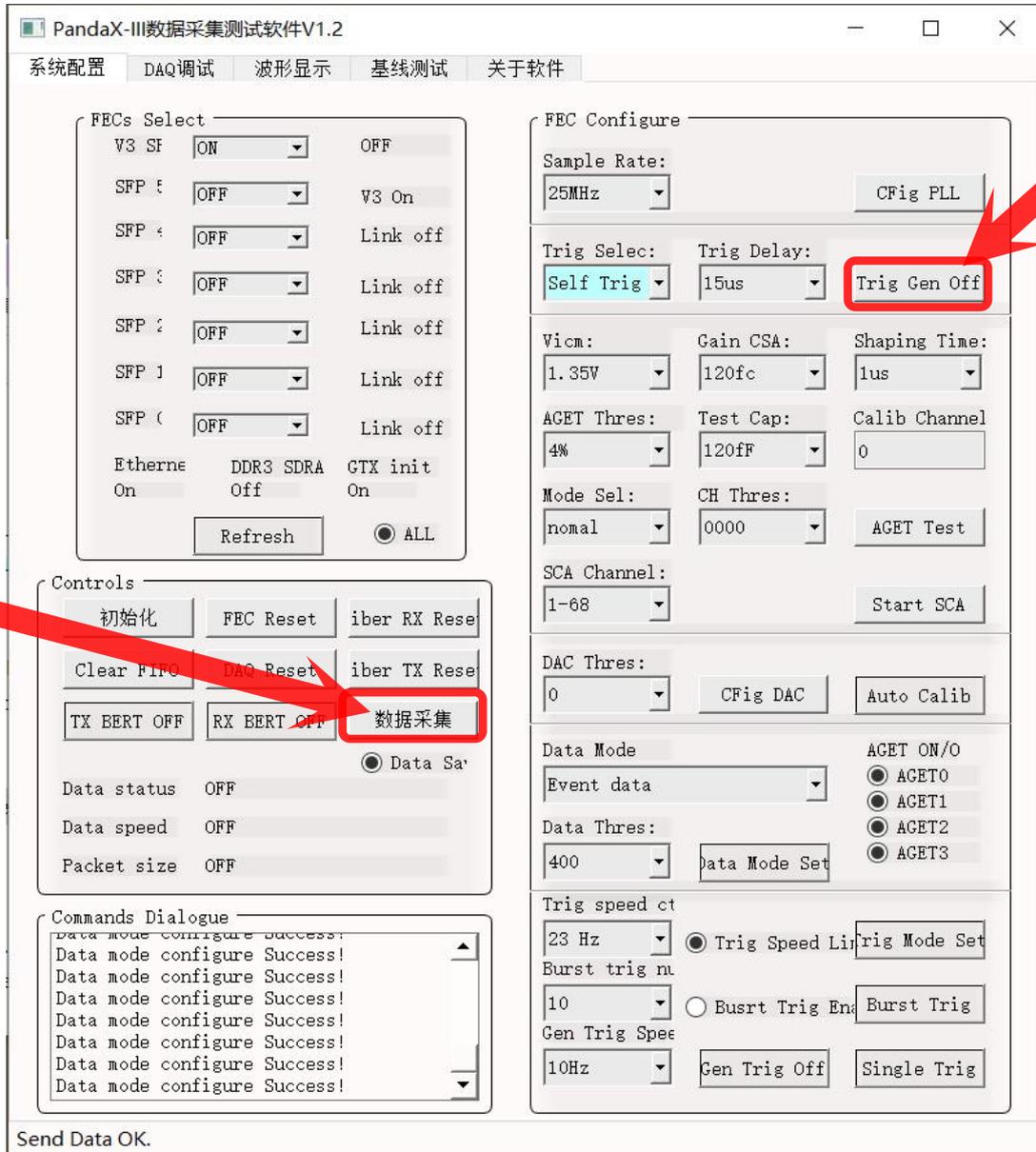


Step 5. Click *data acquisition*

Step 6. Click *Trig Gen Off*

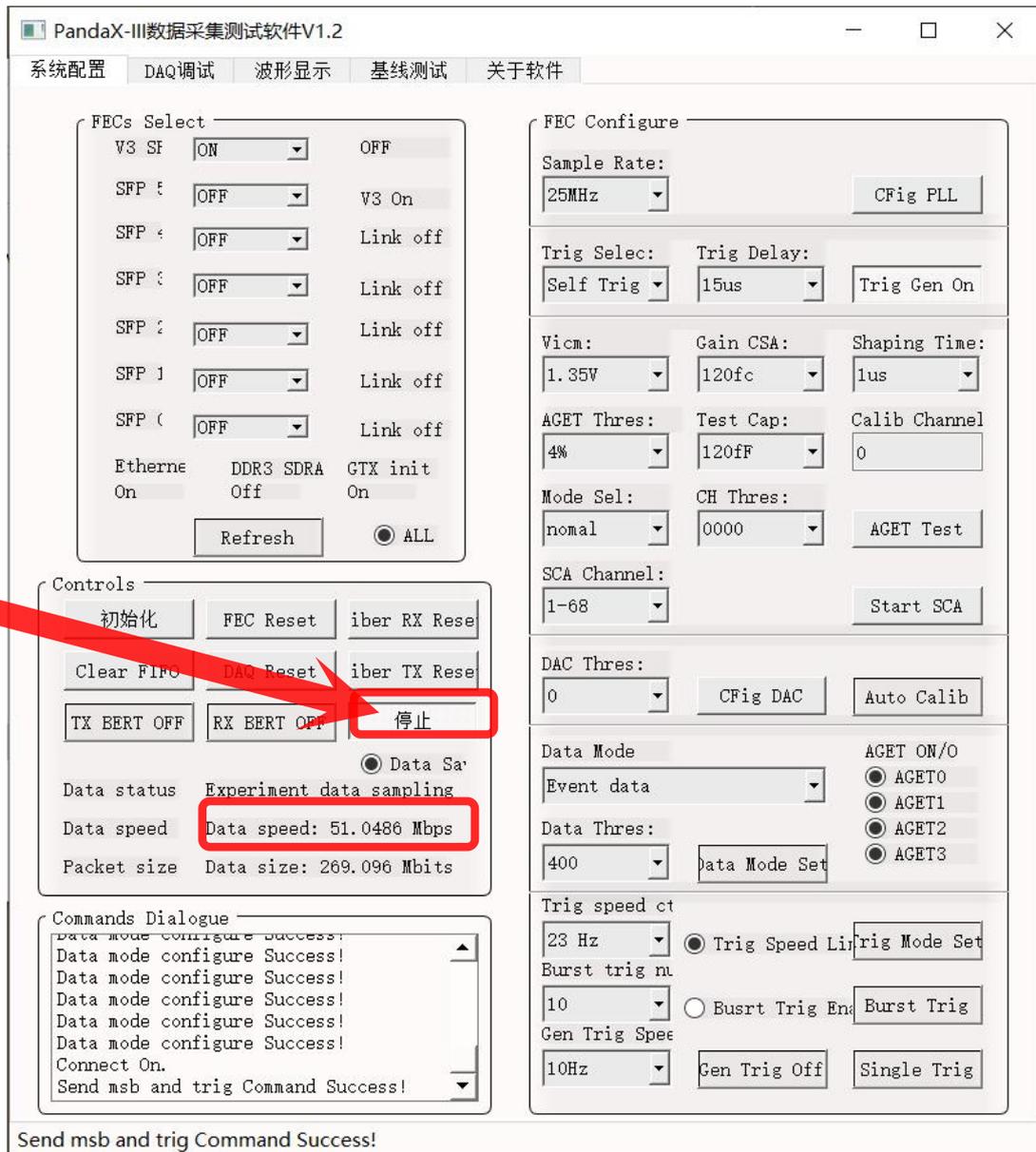
5  
*data acquisition*

6



**Step 7.** Click *stop*

**7**  
*stop*



Click stop. Generally, the value of Data speed is about 51 Mbps. We can collect data for almost two seconds.

The data that we just generated will save in this path automatically:

 > TRD > software

## Section 2:

There is a file named **TRD** on the desktop and click it. Then click  f11

and  f11.exe

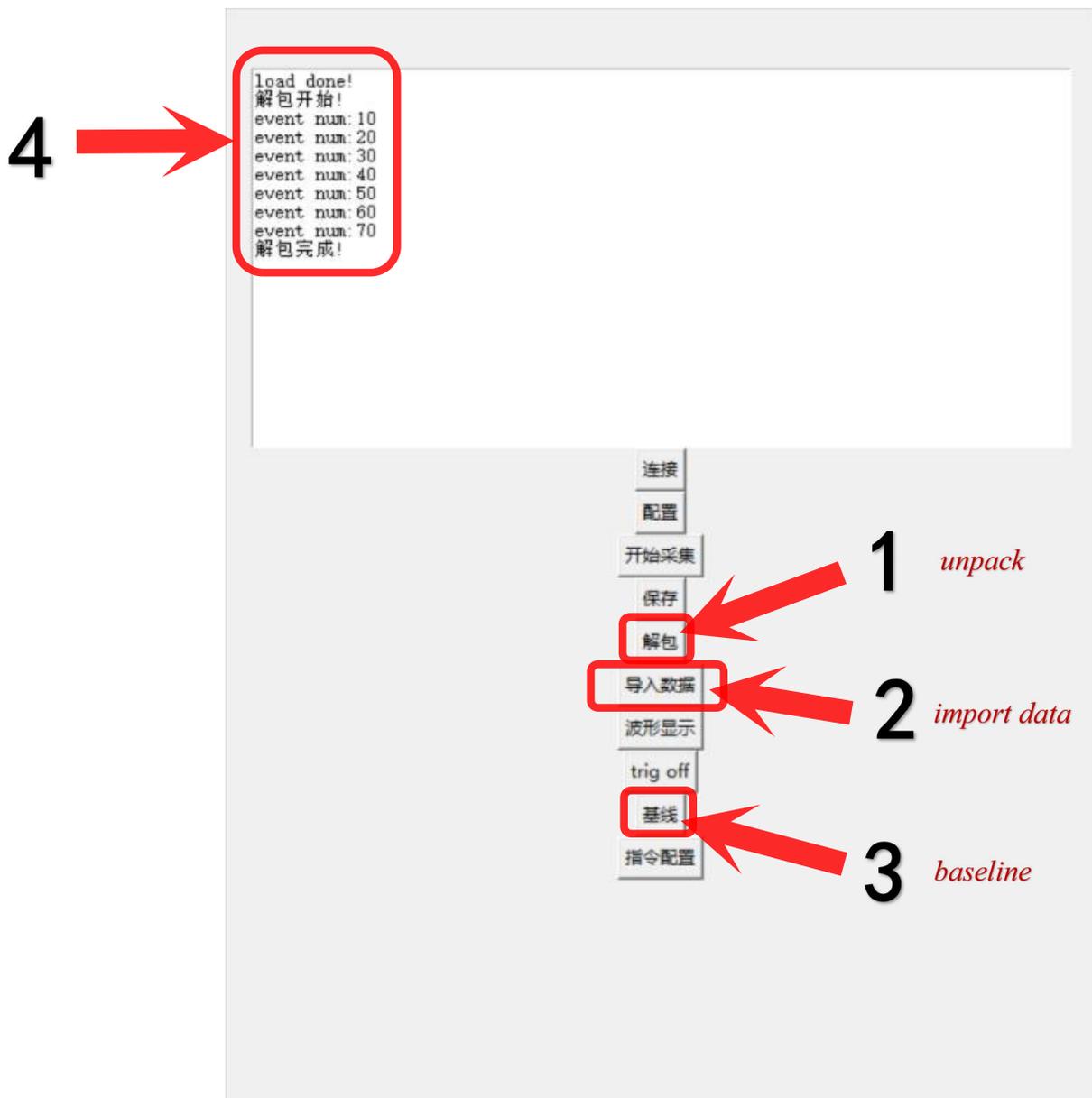
**Step 1.** Click *unpack*

**Step 2.** Click *import data*

Click 1, then 2, then chose the data generated in the section 1 step 7, then click 3.

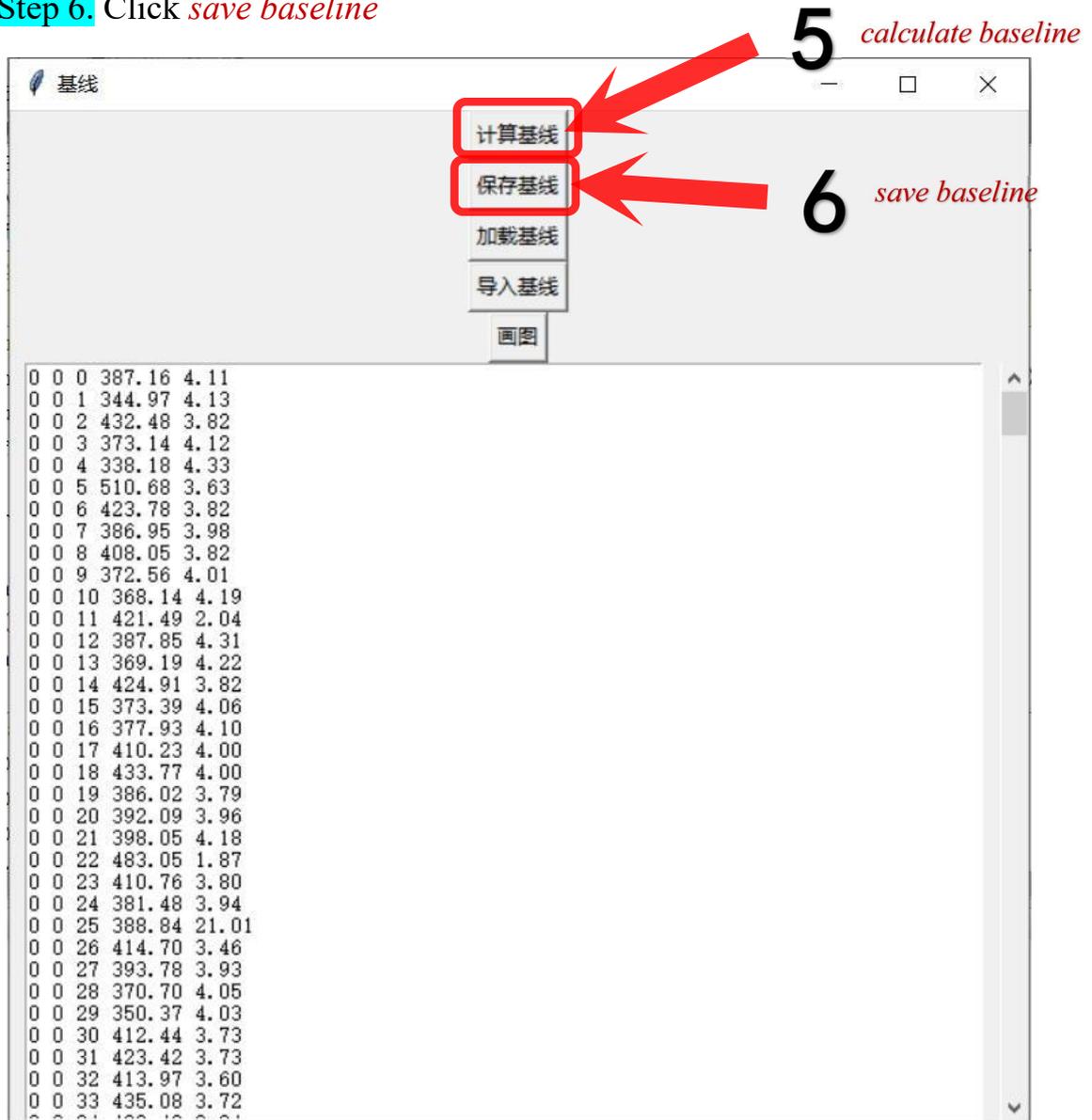
**Step 3.** Click *baseline*

it will **appear 4** when you operate all successfully.



Step 5. Click *calculate baseline*

Step 6. Click *save baseline*



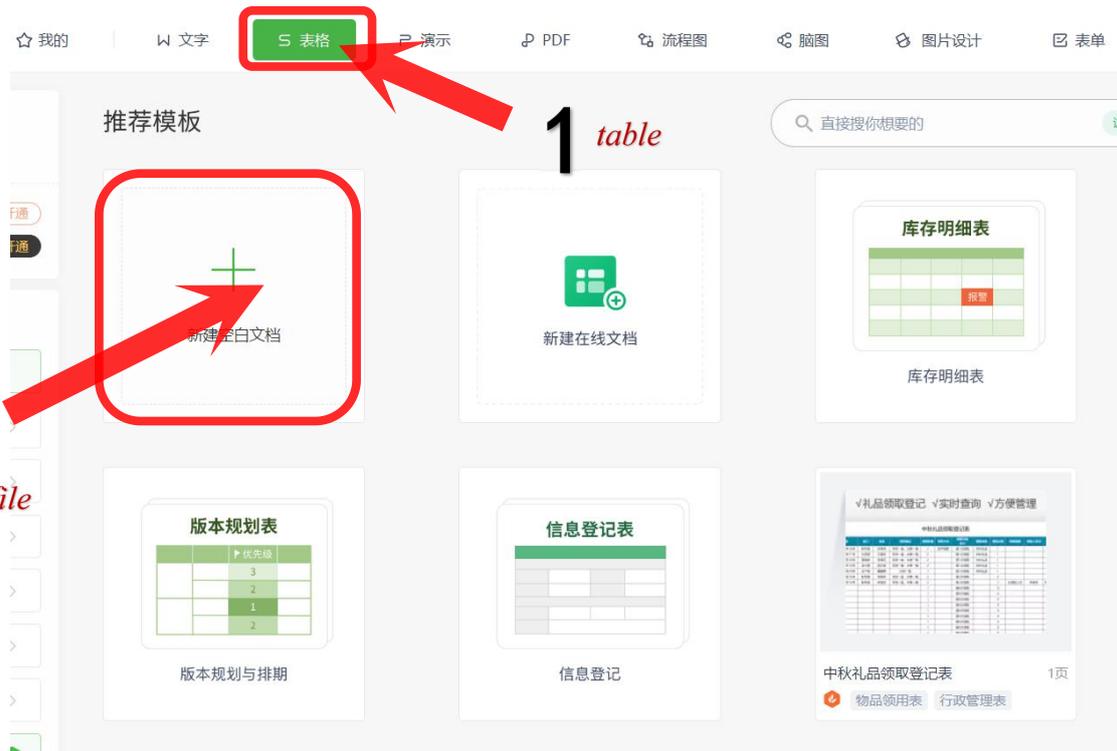
# Section 3:



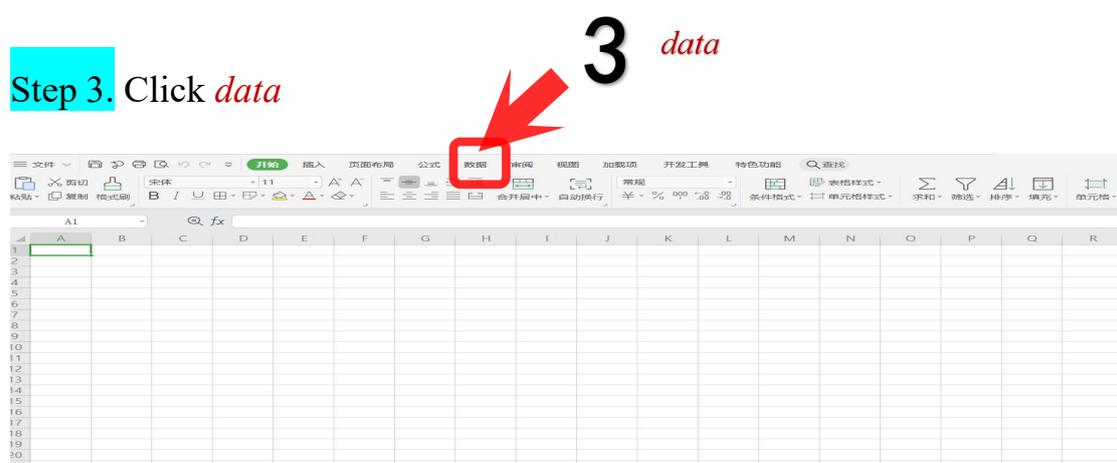
After you click 6, you should save it on desktop, Then click on the desktop and create a new blank table like this:

Step 1. Click *table*

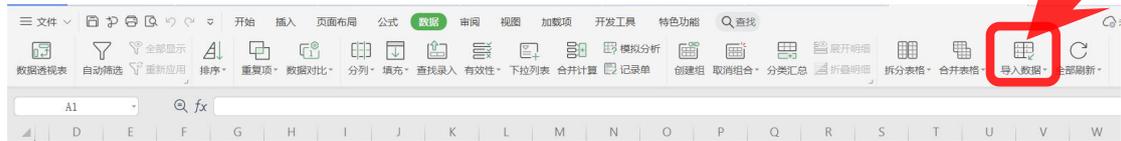
Step 2. Click *create a new file*



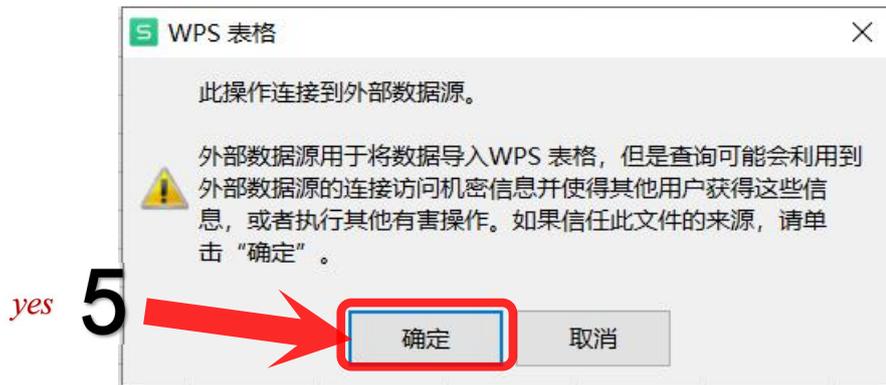
Step 3. Click *data*



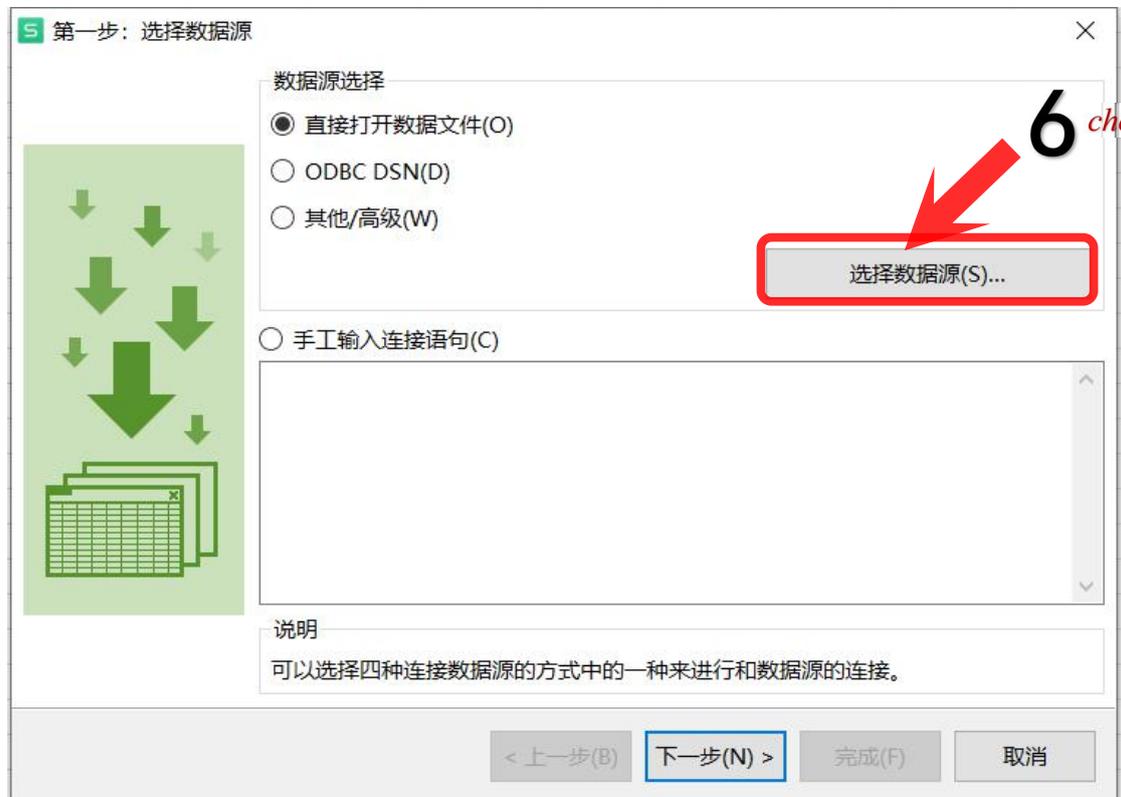
Step 4. Click *import data*



Step 5. Click *yes*



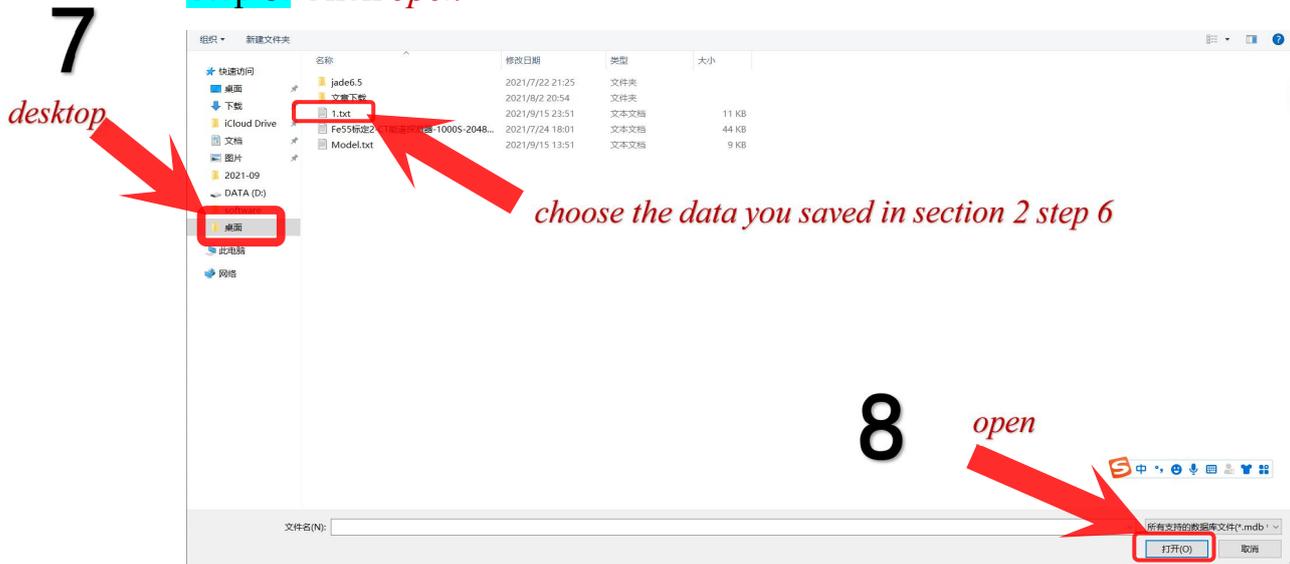
Step 6. Click *choose data source*



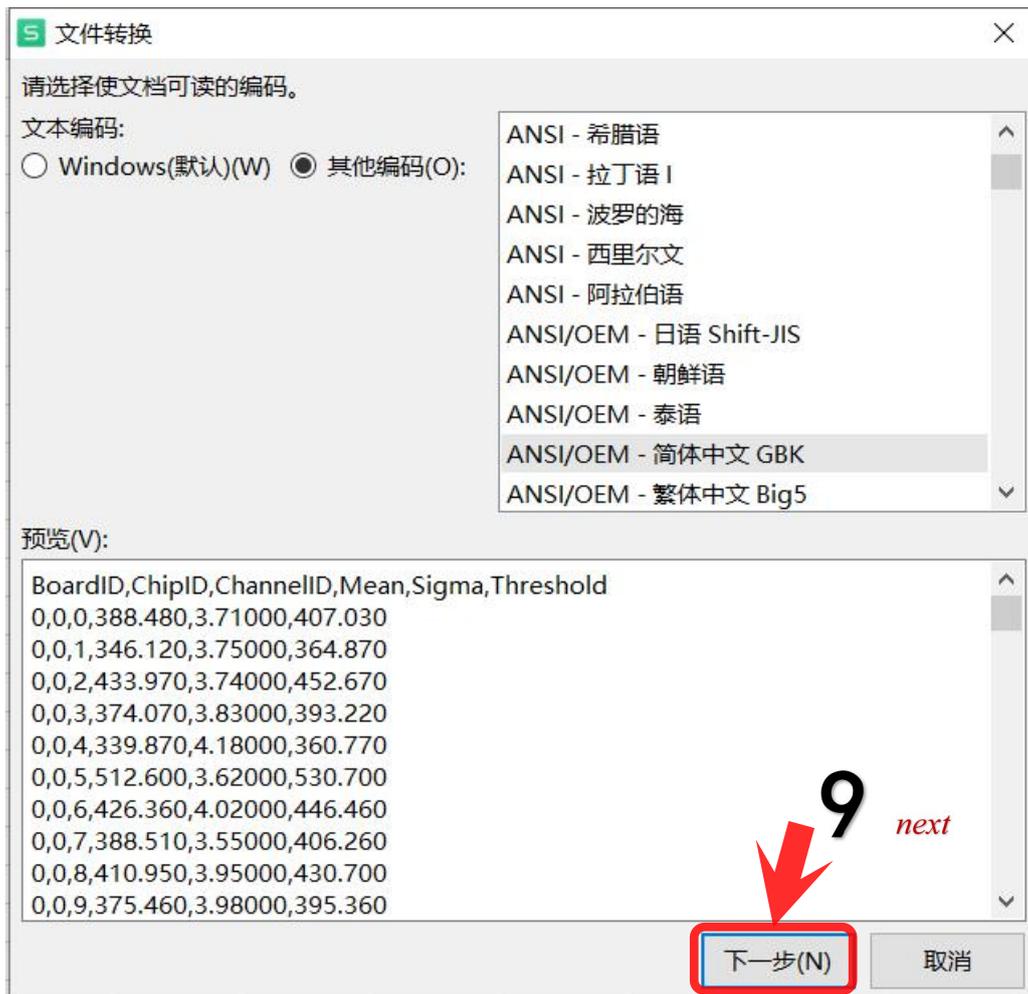
choose the data that we generated in section 2, and the data saved in desktop.

Step 7. Click *desktop* and choose the data you saved in section 2 step 6

Step 8. Click *open*



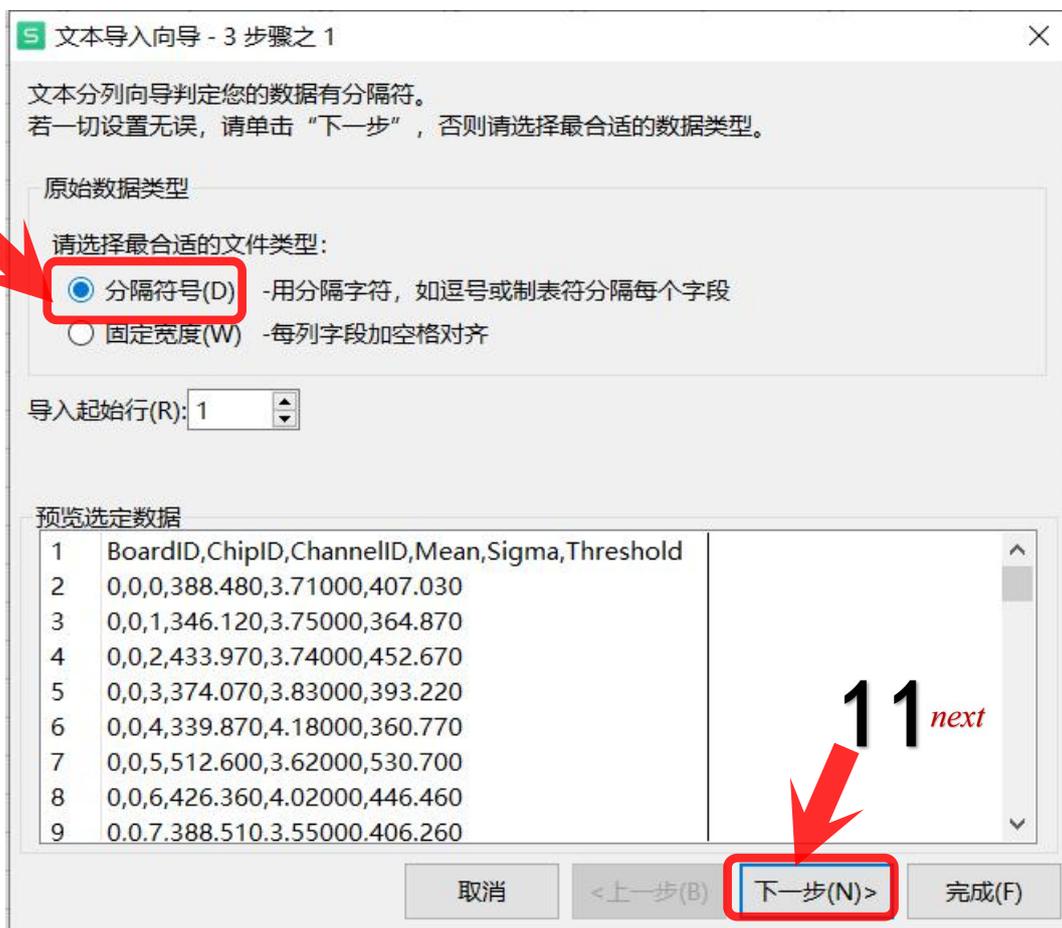
Step 9. Click *next*



Step 10. Click *separator*

Step 11. Click *next*

10  
*separator*



11  
*next*

Step 12. Click *space*

Step 13. Click *next*

12  
*space*

文本导入向导 - 3 步骤之 2

请设置分列数据所包含的分隔符号。在预览窗口内可以看到分列的效果。

分隔符号

Tab键(T)  分号(M)  逗号(C)  连续分隔符号视为单个处理(R)

空格(S)  其他(O):

文本识别符号(Q): "

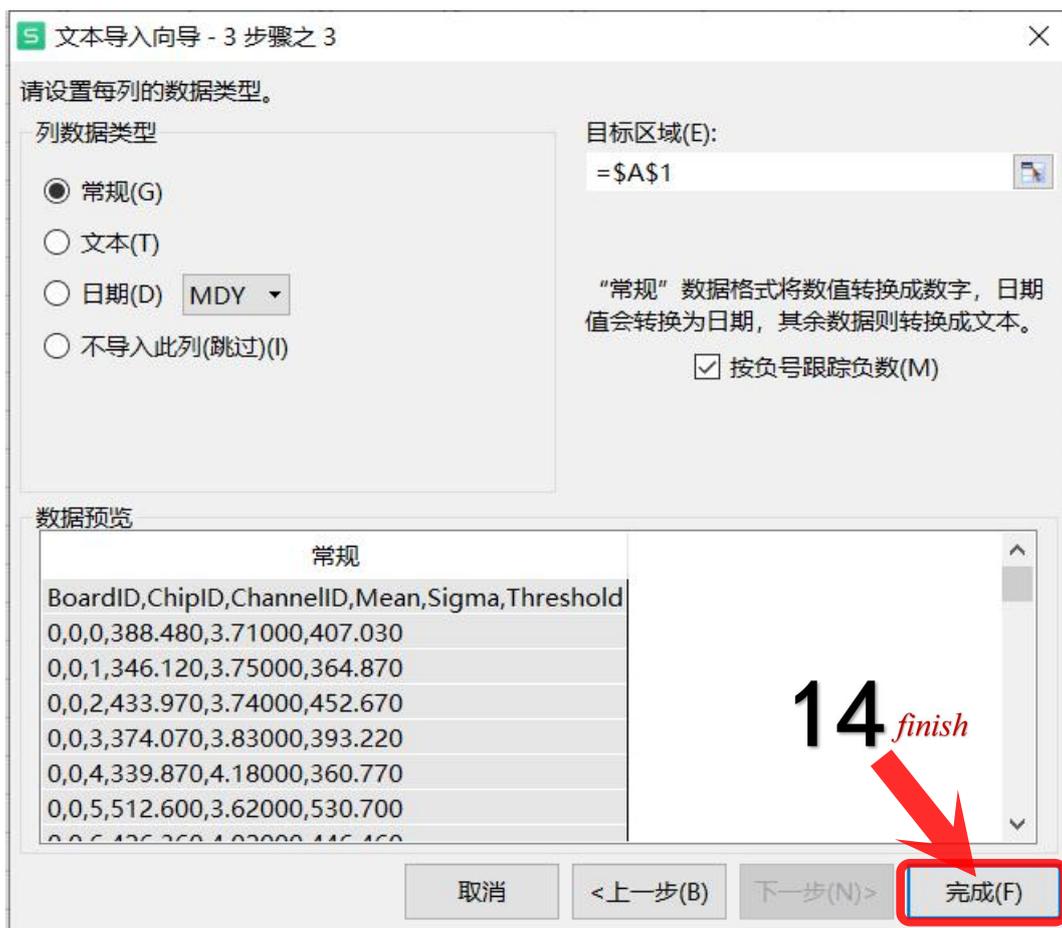
数据预览

| BoardID | ChipID  | ChannelID | Mean    | Sigma | Threshold |
|---------|---------|-----------|---------|-------|-----------|
| 0,0,0   | 388.480 | 3.71000   | 407.030 |       |           |
| 0,0,1   | 346.120 | 3.75000   | 364.870 |       |           |
| 0,0,2   | 433.970 | 3.74000   | 452.670 |       |           |
| 0,0,3   | 374.070 | 3.83000   | 393.220 |       |           |
| 0,0,4   | 339.870 | 4.18000   | 360.770 |       |           |
| 0,0,5   | 512.600 | 3.62000   | 530.700 |       |           |
| 0,0,6   | 426.360 | 4.02000   | 446.460 |       |           |
| 0.0.7   | 388.510 | 3.55000   | 406.260 |       |           |

取消 <上一步(B) 下一步(N)> 完成(F)

13  
*next*

Step 14. Click *finish*



Step 15. *apply this formula to the column F*

|    | A   | B   | C    | D      | E    | F        | G | H | I | J | K |
|----|-----|-----|------|--------|------|----------|---|---|---|---|---|
| 1  | fec | chn | chip | mean   | std  |          |   |   |   |   |   |
| 2  | 0   | 0   | 0    | 394.01 | 4.79 | =D2+5*E2 |   |   |   |   |   |
| 3  | 0   | 0   | 1    | 350.66 | 4.92 |          |   |   |   |   |   |
| 4  | 0   | 0   | 2    | 440.87 | 4.49 |          |   |   |   |   |   |
| 5  | 0   | 0   | 3    | 379.25 | 4.7  |          |   |   |   |   |   |
| 6  | 0   | 0   | 4    | 350.43 | 4.38 |          |   |   |   |   |   |
| 7  | 0   | 0   | 5    | 516.9  | 4.2  |          |   |   |   |   |   |
| 8  | 0   | 0   | 6    | 432.11 | 4.03 |          |   |   |   |   |   |
| 9  | 0   | 0   | 7    | 393.56 | 5.01 |          |   |   |   |   |   |
| 10 | 0   | 0   | 8    | 418.74 | 4.23 |          |   |   |   |   |   |
| 11 | 0   | 0   | 9    | 381.68 | 5.09 |          |   |   |   |   |   |
| 12 | 0   | 0   | 10   | 374.75 | 4.98 |          |   |   |   |   |   |
| 13 | 0   | 0   | 11   | nan    | nan  |          |   |   |   |   |   |
| 14 | 0   | 0   | 12   | 397.21 | 4.43 |          |   |   |   |   |   |

15  
*apply this formula to the column F*

|    | A   | B   | C    | D      | E    | F       | G | H | I | J |
|----|-----|-----|------|--------|------|---------|---|---|---|---|
| 1  | fec | chn | chip | mean   | std  |         |   |   |   |   |
| 2  | 0   | 0   | 0    | 394.01 | 4.79 | 417.96  |   |   |   |   |
| 3  | 0   | 0   | 1    | 350.66 | 4.92 | 375.26  |   |   |   |   |
| 4  | 0   | 0   | 2    | 440.87 | 4.49 | 463.32  |   |   |   |   |
| 5  | 0   | 0   | 3    | 379.25 | 4.7  | 402.75  |   |   |   |   |
| 6  | 0   | 0   | 4    | 350.43 | 4.38 | 372.33  |   |   |   |   |
| 7  | 0   | 0   | 5    | 516.9  | 4.2  | 537.9   |   |   |   |   |
| 8  | 0   | 0   | 6    | 432.11 | 4.03 | 452.26  |   |   |   |   |
| 9  | 0   | 0   | 7    | 393.56 | 5.01 | 418.61  |   |   |   |   |
| 10 | 0   | 0   | 8    | 418.74 | 4.23 | 439.89  |   |   |   |   |
| 11 | 0   | 0   | 9    | 381.68 | 5.09 | 407.13  |   |   |   |   |
| 12 | 0   | 0   | 10   | 374.75 | 4.98 | 399.65  |   |   |   |   |
| 13 | 0   | 0   | 11   | nan    | nan  | #VALUE! |   |   |   |   |
| 14 | 0   | 0   | 12   | 397.21 | 4.43 | 419.36  |   |   |   |   |
| 15 | 0   | 0   | 13   | 382.17 | 4.28 | 403.57  |   |   |   |   |
| 16 | 0   | 0   | 14   | 433.84 | 5.19 | 459.79  |   |   |   |   |
| 17 | 0   | 0   | 15   | 381.45 | 4.54 | 404.15  |   |   |   |   |
| 18 | 0   | 0   | 16   | 385.35 | 4.33 | 407     |   |   |   |   |
| 19 | 0   | 0   | 17   | 418.82 | 4.68 | 442.22  |   |   |   |   |
| 20 | 0   | 0   | 18   | 445.7  | 4.64 | 468.9   |   |   |   |   |
| 21 | 0   | 0   | 19   | 397.33 | 4.41 | 419.38  |   |   |   |   |
| 22 | 0   | 0   | 20   | 400.94 | 5.46 | 428.24  |   |   |   |   |
| 23 | 0   | 0   | 21   | 407.97 | 4.92 | 432.57  |   |   |   |   |
| 24 | 0   | 0   | 22   | nan    | nan  | #VALUE! |   |   |   |   |
| 25 | 0   | 0   | 23   | 417.22 | 4.16 | 438.02  |   |   |   |   |
| 26 | 0   | 0   | 24   | 391.07 | 5.37 | 417.92  |   |   |   |   |
| 27 | 0   | 0   | 25   | nan    | nan  | #VALUE! |   |   |   |   |
| 28 | 0   | 0   | 26   | 423.72 | 4.16 | 444.52  |   |   |   |   |
| 29 | 0   | 0   | 27   | 401.41 | 4.84 | 425.61  |   |   |   |   |

Step 16. *delete the last row*

|     |   |   |    |        |      |        |  |  |  |
|-----|---|---|----|--------|------|--------|--|--|--|
| 272 | 0 | 3 | 66 | 403.03 | 6.4  | 435.03 |  |  |  |
| 273 | 0 | 3 | 67 | 379.29 | 4.75 | 403.04 |  |  |  |
| 274 | 0 |   |    |        |      |        |  |  |  |

16

*delete the last row*

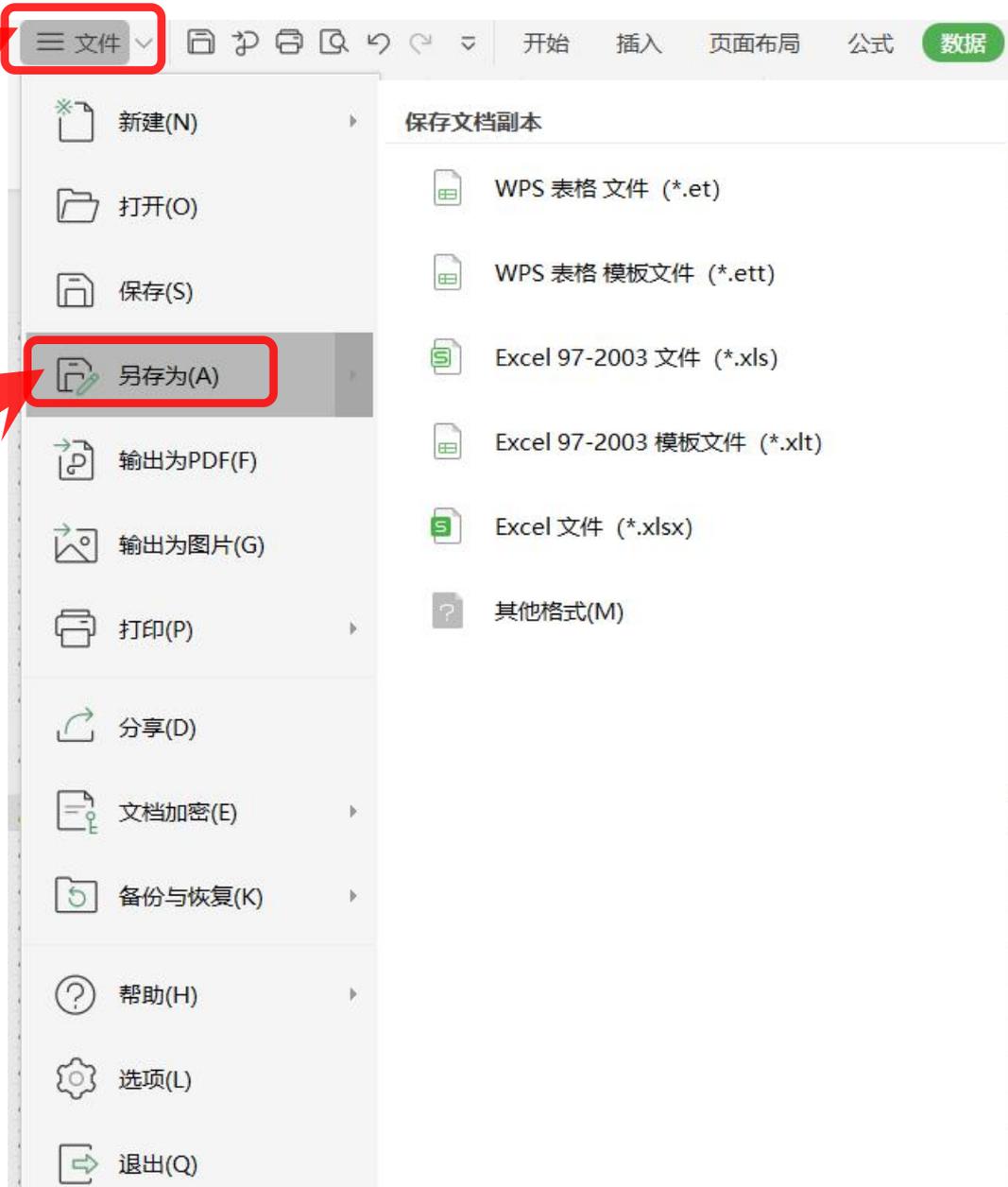
Then save this excel file on the desktop with the default format (.csv), which is explained by the following pictures.

Step 17. Click *file*

Step 18. Click *save as*

17

*file*



18

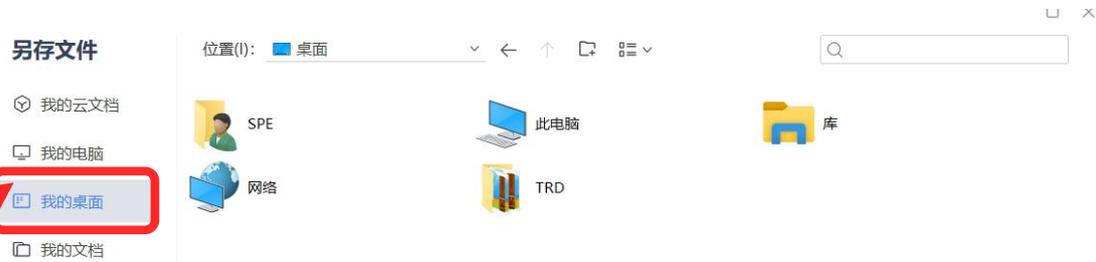
*save as*

Step 19. Click *my desktop*

Step 20. Set *file name and file type*

Step 21. Click *save*

19  
*my desktop*



20

*file name*

*file type*



*save* 21

Step 22. Click *yes*



22 *yes*

Terminate WPS software once you finish above steps.

## Section 4:

Then you should change the format of the file that you just saved in the desktop. You need to convert .csv into .txt

Step 1. Right click



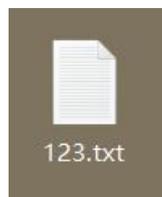
Step 2. Click *rename*



Step 3. Click *yes*

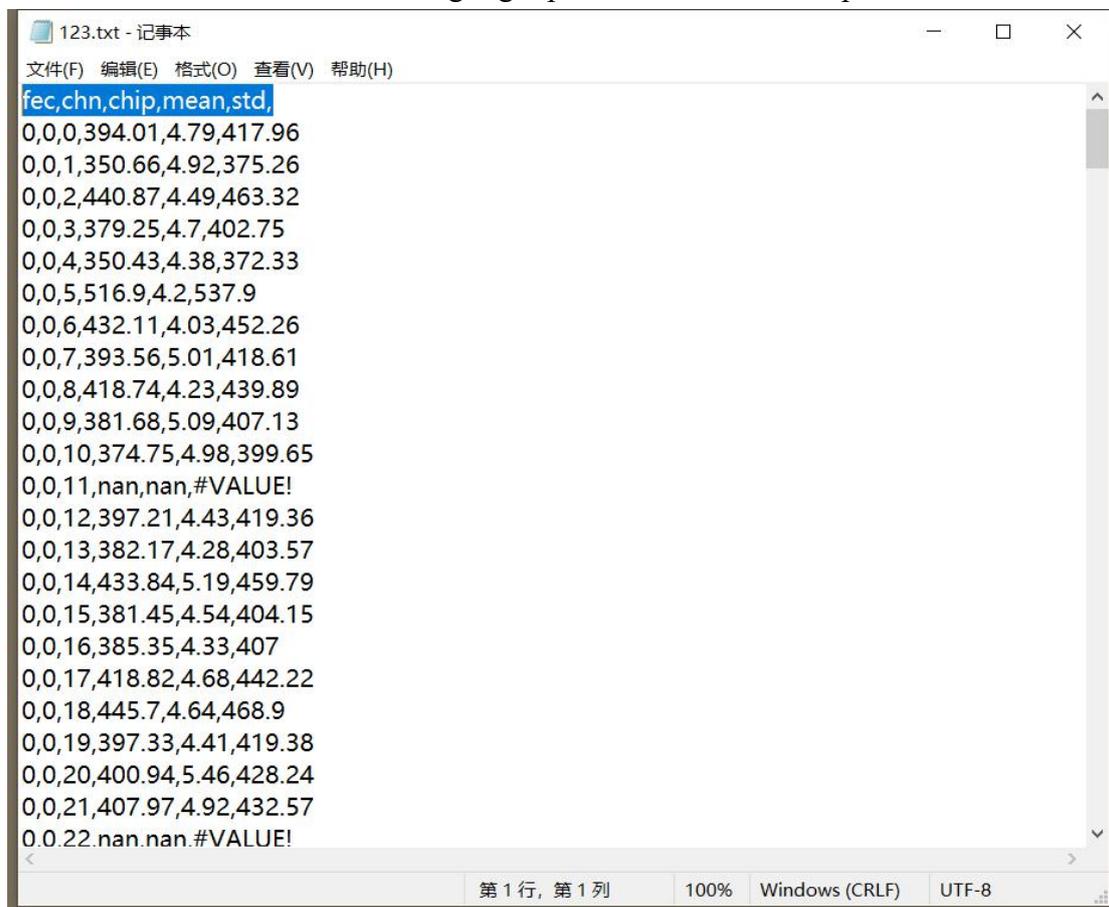


Now we have a .txt file.



Next step, open this .txt file.

Modificate the first line like the highlight part shown in the next picture. Then save it.



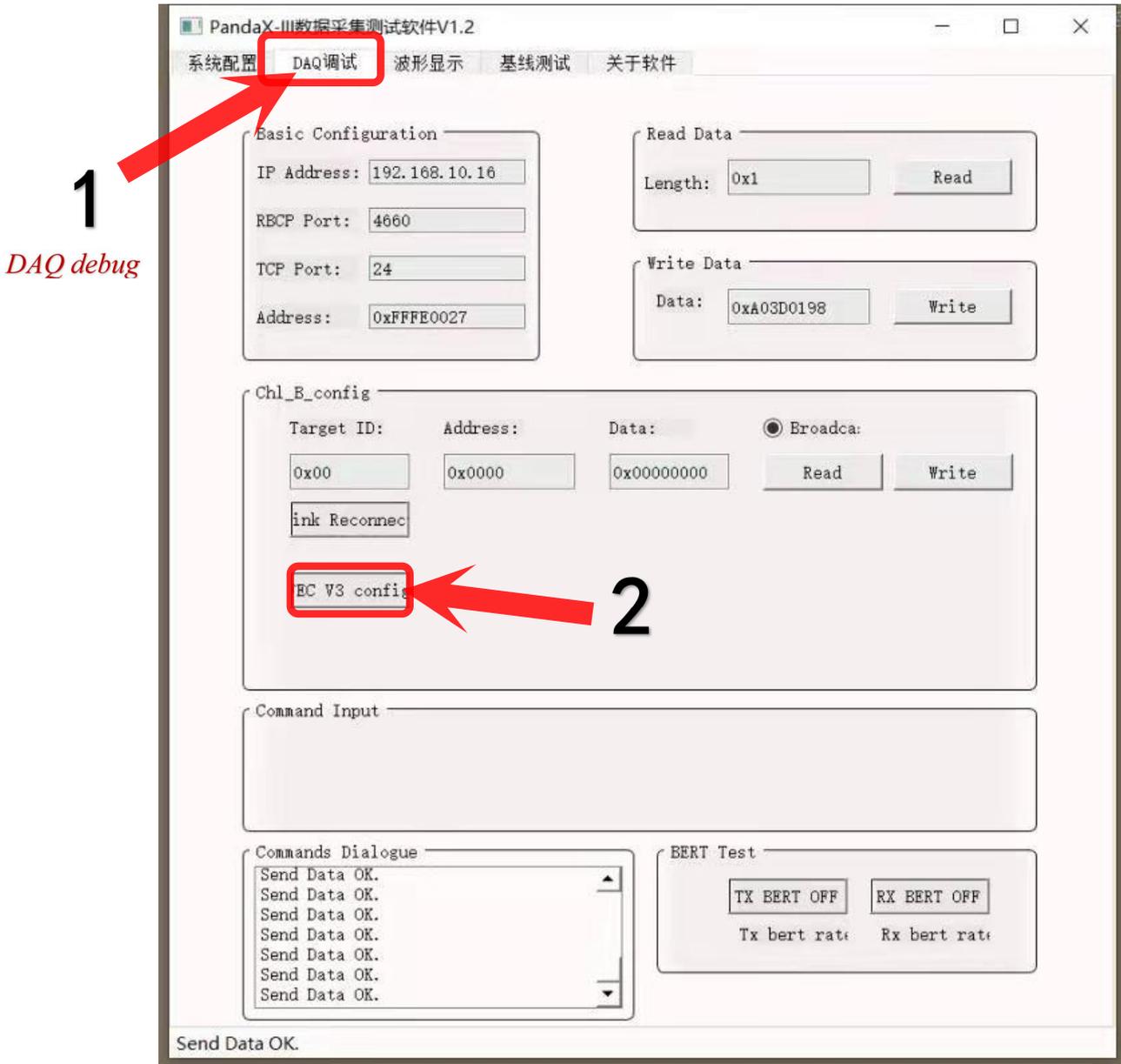
```
*123.txt - 记事本
文件(F) 编辑(E) 格式(O) 查看(V) 帮助(H)
BoardID,ChipID,ChannelID,Mean,Sigma,Threshold
0,0,0,394.01,4.79,417.96
0,0,1,350.66,4.92,375.26
0,0,2,440.87,4.49,463.32
0,0,3,379.25,4.7,402.75
0,0,4,350.43,4.38,372.33
0,0,5,516.9,4.2,537.9
0,0,6,432.11,4.03,452.26
0,0,7,393.56,5.01,418.61
0,0,8,418.74,4.23,439.89
0,0,9,381.68,5.09,407.13
0,0,10,374.75,4.98,399.65
0,0,11,nan,nan,#VALUE!
0,0,12,397.21,4.43,419.36
0,0,13,382.17,4.28,403.57
0,0,14,433.84,5.19,459.79
0,0,15,381.45,4.54,404.15
0,0,16,385.35,4.33,407
0,0,17,418.82,4.68,442.22
0,0,18,445.7,4.64,468.9
0,0,19,397.33,4.41,419.38
0,0,20,400.94,5.46,428.24
0,0,21,407.97,4.92,432.57
0,0,22,nan,nan,#VALUE!
第 1 行, 第 1 列 100% Windows (CRLF) UTF-8
```

## Section 5:

Return to software shown in the very start, and reconfigure.

Step 1. Click *DAQ debug*

Step 2. Click *FEC V3 config*



Select file from /Desktop/TRD/software 

Note that they are different files :

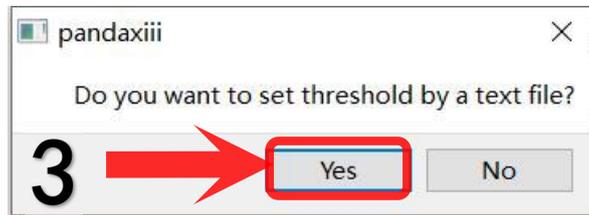
FECV3ConfigFileNew - 2.txt

and

FECV3ConfigFileNew.txt

on section 1 step 3.

**Step 3.** Click *yes*



Then choose the .txt file we saved on the desktop in the end of Section 3 and wait a few minutes.

**Step 4.** Click *ok*



If you connect the exit trigger through RJ45 interface, then we need to select the 'exit trigger' in this step, and collect data by repeating steps like section 1 step 5 and 6.

Step 5. Select the 'exit trigger'

Step 6. Click data acquisition

Step 7. Click Trig Gen Off

system configuration

5 exit trigger

6 data acquisition

7

系统配置 DAQ调试 波形显示 基线测试 关于软件

FECs Select

V3 SFP: ON OFF

SFP 5: OFF V3 On

SFP 4: OFF Link off

SFP 3: OFF Link off

SFP 2: OFF Link off

SFP 1: OFF Link off

SFP 0: OFF Link off

Ethernet: On

DDR3 SDRAM: Off

GTX init: On

Refresh

ALL

FEC Configure

Sample Rate: 12.5MHz

CFig PLL

Trig Selec: Ext Trig

Trig Delay: 10us

Trig Gen Off

Vcom: 1.35V

Gain CSA: 120fc

Shaping Time: 1us

AGET Thres: 4%

Test Cap: 120fF

Calib Channel: 0

Mode Sel: normal

CH Thres: 0000

AGET Test

SCA Channel: 1-68

Start SCA

DAC Thres: 0

CFig DAC

Auto Calib

Data Mode: Event data

AGET ON/OFF: AGETO, AGET1, AGET2, AGET3

Data Thres: 400

Data Mode Set

Trig speed ctrl: 23 Hz

Trig Speed Limit

Trig Mode Set

Burst trig num

Controls

初始化 FEC Reset Fiber RX Reset

Clear FIFO DAQ Reset Fiber TX Reset

TX BERT OFF RX BERT OFF 数据采集

Data Save

Data status: OFF

Data speed: 15.2257 Mbps

Packet size: 88.1667 Mbits

Commands Dialogue

Data mode configure Success!

Data mode configure Success!

If we have enough data , we click stop and the data we just tested save in path:  
/Desktop/TRD/software.

Step 8. Click *stop*

*stop* 8

