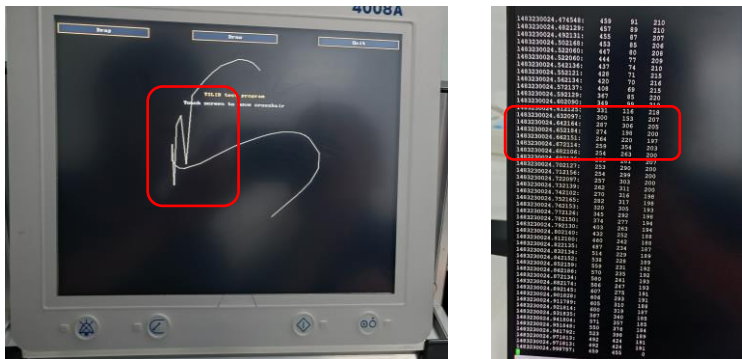
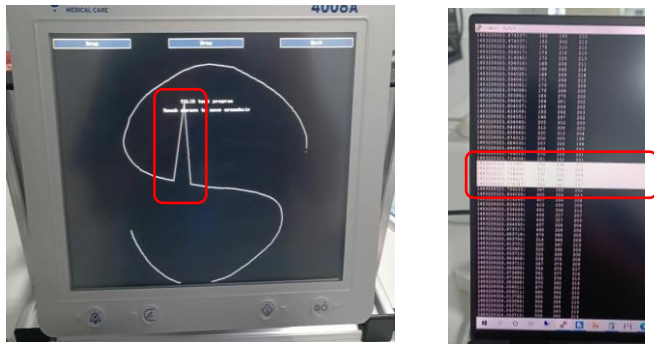


# DRAW TEST

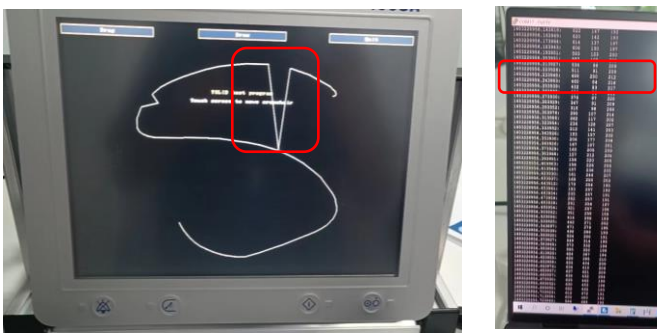
SAMPLE 1# – Supplier A



SAMPLE 2# – Supplier A



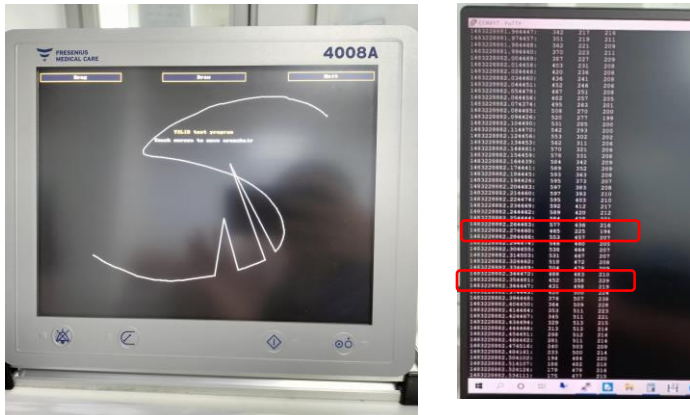
SAMPLE 3# – Supplier A



SAMPLE 1# – Supplier B



SAMPLE 2# – Supplier B

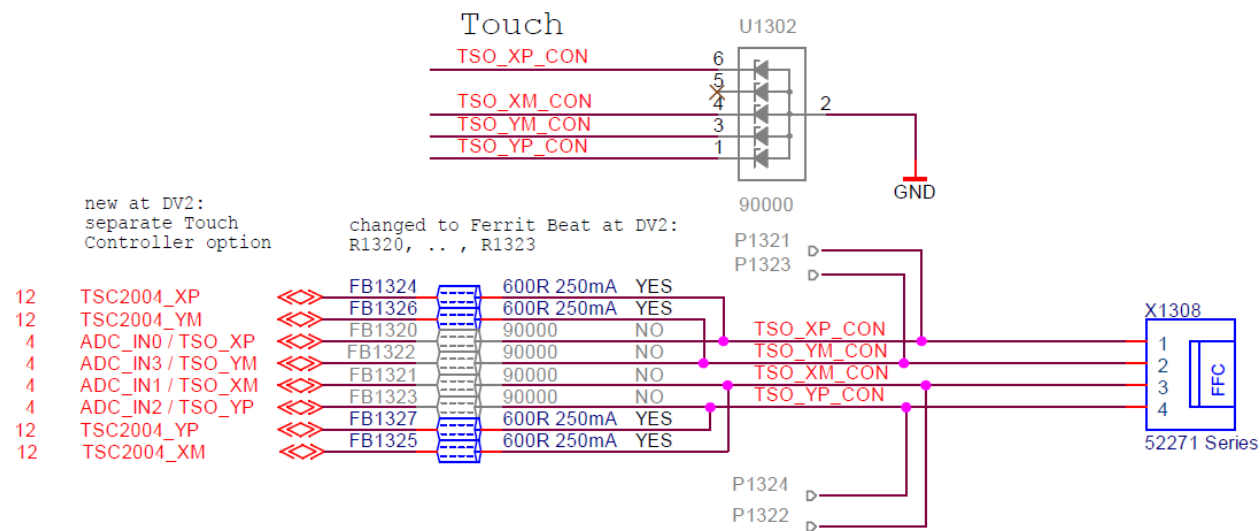
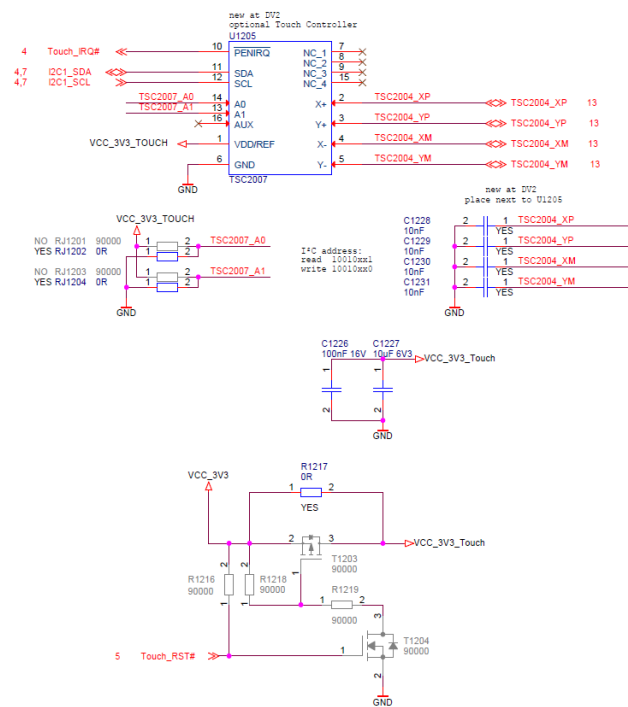


Remarks:

1. Same behavior was observed on two touch screens from different supplier.
2. Only with small pressure can the behavior be stably re-produced.



# TSC2007 – SCH



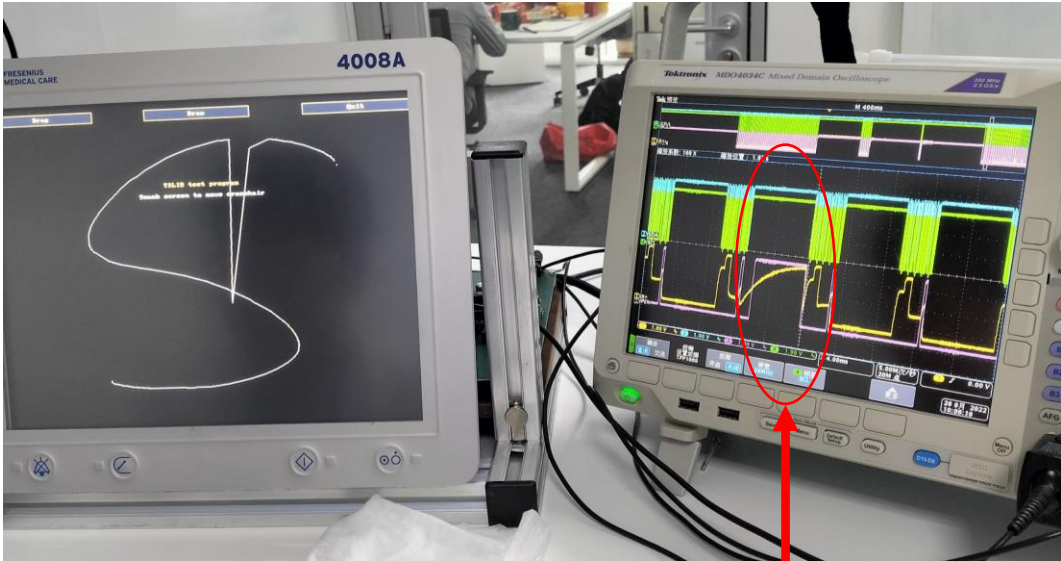


# WAVEFORM – X+



- SDA
- SCL
- X+
- PENIRQ

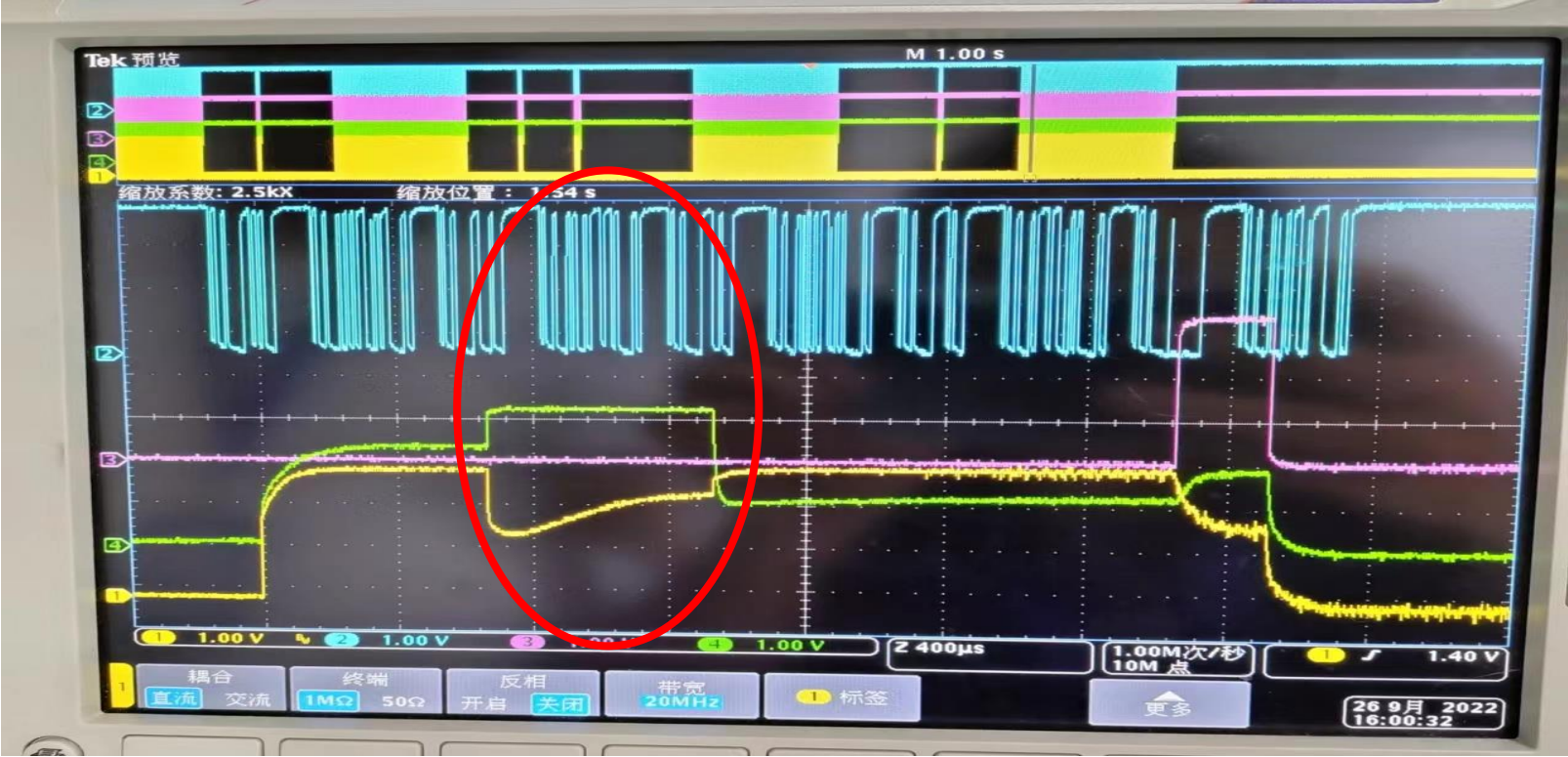
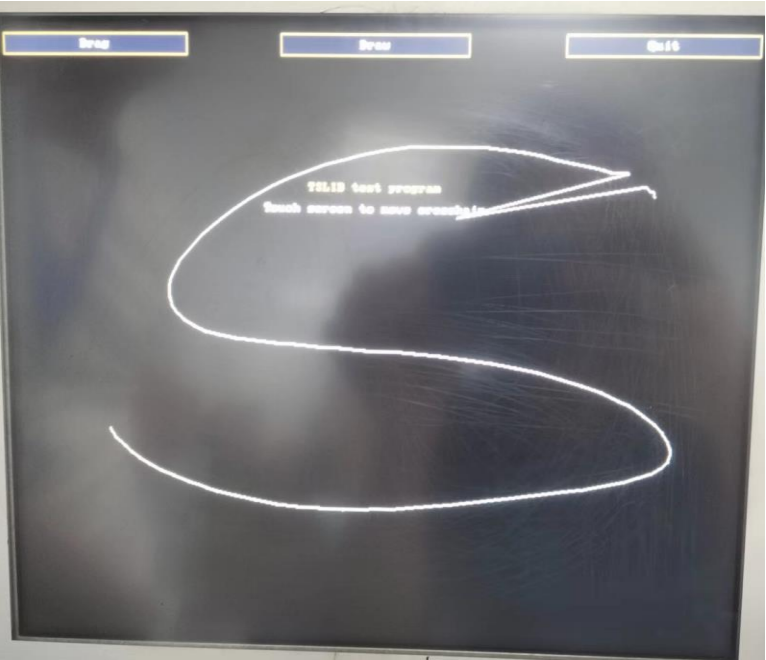
The waveform rises slowly, so the collected data may not be accurate.



Unexpected Interrupt Pin behavior , possibly due to bouncing of light pressure



# ■ WAVEFORM – Y+



- SDA
- Y+
- X+
- PENIRQ

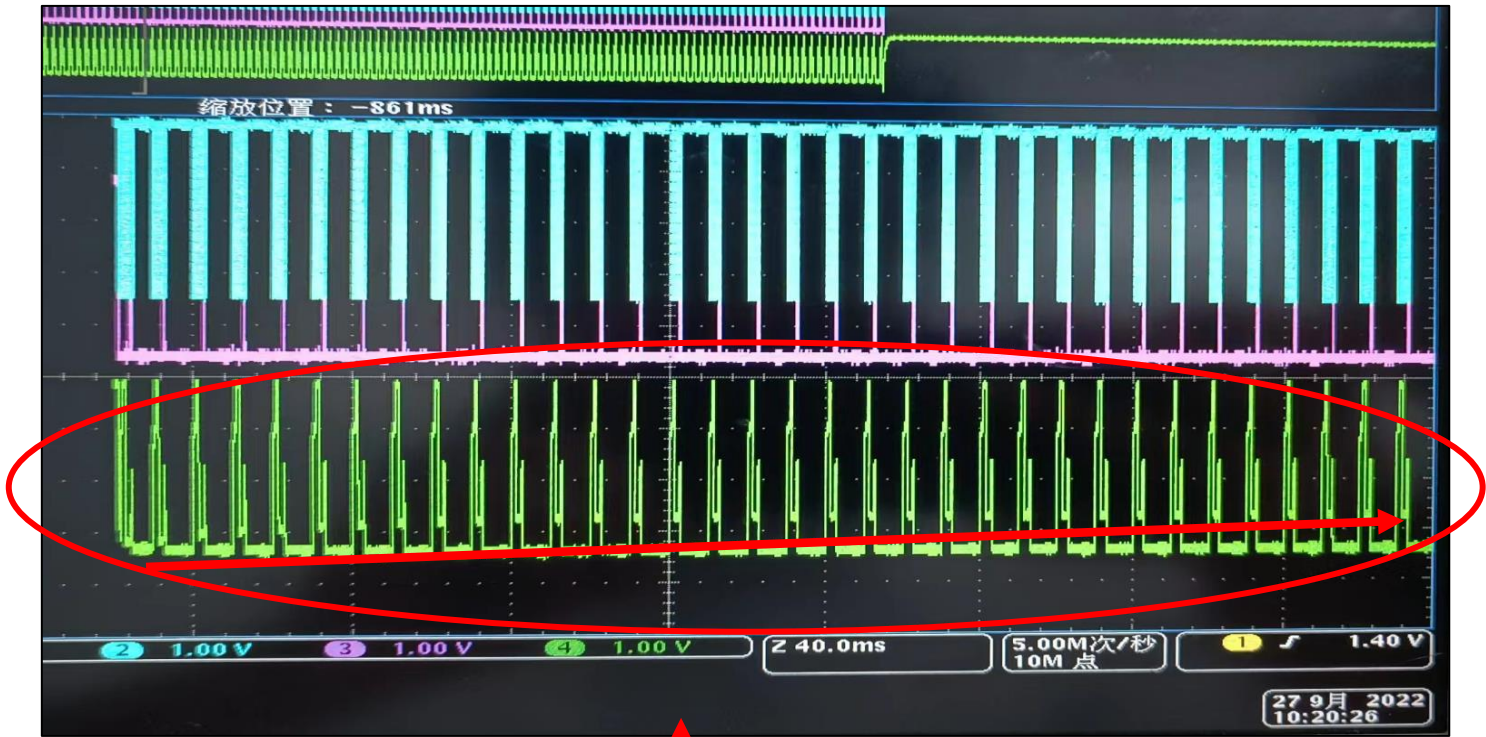
The waveform rises slowly, so the collected data may not be accurate.



# ■ WAVEFORM – PRESSURE UP/DOWN LITTLE BY LITTLE



No X/Y Coordinates jumping was observed in the screen



The pressure increases, the Z-value goes up.

Bouncing of PENIRQ was identified

— SDA  
— X+  
— Y+  
— PENIRQ



# ■ WAVEFORM – PRESSURE UP/DOWN LITTLE BY LITTLE



EP0101



EP0116



EP0105



EP0087

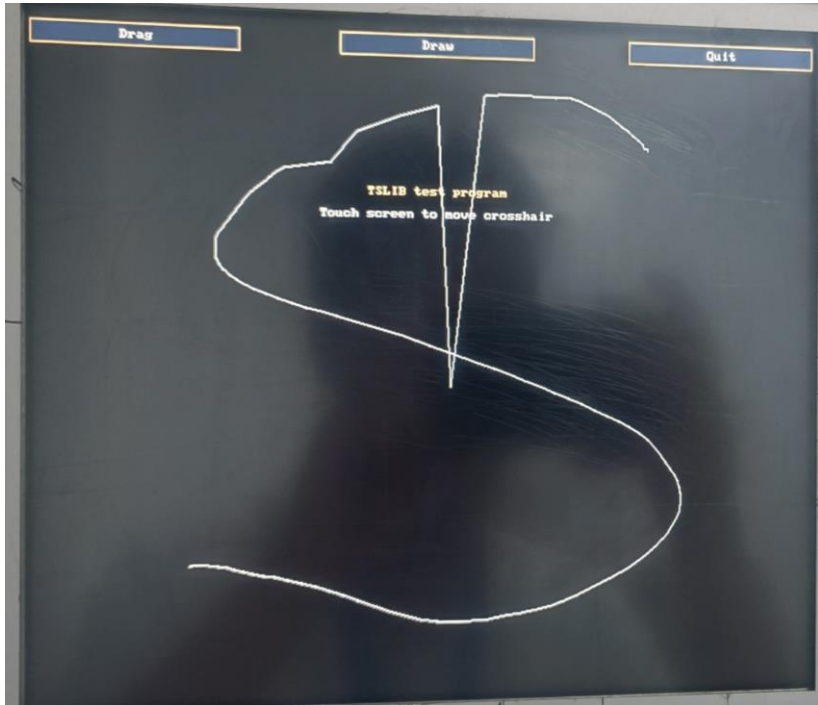
No X/Y Coordinates jumping was observed in the screen

EP0101:	X	Y	Z
1483229747.451925:	699	135	249
1483229747.461965:	700	134	241
1483229747.471929:	701	134	236
1483229747.481927:	701	134	236
1483229747.491846:	701	134	233
1483229747.501911:	701	134	230
1483229747.511908:	701	134	225
1483229747.521912:	702	134	219
1483229747.531929:	702	133	213
1483229747.541913:	702	133	207
1483229747.551911:	703	133	204
1483229747.561900:	703	133	202
1483229747.571862:	703	133	203
1483229747.581924:	703	133	204
1483229747.591841:	702	133	212
1483229747.601933:	702	134	223
1483229747.701854:	701	134	228
1483229747.711903:	701	134	221
1483229747.721834:	702	134	207
1483229747.731898:	702	133	191
1483229747.741964:	703	133	176
1483229747.751887:	704	133	167
1483229747.761897:	704	133	161
1483229747.771890:	704	133	156
1483229747.781915:	704	133	151
1483229747.791912:	704	133	146
1483229747.801902:	705	134	141
1483229747.811954:	705	134	137
1483229747.821904:	705	134	133
1483229747.831882:	705	135	130

As the pressure goes up, the Z-value goes down.  
No obvious change in X&Y value was observed.



## ■ WORK AROUND: 10NF ( X+/-,Y+/-)

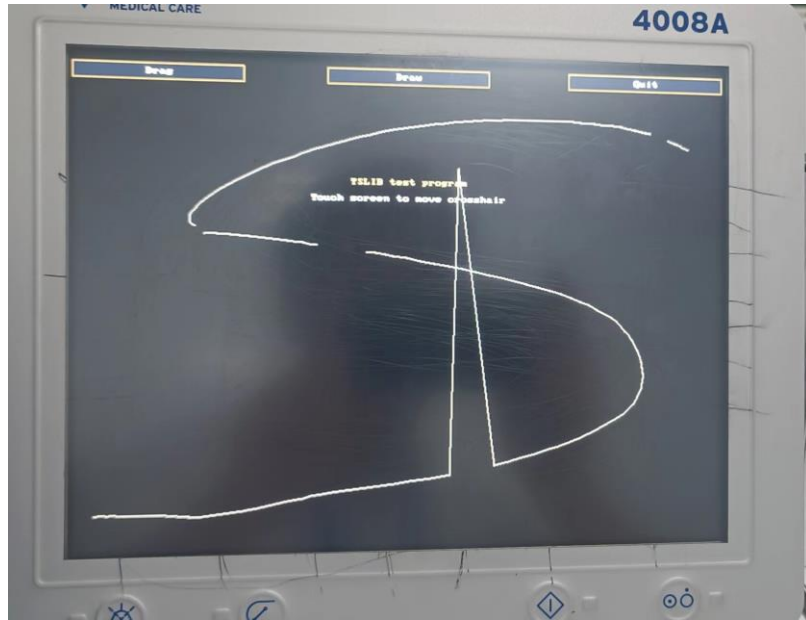


— Y-  
— Y+  
— X+  
— PENIRQ

A sudden drop in the X+ level was found.



## ■ WORK AROUND: REMOVE 10NF ( X+/-,Y+/-)

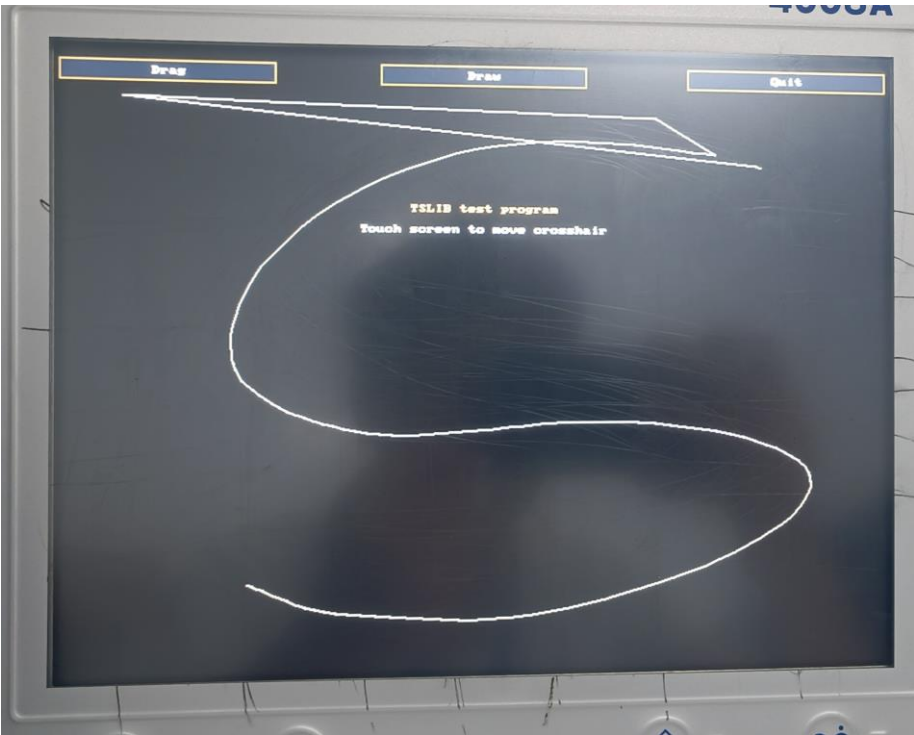


Y-  
Y+  
X+  
PENIRQ

It can still be found after removing 10NF capacitance.



■ WORK AROUND:10NF -> 100P( X+/-,Y+/-)

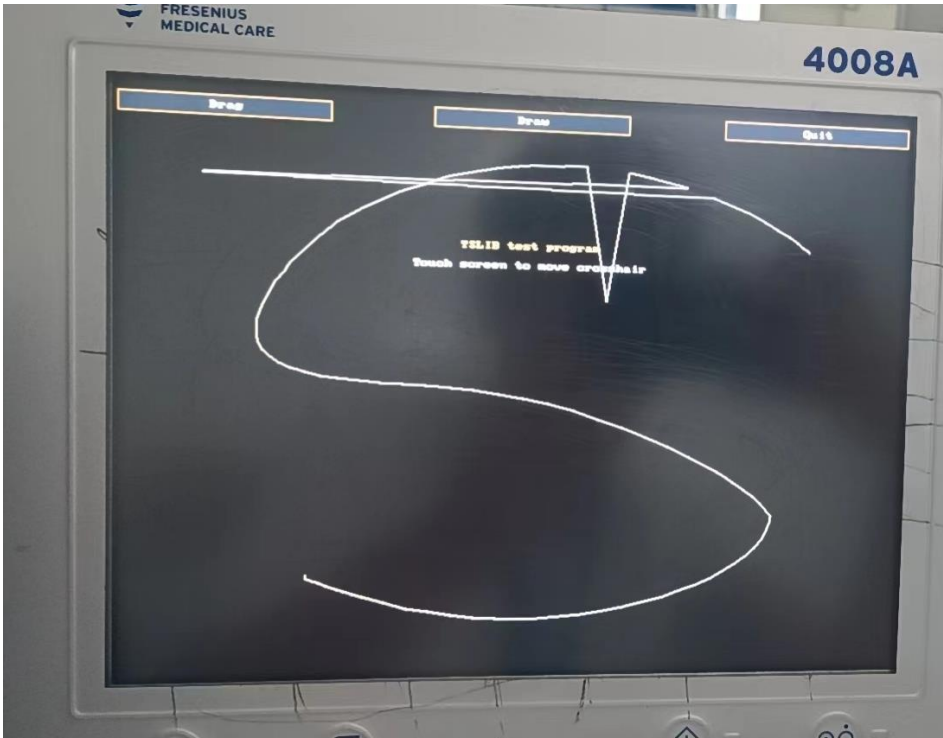
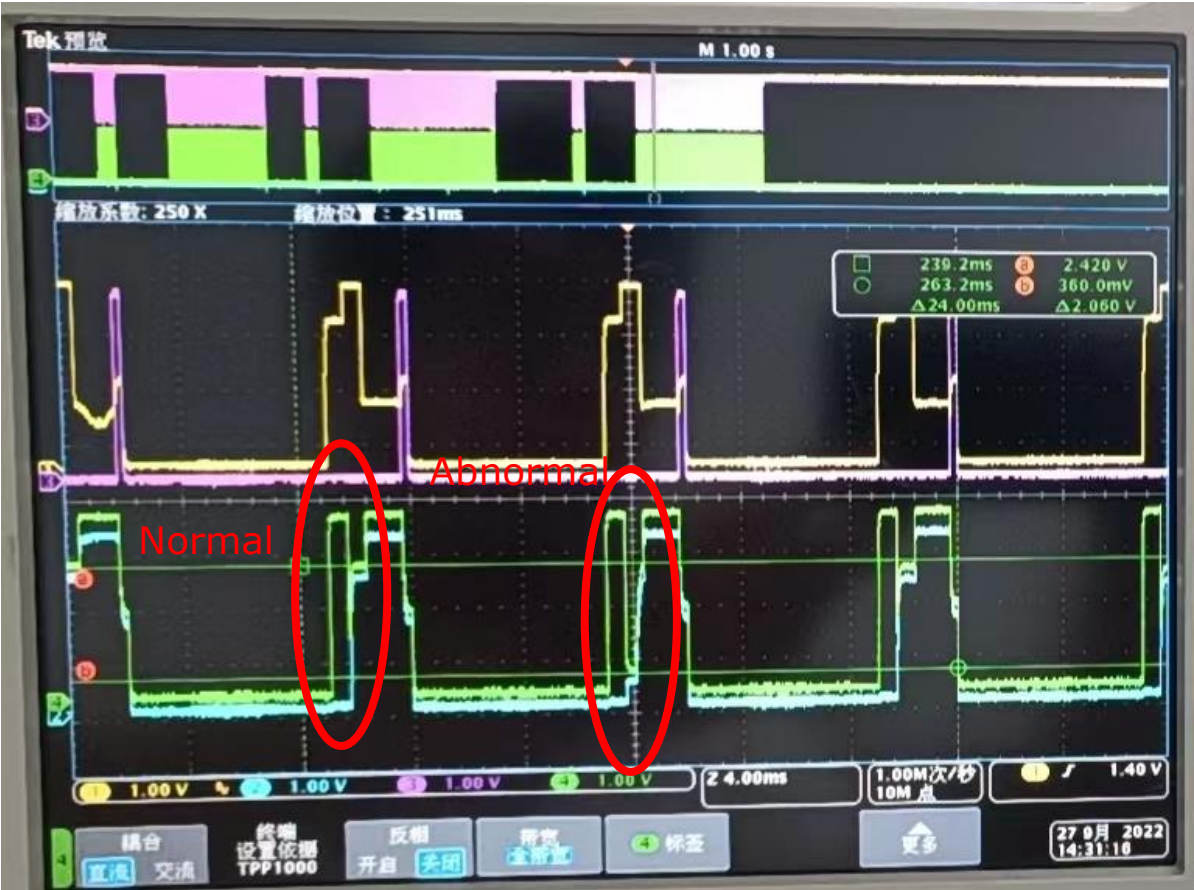


- Y-
- Y+
- X+
- PENIRQ

Change the capacitance from 10NF to 100PF and you can still find it.



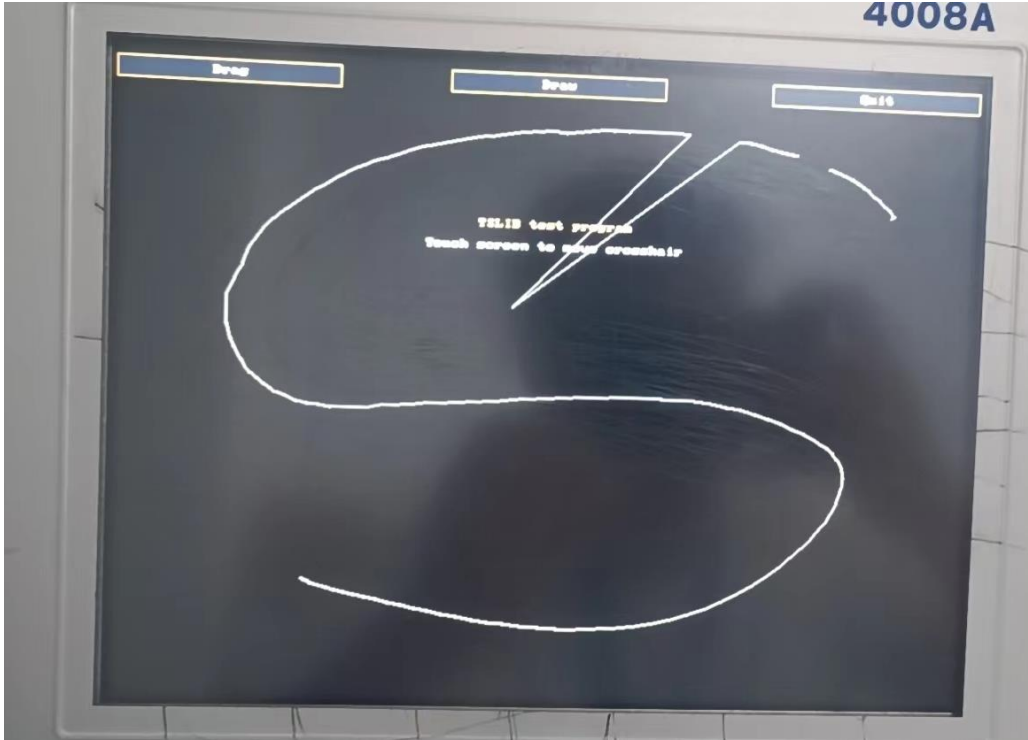
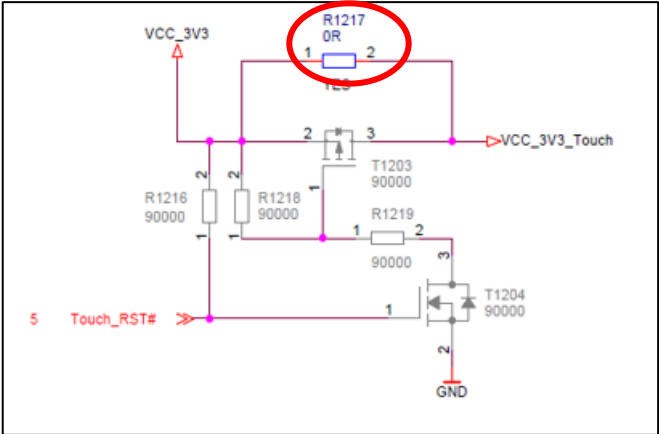
■ WORK AROUND -10NF -> 2PCS( X-,Y-)



Add capacitance only at X-&Y-, It can still be found.



# WORK AROUND – USE DC SUPPLY TO POWER ON TSC2007



- Y-
- Y+
- X+
- PENIRQ

Using DC Power Supply to provide clean VCC still exists.



# ■ CONFIGURATIONS IN SOFTWARE DRIVER

Internal Pull up Resistor : 50K  
Filter Control : On  
ADC : 12-bit

- only up to 100 measurements / s
- Connection to controller via I2C

**Procedure:**

Table 4. Command Byte Definition for the Setup Command		
BIT	NAME	DESCRIPTION
D7-D4	C3-C0 = '1011'	Setup command; must write '1011'.
D3-D2	PD1-PD0 = '00'	Reserved; must write '00'.
D1	Filter control	0: Use the onboard MAV filter (default). 1: Bypass the onboard MAV filter.
D0	PENIRQ pull-up resistor (R <sub>IRQ</sub> ) select	0: R <sub>IRQ</sub> = 50kΩ (default). 1: R <sub>IRQ</sub> = 90kΩ.

**COMMAND BYTE**

Table 2. Command Byte Definition (Excluding the Setup Command) <sup>(1)</sup>		
BIT	NAME	DESCRIPTION
D7-D4	C3-C0	All Converter Function Select bits as detailed in <a href="#">Table 3</a> , except for the setup command ('1011').
D3-D2	PD1-PD0	00: Power down between cycles. PENIRQ enabled. 01: A/D converter on. PENIRQ disabled. 10: A/D converter off. PENIRQ enabled. 11: A/D converter on. PENIRQ disabled.
D1	M	0: 12-bit (Lower speed referred to as the 2MHz clock). 1: 8-bit (Higher speed referred to as the 4MHz clock).
D0	X	Don't care.

(1) The command byte definition for the setup command is shown in [Table 4](#).

**Bits D7-D4: C3-C0**—Converter function select bits. These bits select the input to be converted and the converter function to be executed, activate the drivers, and configure the PENIRQ pull-up resistor (R<sub>IRQ</sub>). [Table 3](#) lists the possible converter functions.

**Bits D3-D2: PD1-PD0**—Power-down bits. These two bits select the power-down mode that the TSC2007 will be in after the current command completes, as shown in [Table 2](#).

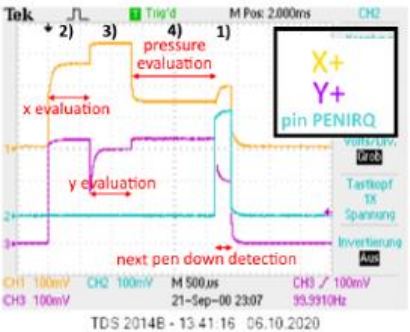


Figure 6: Oscilloscope picture of one measurement and the next pen down recognition (driver IC TSC2007).