Projected Capacitive Input (PCI) Touch Panel Controller User Guide

Version 2.1

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PenMount®
TOUCH SCREEN SOLUTIONS

Preface

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Revision Table

Date	Revision	Changes
09/30/2014	2.0	
01/05/2015	2.1	

Table of Content

1. Introduction

This document provides information on using PenMount utilities for touch device setting, update and tests. PenMount Projected Capacitive Input (PCI) control boards are designed to support projected capacitive touch panels. PenMount offers a series of PCI controller products. PenMount PCI controllers facilitate high precision touch activation.

1.1. System Requirements

PenMount PCI Utilities can operate in the operating systems listed below:

Types	Operating Systems
Desktop	Windows 2000
	Windows XP (32/64bit)
	Windows XP Tablet PC Edition
	Windows Vista (32/64 bit)
	Windows 7 (32/64 bit)
	Windows 8/8.1 (32/64 bit)*
Server	Windows Server 2003
	Windows Server 2008
	Windows Server 2008 R2
	Windows Server 2012
	Windows Server 2012 R2
Embedded	Windows XP Embedded
	Windows Embedded Standard 2009
	Windows Embedded Standard / POSReady 7
	Windows Embedded 8 Standard / Industry

*If the warning as shown in the display box comes up when running the program on Windows 8, please press “More info” and click “continue to execute” to unlock.

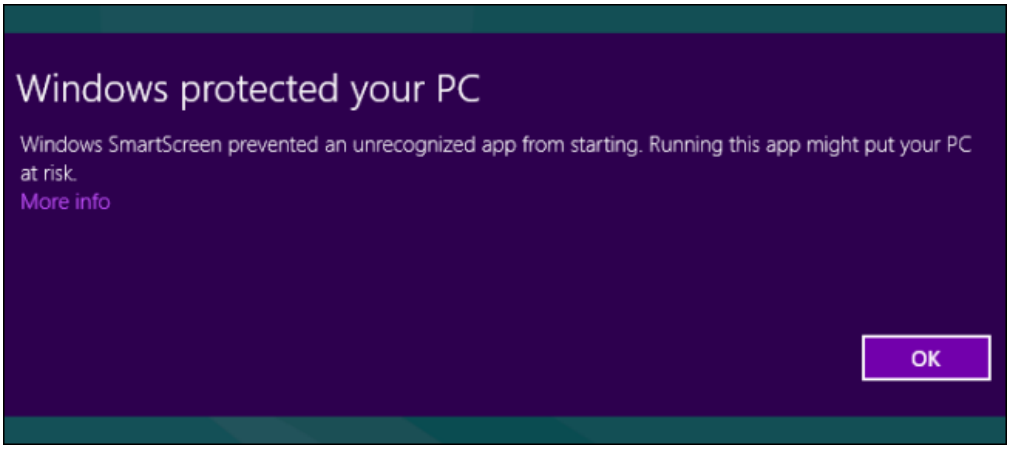


Figure. 1

1.2. Support Devices

The devices and interfaces supported by PenMount PCI Utilities are as follows:

IC	Control Board	USB	RS-232 / UART	I^2C
P2-02	PM2101		v	v
P2-03	PM2102	v	v	v
	PM2201	v	v	v
	PM1201A	v	v	
P2-04	PM1300A	v		
	PM1302	v	v	
P2-04 x 1 & P2-02 x 1	PM1400A	v	v	
	PM1401	v	v	
P2-04 x 1 & P2-02 x 2	PM1500	v	v	
P2-08	PM1710*	v	v	
	PM1310*	v	v	v
P2-06	PM2300	v	v	v**

* This series of controllers can automatically detect the interface connected but this cannot be set by hand.

** PenMount PCI 1^2C can only be set on Windows by using the PMT101 Adapter Plate.

1.3. Execution Limitations

Currently, PenMount PCI utilities can only support the setting and operation of one single device at one time. If you need batch settings for PenMount touch devices, please refer to Chapter III auto update function for the auto update program. End users can use the utility built into the PenMount driver instead. After installing the PenMount PCI driver, the user can use other PenMount touch functions such as edge compensation and linearity test with the utility built in the driver. Please refer to the AMT or PenMount website for PenMount PCI control board drivers.

1.4. Before using this manual

Make sure the PCI touch panel and PenMount control board have been integrated properly into the computer system. If your need to integrate the control board and touch panel, please refer to the “Projected Capacitive Touch Panel Integration Guide”.

The Touch Panel function will be disable when processing the PenMount Utility, suggest adopt the Keyboard / Mouse as the input devices.

1.5. After-sales service

The PenMount PCI control board series and software are updated on a regular basis. For more information on the latest updates, downloads, and technical support, please refer to our websites:

http://www.salt.com.tw

http://penmount.com.tw

2. Settings

"PCIMSet" tool mainly modifies the controller's firmware parameter settings and confirms the firmware version when the user is integrating or operating the PCI touch panels. As the touch functionality of the touchscreens will be temporarily disabled when PCIMSet application program is running, the user has to use the external mouse to run the software.

2.1. Connect Devices

When the program is activated, it will automatically search for the PenMount devices connected with USB or COM1. If it detects successfully, it will show the firmware version.

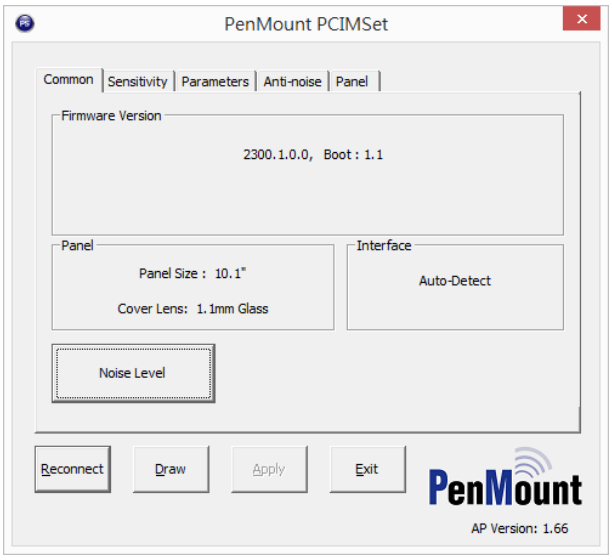


Figure. 2

When it cannot detect any devices, the program will presume that the interfaces you are using are the special RS-232/UART. You can choose the correct "COM Port & Baud Rate" in the pop-up window, then press OK to restart the program for device detection.

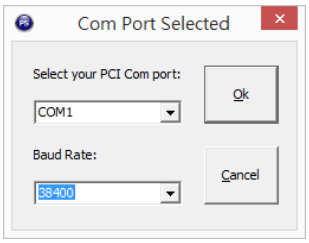


Figure. 3

If the program cannot detect the devices supported, the following window will be displayed. Please confirm whether the connection between the connector and the system is loose and the power is on or if the cables for the interface and the controller are compatible. (For instance, the default interface for the controller is

RS-232, however, the USB cables are used. Under this situation, the controller, not properly connecting to, cannot communicate with the system.)

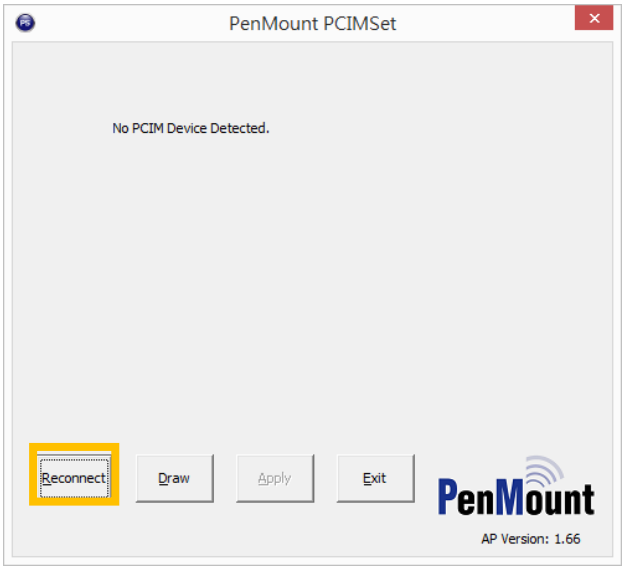


Figure. 4

Once the above situation is cleared, please click “Reconnect” to restart the connection. At this time, PCIMSet should be working. If PCIMSet is still not initiated, please contact us.

2.2. Basic Operation

PCIMSet includes five tabs: Common, Sensitivity, Parameters, Anti-noise, and Panel. Under the tabs, there are four buttons:

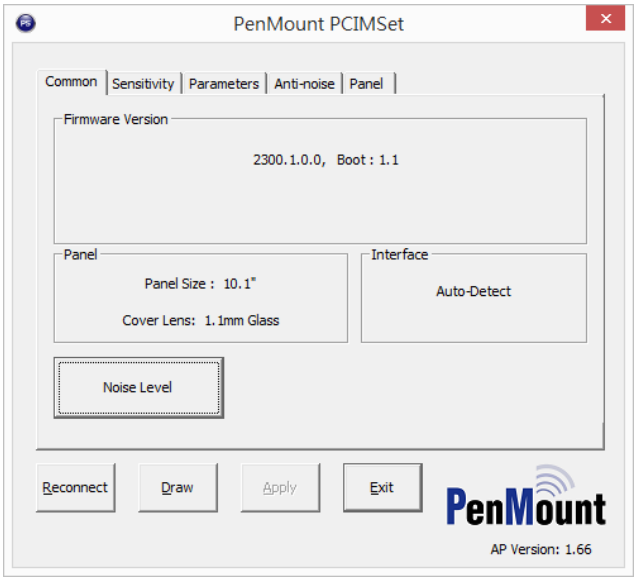


FIGURE. 5

1. Reconnect

Press this button to allow the system and the connector to connect again. When you want to pull and plug in or change the controller, please click “Reconncet” to reconnect the system and the controller so that the system can read the controller data correctly.

2. Draw

Press this button to run “Draw.exe”, the drawing test program. Before using this program, please make sure that the system is connected to the keyboard. If the connection is off when this program starts, it is impossible to exit the program unless rebooting the computer.

3. Apply

When the program starts to run, “Apply” is grayed out and cannot be clicked. After the user changes the settings, “Apply” can be clicked. When you click “Apply”, the settings will be saved. After the settings are changed, if “Apply” is not clicked to save all the changes on the settings, all new settings will be lost.

4. Exit

Exit the program. The user can also click “X” on the top right corner to exit. However, all changes will be lost.

2.3. Inspect Firmware Version

The “Common“ tab shows the information and settings of PenMount PCI controllers, such as the firmware version and the panel size, etc.

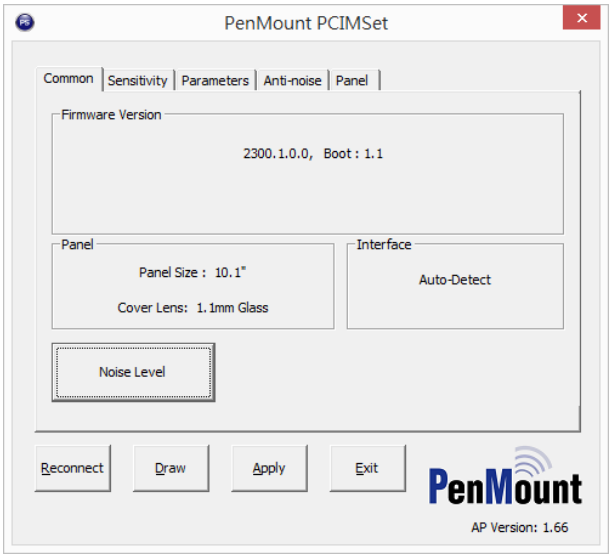


Figure. 5

1. Firmware Version

Display the firmware and Boot Loader version. Take the above as an example, the firmware version of the controller is 2300.1.0.0. If there are Master and Slave versions, it will show as well. The firmware revisions for Master and Slave are the same, but the boot versions are not necessarily the same.

2. Panel Size

Show the default panel size for the controller. Take the above as an instance, the controller is designed to support the 10.1” touch panel.

3. Cover Lens

Show the default thickness of the top glass for the touch panel supported by the controller. Take the above picture as an example, the thickness of the top glass is 1.1mm.

4. Interface

Indicate the default interface the PenMount PCI controller adopts. If it shows Auto-Detect, it means the controller will automatically detect the interface connected.

5. Noise Level

Calculate the standard deviation in the current environment. If the touch operation is not smooth, the lines will break up or the cursor will drift when drawing the lines. Please run “Noise Level”.

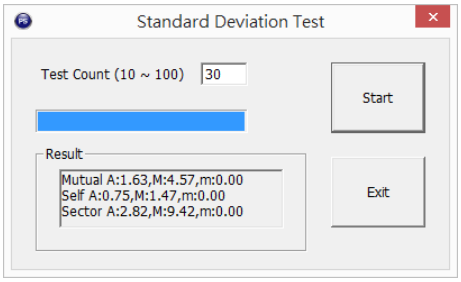


Figure. 6

The default test count is 30. The number is bigger and the time spent is more. Please press “start” (Figure. 7). Do not touch it until the calculation is completed. When calculation is done, a file named “PCIM STDEV Result.log” will be produced under the same directory as PCIMSet. Please send the file to PenMount for further examination.

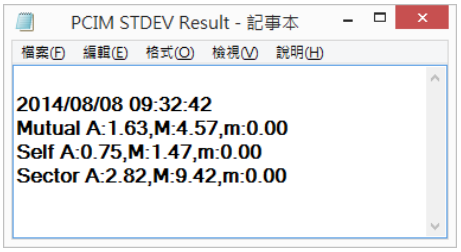


Figure. 7

6. AP Version

PCIMSet version number.

2.4. Modify Touch Sensitivity

Under “Sensitivity”, the user can adjust the touch panel sensitivity.

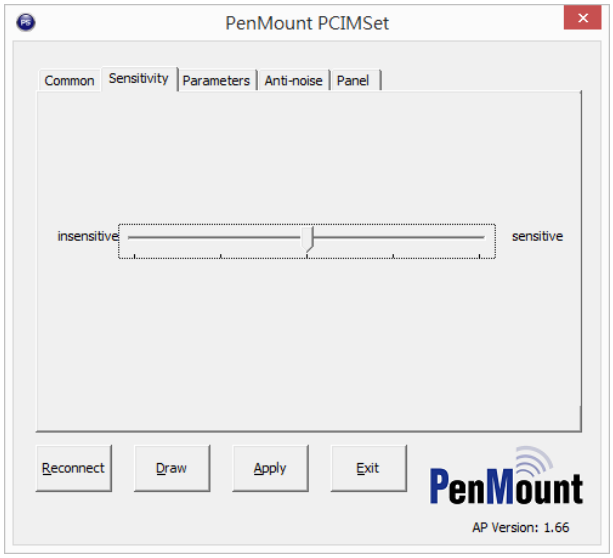


Figure. 8

PenMount product has been tuned to its best condition when released from the factory, therefore, there is no need to change the parameters under normal circumstances. If the touch result is not satisfactory due to the changes in the environment when the user integrates the touchscreen, the user can modify the sensitivity parameters according to the needs to achieve the better sensitivity in the PCI product.

When you move the tab toward “Sensitive” by dragging the mouse, the PenMount firmware automatically modifies the parameters for more sensitive touch operation. However, at the same time, it also becomes more susceptible to the noise interference in the environment.

When the tab moves toward “Insensitive”, the parameter settings makes the touch panel less sensitive and it is less susceptible to the noise interference.

2.5. Adjust Touch Settings

"Parameters" allows the user to modify the parameters of the touch panel, such as the orientation, edge compensation and calibration of the touchscreen.

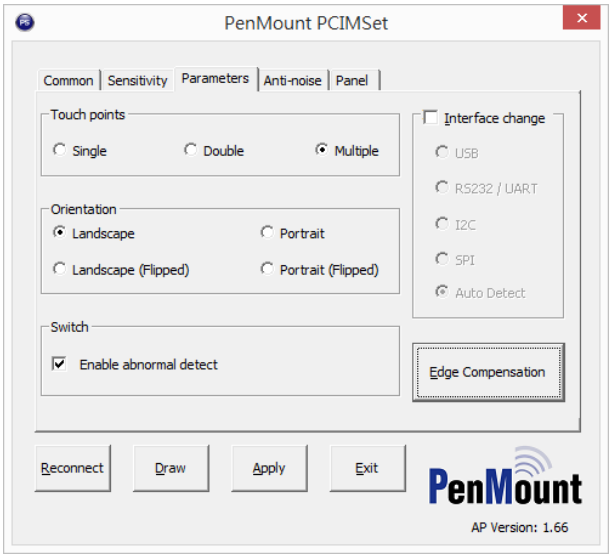


Figure. 9

1. Touch Points

This can adjust the number of the touch point. You can choose single, double or multiple touch according to your needs. It can support up to 5-touch operation by default.

2. Orientation

This can allows the user to rotate the orientation of the touch panel with four different angles available:

Orientation	Degree
Landscape	0
Portrait	90
Landscape (Flipped)	180
Portrait (Flipped)	270

3. Switch

When "Enable abnormal detect" is running, the touch functionality will shut down automatically as the controller detects that the conductor area in contact with the touch panel is oversized (i.e. large amount of water, or palm, etc.) Once the conductor or water is wiped dry, the touch functionality will resume.

4. Interface Change

This is for PenMount standard firmware version to change the connecting interface between the system and the controller. Please make sure the cable for the chosen interface is at hand when making the changes.

After clicking “Interface Change”, the warning will appear to remind the user that the controller will be compatible with the new interface and the cables for the newly chosen interface should be prepared. After clicking “OK” in the warning, please choose the interface for the host.

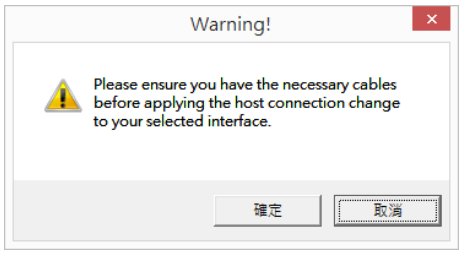


Figure. 10

The controller presets the default interface for the “Auto Detect” function. However, the user can still choose any of the interfaces that the controller supports, including USB, RS232/UART and I2C.

Click the new interface and press “Apply”. “The warning” will appear again to remind that the cables for the new interface should be prepared. Please press “OK” and the changes can be applied.

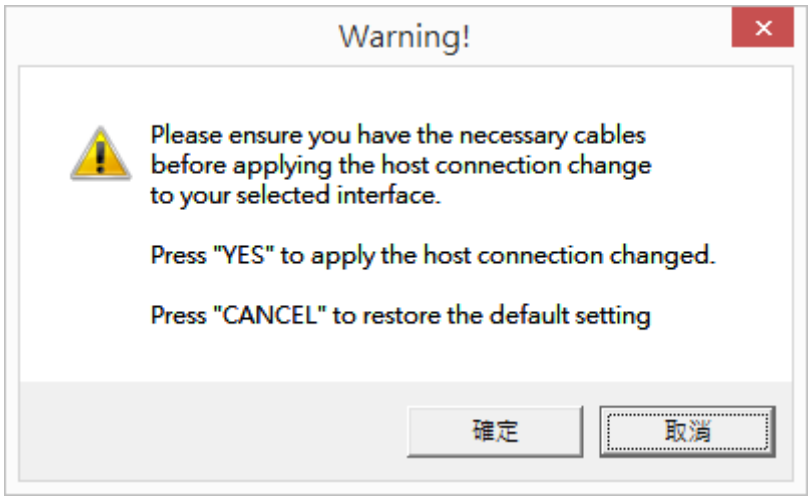


Figure. 11

Please note that after the changes on the settings are applied, the old cables are not compatible with the new interface any more. It is impossible to reset the interface again. For instance, if you use USB interface originally, then you change the interface to RS-232 in PCIMSet. Once the setting is changed, the RS-232 cables should be used to connect the interface to the host.

5. Edge Compensation

When the PenMount controller is released from the factory, the firmware comes with a default setting for the active area of the LCD monitor corresponding to that of the touch panel and the sizes of the active areas of the hardware and software are the same.

However, due to the resolution, the active areas for hardware and software can be slightly different. To adjust it, please click “Edge Compensation”.

When the edges of the touch panels do not function smoothly, please set the edge compensation value higher to have better improvement. If a response is produced before in contact with the edges of the touchscreen, please set the edge compensation value lower. If you want to restore to the default setting, please click “Default”.

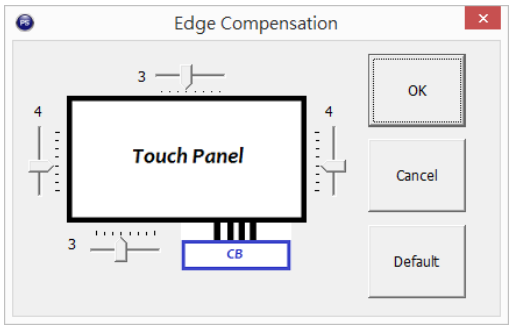


Figure. 12

2.6. Modify Anti-Noise Settings

The PenMount firmware has been adjusted to its best condition when it is released from the factory. Under normal usage, there is no need to change the anti-noise parameters.

If the user finds the noise interference from the environment when integrating the touch panel, please adjust anti-noise parameters to “weak” to attenuate the signals and eliminate the noise interference.

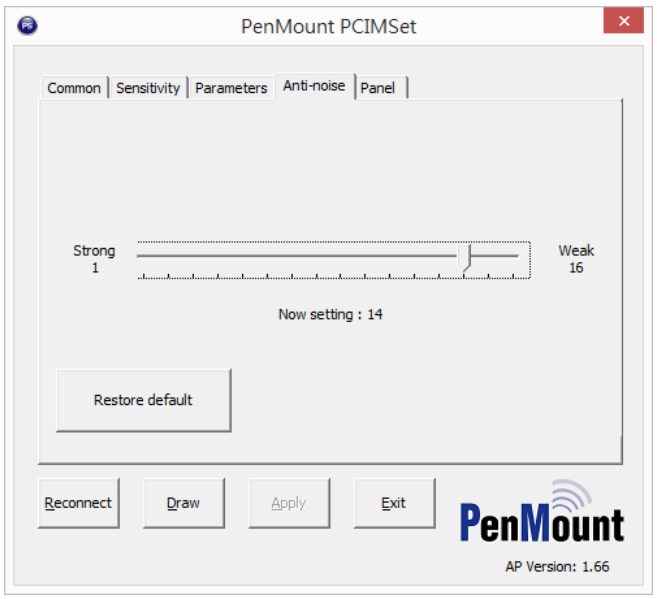


Figure. 13

When the tab moves to “Strong”, it will attenuate the signal noise to reduce the degree of the noise interference. But, the touch effectiveness will be weakened as well. When the tab moves to “Weak”, it will directly read the intensity of the signal and the noise to diminish the degree of signal attenuation.

However, when the noise is too strong, it will also directly affect the touch effectiveness. If you wish to restore to the default setting, please click “Restore Default”.

Please note that when the anti-noise parameters are adjusted too much to “strong”, the touch sometimes cannot function at all.

2.7. Change Settings for Touch Panels

For standard firmware, PenMount controllers can support different sizes of touch panels and a wide range of thickness for top glass. If the default size of the touchscreen or thickness of the cover glass is not consistent with the touch panel size and top glass thickness currently adopted. Please modify in “Panel”.

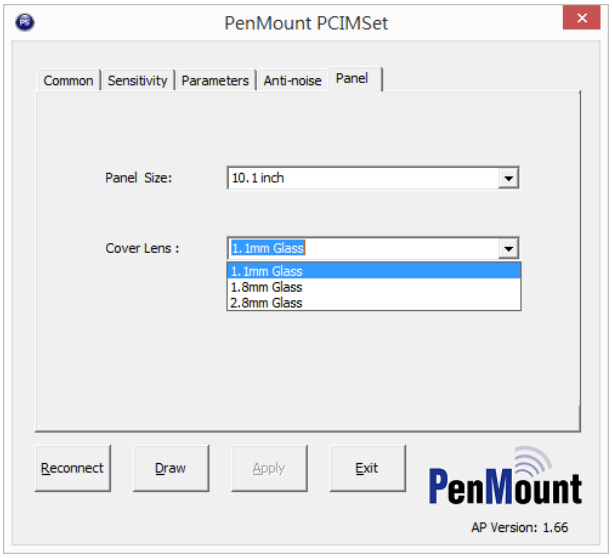


Figure. 14

1. Panel Size

   Set the size of the touch panel currently used. Click the drop-down menu to see the sizes of the touch panels supported by the controller. Take PM2300 controller as an example, only 10.1” touchscreen is available in the drop-down menu.

2. Cover Lens

   You can set the top glass thickness of the touch panel that you currently use and click the drop-down menu to find the thickness range supported by the controller. Take the PM2300 for an instance, in the drop-down menu, there are three options for top glass thickness: 1.1mm, 1.8mm, and 2.8mm. as example

   Please note that if you use the custom firmware version, you may not be able to make any changes as the tabs of touch panel sizes and glass thickness are locked.

For better touch experiences, please adjust the touch mode to single or dual touch when you use top glass of 2.8mm thick at least.

3. Update

“PMUpdate “ tool enables the user to change the controller firmware version or update the controller parameter settings.

3.1 Basic Operation

When the program is running, the user can see the default “Field Update and Parameter Update” as follows:

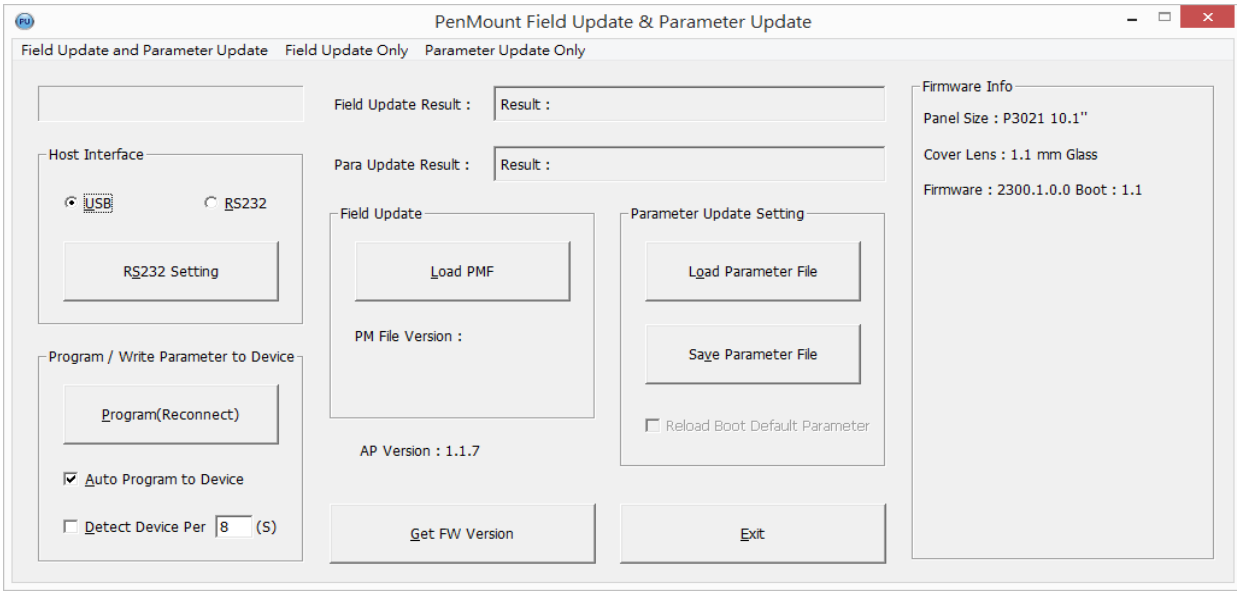


Figure. 15

1. Switch the mode

To meet the needs of various users, “Update” program provides “Field Update Only” or “Parameter Updates Only” for mode options.

- Field Update Only

Under this mode, only the interface related to the firmware update will appear.

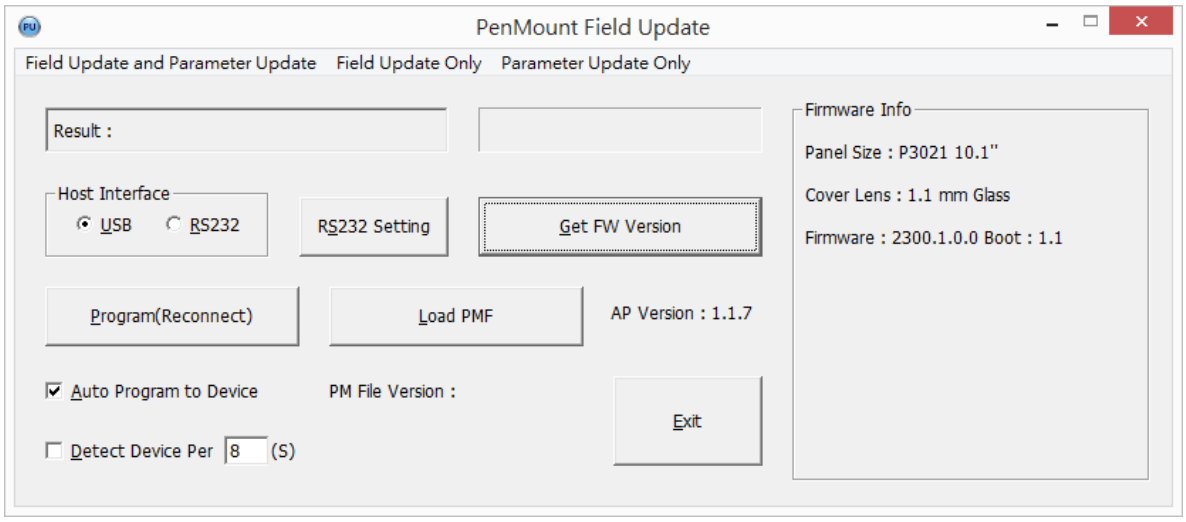


FIGURE. 16

- Parameter Updates Only

Under this mode, only the interface related to the parameter update will appear.

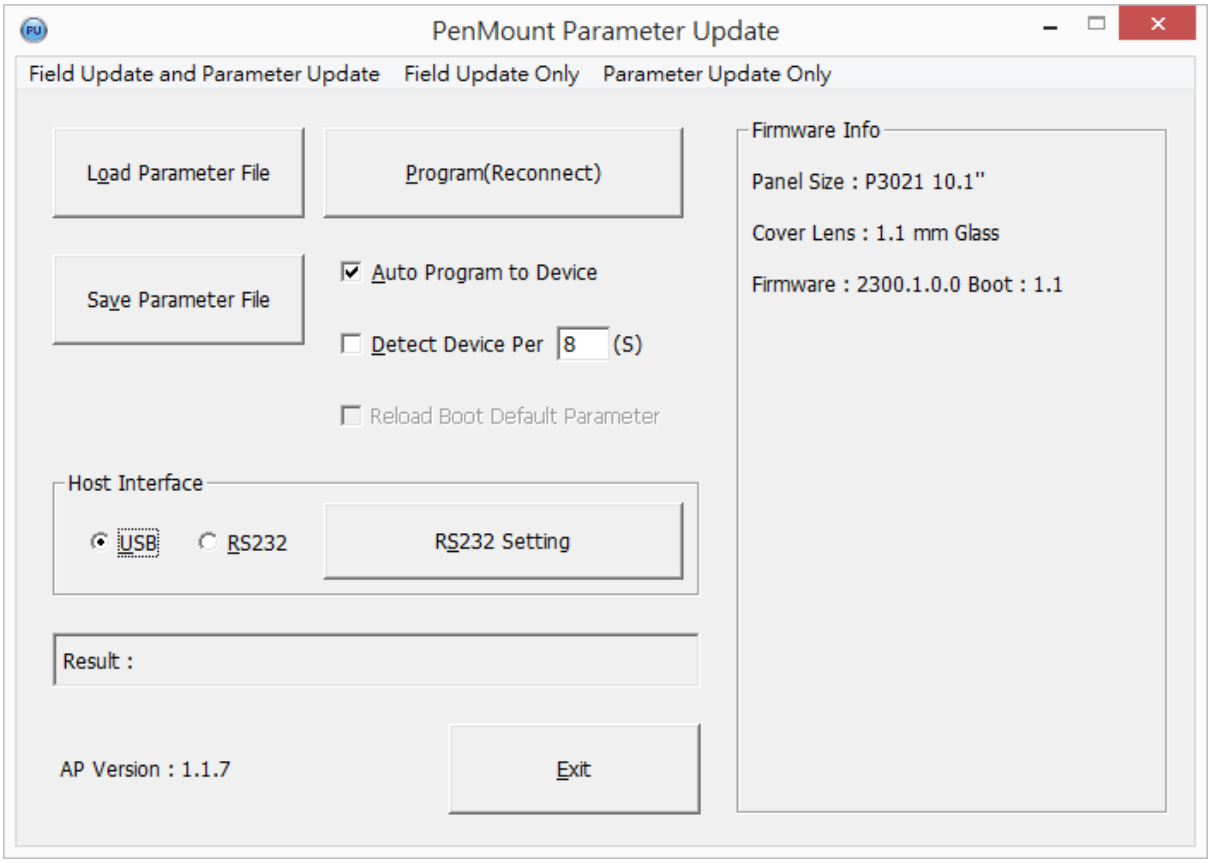


Figure. 17

2. AP Version

The Update version no. If you encounter any problems when using Update, please make note of the number and inform PenMount.

3. Exit

Press “Exit” or “X” at the top right corner to exit the program. In order to make sure that no interruption happens during the update, please do not click “Exit”.

3.2 Connect Devices

When the program is activated, it will search for the PenMount devices connected by USB or COM1. If the detection is successful, the firmware information will appear in “Firmware Info”. When you start the program, the devices are not connected properly, there are several ways to handle the situation according to the connecting interface used:

- USB

  Owing to the characteristics of USB –plug and play, the program will automatically detect after you connect the device.

- RS-232

  If you connect the PenMount device to COM Port of non COM1, please choose the port according to the steps indicated in the following Figure. and press “Get FW Version” to update firmware information.

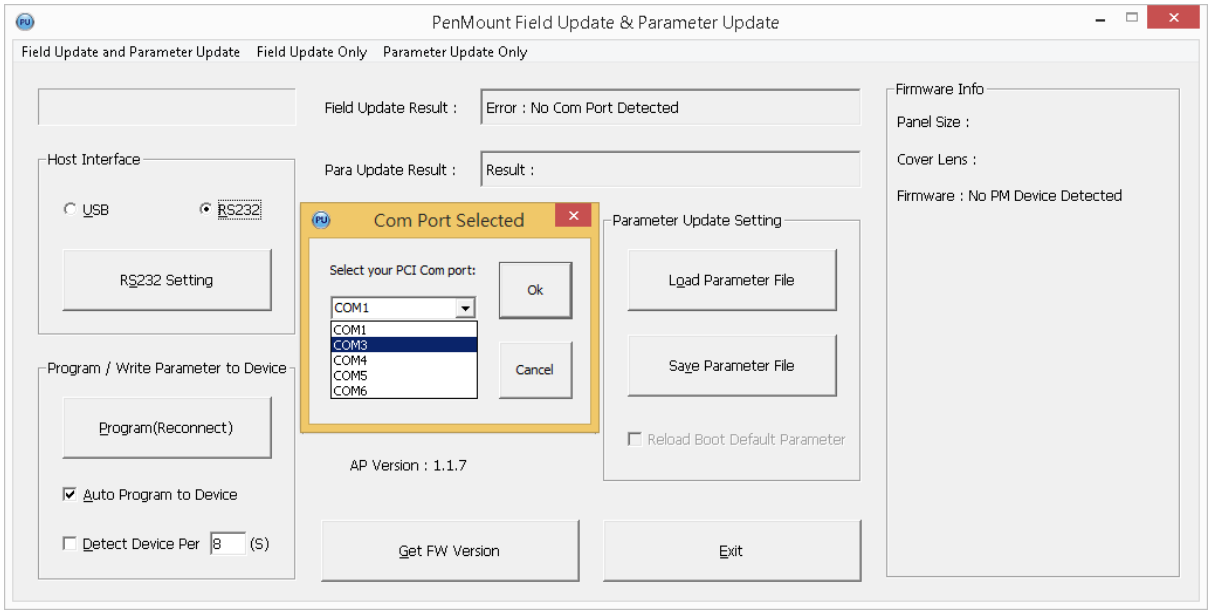


FIGURE. 18

The firmware information the program shows includes the following columns:

1. Panel Size

   The part no. and size of the touch panel PenMount controller corresponds to, such as P3021 to AMT's 10.1" touch panels.

2. Cover Lens

   It means the top glass thickness of the touch panel PenMount controllers support, such as the 1.1mm thick top glass as indicated above.

3. Firmware

   This shows PenMount controller firmware version and Boot Loader version. The PenMount controller as indicated in the Figure. above is 2300.1.0.0. If the controller uses several ICs, it will respectively show the number of the master and slave versions as follows:

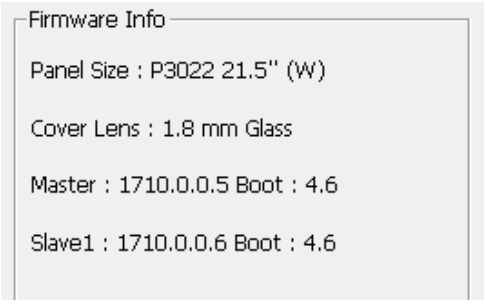


FIGURE. 19

3.3 Load Firmware File

Please press "Load PMF" under the "Field Update" and click the file you want to update in the dialogue box.

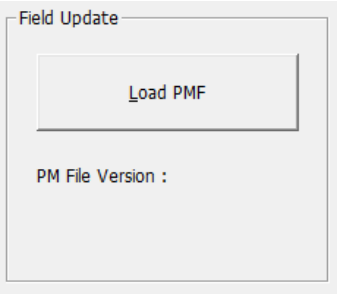


Figure. 20

The format of the firmware PenMount supports is suitable for "pmf format" for one single IC and "pmc format" for multiple ICs.

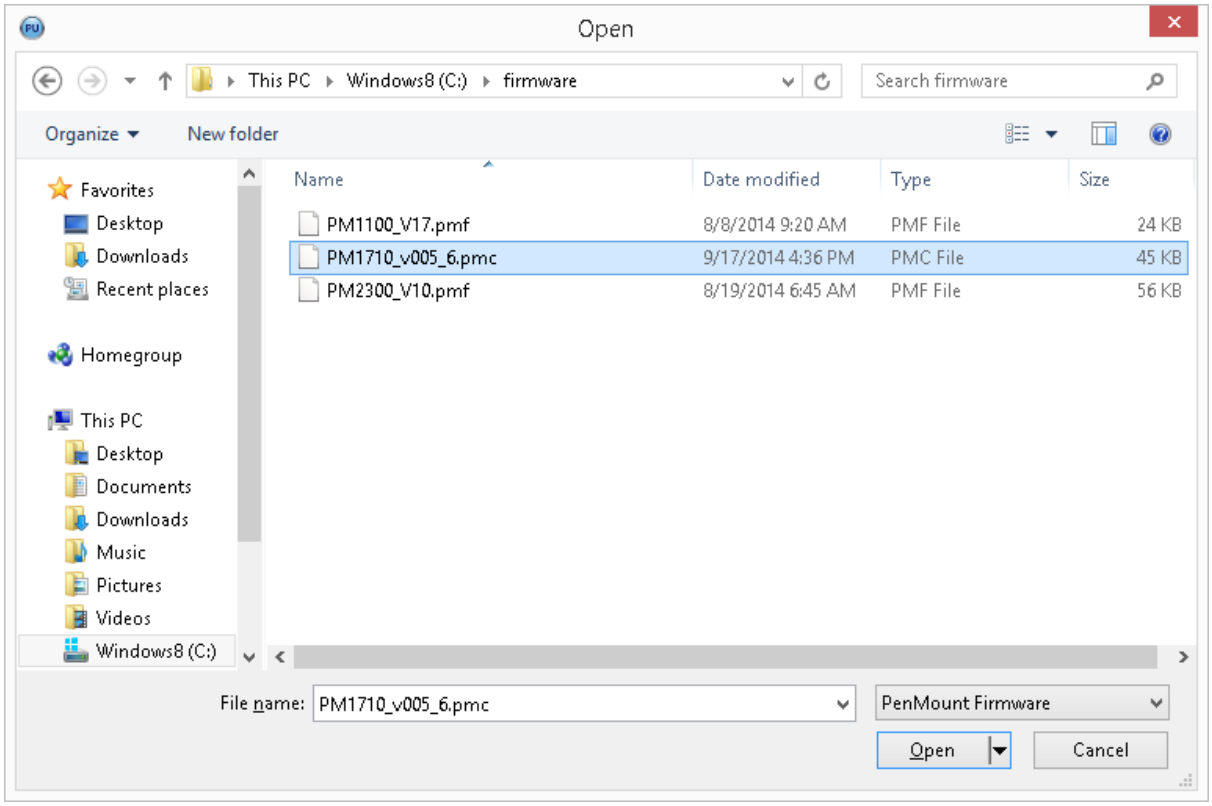


Figure. 21

If the reading is successful, the information below will appear under “Field Update Result”.

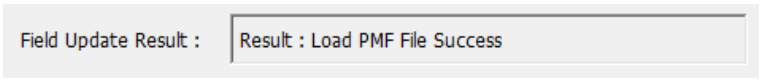


Figure. 22

At the same time, the program will show the version no. of the firmware file as follows:

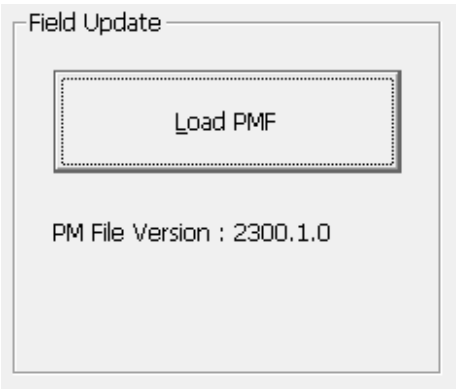


Figure. 23

If the reading fails as a result of the damage of the file, which is rare, information as indicated below will appear under “Field Update Result”:

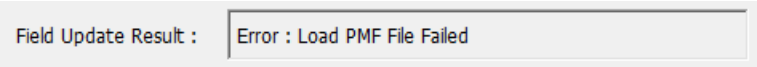


Figure. 24

Please note that the firmware the program cannot load by force during loading is identical with the controller. If the firmware file is not consistent with the controller connected during the update, the update will fail.

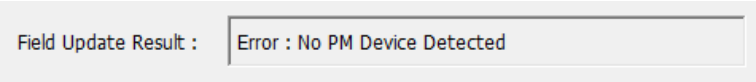


Figure. 25

3.4 Load Parameter Settings

In addition to the firmware, Update program also enables the parameter update.

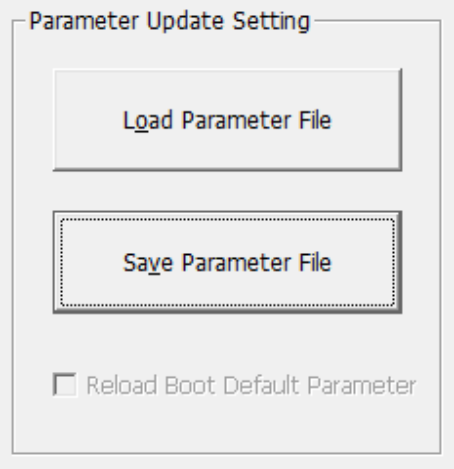


Figure. 26

The PenMount parameter setting program is a text file with a slave filename of INI, usually provided by PenMount. It saves the controller parameter settings to meet the individual needs of the customers. For instance, the parameter file for PM2300 is indicated below:

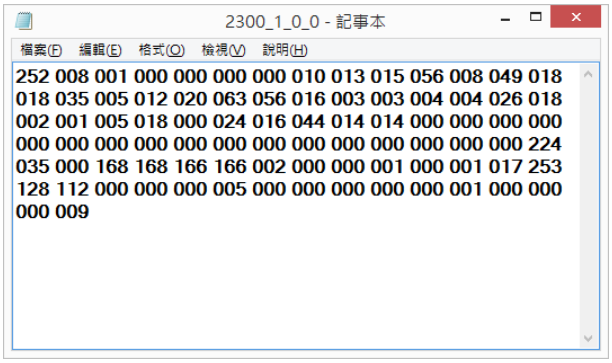


Figure. 27

1. Load Parameter File

The user can click “Load Parameter File” to load the parameter settings provided by PenMount. When loading is successful, the information below will appear in “Para Update Result”:

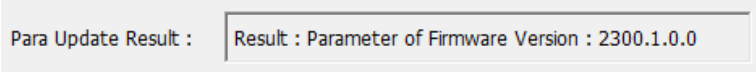


Figure. 28

If the file format chosen is not correct, the information below will appear in ” Para Update Result”:

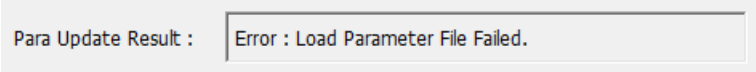


Figure. 29

Please note that the parameter file not loaded by force during loading should be identical with the controller connected. The firmware version corresponding to the parameter file during update is consistent with the controller, or the update will fail.

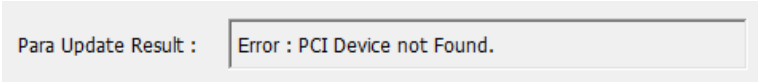


Figure. 30

2. Save Parameter File

This program allows the user to export the parameters the controller adopts to the file. Please click ”Save Parameter File”, the program will automatically generate a file under the name of the firmware version in“PmFu_ParaList”. For instance, the file name for PM2300.1.0.0 is 2300_1_0_0.ini.

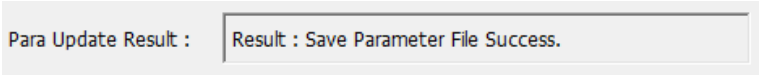


Figure. 31

3. Reload Boot Default Parameter

For clients using custom firmware, please click this function to update and restore to the default setting. If the standard firmware version is used, this function will be grayed out and cannot be clicked.

Please note that if you load the parameter file “INI” and click “Reload Boot Default Parameter” at the same time, the update will be made according to the settings in the “INI”.

3.5 Program Device

After you load firmware and parameter files, please click “Program (Reconnect)” to update. If you load the firmware and parameter files at the same time, please click “Program”. The program will update the firmware first, then proceed to update the parameters.

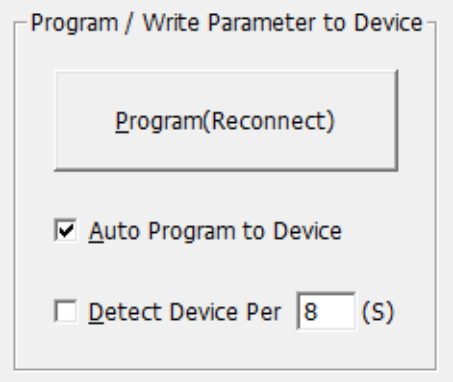


Figure. 32

During the update, all the button settings will be locked temporarily to prevent the update failure due to touch by mistake. Please wait until it shows the update reaches 100% on the top left corner. During the update, please do not interrupt the power supply as it will cause unexpected situations.

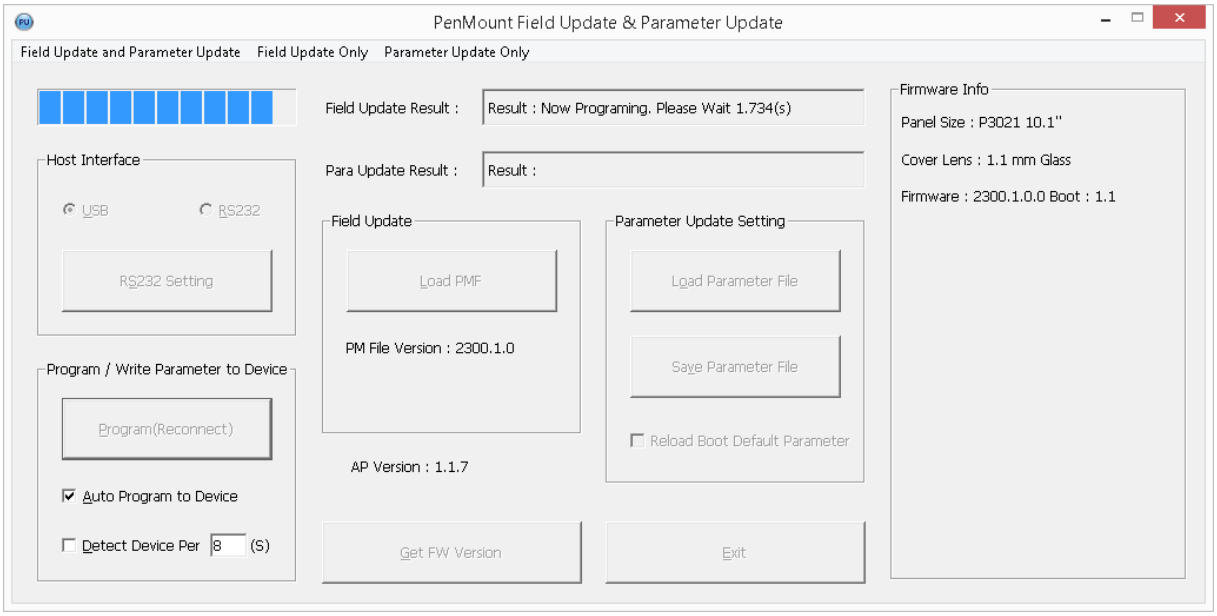


Figure. 33

After the firmware update is completed, you will see the information below appear in “Field Update Result”.

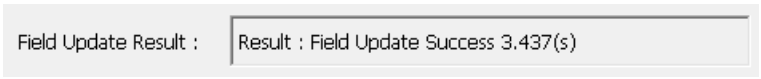


Figure. 34

After the parameters are updated, you can see the following information appear in “Para Update Result”:

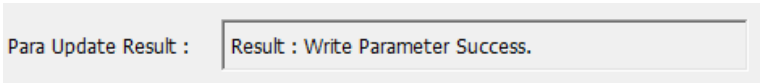


Figure. 35

If the update fails due to some irresistible factor, you will see the Error appear.

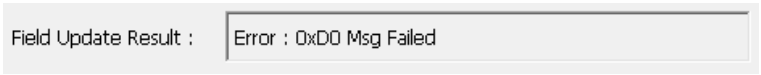


Figure. 36

If this happens, you will find the firmware info still stays in the “Boot Loader” mode. You can click “Program” again to start burning.

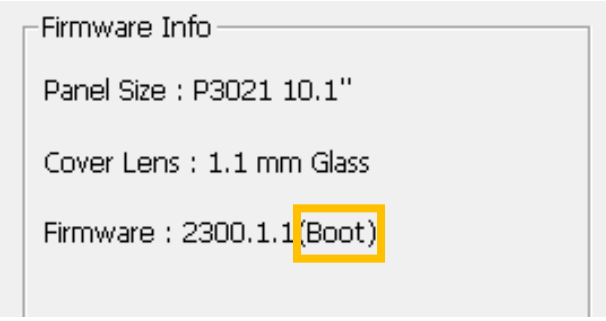


Figure. 37

3.6 Utilize Auto Update

You can either click “Program” to start the update by hand, or “Program/Write Parameter to Device” also has the “auto update” option for large amount of update.

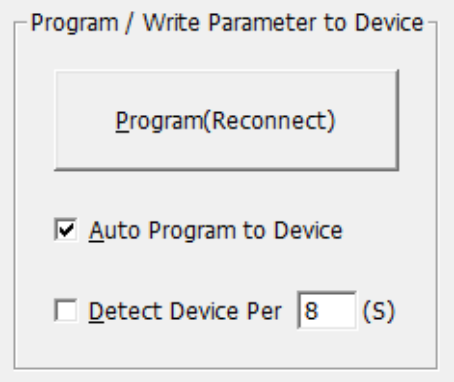


Figure. 38

1. USB

   For USB interface, please click “Auto Program to Device”. As long as the firmware or parameter file is loaded once after clicking, the program will automatically start updating when it detects the corresponding PenMount USB in connection.

2. RS-232

   As the RS-232 interface does not have the “Plug and Play” feature, therefore, it can be changed to auto update by clicking “Detect Device Per n (s)”. After clicking, the program will start counting until the number of the seconds in the “dialogue box” becomes “0”. The program will check the designated COM Port. If it finds the controller in connection is compatible, it will start updating.

   Under default, the program will check every 8 seconds. But the user can set according to the circumstances to have enough time to change the controller. If you want to cancel the auto update, just unclick “Auto Program to Device”or“Detect Device Per (S)”.

4 Test

"**PCIScan**" utility allows the user to inspect if the touchscreen functions normally. It can support:

- Diagnose: test the electrical function of the PCI touch panels
- Draw Test: provides the drawing test on PCI touchscreens
- Live Test: can tell whether the PenMount controller is abnormal during the environmental test.
- Noise Level: detect the size and area of the PCI touchscreen under the influence of the noise interference

Note: if you are using the custom PenMount firmware version, please use the corresponding custom PCIScan for inspection.

4.1 Connect Devices

When the program is running, it by default, will try to detect the PenMount devices connected with USB and COM1. When the detection is successful, the connection status will show "Connect" and the firmware information will appear in "information".

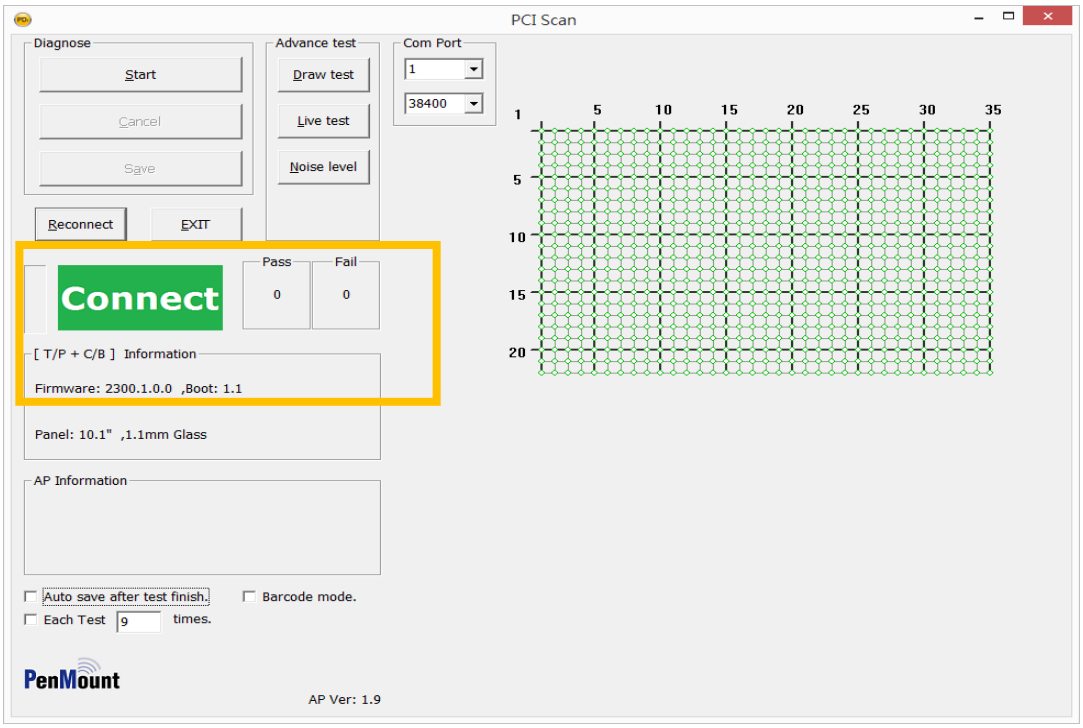


Figure. 39

If the device is not connected when the program starts or it needs the batch test, there will be different ways of testing for different interfaces.

4. USB

The program can automatically detect the connection of the device, showing “Connect” or ”Disconnect”.

5. RS-232

Please set the connection to baud rate used and port number under ”Com Port”, then click “Reconnect”. If the program detects the device successfully, “Connect” will appear.

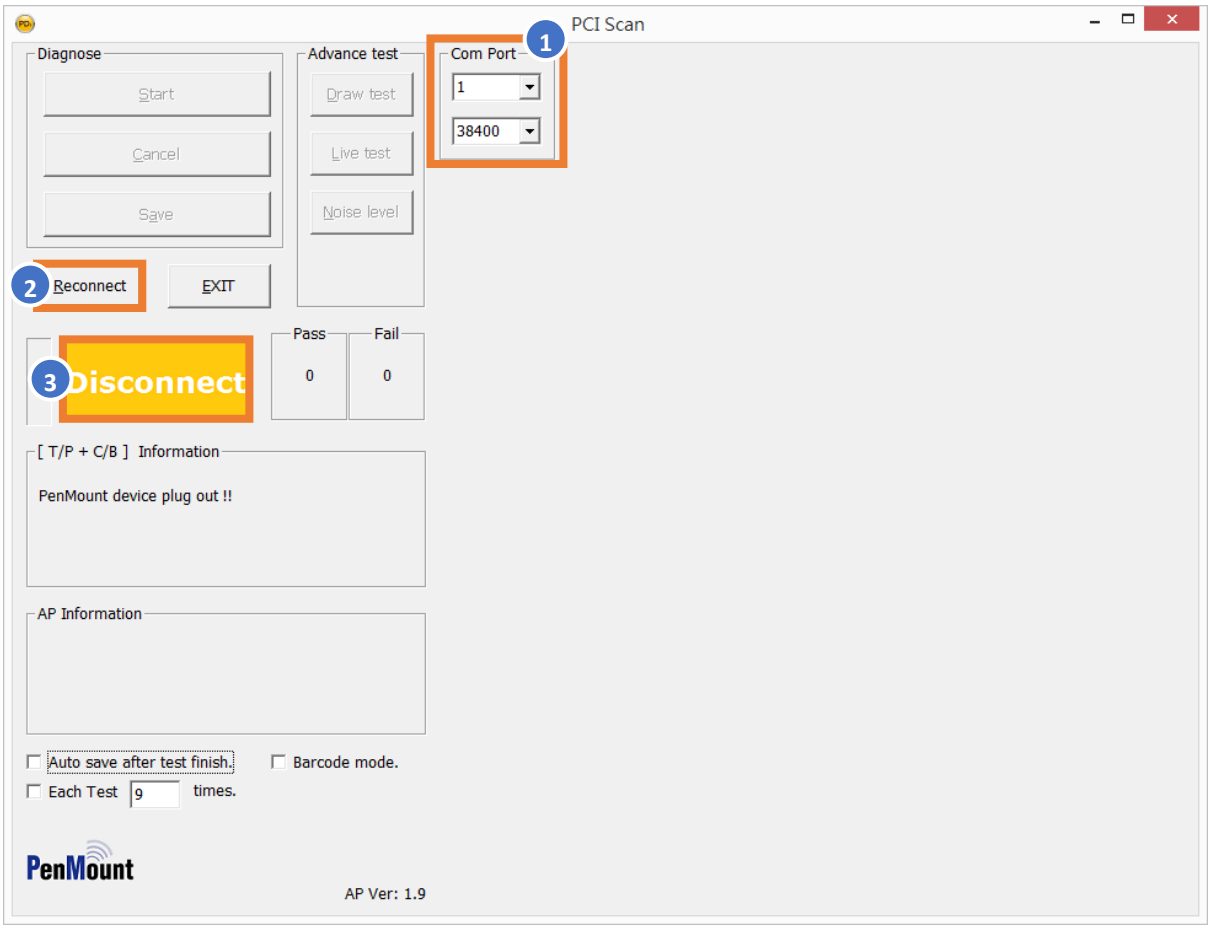


Figure. 40

4.2 Test Touch Panels

The main purpose of the touch panel test is to inspect the electrical function of the touch panels after feeding and integration. It mainly tests if all the signals gathered on each sensor and driving pin are normal.

To make sure the accuracy of the test, please avoid any touch action after the test is running.

4.2.1 Signal Test

Click “Start” under “Diagnose”, it will start the electrical detection on the touchscreens.

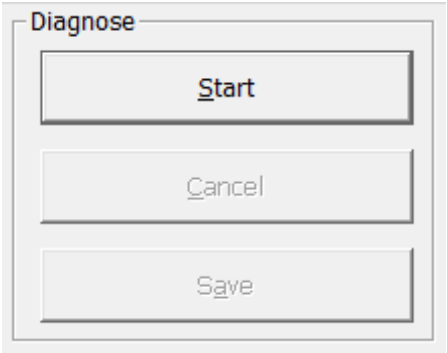


Figure. 41

When the signal test is running, the status will show Start and the “progress” will rise from the bottom to the top.

Figure. 42

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

Figure. 43

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.

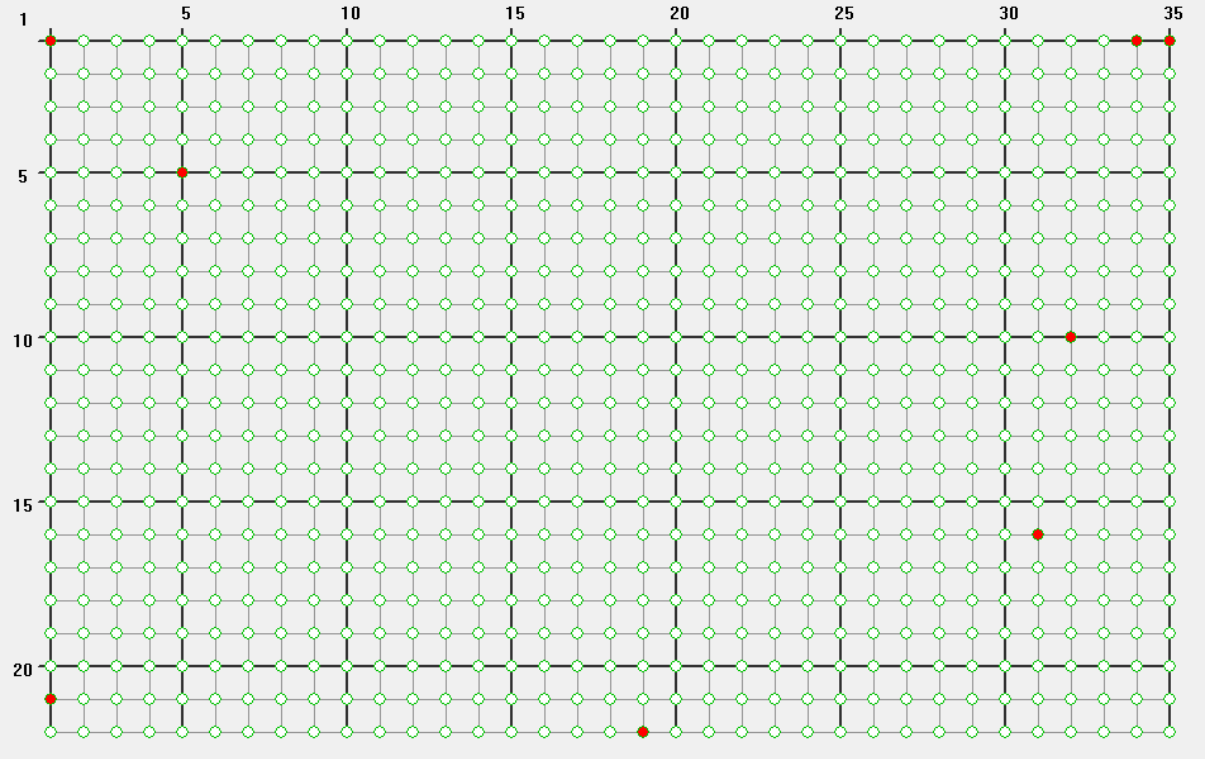


Figure. 44

4.2.2 Multiple Tests

If some touch panel signals are detected between the edges of the critical values for “stable” or “unstable”. To make sure the program can filter out the touchscreens, please run the program several times or click the multiple times for each test at the bottom of the program before testing.

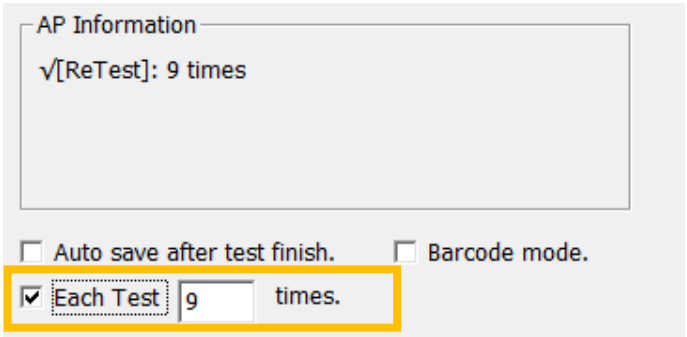


Figure. 45

Under default, the program will run the test for 9 times. As soon as FAIL appears, it will stop inspection immediately.

4.2.3 Test Result & Analysis

After the test is completed, it will immediately indicate the nodes with abnormal signals. 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 spot and the ambient nodes is too large. If the grounding for the system is not ideal, which may lead to the touch instability, abnormality will be tested at different nodes during each test.

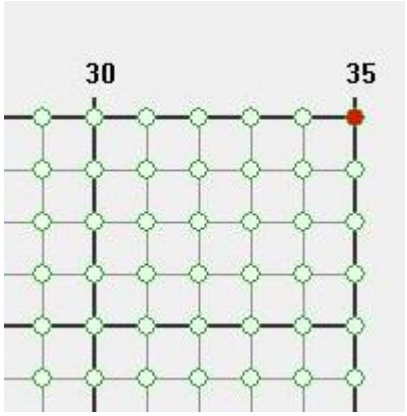


Figure. 46

2. Whole pin abnormal

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

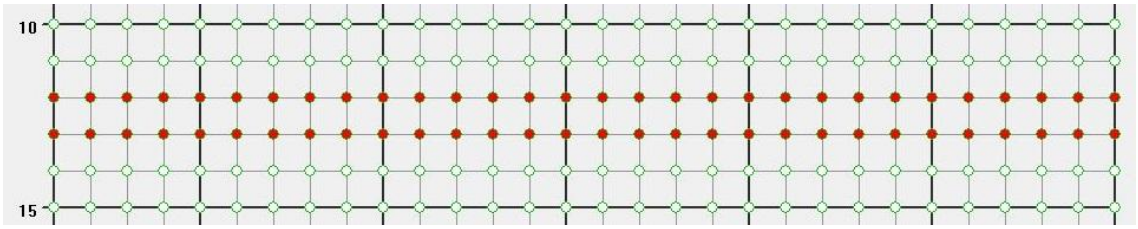


Figure. 47

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.

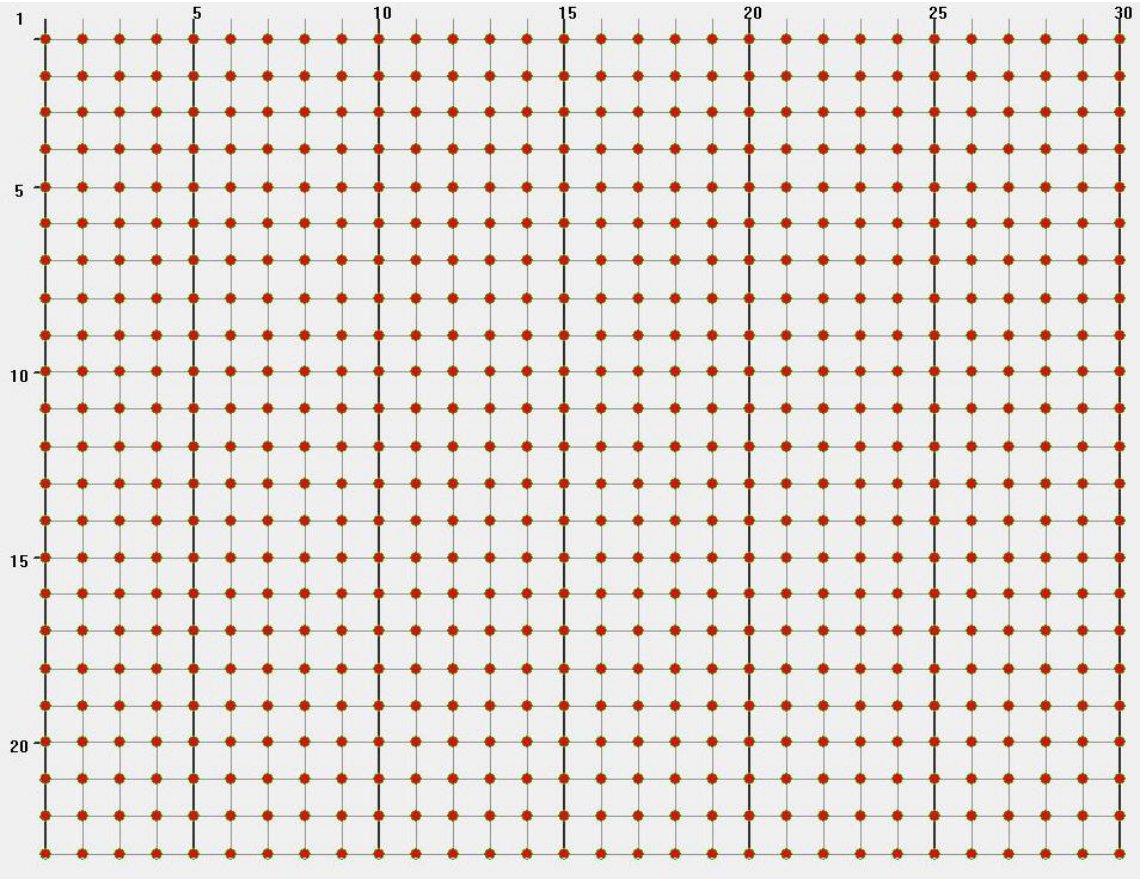


Figure. 48

Under some circumstances, it is hard to see where the problem is from the appearance of the product. You can run PCIScan and cross compare to find out the source of the problem is control board or the touch panel.

4.2.4 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.

1. Save by hand

   For the single test, you can click “Save” after the test is completed.

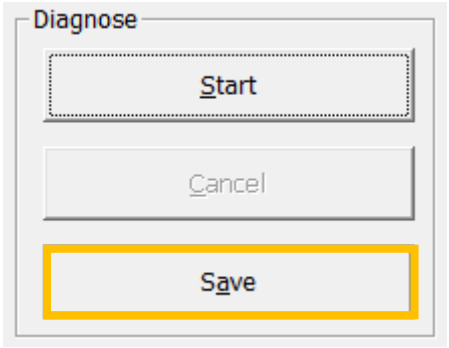


Figure. 49

Then, the dialogue box below will appear. The user has to enter ” Batch Number” and click OK to save. We suggest using the touch panel number as “Batch Number” for future identification.

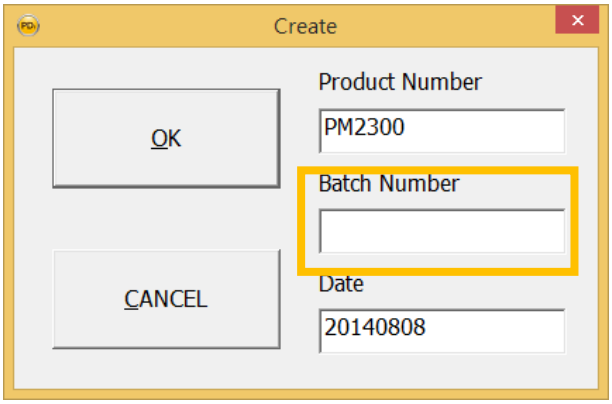


Figure. 50

The program will save the test results either in 「TestPass」or「TestFail」folder based on the test results under the name of $ProductNumber_$BatchNumber_$Month$Day$Hour$Minute$Second”.csv.

2. Auto save mode

If you click the multiple test or wish the program to automatically save the results, you can click “Auto Save After Finish” before the test starts.

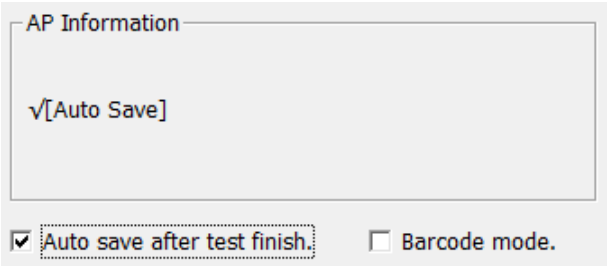


Figure. 51

Under the auto save mode, only at the end of the first test, the program will remind the user to enter “Batch Number” by hand. Afterwards, the program will automatically use the same “Batch Number” as the file name.

3. Barcode mode

If you have Bar Code Scanner，you can also click “Barcode Mode” in the program and the program will automatically click “Auto save after test finish”.

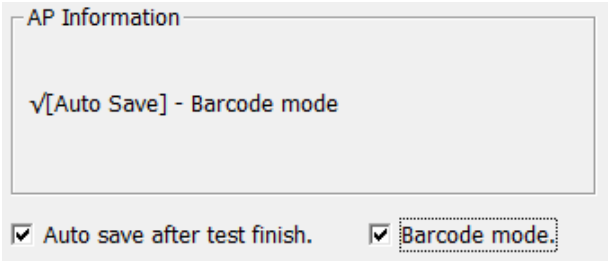


Figure. 52

When the file is automatically saved as the test is completed, the program will request to enter Batch Number. At this time, you can scan “bar code” on the touch panel.

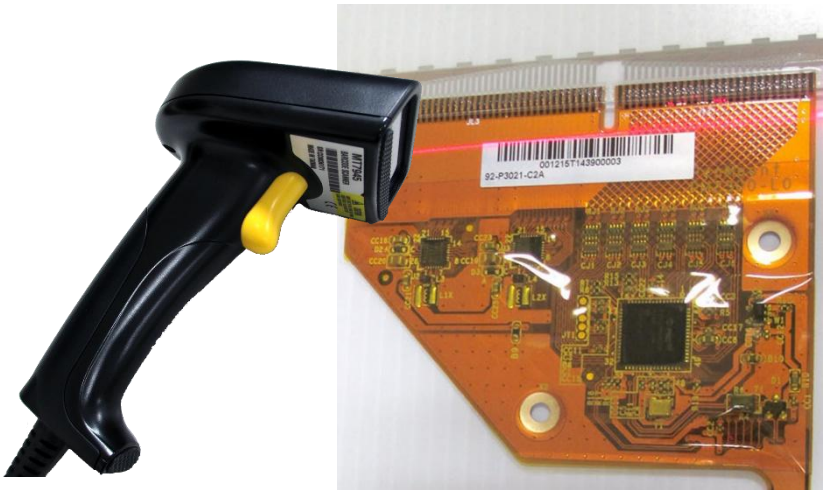


Figure. 53

With the bar code scanned automatically, input errors on Batch Number could be avoided.

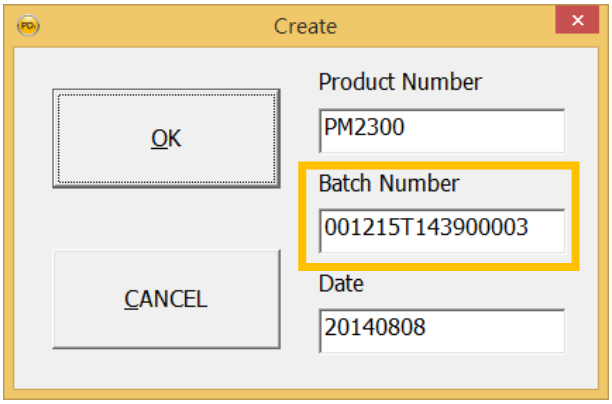


Figure. 54

4.2.5 Test Programs

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

- Basic data

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

	A	B	C	D	E	F	G	H	I	J
1	Product n	PM2300								
2	Batch num	1								
3	Date	20140808								
4	[Result]									
5	Result	Fail								
6	[PCIM]									
7	F/W ver:	2300.1.0.(	BT ver:	1.1						
8	PanelSize	10.1	CoverLen:	1.1						
9	[Threshold]									
10	LevelA	50	LevelB	10	LevelC	20	LevelD	505	LevelE	15
11	[Application]									
12	AP ver:	1.9.0								

Figure. 55

- RawData

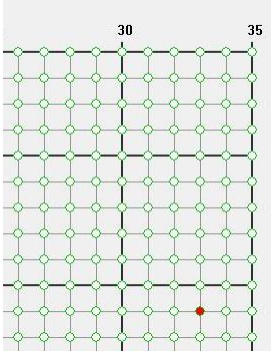
  Afterwards, the CSV file will record three sets of raw data which are the basis for judgment for each test.

[RawData1]																	
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1	1923	1922	1923	1924	1924	1922	1923	1922	1922	1924	1922	1924	1924	1924	1923	1924	
2	1921	1920	1921	1921	1921	1920	1921	1921	1921	1922	1921	1922	1922	1921	1921	1921	
3	1920	1920	1921	1920	1920	1920	1917	1920	1921	1920	1921	1920	1920	1921	1920	1920	
4	1918	1918	1920	1922	1920	1919	1916	1919	1922	1923	1923	1921	1922	1923	1920	1921	
5	1921	1920	1920	1920	1918	1920	1917	1920	1920	1920	1920	1920	1920	1920	1920	1920	
6	1924	1923	1925	1921	1922	1922	1923	1922	1923	1924	1922	1923	1922	1921	1921	1924	
7	1920	1919	1919	1919	1920	1920	1919	1919	1921	1920	1919	1919	1919	1920	1919	1919	
8	1924	1921	1924	1923	1923	1924	1923	1920	1920	1922	1919	1923	1922	1923	1922	1922	
9	1924	1923	1923	1923	1923	1923	1923	1924	1920	1922	1922	1922	1922	1923	1923	1923	
10	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	1920	
11	1923	1921	1922	1920	1921	1921	1921	1922	1922	1921	1921	1920	1920	1921	1920	1920	
12	1920	1919	1919	1919	1919	1918	1920	1919	1919	1918	1918	1920	1919	1917	1919	1917	
13	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	
14	1919	1919	1919	1919	1918	1919	1919	1919	1918	1919	1919	1919	1919	1919	1919	1918	
15	1921	1921	1921	1920	1920	1920	1920	1920	1920	1921	1921	1921	1920	1921	1920	1920	
16	1919	1919	1919	1919	1919	1919	1919	1919	1918	1919	1919	1919	1919	1919	1919	1919	
17	1920	1922	1921	1920	1919	1920	1920	1920	1922	1920	1921	1922	1919	1918	1916	1919	
18	1920	1918	1919	1920	1919	1917	1919	1919	1920	1919	1919	1920	1918	1919	1919	1919	
19	1921	1921	1921	1919	1915	1912	1921	1922	1921	1921	1921	1920	1919	1921	1921	1921	
20	1919	1920	1920	1918	1916	1916	1919	1919	1920	1920	1920	1919	1921	1920	1919	1920	
21	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	1919	
22	1900	1908	1912	1914	1910	1913	1913	1914	1914	1915	1914	1914	1914	1913	1914	1917	

FIGURE. 56

Raw data is a two-dimensional array, which corresponds to the nodes on the sensor and the driver pin. The nodes with * mean these nodes are abnormal. From the raw data, you can presume the reason for

the abnormality. In the instance below, the raw data of the nodes marked abnormal are obviously smaller than those of the surrounding nodes.



AB	AC	AD	AE	AF	AG	AH	AI	AJ
27	28	29	30	31	32	33	34	35
1926	1925	1925	1926	1926	1928	1926	1925	1913
1923	1924	1922	1924	1925	1925	1923	1918	1921
1922	1923	1920	1924	1923	1922	1924	1926	1923
1926	1926	1926	1924	1926	1926	1926	1926	1926
1922	1922	1921	1921	1921	1921	1921	1924	1922
1925	1926	1926	1926	1927	1926	1926	1926	1925
1920	1922	1922	1922	1924	1924	1924	1925	1921
1924	1925	1925	1924	1926	1926	1926	1926	1925
1926	1926	1926	1926	1926	1926	1926	1926	1926
1922	1921	1922	1922	1921	1919	1922	1925	1921
1920	1922	1924	1923	1924	1925	*1910	1922	1923
1921	1923	1922	1923	1923	1921	1914	1914	1923

Figure. 57

- PDData

PDData is the raw data used as the basis for judgment after ChkNoDriverTail activates PTEST.

- Self

Self records the total driving signals of sensor pins and you can compare the signals with those of the sensor pins with abnormality. For instance, in the instance below, the signals of the sensor pin 12、13 and 14 are higher than the threshold value set by the program and therefore are marked abnormal.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
113	[Self]																						
114	442	440	434	435	441	438	431	431	433	430	415	901	933	807	414	408	414	415	408	406	410	407	376
117	[SensorIdx]																						
118	11	12	13																				

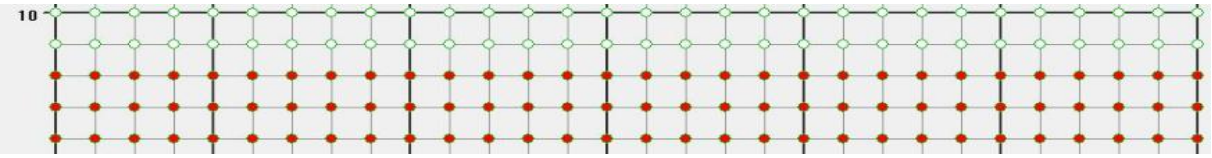


Figure. 58

- NineFD4

NineFD4 records the nodes which are determined abnormal after RawData1 、RawData2 and RawData3 are examined with CompareData running the test (driverIdx, sensorIdx).

- DebFD1

DebFD1 records the nodes which are determined abnormal after RawData1 and RawData2 are examined with ChkDebounce running the test (driverIdx, sensorIdx).

- DebFD2

DebFD2 records the nodes which are determined abnormal after RawData2 and RawData3 are examined with ChkDebounce running the test (driverIdx, sensorIdx).

- DriverIdx

  DriverIdx records driver pin index which are determined abnormal after ChkDriverAbnornal is running. They are numbered from 0.

  SensorIdx

  SensorIdx records sensor pin index which are determined abnormal after ChkDriverAbnornal is running. They are numbered from 0.

4.3 Drawing Test

The Drawing Test mainly examines whether breaking or hopping points in the line will happen while drawing lines and provides a mechanism of measuring how many points per second. Please click “Draw Test” in the “Advanced test” and PCIScan will try to run “pmDraw3.exe” .

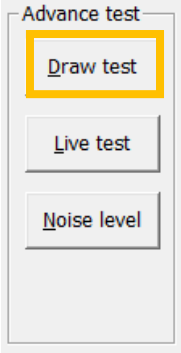


Figure. 60

“pmDraw3” offers the complete drawing test function. If it does not include “pmDraw3” under the same directory, PCIScan will start the simplified in-box drawing test interface. The following diagram shows the differences between the afore-mentioned two:

	In-box drawing test		pmDraw3	
Operating systems	Windows XP		Windows 7 / 8	
Input Type	Mouse		Touch	
Support Index	1P	black	1P	black
	2P	X	2P	red
	3P	X	3P	green
	4P	X	4P	blue
	5P	X	5P	purple
Sample Rate	not supported		supported	
Live Test	supported		supported	

Figure. 61

We mainly introduce the features of “pmDraw3” in this section.

4.3.1 Basic Operation

The program will show a white canvas on the full screen, allowing the user to test the touch drawing feature. If you need the advanced function, please click ”Press and Hold” by touch or press the right key on the mouse for the functions as indicated below:

Figure. 59

- Draw

  Switch to Draw mode. Under this mode, the program will mark the touch points by different colors.

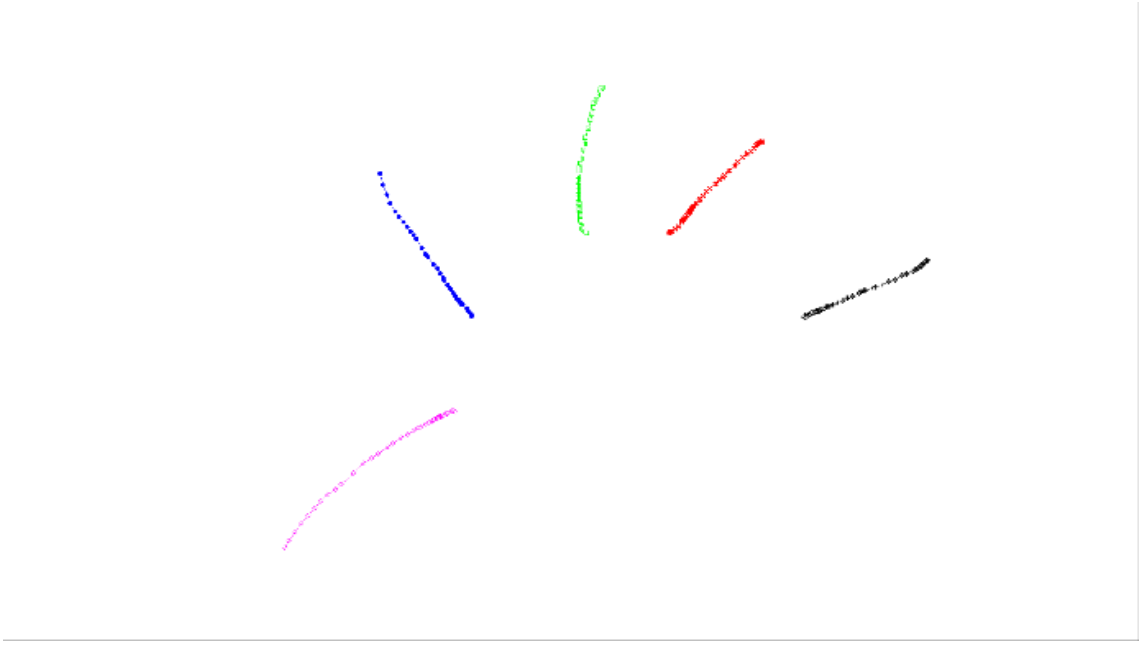


Figure. 60

- Touch

  Switch to Touch mode. Under this mode, it will only show the location of the touch point where your finger is.

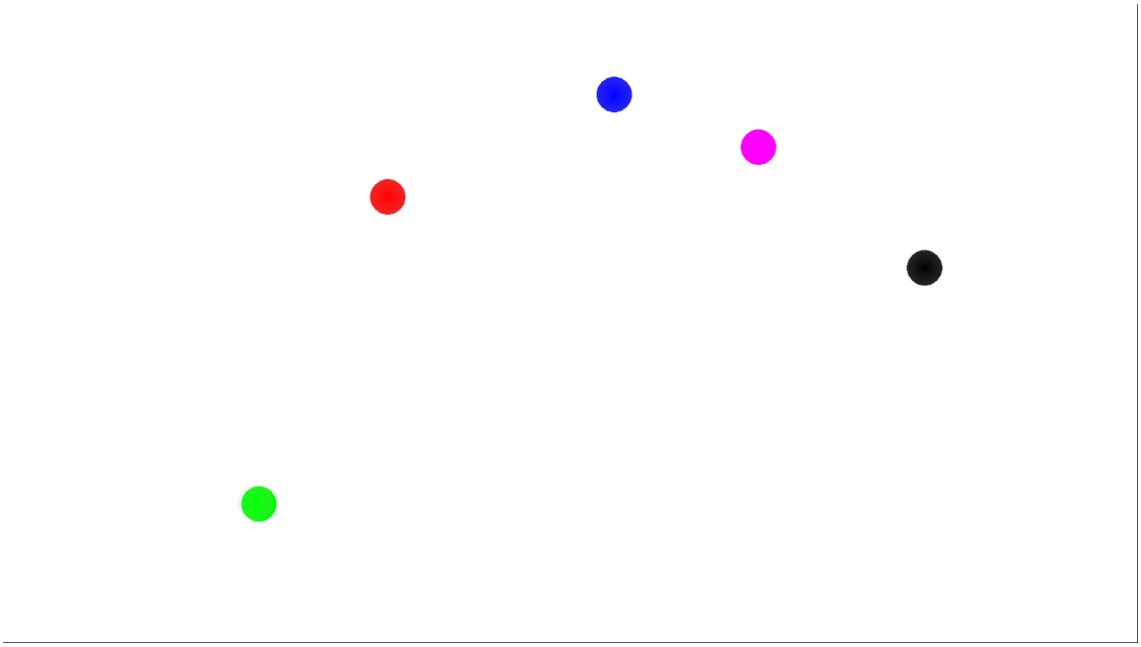


Figure. 61

- Sample Rate

  After touch, It will take around 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, the drawing will be more precise.

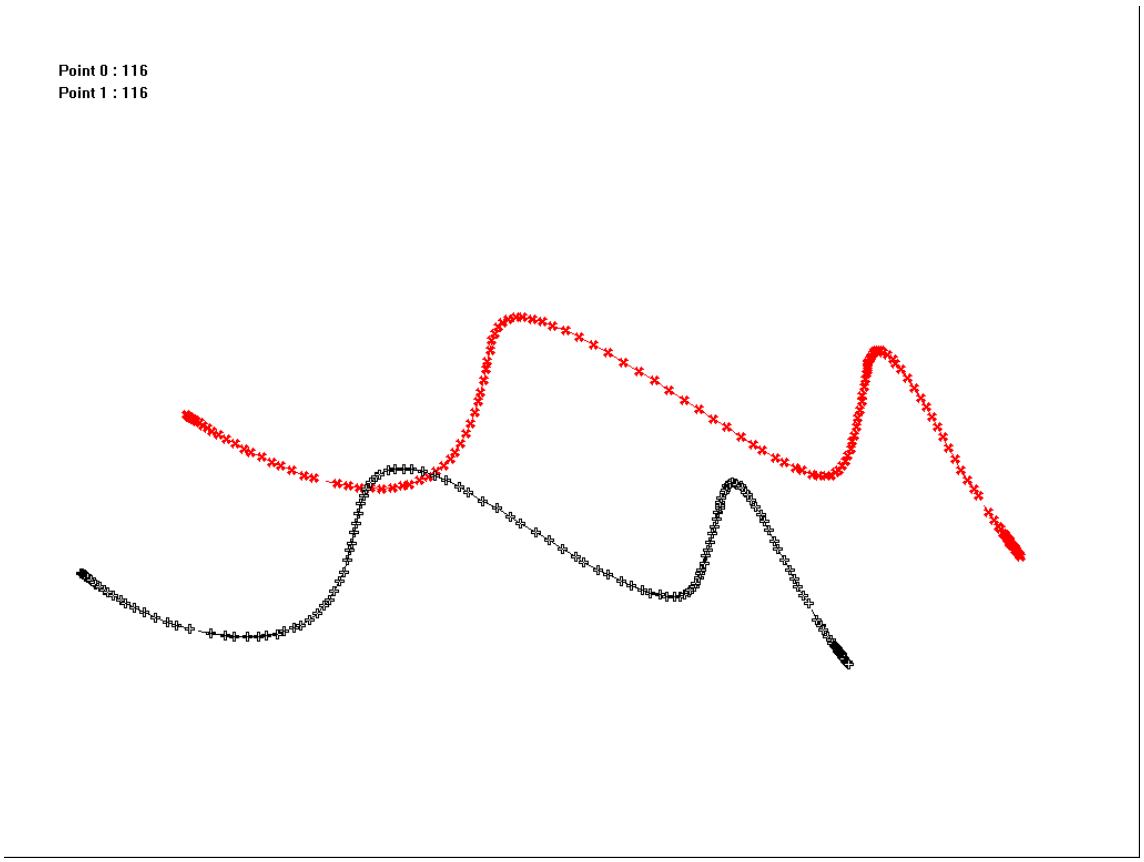


Figure. 62

- Clear

  Clean the canvas.

- Full Screen or Restore

  Switch to the full screen display or the window display.

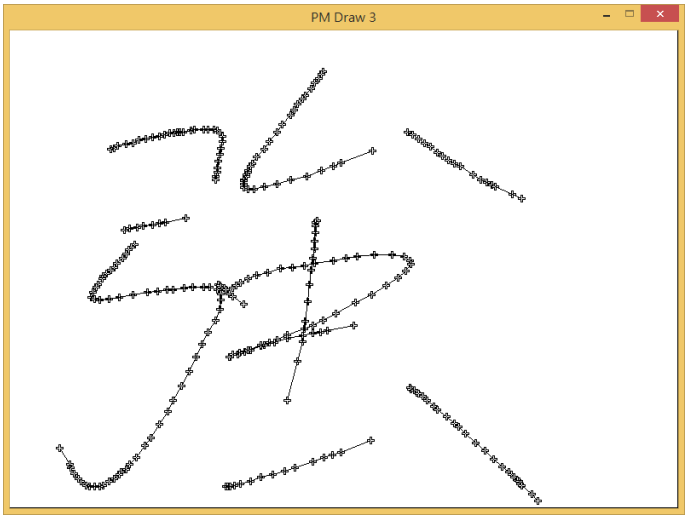


Figure. 63

- Exit

To exit the program.

Note: After entering pmDraw3, please do not pull or plug in the devices or the touch will not function.

4.3.2 Line-Breaking Test

- Line breaking for fast drawing

  When drawing lines at a high speed, the lines may break or change into a different color. This tends to happen when multiple touch is applied with drawing at a high speed at the same time. This is caused because there are limitations to the hardware effectiveness, therefore, this is still regarded normal.

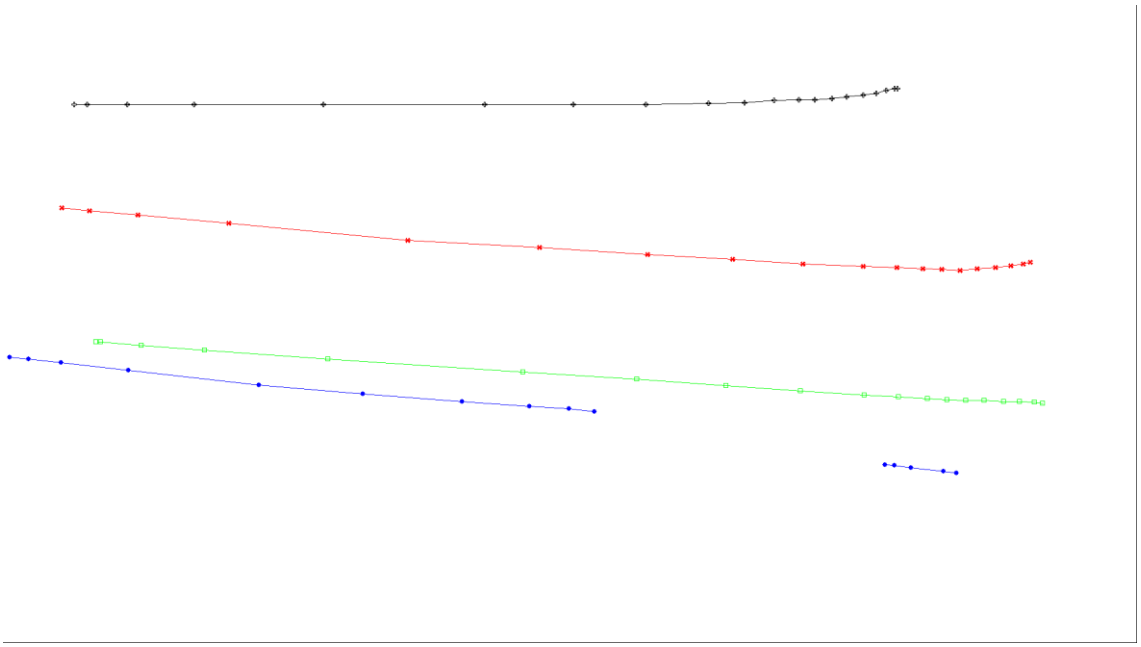


Figure. 64

- Line breaking when drawing under the normal speed

  If the line still breaks under the regular speed of drawing, it is caused by the noise interference or hardware problems. At this time, please run other test processes PCIScan provides for further information.

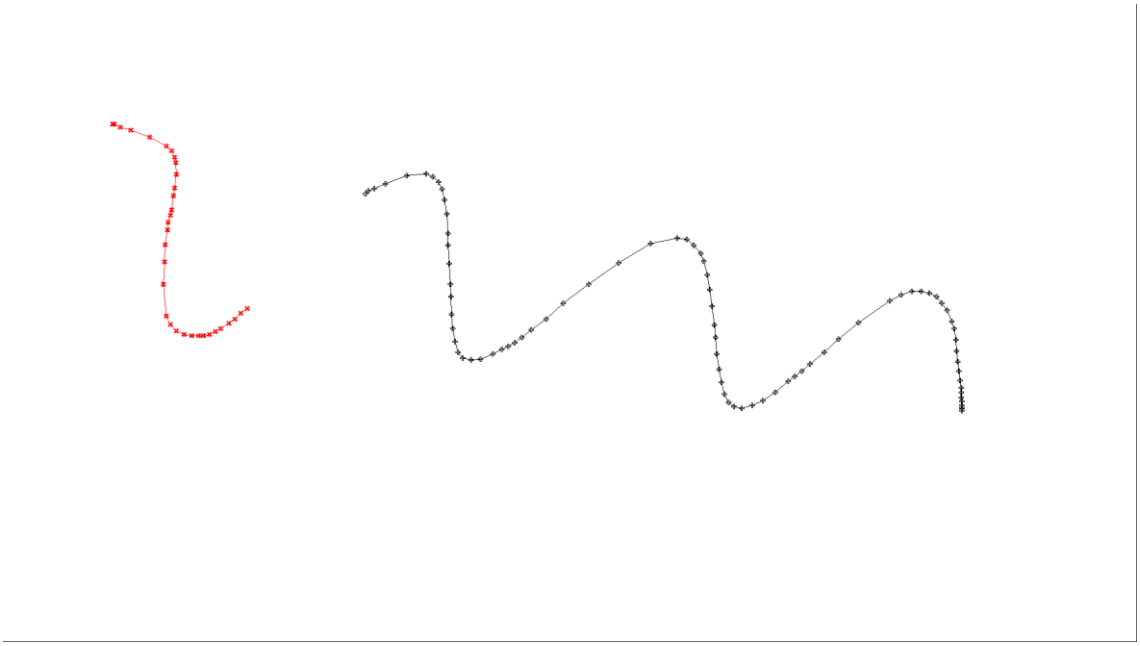


Figure. 65

Please lower the drawing speed when running the drawing test to avoid being under the influence of the mechanism that the firmware will automatically connect the close touch points when drawing. In the Figure. below, the red line shows that the breaking is not identified when drawing fast. The black line indicates breaking in the line when drawing slowly.

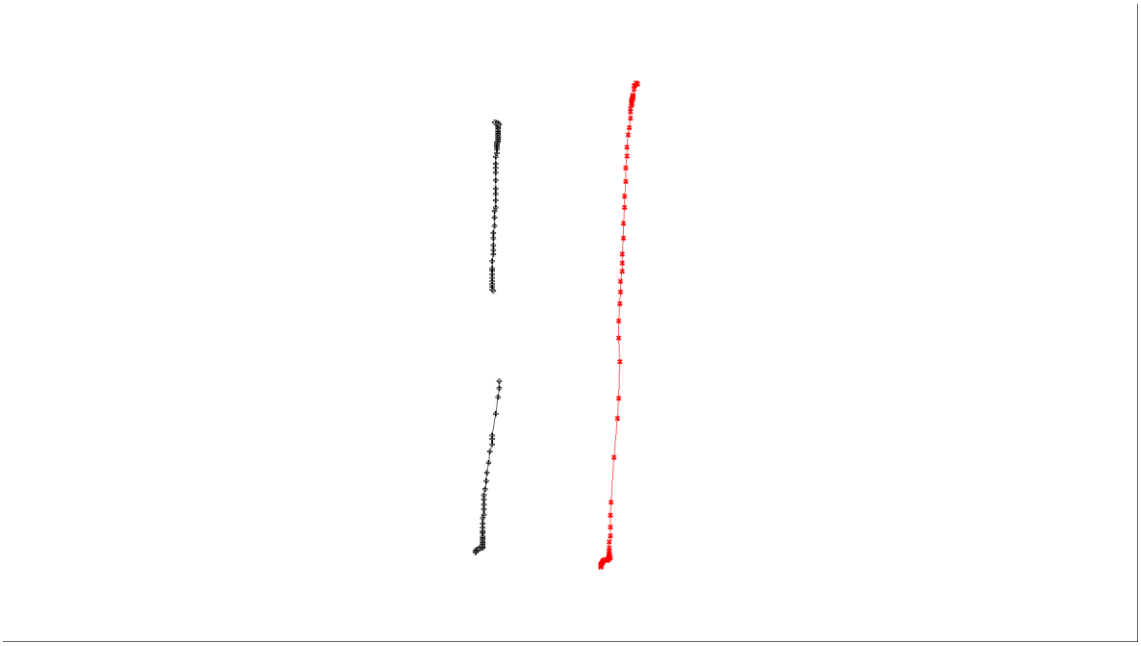


Figure. 66

4.3.3 Support Live Test

The drawing program can support the Live Test mode, allowing the user to know whether there will be any unexpected spots during the environmental tests on the touch.

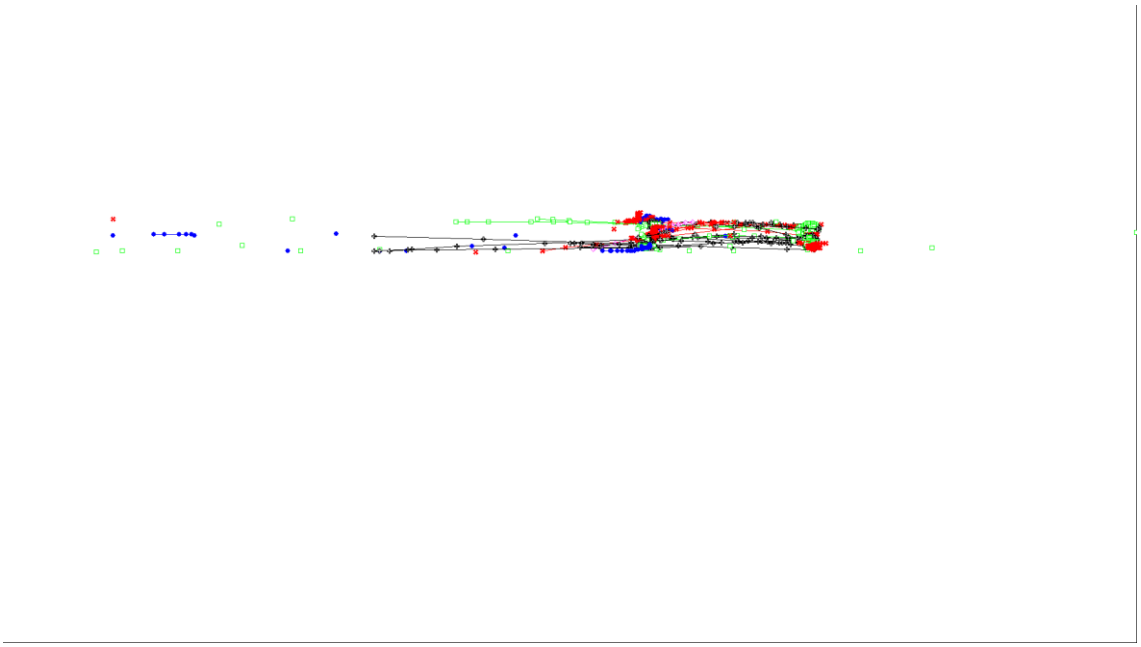


Figure. 67

For further information, we will explain in the next section.

4.4 Live Test

Live Test mainly tests during the environmental test whether the controller will be affected by the changes of the temperature and humidity in the environment and cannot function properly.

4.4.1 Basic Mode

Please click ”Live Test” under “Advanced test” to run the testing.

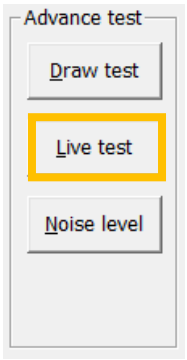


Figure. 68

Once Live Test starts running, the progress tab will rise from the bottom to the top and the reference signal value will appear.

Figure. 69

When the program runs repeatedly and three reference signal values are obtained, it will run a test to confirm that the reference signal value changes with time and the device functions properly as a result. Therefore, it will show “PASS” or ”FAIL” in the result column.

Figure. 70

Live Test will continue until the user clicks “Live test” under “Advance test” (it will show “Finish” at this time”). You can know whether the device passes the environmental test after calculating the numbers of Pass and Fail.

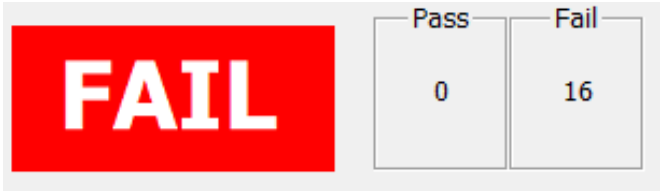


Figure. 71

If the test result shows FAIL, it may be due to the reason that the touch device is affected by the environmental changes and stops running. If touch occurs during the test, it might be determined as “FAIL”. This is because that the device will not update the reference signal value at touch. Therefore, we suggest avoiding any touch actions during Live test to prevent the test results being compromised.

When the test is completed, the program will save the test results in the “LiveTest” folder under the file name of the test finish time. For instance, 0808151815.csv means the test finishes at 08.08 15:18:15. The CSV file can be opened by using the spreadsheet software and mainly record the test start and finish time with contents as follows:

	A	B	C	D	E	F
1	[PCIM]					
2	F/W ver:	2300.1.0.(	BT ver:	1.1		
3	PanelSize	10.1	CoverLen:	1.1		
4	AP ver:	1.9.0				
5	[Live Test]	Month	Day	Hour	Minute	Second
6	StartTime:	8	8	15	17	46
7	FinishTime	8	8	15	18	15

Figure. 72

4.4.2 Canvas Mode

Live Test can run together with Draw test to see if the device is working properly or there are any unexpected spots. After entering the Draw test, please connect the keyboard in advance and click “L” to start Live test. The test message will appear at the top right corner of the window:

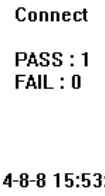


Figure. 73

Under this mode, Live test is running at the background, therefore, it will not show the progress immediately. It will take around 20 seconds to update the number of PASS or FAIL. Please do not pull or plug in the device during the test or the test may fail.

During the test, you can check whether there are any abnormal spots on the canvas. If there are, it means the controller is under the impact of the environment, which causes the abnormal spots on the canvas.

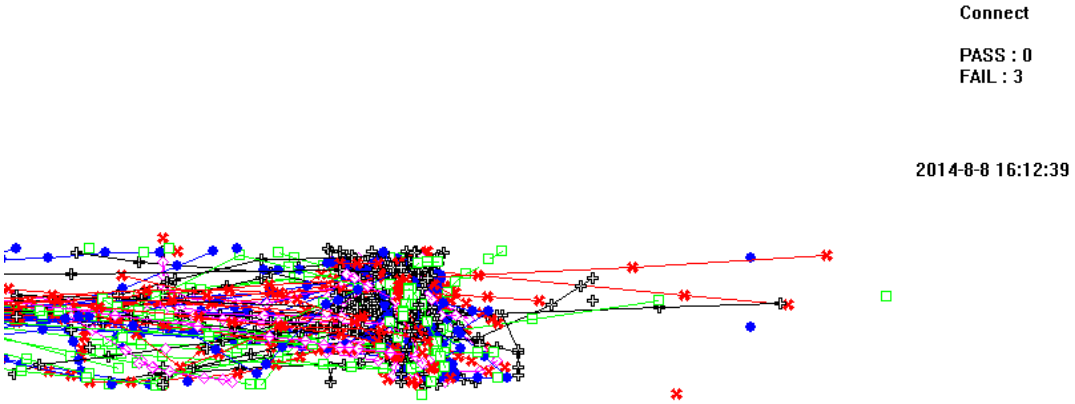


Figure. 74

If you want to finish the test, you can click Esc to exit the canvas and the program will automatically save the test results in a file.

4.5 Noise Test

The Noise Test mainly evaluates the degree of the impact of the noise interference on the touch panel. Usually the noise will affect the measurement and a great change will be produced. If you need to run this test, please click “Noise Level” under “Advanced test”.

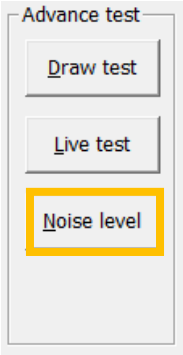


Figure. 75

The program will show the “noise level” interface:

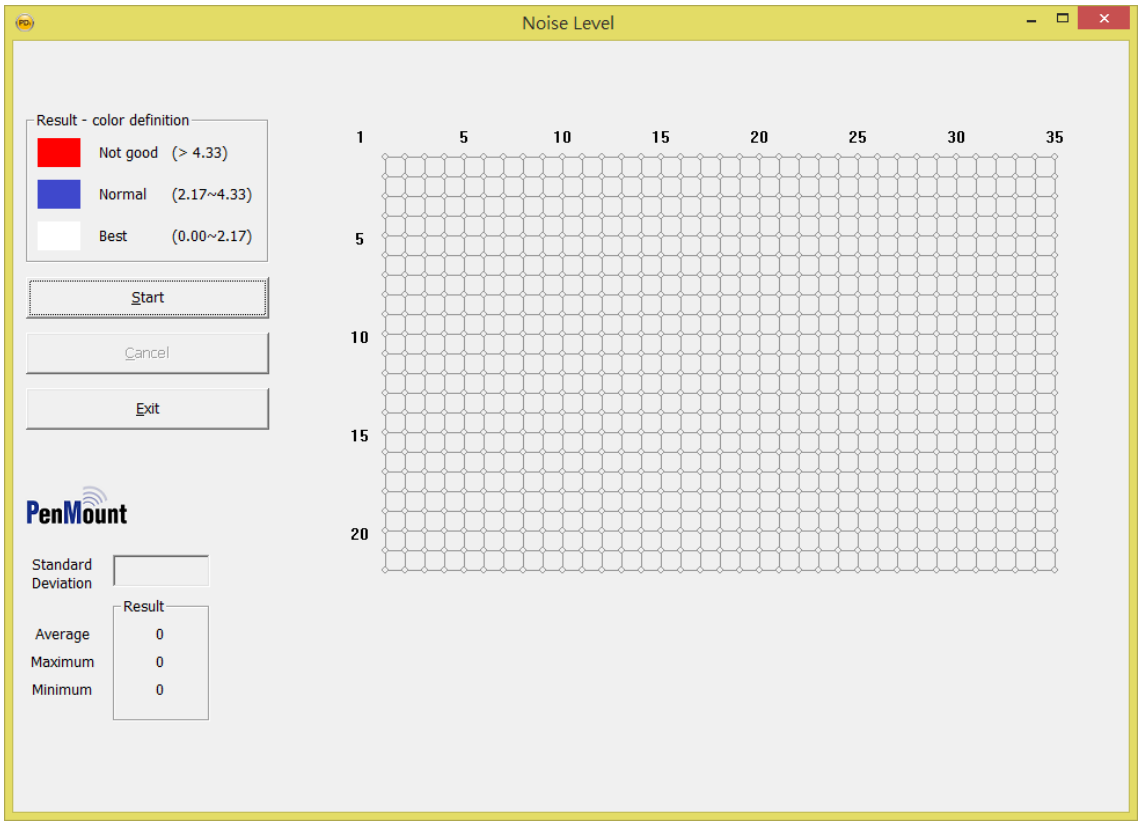


Figure. 76

4.5.1 Execute test

Please click “Start” on the left of the window to start running the test. For the accuracy of the test, please avoid any touch action during the test.

Figure. 77

Each test will take some time and the program under default will obtain 50 raw data for evaluation. During this period of time, you will know the progress so far from the window caption.

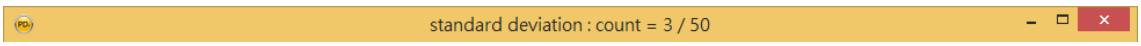


Figure. 78

Based on these 50 raw data, the program will calculate the standard deviation and determine the noise interference.

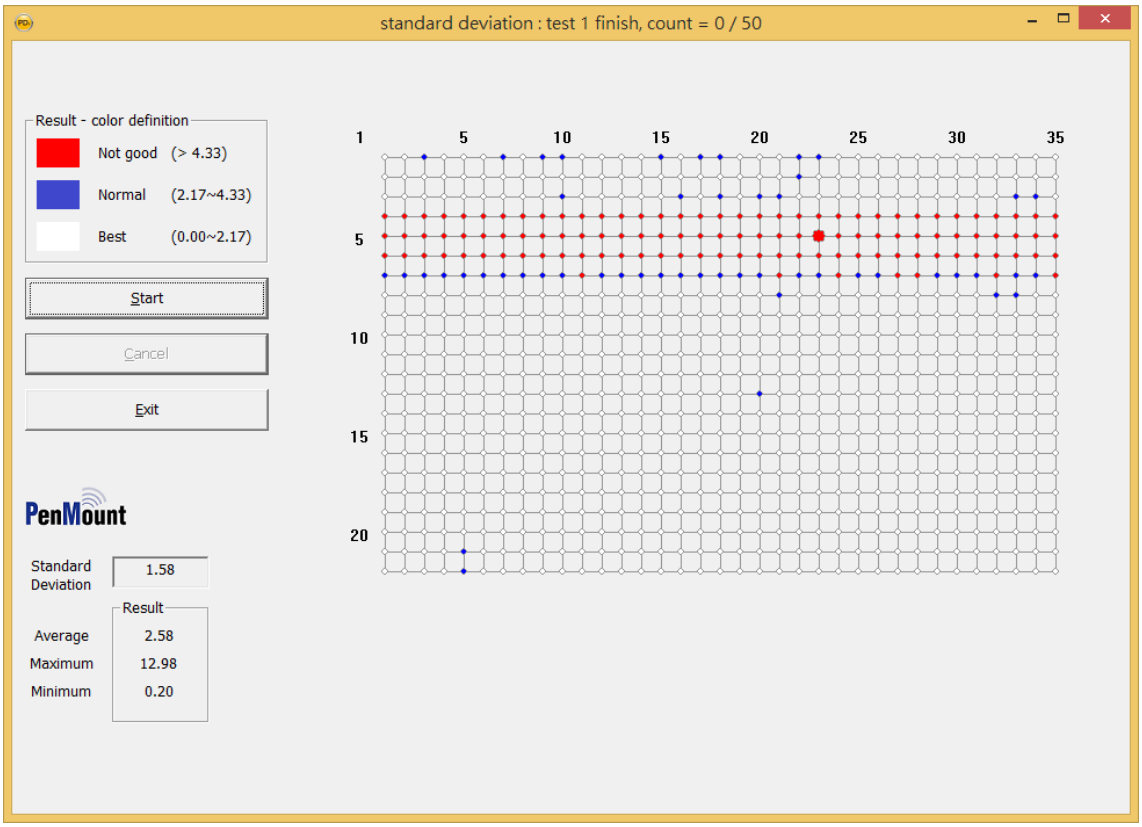


Figure. 79

Note: The program progress will go back to 0/50 and repeat the evaluation until the user clicks “Cancel”.

4.5.2 Test Analysis

According to the standard deviation calculated from the raw data, the program will categorized the nodes on the touch panel as “Best”, “Normal” and “Not good” and mark them respectively with white, blue and red.

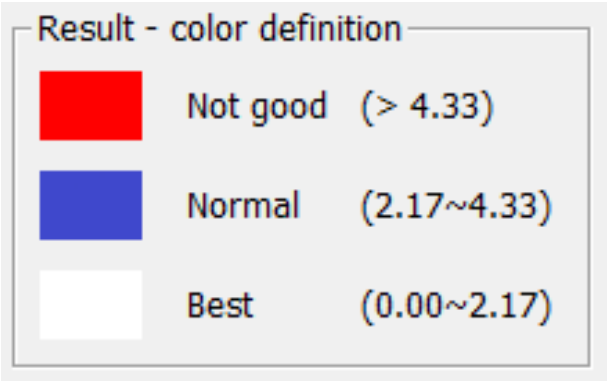


Figure. 80

The right side of the program indicates the degree of the signal changes in the nodes on the touch panel. The one with the greatest change will be marked with a bigger circle. The node marked with a red circle indicates a greater change in the signal value measured for this node and it may be unstable.

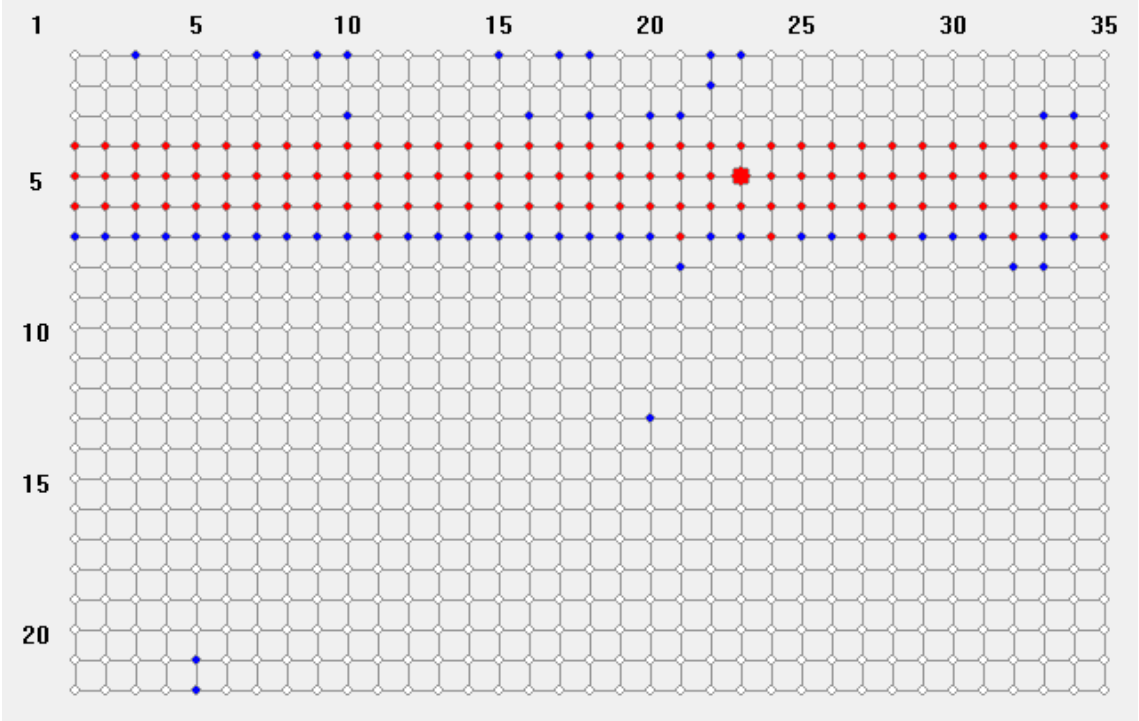


Figure. 81

To give the user a better idea of the whole signal changes, the program will show the average, the maximum and the minimum at the left lower corner of the program. Generally speaking, the smaller the value is, the more stable the signal is.

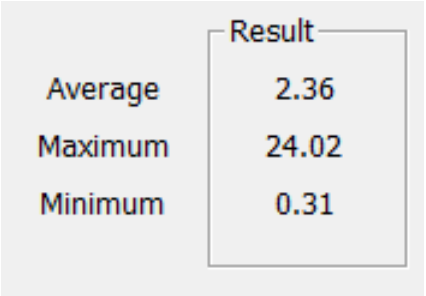


Figure. 82

When the user moves the mouse cursor to the node, the standard deviation of the node will appear at the left lower corner of the window.

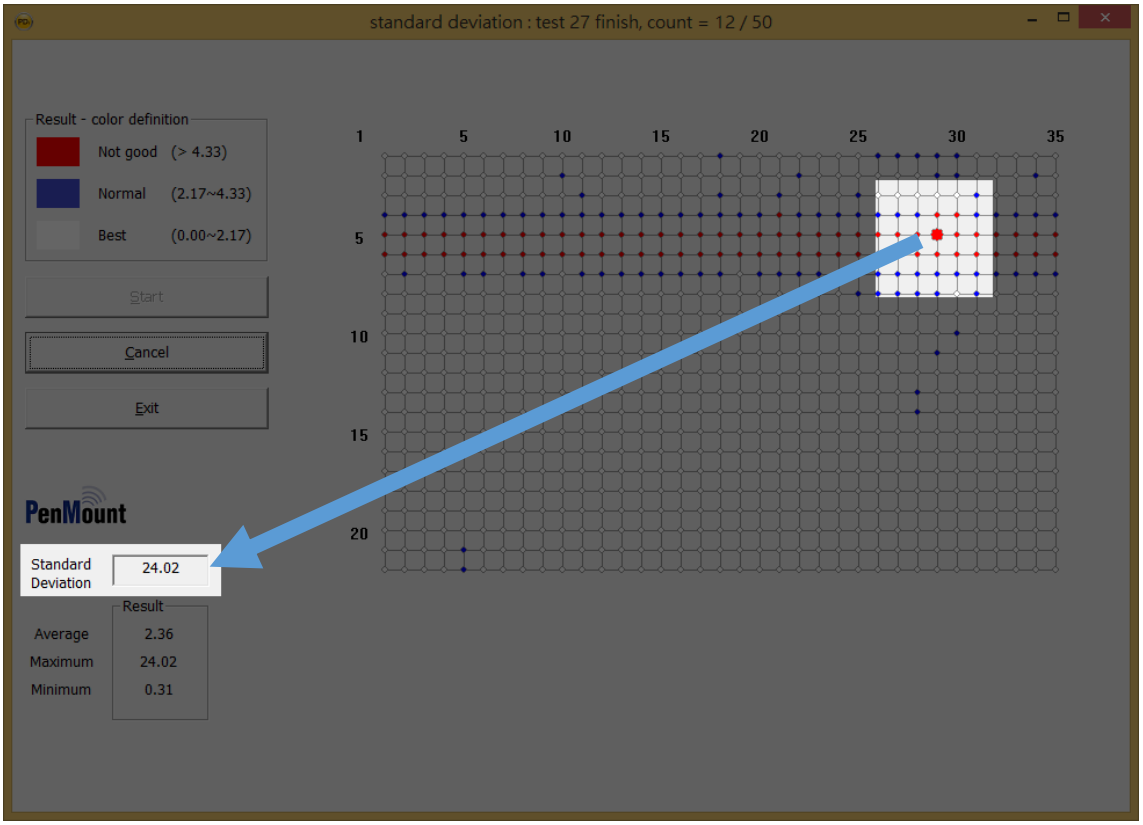


Figure. 83

Generally speaking, the node with the red circle means it is possible to be under the influence of noise interference and the false point is hence generated. Therefore, it requires enhanced protection, for example, to lower the influence of the interference sources.

4.5.3 Save Test Results

When each round of the test is completed, the test results will be automatically saved in “PCIM STDEV Result.csv” under the same directory as the program. CSV file can be opened with Microsoft Excel, spreadsheet software, and the like. The contents include four parts:

- Mutual

  Standard deviation of all the nodes on the touch panel measured and calculated.

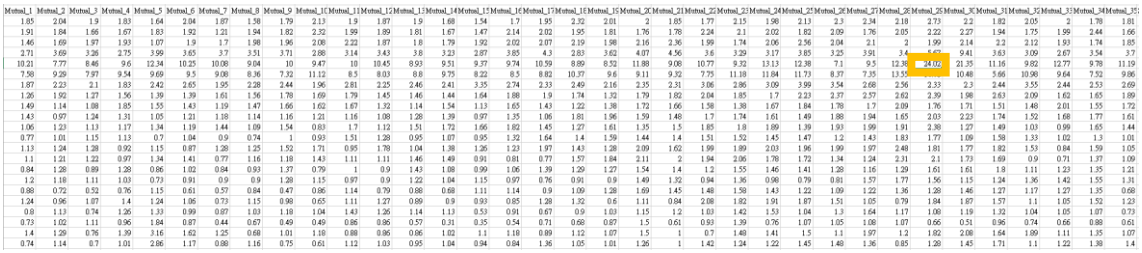


Figure. 84

- Sector

  Standard deviation of sectors of the driving pins for the touch panel after measurement and calculation. If the standard deviation of the nodes in the sector is bigger, then the standard deviation of sectors of the driving pins will be bigger as well.

Sector_1	Sector_2	Sector_3	Sector_4	Sector_5	Sector_6	Sector_7	Sector_8	Sector_9	Sector_10	Sector_11	Sector_12
2.02	1.43	2.01	2.35	2.22	2.29	2.16	3.27	2.24	1.97	1.98	2.14
1.75	1.73	1.88	1.6	1.78	2.2	2.22	3.77	2.16	3.01	2.38	3.1
1.23	1.52	1.76	1.97	1.75	2.7	3.11	3.64	3.82	3.26	2.94	1.69
3.24	3.66	3.57	4.26	3.26	3.95	4.14	5.28	5.28	14.29	4.8	3.56
10.68	9.18	9.28	11.28	9.84	10.05	9.43	10.7	12.73	49.15	9.95	10.39
7.54	6.27	7.72	10.6	9.94	9.07	9.18	17.88	18.63	30.8	8.29	9.68
2.91	2.37	2.55	1.64	3.32	3.87	4.76	4.38	4.26	3.59	3.53	2.02
1.86	1.85	1.45	1.98	1.96	4.17	4.05	4.29	4.8	3.75	4.23	1.84
1.35	1.62	1.18	1.65	1.96	2.7	2.28	3.34	4.01	4.22	3.19	2.53
1.44	1.6	1.43	1.63	1.22	1.99	3.07	3.26	4.23	4.3	2.87	2.71
1.37	1.28	1.47	2.79	3.53	3.25	2.6	3.23	2.94	3.56	1.39	2.22
1.08	1.11	1.03	2	2.39	2.98	3.34	3.39	3.41	2.96	1.92	1.3
1.46	1.57	0.91	2.07	1.66	1.94	3.45	3.38	3.94	4.09	1.25	1.84
1.42	1.2	1.04	1.53	1.48	0.89	3.43	3.27	3.22	4.49	1.36	1.11
1.05	1.07	0.83	1.29	1.36	1.72	3.27	2.34	2.38	2.98	1.93	1.96
1.5	1.07	0.87	1.07	1.11	1.15	2.55	2.54	1.4	2.88	2.41	1.88
1.1	0.99	1.25	0.89	1.06	1.3	1.87	3.42	1.19	2.62	2.04	1.74
0.84	1.3	1.17	1.01	1.33	1.36	1.34	3.43	1.46	1.51	1.08	1.97
0.66	1.01	0.65	0.87	0.65	1.28	2.19	2.01	2.9	2.92	2.24	1.36
1.08	0.9	0.91	1.08	0.75	0.85	2.37	2.14	2.6	2.66	2.06	1.12
0.95	0.7	1.04	0.93	1.21	1.17	1.34	1.67	1.5	3.33	3.28	0.83
1.05	1.08	1.15	1.28	1.15	1.45	1.46	2.29	2.88	2.65	2.39	1.79

Figure. 85

- Self

  Standard deviation of the sensor pins for the touch panel after total driving. If the standard deviation of the sensor nodes is bigger, then the self standard deviation will be bigger as well.

Self
2.3
3.28
3.92
6.39
18.37
15.7
4.5
4.58
3.95
3.54
3.77
4.26
4.25
3.42
3.53
3.27
3.06
2.82
2.25
1.91
1.89
2.72

Figure. 86

- Summary

  The average, maximum and minimum of the standard deviations of the mutual, sector and self.

Mutual	A:2.36	M:24.02	m:0.31
Sector	A:3.22	M:49.15	m:0.65
Self	A:4.71	M:18.37	m:1.89

Figure. 87

4.6 3D Signal Test Mode

When the user clicks ALT+E and the test setting window appears, “3D Module” is added to the end of “Advance test”.

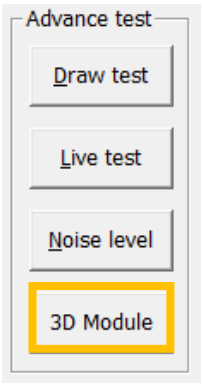


Figure. 88

As the name suggests, this function features the display of signal values of the touch panel dynamically under 3D test mode. As this feature relies more on the hardware effectiveness, we suggest using faster operating system to run the test.

4.6.1 Basic Operation

After 3D Module is running, it will show the whole signals of the touch panel with the full screen.

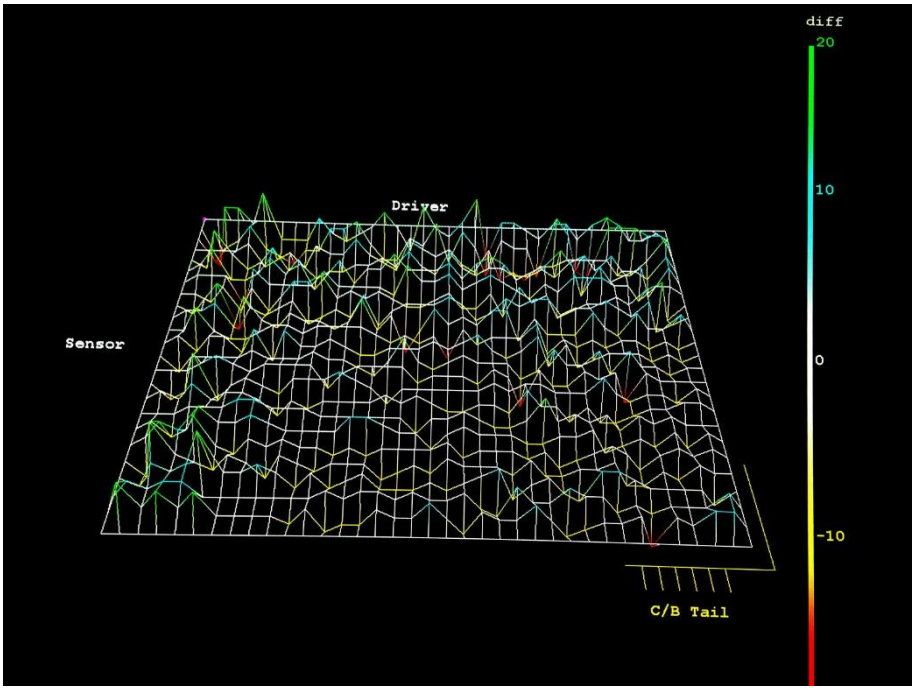


Figure. 89

The program will use different colors to show the positive, negative and intensity of the signals.

Colors	Signals
white	Normal signal and No touch
blue	Smaller positive signals, usually caused by the noise
green	Larger positive signals, possibly identified as finger touch
yellow	Smaller negative signals, usually caused by the noise
red	Larger negative signals, possibly caused by water and the like.

The user can adjust the display position by clicking the top, down, left, and right keys of the keyboard.

Colors	Actions
top	On X axis counterclockwise rotate by 5 degrees
down	On X axis clockwise rotate by 5 degrees

left	On Y axis counterclockwise rotate by 5 degrees
right	On Y axis clockwise rotate by 5 degrees
+	On z axis counterclockwise rotate by 5 degrees
-	On z axis clockwise rotate by 5 degrees
O	Restore to the default angle: on X axis counterclockwise rotate by 225 degrees, on Z axis clockwise rotate by 270 degrees

In the following instance, please adjust the angle to where you rotate counterclockwise by 270 degrees on X axis to make the signal test easier.

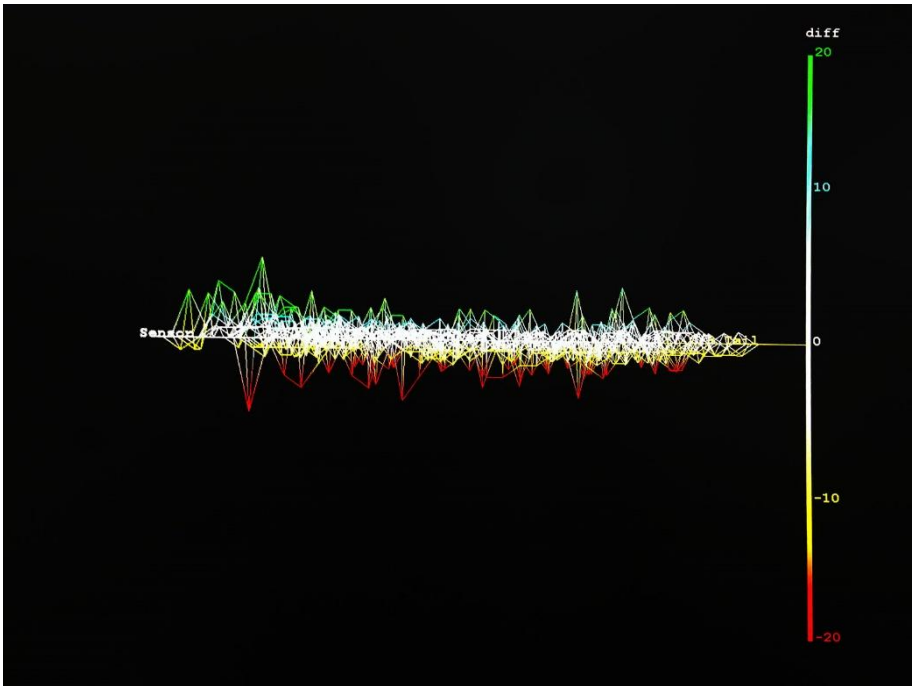


Figure. 90

4.6.2 Differentiate Different Signals

- Finger

Ideal finger signal is the positive signal with an extreme large value.

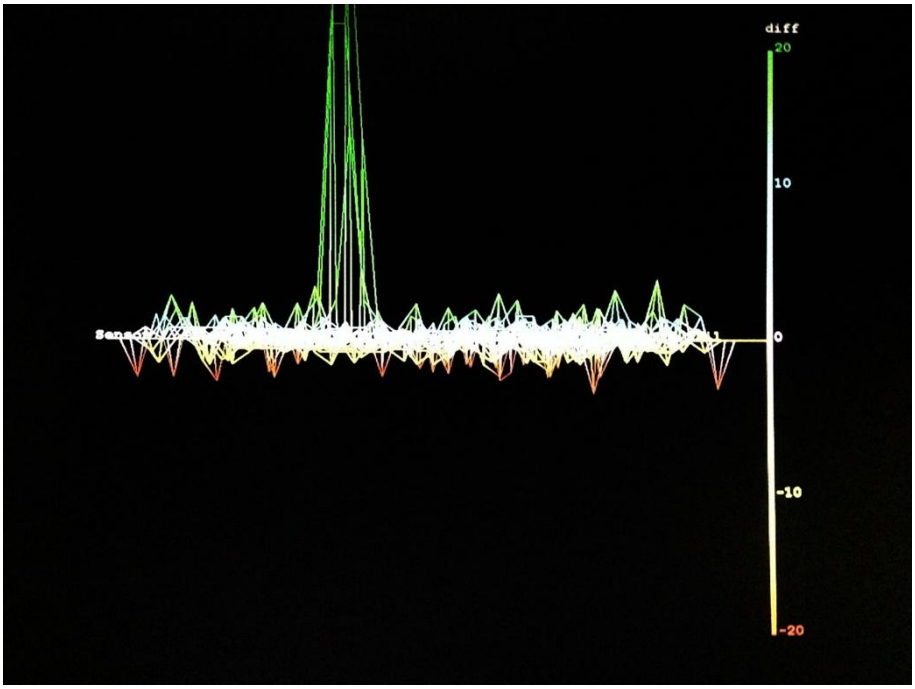


Figure. 91

- Noise

Noise is also the positive signal. However, as the intensity is not strong enough, therefore, it is not judged as Finger.

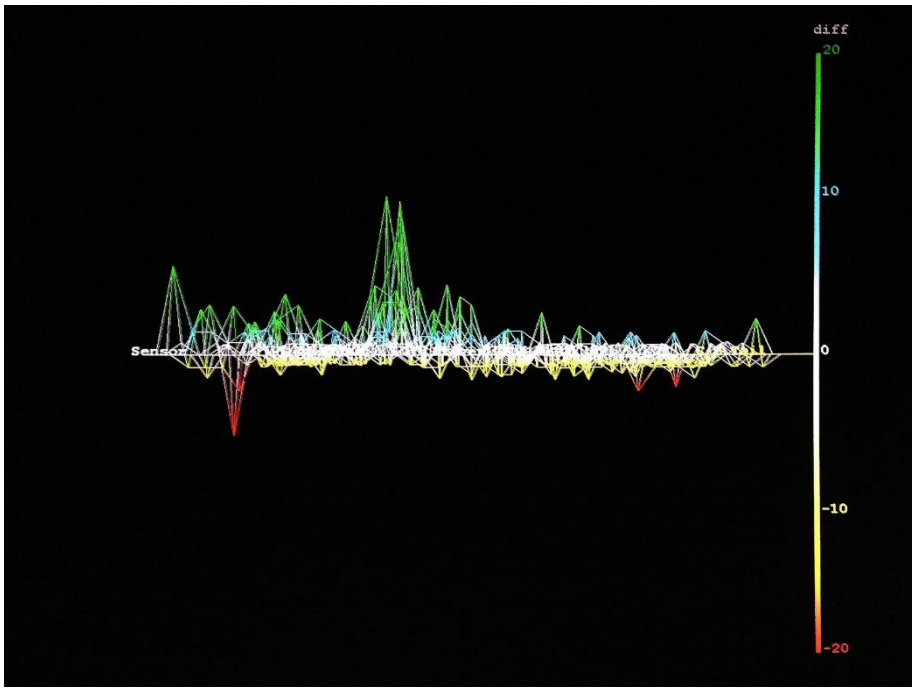


Figure. 92

- Water

Water usually comes with larger negative signals. As it also influences the measurement of positive signals, therefore, it requires special effort to take care.

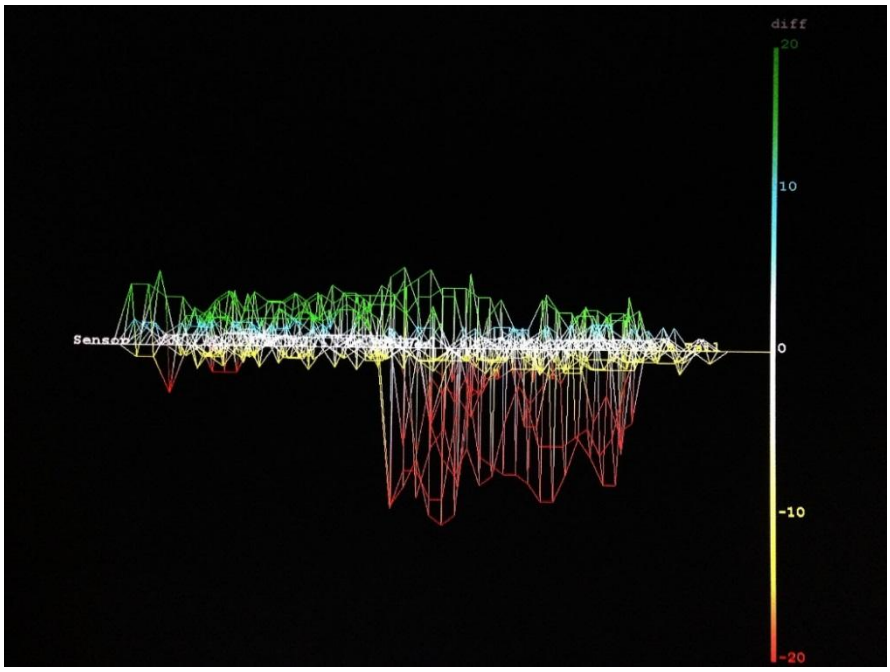
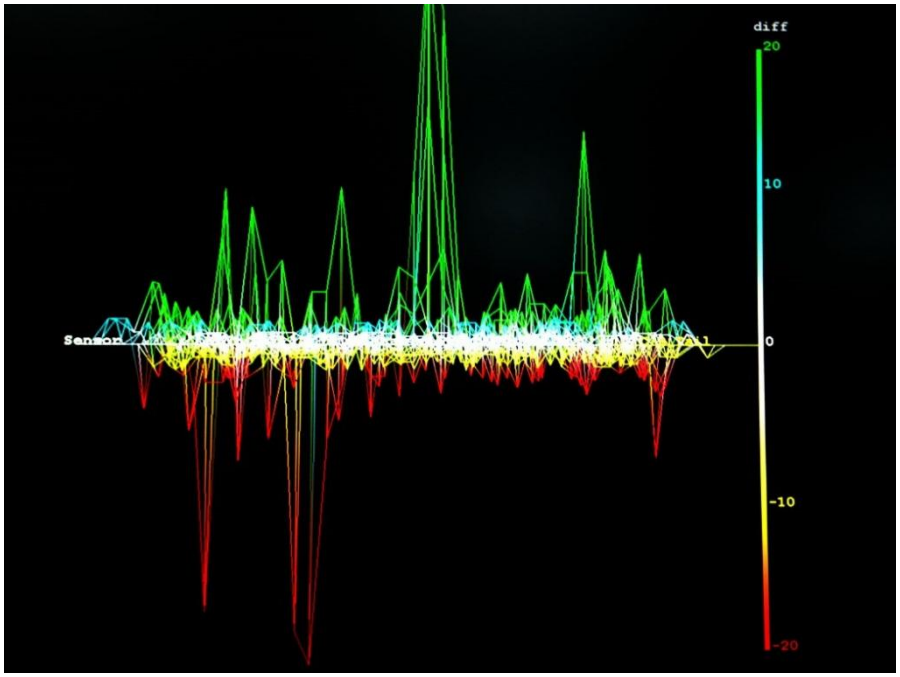


Figure. 93

- Bad signal environment

When you touch and find both positive and negative signals mixed together, the device may be under the influence of the noise interference and produce false points. We suggest you to look into the system environment and try to locate the device in a cleaner area.



5 Driver Installation / uninstallation

PenMount provides drivers for the RS-232 and USB interfaces, you could download the latest driver version from PenMount Web. PenMount windows universal driver can be used in Windows 2000/2003/2008/XP/Vista/7/8. For Windows Vista/7/8, the PenMount control board can be used directly with the built-in USB driver without having to install additional drivers.

5.1 Install/Uninstall PenMount PCI Windows driver in Windows 7

Before installing the driver, please connect the PenMount PCI controller via the RS-232 or USB interface. (The driver will be installed according to the interface you are using.) Then, decompress the file "PenMount-Windows-Universal-Driver-Vxxx" and begin driver installation following the steps below:

Step 1: After extracting the files, run "Setup.exe" (Figure. 98).

Step 2: When the setup wizard appears, click "Next" to continue (Figure. 99).

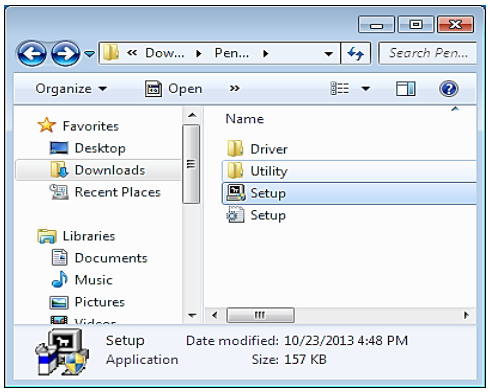


Figure. 98

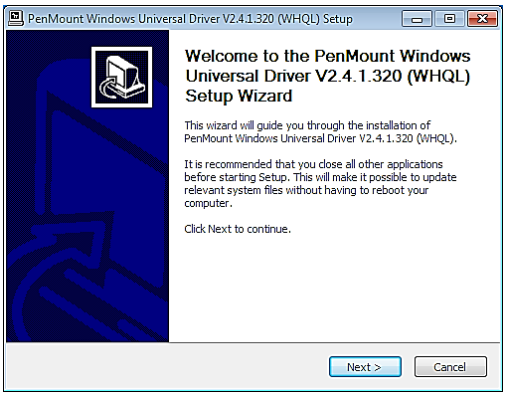


Figure. 99

Step 3: When the license agreement appears, click "I Agree" to continue (Figure. 100).

Step 4: Select the destination folder and click "Install" (Figure. 101).

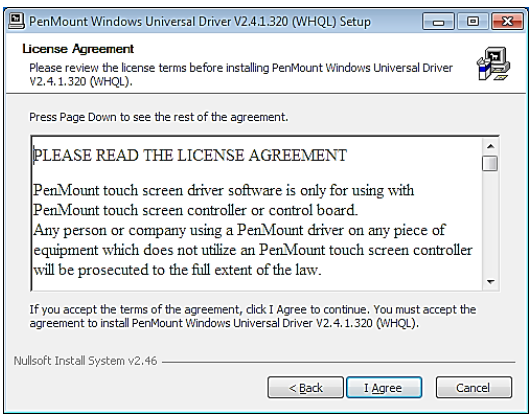


Figure. 100

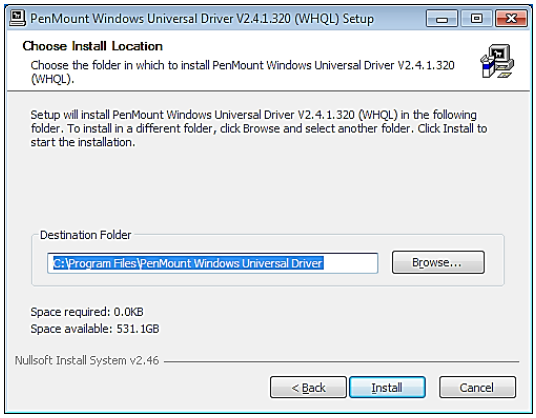


Figure. 101

Step 5: The dialog window “Would you like to use touch as mouse device?” will appear. If you would like to use PenMount touch functionality, click “Yes”; if you would like to use system touch gestures, click “No” (Figure. 102).

Step 6: If you click “Yes” in step 5, the following window will pop up, indicating the installation is complete. Click “Finish” to exit the window (Figure. 103).

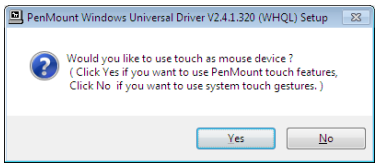


Figure. 102

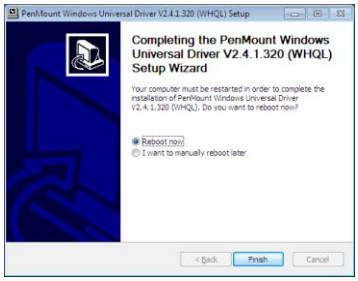


Figure. 103

When the installation is complete, the PenMount icon will be displayed in the notification area.

If you click “No” in step 5, the following dialog window will appear. Click “Finish” to exit the window (Figure. 104). When the installation is complete, the “PenMount Control Panel” icon will appear on the desk top (Figure. 105).

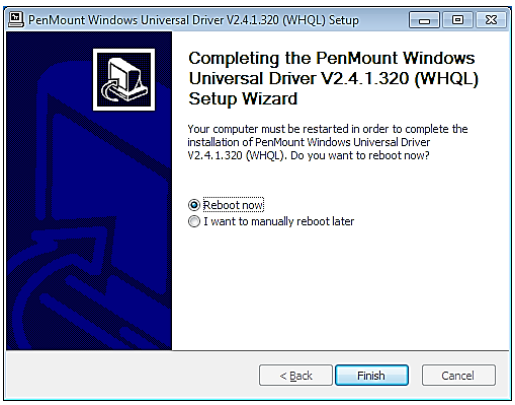


Figure. 104

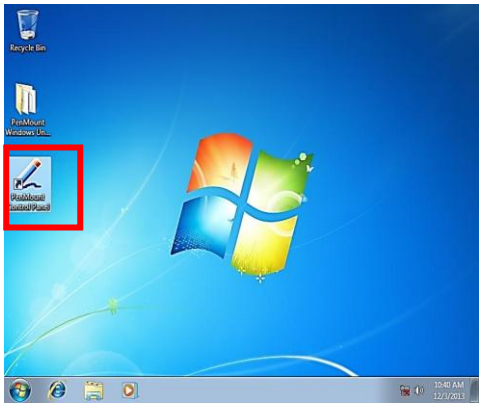


Figure. 105

Please follow the steps below to uninstall the PenMount PCI Windows driver:

Step 7: In “Control Panel “, choose “Uninstall or change a program”. Find “PenMount Windows Universal Driver Vxxx”, and click “Uninstall/Change” (Figure. 106).

Step 8: When the following dialog appears, click “Next” to remove the driver (Figure. 107).

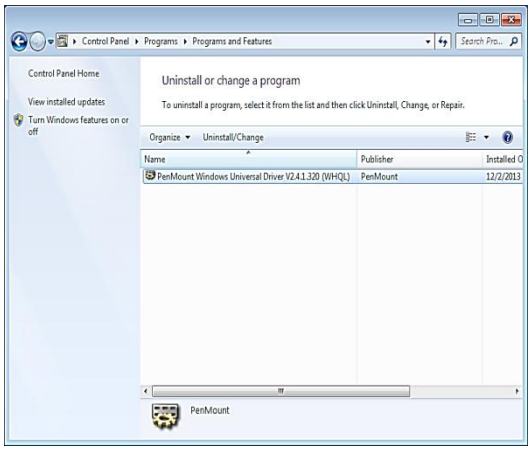


Figure. 106

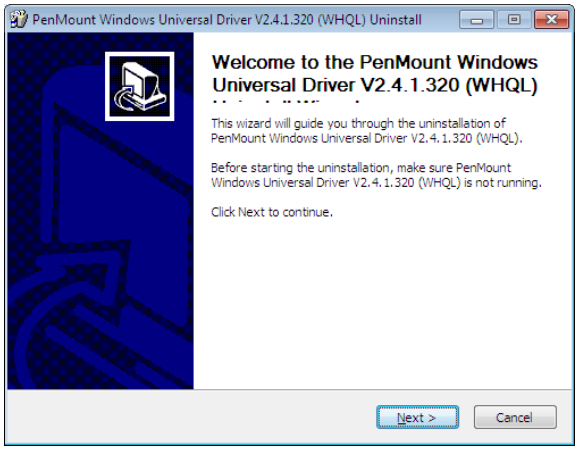


Figure. 107

Step 9: The system will uninstall the driver (Figure. 108).

Step 10: A dialog window will appear, indicating the driver has been uninstalled. Click “Finish” to exit (Figure. 109).

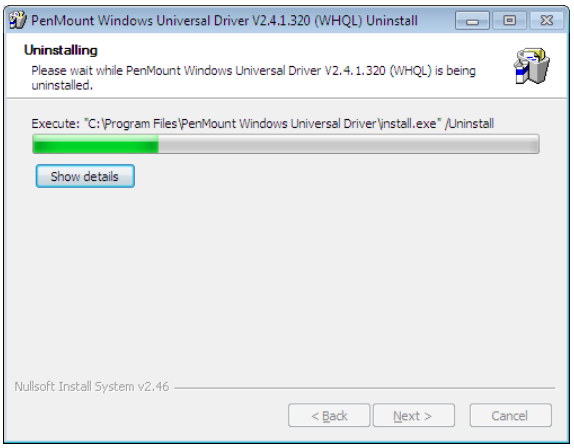


Figure. 108

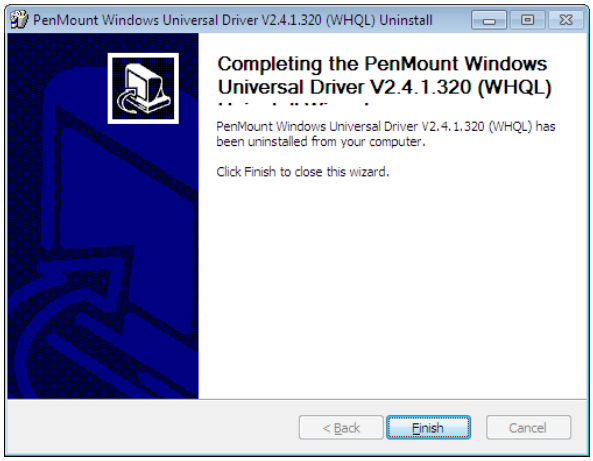


Figure. 109

5.2 Install / uninstall PenMount PCI Linux X Window driver

Before installing PenMount PCI Linux X Window Driver for PenMount control boards, you must have Linux X Window installed and running on your computer.

PenMount PCI Linux X Window Driver for PCI control boards support various operating systems. The supported Linux versions are listed on our website. Please visit http://www.amtouch.com.tw or http://www.salt.com.tw to view the supported Linux versions.

Embedded Linux / Android : Provide source code for integration.

Please refer to the readme file included in the driver folder for further details.

5.3 Install / uninstall PenMount PCI WinCE Driver

Before installing the PenMount WinCE Driver, you must have a WinCE system installed and running on your device.

Please see the readme file included in the driver folder for further details

6 Windows Driver ConFigure.

This section describes how to conFigure. the PenMount device after it is installed to the windows operating environment. A PenMount driver provides various functions for testing and enhancing controller performance under the windows operating environment.

6.1 ConFigure. PenMount PCI RS-232/ USB in Windows XP

Right-click on the PenMount monitor icon in the notification area and select “Control Panel” from the menu to conFigure. the touch screen. (Figure. 110)

Open PenMount Control Panel. The PenMount PCI USB icon can be accessed under the “Device” tab. In the Device tab, you can see the devices detected on your system. Select a device and press “ConFigure. ” to set the configuration. (Figure. 111)

Figure. 110

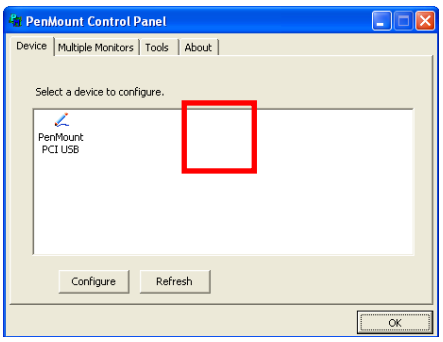


Figure. 111

6.2 PenMount Control Panel

The “PenMount Control Panel” functions are described below.

6.3 Device

In this tab, you can see how many devices are detected on your system. Select any device by clicking on its icon. (Figure. 112)

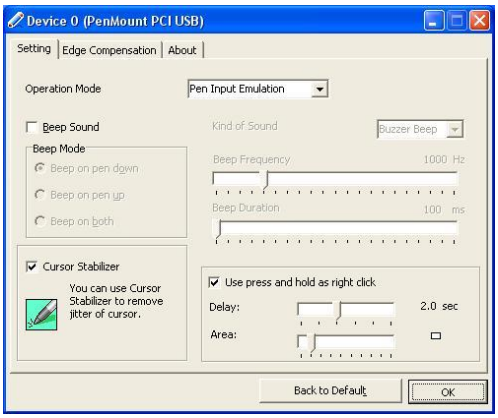


Figure. 112

a. Setting

Operation Mode	This mode enables and disables the mouse's ability to drag on-screen icons—useful for configuring POS terminals.	
	Pen Input Emulation –	When this mode is selected, the mouse will emulate Windows Vista pen input device operation. No mouse event will be sent until the touch is dragged out of range or released from the screen.
	Click on Touch –	When this mode is selected, the mouse only provides the click function; dragging is disabled.
	Mouse Emulation –	When this mode is selected, the mouse functions as normal and allows dragging of icons.
	Click on Release –	When this mode is selected, the mouse only provides a click function when the touch is released.
Beep Sound	Beep Sound checkbox–	Enables/disables beep function.
	Beep on pen down –	Beep occurs when the pen comes down.
	Beep on pen up –	Beep occurs when the pen is lifted.
	Beep on both –	Beep occurs both when the pen comes down and when iit is lifted up.
	Beep Frequency –	Modifies sound frequency.
	Beep Duration –	Modifies sound duration.
	Kind of Sound –	Selects beep sound type.
Cursor Stabilizer checkbox	Enables/disables the function which prevents cursor shaking.	
Use press and hold as right click	You can set the time out and area to your needs.	

b. Edge Compensation

This page contains the edge compensation settings for advanced calibration. You can adjust the settings from 0 to 30 to accommodate differences in touch panels. If the edge area has difficulty detecting touch,

please increase this value. If the sensing point shifts too much in the edge area, please decrease this value. (Figure. 113)

c. About

This tab displays information about the PenMount controller and driver version. (Figure. 114)

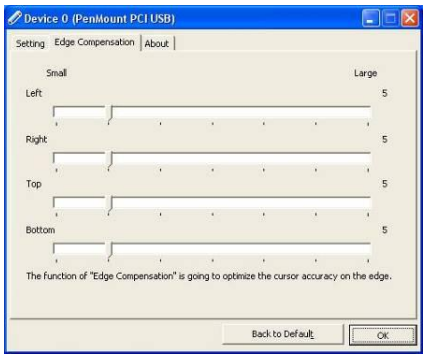


Figure. 113

Figure. 114

6.4 Multiple Monitors

Multiple Monitors supports two to four touch screen displayson one system. Each monitor requires its own PenMount PCI control board, either installed inside the display or in a central unit. The PenMount PCI control boards must be connected to the computer's RS-232 or USB ports. Driver installation procedures are the same as installation procedures for a single monitor.

Before using Multiple Monitors, you must have two or more monitors that are in extension mode. For display cards that support multiple monitors, we recommend using Matrox, nVidia, or ATI products and inquiring about operation and usability issues in advance.

Note:

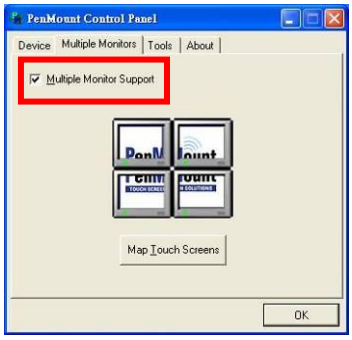
- The Multiple Monitors function is for use with multiple displays only. Do not use this function if you have only one touch screen display. Please note once you turn on this function, the Rotating function will be disabled.
- Before using multiple monitors, you need to map each monitor.

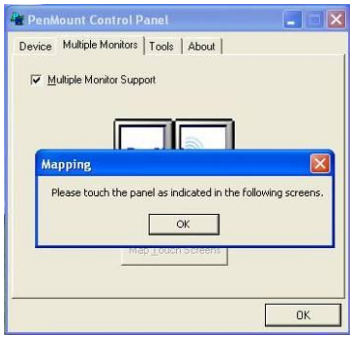
Follow the steps below to enable multiple displays:

Step 1: In PenMount Control Panel, under the Multiple Monitors tab, check the "Multiple Monitor Support" box. Then click "Map Touch screens" to assign touch controllers to displays. (Figure. 115)

Step 2: When the mapping screen message appears, click “OK”. (Figure. 116)

Step 3: Touch each screen when it displays the message “Please touch this monitor. Press “S” to skip. Follow this sequence and touch each screen to map the touch screens. (Figure. 117)





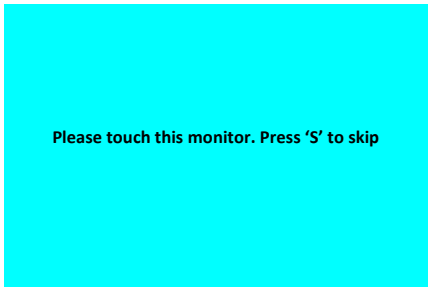


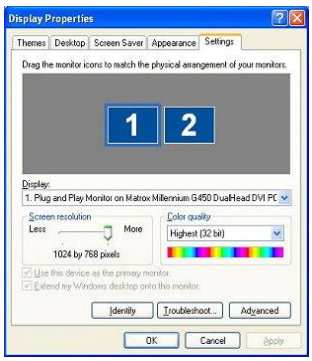
Figure. 115 *Figure. 116* *Figure. 117*

Note:

- If you change the resolution of displays or their screen address, you have to perform “Map Touch screens” again so the system can identify where the displays are.
- If you have multiple monitors but only one touch screen, press ”S” to skip the mapping step.

Step 4: For example, with two Touch Monitors connected, please make sure the touch monitors are plugged in and detected. (Figure. 118 & 119)

Step 5: In PenMount Control Panel, in the Multiple Monitors tab, click “Map Touch screens,” then click “OK”. (Figure. 120)



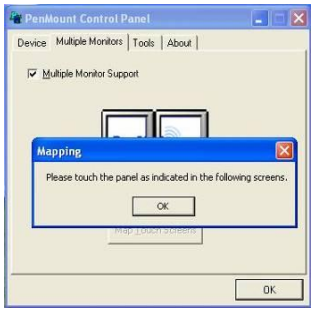


Figure. 118 *Figure. 119* *Figure. 120*

Step 6: Please follow the instructions shown on the display to match controllers and the touch screens. Click “S” to skip this step if the first monitor is not being used as a touch screen. (Figure. 121)

Step 7: When the screen switches to Screen 2, please touch it. If screen 2 has no touch function, press “S” to skip it. (Figure. 122)

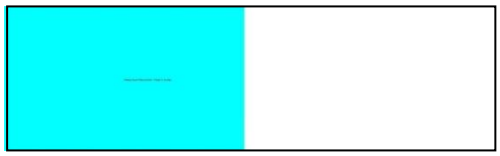


Figure. 121

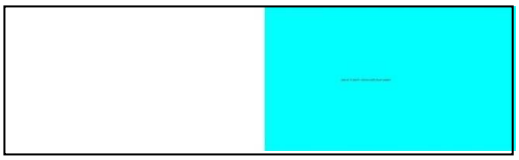


Figure. 122

6.5 Tools

The buttons on “PenMount Control Panel” have the following functions: (Figure. 123)

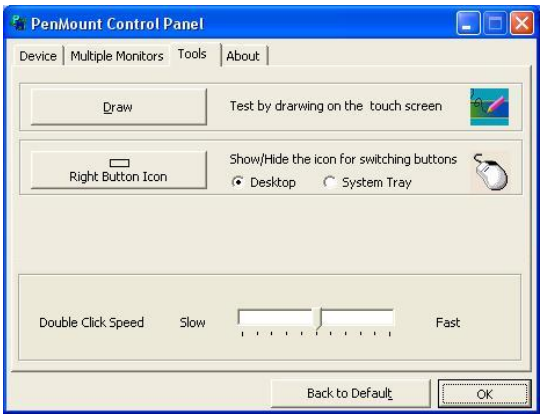


Figure. 123

Draw :	Tests or demonstrates PenMount touch screen operation.
Right Button Icon :	Enables right button function. The icon can be shown on the Desktop or in the notification area.
Double Click Speed :	Adjusts Double click operation speed.

6.6 Screen Rotation Monitor

This function supports nVidia, Intel, or ATI rotation auto-detection.

6.7 PenMount monitor menu icon

The PenMount Monitor icon (PM) appears in the notification area of Windows XP systems when you turn on PenMount Monitor in the PenMount utility. (Figure. 124)

Figure. 124

PenMount Monitor has the following functions: (Figure. 125)

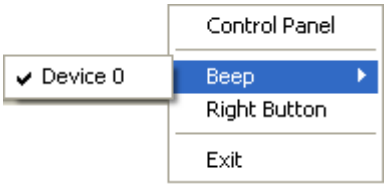


Figure. 125

Control Panel:	PenMount Control Panel.
Beep:	Beep setting for each device.
Right Button:	When this function is selected, a mouse icon appears in the upper right of the screen. Click this icon to switch between Right and Left Button functions.
Exit:	Exits the PenMount Monitor.

6.8 Configure

PenMount PCI RS-232/USB In Windows Vista/7/8. Double-click on the “PenMount Control Panel” icon on the Desktop to open the configuration utility. (Figure. 126) On the “PenMount Control Panel”, you will see the icon for PenMount PCI RS-232 (or USB) under the Device tab. In the “Device” tab, you can see the “devices” detected on your system. Select a device and press the “ConFigure. ” button to configure it.

Figure. 126

6.9 PenMount Control Panel

Device

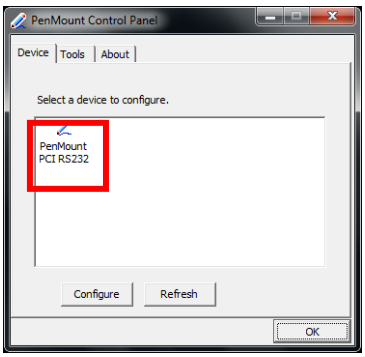
In this tab, you see how many devices are detected on your system. Select any device by clicking on its icon. (Figure. 127)

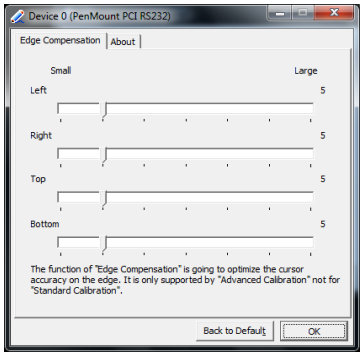
a. Edge Compensation

The edge compensation settings allow for advanced calibration. You can adjust the settings from 0 to 30 to accommodate the differences of each touch panel. (Figure. 128)

b. About

This panel displays information about the PenMount controller and driver version. (Figure. 129)





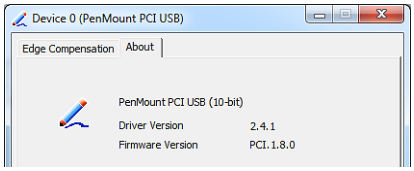


Figure. 127 *Figure. 128* *Figure. 129*

Tools

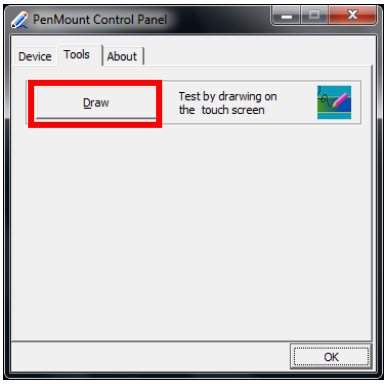


Figure. 130

a. Draw

The Draw tool tests or demonstrates PenMount touch screen operation. (Figure. 130)

Multiple Monitors

In the Windows Vista/7 environment, if you installed the PenMount controller as a digitizer device, you will need to use Multiple Monitor control functions provided by Microsoft to set the touch panel and monitor pairings. Here are the operating steps (Figure. 131):

Step 1: Open Control Panel

Step 2: Find Tablet PC Settings and click

Step 3: Hit Setup Button

Touch each screen when it displays “If this is not the Tablet PC screen. Press Enter to move to the next screen. To close the tool, press Esc.” Follow the sequence and touch each screen to map all the touch screens. (Figure. 132)

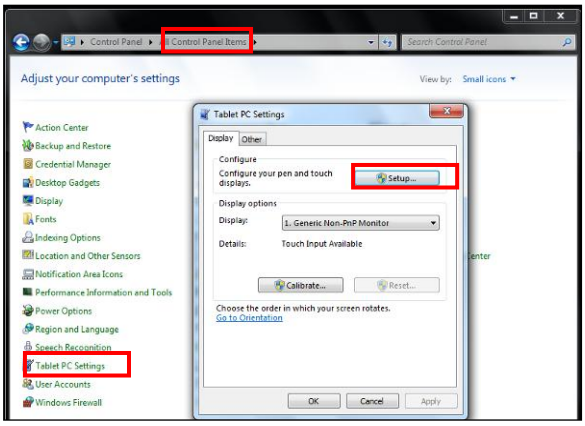


Figure. 131

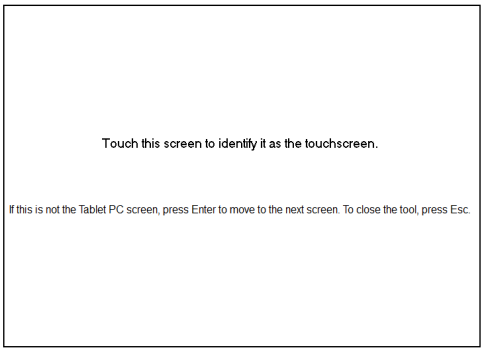


Figure. 132

7 Trouble Shooting

1 What is the structure of AMT PCI touch sensors?

The current AMT PCI sensor structures consist of either two or three layers of ITO film laminated to the glass top panel, otherwise known as GFF (Glass-Film-Film) or GFFF(Glass-Film-Film-Film) types.

2 What is the purpose of the PCI touch sensor's rear conductive layer?

The bottom conductive film layer of the PCI touch panel is for EMI shielding purposes; the EMI shielding layer blocks system or LCD noise and ensures accurate detection of signals.

3 What is the bending radius of the PCI tail? Is there anything in particular we should take note of for the tail?

The tail's bending radius is 1mm. The PCI touch panel is sensitive to noise. If the tail gets too close to or come into contact with the bezel or metal case, it will cause interference to PCI touch detection.

4 What is the surface hardness of the PCI panel?

The surface of the PCI panel is cover glass with a hardness of MOHS 5.

5 Do AMT PCI solutions operate on Windows 7 and Windows 8?

Yes, AMT PCI USB products use the Windows 7 or Windows 8 inbox driver.

For AMT PCI RS232 products, please install the PenMount Universal Driver.

6 What should the length of the tail be on the PCI touch sensor?

The shorter the better. A shorter tail reduces interferences between electronic components.

7 What kinds of surface treatments are available for PCI touch sensors?

Clear, AG (Antiglare), AR(Anti-reflection), and AS(Anti-smudge).

8 Can a projected capacitive touch screen be operated when there is liquid on its surface?

Sometimes liquid on the surface of a projected capacitive touch screen might cause a malfunction, which is a limit yet to be overcome by projected capacitive touch technology. When there is water on the surface of the PCI touch panel, please wipe it dry. Then PCI will function properly.

9 Can I operate a projected capacitive touch screen with gloved fingers?

AMT PCI touch panels with PenMount PCI control boards are able to support gloved finger operation by certain kinds of gloves including latex gloves for medical and clean rooms, household latex gloves, cotton gloves, and work gloves.

10 Is it ok if there are objects on the surface of the touch panel while rebooting?

When the system is rebooting, no objects (such as hands) should be on the surface of the touch sensor.

11 What capacitance technology does PenMount projected capacitive touch controllers employ?

PenMount projected capacitive touch controllers are based on mutual capacitance technology and locate touches with driving and sensing lines laid out on the two conductive layers of the touch sensor.

12 Do PenMount's projected capacitive touch controllers work with touch sensors made by other manufacturers?

PenMount's projected capacitive touch controllers can work with any touch sensors designed to meet the requirements of PenMount controllers. Please contact our sales staff for further information.

13 If customers would like to design a PCI IC onto their system main board, can AMT support this kind of design?

In general, we are able to support customers designed PCI IC on their system main board. Please contact our sales staff.

14 Which hardware platforms do PenMount PCI drivers support?

All PenMount PCI drivers are based on the x86 system and ARM-based Linux embedded system. Please contact our sales staff for other hardware platform requirements.

15 Will PenMount support ARM-based Linux and Android OS? Can PenMount provide the drivers?

Yes. If you use the ARM hardware platform, it employs Reduced Instruction Set Computing (RISC). You can contact our sales staff with your requirements. You will need to fill out company profile information and sign a NDA. PenMount will provide source code for you to successfully develop drivers for our PenMount devices.

16 How do I enable multi-touch on Linux or Android?

For Linux, PenMount USB devices are supported by the inbox driver of Linux Kernel 3.0, and PenMount RS232 interface is supported by the inbox driver of Linux kernel 3.2.

For other Linux and Android operating systems, you can drive PenMount hardware devices with PenMount driver source code and enable multi-touch functionality with Linux/Android multi-touch application programs.