

# PENMOUNT P2 PCIMSET USERS' GUIDE FOR MICROSOFT WINDOWS

Version 3.1

2025/04/30



## Preface

### Disclaimer

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## Revision Table

Date	Revision	Changes
<b>29/Aug/2017</b>	2.3	Initial release version.
<b>03/Jan/2018</b>	2.4	<ul style="list-style-type: none"> <li>(1) Added "Parameters CRC" to page display items</li> <li>(2) Added 1.4.7: Log UI Parameters Information Button under Information item, can read/write UI Parameter.</li> <li>(3) Added Auto Save Log Button to 2.1.3 Open Short Test function.</li> <li>(4) Added 3.4.3 Options, "Switch on the System Reference Dialog Box" and "Auto Save Log Button" selections to System Reference function.</li> <li>(5) Changed 3.1 Export / Import Parameters file format from PMP to INI format in the Parameters item.</li> <li>(6) 3.9.3 Orientation, corrected Orientation display method.</li> <li>(7) 5.2 Firmware Update item, added "Writer Factory Default Parameter" and "Write Host Interface/Panel Parameters" selections.</li> </ul>
<b>20/Jul/2018</b>	2.5	<ul style="list-style-type: none"> <li>(1) 5.1: add description of utility supporting pfp files with virtual button settings.</li> <li>(2) 5.2: add description of utility automatically selects write factory default option when using PMF or PMC file.</li> </ul>
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		<p>page.</p> <p>(8) 7.2: Remove “Log Noise Info” and combine the function into “Log Current Device Information”.</p> <p>(9) 16: New “Process Config” feature</p>
<b>31/Jan/2019</b>	2.7	<p>(1) Chapter 16: New section for Golden.</p> <p>(2) Chapter 16: New “Diagnostic Test” Option.</p>
<b>20/Aug/2020</b>	2.8	<p>(1) Removed: Process List Golden Sample and Diagnostic Test.</p> <p>(2) Add: 1.4.3 DLL Version.</p> <p>(3) Add:1.4.4 Core Version.</p> <p>(4) Add: <b>1.4.7</b> Folder Configure.</p> <p>(5) Add: 3.4.3 Reset SR.</p> <p>(6) Add: Edge Adjustment.</p> <p>(7) Modify: 4.7.1 Median Filter Renamed to Spike Filter.</p> <p>(8) Modify:4.7.3 Enhanced Frequency Hopping Renamed to Frequency Hopping Mode.</p> <p>(9) 5.1: Show CRC information of ND Base.</p> <p>(10) Add: 16.3 Skip Noise Level N Times Setting.</p>
<b>31/Mar/2021</b>	2.9	<p>(1) Document Title Changes to PenMount P2 PCIMSet Users Guide.</p> <p>(2) Modify: 1.6 psave and pload command line options.</p> <p>(3) Modify: 3.1 Open Short Test Renamed to Panel Quality Test.</p> <p>(4) Add: 4.7.3.2 Double ADC, FH Plus, and FH Tuning options.</p>
<b>09/Apr/2021</b>	2.9A	<p>(1) Modify: 1.6 -srns and -fu command line options.</p>
<b>30/Apr/2021</b>	2.9B	<p>(1) Modify:3.4, add notes that SR is required when using WD or WP.</p> <p>(2) Modify:4.6.1, add notes that SR is required when using WD or WP.</p>

<b>31/May/2021</b>	2.10	<ul style="list-style-type: none"> <li>(1) Modify: 1.4.5, ND Base CRC information.</li> <li>(2) Modify: 2.4.2, Add options for changing background color.</li> <li>(3) Modify: 4.7.3.2, the advanced FH parameters.</li> <li>(4) Modify: 4.7.3.3, introducing new UI.</li> </ul>
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<b>13/Mar/2024</b>	3.0C	<ul style="list-style-type: none"> <li>(1) Modify 2: GUI adjustment.</li> </ul>
<b>30/Apr/2025</b>	3.1	<ul style="list-style-type: none"> <li>(1) PM1420 Support.</li> </ul>

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# 1. Introduction

This document provides information for using PenMount PCIMset to determine touch device settings and perform updates and tests.

## 1.1 Supported Systems

PenMount PCIMset can operate in the operating systems listed below:

Types	Operating Systems
<b>Desktop</b>	Windows XP (32/64bit)
	Windows Vista (32/64 bit)
	Windows 7 (32/64 bit)
	Windows 8 / 8.1 (32/64 bit)
	Windows 10 (x86 32/64bit) <sup>1</sup>
	Windows 11 (x86 64bit / ARM 64bit)
<b>Server</b>	Windows Server 2003 / R2
	Windows Server 2008 / R2
	Windows Server 2012 / R2
	Windows Server 2016 / 2019 / 2022
<b>Embedded</b>	Windows XP Embedded / Standard 2009
	Windows Embedded Standard / POSReady 7
	Windows Embedded 8 Standard / 8.1 Industry
	Windows 10 / 11 IoT Enterprise

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<sup>1</sup> Recommend using the Windows 10 Anniversary Edition 1607 (10.0.0.14393) and later versions.

## 1.2 Supported Device

Devices and interfaces supported by PenMount PCIUtility are as follows:

Series	Control Board	USB	RS-232 / UART	I <sup>2</sup> C <sup>2</sup>
<b>PenMount P2-02 Series</b>	PM1100		v	
	PM2101		v	v
<b>PenMount P2-03 Series</b>	PM1200	v	v	
	PM1201A	v	v	
	PM2201	v	v	v
<b>PenMount P2-04 Series</b>	PM1300A	v		
	PM1302	v	v	v
	PM1302B			v
	PM1400A	v	v	
	PM1401	v	v	
	PM1401A	v		v
	PM1500	v	v	v
<b>PenMount P2-06 Series</b>	PM1110A		v	
	PM1210	v	v	v
	PM2103	v	v	v
	PM2203	v	v	v
	PM2203B	v	v	v
	PM2203C	v		
	PM2204	v	v	v
	PM2251	v	v	v
	PM2252	v	v	v
	PM2351	v		
	PM2300	v	v	v
	PM2301A	v	v	v
<b>PenMount P2-08 Series</b>	PM1310	v	v	v
	PM1410	v	v	v

<sup>2</sup> The I<sup>2</sup>C, UART / RS-232 interface is supported by connecting through the PMT101 Adapter.

	PM1415	v		v
	PM1710	v	v	
	PM1711	v		v
	PM1715	v		v
	PM2205	v	v	v
	PM2206	v		
	PM2207	v		v
	PM2303	v	v	v
	PM2304	v	v	v
	PM2356	v	v	
	PM2357	v		
	PM2358	v	v	v
<b>iBTPS-1104</b>	PM1420	v	v	v

The “Quick Select” feature supports the following firmware versions.

Touch Panel Model	Size	Control Board	1.1mm	1.8mm	2.8mm	4.0mm
<b>AMT P3007</b>	8.4”	PM1310	v	v	v	v
<b>AMT P3008</b>	10.4”	V6.4	v	v	v	v
<b>AMT P3021</b>	10.1”	V6.5	v	v	v	v
<b>AMT P3023</b>	15.6”	PM1410		v	v	v
<b>AMT P3026</b>	12.1”	PM1415	v	v	v	v
<b>AMT P3029</b>	15”	V6.4		v	v	v
<b>AMT P3030</b>	12.1”	V6.5	v	v	v	v
<b>AMT P3019</b>	18.5”	PM1710		v	v	v
<b>AMT P3022</b>	21.5”	PM1711		v	v	v
<b>AMT P3027</b>	19”	PM1715		v	v	v
<b>AMT P3028</b>	17”	V6.4		v	v	v
<b>AMT P3034</b>	23.8”	V6.5		v	v	v

### 1.3 Summary

The application version of PenMount PCIMset is summarized in the table below.

### 1.3.1 Main Files

Utility	Usage	Application Version	Notes
<b>PCIMSet.exe</b>	Advanced firmware configuration	3.1.X	32-bit Windows application.
<b>PM_Standard.dll</b>	Companion library of PCIMSet.	1.8.X	
<b>PCIMSet.ini</b>	Default settings of PCIMSet.		

The application version can be found on the “Information” page.

### 1.3.2 Optional Addon Files

Utility	Usage	Application Version	Notes
<b>iBTEventLog.exe</b>	The Event Logging tool.	1.17.X	32-bit Windows application.
<b>Setting.ini</b>	Settings of iBTEventLog		
<b>PanelConfig.exe</b>	Panel configuration utility.	1.6.X	32-bit Windows application.
<b>PanelConfig.ini</b>	Settings of PanelConfig		
<b>IB_Standard.dll</b>	Companion library of iBTEventlog and PanelConfig utility.	1.4.X	

## 1.4 Checking Utility Information

The version of PCIMset and other useful information are listed on the “Information” page.

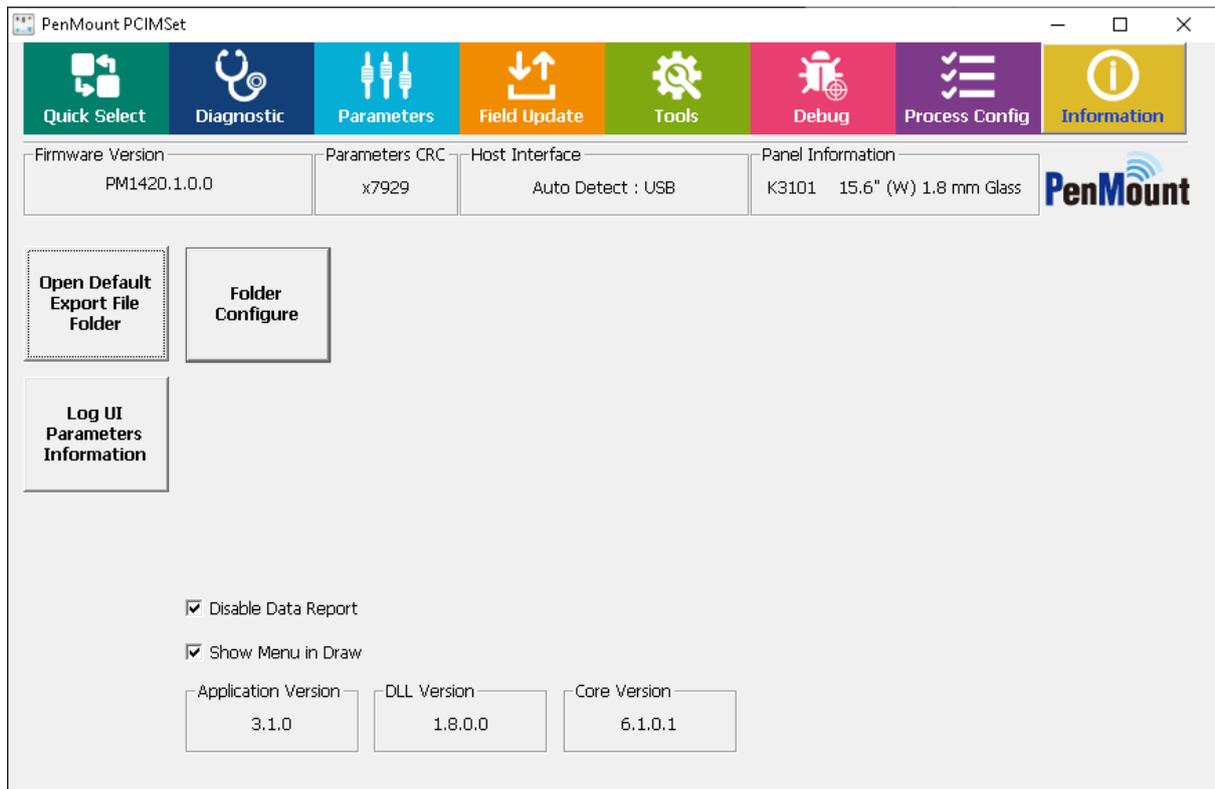


FIGURE 1

### 1.4.1 Device Information

Connected device information consists of several parts:

- Master Firmware / Slave Firmware / Test Version  
The firmware version of the connected device.  
If marked as “Test Version”, it means that this firmware is for testing purpose only.
- Parameters CRC  
A code for identifying parameter sets. Same firmware versions with different CRC values indicates there are parameter differences.
- Host Interface  
The connected interface, most P2-06 and P2-08 devices support interface auto detection.
- Panel Information  
Configuration of panel size and cover lens thickness.

### 1.4.2 Application Version

It is the version of the utility.

### 1.4.3 DLL Version

This is the version of the PM\_Standard.dll file that the utility is using.

### 1.4.4 Core Version

It is the version of the firmware core features. Different firmware with similar core versions mean that their performance result will be very close too.

### 1.4.5 ND Base CRC

When this CRC value appears, it means that this firmware comes with some extra preconfigured noise compensation settings.



FIGURE 2

### 1.4.6 Open Default Export File Folder

Pressing this button will open the file manager and allow user to browse the test results, parameters, and other files generated by PCIMset. By default, the directory is located at:

%LOCALAPPDATA%\PenMount Utility

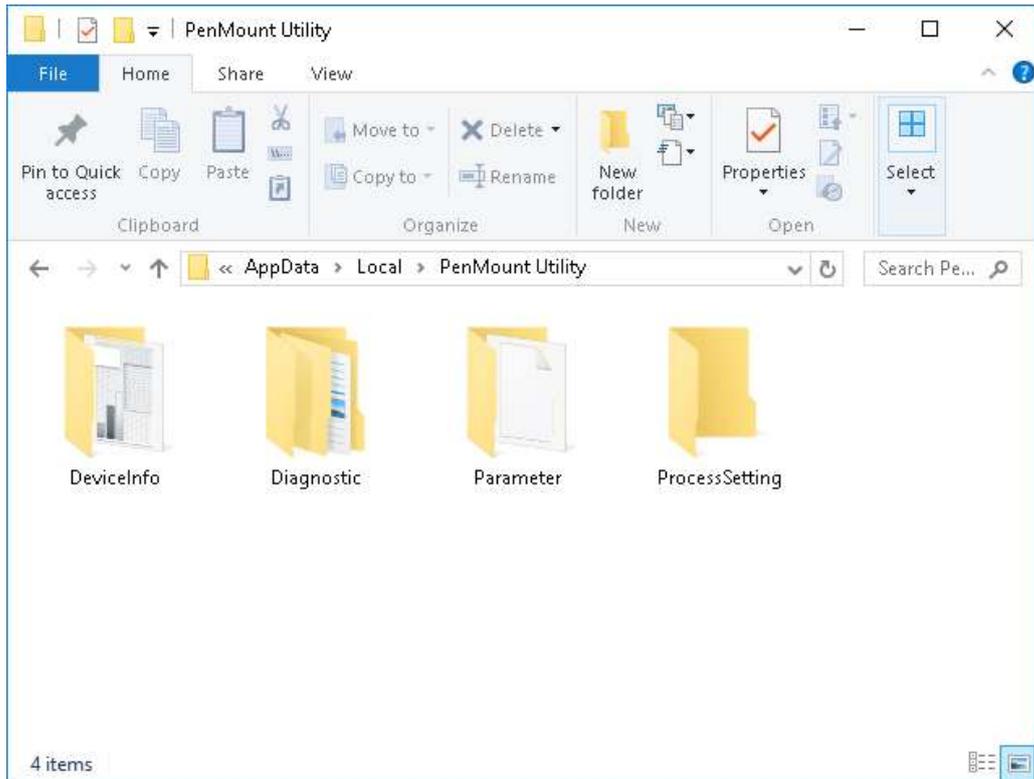


FIGURE 3

### 1.4.7 Folder Configure

The PCIMset remembers the last selected directory as the default value of next operation. For example, if user loads firmware file from “D:\Firmware”, the next time user launches “Load Firmware” button, it will list firmware files in the “D:\Firmware” directory.

PCIMset allows specifying the default folders for different actions, as shown in the below screenshot.



FIGURE 4

### 1.4.8 Log UI Parameters Information

Pressing this button will save all the parameter settings in human readable format from the connected device. This feature is useful when comparing the parameter differences of two devices with different CRC values.

	A	B	C	D	E
1	Log Time:	2024	1-Oct	11:10:26	
2	Function:	Log UI Parameters Information			
3					
4	[SW Info]				
5	Version	Application PenMount PCIMSet 3.0.0.0			
6	Version	Library:	1.7.0.0		
7					
8	Master	Version :	PM1310.6.4.0	Boot :	8.0
9					
10	Core	Version :	4.0.1.19		
11					
12	Device Interface :	Auto Detect :	USB		
13					
14	Parameters CRC :	x2364			
15					
16	Host Interface :	Auto Detect :	USB		
17	Baud Rate :	38400			
18	Hid Report :	Digitizer Mode ( PID 3508 )			
19	I2C Hid Protocol :	( OFF )			

FIGURE 5

### 1.4.9 Disable Data Report

When this option is checked, touch will be disabled when PCIMset is running.

### 1.4.10 Show Menu in Draw

When this option is checked, a menu button will appear in Draw mode. Please check chapter 6.2 for each option in menu.

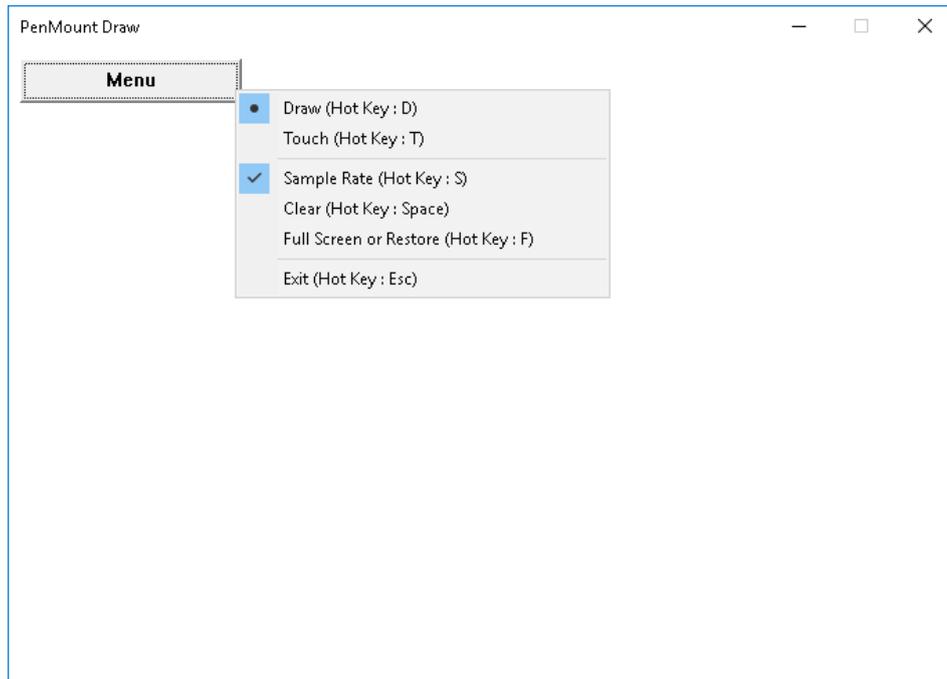


FIGURE 6

### 1.4.11 Reset Device

If device is not connected when utility starts up, it can still automatically detect when device is attached to USB interface. For RS-232 / UART / I2C interface, PCIMset should configure device by the PenMount Bridge, and the user can press the "Refresh" button to detect device.

Please notice that is no device connected, only "Draw", "Process Config", "Refresh", and "Information" pages can be accessed, and the reset button becomes "Refresh".

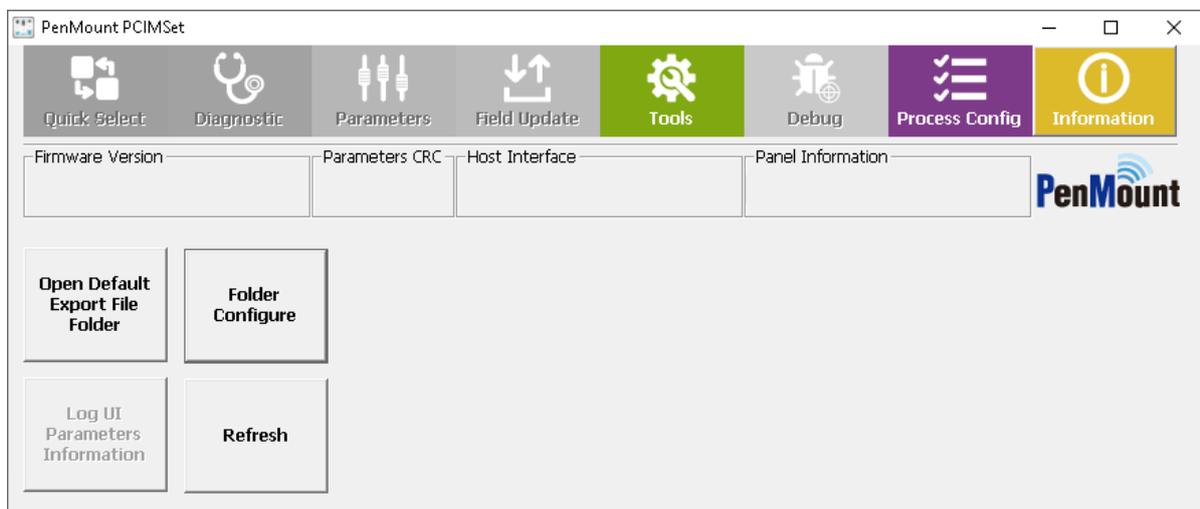


FIGURE 7

If the device is connected, PCIMset enables “Reset Device” button. The user can reset device by this button.



FIGURE 8

## 1.5 Special Notice

1. PenMount PCIMset can only support the setting and operation of one single device at one time.
2. Not all PenMount Utilities can be opened simultaneously.

## 1.6 Command Line Features

This version of PCIMset supports the following command line options. Please choose one of the following options.

Option	Description	Feature Reference
-os	Panel Quality (Open Short) Test	Section 3.1
-nl0	Noise Level Test, using pattern “NONE”	Section 3.2
-nl1	Noise Level Test, using pattern “WHITE”	
-nl2	Noise Level Test, using pattern “BLACK”	
-nl3	Noise Level Test, using pattern “CHECKERBOARD”	
-sr	Build System Reference	Section 3.4
-srns	Build System Reference (no dialog box for log saving)	Section 3.4
-psave	Saves parameters of the connected device to INI file.	Section 4
-pload	Loads parameters from specified INI file to connected device	Section 4

<b>-fu</b>	Load specified firmware file and perform firmware update.	Section 5
------------	---	-----------

## 2. Quick Mode Selection

This feature provides a convenient way to switch between modes for *anti-noise performance optimization*.

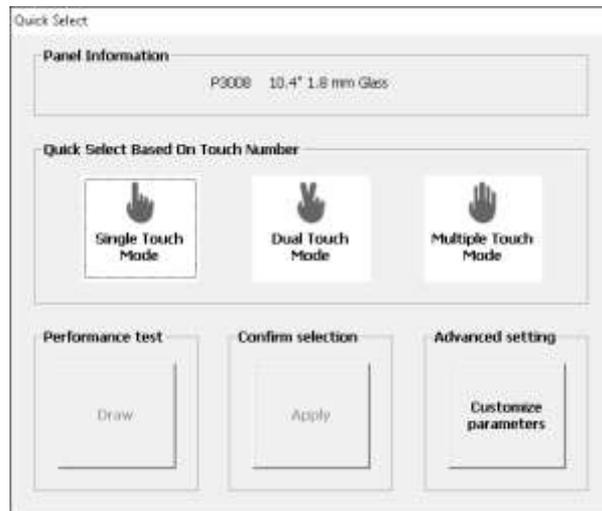


FIGURE 9

### STEP 0. Confirm using Quick Select

Since the quick select feature will overwrite parameter settings, the utility will remind users that does not intend to use Quick Select on startup.

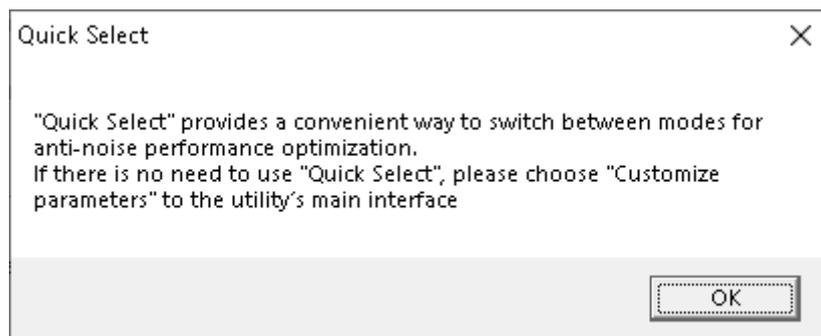


Figure 10

### STEP 1. Check Panel Information

The utility will show the firmware panel configurations on top of the window. Please check if the information is correct.

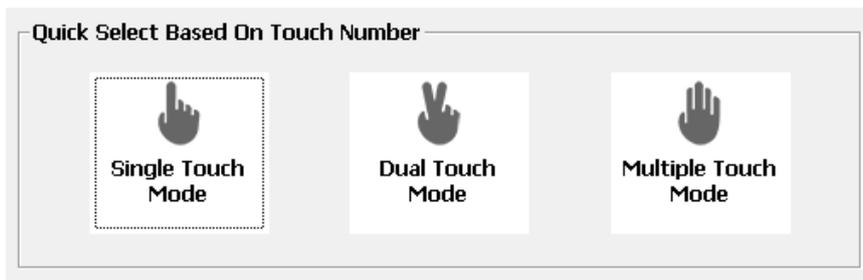


**Figure 11**

If the firmware configuration does not match the panel or cover lens physically used, or after firmware update, please use the “Customized parameters” button to return to the main menu of the utility and change the configurations to correct settings.

**STEP 2. Select Finger Mode**

Select from Single Touch / Dual Touch / Multiple Touch Mode based on your need. For more demanding operating environments, it is recommended to choose a mode with fewer fingers.



**FIGURE 12**

The supported modes:

Mode	Sample Rate	Anti-Noise	Gesture Support	Water Handling
Single Touch mode	Good	Extreme	1	Fewer false reports
Dual Touch Mode	Normal	Extreme	1 / 2	
Multiple Touch Mode	Normal	Enhanced	1 / 2 / multiple	

After a mode is selected, proceed by selecting Yes for mode change confirmation. **Please notice that this will overwrite the current device parameters.**



**FIGURE 13**

**STEP 3. Test Performance**

The final step is to use “Draw” to test performance.

- Choose “Apply” to continue using this mode and return to the utility’s main interface.
- Choose “Restore parameters” to restore to original device settings and return to the utility’s main interface.

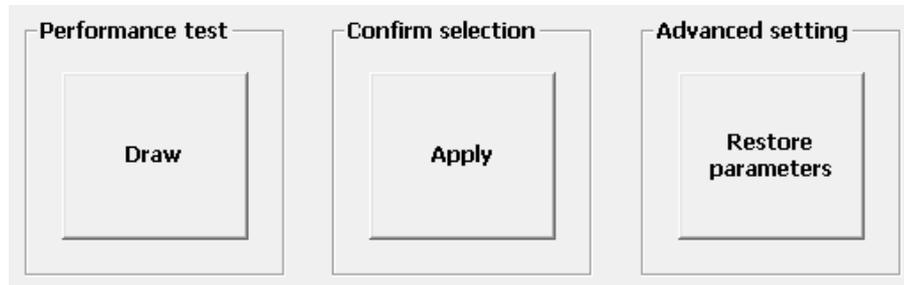


FIGURE 14

### 3. Diagnostic

PCIMset provides standard product testing procedures, including:

- Panel Quality Test: test the electrical functions, including open-short test of PCI touch panels
- Noise Level: detect the size and area of the PCI touchscreen influenced by noise interference.
- 3D Module: graphical view for diagnosing raw signal.
- System Reference: allow user to rebuild the reference data used for adjusting environmental changes. This feature is only supported in some device firmware versions.

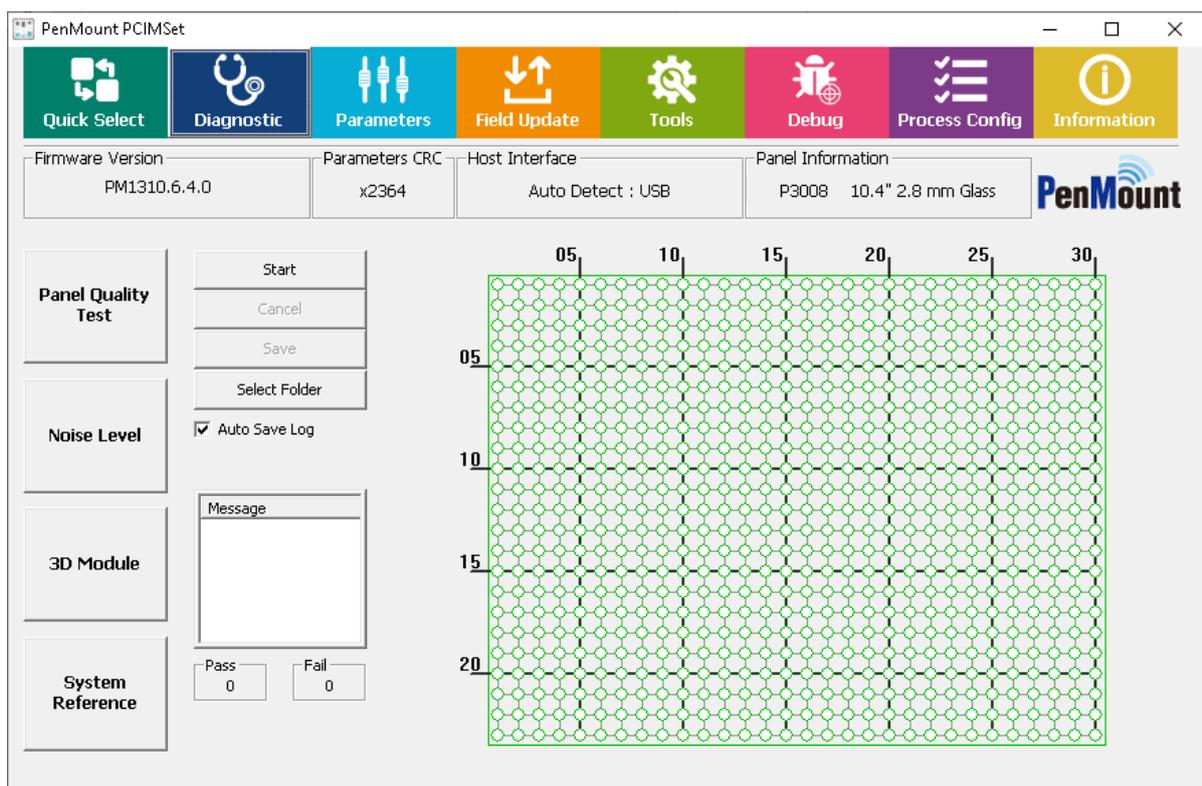


FIGURE 15

#### 3.1 Panel Quality Test

The Panel Quality tests sensor and driver pins for possible open / short issues. To ensure the accuracy, please do not perform any touch action while the test is running.

Click the “Start” button; this will start electrical detection on the touchscreen. When a single test is running, status will display “START” and “progress” will rise from bottom to top.



FIGURE 16

Once detection is completed, the result will appear as the status. If the touchscreen is normal, PASS will be displayed. If it is abnormal, FAIL will be displayed. To the right side of the Status field is the “Pass & Fail” field, indicating the number of Passes or Fails after the program starts to run detection

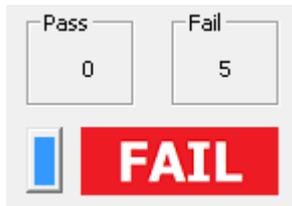


FIGURE 17

Meanwhile, the status of the touchscreen is shown at the right side of the window. Green means the node is normal and red means abnormal.

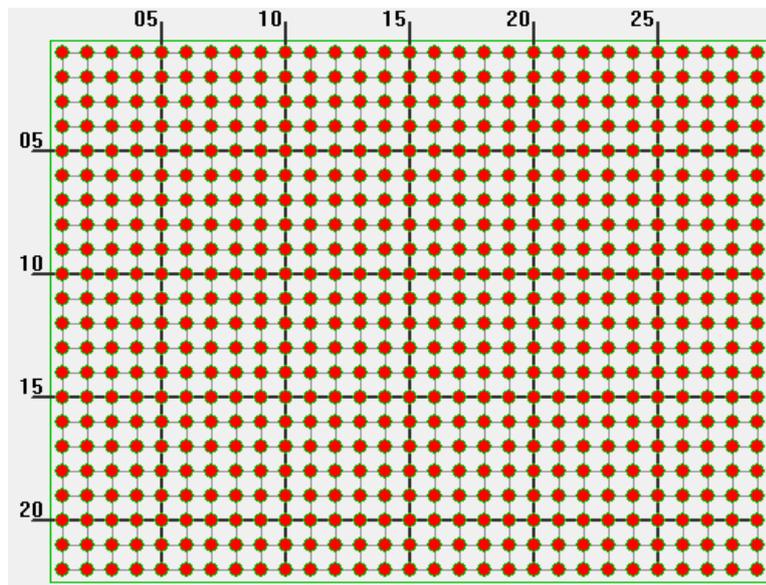


FIGURE 18

### 3.1.1 Test Items

When diagnosis starts, the program measures raw data from every node on touch panel. Three sets of raw data are collected for signal testing. The primary test items are as follows:

Items	Data Set	Settings	Threshold
<b>Check the Same Data</b>	PD Data	---	Check if all sets of PD data are identical.
<b>Check</b>	PD Data	[PCIScan Threshold]	If the three sets of raw data on all the nodes of the touch panels are

<b>Debounce</b>		Debounce	distinctively different from one another and larger than Debounce threshold, it is determined as abnormal.
<b>Check Driver Abnormal</b>	PD Data	[PCIScan Threshold] Driver Driver Percent	Test the raw data of two consecutive driving and the difference between them should not be excessively large.
<b>Check Sensor Abnormal</b>	PD Data	[PCIScan Threshold] Sensor Sensor Percent	Test the raw data of two consecutive sensor pins and the differences should not excessive.
<b>Check Absolute Data</b>	PD Data	[PCIScan Threshold] Absolute	Checks whether raw data is within valid range.
<b>Check ND Base</b>	ND Base	[PCIScan Threshold] Do_ND_Base_Check	Check if ND base normal.
<b>Check Near Raw</b>	Raw Data 1	[PCIScan Threshold] Skip_Do_SR_Test	Checks whether the raw data of two adjacent driver lines/sensor lines is similar.
<b>Check Base Flat</b>	Mode Diff	Enabled by GUI option	Checks whether the base is flat.

### 3.1.2 Test Result & Analysis

When diagnose ends, the program displays messages for each failed test items:

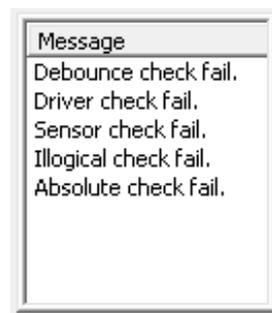


FIGURE 19

After the test is completed, nodes with abnormal signals will be immediately indicated. They are usually classified in three types:

1. Single point abnormal

When the test result is “single point abnormal,” it is because the difference of the signal values for one location and the ambient nodes is too large. If the grounding for the system is not ideal, which may lead to touch instability, abnormality will be tested at different nodes during each test.

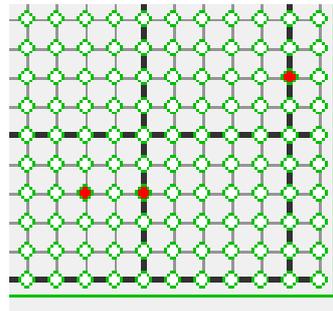


FIGURE 20

## 2. Whole pin abnormal

When the test result is “Whole pin abnormal,” it is usually either due to the open state of sensor/driving pin or too many abnormal nodes on the same pin.

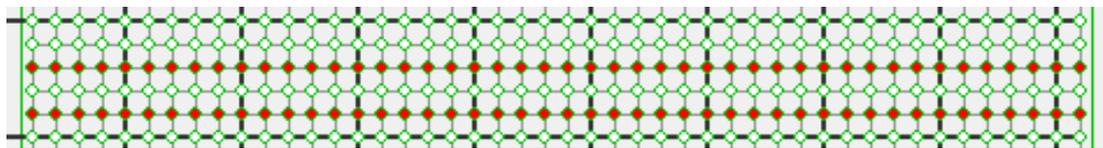


FIGURE 21

## 3. Whole panel abnormal

When the test result shows whole panel abnormal, it is usually because the signals detected never change during the process. When you are connecting the touch panel with the control board, if the cables are not connected properly, this will happen.

In some circumstances, it is hard to see where the problem is from the appearance of the product. You can run PCIScan and cross reference to determine whether the source of the problem is the control board or the touch panel.

### 3.1.3 Save Test Results

If the touch panel shows “signal abnormal,” you can save the results into a file and provide it to PenMount for further analysis. You can click “Save” after the test is completed. The “Select Folder” button allows changing of the target folder for saving test results.

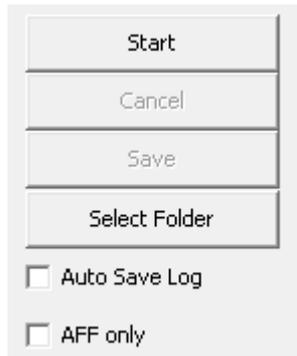


FIGURE 22

A dialogue box below will appear. The user must enter “Batch Number 1” and click OK to save. We suggest using the touch panel number as the “Batch Number” for future identification. The program will save the test results either in the “TestPass” or “TestFail” folder based on the test results under `$ProductNumber_ $BatchNumber_ $Month$Day$Hour$Minute$Second”.csv`.

- Auto Save Log

With this option checked, the “Save File” dialog will automatically appear.

- AFF only

Select this option if the target panel is AFF type. It will skip the “base flat” checking, which could fail when testing AFF type of touch panels.

### 3.1.4 Test Log

The program will save the detected signal in CSV file. The format of CSV is a text file, which can be opened with spreadsheet software such as Microsoft Excel.;

- Basic data

The beginning of the CSV file records data for the corresponding touch panel and controller. You can also see the threshold value for the test.

	A	B	C	D	E
1	[SW Info]				
2					
3	Log Info Spec Version:	V 3.0.1			
4					
5	Log Time:	10/1/2024 13:21			
6	Version	Application:	PenMount PCIMSet 3.0.0.0		
7	Version	Library:	1.7.0.0		
8	Function:	Panel Quality Test			
9					
10	[FW Info]				
11	Version	Firmware:	PM1310.6.4.0 Boot : 8.0		
12	Version	Core:	V4.0.1.19		
13	Panel Information:	P3008 10.4"			
14	Cover Lens:	2.8 mm Glass			
15					
16	[Parameter]				
17	Parameter	CRC:	x8C86		
18					
19	Batch1:	P3008			
20					
21	Batch2:				
22					
23	[Panel Quality]				
24	Result:	PASS			

FIGURE 23

- RawData

The CSV contains several sets of raw data which are the basis for judgment for each test.

[RawData]							
0	1	2	3	4	5	6	7
1	493	498	499	503	501	503	509
2	511	526	525	528	527	528	528
3	514	528	528	530	531	533	533
4	508	519	523	525	526	528	529
5	501	509	510	512	519	519	519
6	516	528	534	534	531	533	533
7	517	528	528	531	532	532	539
8	512	519	523	524	521	527	526
9	518	525	527	528	530	530	533
10	520	529	529	527	530	531	538
11	519	531	535	537	535	533	538
12	514	528	525	529	529	529	534
13	516	524	527	527	530	532	539
14	525	536	537	537	538	540	553
15	534	535	540	538	542	541	558
16	523	537	534	534	534	534	536
17	528	534	536	538	540	538	545
18	530	538	540	539	541	541	546

FIGURE 24

Raw data is arranged in a two-dimensional array, which corresponds to the nodes on the sensor and the driver pin. The nodes with \* are abnormal. From the raw data, you can presume the reason for the abnormality. In the example below, there is obviously less raw data coming from the nodes marked abnormal than the surrounding nodes.

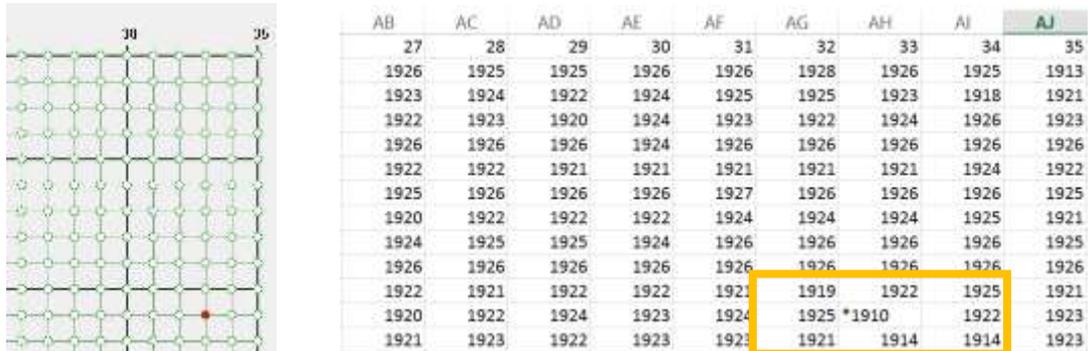


FIGURE 25

- PDData  
This is the raw data used during the “Illegal Data Check”.
- SectData  
This is the sector scan result. For reference only.
- SelfData  
This is the abnormal scan result. For reference only.
- Raw Data Near  
This is to check total delta of adjacent sensor and driver.
- Base Flat  
This checks whether base is sufficiently flat.

### 3.2 Noise Level

The Noise Test mainly evaluates the degree of noise interference impact on the touch panel. Usually noise will affect measurement and large fluctuations will be produced. The program will display the “noise level” interface:

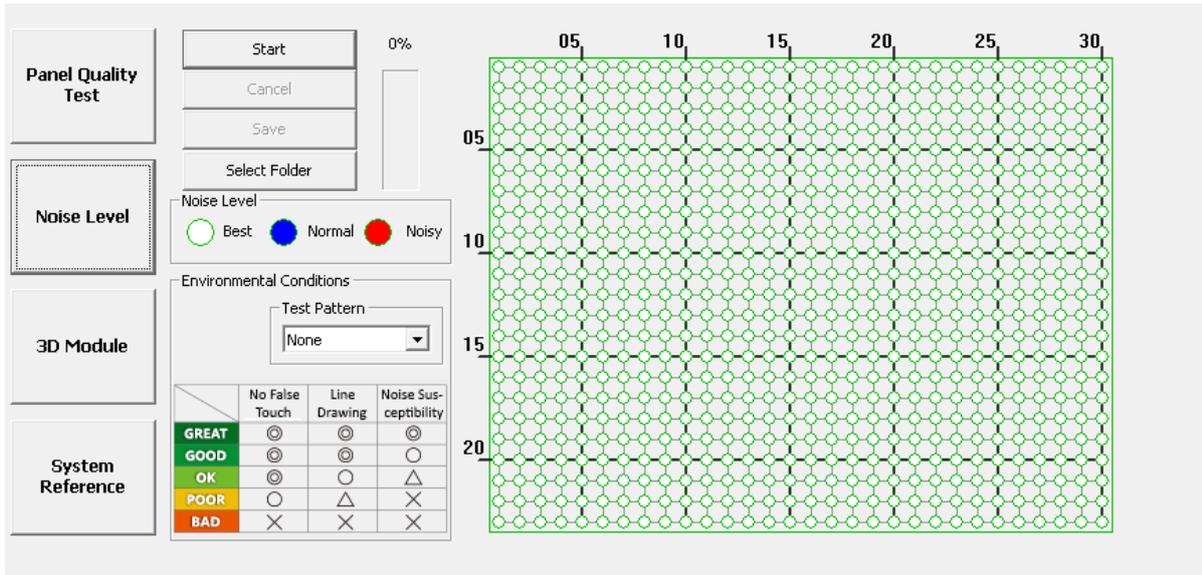


FIGURE 26

### 3.2.1 Execute Test

Please click “Start” on the left side of the window to start running the test. To ensure test accuracy, please avoid any touch input during the test.

During this period, progress will be displayed in the window caption. All other utility features will be temporarily disabled during the test. Usually, the test takes longer when using larger panel sizes. Please click “Cancel” if want to abort to sue other features.

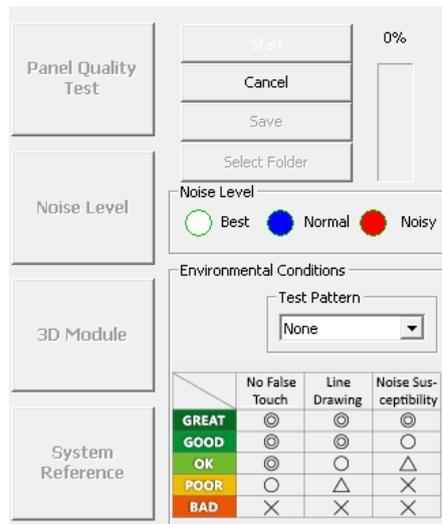


FIGURE 27

For testing LCD noise interference with specific display patterns, please change “Test Pattern”. Currently “White”, “Black”, and “Checkerboard” are supported. Please be aware that after pressing the “Start” button, the LCD will display the specified pattern in full screen mode until the test finishes. The utility will obtain 50 instances of raw data for each node and use these raw data to calculate standard deviation for each node.

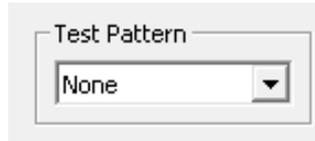


FIGURE 28

### 3.2.2 Test Analysis

The utility uses standard deviation (SD) and difference threshold values to judge the noise level. According to the standard deviation calculated from the raw data, the program will be categorized nodes on the touch panel as “Best”, “Normal,” and “Noisy” and mark them respectively in white, blue, and red.

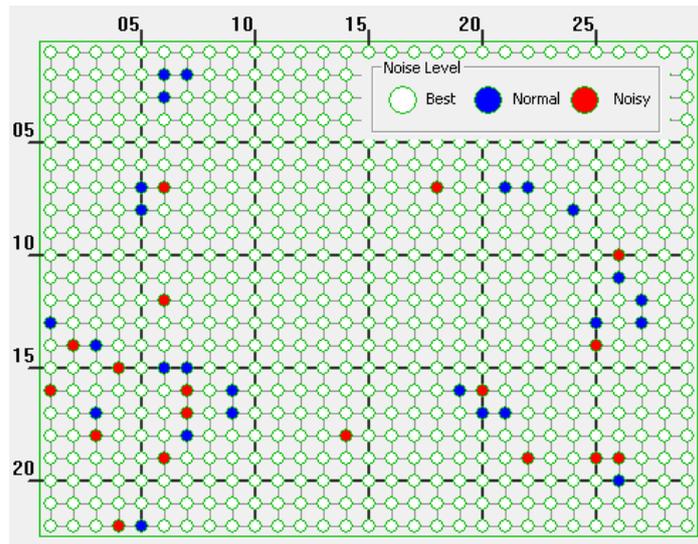


FIGURE 29

Node	Color	Criteria
Best	White	$ SD  \leq \frac{1}{6} \text{ threshold}$
Normal	Blue	$\frac{1}{6} \text{ threshold} \leq  SD  \leq \frac{1}{4} \text{ threshold}$
Noisy	Red	$ SD  \geq \frac{1}{4} \text{ threshold}$

The right side of the program indicates the degree of signal changes in the nodes on the touch panel.

Nodes marked with a red circle indicate a greater change in the signal value measured and it may be unstable.

To give the user a better idea of overall signal changes, the program will analyze and show the environmental criteria, and classified in 5 levels: “GREAT”, “GOOD”, “OK”, “POOR”, and “BAD”.

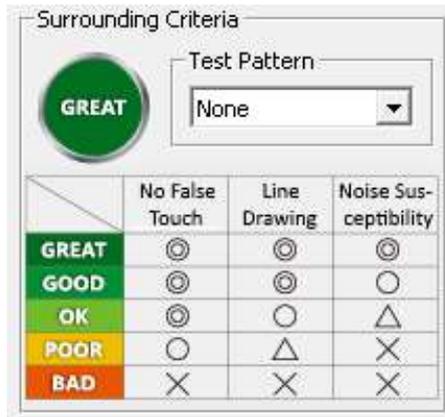


FIGURE 30

The following table shows how the environmental condition is evaluated. The threshold values can be adjusted in the config file.

Result	Node Conditions	Threshold Setting
	Best 100%	[Noise Level Threshold] Great=100
	Best $\geq 95\%$ Normal $\leq 5\%$ Noisy = 0%	[Noise Level Threshold] Good=95
	Best $\geq 85\%$ or Noisy $< 1\%$	[Noise Level Threshold] OK=85 OKRed=1
	Best $\geq 50\%$ or $1\% \leq \text{Noisy} \leq 10\%$	[Noise Level Threshold] Poor=50
	Best $< 50\%$ or Noisy $> 10\%$	OKRed=1 PoorRed=10

Please try to lower noise interference by increasing the air gap between touch panel and LCD, and also use common ground by connecting the LCD metal frame and the screw holes of the PenMount control board together to bring environmental conditions to a least “OK” level.

### 3.3 3D Module of Touch Signal

Pressing the “3D Module” button launches the 3D module for inspecting touch or noise signals. Please prepare a mouse or keyboard before launching this feature, because touch will be disabled during the entire process.

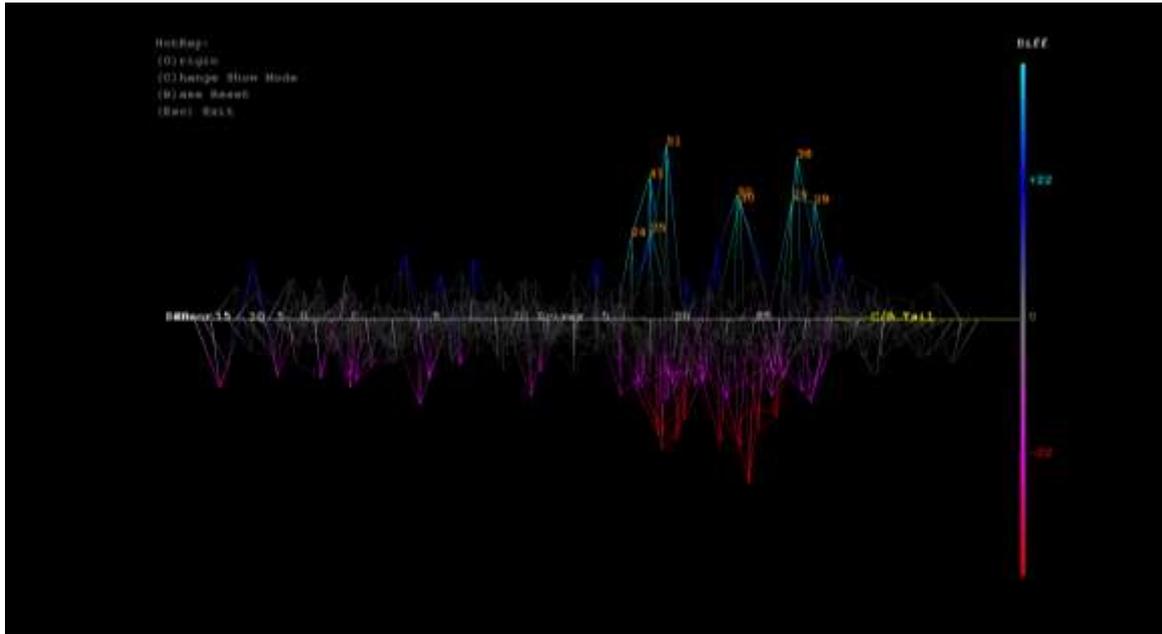


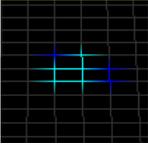
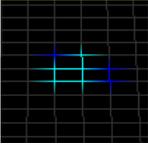
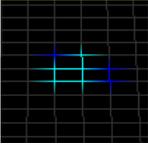
FIGURE 31

The program will use different colors to show the signal strength.

Colors	Signals
<b>Cyan</b>	Larger positive signals, possibly identified as finger touch
<b>Blue</b>	Smaller positive signals, usually caused by environmental noise
<b>White</b>	Normal signal and No touch
<b>Magenta</b>	Smaller negative signals, usually caused by environmental noise
<b>Red</b>	Larger negative signals, possibly caused by water, etc.

The 3D module supports several hotkey listed in the table below.

Colors	Actions
<b>top</b>	5 degree X axis counterclockwise rotation
<b>down</b>	5 degree X axis clockwise rotation

<b>left</b>	5 degree Y axis counterclockwise rotation						
<b>right</b>	5 degree Y axis clockwise rotation						
<b>+</b>	Zoom in						
<b>-</b>	Zoom out						
<b>O</b>	Restore to default angle: 225 degree X axis counterclockwise rotation, 270 degree Z axis clockwise rotation						
<b>B</b>	Reinitialize the base signal						
<b>C</b>	<p>Change displayed mode.</p> <table border="1"> <thead> <tr> <th colspan="2">Mode</th> </tr> </thead> <tbody> <tr> <td><b>Mode 1</b></td> <td></td> </tr> <tr> <td><b>Mode 2</b></td> <td></td> </tr> </tbody> </table>	Mode		<b>Mode 1</b>		<b>Mode 2</b>	
Mode							
<b>Mode 1</b>							
<b>Mode 2</b>							

### 3.4 System Reference (SR)

The “System Reference” is supported in most P2-06 and P2-08 device firmware, which is essential when using firmware water handling features (WD / WP). Without SR built, environmental changes could cause unexpected behaviors.

If the “System Reference” button is greyed out, it means that the device firmware does not support system reference.

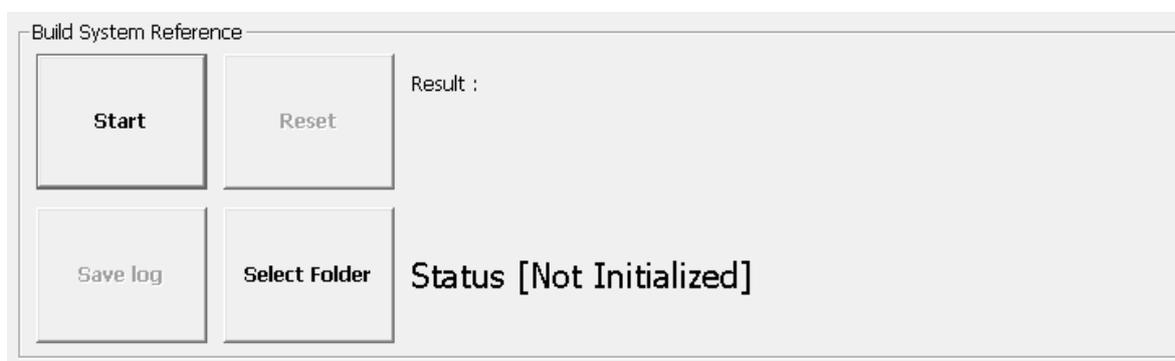


FIGURE 32

#### 3.4.1 Checking Status

The utility shows the current status on screen, and can be one of the following:

Status	Description
Active	The system reference is built and in use
Not Initialized	The device does not have a valid system reference. Please press start to rebuild it.

In the following cases, the utility will check the reference status and prompt rebuild a new set of reference data.

- A new touch controller is connected.
- Firmware update is performed.
- The setting of touch panel size or cover lens thickness has changed.

#### 3.4.2 Rebuild the System Reference

Before proceeding to rebuilding the system reference, please check the following:

1. The touch panel is connected to control board properly.
2. The touch screen surface is clean, and free of objects such as water, hands, fingers, etc...

3. The build environment is noise free (check using 3D module).
4. Check the LCD type, and specify a proper background color in PCIMSet.ini file, which will be used during construction.

```
[Build System Reference]
Background=0
```

Background	Displayed Mode
0	White background
1	Black background

The rebuild process should take a few seconds after pressing the “Start” button, please wait until the progress bar proceeds to 100%.

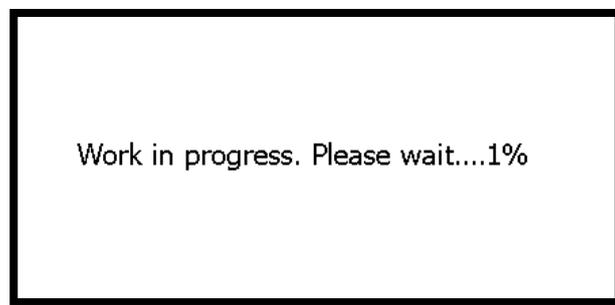


FIGURE 33

If the touch panel is not connected properly, or having environmental interference, the utility will display a warning message after build completes. User must confirm whether to accept the build result by pressing the Yes or No button.

Environmental interference. Build anyway ?



FIGURE 34

PCIMset will display a “FAIL” message if user presses the “No” button, and utility will roll back to previous settings.

### 3.4.2.1 Testing No-Shielding Panels

Touch panels without shielding should use loosen threshold values during tests. Please setup proper values in the following settings in PCIMSet.ini file.

Section	Setting	Value
[Build System Reference]	No Shielding	The threshold values in percentage. For example, 120 meaning the normal threshold value * 120% as the new threshold for checking.

### 3.4.3 Options

There are two options that user can adjust:

- Select Folder

Select the destination folder that log file will be saved to.

- Auto Save Log

With this option checked, the “Save File” dialog will automatically appear after the SR construction operation finishes.

- Switch on the System Reference Dialog Box

When this option is checked, the PCIMset will notify user for SR construction when it detects that SR is not initialized.

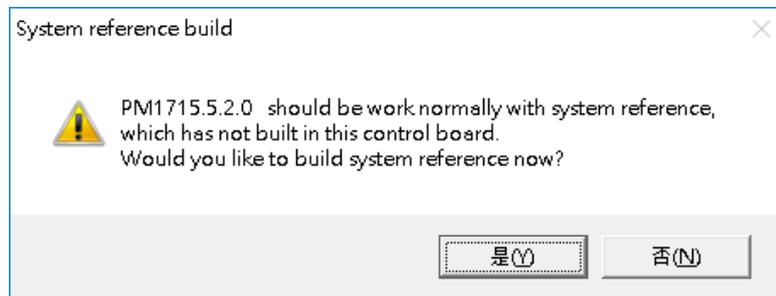


FIGURE 35

The definitions of Skip Sensor, Skip Driver, Used Sensor, and Used Driver are defined as below.

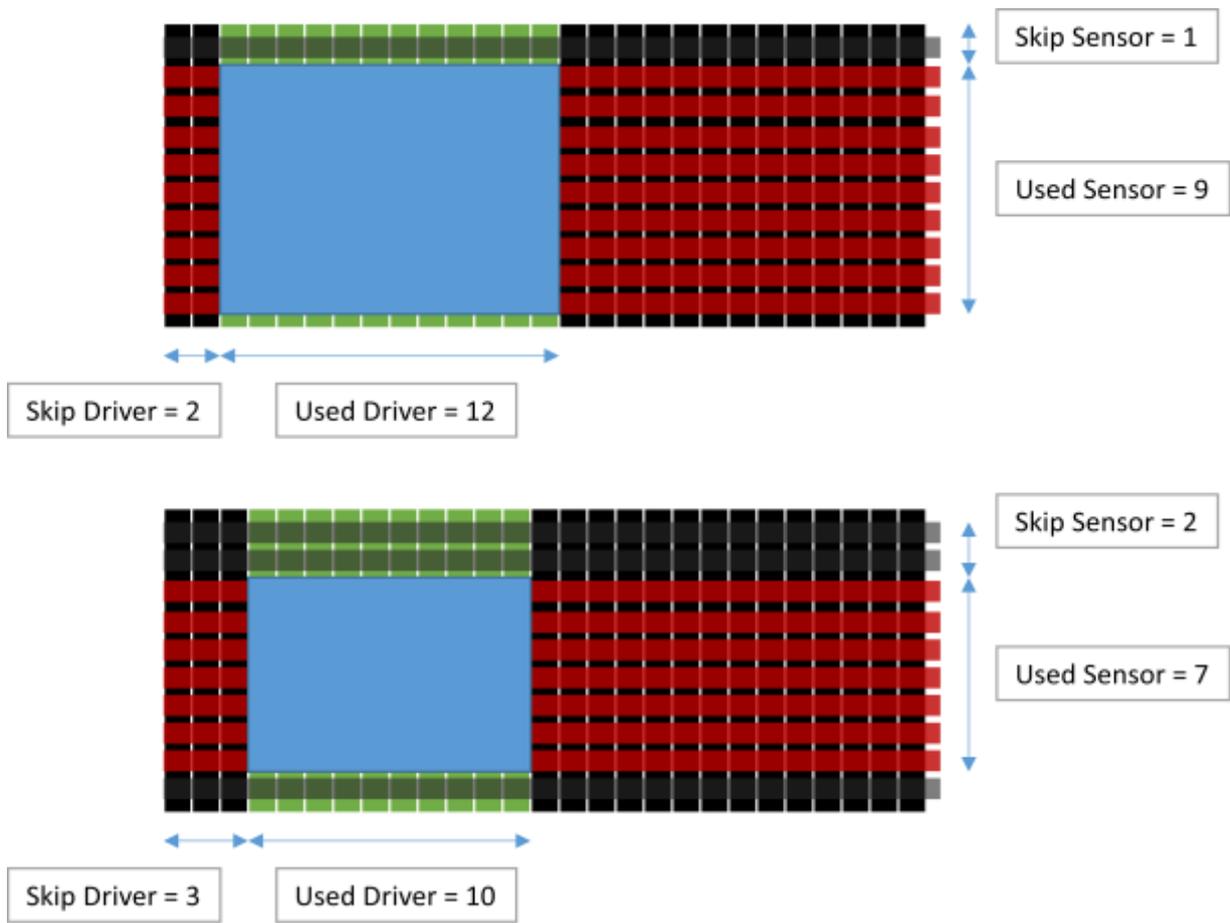


FIGURE 36

Please notice that click button several times might significantly decrease accuracy. To revert settings, please use the "Write Factory Default Parameter" button or do firmware update again.

## 4. Parameters

Parameters provide an interface to flexibly fine tune PenMount firmware settings.

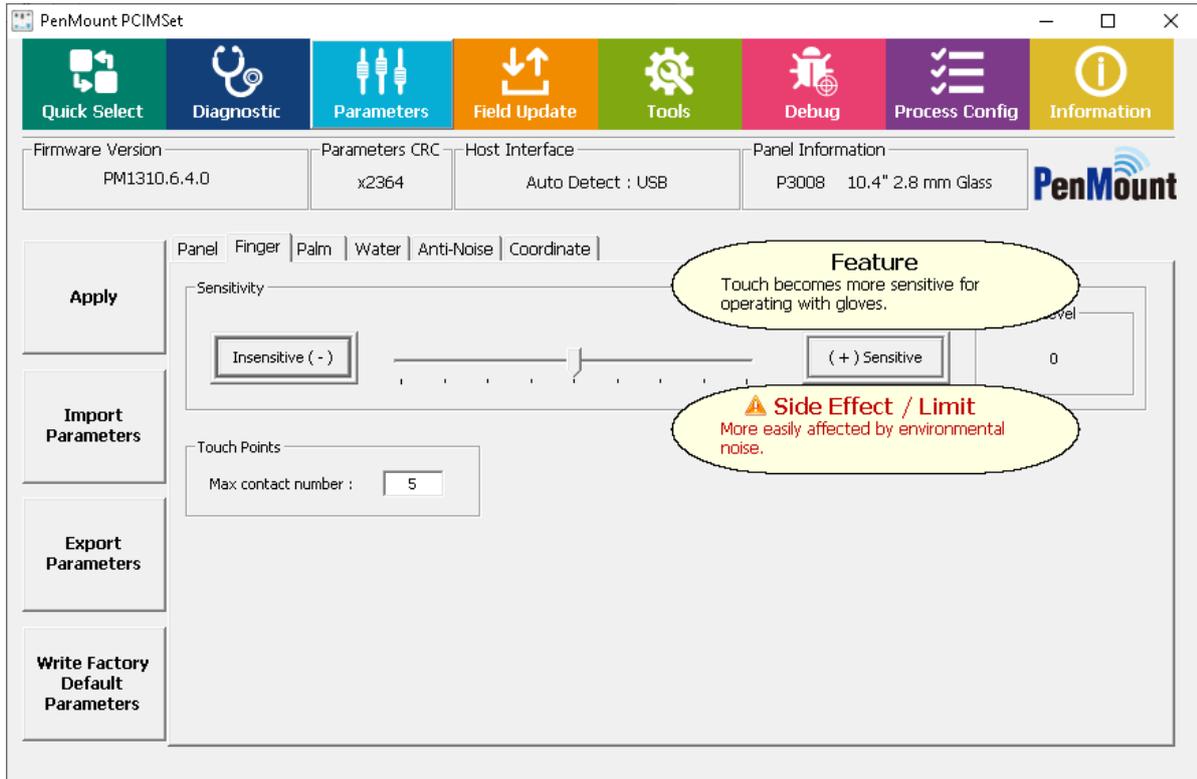


FIGURE 37

- The “Apply” Button

Applied all the parameter changes. A confirmation dialog box will appear.

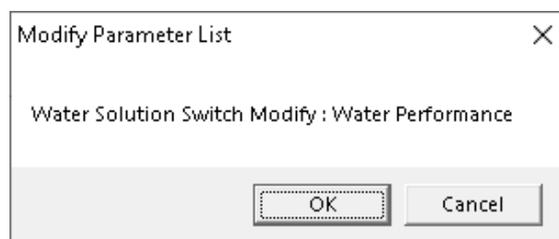


FIGURE 38

This dialog box will also appear when closing the utility without applying the parameter changes first.

- The “Export Parameters” Button

Export the firmware parameter values into a text file with “.ini” extension.

- The “Import Parameters” Button

Import the firmware parameter values from a text file with “.ini” extension. Only parameter files for the same firmware version can be imported.

- The “Write Factory Default Parameters” Button

Reload the firmware parameters to factory default. However, the parameter of host interface and panel size will not be changed.

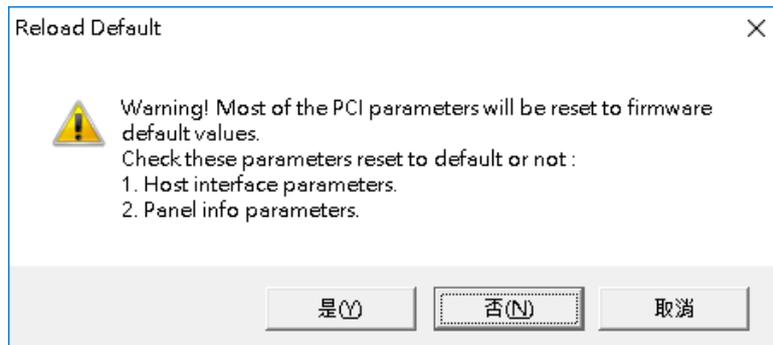


FIGURE 39

## 4.1 Main Features

The Parameters configuration interface includes the following features.

1. The Parameters Panel

Parameters are categorized into different tabs. For example, parameters related to anti-noise layout can be found in the “Ant-Noise” tab. When adjusting a parameter, its features and side effects are shown in the quick reference.

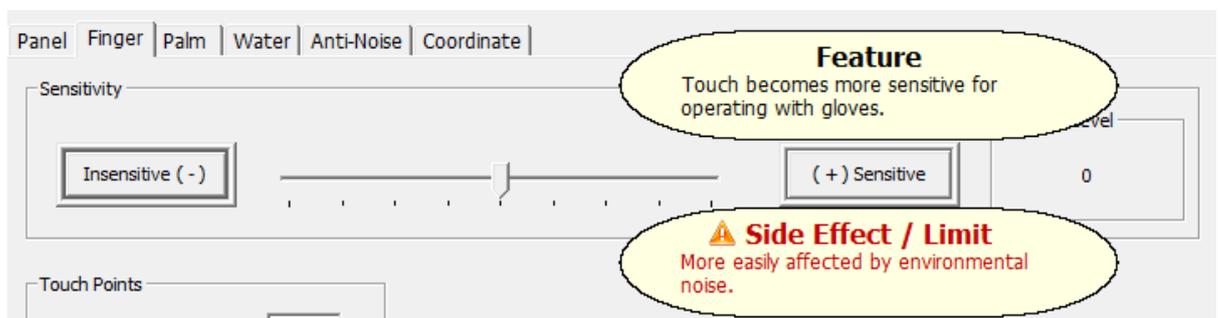


FIGURE 40

- Grayed out Options

Any parameter in gray is not adjustable. In the following example, “Change Interface” is not adjustable, because the firmware supports interface auto detection, so there is no need to manually assign the connection interface.



FIGURE 41

- **Hidden Options**

Any parameter that is not displayed also means that it is not adjustable. In the following example, when using older firmware versions such as PM1410 V2.1, the utility only displays “Panel”, “Finger”, “Water”, “Anti-Noise” and “Coordinate” tabs with a few adjustable options.

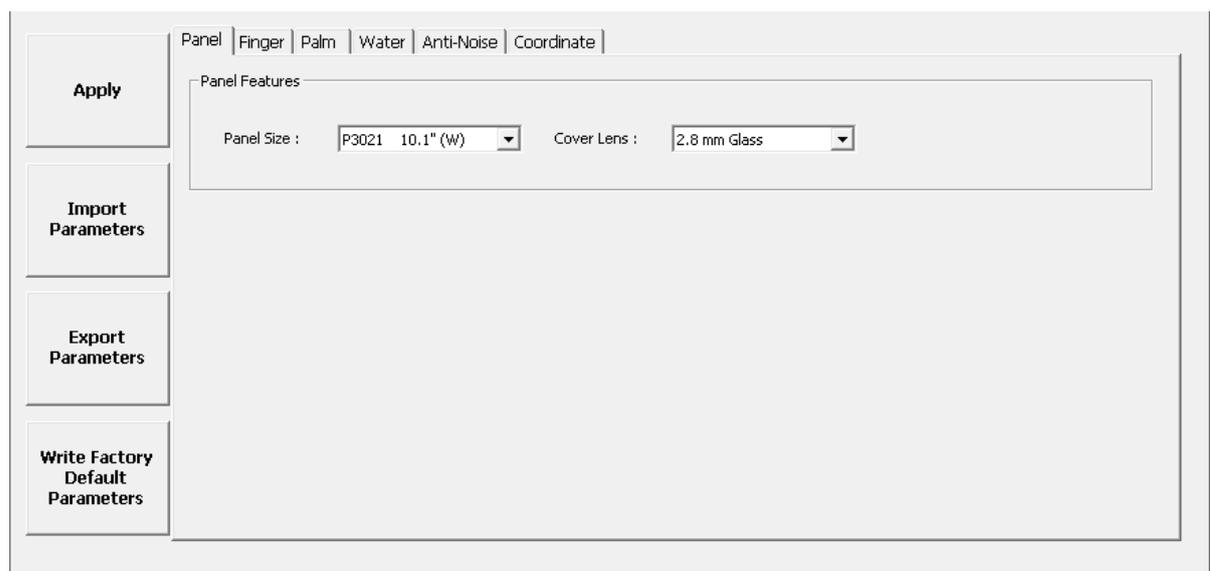


FIGURE 42

## 4.2 Interface Parameters

Users can change interface settings in the “Interface” tab.

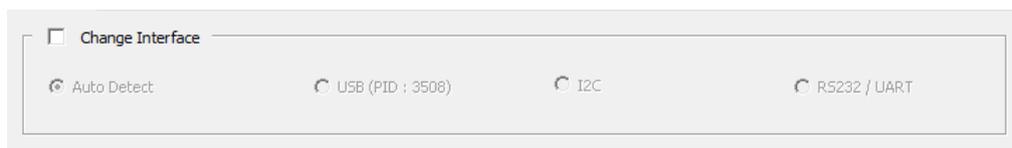


FIGURE 43

### 4.2.1 Change Interface

User can manually specify the connection interface when using PenMount COF products. For control boards, since the firmware can automatically detect connection interfaces, this field is not adjustable.

### 4.2.2 I2C Address

The slave address default as 0x38 when using I<sup>2</sup>C connection.

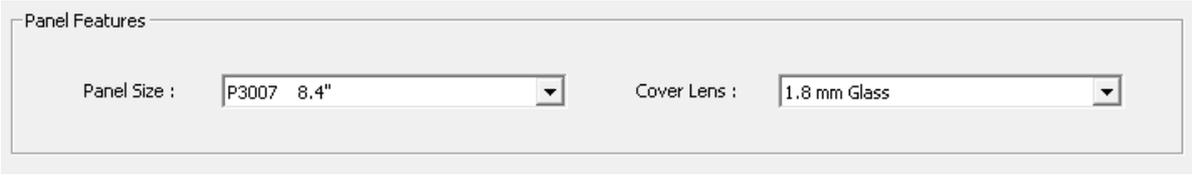
### 4.2.3 Baud Rate

The transfer baud rate is used for UART/RS-232 connection.

For compatibility with PenMount device drivers, meanwhile PCIMset does not allow changing baud rate.

## 4.3 Panel Parameters

The panel tab allows users to specify the desired panel size, either from a preset or from manually setting up the skipped driver / sensor pins.



The image shows a software interface titled "Panel Features". It contains two dropdown menus. The first is labeled "Panel Size" and is currently set to "P3007 8.4". The second is labeled "Cover Lens" and is currently set to "1.8 mm Glass".

FIGURE 44

### 4.3.1 Choosing from a Preset

Standard PenMount firmware versions support a number of panel sizes and cover lens thicknesses. By selecting a preset, firmware will apply different configurations to parameters.

#### 1. Panel Size

Each PenMount firmware supports several panel size presets. For example, choosing the 'P3030 12.1" (W)' will setup firmware parameters to support the AMT P3030 12.1-inch touch panel.

#### 2. Cover Lens

Each PenMount firmware supports several cover lens thickness parameters, with the following standard thicknesses: 1.1mm, 1.8mm, 2.8mm, and 4.0mm. Please choose the nearest thickness from the list that most closely matches your cover lens.

## 4.4 Finger Parameters

The parameters in this tab are for tuning finger detection.

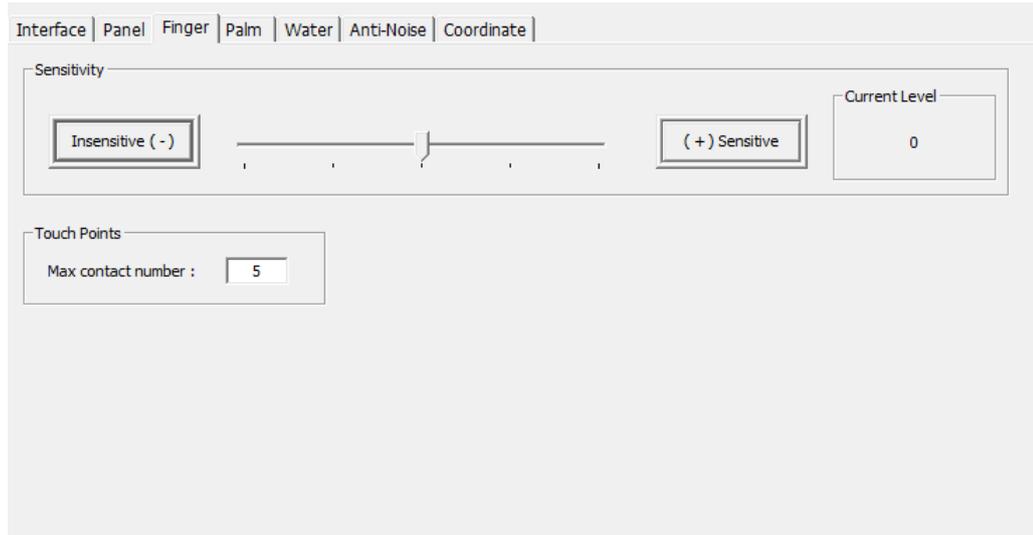


FIGURE 45

#### 4.4.1 Sensitivity

Touch sensitivity can be adjusted with a slider. User can either use the slider or press the “Insensitive” and “Sensitive” buttons. By default, sensitivity level is 0, setting to positive values increases sensitivity and setting to negative values decreases sensitivity.

#### 4.4.2 Touch Points

The maximum contact number limits how the number touch contacts reported to the system. For example, if the value is 1, the device supports single touch only, and other touch signals will not be sent to the system. This value will also be displayed in the Windows “System” Control Panel item.



For standard PenMount firmware, this value is adjustable. But the maximum value range is still limited by the firmware default. For example, if the firmware can support a maximum of 5 contacts, users cannot set this value to 10.

### 4.5 Palm Parameters

If the PenMount firmware supports palm rejection, there will be a “Palm” tab in the PCI Parameter utility. Palm rejection is used to detect and ignore large contact areas.

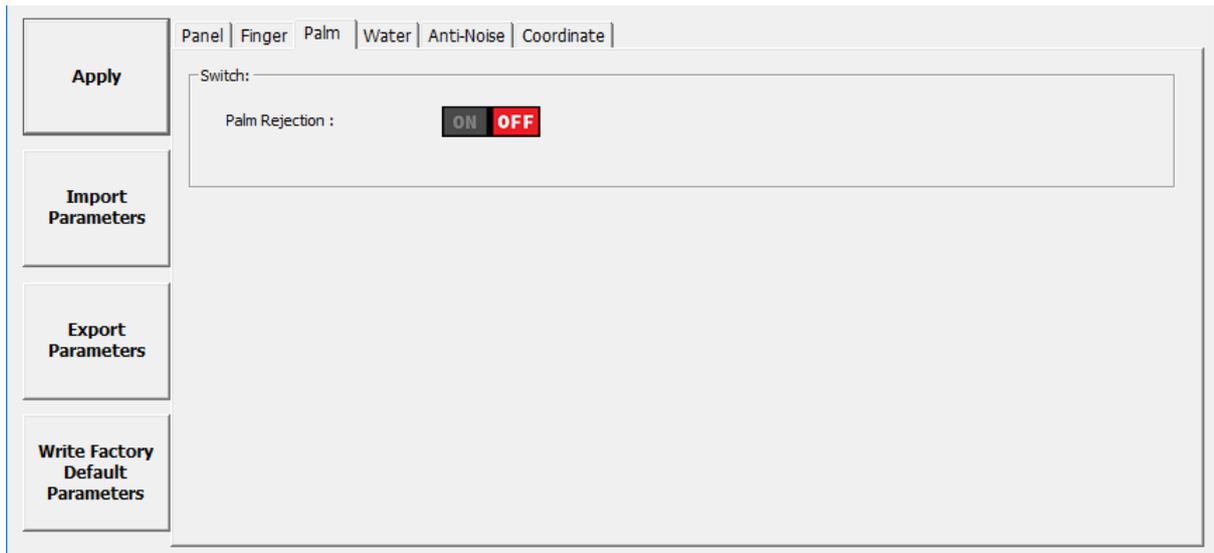


FIGURE 46

#### 4.5.1 Palm Rejection

This is the overall switch for the firmware palm rejection feature. When this is turned OFF, all other palm features will be grayed out and a palm on the touch panel will be scanned and reported as touch event.

### 4.6 Water Handling

The water handling feature includes choosing between different modes and tweaking parameters to compromise between performance and reliability.

#### 4.6.1 Choosing a Water Handling Solution

The PenMount firmware supports two different water handling modes: Water Detection (WD), and Water Performance (WP).



FIGURE 47

Users must choose one of the supported modes, or “OFF”, if water handling is not the main concern.

Modes	Water Handling
<b>Water Detection Mode</b>	Stop reporting all touch data
<b>Water Performance Mode</b>	Supports touch in dry area, lock to single touch if water can cause false touch points

**When choosing WD or WP, building system reference is required to prevent unexpected behaviors during environmental changes. A dialog box will prompt users for building SR, please press Yes button to proceed.**

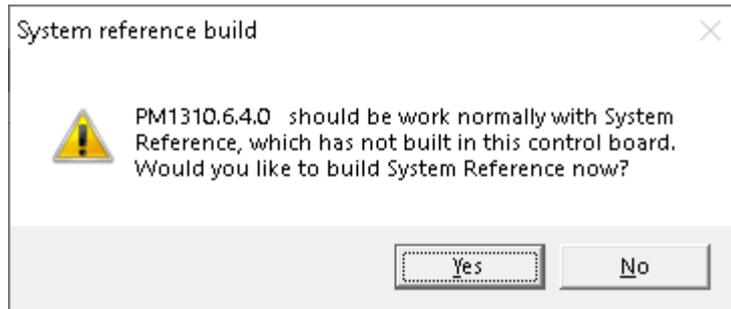


FIGURE 48

After the SR built process finishes, the utility will switch to the Diagnostic “System Reference” page and show built result.

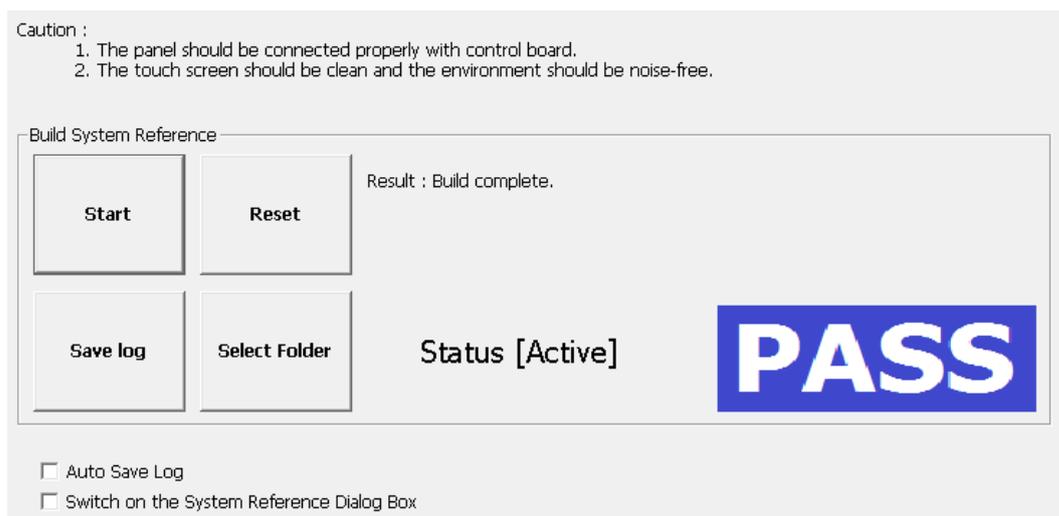


FIGURE 49

## 4.7 Anti-Noise Parameters

In anti-noise parameter tab, users can Configure the “Low pass filter” and switch “Enhanced Driving” to decrease the impact of noise.

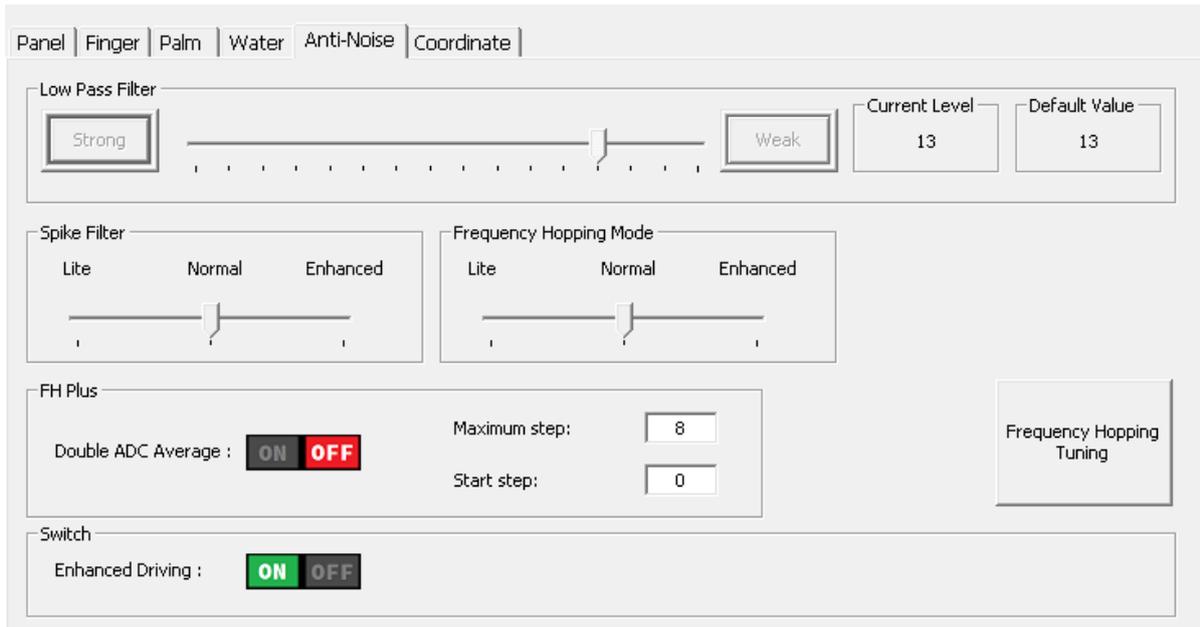


FIGURE 50

#### 4.7.1 Configure Spike Noise Filtering

The PenMount firmware may use one of the following noise filtering methods:

Firmware Support	Spike Filter Settings		
	Lite	Normal	Enhanced
<b>V6.2 and later</b>	V	V	V
<b>V6.1 and later</b>	V		V
<b>V1.0 and later</b>	V		

Both methods are designed for eliminating the influence of noise jitter, and “Spike Filter” can give better result when dealing with ESD.

The “Low Pass Filter” setting will only be effective if “Spike Filter” is switched to “Lite” mode. Choosing a stronger value of “Low Pass Filter” will cause slower signal changes. The lower filter value can affect the base update time in KBU (keep base update) mode, so it needs to be fine-tuned for the best result.

Low Pass Filter	Keep Base Update Speed
<b>Weak</b>	Fast
<b>Strong</b>	Slow

#### 4.7.2 Enhanced Driving

Enable enhanced driving for noisy environments, thicker cover glass, or glove touch to achieve better SNR and finger resolution at the expense of accuracy on the edge.

### 4.7.3 Configuring Frequency Hopping

The frequency hopping is most important for anti-noise.

#### 4.7.3.1 Frequency Hopping Mode

The Frequency Hopping Modes Options provide user to leverage between touch performance and anti-noise.

Firmware	Lite (0)	Normal (1)	Enhanced (2)	Extreme 1 (3)	Extreme 2 (4)
V6.4 and later	V	V	V	V	V
V6.2 and later	V	V	V		
V6.1 and later		V	V		
V1.0 and later		V			

Please notice that Level 3 and 4 are locked and can only be configured by using the Quick Select feature.

#### 4.7.3.2 Advanced Frequency Hopping Options

Firmware V6.3 further supports some advanced frequency hopping features such as the Double ADC Average.

This is another Feature that supports pulse type noise suppression.

#### 4.7.3.3 Frequency Hopping Tuning

Choosing a good value for the touch firmware’s drive wait parameter can greatly improve touch stability, especially when other anti-noise parameters are turned OFF for fast drawing. The “Frequency Hopping Tuning” can help evaluate a good value for the “Drive Wait” parameter after a series of data collecting. Will ask for user input during the evaluation.

The utility will prompt for the following options before proceeding the evaluation process. Using the default values are good for most cases.

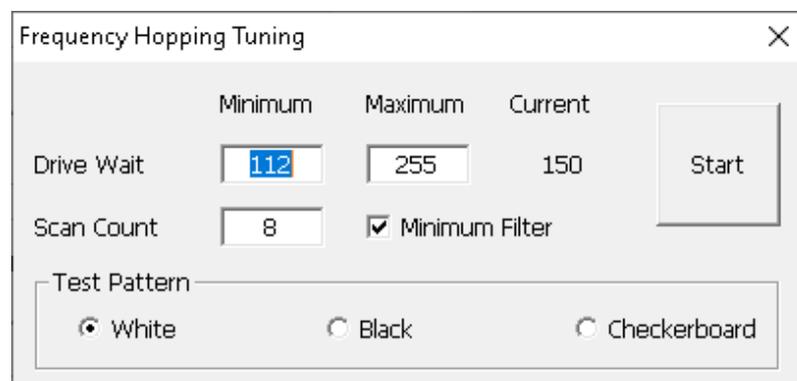


Figure 51

#### A. Options

- Current Drive Wait

The current drive wait parameter value used by touch firmware.

- Minimum / Maximum Drive Wait

The range of “Drive Wait” parameter values to be evaluated.

- Scan Count

Controls the accuracy for “Drive Wait” evaluation.

- Minimum Filter

If this option is checked, the utility will automatically hide drive wait evaluation results that could make touch scanning unstable under certain circumstances, therefore the candidate values will be fewer.

- Test Pattern

Provide different background patterns during testing. The checkboard pattern shall be the strictest test environment, however, if no candidate found, please use white or black test pattern depending on the type of LCD.

#### B. Procedures

- After pressing “Start”, the utility enters the data collection phase. Please follow the instructions on screen to touch and release finger.

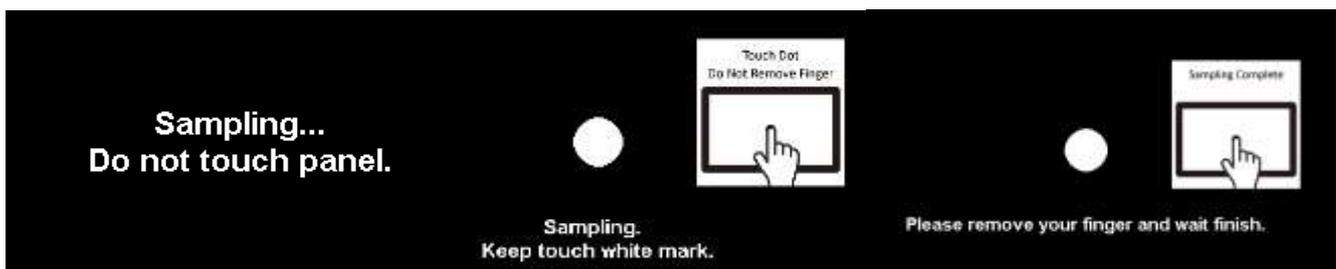


Figure 52

- After evaluation finishes, the utility will automatically select one of the candidate drives wait values as the new parameter. The evaluation result is marked with different colors.

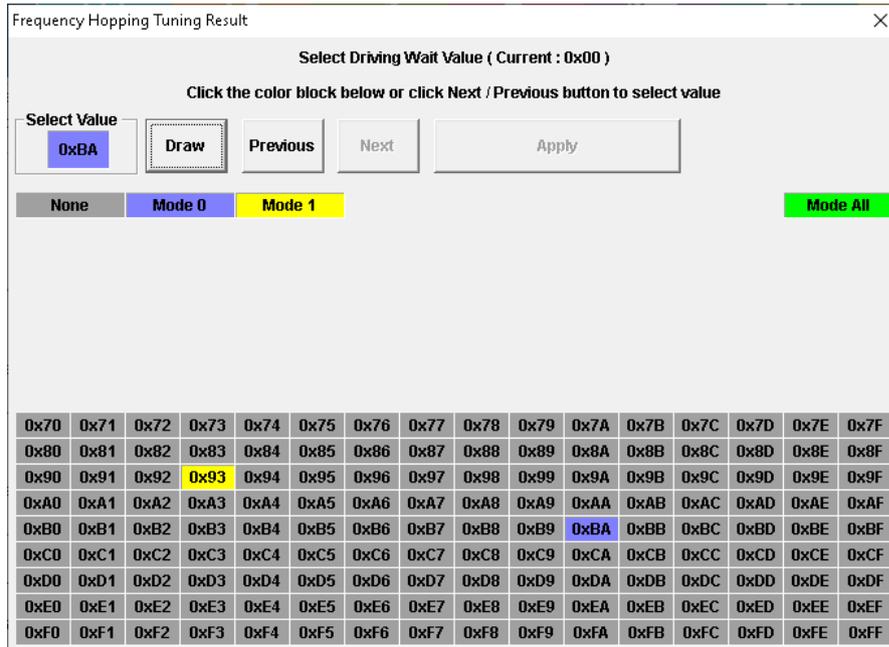


Figure 53

Cell Color	Description	Candidate
Green	Drive Wait value good for all FH modes	YES
Blue	Drive Wait value good for FH mode 0	YES
Yellow	Drive Wait value good for FH mode 1	YES
Grey	Drive Wait value not good for all FH modes	NO

- Draw Button: Test touch function with selected driving wait parameter candidate.
- Previous / Next Button: Use to navigate between different driving wait candidates.
- Apply Button: After Draw button is pressed, and test result meets requirement, use this button to apply new settings.
- X Button: To abort the evaluation process.

#### 4.8 Coordinate Parameters

After the PenMount firmware applies low pass, smoothing, and other filters to the sensed touch data, it will proceed to the final step according to the parameters in the “coordinate” tab to map data to the user specified display size, before sending them to the system.

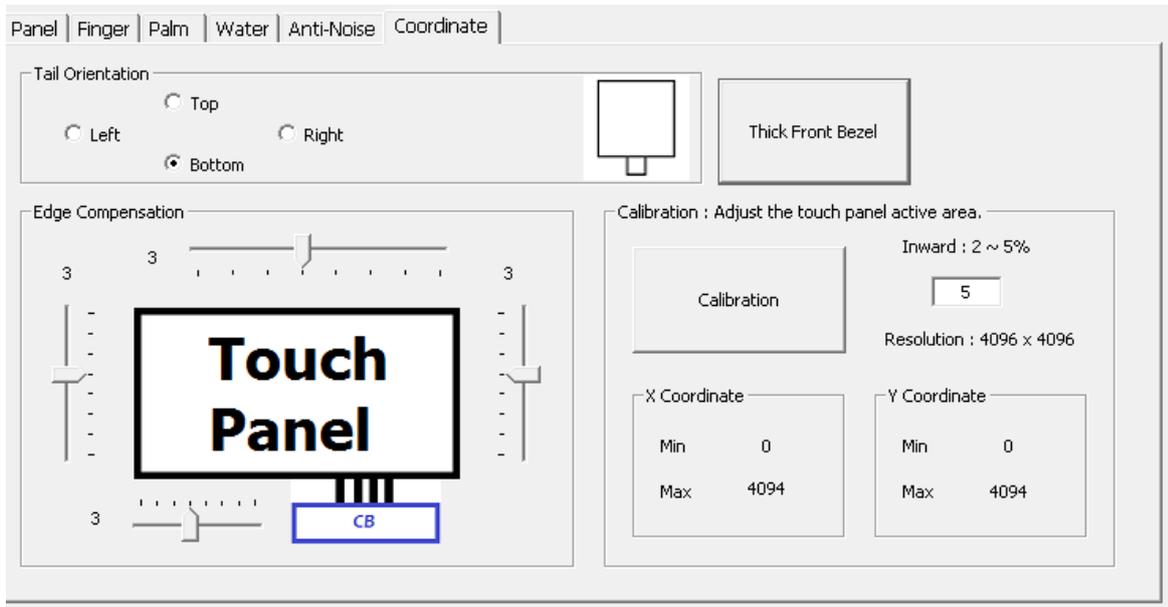


FIGURE 54

#### 4.8.1 Calibration

Although the term “calibration” for some PCAP devices means calibrate the “base signal” for the current environment, for PenMount it means calibrate the coordinates of the touch area to match the user defined region.

By default, the PenMount firmware maps the whole touch panel active area to the display, meaning when touching the top left corner, it sends (0,0) as its position, and sends (RES\_X, RES\_Y) for the lower right corner.



FIGURE 55

There are two common cases that need calibration:

- (1) When Touch panel is larger than the LCD

On systems that use touch panels larger than the actual display size, the display will be mapped to the part of the touch panel from (min\_x, min\_y) to (max\_x, max\_y).

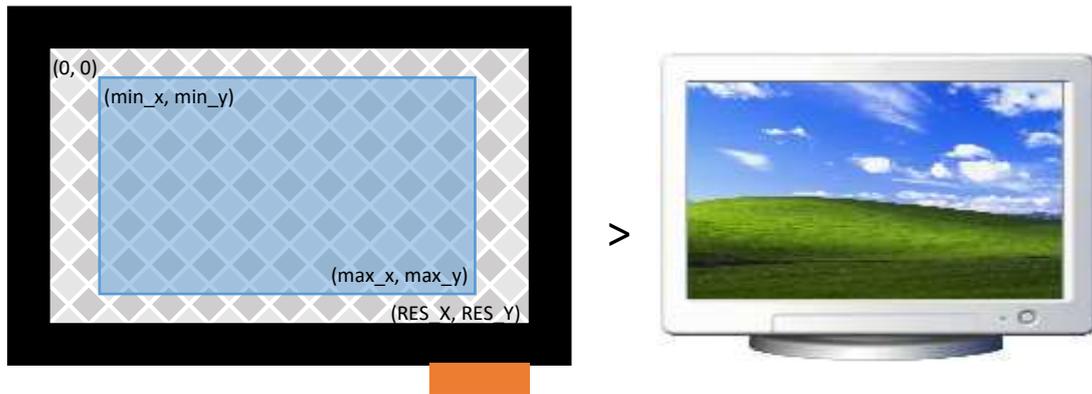


FIGURE 56

(2) When Using Front Bezel

On systems with displays designed with a front bezel, it can be harder for fingers to reach the edges. The touch position reported by firmware is near the center of a finger, and in the following diagram, it's represented by min "min\_x".

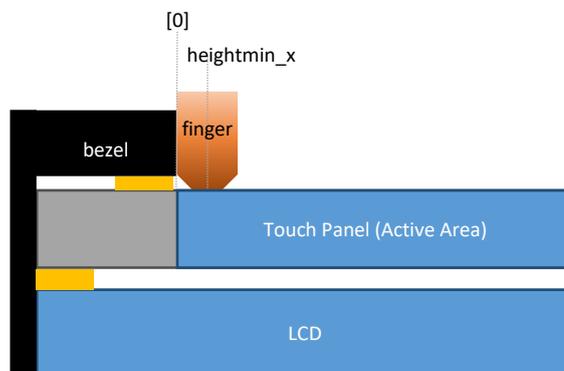


Figure 57

Calibration can be completed by:

- (1) Manually setting up the minimum and maximum values for the X and Y axes.

The values should be calculated and converted to a 0 to DIP\_RESO\_X and DIP\_RESO\_Y<sup>3</sup> range.

- (2) Pressing the "Calibration" button to launch the helper UI.

#### 4.8.1.1 Data Collection Stage

Please follow the instructions on screen by pressing the two red squares in top-left and bottom-right corner. The program will calculate the minimum and maximum values for the X and Y axes when finished.

---

<sup>3</sup> The "DIP\_RESO\_X" and "DIP\_RESO\_Y" value can be 4095 when using firmware V6.1 USB interface, or 2047 for any other case.

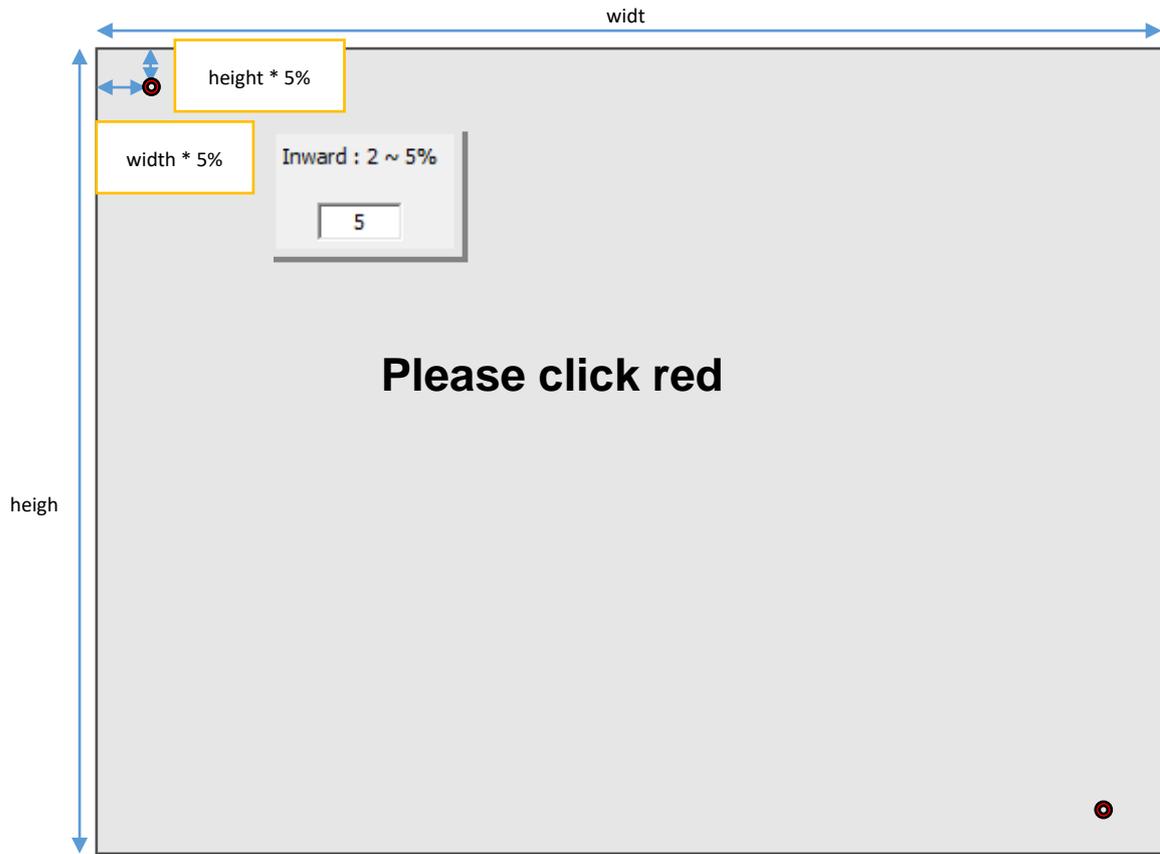


FIGURE 58

The “inward” setting helps users touch the red square easier, especially when performing calibration on a LCD with front bezels.

#### 4.8.1.2 Test Stage

If the test fails, the program will prompt for another confirmation and users can still choose to apply the calibration result by pressing the “yes” button on screen.

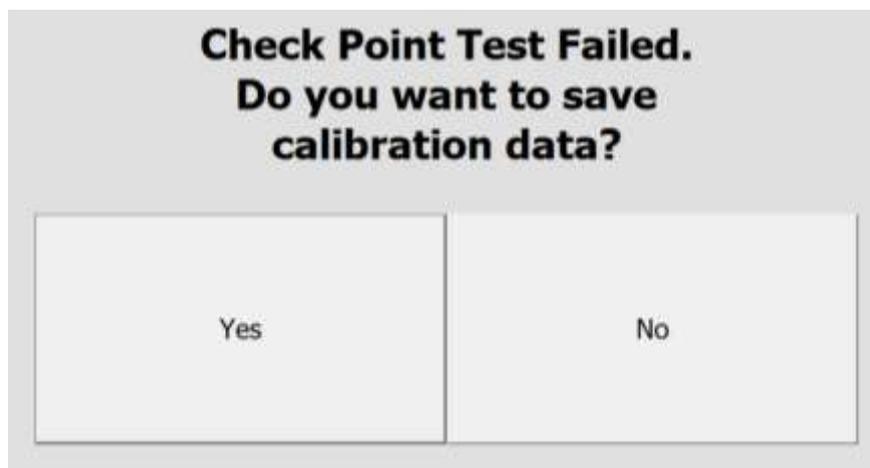


FIGURE 59

### 4.8.2 Edge Compensation

When the PenMount controller is released from the factory, the firmware’s default active area setting for the LCD monitor corresponds to that of the touch panel and the active area sizes of hardware and software are the same. However, due to resolution, the active areas for hardware and software can be slightly different. To adjust this, please click “Edge Compensation”.

When the edges of the touch panels do not function smoothly, please set the edge compensation value higher to improve functionality.

### 4.8.3 Tail Orientation

The firmware supports four rotational degrees compared to tail orientation.



FIGURE 60

### 4.8.4 Thick Front Bezel Configuration (V6.4 and V6.5 only)

The button will open a new window that configures the “Thick Front Bezel Support” feature available in firmware V6.4 and V6.5. When enabled, touch will be adjusted to screen borders when the position reaches the criteria.

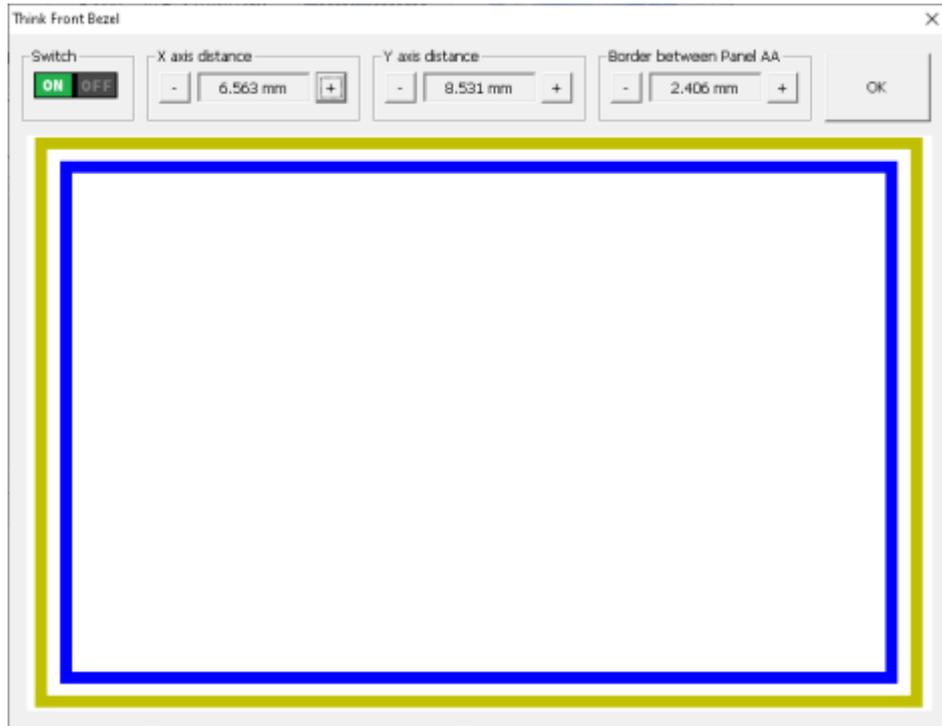


FIGURE 61

- Switch
 

Enable or disable this feature.
- X axis distance
 

Defines the x threshold.

When touch x-axis distance to border is within this range, adjust the x axis value to border.

It is marked as blue lines in the configuration window.
- Y axis distance
 

Defines the y threshold.

When touch y-axis distance to border is within this range, adjust the y axis value to border.

It is marked as blue lines in the configuration window.
- Border between Panel AA
 

Defines the border position from panel AA.

It is marked as dark yellow lines in the configuration window.

## 5. Field Update

The field update page allows user to change controller firmware version.

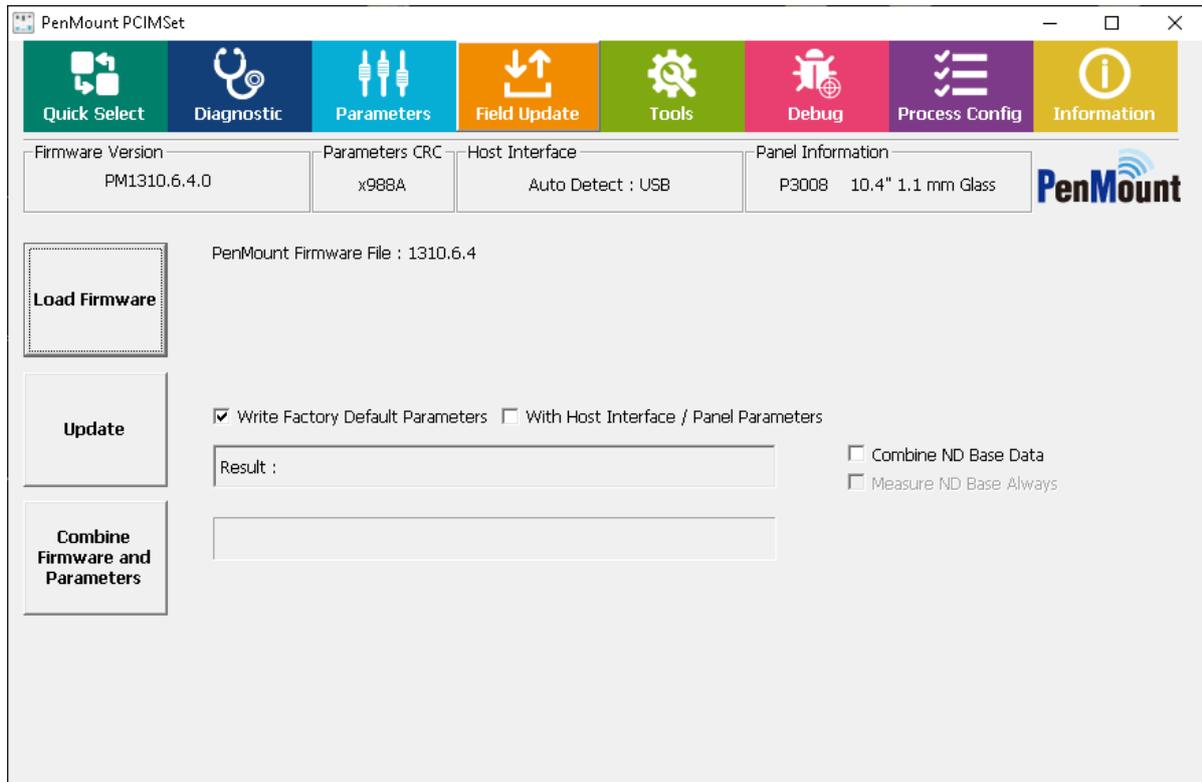


FIGURE 62

### 5.1 Load Firmware File

Please press “Load Firmware” under “Field Update” and click the file you want to update in the dialogue box.

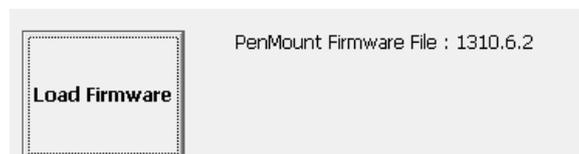
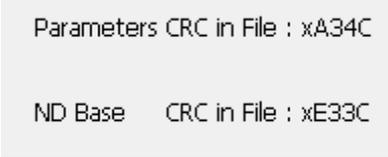


FIGURE 63

The format of the firmware supported by PenMount is suitable for

- (1) “pmf”, “pnf”, or “pxf” format for one single IC
- (2) “pmc”, “pnc”, or “pxc” format for multiple ICs.
- (3) “pfp” format for combination of firmware and parameters.

The pfp file format that includes virtual button settings are also supported in this utility version, which may also display the CRC values of “Parameter”, “ND Base”, or “Virtual Key” when corresponding data is included in target file.



```
Parameters CRC in File : xA34C  
  
ND Base   CRC in File : xE33C
```

FIGURE 64

Please note, if the firmware file is not consistent with the controller connected during the update, the update will not proceed.

## 5.2 Update Firmware

After you load firmware files, please click “Update” button to proceed. There are two options available:

- Write Factory Default Parameters

This option is selected by default when updating with PMF or PMC file format. This option is not selectable when using PFP file format.

With this option set, firmware parameters will be reset to default values after update finishes. When only check this option, host interface / panel and other firmware parameters will remain unchanged.

- Write Host Interface / Panel Parameters

This option is only adjustable when “Write Factory Default Parameters” is turned ON. With this option set, host interface and panel parameters will also be reset to default values after update finishes.

During the update, all the button settings will be locked temporarily to prevent update failure due to inadvertent selection.

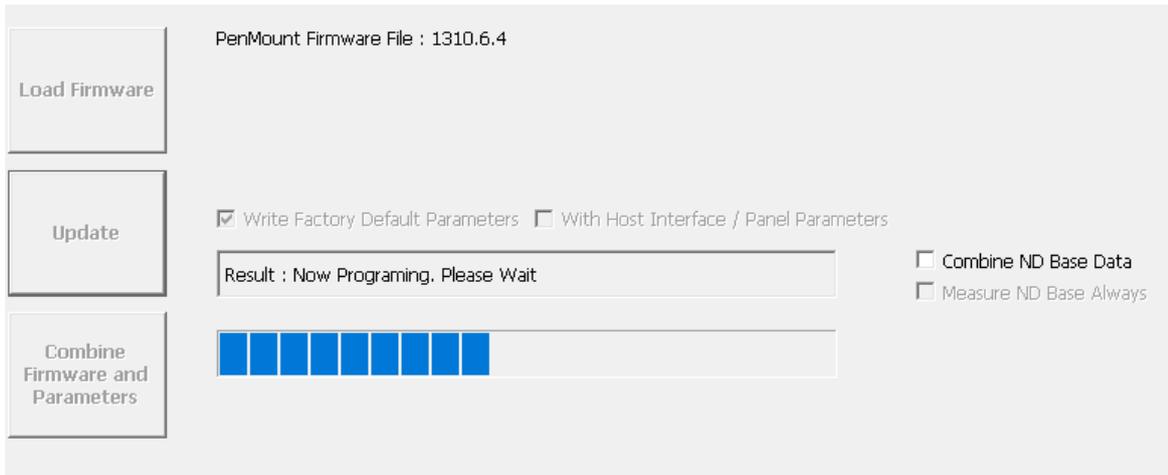


FIGURE 65

Please wait until update reaches 100%. During the update, please do not interrupt the power supply. After the firmware update is completed, you will see the “PASS” mark.

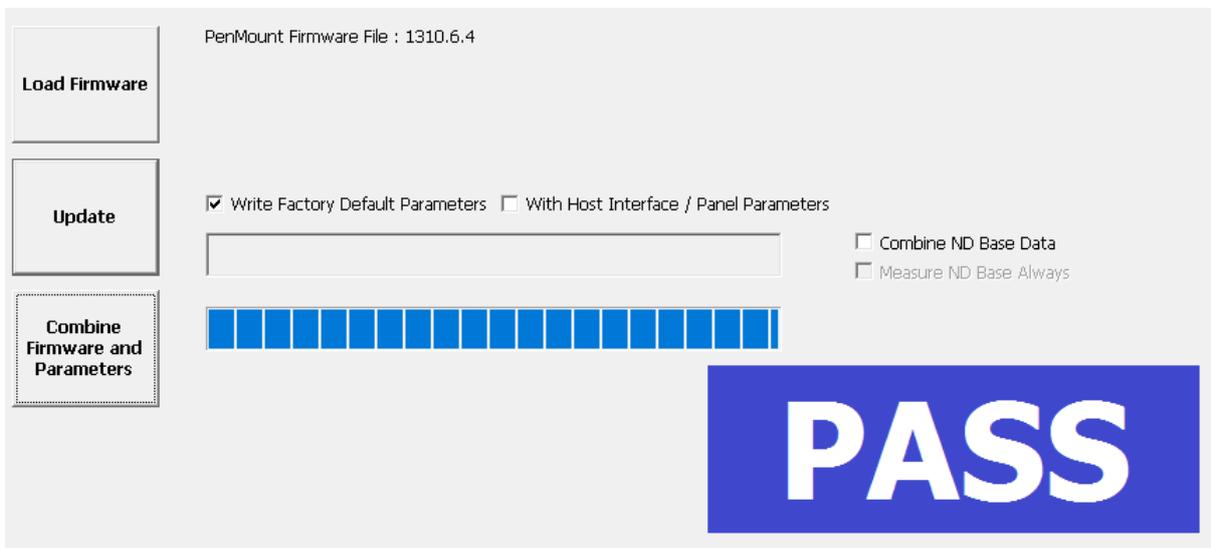


FIGURE 66

If the update fails due to an unavoidable factor, you will see the “FAIL” mark and the error messages.



FIGURE 67

If this happens, you will find firmware info remains in “Boot Loader” mode. You can click the “Update” button again to restart the update process.

### 5.3 Generate New PFP File

The utility can combine the parameters of the connected device with a base firmware file and generate new PFP files.

1. By default, the “Combine Firmware and Parameters” button is disabled, as shown in the figure below, when firmware file is not loaded yet.



FIGURE 68

2. Press the “Load Firmware” button and choose any firmware files that match the connected device. For example, if using PM1410 V6.3, any PXC or PFP files that are targeted for PM1410 V6.3 can be used.

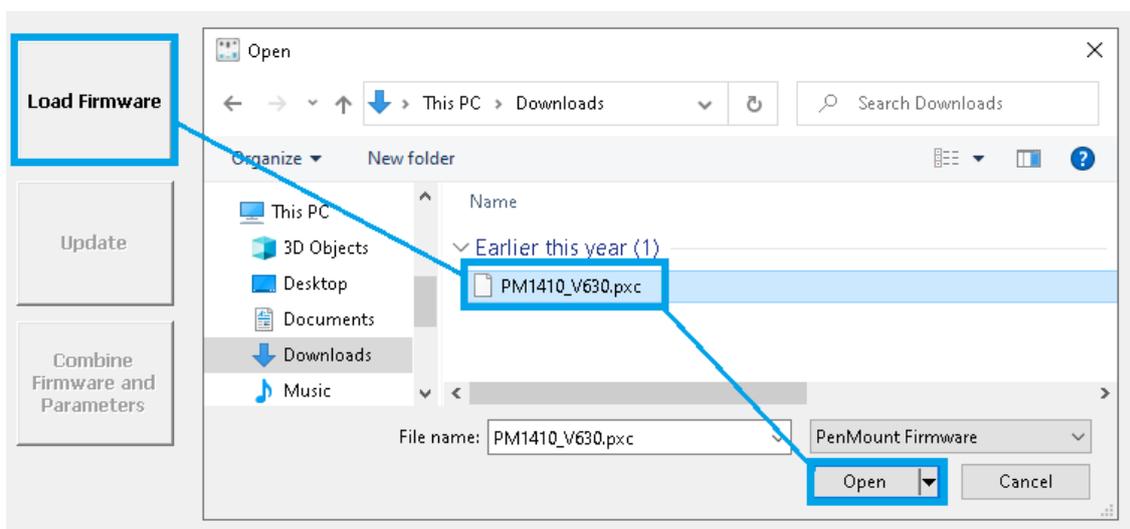


Figure 69

3. Press the “Combine Firmware and Parameters” button, and the utility shall create the firmware (.pfp file) with parameter CRC x908C in the same directory.

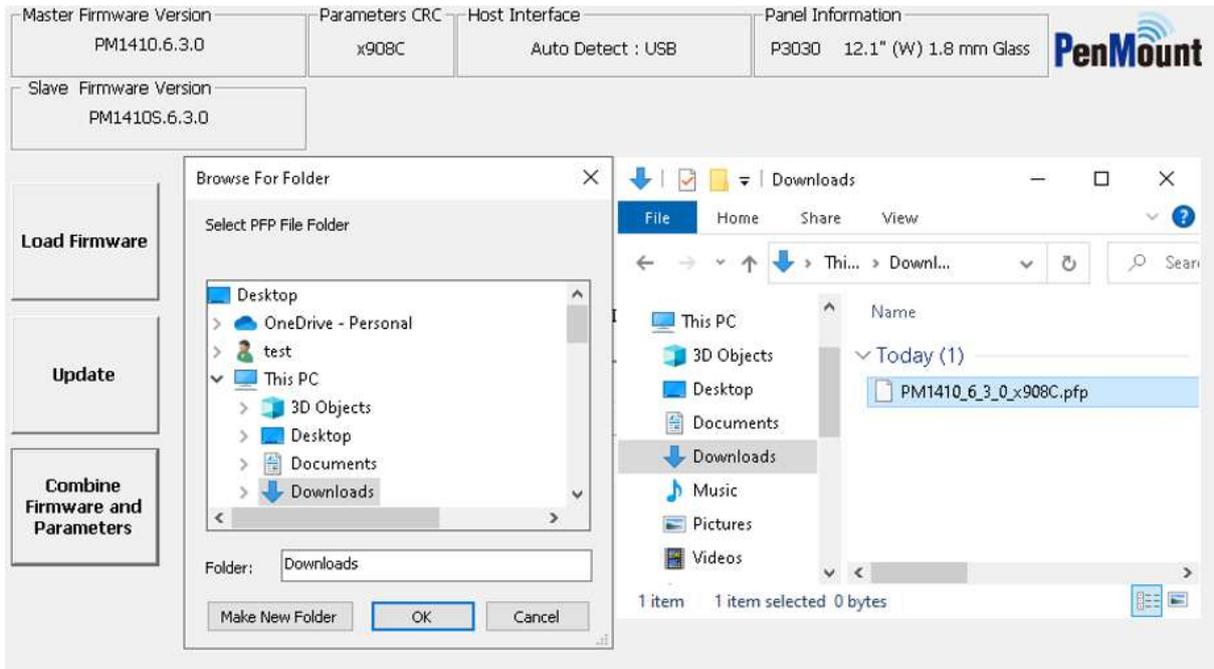


Figure 70

4. If there is no firmware of the same version that can be loaded, please select the “Export Parameter” button in the Parameters page and save the parameter as an .ini file. Please provide the file to PenMount team, and we will provide the firmware file with the same parameters.



Figure 71

## 6. Tools

The Tools panel shows buttons that users can use to launch related tools.



Figure 72

### 6.1 Reset Device

Use this button to reset the connected PenMount P2 touch controller.

### 6.2 Draw

In Drawing mode, user can examine whether breaking or point hopping will occur when drawing lines and provides a mechanism for measuring sample rate.

Item	Description	
<b>Operating systems</b>	Windows XP and later versions	
<b>Support Index1</b>	1P	Black
	2P	Red
	3P	Green
	4P	Blue
	5P	Magenta
	6P	Cyan
	7P	Brown

	8P	Yellow
	9P	Purple
	10P	Orange
<b>Switch to Draw Mode</b>	"D" key	
<b>Switch to Touch Mode</b>	"T" key	
<b>Sample Rate Test Hotkey</b>	"S" key	
<b>Clear Screen</b>	"Space" key	
<b>Toggle Full Screen</b>	"F" key	

The program will show a white canvas in full screen mode, allowing the user to test the touch drawing feature. If you need advanced functions, please "Press and Hold" with your finger or click the right mouse button for the functions indicated below:

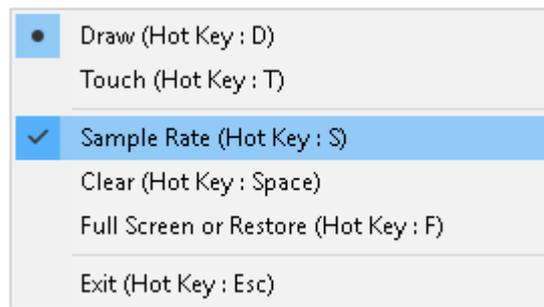


FIGURE 73

- Draw Mode

Switch to draw mode. In this mode, the program will label touch points in different colors.

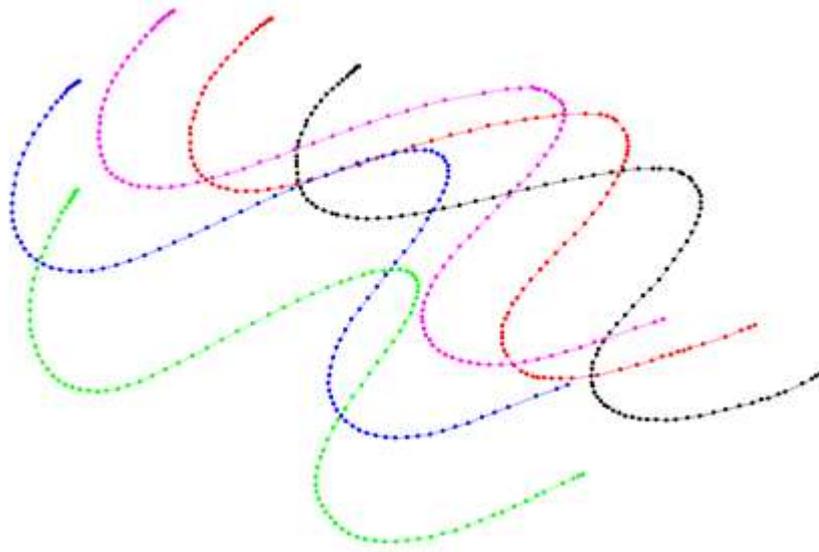


FIGURE 74

- Touch Mode

Switch to touch mode. In this mode, only the touch point location of your finger is shown.

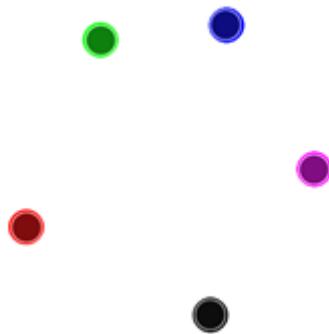


FIGURE 75

- Sample Rate

After touch input, it will take approximately one second for the program to calculate and show the Sample Rate of each touch point. For example, Point 0: 116 means 116 points per second. When the Sample Rate is higher, drawing will be more precise.

Point 0 : 100  
Point 1 : 100  
Point 2 : 100  
Point 3 : 100  
Point 4 : 100

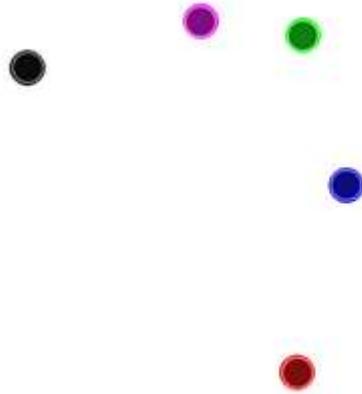


FIGURE 76

- Clear  
Clean the canvas.
- Full Screen or Restore  
Switch between full screen display and windowed display.
- Exit  
Exit the program.

Note: After entering Draw mode, please do not connect or disconnect devices. Otherwise, touch will not function.

### 6.3 Event Log

The Event Log button will launch the iBTEventLog utility, which provide different ways to log data for analysis. After launched, an icon appears in taskbar notification area. If the Event Log tool is not bundled with the main utility, the button will greyed out.

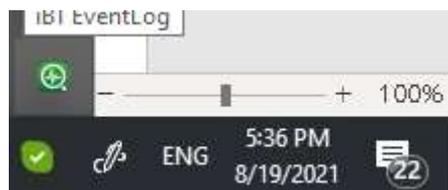


FIGURE 77

### 6.3.1 Check Event and Log File

Any detected events and log data will be saved to files in the sub directory of the iBTEventLog.EXE file.

Directory	Sub-Directory	Data
<b>Event</b>		Single Event / Status Event
<b>Log</b>	StatusEvent	FW Information logged by status event.
	Timer	FW Information logged by timer, matching condition.
	Condition	FW Information logged by touch condition.
	Manual	FW Information logged manually.

### 6.3.2 Stop Utility

The Event Log utility can be switched off in PCIMSet. User can also stop the utility by right click on the utility icon on taskbar and choose Exit in menu.

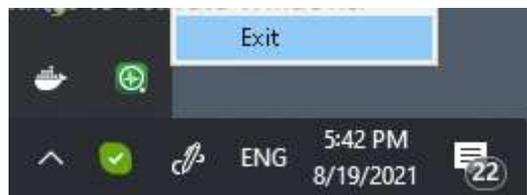


FIGURE 78

### 6.3.3 Setting

Right click on the utility icon on taskbar and choose Setting in menu.

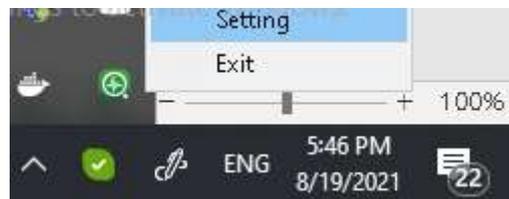


FIGURE 79

The Setting window of iBTEventLog utility will appear.

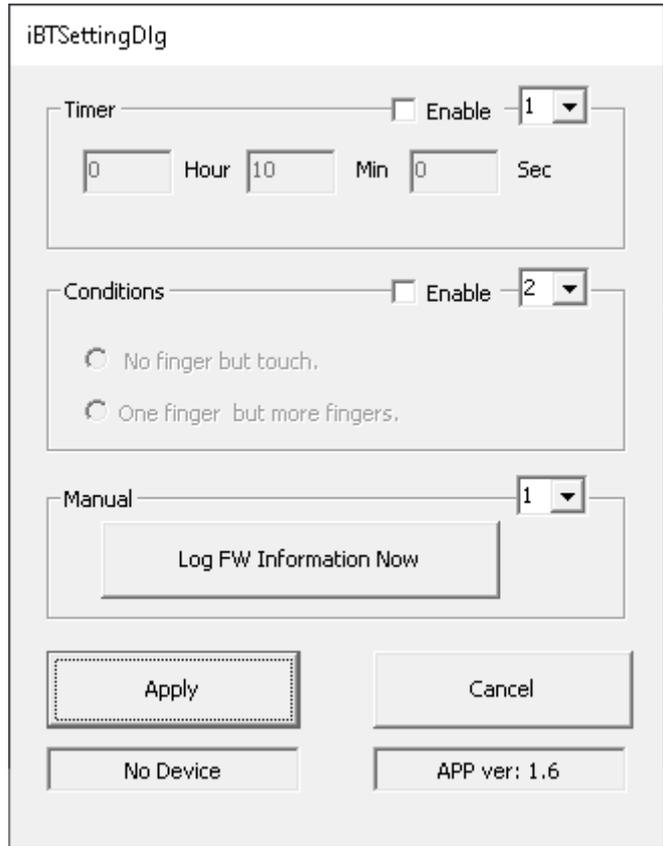


FIGURE 80

Please notice that the basic UI include common features supported by PenMount P2 V6.3 and later versions. Please use the PenMount P2 firmware V6.4 and later for complete event logging support.

### Timer

Enable to periodically log firmware information. Choosing larger Log Level values to log more information.

### Conditions

Enable to log firmware information triggered by touch. Choosing larger Log Level values to log more information.

Type	Description
<b>No finger but touch</b>	Utility will log firmware information when touch detected.
<b>One finger but more fingers</b>	Utility will log firmware information when multiple touch detected.

### 6.3.4 Manual

Click on the button to log firmware information immediately.

## 6.4 Panel Config

The Panel Config button will launch the Panel Config utility, which provide interactive ways to setup touch panel parameters. Please follow the instructions to finish setup. If the Panel Config tool is not bundled with the main utility, the button will greyed out.

1. Make sure that touch panel is connected properly and press the START button.



FIGURE 81

2. In Settings window, enter Panel Name, Cover Material, Cover Thickness, Panel Size and Tail Orientation respectively, then press the "Next >" button.

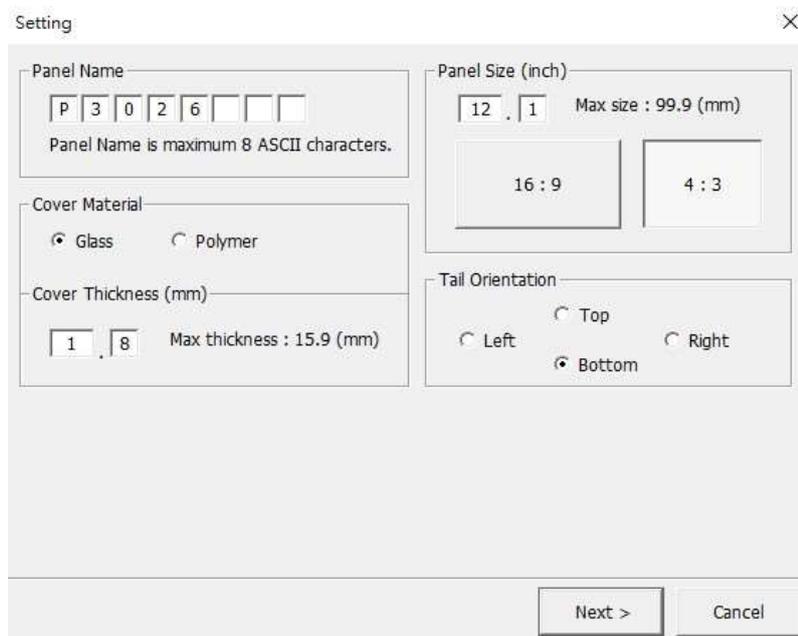


FIGURE 82

3. Check the touch panel specification and fill in the Key Area and Active Area information. Firmware use these settings to determine coordinate adjustments on edge.

Options:

- a. Skip coordinate correction

This will disable touch coordinate adjustments on edge. The Active Area settings will be ignored.

The screenshot shows a settings window for touch panel calibration. It is divided into two main sections: 'Touch Panel Key Area (mm)' and 'Touch Panel Active Area (mm)'. Each section contains input fields for 'Height' and 'Width', and a 'Max size' label. Below the Active Area section, there is a checkbox labeled 'Skip coordinate correction.' which is checked, and a note below it stating '(Note: Skip it may cause inaccurate coordinates.)'.

Touch Panel Key Area (mm)	
Height	184.5
Width	246.0
Max size :	6553.5 (mm)

Touch Panel Active Area (mm)	
Height	191.5
Width	253.0
Max size :	6553.5 (mm)

Note: When there is no expansion or retraction, the AA should be one pitch larger than the KA.

Skip coordinate correction.  
(Note: Skip it may cause inaccurate coordinates.)

FIGURE 83

- b. Do retraction calibration of the LCM

If you do not know the exact Active Area settings, please check this option to launch interactive calibration instead of manual input. When this option is checked, only the Key Area setting will be used.

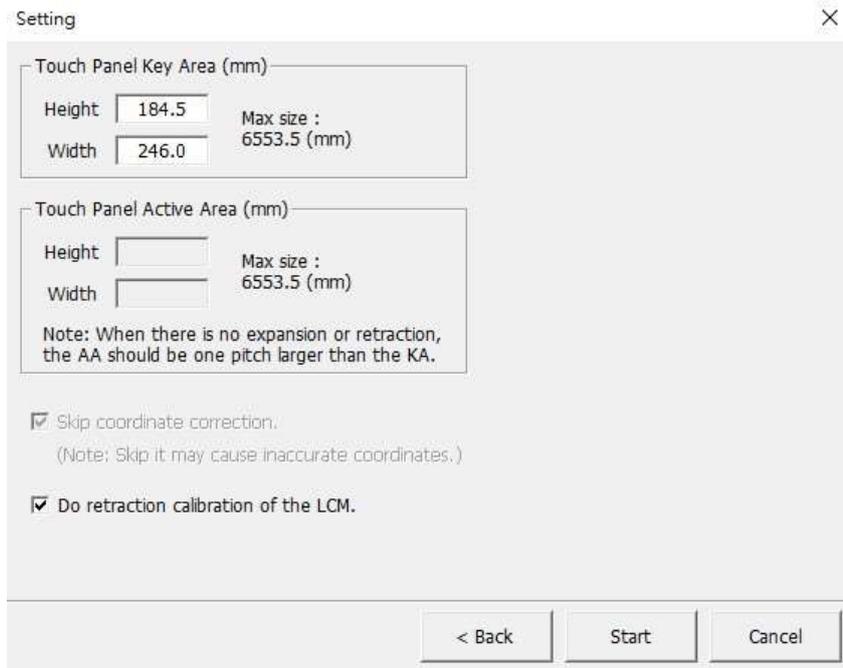


FIGURE 84

- Press Start for detection. Messages appear to notify users to avoid placing hand, dirt, or other objects on touch panel during detection.



FIGURE 85

- The utility starts full screen data collection, and prompt user not to touch



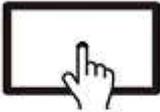
FIGURE 86

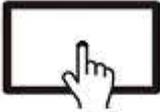
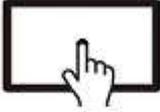
In this phase, the utility will do the following.

- Tune Sensor & Driver Index
- Tune Charge Count Setting
- Tune Driving Wait

- Tune Finger Threshold

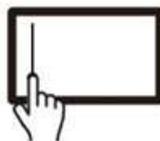
In this phase, the utility prompts to press and hold for a few seconds on center and on each corners respectively.

A	B	C
<p>Touch heavily</p>  <p>Please press the center of the panel heavily with your finger, then click the 'OK' button. (Hot Key: Enter)</p> 	<p>Touch heavily</p>  <p>Please keep touching.</p> 	<p>Please release touch.</p>
 <p>Please press the upper left of the panel heavily.</p>	<p>Touch heavily</p>  <p>Please keep touching.</p> 	<p>Please release touch.</p>

<p>Please press the upper right of the panel heavily.</p> 	<p>Touch heavily</p>  <p>Please keep touching.</p> 	<p>Please release touch.</p>
<p>Please press the bottom right of the panel heavily.</p> 	<p>Touch heavily</p>  <p>Please keep touching.</p> 	<p>Please release touch.</p>
<p>Please press the bottom left of the panel heavily.</p> 	<p>Touch heavily</p>  <p>Please keep touching.</p> 	<p>Please release touch.</p>

### 10. Tune Tail Orientation

To determine the panel orientation, please follow the instructions on screen to touch and drag from top to bottom.



Please draw a line from top left to bottom left.

FIGURE 87

### 11. Tune Water Parameter

In this phase, utility will prompt user to select the desired water solution.



FIGURE 88

The utility will then ask user to further tune the parameters by drawing or press and hold.

OFF (KBU mode)	Water Detect	Water Performance
<p><b>Tune KBU Parameter</b></p>	<p><b>Tune Water Parameter</b></p>	
<p><b>Press and Hold for 90 seconds, then release finger when prompted.</b></p>	<p>Pour water on touch panel surface, increase level until no false touch caused by water.</p>	
		

- Tune Coordinate

The final step is to tune coordinates. Depending whether the “Do retraction calibration of the LCM” option is checked, the utility will do calibration of ask user to setup edge parameters manually.

	Calibration	Tune Edge Parameter
<b>Do retraction calibration of the LCM</b>	ON	OFF

- Calibration

In calibration process, the utility will ask user to touch at three points.



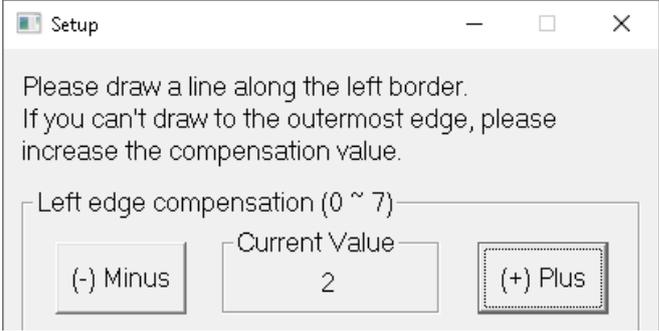
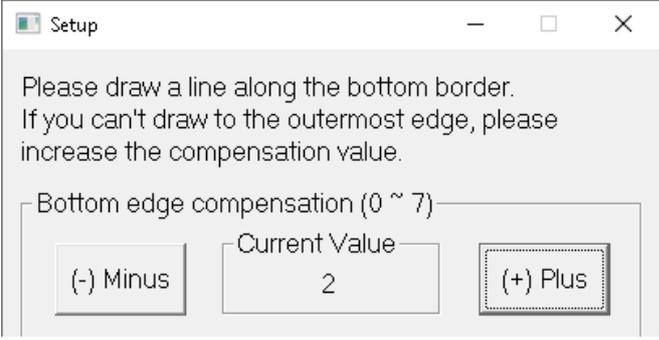
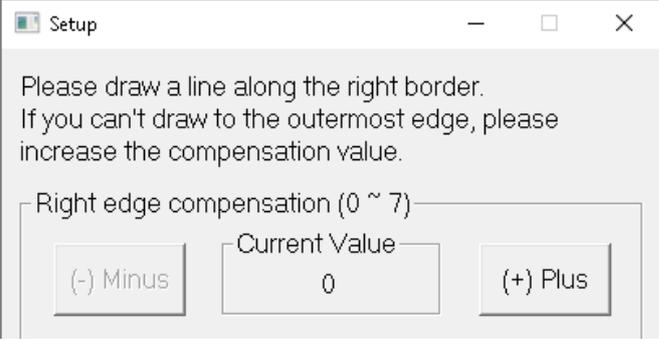
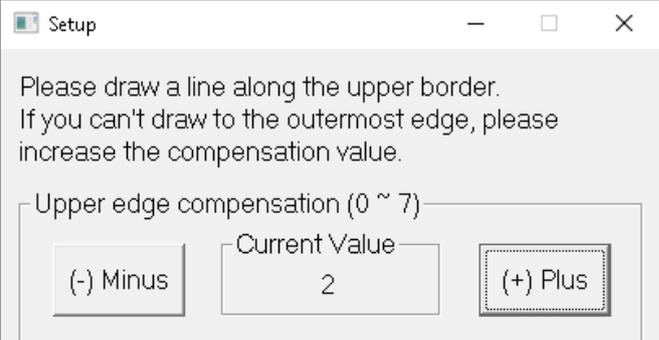
The third point is the check point. If user does not press and hold on it accurately enough, the test will fail. However, user can still choose to use the calibration result.



FIGURE 89

- Tune Edge Parameter

The utility will ask user to manually draw on each edge and increase the parameter if the result cannot reach the very end of the edge.

Left Edge	
Bottom Edge	
Right Edge	
Top Edge	

If the “Skip coordinate correction” option is not checked, the utility will also show information of the calculated expansion or extraction offsets of the touch points.

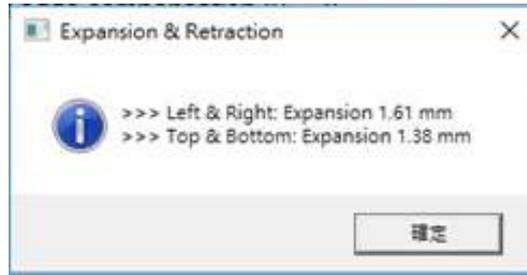


FIGURE 90

## 7. Debug

The debug panel provides several features for analysis of touch status and debugging touch issues.

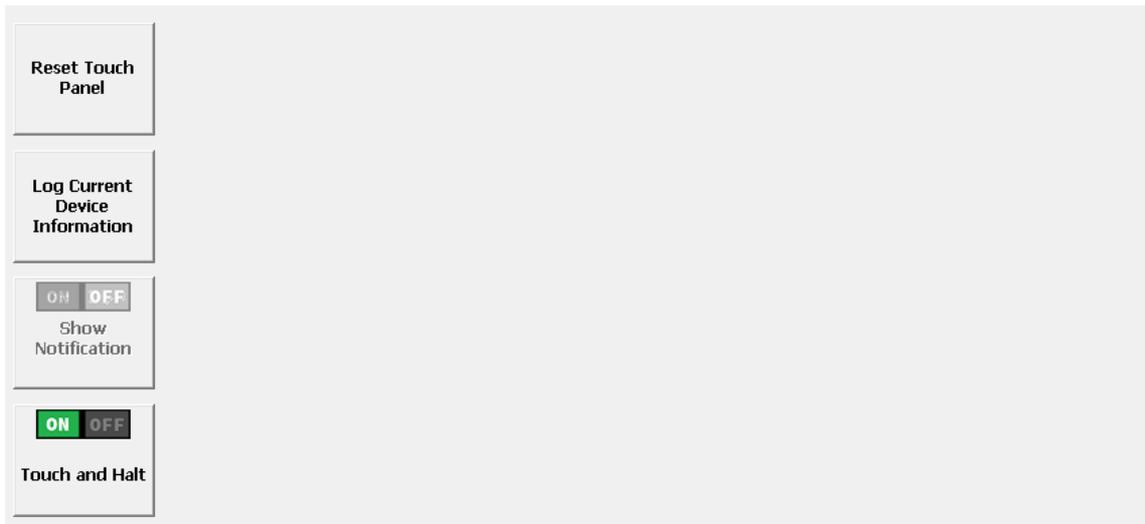


FIGURE 91

### 7.1 Reset Touch Panel

Choosing this option will force the PenMount touch device to be reinitialized. There will be a message box asking for user confirmation, please choose “Yes” to perform device reset and wait until the “Reset touch panel finish” message appears.

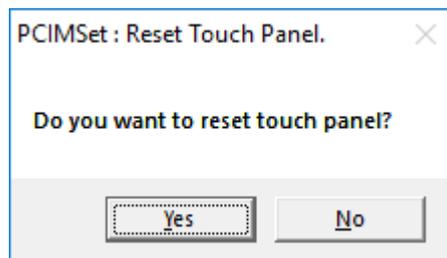


FIGURE 92

Reset touch panel may help resolve some touch malfunction issues when panel is affected by environmental changes such as temperature, water, or noise.

### 7.2 Log Current Device Information

8. Choosing this option will save firmware information to file which can be provided to the PenMount team for issue debugging. Due to the amount of information, the whole process could take several seconds.
9. As a practical condition, the human body and the system cannot share the same ground. The touch panel performs normally when it is isolated. However, the touch panel may be interfered with when a human touched the panel. This is because noise may come from a different ground.

10. This function can guide the user to obtain information step by step and save this information in the directory that the user specified. Please specify the <log file name> in the Save As dialog box.

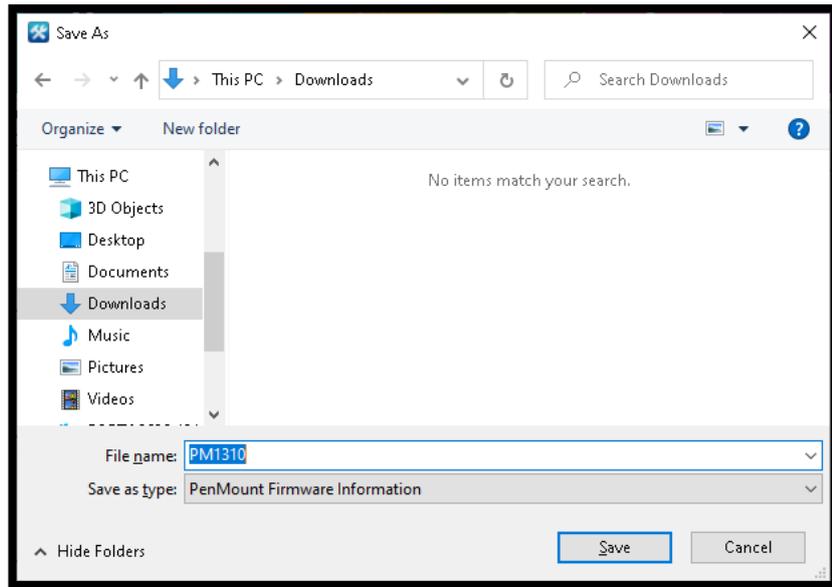


FIGURE 93

11. When user starts the test, tap the black mark to start noise test.

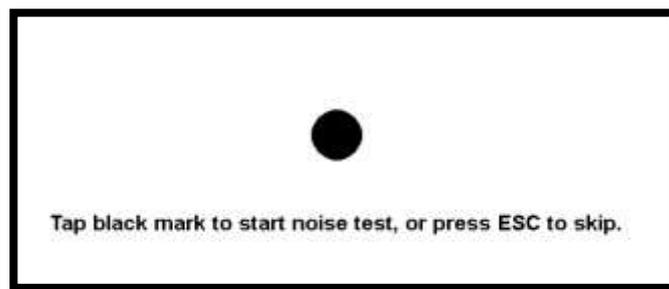


FIGURE 94

12. Then, do not touch panel while the firmware is sampling.



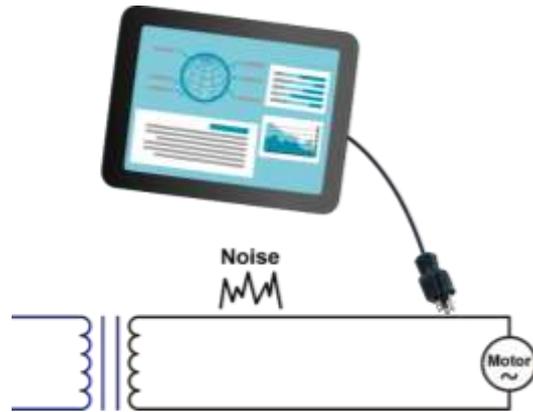


FIGURE 95

When the screen shows the black point, please keep touch it until the process is finished.

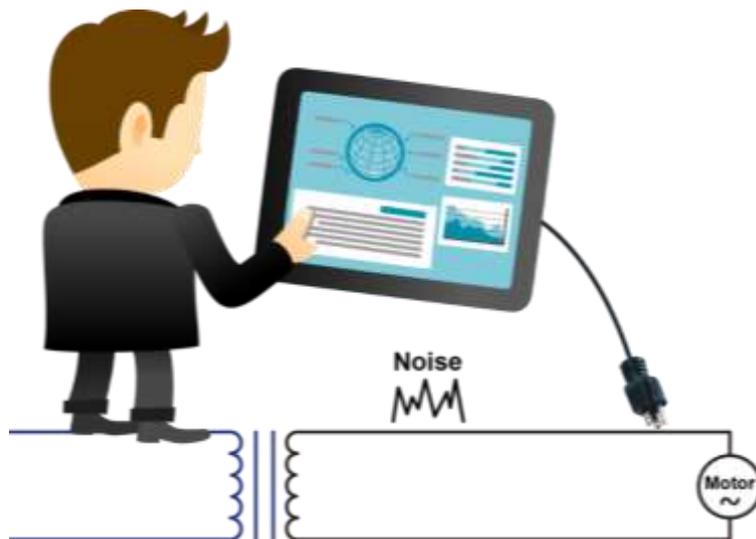
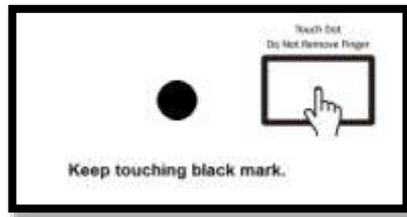
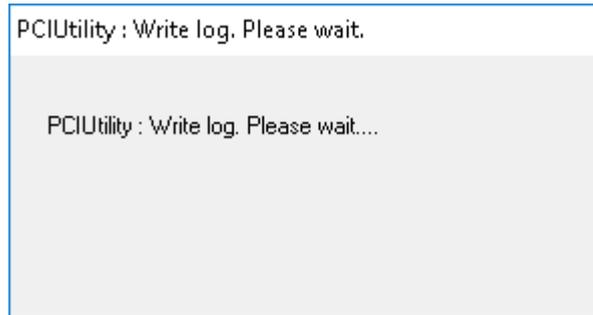


FIGURE 96

13. Finally, please wait for the "Write log finish" message to appear.



14. FIGURE 97

15. The file consists of the useful information for debugging touch issues. The utility will also export current firmware parameters to INI file named:

<log file name>\_ParameterList\_<CRC>.ini

### 15.1 Show Notifications for Water Detection

When firmware is using “Water Detection” mode, touch will be disabled when firmware detects water on touch panel surface.

Choosing the “Show Notification” option enables more conspicuous notifications when touch is disabled. The warning dialog box will disappear after several seconds.



FIGURE 98

### 15.2 Touch and Halt

The touch and halt feature is supported by PenMount firmware version later then 5.2.0, which is used for debugging touch issues. If this field is grayed-out, it means that the firmware does not support this feature.

When enabling, utility will ask user to choose a folder to store firmware information.

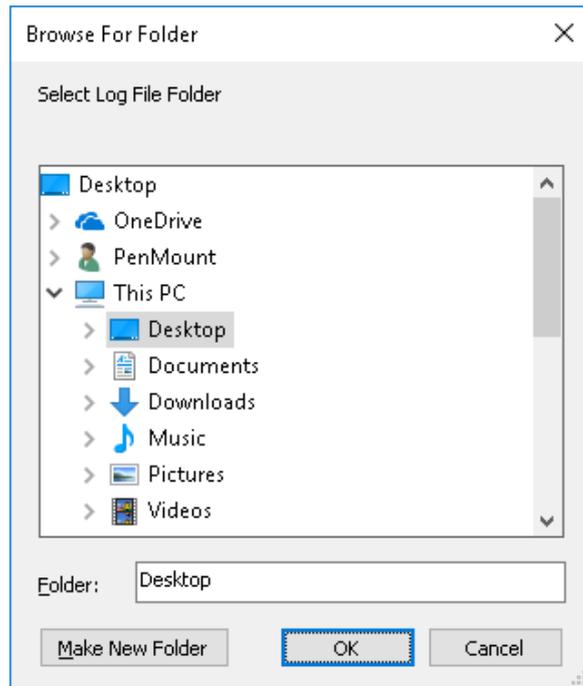


FIGURE 99

After enabling, each touch operation will trigger the firmware to cease scanning, and allow the utility to retrieve the most accurate information from device. This feature will be switched back to disabled state after utility finishes saving data.

## 16. Process Config

“Process Config” is the feature that allows generating process configuration files to be used in PenMount production line utility for processing the configured tasks.

This feature is accessible without PenMount device connected.

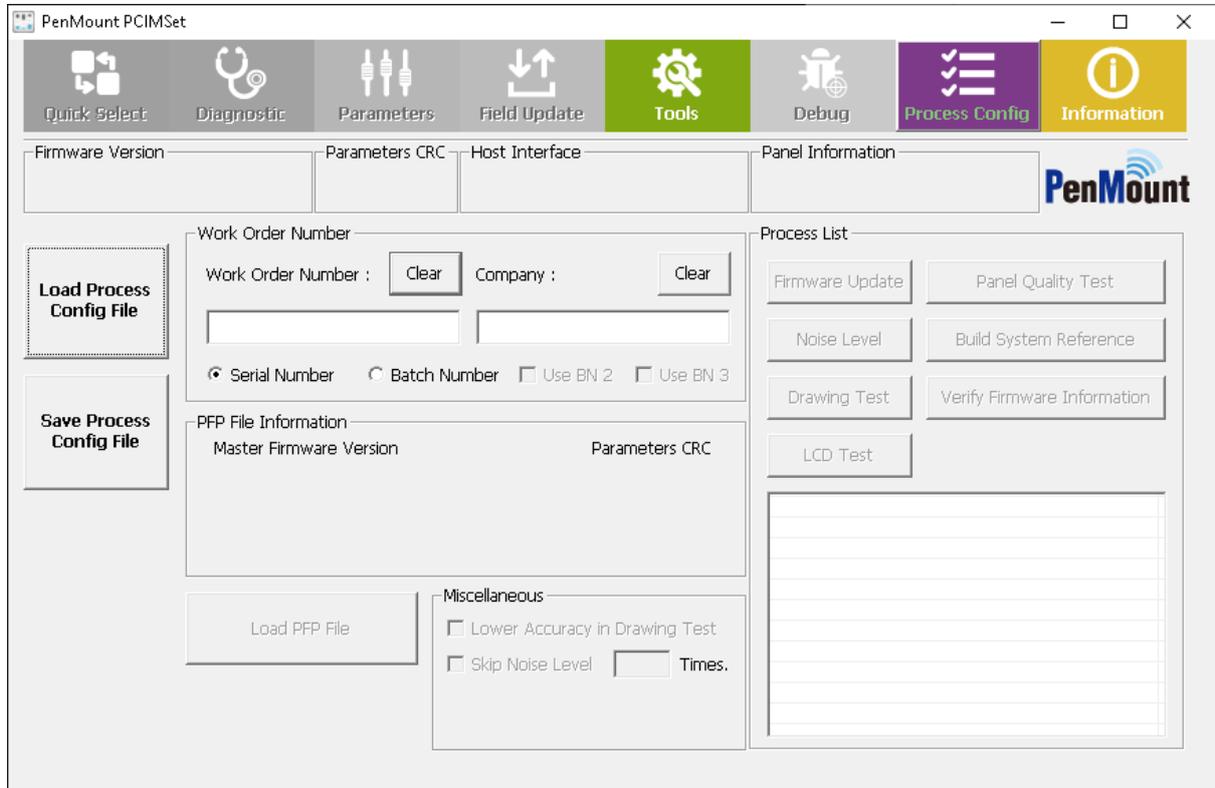


FIGURE 100

- Load Process Config File  
Log the existed process configuration file to check detail or modify the setting.
- Save Process Config File  
Save the current setting the in the process configuration file.
- Load PFP File  
Load the PFP file to set up the process configuration file

### 16.1 Work Order Number

A “Process Config” file is a plan text file with INI extension. The following information is necessary to create a new file.

The work order number is defined by project or by company.

FIGURE 101

Choose the “Batch Number” or “Use Batch Number 2” option when output file is for batch test.

Choose the “Serial Number” option when output file is for individual test.

## 16.2 Load PFP File

Please provide a valid PFP file by using the “Load PFP File” button. After that, the information of the file will be displayed in utility.

FIGURE 102

## 16.3 Miscellaneous

Several options are available for tweaking the test flow.

- Lower Accuracy in Drawing Test

User can select drawing test to check if the PCAP can be draw smoothly. However, sometimes the user test without LCM and the accuracy may be affected. The user can switch on “Lower Accuracy Test in Drawing Test” to improve the production line efficiency.

The next two figures show the normal test area for drawing test, and the test area when the user can switch on “Lower Accuracy Test in Drawing Test”.

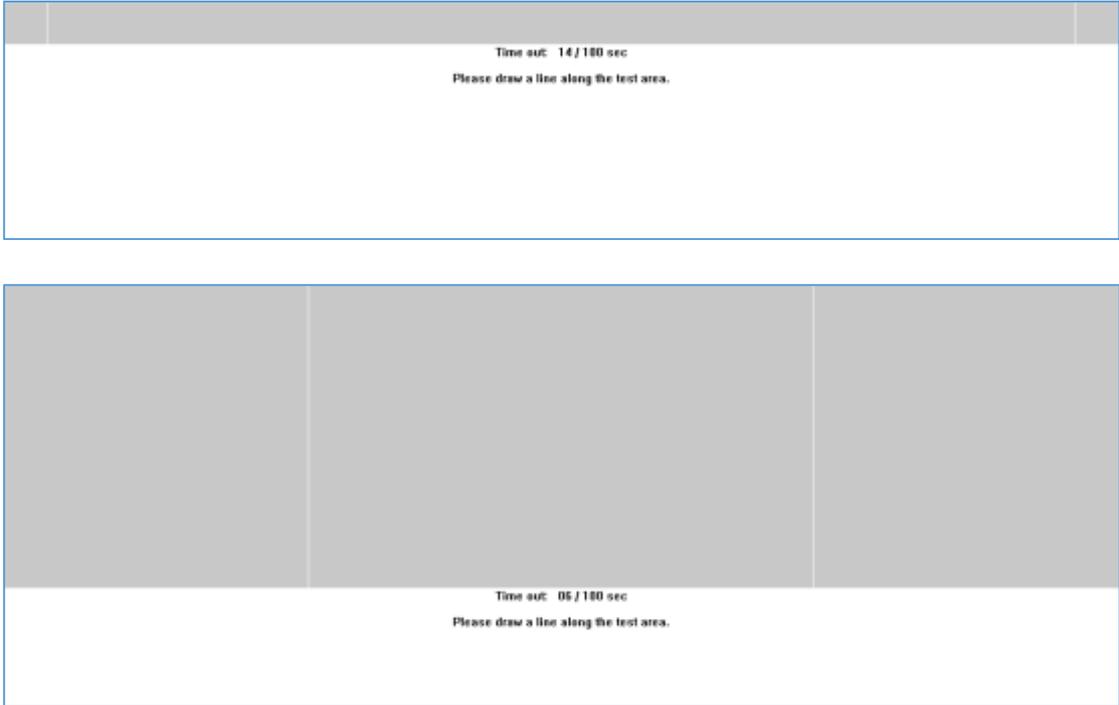


FIGURE 103

- Skip Noise Level N Times

Noise Level Test costs a lot of time. When performing batch tests for multiple control boards, it is not always necessary to do noise level test each run. In this case, user can specify the skip times in this field.

For example, if set up “Skip Noise Level 2 Times”, the test flow may become as below.

Test #	1	2	3	4	5	6	7
<b>Do Noise Test</b>	YES	SKIP	SKIP	YES	SKIP	SKIP	YES

## 16.4 Select Tests for Process List

Each button under the Process List group is represents a specific task. Please click on the desired button to add the task to Process List. To remove it, please click the button again.

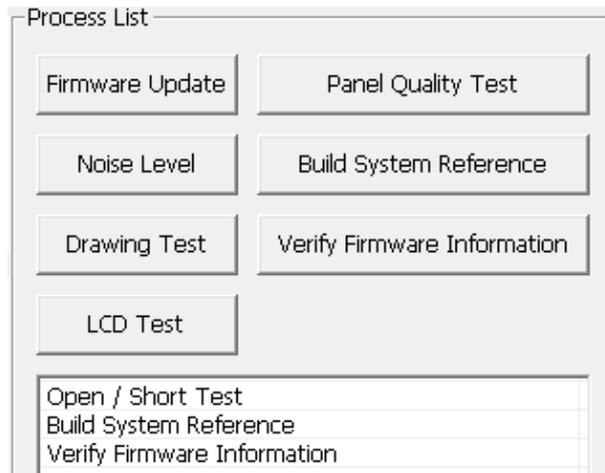


FIGURE 104

The process order is determined by the task selection sequence. In the example above, the selection order is “Firmware Update”, “Build System Reference”, and “Drawing Test”, and the PenMount production line utility will also follow this order to perform tasks.

Task	Description	Option
<b>Firmware Update</b>	Update firmware with the selected PFP file.	
<b>Open / Short Test</b>	Do open short test	
<b>Noise Level</b>	Do noise level test with pattern “WHITE”, “BLACK”, and “CHECKERBOARD”	
<b>Build System Reference</b>	Build system reference	
<b>Drawing Test</b>	Do instructed draw test to verify touch functionality and within acceptable accuracy.	Low Accuracy in Draw Test When this option is selected, “Draw Test” will allow much relaxed passing conditions.
<b>Verify Firmware Information</b>	To verify if the device firmware matches the selected PFP file.	
<b>LCD Test</b>	Display solid background colors for LCD inspections.	