User Manual

(DOC No. HiTouch Designer-DS)

HiTouch Designer

Touch Screen Controller

Preliminary version 01 May, 2012

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Contact and Assistant

This Development Tool named HiTouch Designer supports Himax touch screen controllers include the *HX8519-A, HX8520-A, HX8520-A05, HX8520-C, HX8525-A, HX8526-A, HX8526-B, HX8527-A,* and *HX8531-A* that provided by the Touch Team of Himax Technologies, Inc. (Himax). Contact information for the Himax can be found at http://www.himax.com.tw.

System Constraints

The minimum hardware requirements to execute HiTouch Designer are as followings:

CPU: Intel Pentium® D 2.8 GHz

RAM: 1GB (XP), 1.5 GB (Vista/7)

And the software & driver requirements are:

OS: Windows® XP/Vista/7

.Net framework: 3.5 SP1

Microsoft Chart Controls for Microsoft .NET Framework 3.5

Himax bridge board USB driver

Driver Installation

The .Net framework: 3.5 SP1 and the Microsoft Chart Controls can be downloaded and installed on Microsoft's website or following links:

http://msdn.microsoft.com/en-us/netframework/cc378097

http://www.microsoft.com/en-us/download/details.aspx?id=14422

Please see the driver step by step installation guide for more details:

Driver install step by step (2011-05-10).pdf

Procedure Introduction

HiTouch Designer Introduction

The HiTouch Designer is a comprehensive IDE tool to quickly configure and fine-tune the Himax touch IC. Instead of configuring IC mapping and fine-tuning touch performance by manually editing register settings, the HiTouch Designer provides friendly and intuitive UI settings to perform these tasks faster and easier. Customer can perform following tasks with the HiTouch Designer:

- Configuring the touch sensor channel mapping with Himax touch IC.
- Observing and fine-tuning touch performance instantly with many rendering mode such as: drawing line, raw data, gesture….
- Switching to demo mode to output line drawing on external LCD module.
- Editing register with detailed setting description.

Application Overview

The HiTouch Designer consists of following sub-functions:

- **Programming Setting**
  - Program touch IC FW, program bridge FW, and load configuration data from either a FW binary file or from the touch IC.
- **Mapping Table**
  - Configure the IC setting according to the connection arrangement between the IC pin assignments and the touch sensor channel.
- **Performance Tuning**
  - Fine-tune touch performance by edit configuration data through a friendly user interface.
- **Data Viewer**
  - Observe the touch performance in different ways such as line drawing, histogram, waveform…
- **Configuration File Saving**
  - After the configuration data are edited, it can be saved to a FW binary file and to be reloaded anytime.
- **Register Read/Write**
  - Read or edit touch IC registers.
- **Gesture Demonstration**
  - Observe the gesture performance.
- **Demonstration Viewer**
  - Set up and display the line drawing panel on the 2nd external monitor.

Operation Flow

The whole configuring and fine-tuning are all about the configuration data which contains the specific information about sensor mapping and touch performance settings. According to the operation of the configuration file, all sub-functions can be reorganized to four phases as followings:

- **Load configuration data:**
  - Programming Setting
- **Edit configuration data:**
  - Mapping Table
  - Performance Tuning
  - Data Viewer
- **Save configuration data**
  - Configuration File Saving
- **Misc.**
  - Register Read/Write
  - Gesture Demonstration
  - Demonstration Viewer

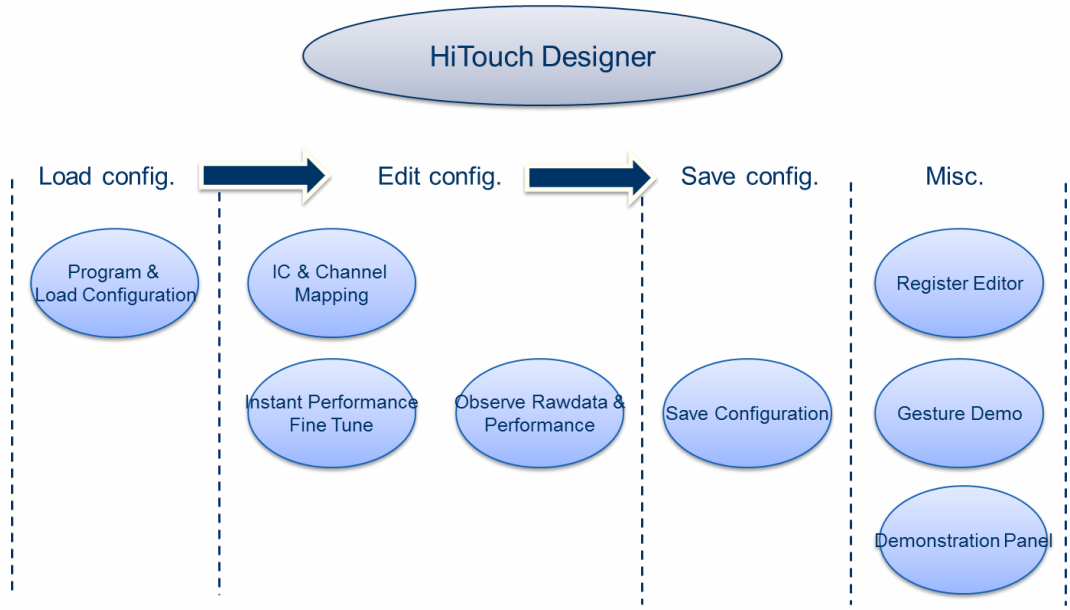


Figure 0-1 : Operation Flow – Overall

The HiTouch Designer always starts with loading configuration data. The configuration data can be loaded from a pre-saved FW file or from the already programmed touch IC. The loaded configuration data is the default value of following editing operations. After the data are loaded, user can edit the channel mapping according to the connection between IC pins and sensor channels. The channel mapping operation can be done even without connecting the touch IC and sensor to the system.

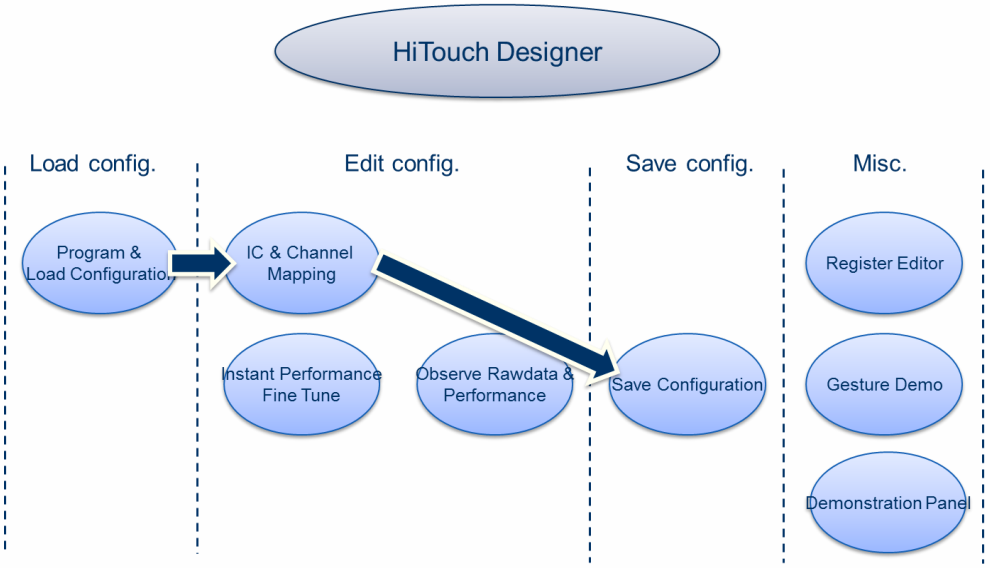


Figure 0-2 : Operation Flow - Mapping

Besides the channel mapping, the performance fine-tuning process also modifies the configuration data, but the connection of touch IC and sensor is needed in order to observe the performance changed instantly. The fine-tuning process provides a friendly user interface to instantly modify configuration data, and the data viewer function provide many different method to observe touch performance. The editing – observing cycle may need much iteration to optimize the touch performance. The modified data can be saved to a FW file by the configuration saving process which needs user to note information about the configuration such as company name, model name, version, and date.

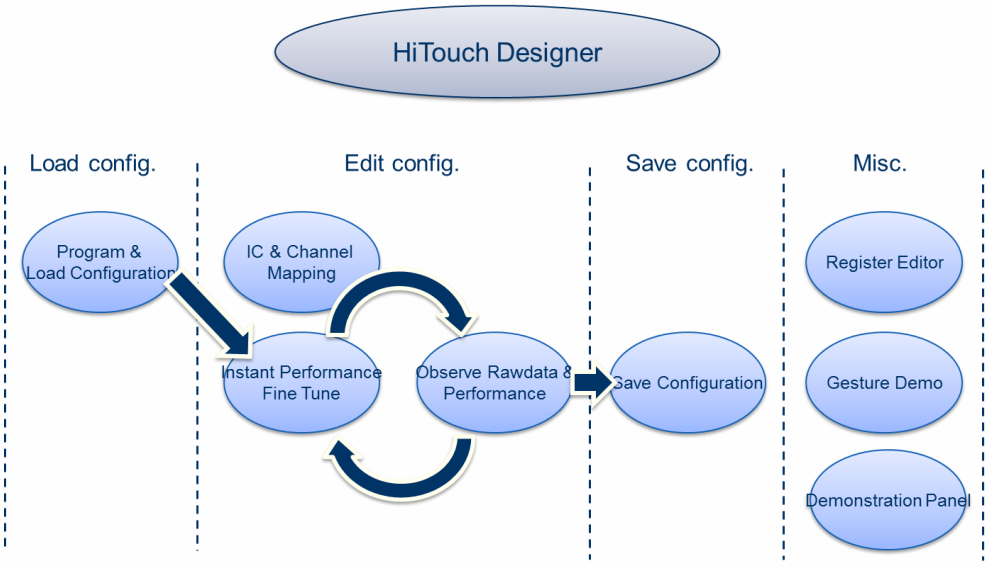


Figure 0-3 : Operation Flow – Fine-tuning

After programming the new FW to touch IC, the modified configuration data can be reloaded directly from the touch IC and start another fine-tuning round again. If the performance is optimized, the saved FW file is which contains the configuration is the final output and can be programmed to touch IC to drive the touch sensor.

1 Program Setting

1.1 Description

The program setting function is mainly for burning firmware and configure file into the Touch IC after selecting, or load settings from programmed IC. Of the panel 2 are the current status and one suggesting list which indicate the connection status between the integrated chips, bridge board the computer. In the left, top corner are some useful buttons which users could burn the firmware or configure file into the integrated chip. In the right, top corner are help and information buttons which link to the user guide document. In the following section, the detail functionality would be explained respectively.

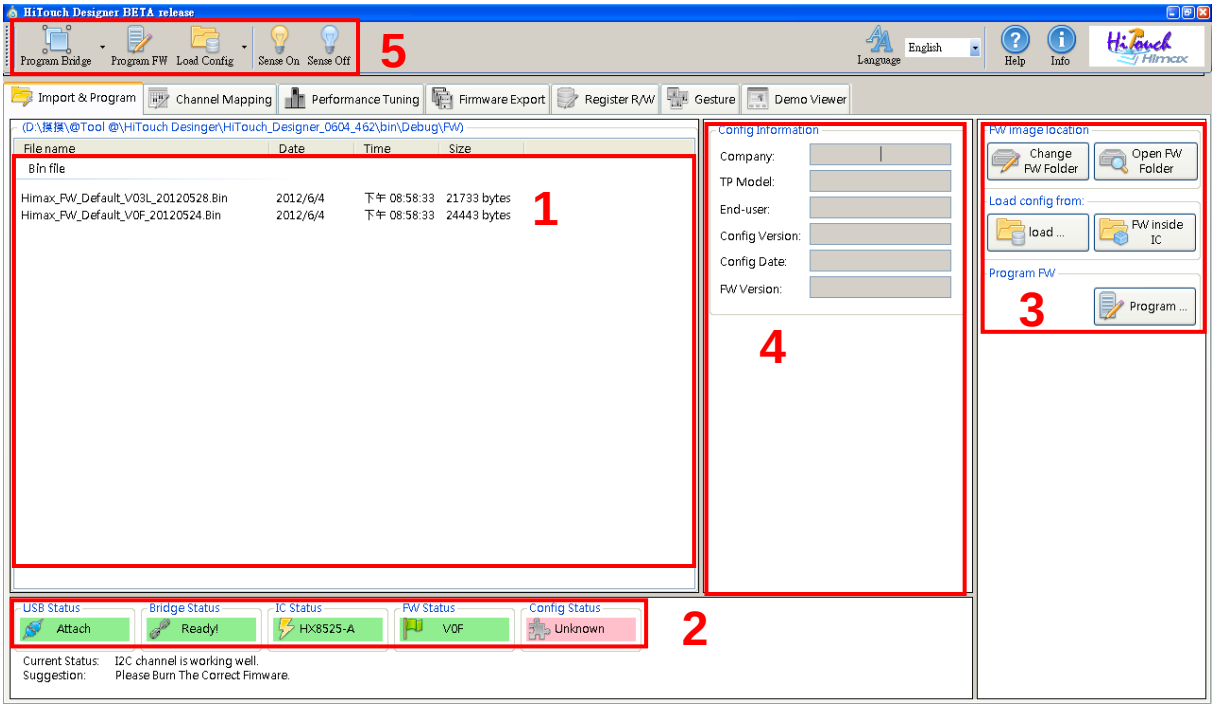


Figure 1-1 : Import & program settings

1.2 Function Usage

1. **Binary File Manager:** It shows all binary (called “bin file” below) in the specific folder. Select one file and click the right button of the mouse to:
   1) Load the configure setting from the file into the IC registers.
   2) Burn the bin file into the flash memory of the IC.
   3) Load the configure setting from the flash memory of the IC to IC registers.

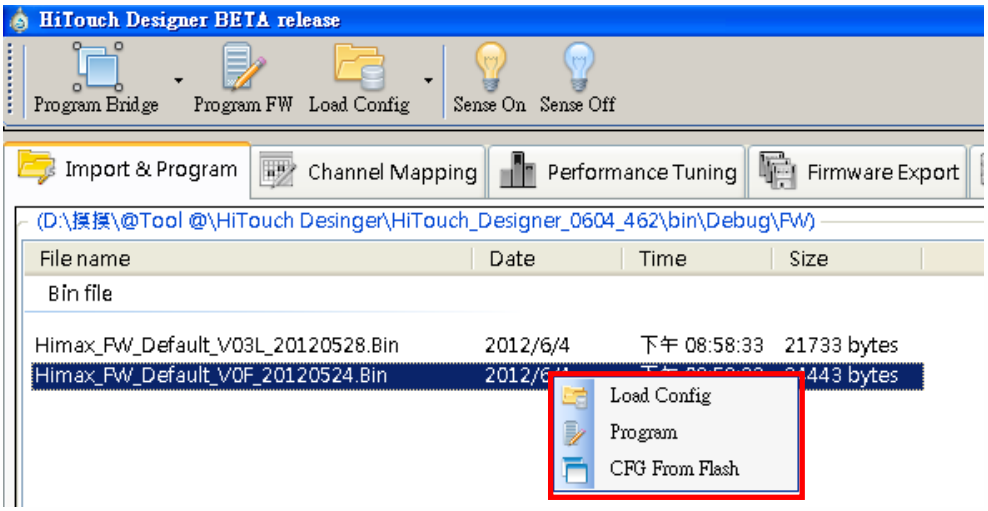


Figure 1-2 : Load binary file

2. **Status bar and the suggestion list:** There are 5 UI components for indicate current status between the USB cable, the bridge board, the PC and the IC
   1) Whether the USB cable is connected.
   2) Whether the bridge board works well or not.
   3) Current IC type.
   4) Current firmware version.
   5) Whether the configure setting is loading or not.
   6) The suggestion for user to follow the correct operating sequence.

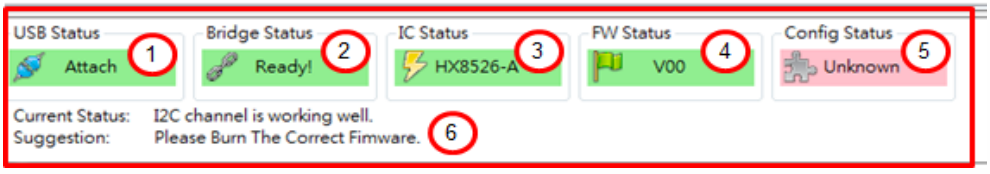


Figure 1-3 : Status bar and suggestion list

3. **Firmware Image Location**：Common-used buttons are put in this area which users could use them to load the configuration, burn the image and open the firmware-located folder.
   1) Change location: The button is used to select one new folder which contains the bin and hex files. After the user finish selecting the folder, the data in the panel 1 will be update.
   2) Open location: This button is used to open the FW-located folder by the windows explorer.
   3) Load selected: This button is used to load the configure setting from the selected bin file of Panel 1
   4) FW inside IC: This button is used to load the configure setting from flash memory into the IC registers.
   5) Program selected: This button is used to burn the selected file from the panel 1 into the IC registers.

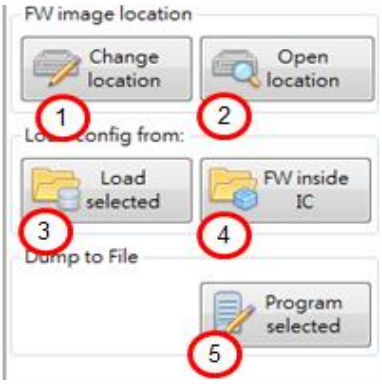


Figure 1-4 : Firmware Image Location

4. **Config Information:** When one configure file is loading into the integrated chip, certain fundamental data would be shown in this panel, such as company name, firmware version , configure file modified date, touch panel information ...and so on. Certain fundamental data would be shown in this panel

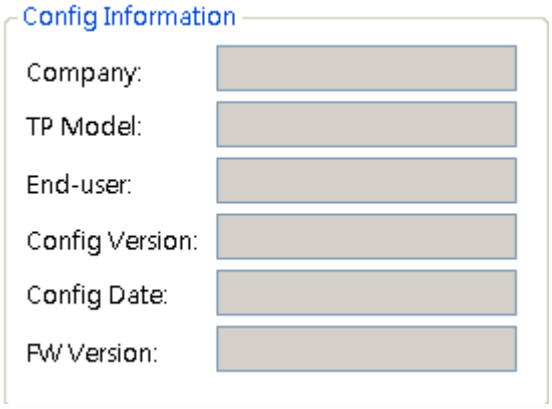


Figure 1-5 : The information block

5. **Tool Bar:** This panel contains several useful buttons for burning firmware and loading configurations into the IC.
   1) Program Bridge: users could select the bridge code to burn it into the RAM or EEPROM (default).
   2) Program FW: users could select one firmware file into the IC.
   3) Load the configuration: users could select one bin file and load its configuration into the IC.
   4) Sense On: The IC would be running by this button.
   5) Sense Off: The IC would be stopping running by this button.

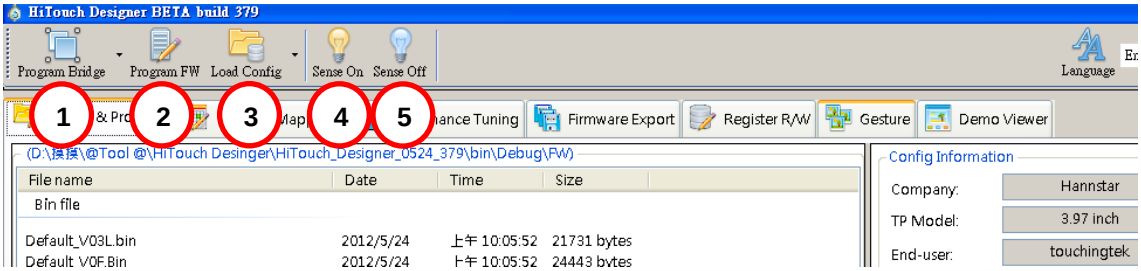


Figure 1-6 : Tool Bar

1.3 Operating Flow

This section is mainly to explain the brief usage flow for firmware programming, configuration files loading and the status of USB/bridge/IC observing.

Step1. Users have the USB cable connected from bridge board and the PC, and the bridge code would be burned automatically.

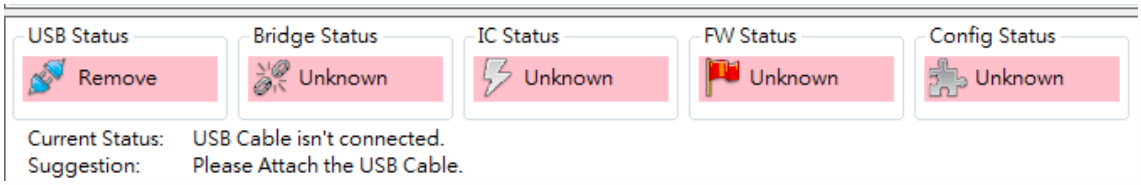


Figure 1-7 : The status which the USB cable is not connected.

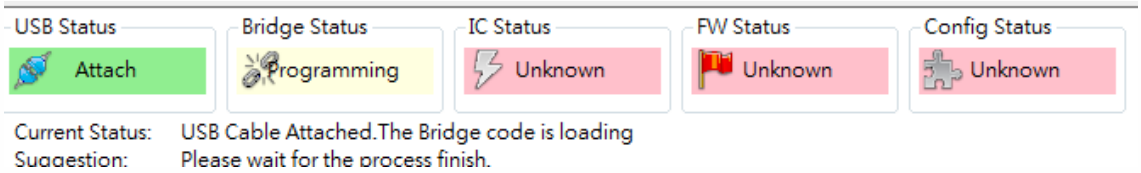


Figure 1-8 : The bridge code is programming currently.

Step2. After the above sequence, the I^2C bus should be working well and the IC type would be identified.

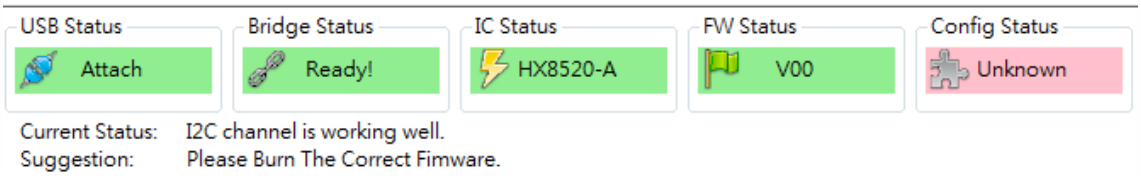


Figure 1-9 : The bridge code programming is finished. And the I2C bus works normally

Step3. User could try to load the correct firmware settings from bin file. If the firmware inside the IC is decided proper, just load the configuration into IC directly.

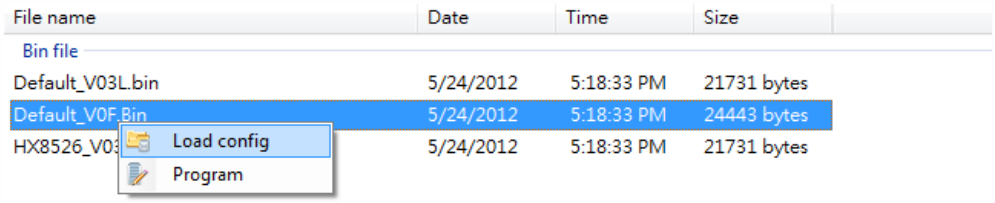


Figure 1-10 : Program the firmware or load the configuration is feasible

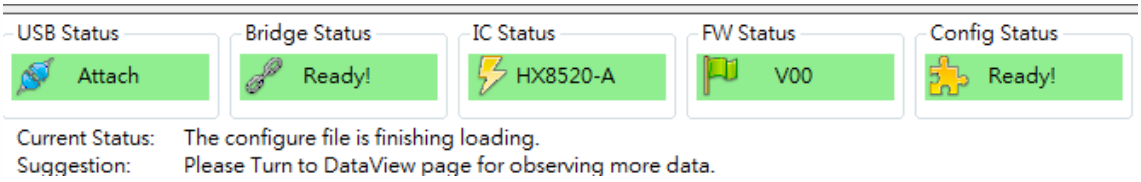


Figure 1-11 : The configuration loading is finished.

Step4. The other pages are enabled after the configuration loading.

2 Mapping Table

2.1 Description

According to the IC model and package, the channels of TX and RX are mapped to corresponding pin of IC. Complete mapping table could be saved as ".xls" file (called "xls file" below), and replace the related data of bin file. Supported IC models and packages are as below.

- **HX8519-A**:
  - A01DDAG-A
  - A04DDDG-A
  - B21ADAG
- **HX8525-A**:
  - A32ADAG
- **HX8526-A**:
  - A01DDAG
  - A04DDDG
  - A05DBEG
  - A06DDFG
  - A07DBGG
  - A08DDHG
  - B27ADAG
- **HX8527-A**:
  - A40ABAG
  - A40ADCG
- **HX8531-A**:
  - A48DDAG
  - A76ADBG

2.2 Function Usage

The followings simply descript the functionalities of Mapping Table.

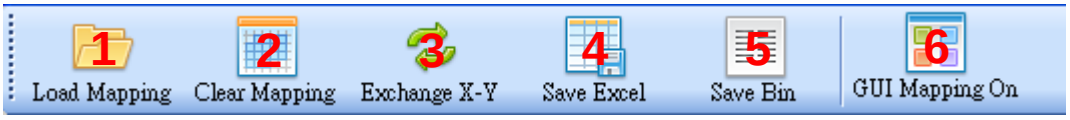


Figure 2-1 : Tool strip of mapping table

1. **Load Mapping**: Load the saved mapping table from the specific folder of computer. Make sure the mapping table includes the information of IC model and package as the following:

   - B1 – HX85**
     - HX8526
   - D1 – Package_*CHs
     - A07DBGG_30CHs

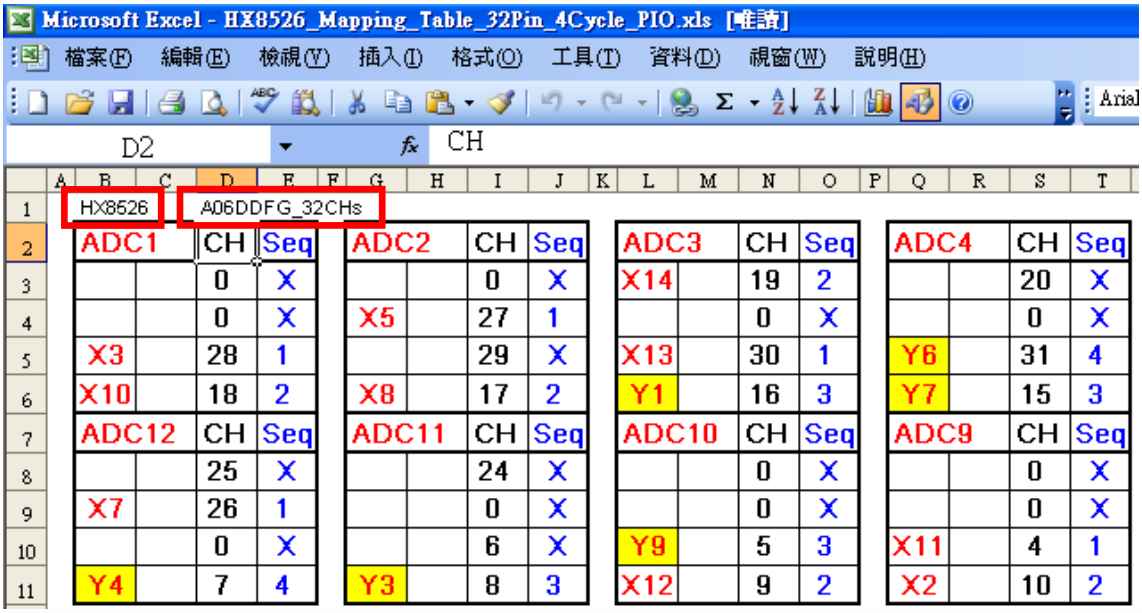


Figure 2-2 : Excel mapping file

Please edit mapping table in Excel if it doesn't meet the requirements. Supported IC model and packages are as below.

- **HX8519**
  - A01DDAG_32CHs
  - A04DDDG_48CHs
  - B21ADAG_21Chs
- **HX8525**
  - A32ADAG_32CHs
- **HX8526**
  - A01DDAG_32CHs
  - A04DDDG_48CHs
  - A05DBEG_32CHs
  - A06DDFG_32CHs

- A07DBGG_30CHs
- A08DDHG_30CHs
- B27ADAG_27CHs

- **HX8527**
  - A40ABAG_40CHs
  - A40ADCG_39CHs
- **HX8531**
  - A48DDAG_48CHs
  - A76ADBG_76CHs

Click the ”Load Mapping” button to open the xls file. The default folder is at “…\Save_Mapping.”

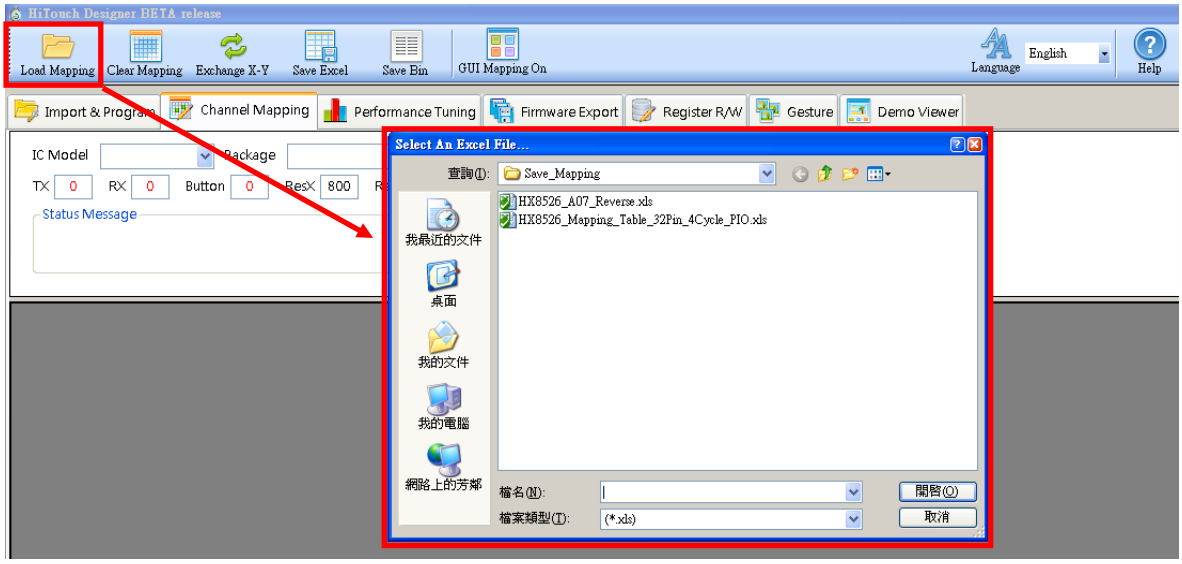


Figure 2-3 : Load Mapping

2. **Clear Mapping**: Click the “Clear Mapping” button to clear all values in mapping table and GUI. After the button clicked, a confirm message will jump out to ensure the clear action. Click “Yes” and mapping will be cleared.

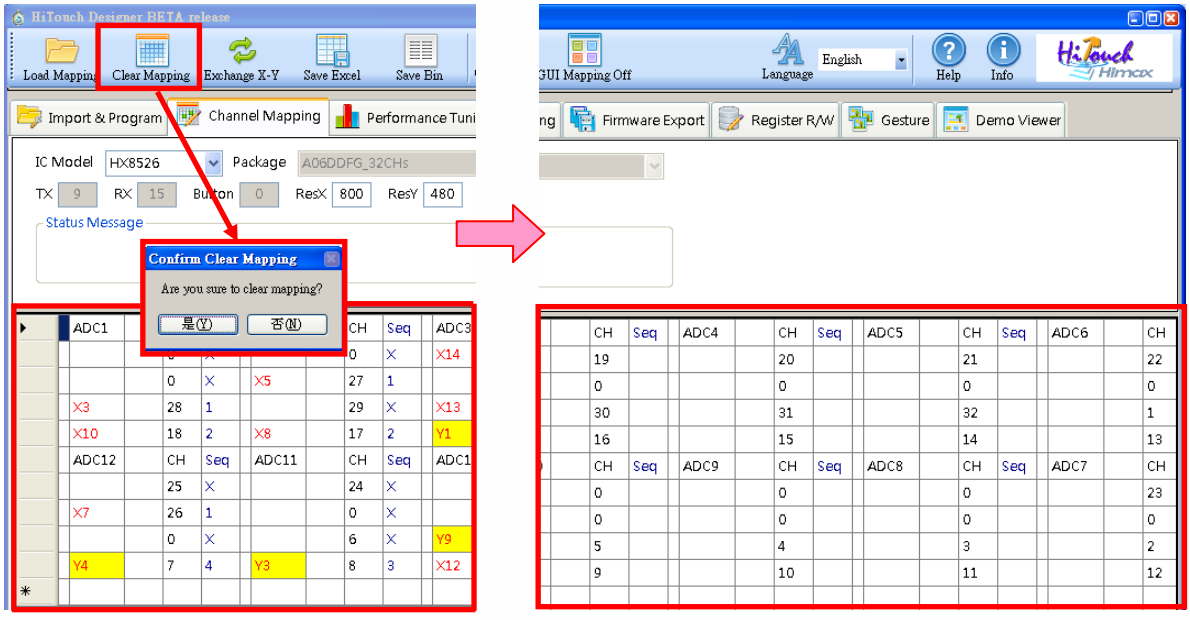


Figure 2-4 : Clear the values of the mapping table and GUI

3. **Exchange X-Y**: Click the ”Exchange X-Y” button to exchange TX and RX, and the cycle number of them.
   1) TX/RX exchanged.
   2) X/Y exchanged.
   3) Cycle of X/Y exchanged.
   4) X/Y in GUI exchanged.
   5) After exchanged, the “XY-Exchange has succeeded” message will be shown at the status message box.

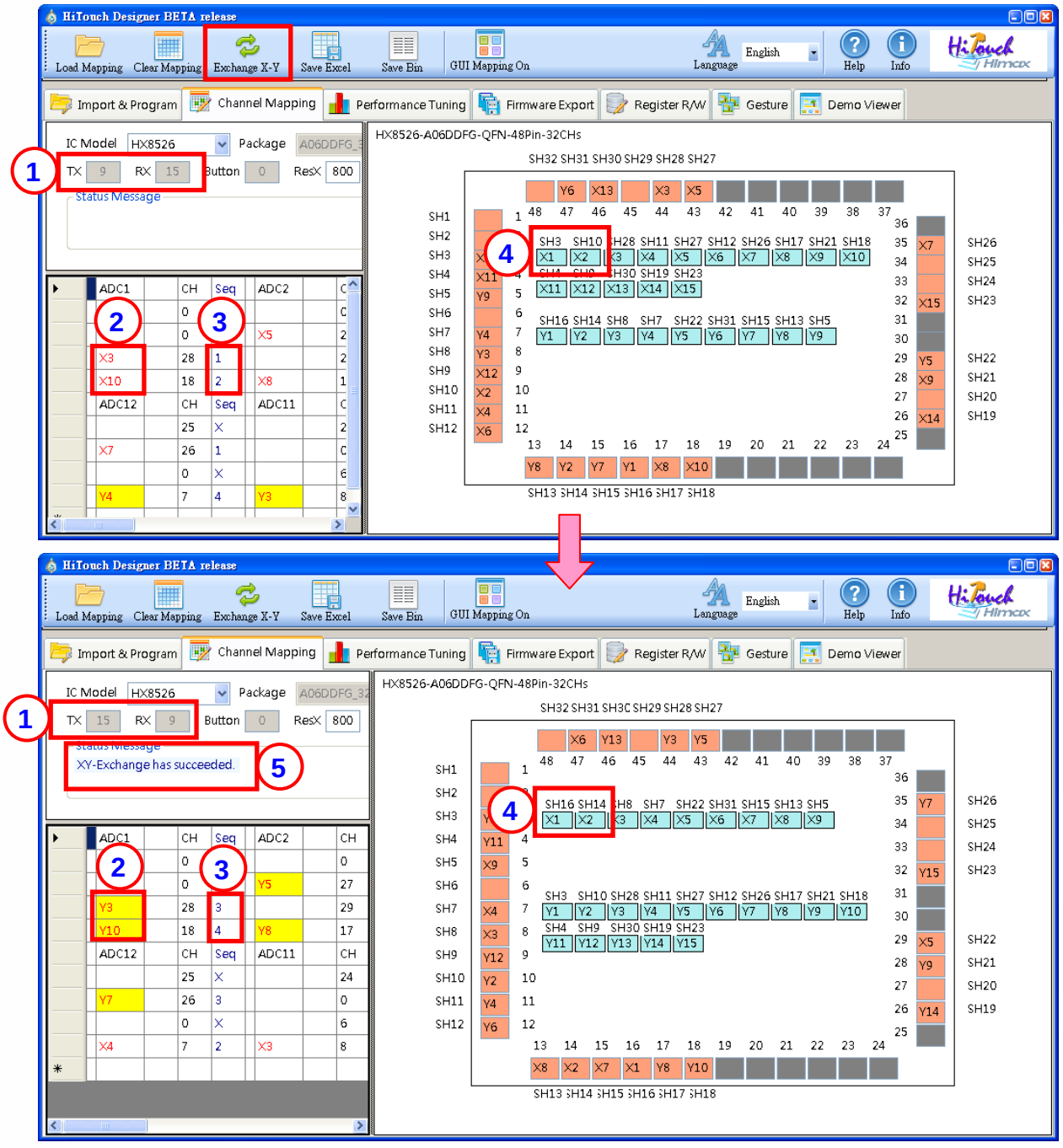


Figure 2-5 : Exchange X-Y

4. **Save Excel**: To save mapping table as excel file. After editing mapping table, click the ”Save Excel” button to save the mapping table as excel file. The default folder is at “…\Save_Mapping.”

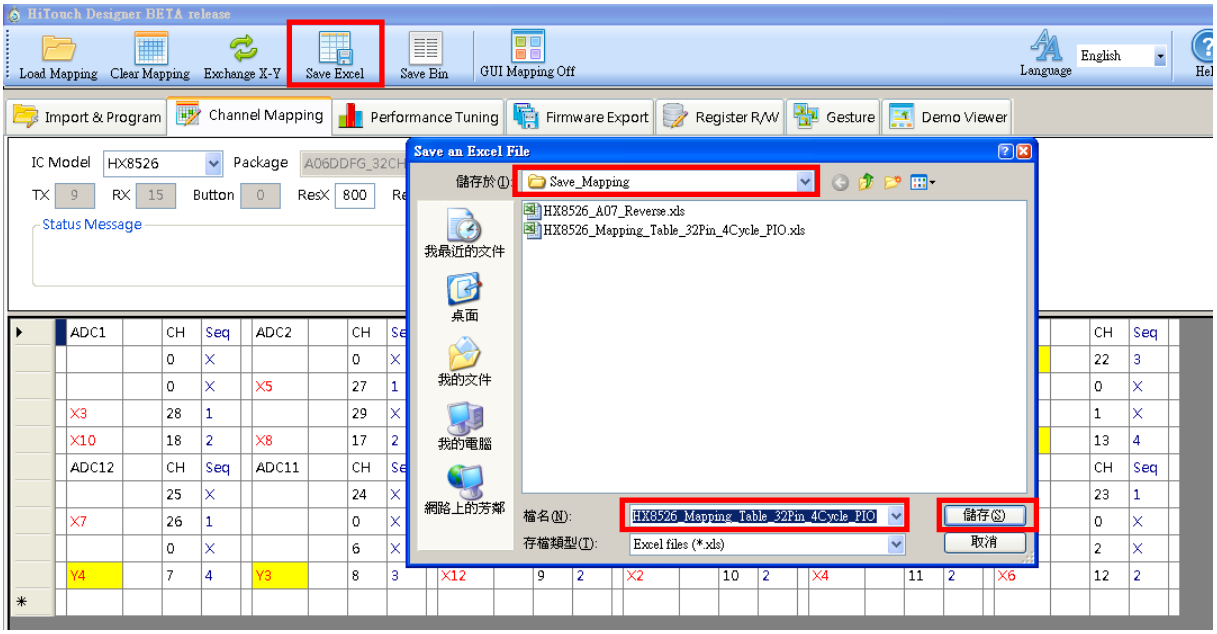


Figure 2-6 : Save as excel file

5. **Save Bin**: Click the “Save Bin” button to save the related parameters of mapping table in a bin file. And the page will change to the “Code Merge” page to export a bin file. Please refer to Chapter 5.

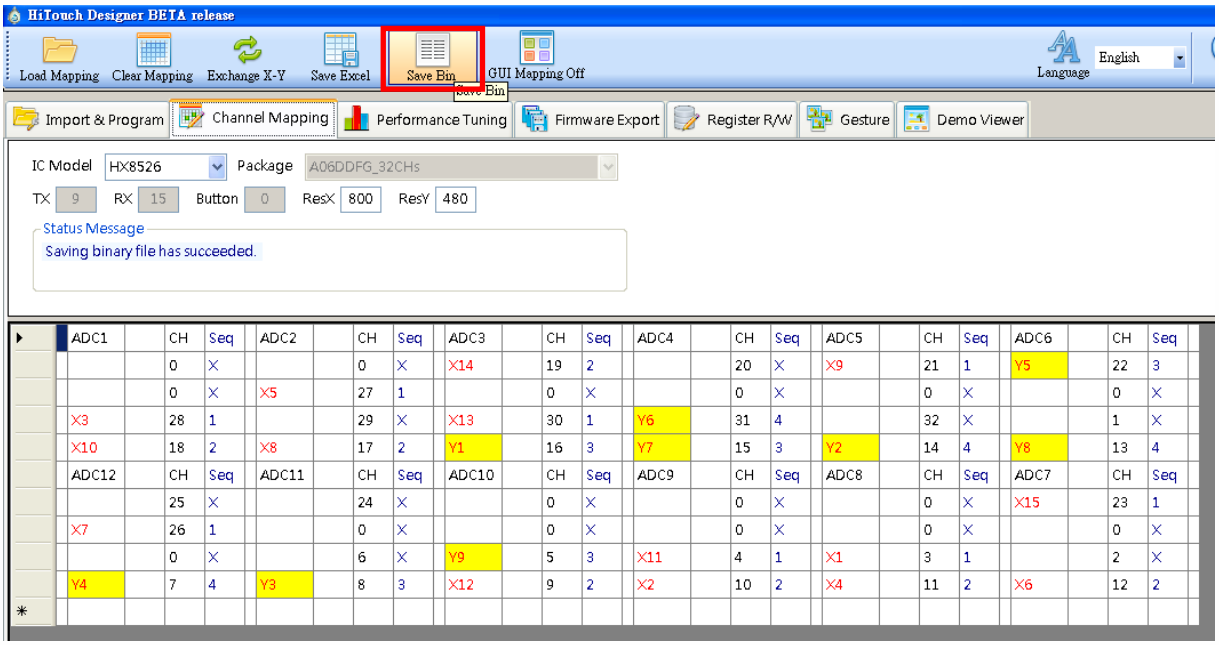


Figure 2-7 : Save the bin file

6. **GUI Mapping On/Off**: Turn on/off graphical user interface (GUI) window. The description of button means the action that is executed while clicking it.

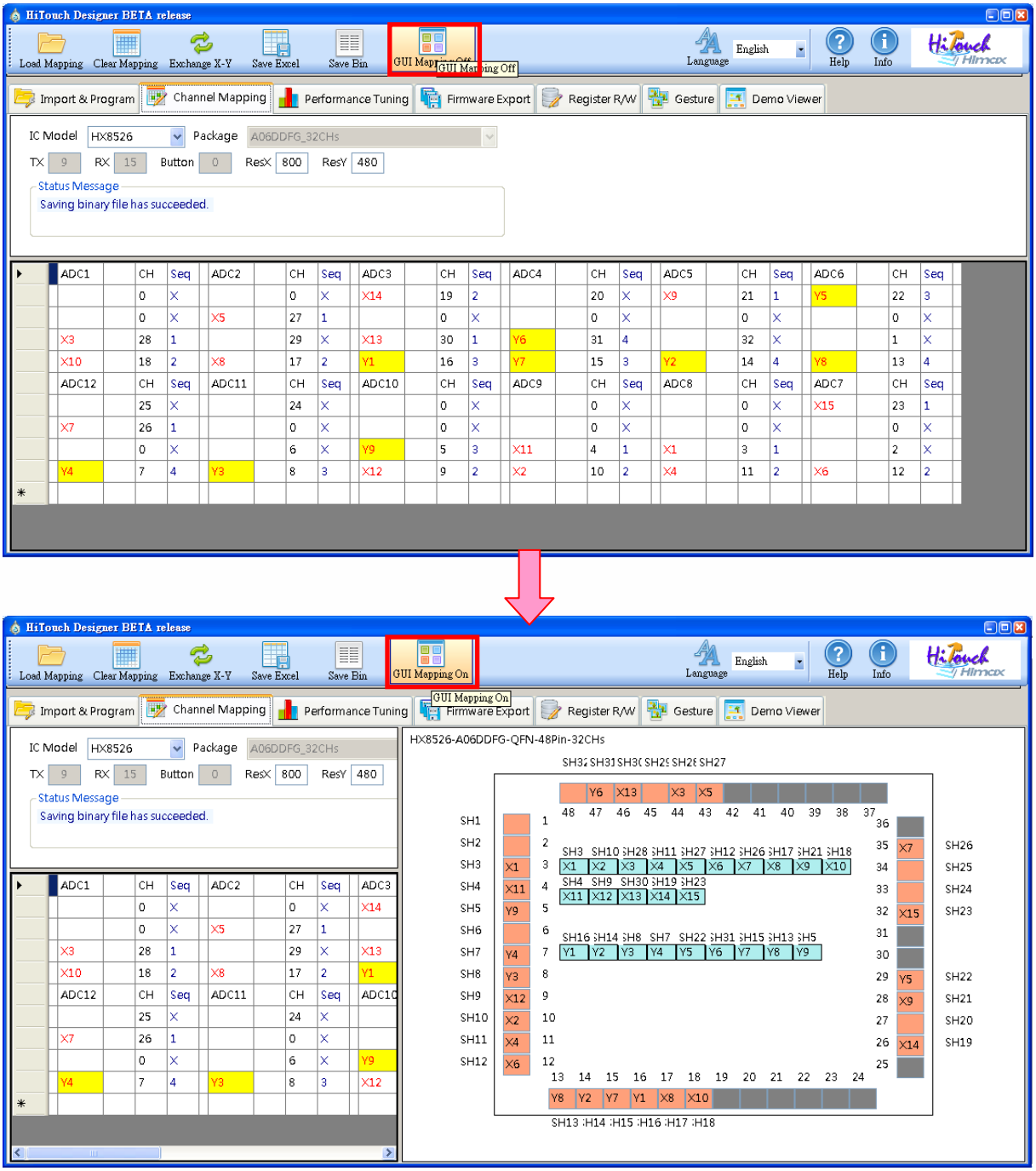


Figure 2-8 : GUI mapping on/off

2.3 Operating Flow

There are two ways to generate mapping table. One is to enter the channel mapping manually, and the other is to use the graphical user interface (GUI).

2.3.1 Manual Way to Create Mapping Table

Step 1. Select an IC model.

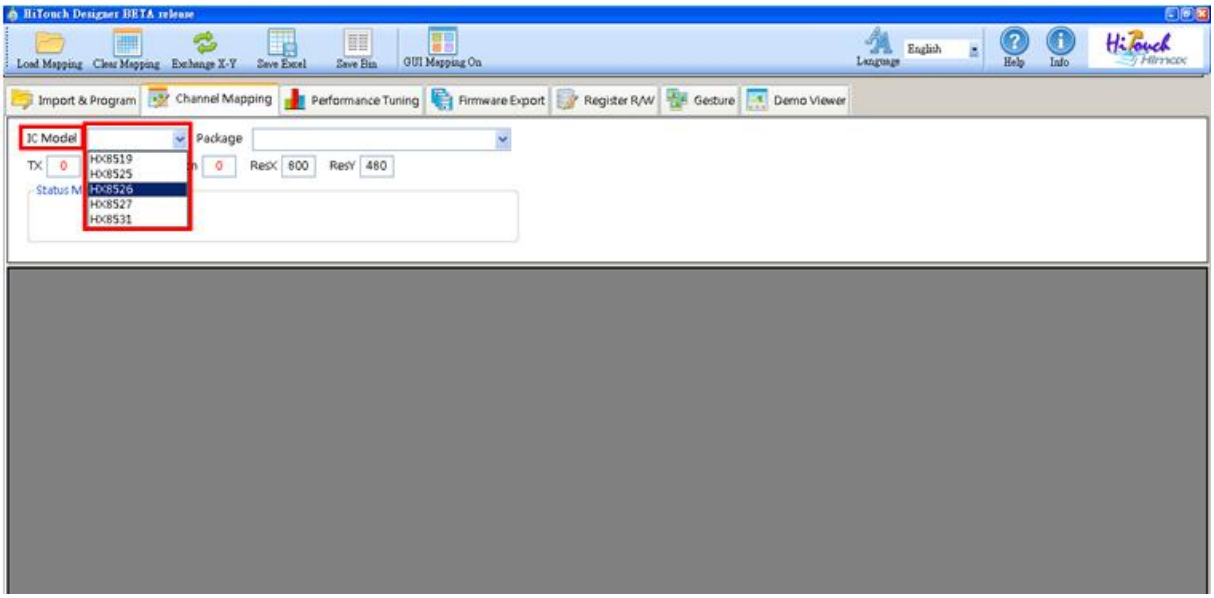


Figure 2-9 : Select an IC model

Step 2. Enter the number of TX, RX and Button and the resolution of touch panel.

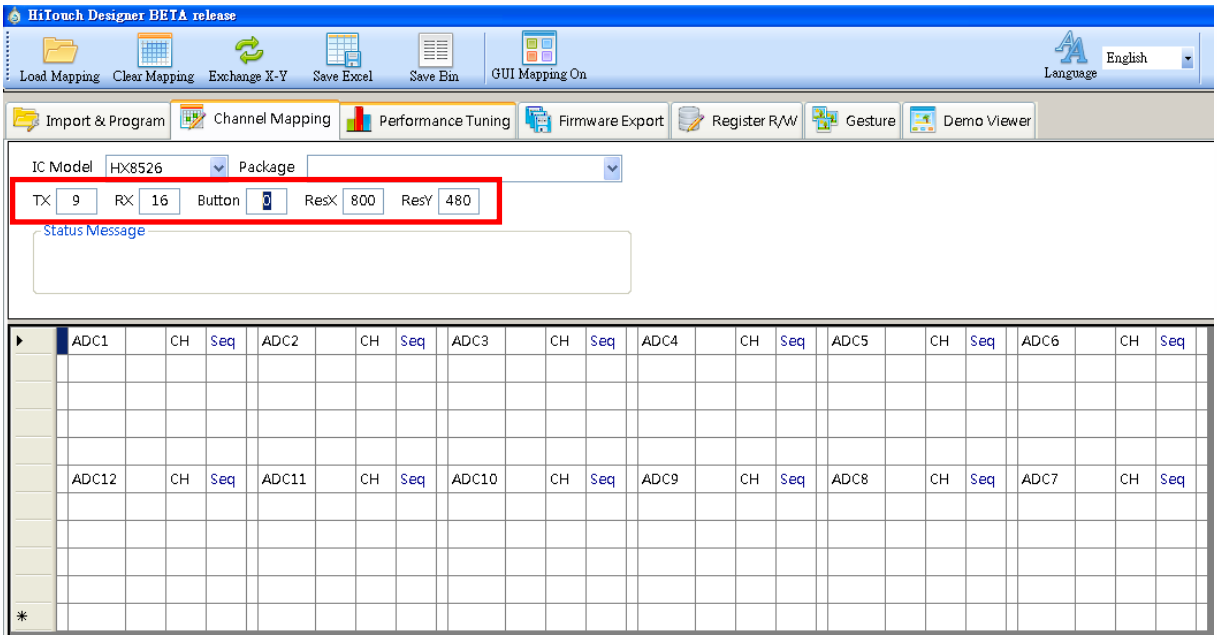


Figure 2-10 : TX, RX information

Step 3. Select the corresponding package.

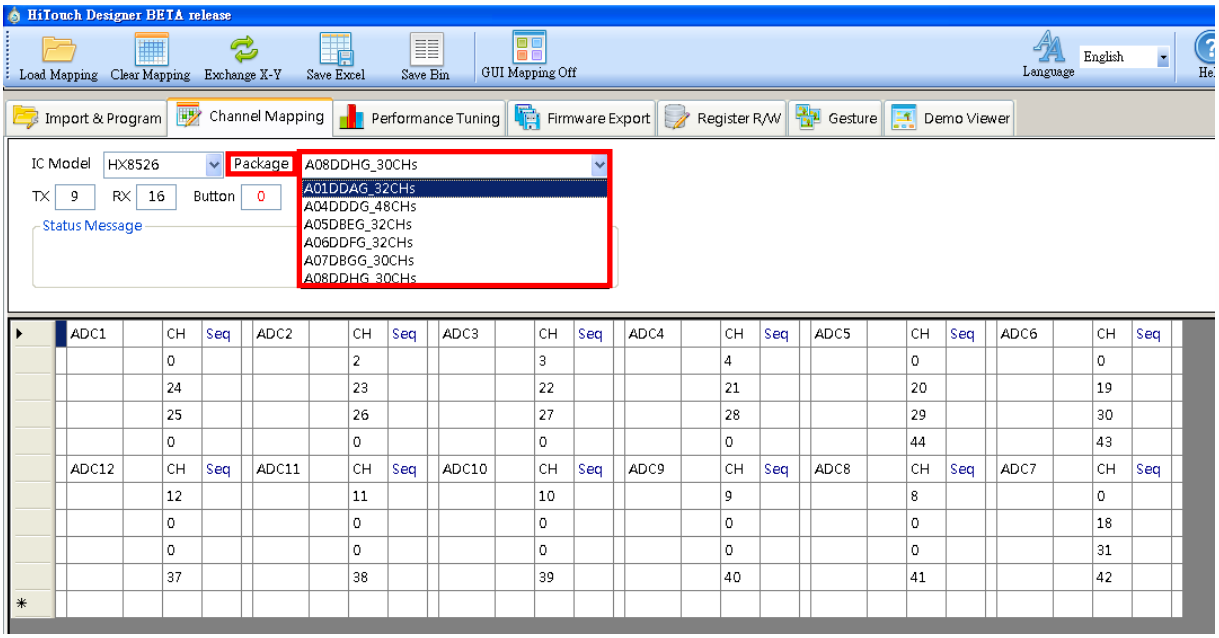


Figure 2-11 : Select package

Step 4. Enter TX, RX and Button in table according to the circuit diagram to the corresponding place.

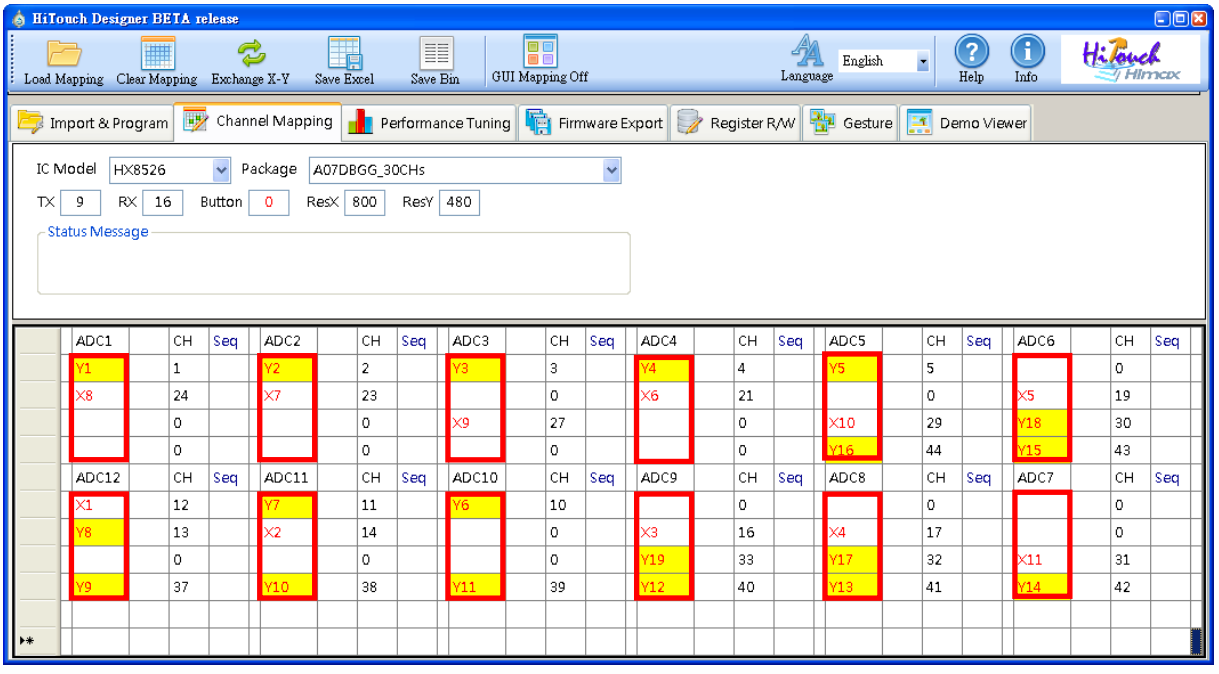
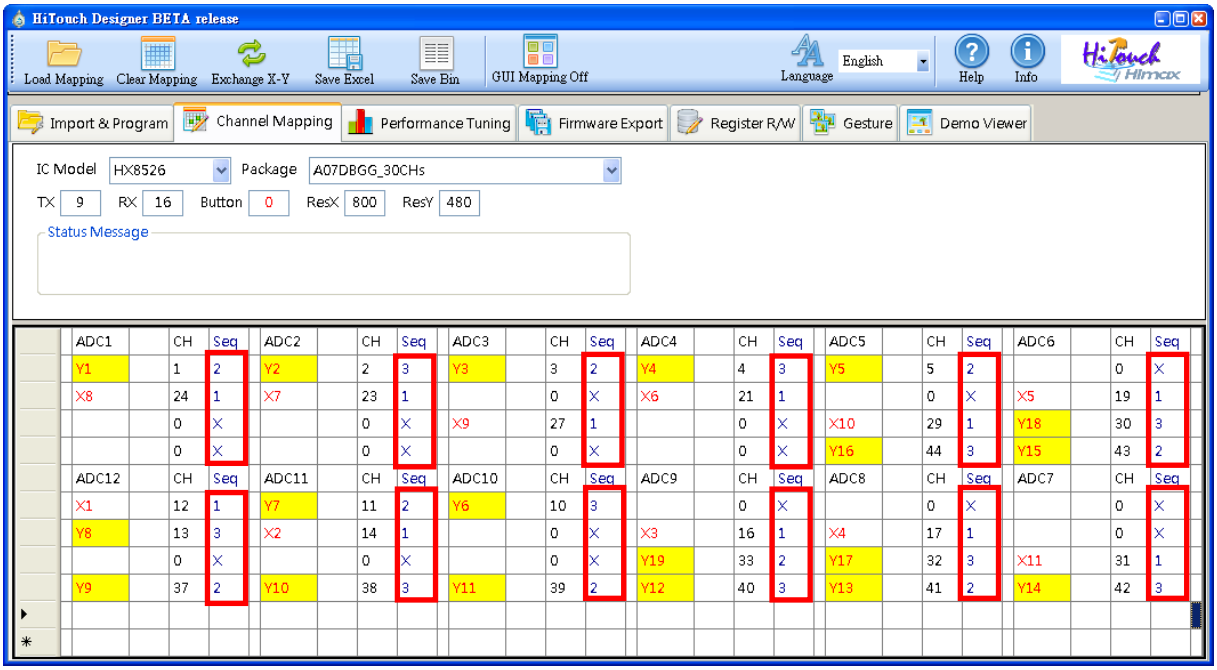


Figure 2-12 : Key-in mapping manually

Step 5. Enter the cycle number with the rules as below.

1) An ADC only scans one channel at one time and consequently the cycle numbers in an ADC cannot be the same.

2) In order to reduce coupling, to scan separately TX and RX, and to scan separately adjacent channels are recommended.



ADC1	CH	Seq	ADC2	CH	Seq	ADC3	CH	Seq	ADC4	CH	Seq	ADC5	CH	Seq	ADC6	CH	Seq
Y1	1	2	Y2	2	3	Y3	3	2	Y4	4	3	Y5	5	2		0	X
X8	24	1	X7	23	1		0	X	X6	21	1		0	X	X5	19	1
	0	X		0	X	X9	27	1		0	X	X10	29	1	Y18	30	3
	0	X		0	X		0	X		0	X	Y16	44	3	Y15	43	2
ADC12	CH	Seq	ADC11	CH	Seq	ADC10	CH	Seq	ADC9	CH	Seq	ADC8	CH	Seq	ADC7	CH	Seq
X1	12	1	Y7	11	2	Y6	10	3		0	X		0	X		0	X
Y8	13	3	X2	14	1		0	X	X3	16	1	X4	17	1		0	X
	0	X		0	X		0	X	Y19	33	2	Y17	32	3	X11	31	1
Y9	37	2	Y10	38	3	Y11	39	2	Y12	40	3	Y13	41	2	Y14	42	3

Figure 2-13 : Key-in cycle number for each channel

2.3.2 Graphical User Interface (GUI) to Create Mapping Table

All steps are as mentioned above except for step 4.

Do step 1~3 of section **3.2.1**.

Step 4. Click the ”GUI Mapping On” button. Please refer to section **3.2**.

Step 5. Use the left mouse button to complete the mapping according to the circuit diagram and the following operations.

1) **Select Xn/Yn label**: Single click left mouse button on Xn/Yn and then its background color changes from green to blue. It means Xn/Yn is selected currently.

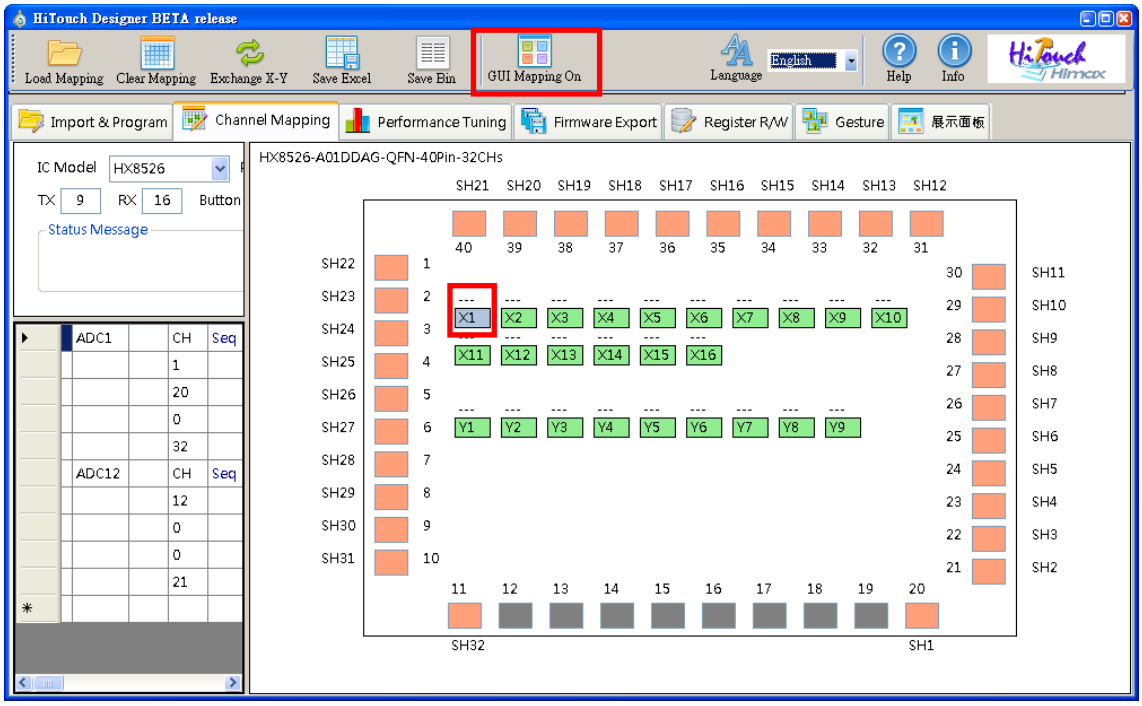


Figure 2-14 : Click mouse left key to select channel Xn/Yn

2) **Select SHx**: Move mouse cursor to the corresponding channel (SH21). Single click left mouse button and then the name of previous selected Xn/Yn is displayed in the grid. Its background color changes from blue to light blue and the name of the corresponding channel is displayed upon it. It means the mapping of Xn/Yn and channel is done. At the same time, the mapped result is filled in the left mapping table.

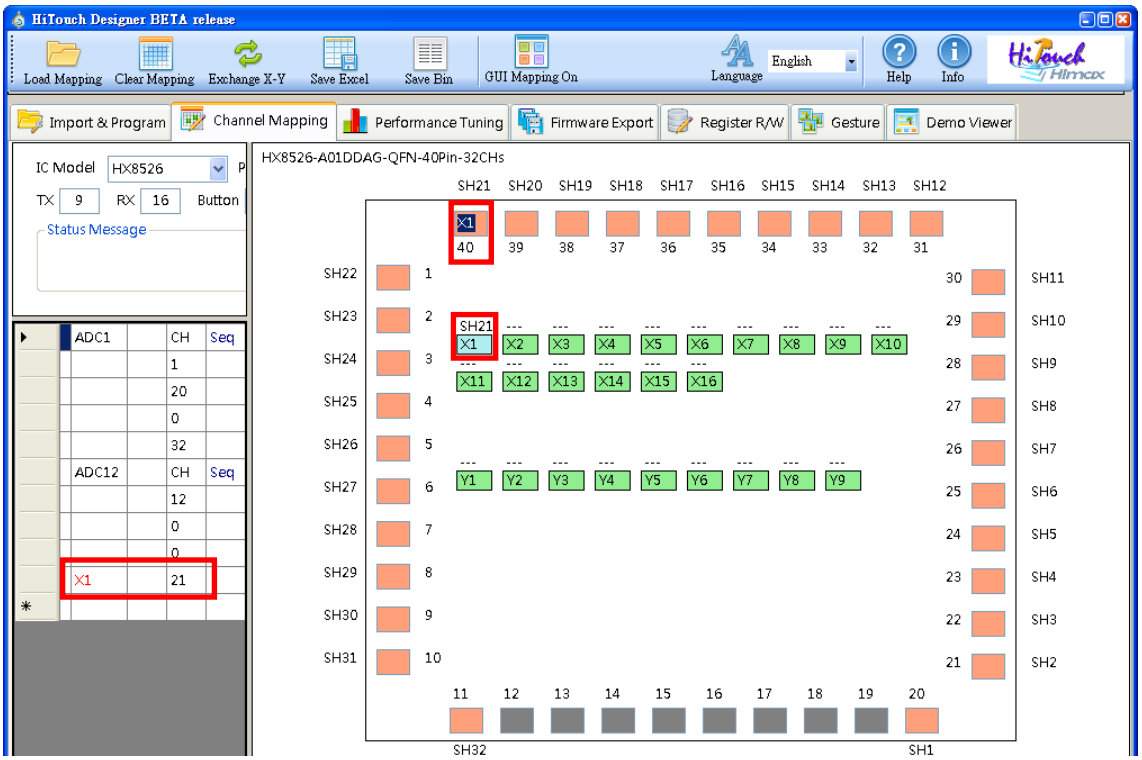


Figure 2-15 : Put channel name label into the channel box

3) **Clear Xn/Yn and SHx**: Move mouse cursor to the mapped grid (SH21 or Xn/Yn with light blue). Double click left mouse button to clear mapping if the mapping needs to be modified.

3 Instant Performance Fine-tuning

3.1 Description

Instant Performance fine-tuning provides some parameters to tune the performance of touch panel.

3.2 Operating Flow

Parameter setting depends on the information of the bin file to enter one of them.

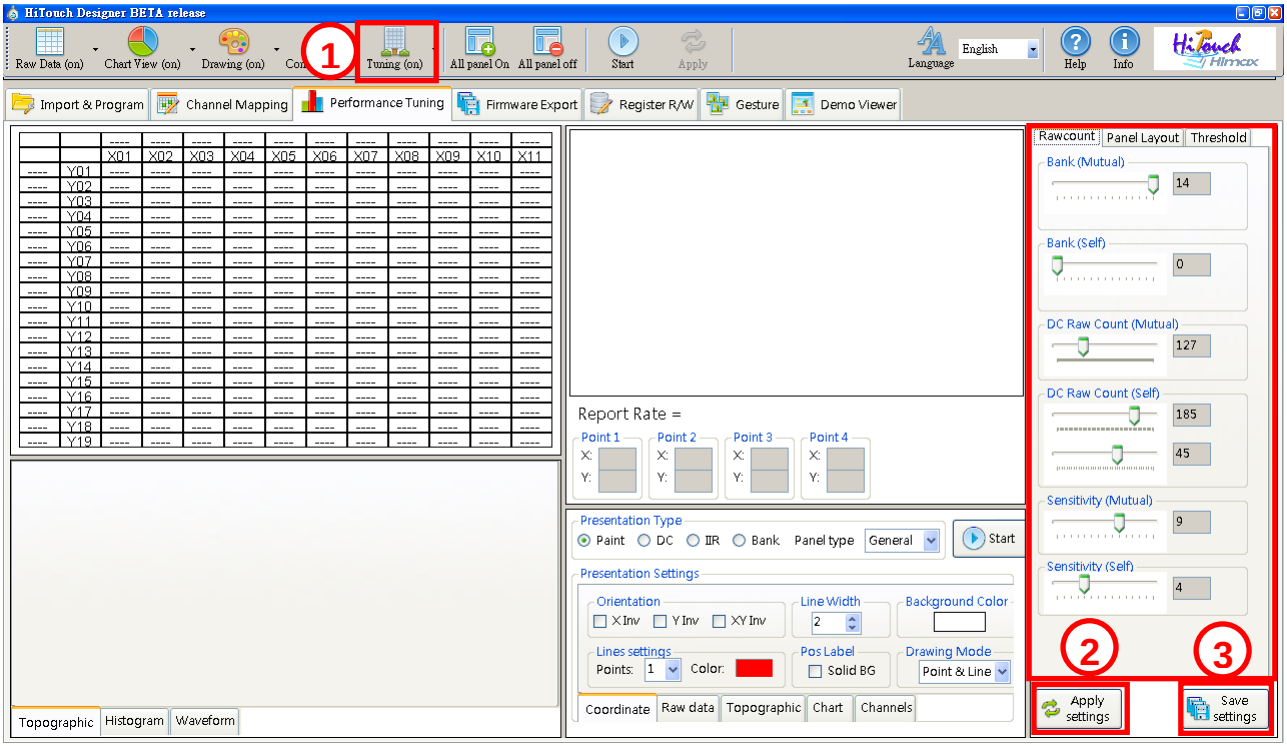


Figure 3-1 : Tuning settings

Step 1. Press the “Tuning” button on the Data View page to enter the parameter settings. The parameter setting page will appears on the right side of the data view page.

Step 2. After adjusting the parameter, to press the Apply button will show the performance immediately.

Step 3. After pressing the Save Settings button, it will go to the Code merge page automatically as Figure 3-3. About the operation of this page, please consult the chapter of Configuration File Saving (Chapter 5).

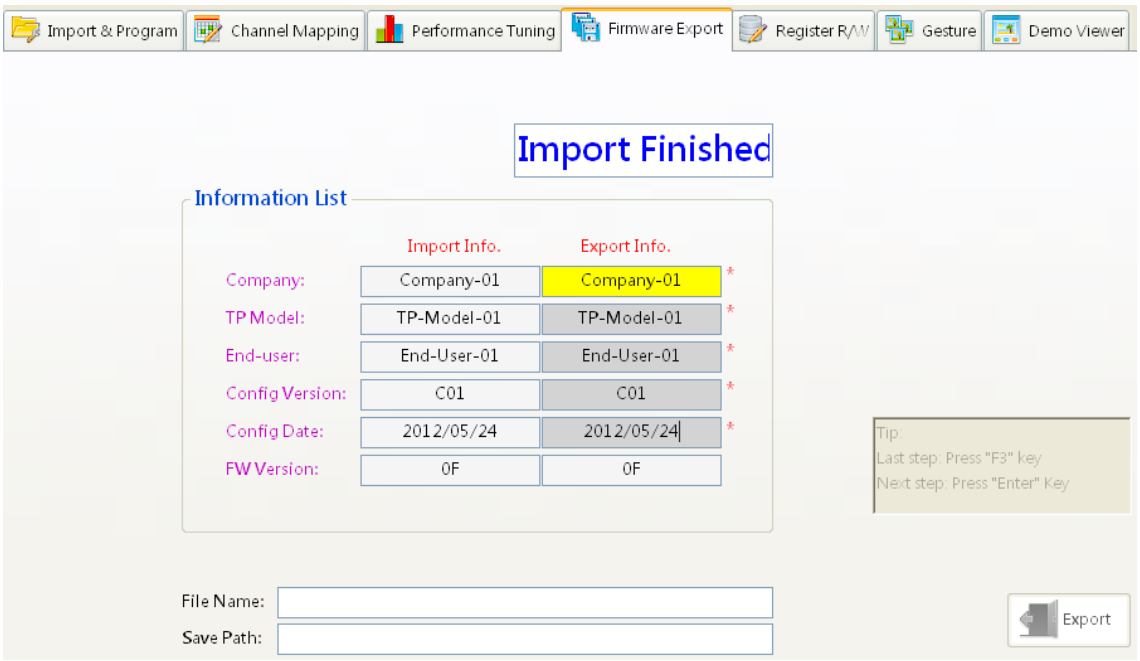


Figure 3-2 : Firmware export page

3.3 Function Usage

When enter to the parameter settings page (item 3 of Figure 4-2), there are 3 sub-pages named Raw count, Panel Layout and Threshold respectively, and the descriptions are as followings:

Row count:

1. **Bank (Mutual):** Base value of the capacitor of mutual mode.
   First, to select the “Bank” item and observe the value of touch panel’s mutual block. The suggested bank value is around 15~50. The value can be changed by tuning the scrollbar.
2. **Bank (Self):** Base value of the capacitor of self mode.
   First, to select the “Bank” item and observe the value of touch panel’s self channel. The suggested bank value is around 15~50. The value can be changed by tuning the scrollbar.
3. **DC Raw Count (Mutual):** Original value of the capacitor of mutual mode.
   First, to select the “DC” item and observe the value of touch panel’s mutual block. The suggested DC value is around 125~180. The value can be changed by tuning the scrollbar.
4. **DC Raw Count (Self):** Original value of the capacitor of self mode.
   First, to select the “DC” item and observe the value of touch panel’s self channel. The suggested DC value is around 35~180. The value can be changed by tuning the scrollbar.
5. **Sensitivity (Mutual):** Sensitivity of the mutual mode
   First, to select the “IIR” item and observe the value of touch panel’s mutual block. Try to touch the sensor and observe the value. The value can be changed by tuning the scrollbar.
6. **Sensitivity (Self):** Sensitivity of the self mode
   First, to select the “IIR” item and observe the value of touch panel’s self channel. Try to touch the sensor and observe the value. The value can be changed by tuning the scrollbar.

Panel Layout:

1. **Resolution:** Panel resolution setting
   According to these setting, the coordinate is limited by the value. In general case, the value is depends on LCM resolution.

2. **Orientation:** Panel’s direction or axis change.

   1) X reverse: To change X axis direction.
   2) Y reverse: To change Y axis direction.
   3) XY reverse: To exchange X Y axis.

Threshold:

1. **Threshold (Mutual):**

2. **Threshold (Self TX):** Mutual threshold value at normal mode.
   According to the stable noise to set a proper value of mutual mode.

3. **Threshold (Self RX):** Self threshold value for TX channel.
   According to the stable noise to set a proper value of Self mode TX channel.

4. **Threshold (Button):** Self threshold value for RX channel.
   According to the stable noise to set a proper value of Self mode RX channel.

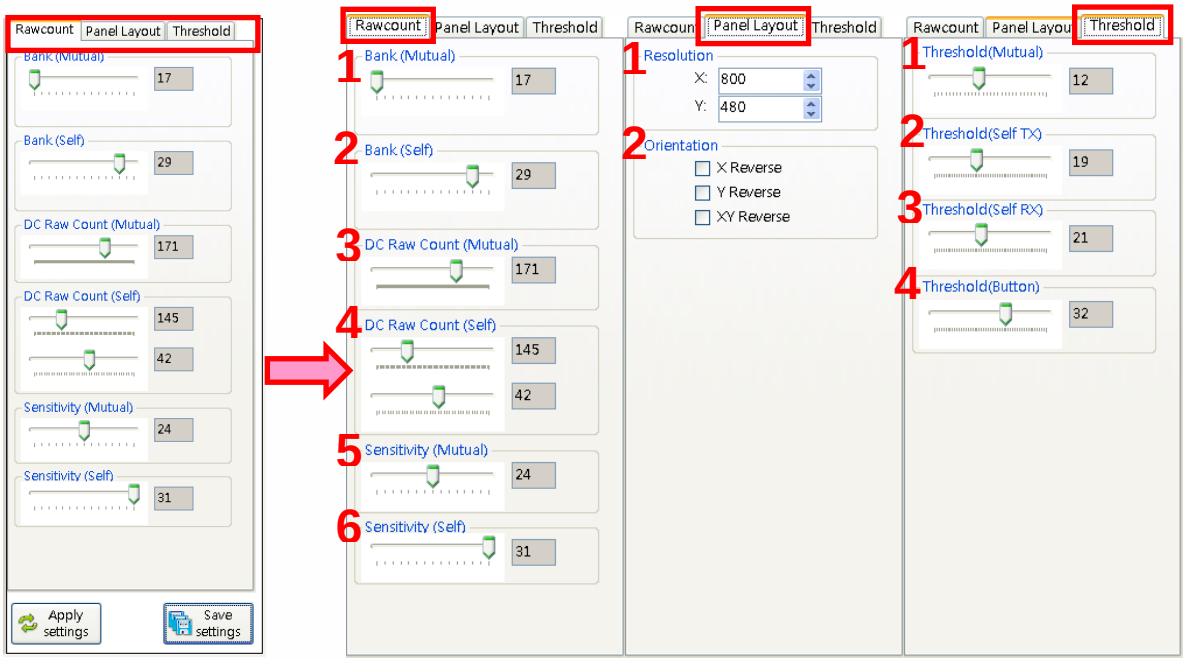


Figure 3-3 : Parameter settings

4 Data Viewer

4.1 Description

When the page tab selected as “Data View” page, HiTouch Designer will show four areas, **Raw Data Viewer** (raw data grid), **Graphical Data** (Topographic, Waveform…etc.), **Drawing Line** (painting) and **Instantly Performance Fine-tuning** (parameter settings). Except the fine-tune function, the others are all used to observe the original capacitance (raw data) that be sensed by touch screen controller for performance adjusting. The fine-tune function is described in Chapter 3 Instantly Performance Fine-tuning.

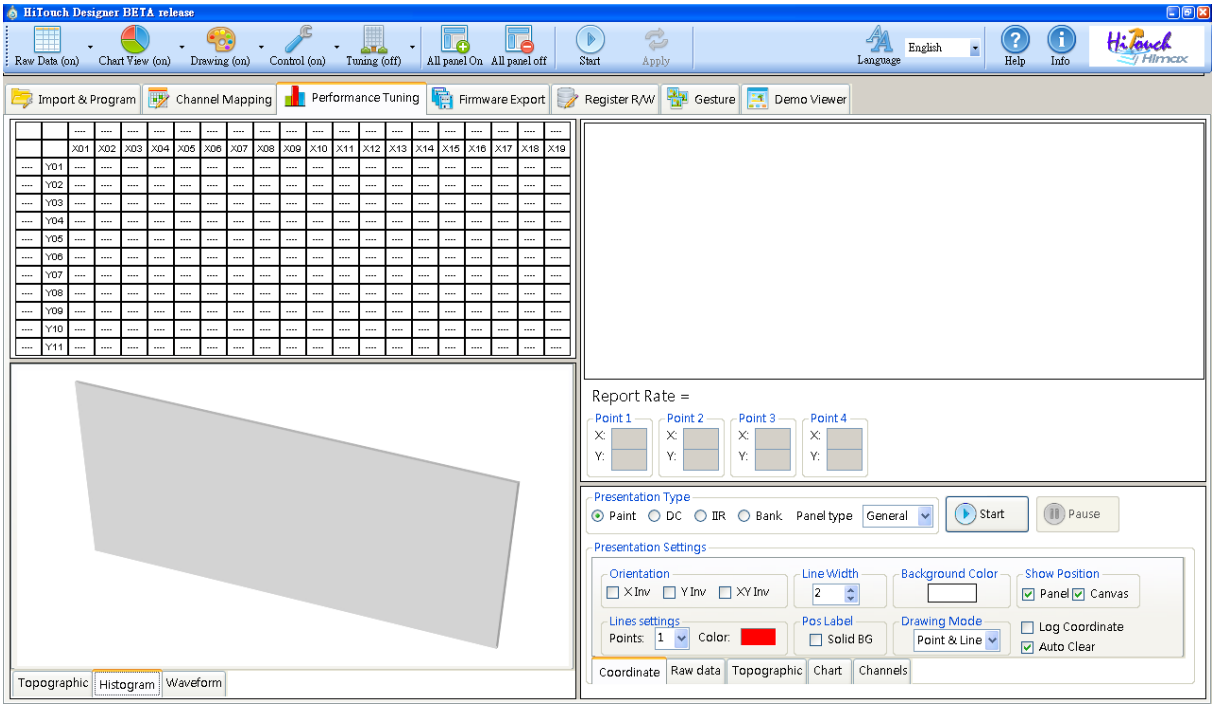


Figure 4-1 : Performance tuning page

4.2 Function Usage

4.2.1 Raw Data Viewer

The Raw Data Viewer data grid area is located at left-top quarter. There are some text and grids show the current raw data of mutual and self capacitance instantly. The row header and the column header are mean self capacitance (top and left side, red area), the others are show mutual capacitance (middle, blue area) as below.

		----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
		X01	X02	X03	X04	X05	X06	X07	X08	X09	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
----	Y01	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y02	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y03	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y04	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y05	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y06	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y07	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y08	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y09	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y10	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
----	Y11	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Figure 4-2 : The raw data display area and self/mutual area

Raw Data Viewer is used for displaying DC, IIR, Bank data types that can be selected on the “Presentation Type” block as below. Choose one data type (DC, IIR or Bank) and press “Start” button, the raw data from touch panel will show in the data grid of Figure 5-2.

There are 4 operations for the “Raw data” sub-page for panel presentation settings.

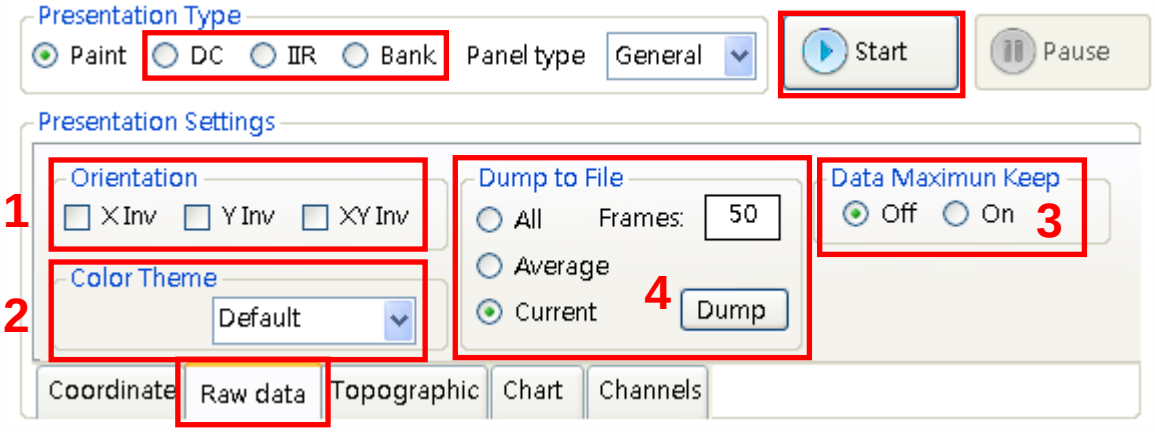


Figure 4-3 : Raw data of presentation setting

1. **Orientations**: In the “Raw data” page of “Presentation Settings” block, the data present orientation of Raw Data Viewer can be inverted by check the X Inv, Y Inx or XY Inv check boxes.

   1) **X Inv**: X invert, the sequence of X orientation will be inverted.

      Ex: X01↔X20, X02↔X19…etc.

      Original

		0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0
		XD1	XD2	XD3	XD4	XD5	XD6	XD7	XD8	XD9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
0	YD1	1	0	1	0	0	0	1	1	1	0	1	1	0	1	1	1	1	2	1	1
2	YD2	0	0	2	0	1	0	2	0	2	0	1	0	2	0	1	0	2	1	2	0

      Inverted

		0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		X20	X19	X18	X17	X16	X15	X14	X13	X12	X11	X10	X09	X08	X07	X06	X05	X04	X03	X02	X01
1	YD1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	YD2	3	0	2	1	2	0	3	0	2	0	2	0	1	0	2	0	1	0	2	0

      Figure 4-4 : X invert

   2) **Y Inv**: Y invert, the sequence of Y orientation will be inverted.

      Ex: Y01↔Y12, Y02↔Y11…etc.

      Original

		0	0
		XD1	XD2
0	YD1	0	2
0	YD2	1	0
1	YD3	0	0
0	YD4	0	0
0	YD5	0	0
0	YD6	1	0
0	YD7	1	0
1	YD8	0	0
0	YD9	0	1
0	Y10	0	0
0	Y11	0	0
0	Y12	0	0

      Inverted

		0	0
		XD1	XD2
0	YD1	0	2
0	YD2	1	0
1	YD3	0	0
0	YD4	0	0
0	YD5	0	0
0	YD6	1	0
0	YD7	1	0
1	YD8	0	0
0	YD9	0	1
0	Y10	0	0
0	Y11	0	0
0	Y12	0	0

      Figure 4-5 : Y invert

   3) **XY Inv**: XY invert, the X/Y orientation will be inverted to Y/X.

      Ex: X01↔Y01, X02↔Y02…etc.

      Original

		0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		X01	X02	X03	X04	X05	X06	X07	X08	X09	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
0	YD1	1	1	2	0	1	0	1	0	1	0	1	2	1	1	0	2	1	2	3	1
0	YD2	0	0	1	0	0	1	1	0	1	0	0	0	0	1	1	0	2	0	2	1
0	YD3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	YD4	1	0	1	1	0	0	1	1	1	1	0	1	1	0	0	0	1	1	1	1
0	YD5	1	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0
0	YD6	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	1
0	YD7	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0
0	YD8	1	0	0	1	1	0	0	1	0	0	0	1	0	1	0	1	0	1	1	0
1	YD9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
0	Y10	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0
0	Y11	1	0	2	0	1	0	1	0	0	1	1	0	1	0	1	0	2	1	2	1
0	Y12	2	0	1	0	1	0	1	0	1	0	1	0	0	0	1	0	1	0	2	0

Inverted

		1	0	1	0	1	0	0	0	0	0	0	1
		Y01	Y02	Y03	Y04	Y05	Y06	Y07	Y08	Y09	Y10	Y11	Y12
0	X01	0	0	0	0	0	1	1	0	0	1	0	0
0	X02	0	1	0	0	0	1	0	1	0	1	1	1
0	X03	0	0	0	0	0	0	0	1	0	1	0	0
0	X04	0	0	0	0	0	0	0	1	0	1	1	0
0	X05	0	0	0	0	0	0	1	0	0	1	0	0
0	X06	0	1	0	0	0	0	0	0	0	1	1	0
0	X07	0	0	0	0	0	0	0	0	0	1	0	0
0	X08	0	0	0	0	0	1	0	0	0	0	0	0
1	X09	0	0	1	0	0	1	0	0	0	1	0	0
0	X10	1	1	0	0	0	1	0	1	0	2	1	1
0	X11	0	0	0	0	0	0	0	0	1	2	0	0
0	X12	1	0	1	0	0	0	0	0	0	1	0	0
0	X13	0	0	0	0	0	0	0	0	0	1	0	0
0	X14	1	1	0	0	0	1	0	1	0	0	1	0
0	X15	0	0	0	0	0	0	0	0	0	0	0	0
0	X16	1	1	0	0	0	0	0	1	0	1	0	0
0	X17	0	0	0	0	0	0	0	0	0	2	0	0
0	X18	1	0	1	0	1	1	0	0	0	1	0	1
0	X19	0	0	0	0	0	1	0	0	0	2	0	0
0	X20	1	1	0	0	0	0	0	1	0	1	1	0

Figure 4-6 : XY Invert

2. **Color Theme**: This function is used to select the background color style of data grid.

Ex:

Hot

		0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	1	0	1
		X01	X02	X03	X04	X05	X06	X07	X08	X09	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
0	Y01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y02	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
1	Y10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y11	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0

Cool

		1	0	1	0	2	1	0	1	1	0	2	0	0	1	1	0	1	0	0
		X01	X02	X03	X04	X05	X06	X07	X08	X09	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19
1	Y01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Y03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	Y06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	Y11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 4-7 : Color theme of Data Viewer

3. **Data Maximum Keep**: In Figure 4-8, the “Data Maximum Keep” means the type of observing raw data that shows in the data grid, it has 2 modes to be selected:
   1) **Off**: To display the real-time data of DC, IIR and Bank.
   2) **On**: To display the max value of data from DC or IIR.

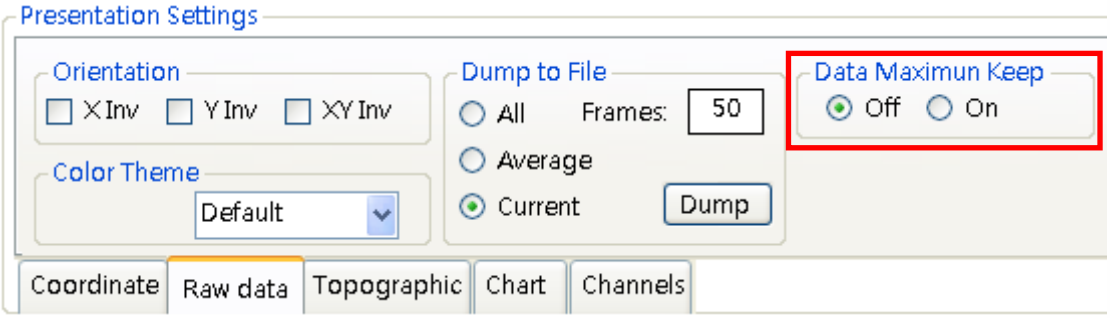


Figure 4-8 : Data Maximum Keep of data viewer

4. **Dump to File**: There are three types to dump raw data into file. Below are the descriptions.
   1) **All**: Dump indicated number of internal frames. In Figure 5-9. In the model, we can gather some frames before and dump to a file. The file will be saved at “…\bin\Debug\log".

   Step 1. Select the type of output data (IIR or DC) and click the button “Start”.

   Step 2. Select the checkbox “All” , and

   Step 3. Set how many frame to be queued into the textbox “Frames”, then

   Step 4. Click the ”Dump” button. It will ignore the selection of “Data Maximum Keep”. When dump is finished, a message “Dumped data already. Please check it out in folder “log”” will be shown.s

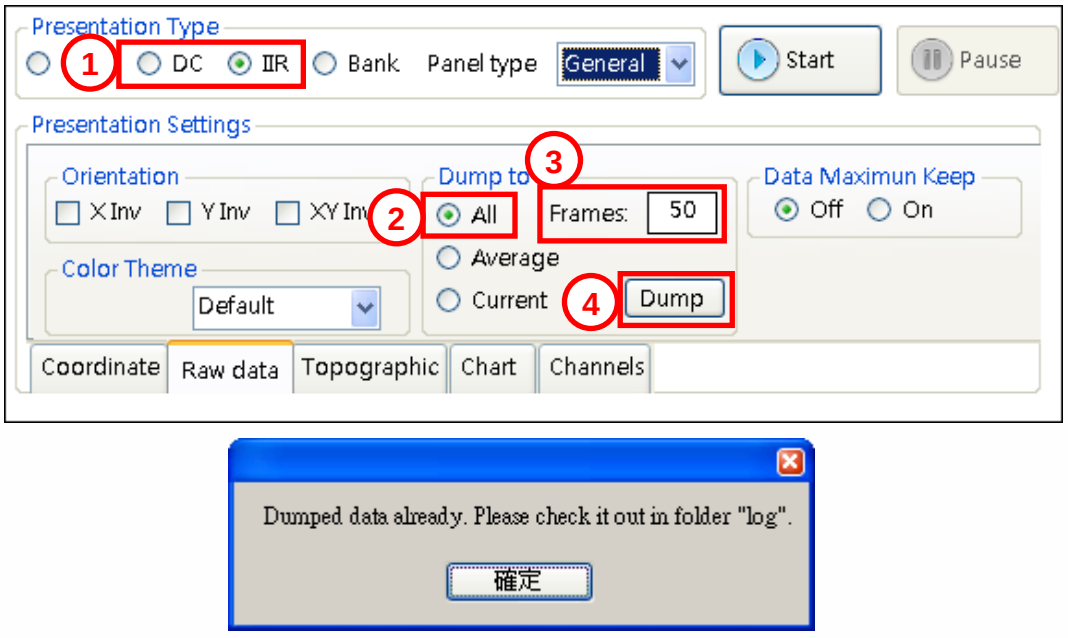


Figure 4-9 : Dump all frames

2) **Average**: Dump the average of the internal frames. As follow figure, in this model, the average that gathers some frames before can be dumped as a file and saved at "…\bin\Debug\log".

Step 1. Select the type of output data (IIR or DC) and click the button "Start".

Step 2. Set the frame number into the textbox of "Frames".

Step 3. Check the selection "Average", and

Step 4. Click the "Dump" button. It will ignore the selection of "Data Maximum Keep". The file is named as "yyyyMMdd_hhmmss_iir/dc_average_dump.csv". And when done, it will show the message.

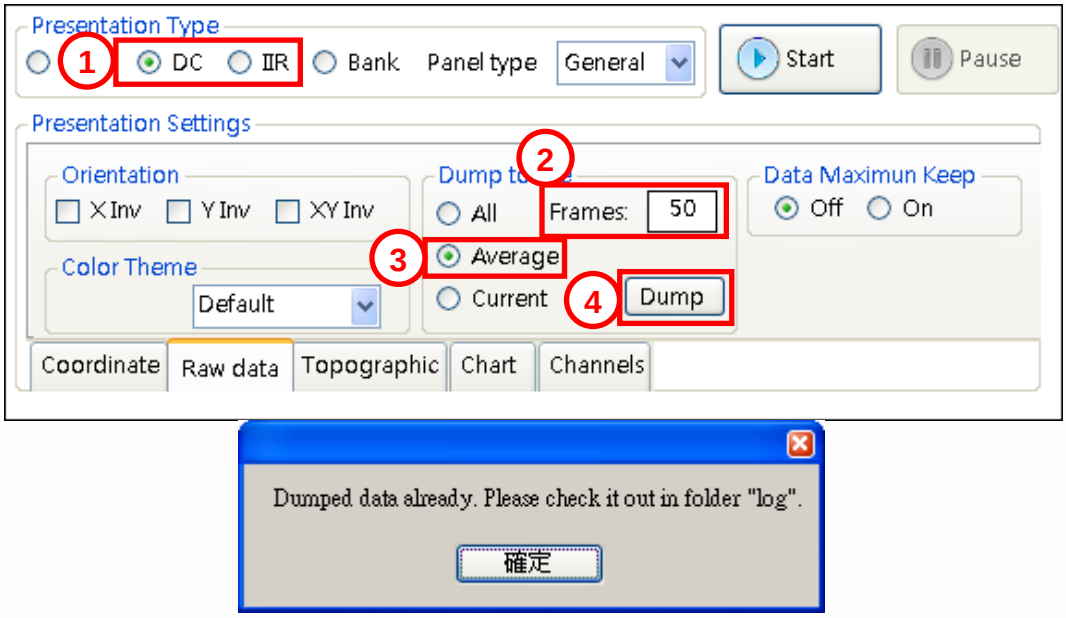


Figure 4-10 : Dump the average of all frames

3) **Current**: Dump the current frame.

In Figure 5-11, dump the current observing raw data that shows in the data grid into a file and the file will be saved at "…\bin\Debug\log".

Step 1. Select a type of output data (IIR, Bank or DC) and click the "Start" button.

Step 2. Check the selection "Current", and

Step 3. Click the "Dump" button. If the selection of "Data Maximum Keep" is "On", the file is named as "yyyyMMdd_hhmmss_iir/bank/dc_max_dump.txt". If the selection of "Data Maximum Keep" is "Off", the file name is "yyyyMMdd_hhmmss_iir/bank/dc_dump.txt".

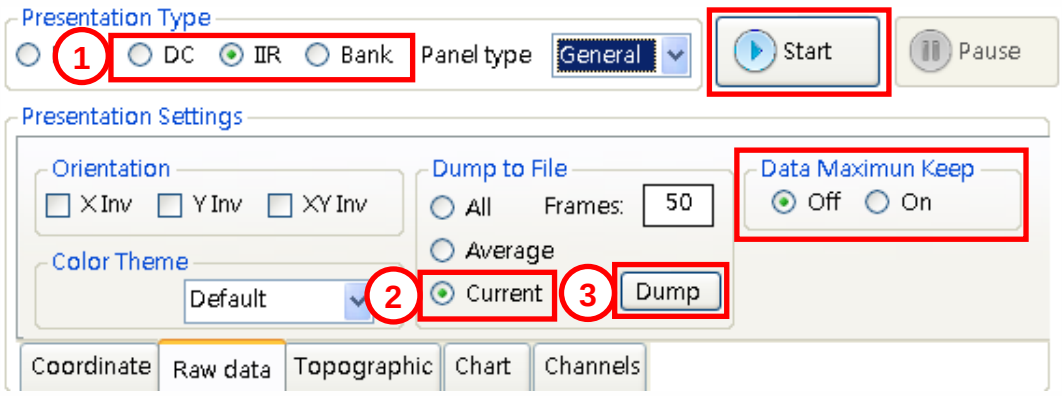


Figure 4-11 : Dump current frame

4.2.2 Graphical Data

At left-bottom side of form, there are 3 graphs combined with, Topographic, Histogram and Waveform. The 3 types of graphs are all for data observation:

1. **Topographic**: Topographic is for showing the raw data as 3D graph to easily understanding the distribution of data as Figure 5-12.The DC, IIR, Bank data types can be selected on the “Presentation Type” block as Figure 5-13.

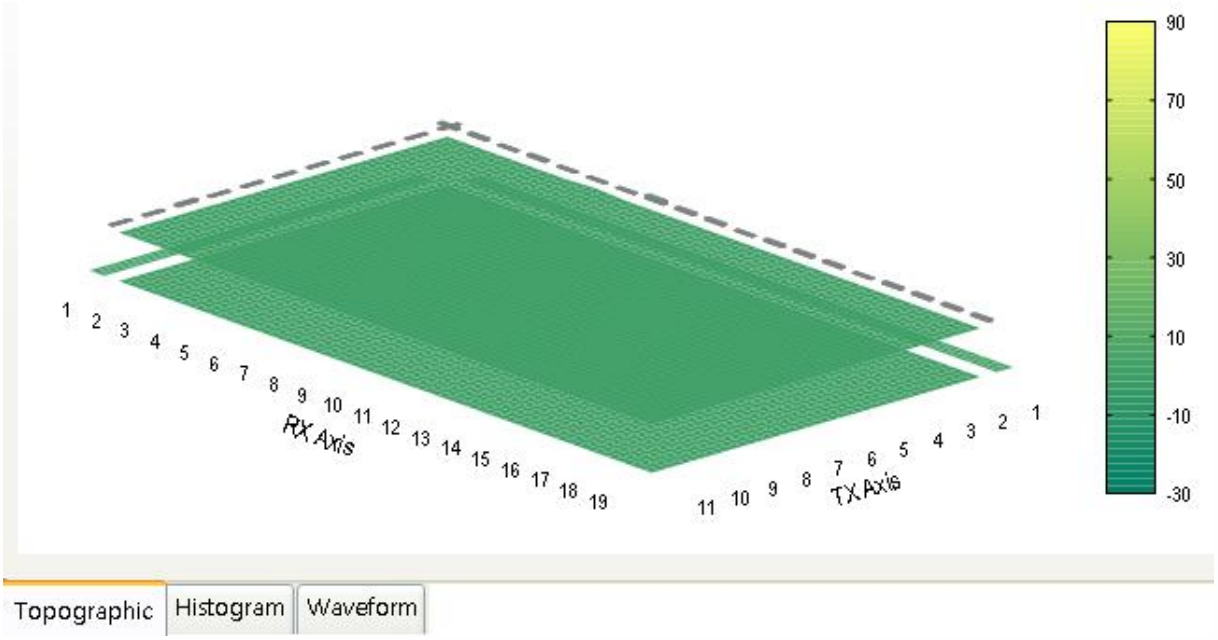


Figure 4-12 : Topographic

In “Topographic” of “Presentation Settings” block, there are 4 operations for adjust topographic.

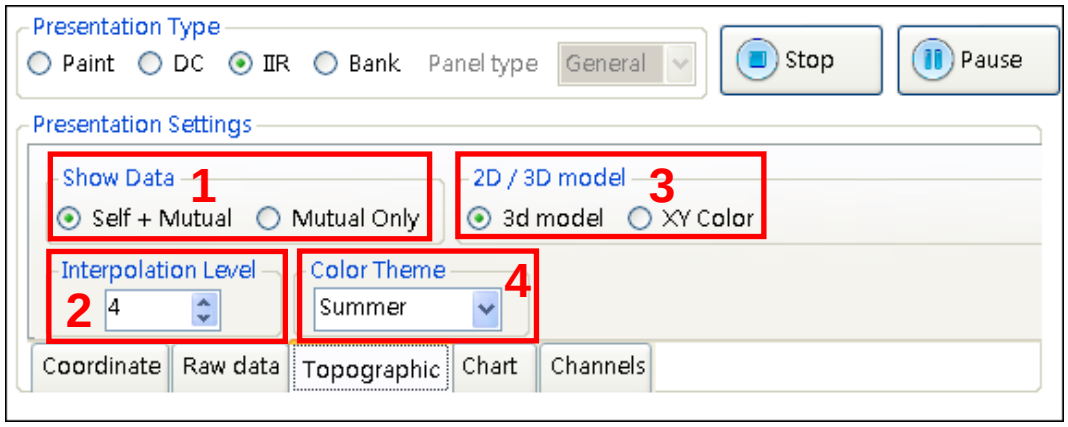


Figure 4-13 : Interpolation Level

1) **Show Data**:

① Self + Mutual: Show the self (the red line areas) and the mutual data at one time.

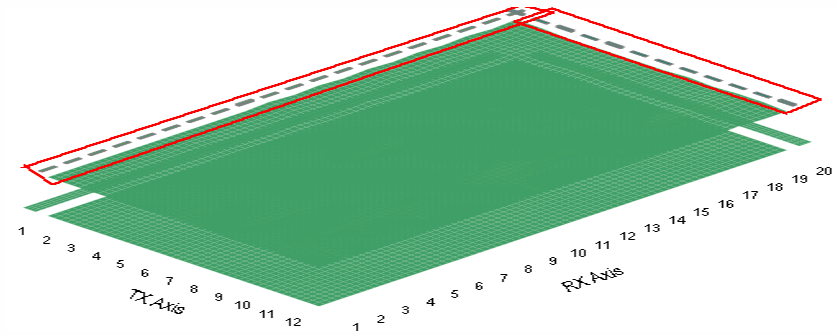


Figure 4-14 : Show self and mutual data at one time

② Mutual only: It is only to show the data of mutual at one time. As Figure 5-15, the area of self is no data.

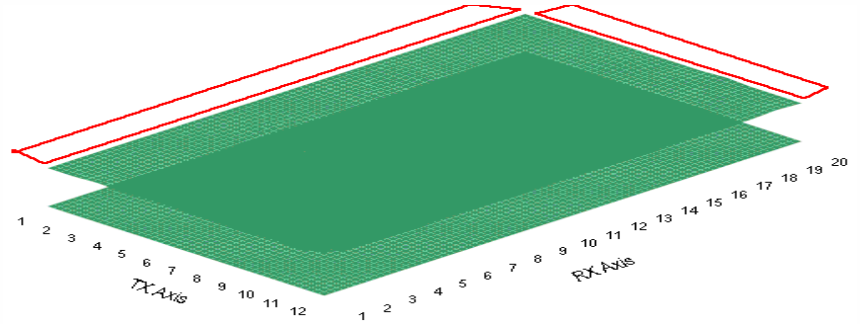
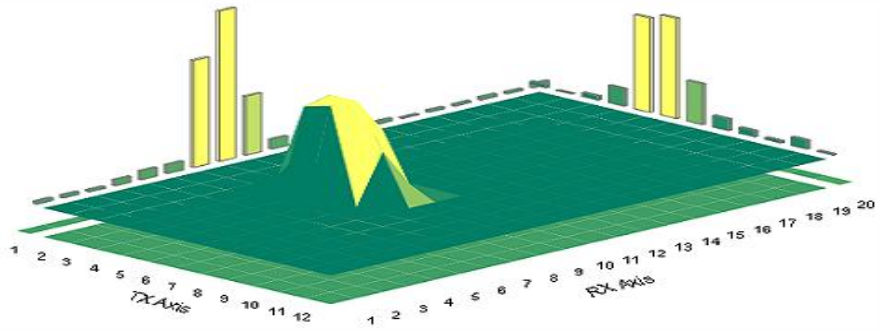


Figure 4-15 : Mutual only

2) **Interpolation Level**: The “Interpolation Level” is the smooth setting of graph, the bigger number cause the smoother graph, but also the larger loading to PC.

Ex:

Level 1



Level 6

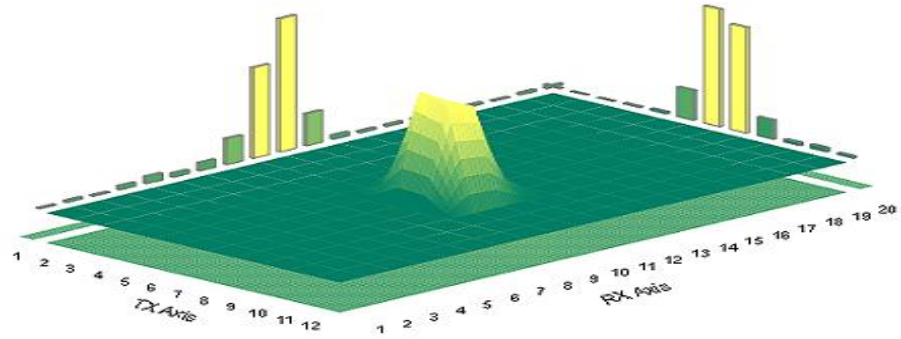


Figure 4-16 : The difference of interpolation of level 1 and 6

3) **2D/3D Model**: Change the topographic style 3D or X-Y only (2D).

① 3Dmodel: Show data as 3D graph, the interpolation function is work. Refer to Figure 5-16.

② XY Color: Show data as 2D graph, it has lower loading to PC then 3D graph.

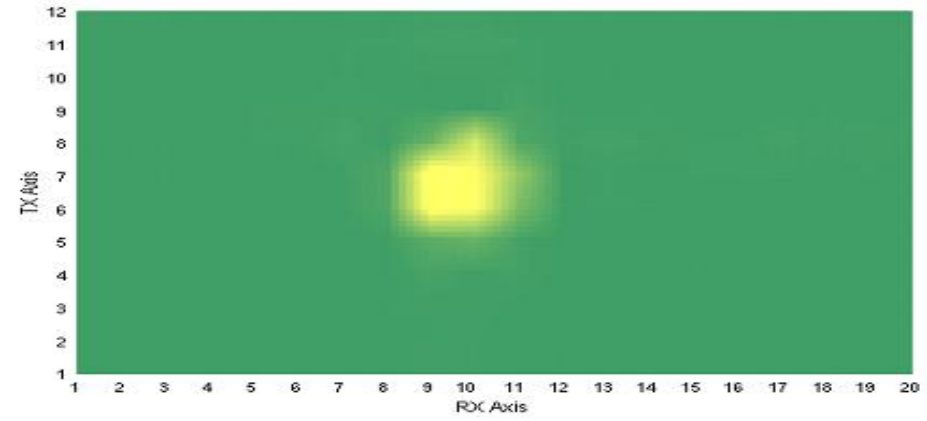
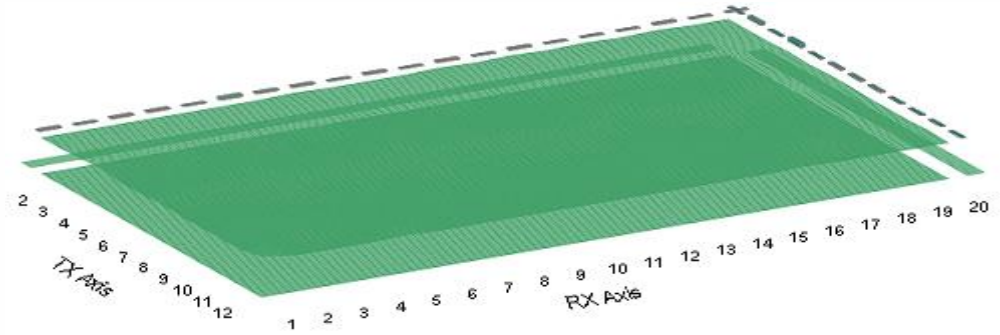


Figure 4-17 : XY Color 2D graph

4) **Color Theme**: This function is used to select the background color style of Topographic.

Ex:

Summer



Winter

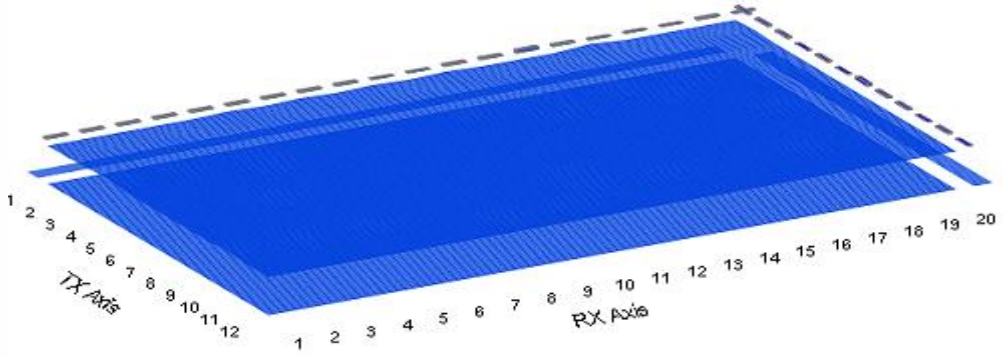


Figure 4-18 : Color theme of topographic

2. **Histogram**: Shows row data of self and mutual mode.

1) Go to the “Chart” page of Data View page as follow figure.

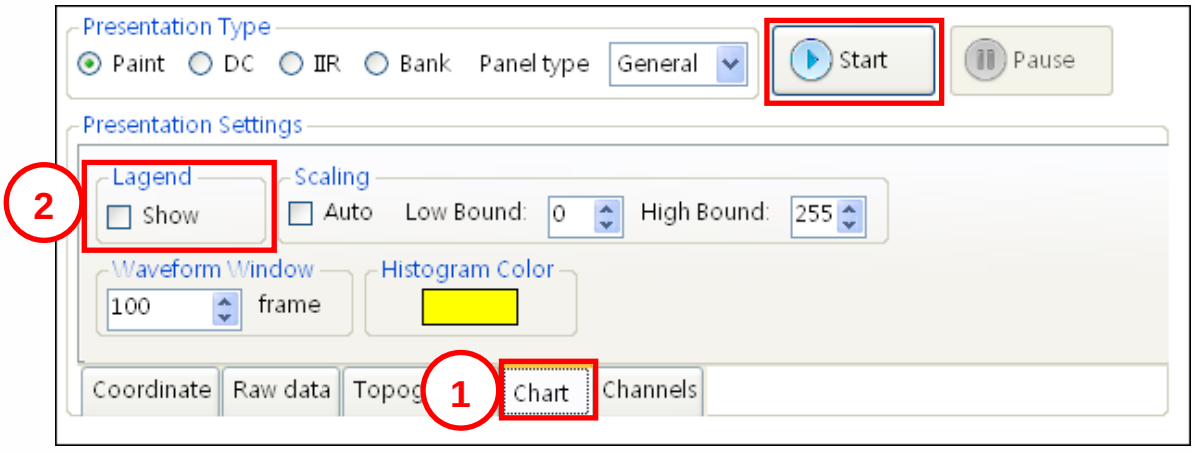


Figure 4-19 : Chart Page

2) Check “Show” selection at the “Legend” setting, and press “Start” button to enable histogram.

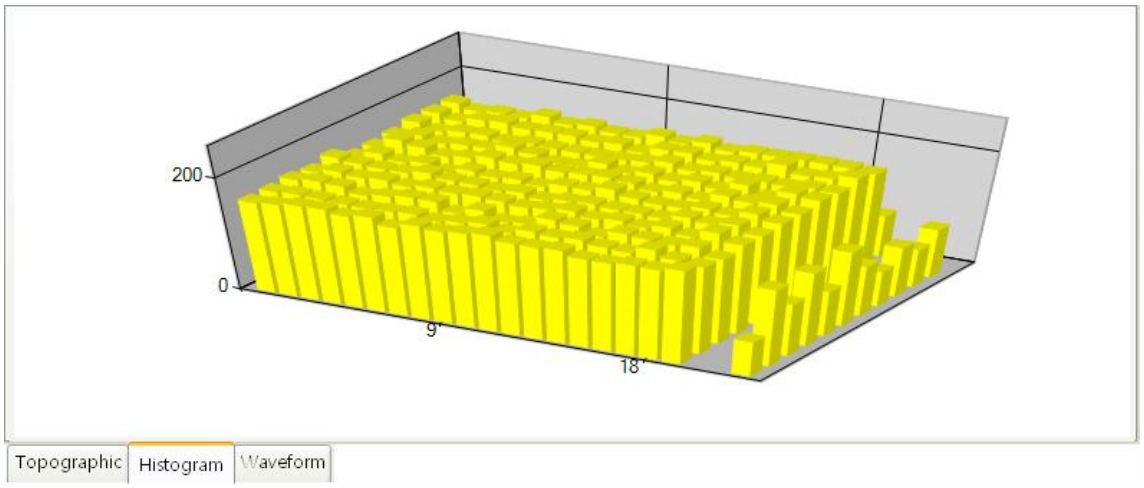


Figure 4-20 : **Start histogram**

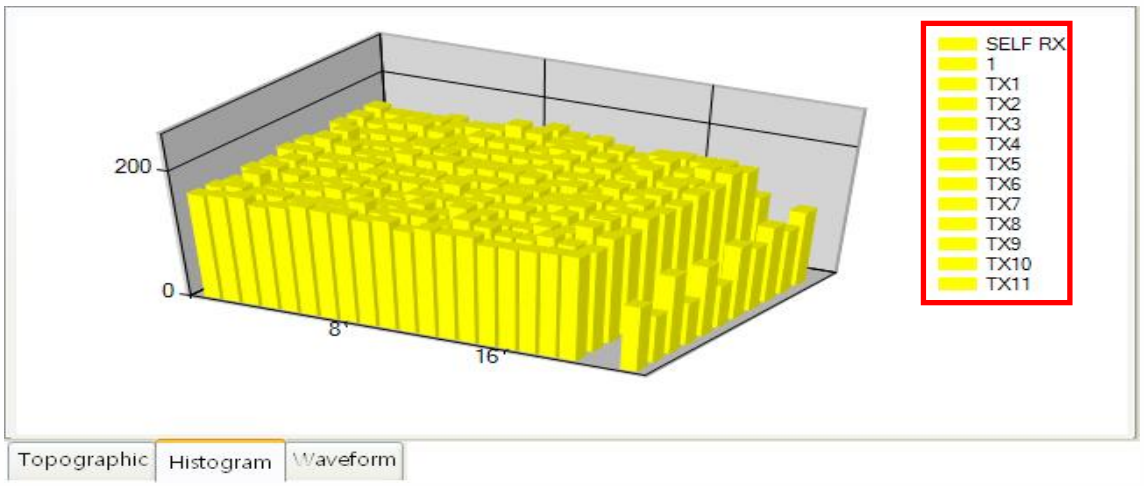


Figure 4-21 : Legend checked

3. **Waveform**: Shows row data of self mode only.
   1) At “Presentation Type” block, select a data type (DC, IIR or Bank).
   2) Enter the “Chart” page of “Presentation Setting”.
   3) Check “Show” selection at the “Legend” setting, and press “Start” button to enable waveform.

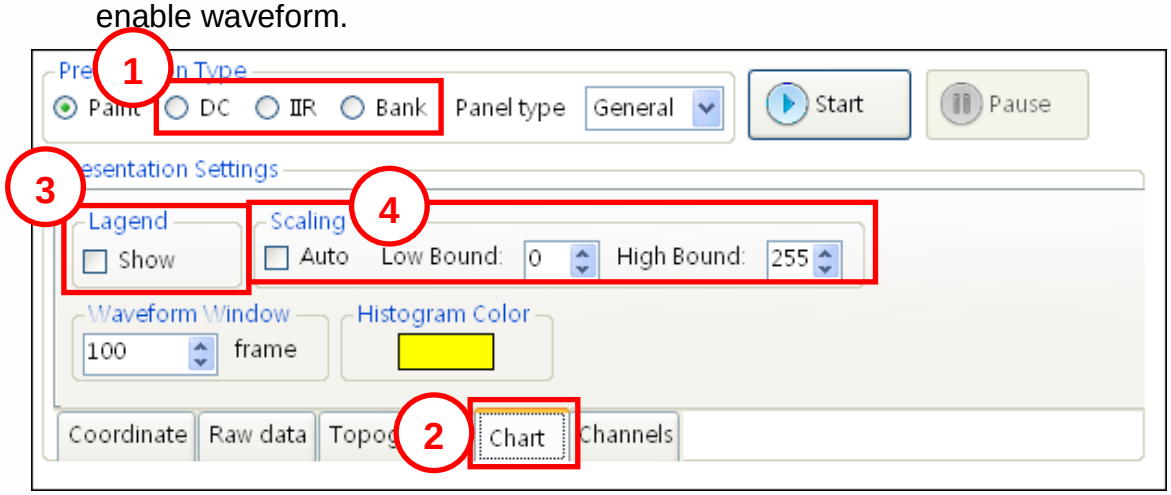


Figure 4-22 : Waveform setting

   4) **Scaling**: The waveform shows information as following.
      ① Current self channels.
      ② Raw data waveform that Y axis is fixed at 0~255.

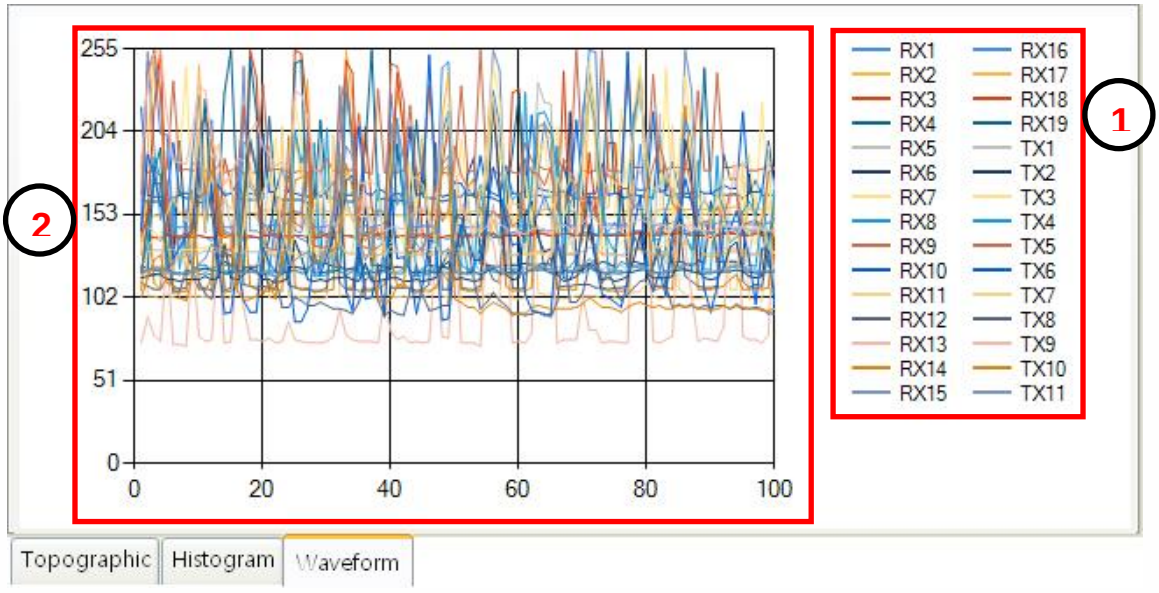


Figure 4-23 : Waveform

③ **Auto Scale**: Select “Auto” than Y axis will tune range automatically. Y axis will tune range automatically in block 3.

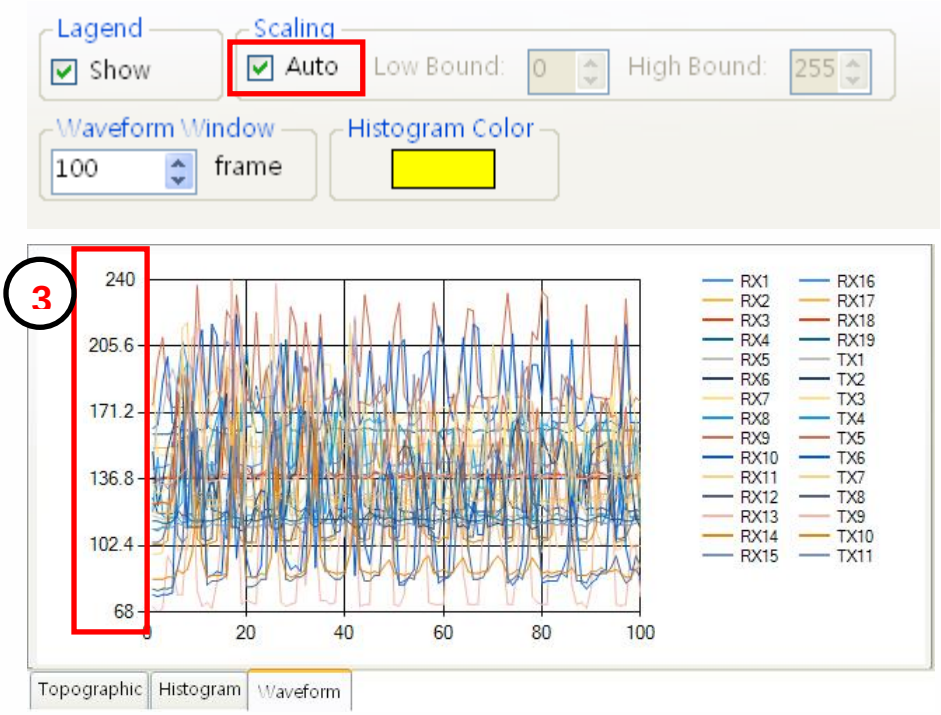


Figure 4-24 : Auto scale

④ **Low Bound/High Bound**: The Y axis scale range. For example, if low bound is 100 and high bound is 205, than Y axis will fix in 100~205.

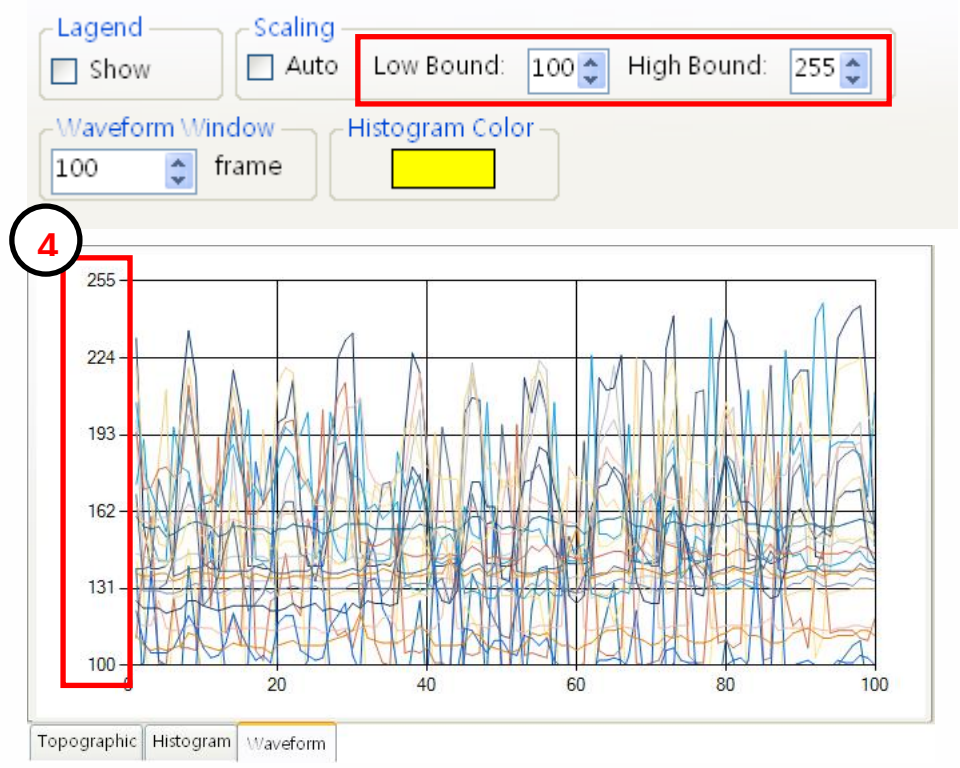
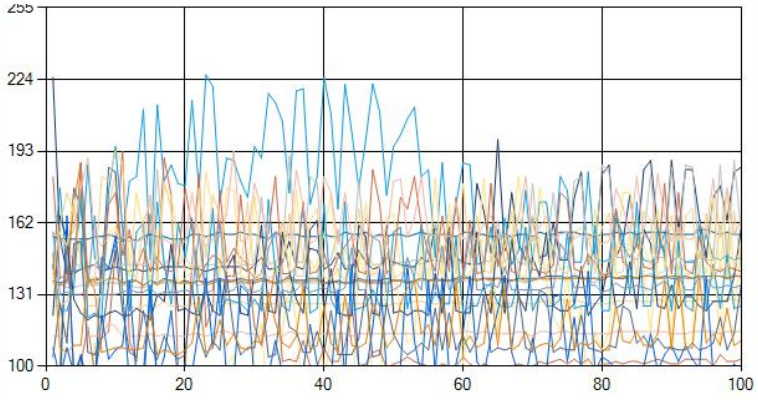


Figure 4-25 : High/Low Bound

⑤ **Waveform Window**: Adjust the frame number that will be displayed in the window at a time. The larger number, the higher line density.

100 Frames



200 Frames

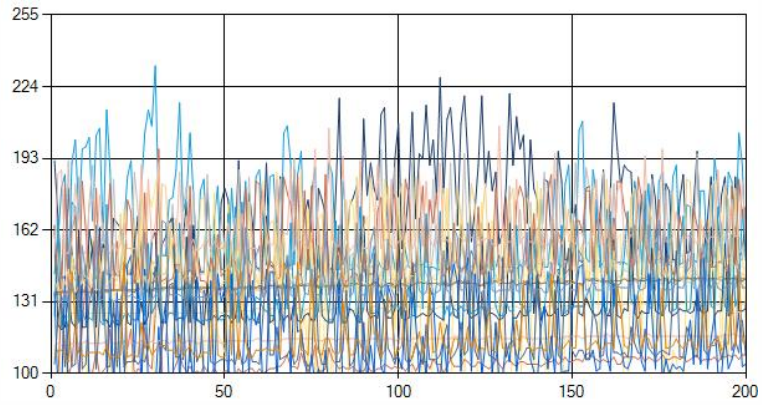
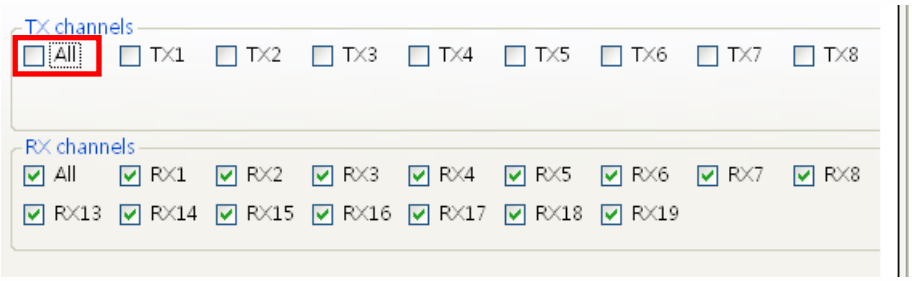
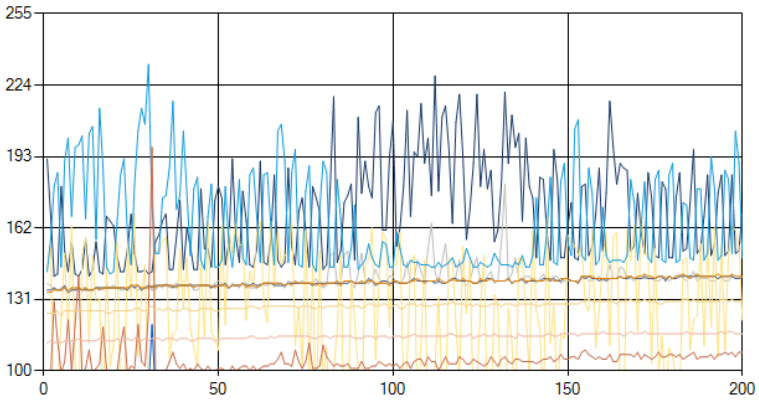


Figure 4-26 : Frame number

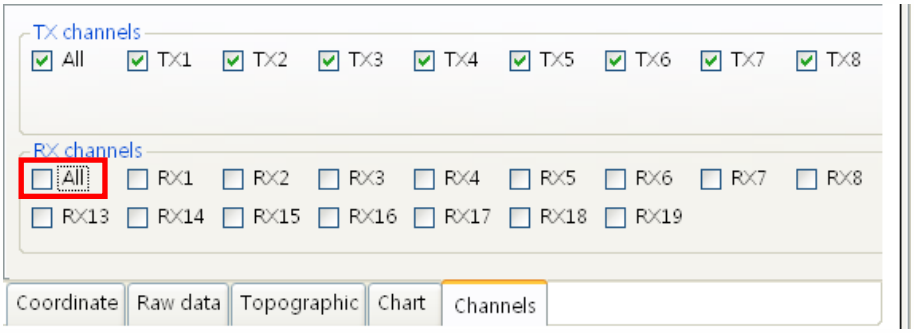
⑥ **TX/RX Channel**: In “Channels” page of “Presentation Settings”, remove “All Item” of “TX channels” or “RX channels” and check the channels that want to observe, the selected channel will show in the window view.

RX channels only





TX channels only



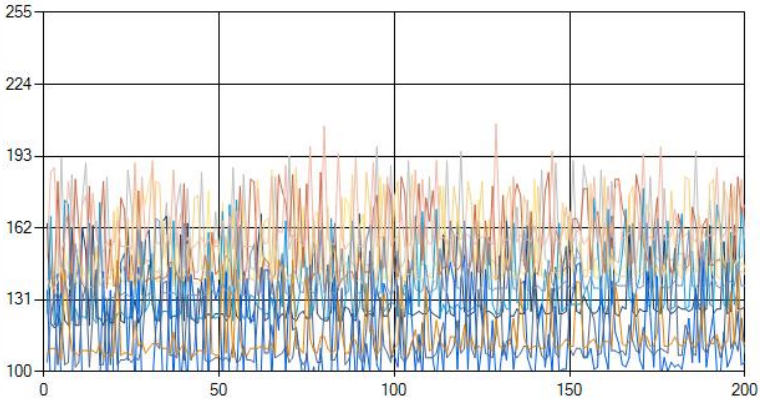


Figure 4-27 : TX/RX channels selection

4.2.3 Drawing Line

When select the Data View page, you can draw on touch panel and display in screen by selecting paint button in presentation mode and press the “Start” button to start drawing. The lines and coordinate positions will display simultaneously as default setting.

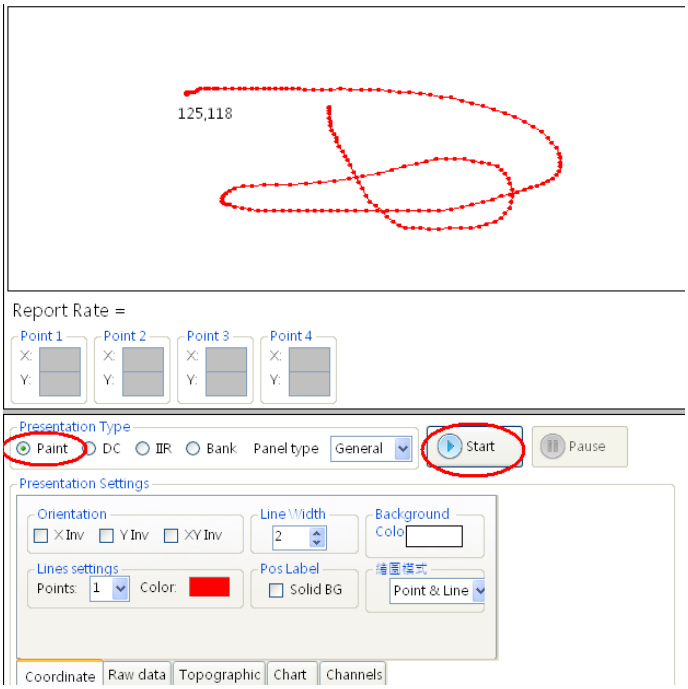
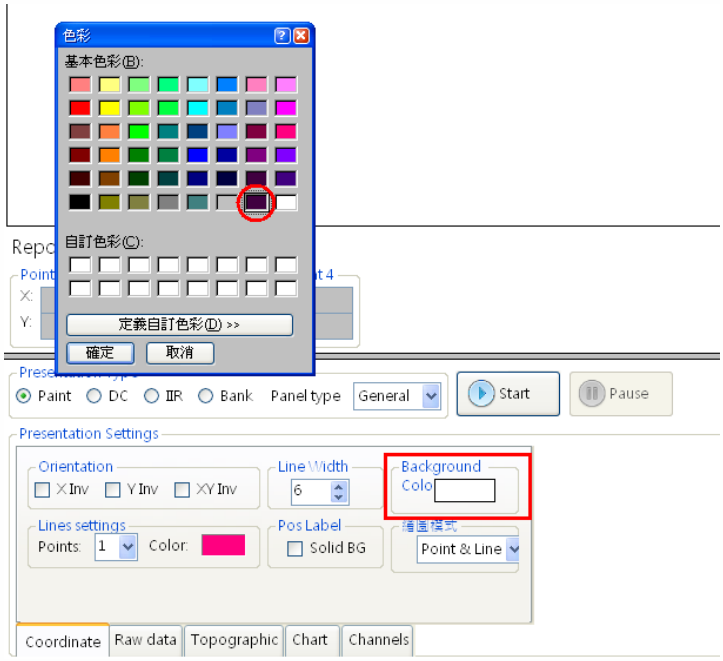


Figure 4-28 : The painting panel view

On the “Coordinate” page of “Presentation Settings” block can set the line width, line color, background color… etc. as user’s favorite setting, and interpret as following:

1. **Background Color:** Click the block to set the background color of drawing panel.



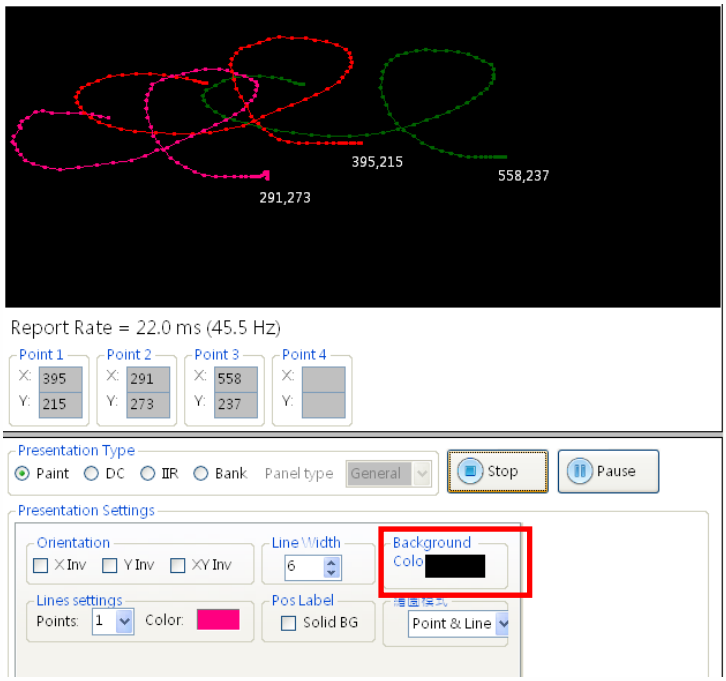
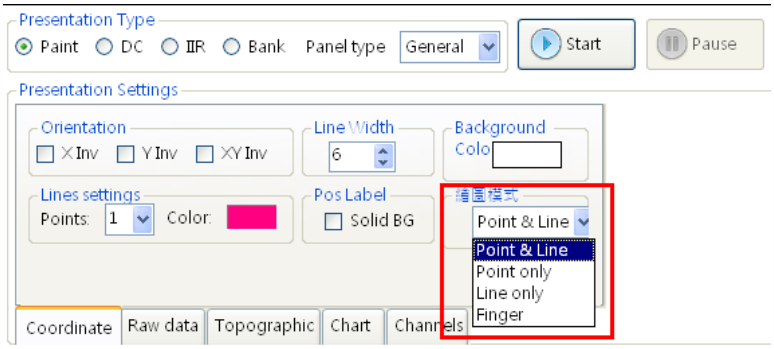
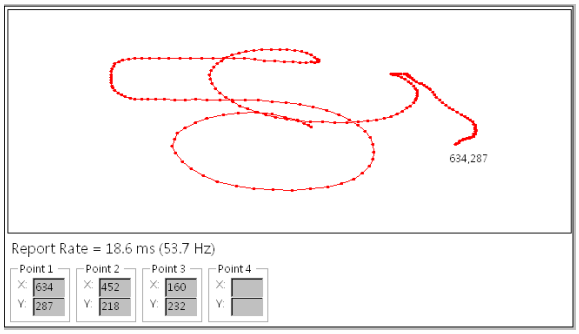


Figure 4-29 : Background color selection

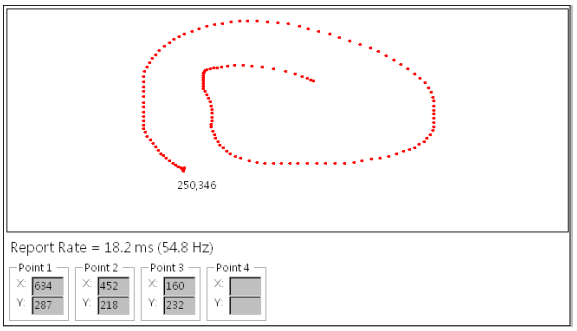
2. **Drawing Mode:** There are 4 modes as Point & Line, Point only, Line only and Finger function which can be chose.



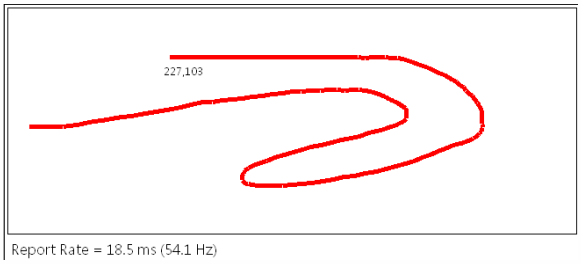
Point & Line



Point only



Line only



Show fingers

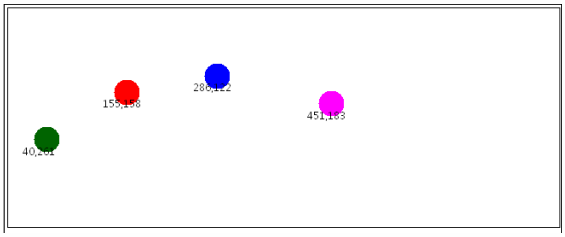
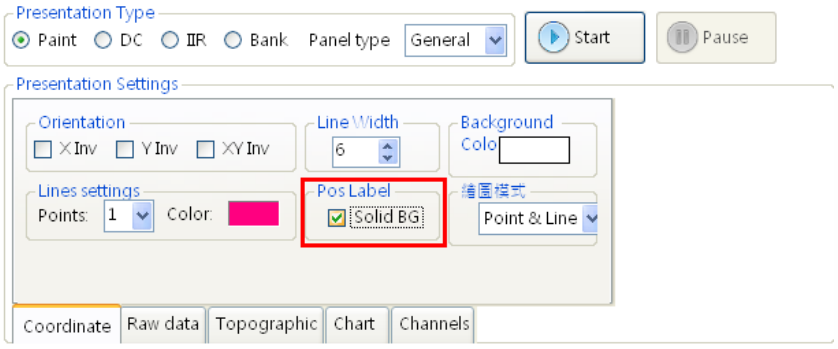


Figure 4-30 : Functions of drawing mode

3. **POS Label:** Choose the background type of position label is solid or transparent. By way of select label background type, the line will be covered by label or not.



Transparent Background

Solid Background

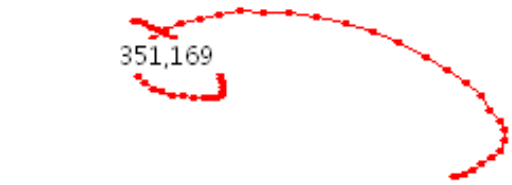
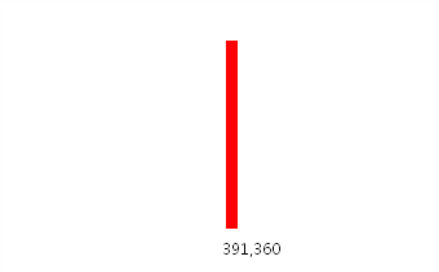


Figure 4-31 : POS Label

4. **Line Width:** This setting only support “Line Only” mode. There are 9 levels you can choose the line width as your favorite size

Line Width

Line Width = 4



Line Width = 9

Figure 4-32 : Line width

5. **Line Setting:** Set the line color of points. Select the point number and click the "Color" block to set color for current line.

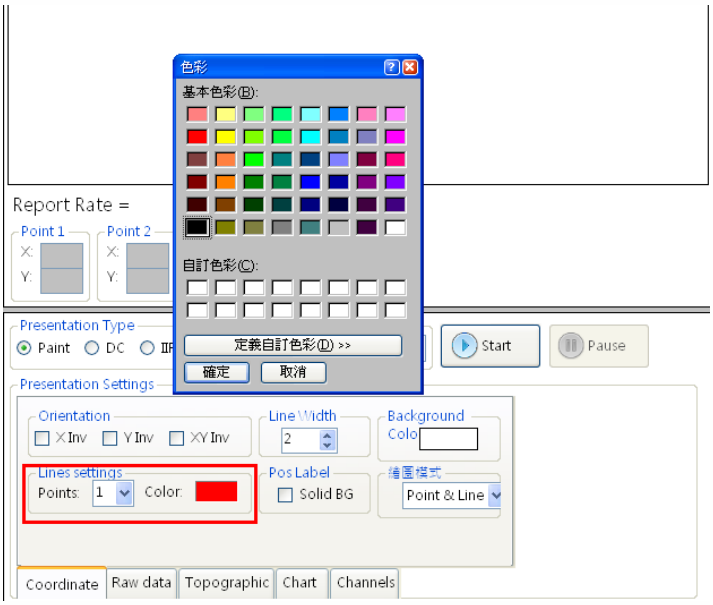


Figure 4-33 : Set line colors

6. **Orientation:** For panel XY/X/Y orientation inverse.

   1) X Inv: Inverse the coordinate of X, if original X coordinate from left to right will become right to left.

   2) Y Inv: Inverse the coordinate of Y, if original Y coordinate from top to bottom will become bottom to top.

   3) XY Inv: Inverse the coordinate X to Y, Y to X.

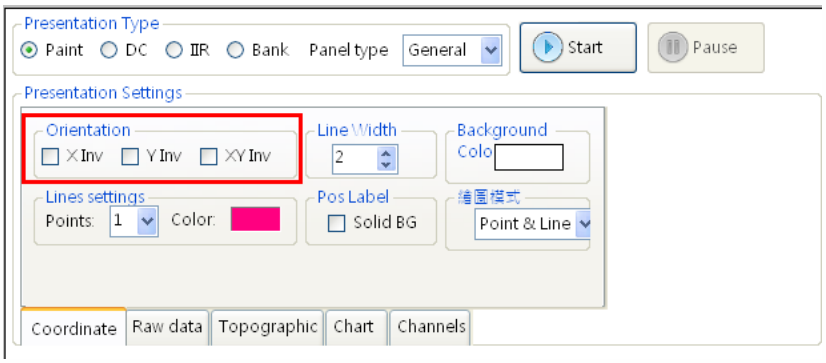


Figure 4-34 : Orientation

5 Configuration File Saving

5.1 Description

Configuration File Saving Function is for exporting the “Mapping Table” and “Instant Performance Fine-tuning” functions to create the new configuration files which are named “*.bin” (called bin file below) as binary files. In other words, when you finished edit mapping table or performance tuning, you must execute this function for exporting the FW initial setting.

5.2 Function Usage

Code Merge Function enables must load the default bin file first. So you have to choose the correct file at the Program Page (FW List) and double click the bin file which you want to reload as Fig 6.1

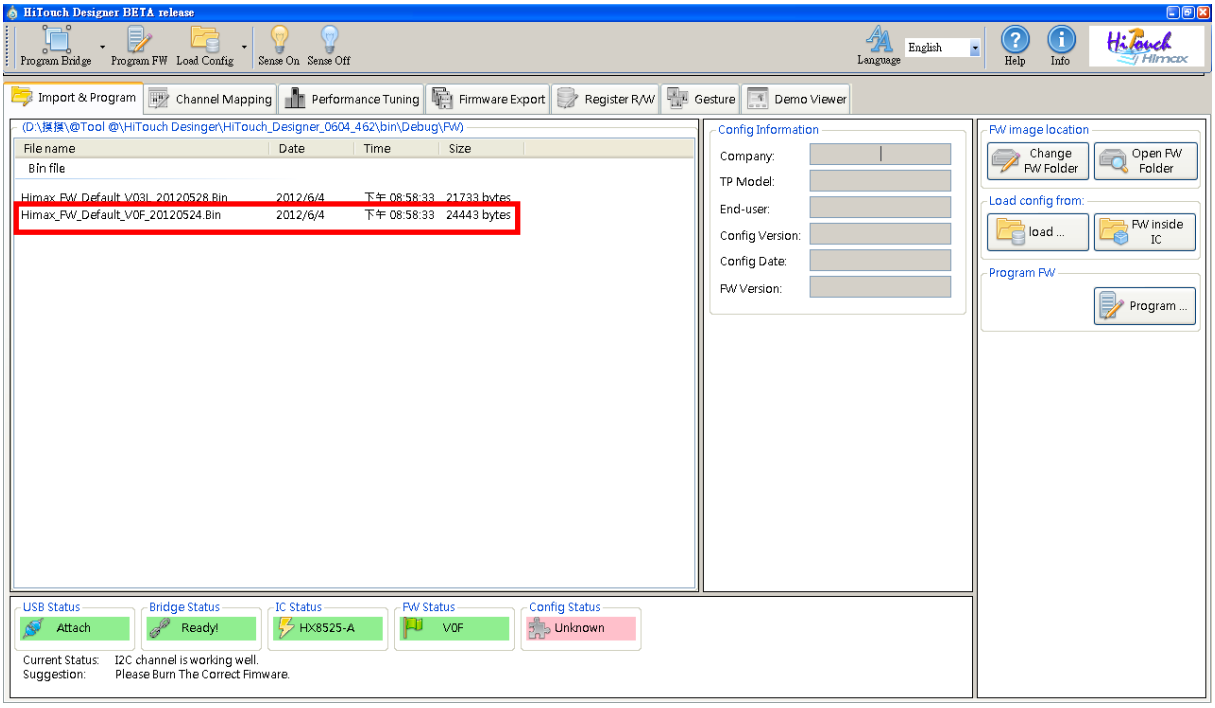


Figure 5-1 : Load a bin file

After the bin file has been reloaded and if this bin file is correct it will show the configure Information & Configure Status will be show “Ready” as the Figure 6.2.

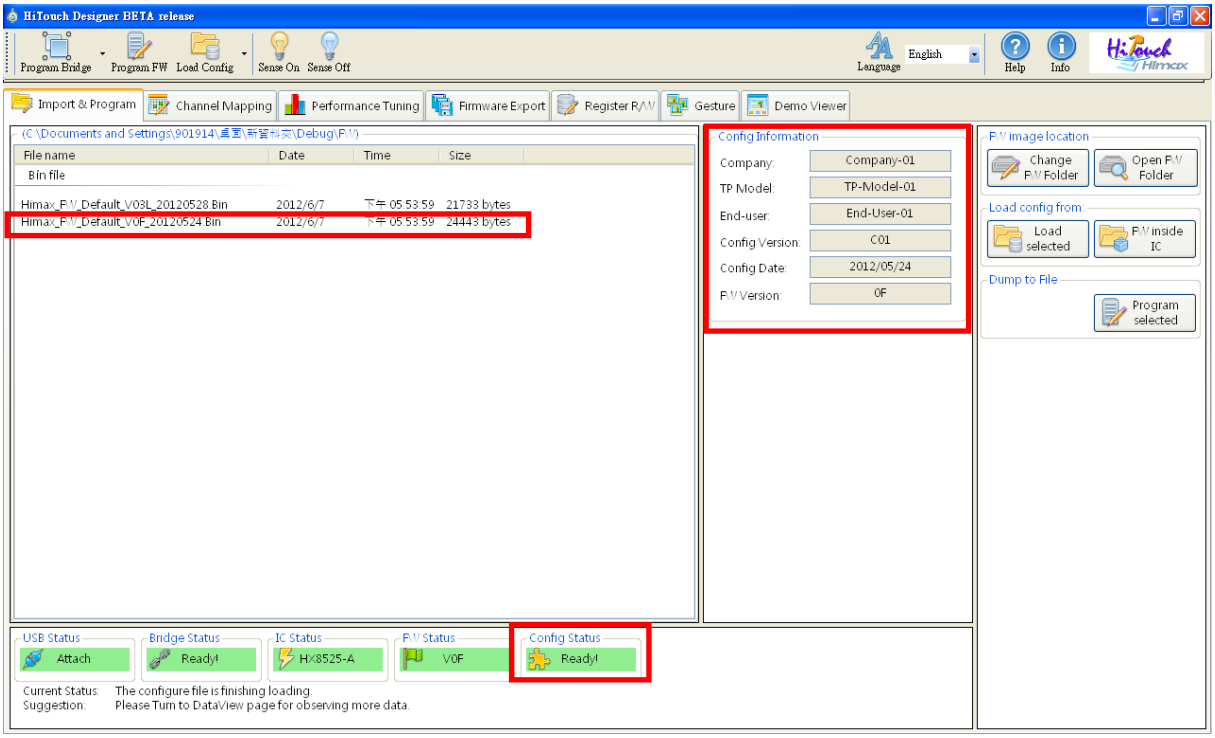


Figure 5-2 : Status bar shows “Ready”

5.3 Code Merge flow

For the bin file management, It must be recorded the Export Information items for each new bin file. And each Export Information item only can key in 12 letters, numbers or symbols combination.

There are 5 Information must be keyed in for the new bin file record (Which has carry the star mark “*”).

1. **Company:** The customer company name.
2. **TP Model:** Touch panel model name.
3. **End-User:** The terminal user name.
4. **Config Version:** Version of this customize configuration file.
5. **Config Date.**

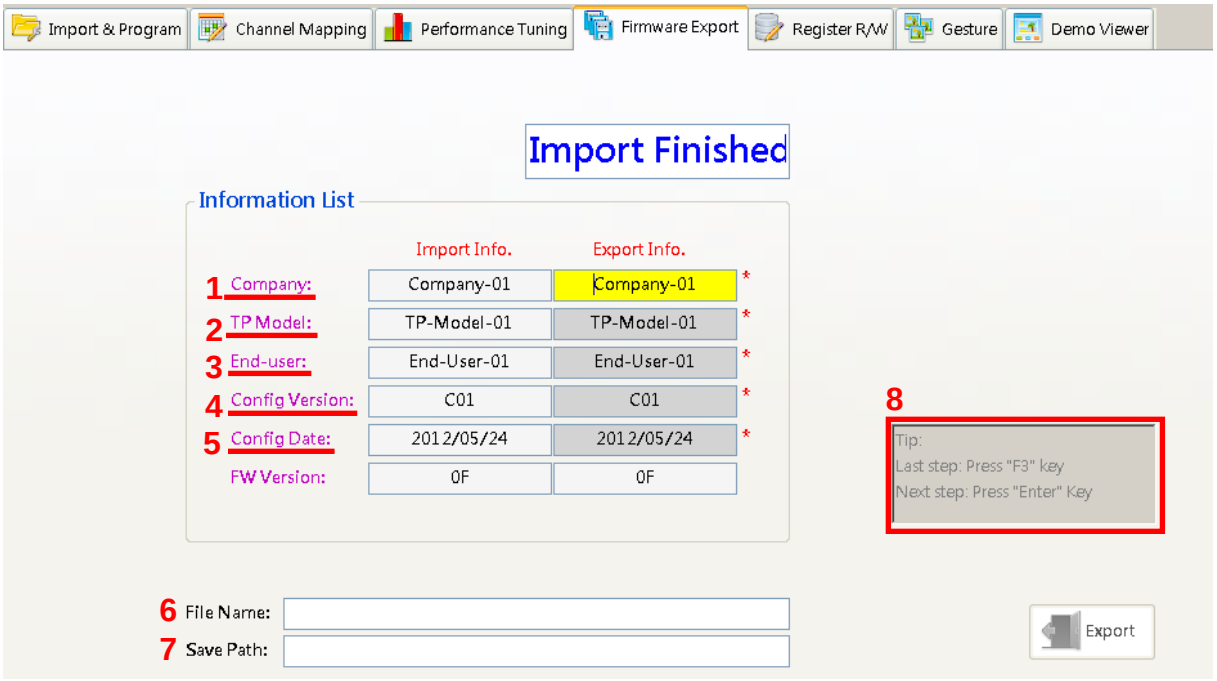


Figure 5-3 : Information of conf0ig

1~5: Key in config information step by step: 1→ Enter→ 2→ Enter→ 3→ Enter→ 4→ Enter→ 5→ Enter

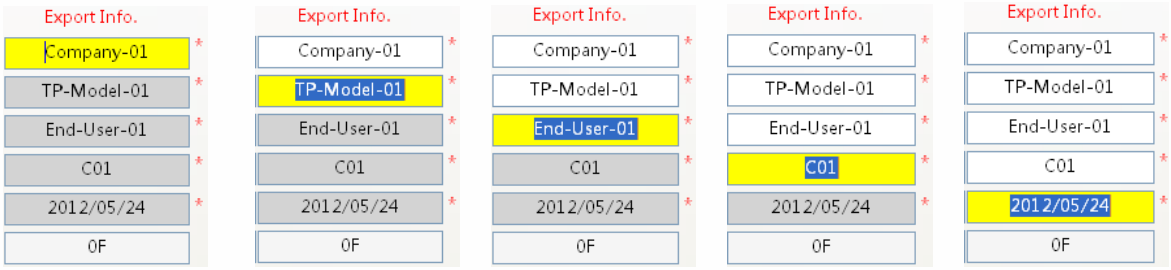


Figure 5-4 : Key in config information

6. Key in **file name**: → 6→ Enter

Figure 5-5 : Key in file name

After 1~6, the Export Button will be enabled.

7. Press the **Export** Button and choose the saving path and press “OK” button. Then the new bin file will be export to the saving path and the bin file will be naming as “Himax_FW_Wintek_PICO-3.2_V02_YYYY-MM-DD_hhmm.Bin”.

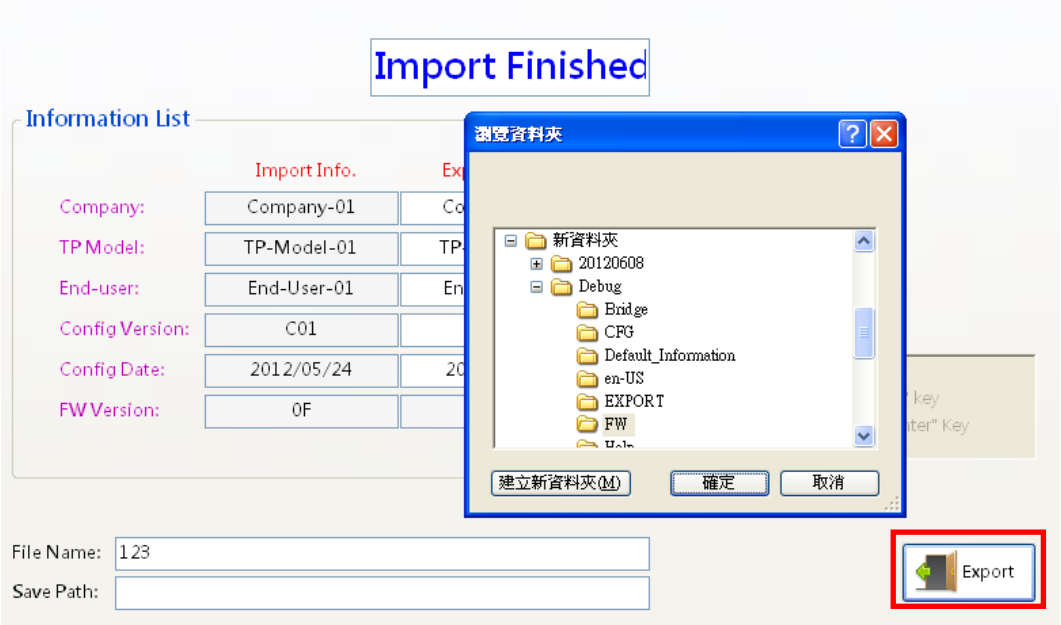


Figure 5-6 : Choose saving path

Finally, it will show the message “Export Finished” when exporting finished.

Figure 5-7 : Export finish

8. **Tip:** When key in the panel information, press enter to next step and F3 to last step.

6 Register Read / Write

6.1 Description

This function is mainly for register read/write to investigate the status of chip. When device is connected and the page tab selected as “Register” page, the model number of current using IC and the register information will show in HiTouch Designer.

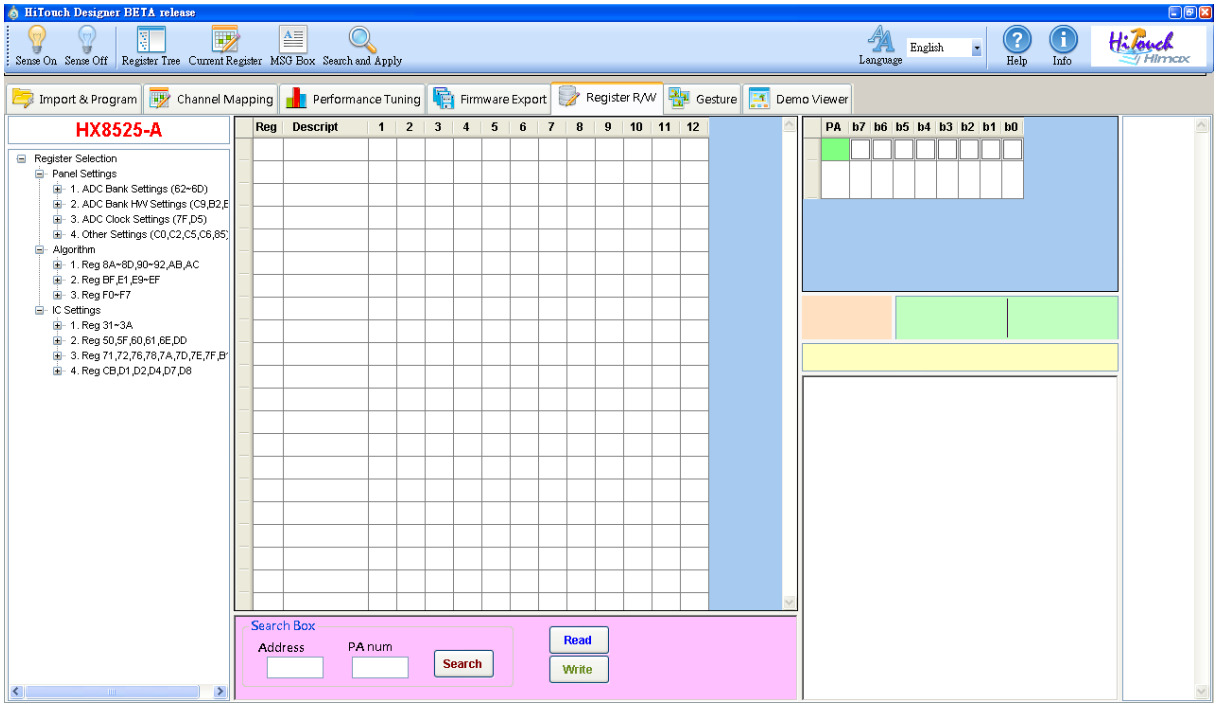


Figure 6-1 : Register data tree view

6.2 Function Usage

6.2.1 Select a Register or the Group

Click the tree of register list can choose a node as register section, or click “+” mark will show every register for choosing as a tree view as Figure 6-1 and 6-2.

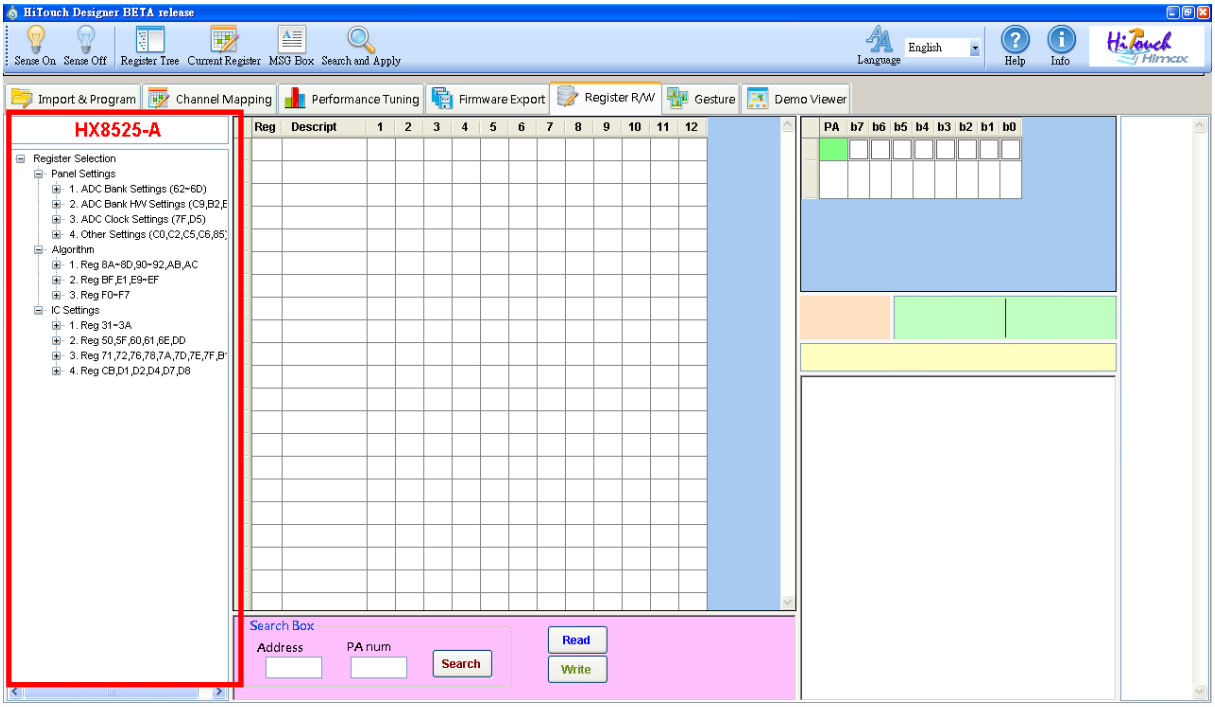


Figure 6-2 : Register data tree view

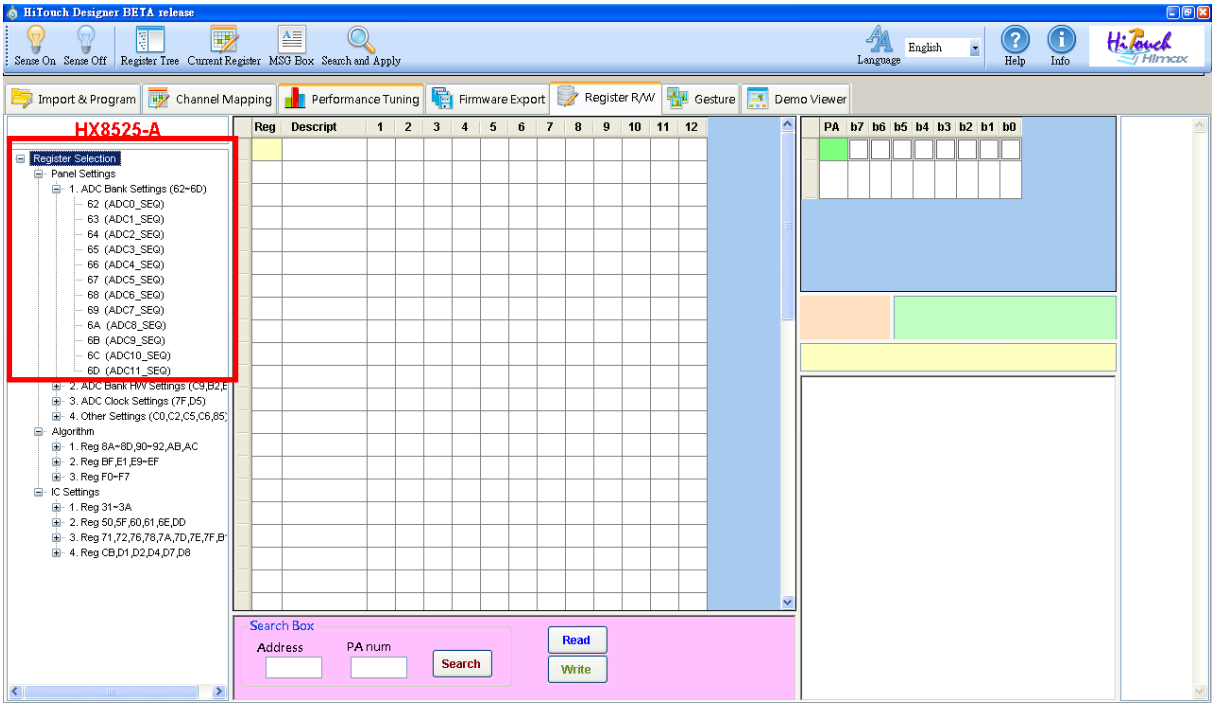


Figure 6-3 : Click “+” mark for register selecting

After register selection, currently selected register data will be showed in the middle and right side as following information:

1. Register address, simple description and data of all parameters in data grid.
2. Read / Write buttons and Search area.
3. Register data that was read / wrote will be listed in this message box.

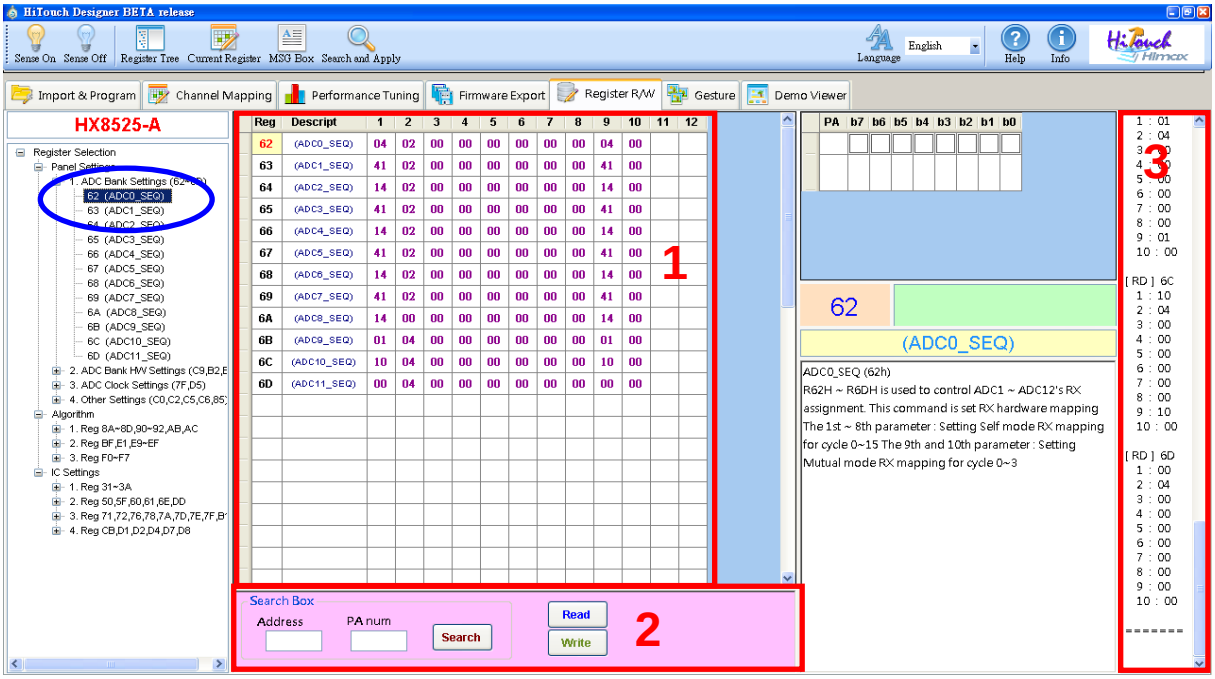


Figure 6-4 : After a register selected

4. Selected parameter bits of current register by binary and each description.
5. Register information (the same as 1.) eye-catching area.
6. Details register description.

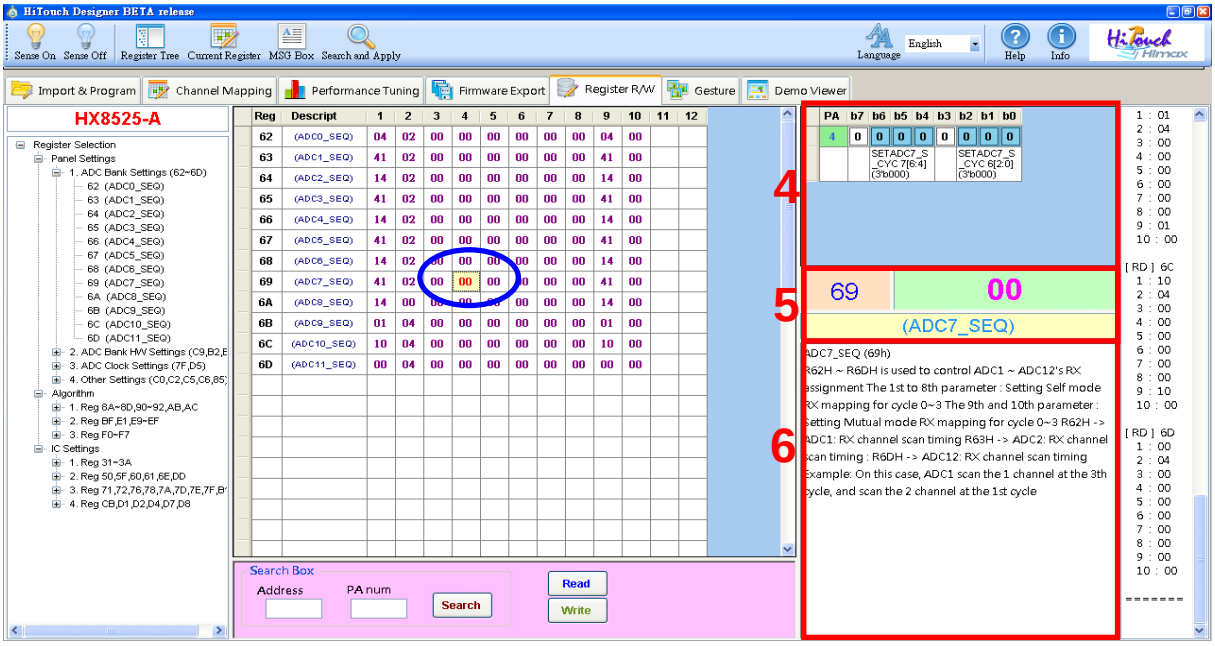


Figure 6-5 : Parameter detail information

6.2.2 Using Method and Skills (Hotkeys)

1.**Register Read**:

1) Press the “Read” button below the data grid (the pink area), or
2) Click the mouse wheel at 1, 4 area.

2. **Register Write**:

1) Press the “Write” button, or
2) Click the mouse right key in area show as Figure 6-5.

3. **Change the Data to Write**:

1) Double click to edit the data grid directly, or
2) Edit the information area, or
3) Single click the bits to switch 0 → 1 or 1 → 0. Clicked bit will turn to pink, and back to blue after read or write.

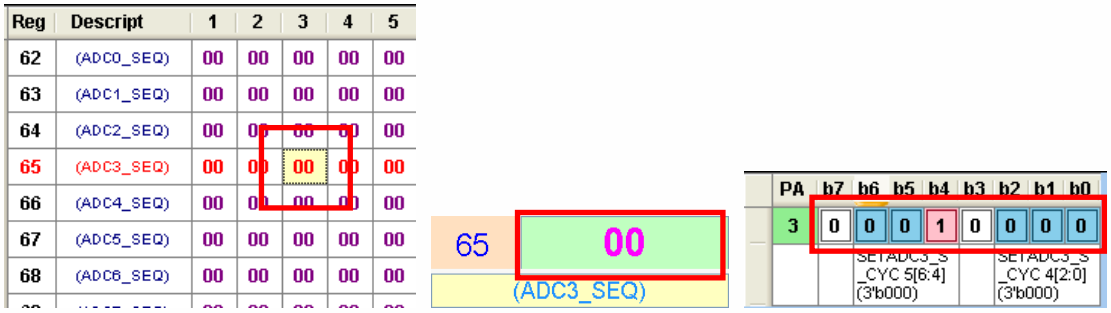


Figure 6-6 : Change the data to write

4. **Search**: Key down the register address (parameter number (PA num) is not necessary) and click “Search” button, the register you want to search will show in the data grid.

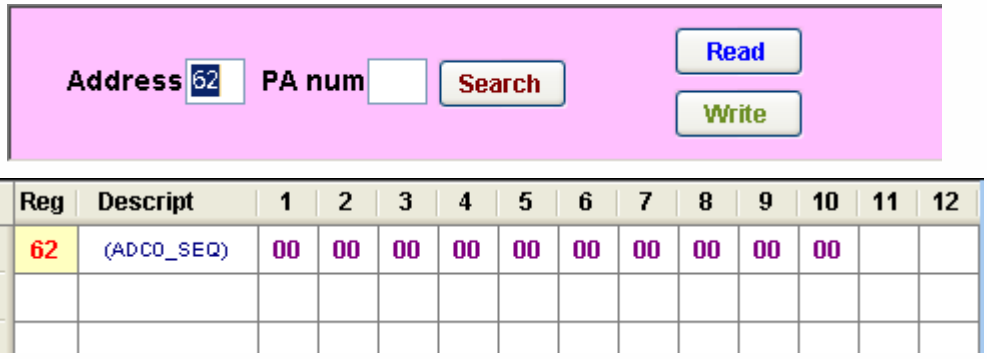


Figure 6-7 : Search function

7 Gesture Determination

7.1 Description

This page is the gesture determination functions for user's demonstration. It supports 2 points as the "Zoom" subpage, and all points as the "Gesture" subpage.

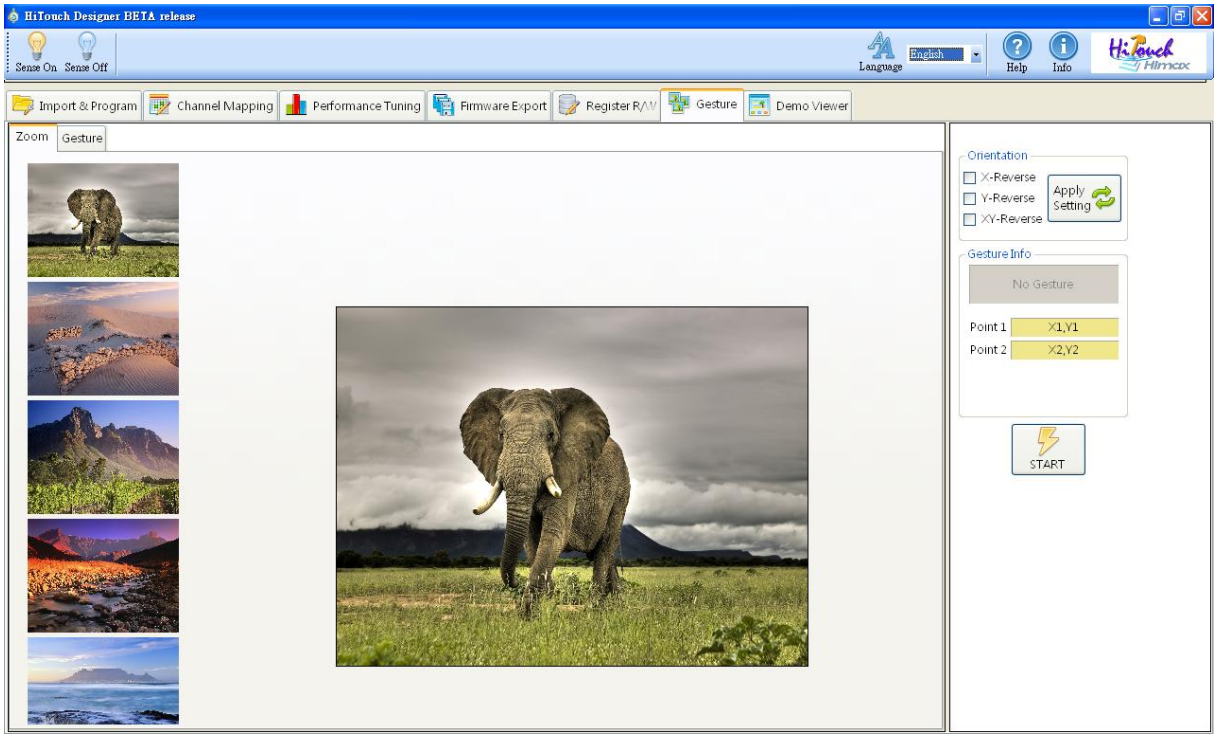


Figure 7-1 : The gesture page

7.2 Function Usage

7.2.1 Zoom in zoom out (2 points)

In the “Zoom” page, there are 5 parts of this function:

1. Click the “Start” button to turn on zoom function.
2. If the orientation of touch panel relative to cursor is wrong, check the “X Reverse”, “Y Reverse” or “XY Reverse” can change the orientations of X axis, Y axis or XY reverse instantly.
3. Choose a picture here by mouse enter the area.
4. Zoom: Use 2 figures to zoom in or zoom out the picture.
5. Coordinates and status information will be showed this area.

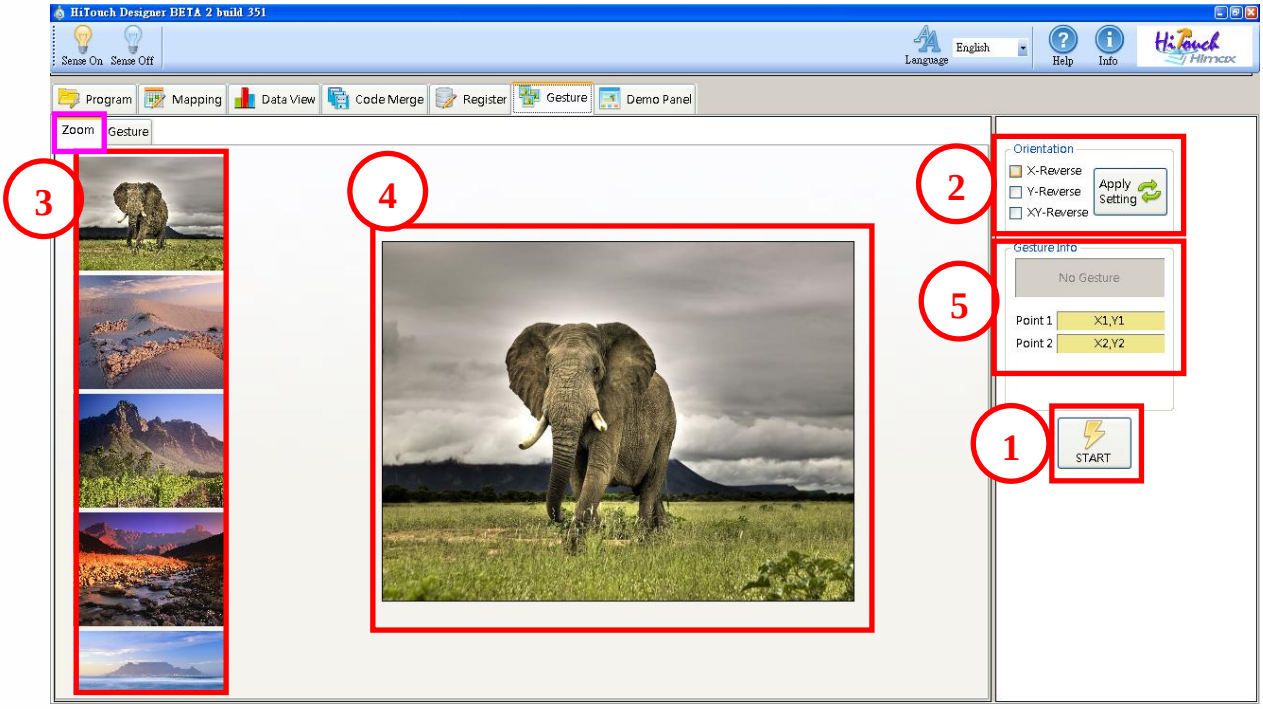


Figure 7-2 : Zoom page

7.2.2 Gesture (3 points)

Similar to the ”Zoom” page, in the “Gesture” page, there are 5 parts of this function:

1. Click the “Start” button to turn on zoom function.
2. If the orientation of touch panel relative to cursor is wrong, check the “X Reverse”, “Y Reverse” or “XY Reverse” can change the orientations of X axis, Y axis or XY reverse instantly.
3. Choose a picture here by mouse enter the area.
4. Gestures:
   1) Use 2 figures to zoom in or zoom out the picture.
   2) Use 3 figures to spin the picture, and cross 2 figures to invert the orientation.
5. Coordinates and status information will be showed this area.

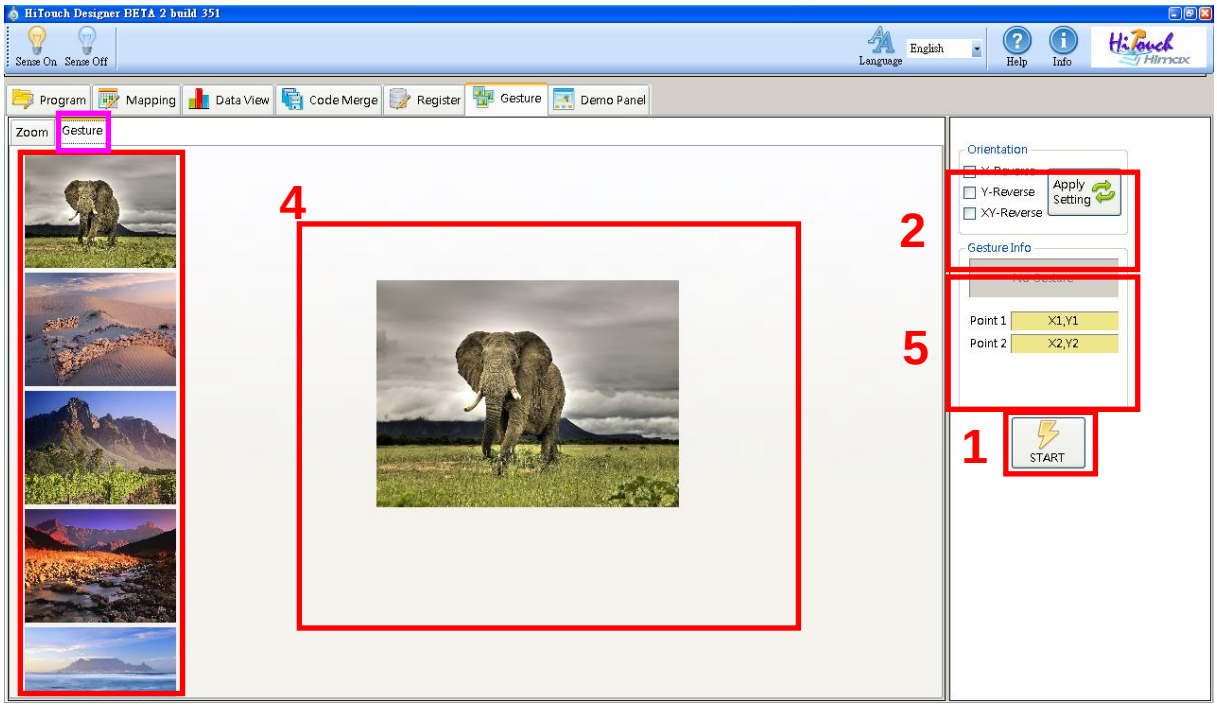


Figure 7-3 : Gesture page

In demo function, mostly use two fingers and zoom in/out to show. In our DEMO AP, we increase one more function to allow three fingers demo. We use three points to be the picture’s three corner locations, when any one of three points change, the picture also changes.

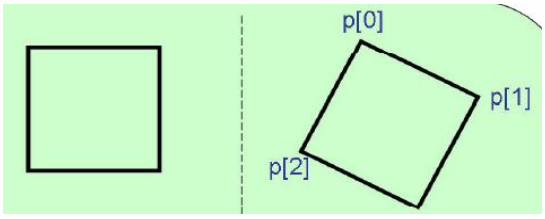


Figure 7-4 : Gesture chart

As the picture below, you can use three fingers to do any transform in picture. So the picture is not only can zoom in/out, but also can rotate or transform shape.

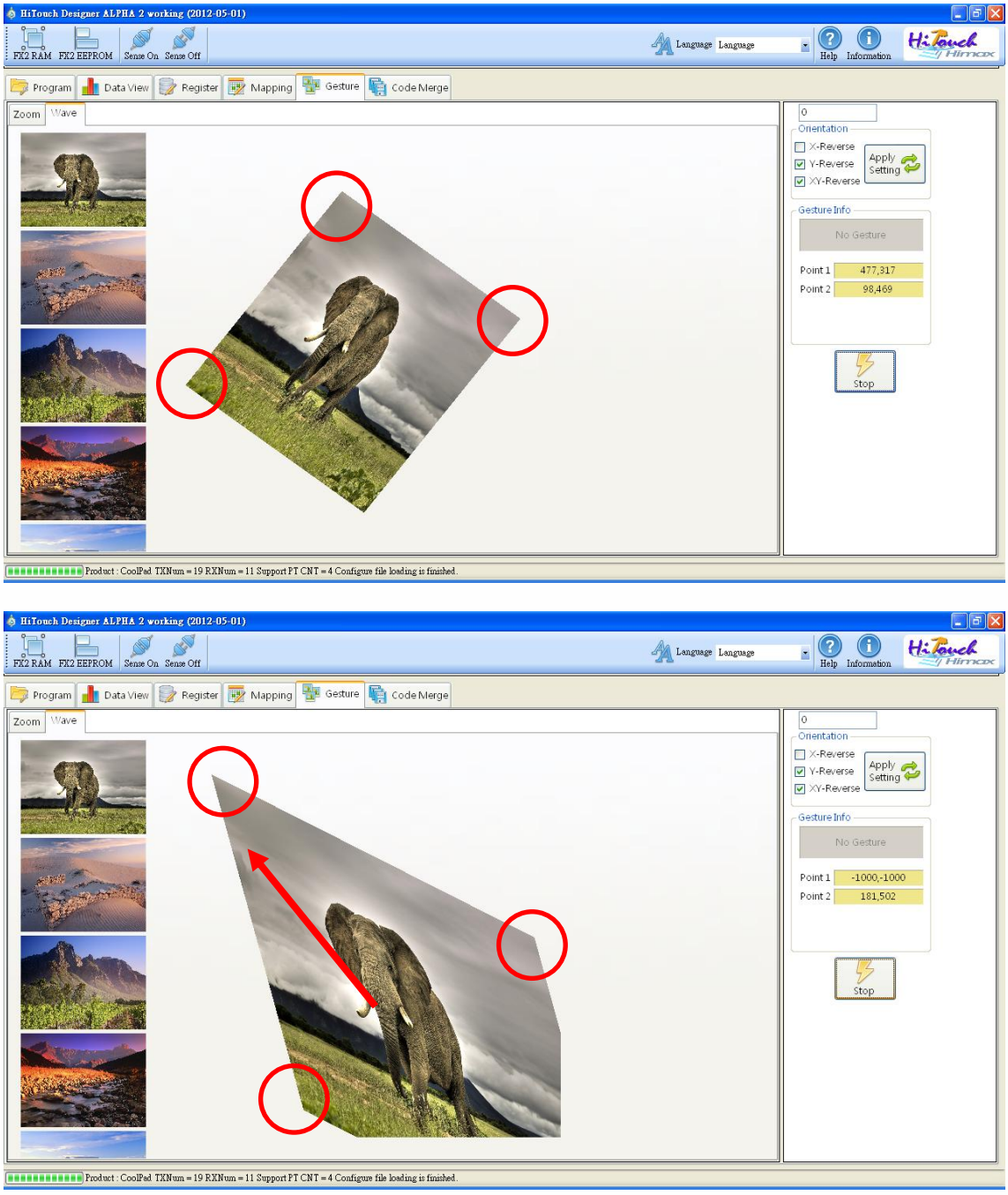


Figure 7-5 : Gesture use 3 point

8 Demonstration

8.1 Description

Many touch sensors, especially in the early stage of a project, may not be combined with a display module. In that case, user can only display and observe the touch performance on the monitor of the computer which launches this tool. However, if a touch sensor has been combined with a LCD module which is connected to the computer as the 2nd monitor, user can setup and directly output the drawing lines to the LCD module by this function.

8.2 Function Usage

After switched to the “Demo Panel” page, the current monitor configuration is showed in the “Monitor configuration” area as figure 9-1:

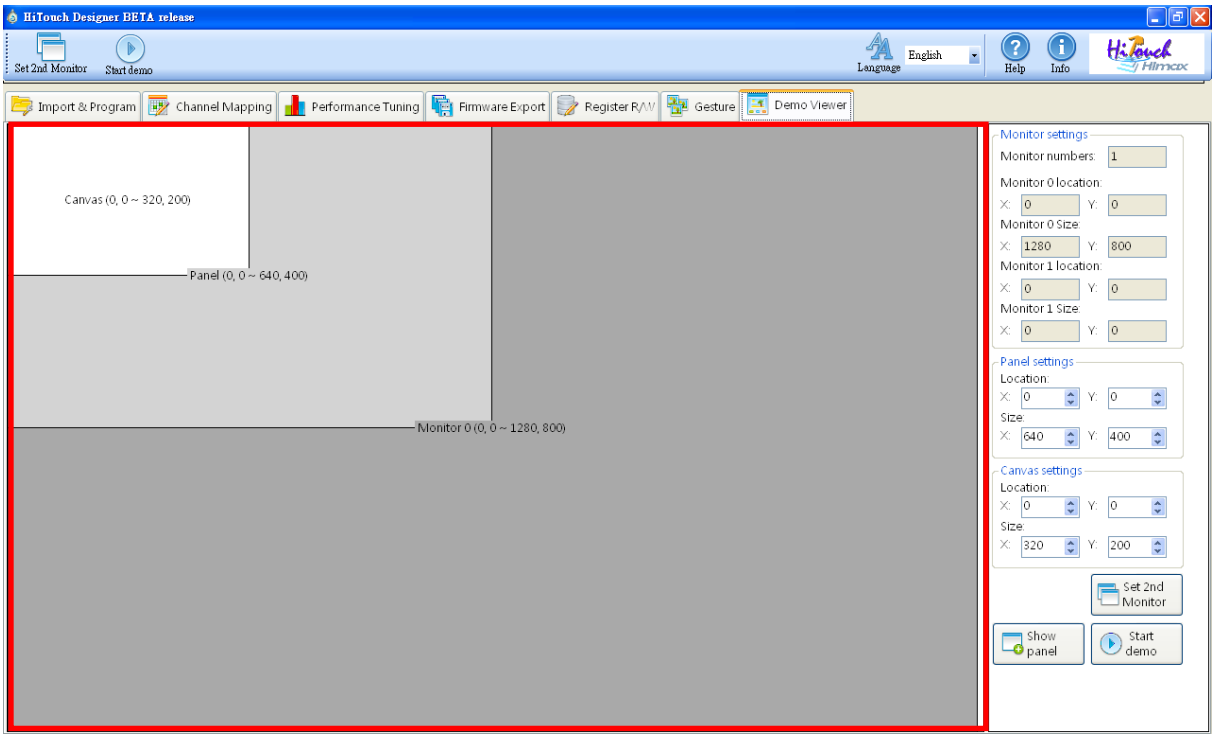


Figure 8-1 : Monitor configuration

The “Monitor settings” area on the upper right side is the read only information of the monitor configuration such as the monitor number and the resolution and position of each monitor. In the case of figure 10-1, there are two monitors side by side, and the resolution is 1280x1024 (monitor 0) and 1366x768 (monitor 1) respectively.

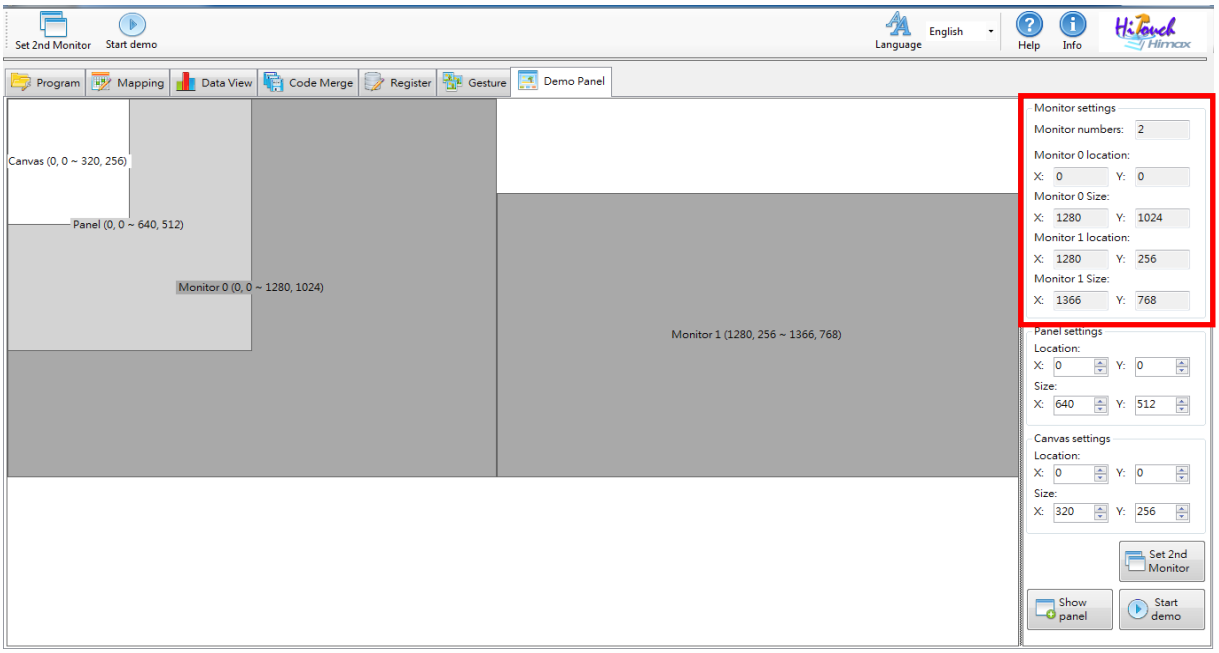


Figure 8-2 : Monitor settings

The “Panel settings” area on the lower right side is the adjustable settings which represents the position and the resolution of the external LCD module. And the “Canvas settings” below the “Panel settings” represents the position and the resolution of the touch sensor on the LCD module. After modified these settings, the output window can be adjusted to exactly match the LCD module.

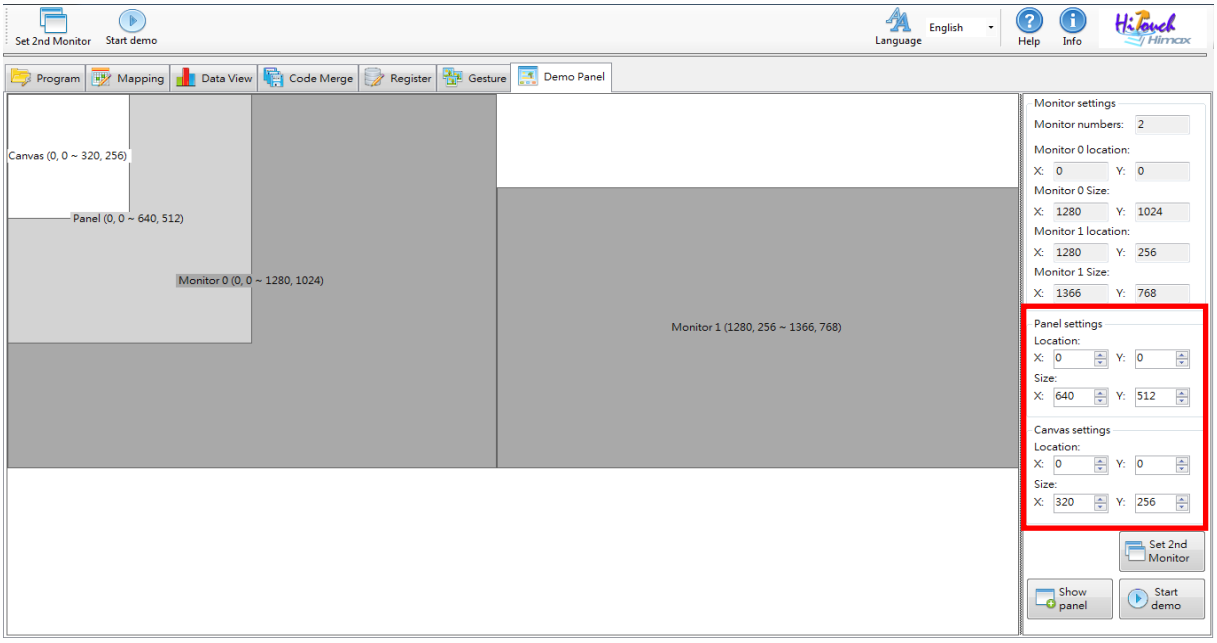


Figure 8-3 : Monitor settings

After the position and the resolution of the panel and canvas are adjusted correctly, clicking the ”Start demo” button will launch the demo panel and start the line drawing. The “Show panel” button can display or hide the demo panel anytime. The “Set 2nd monitor” will automatically set the panel settings according to the 2nd monitor which usually is the LCD module monitor.

9 Reference

FAQ

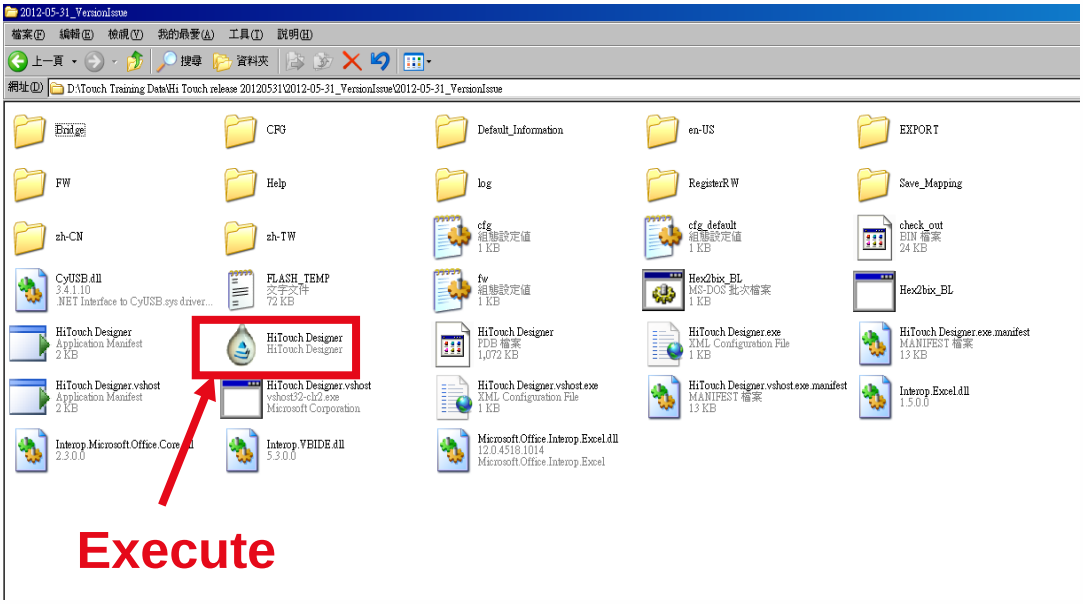
Q. An error message occurs when the HiTouch Designer launching?

A. Please verify the .Net framework 3.5 and the Microsoft Chart control are installed properly. The HiTouch Designer relies on above fundamental software environment to render waveform and histogram chart. Please also make sure the hardware requirements are satisfied and the USB driver is installed as well.

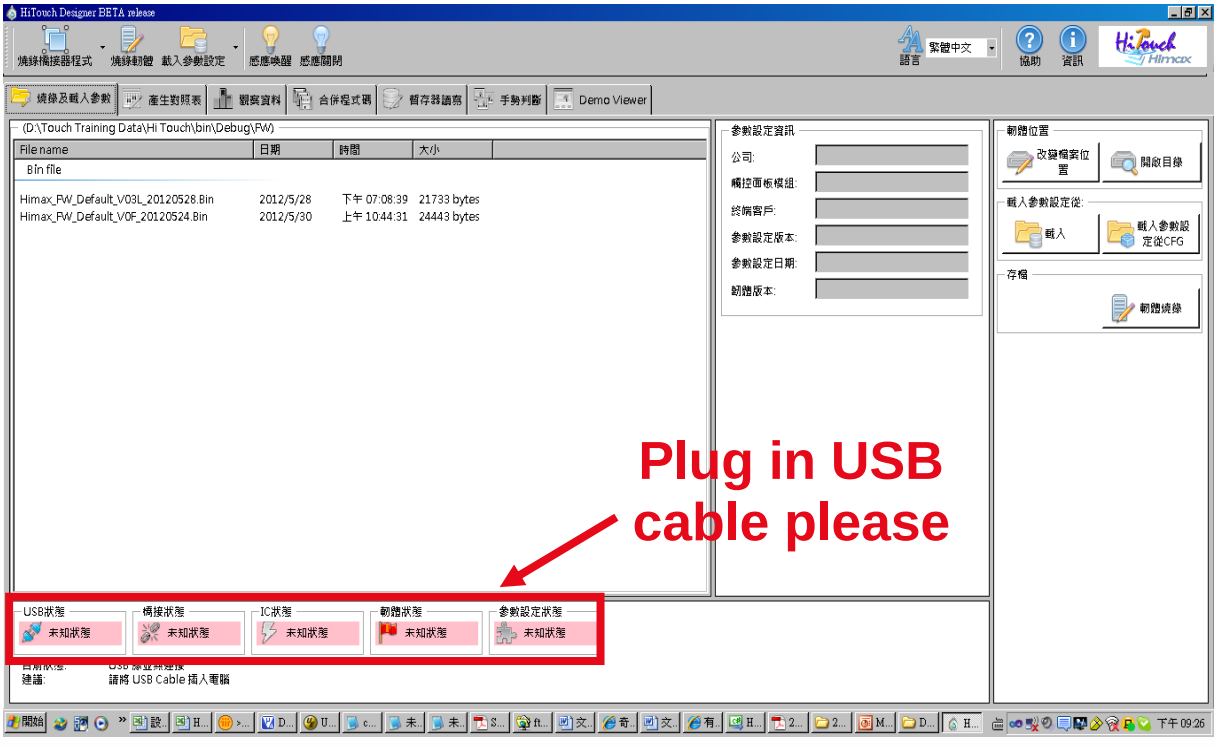
Using Samples A

- **Panel :**
  - (1) 4.3” TP, RX: 17 , TX:11
  - (2) 7” TP, RX:26 , TX:15
- **FW Version:** Default_V03L.bin

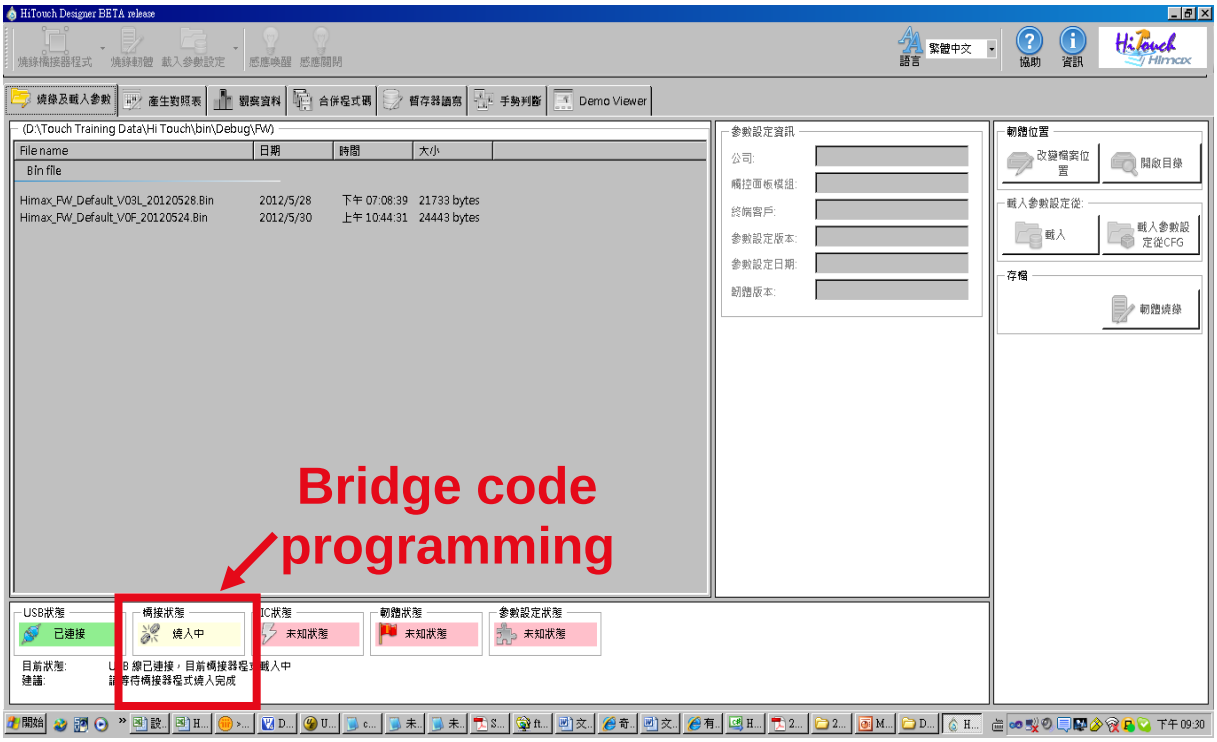
Step 1. Excute HiTouch Designer



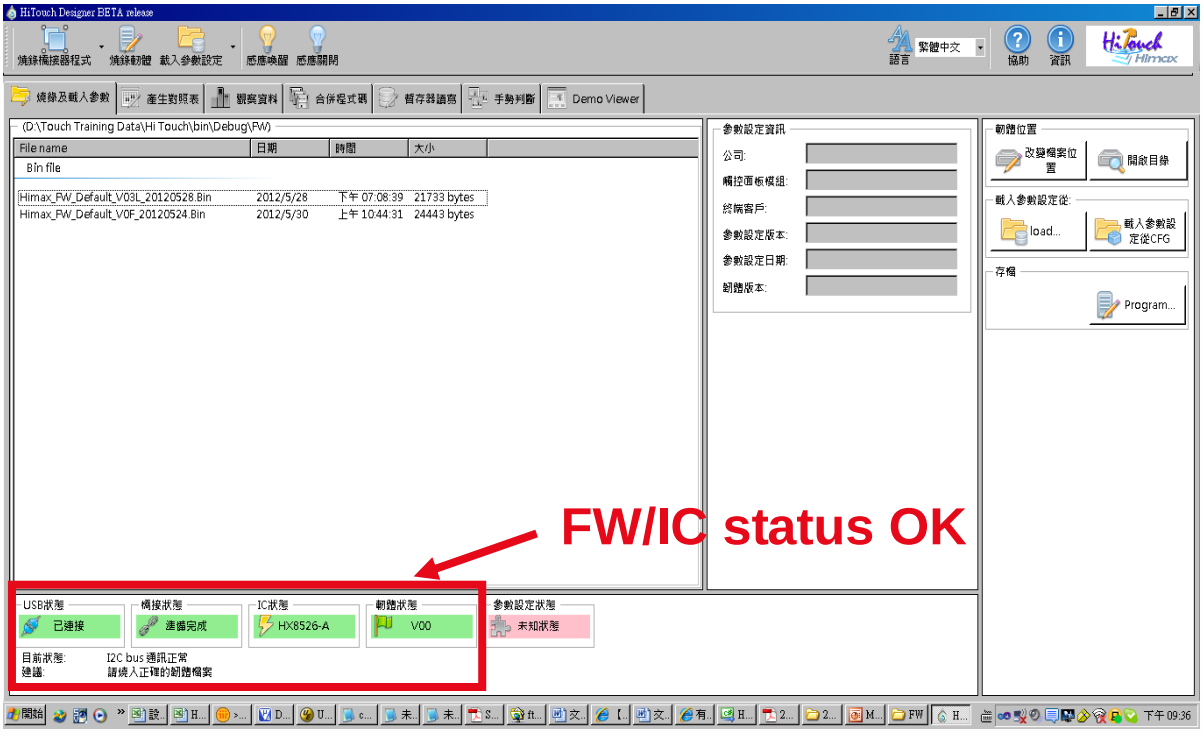
Step 2. Enter to main page



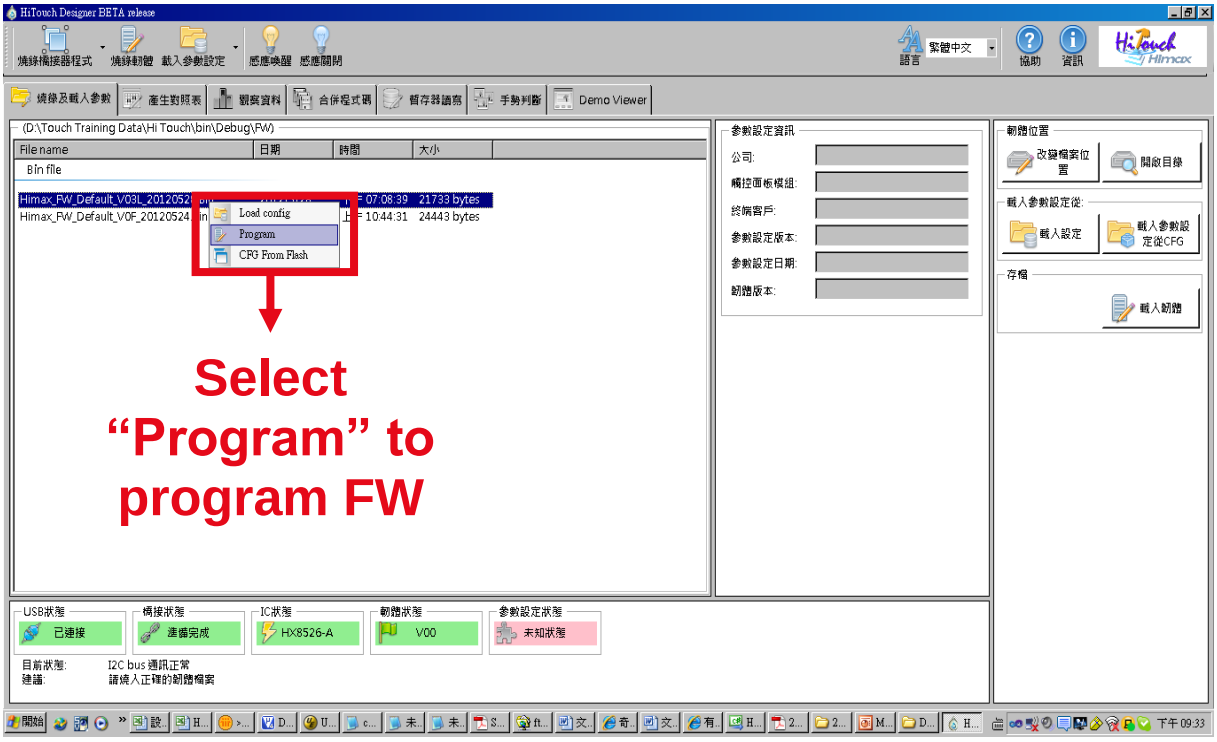
Step 3. Bridge code programming

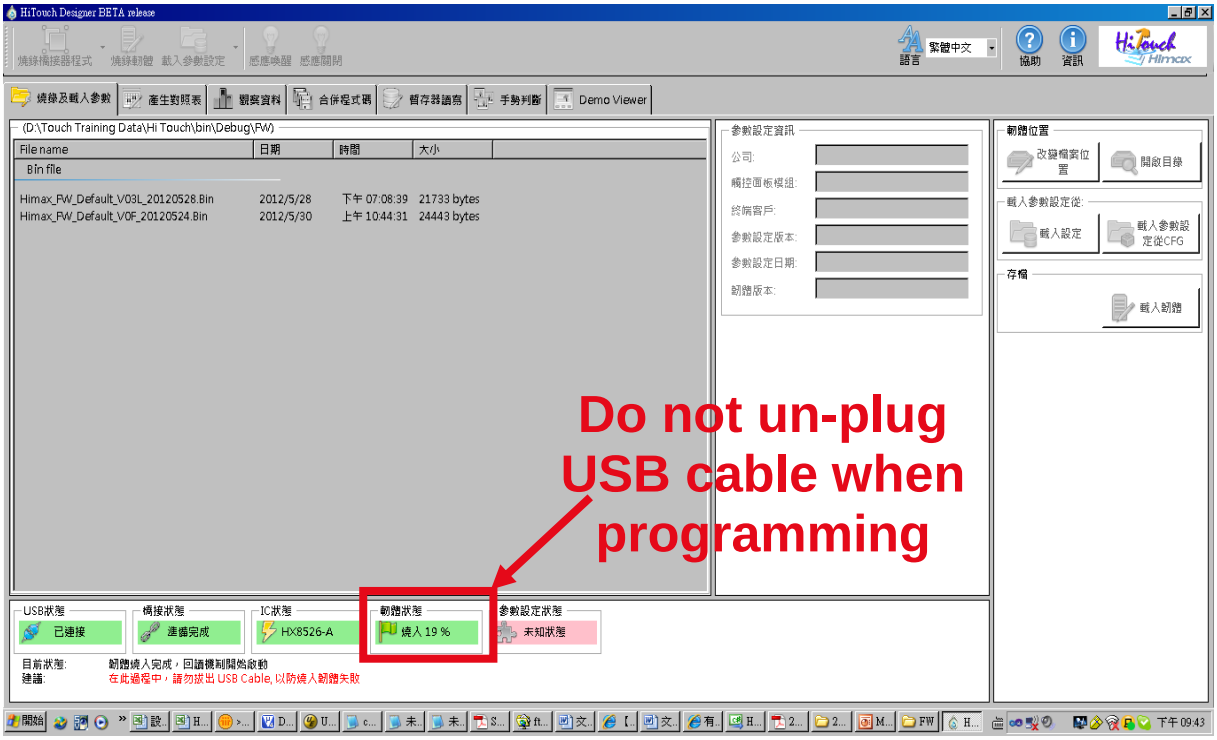


Step 4. FW/IC status

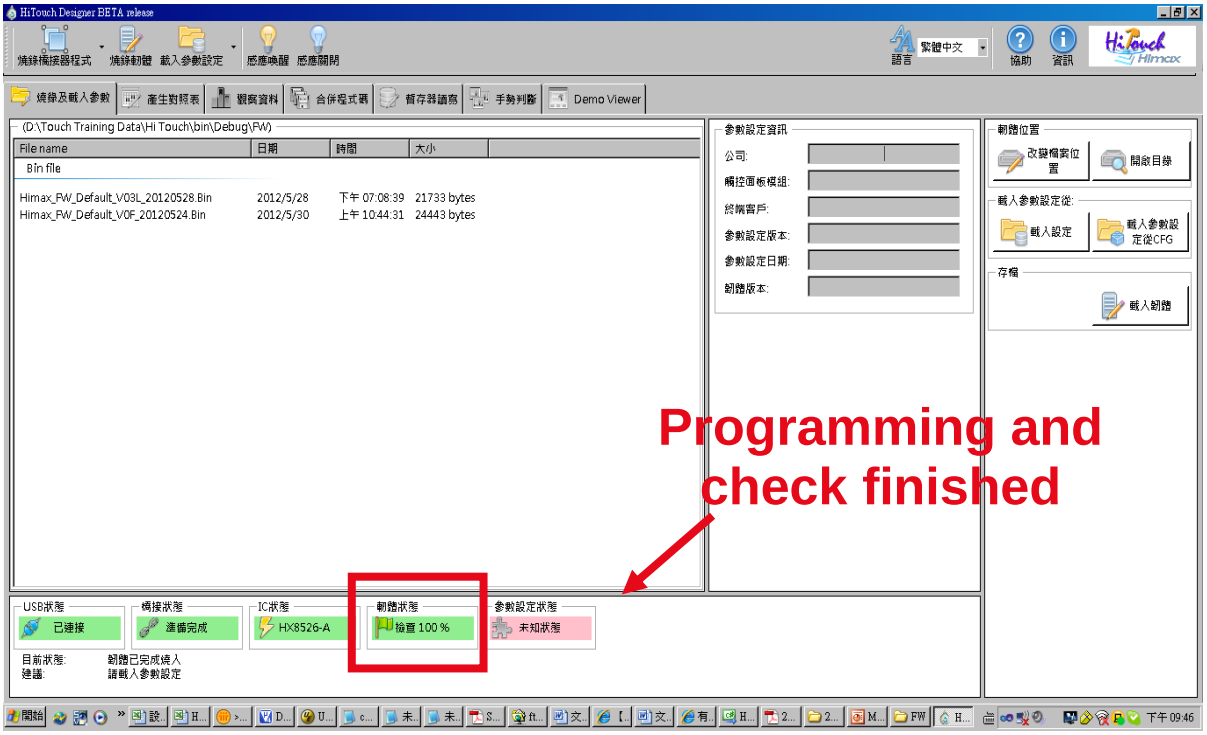


Step 5. FW programming

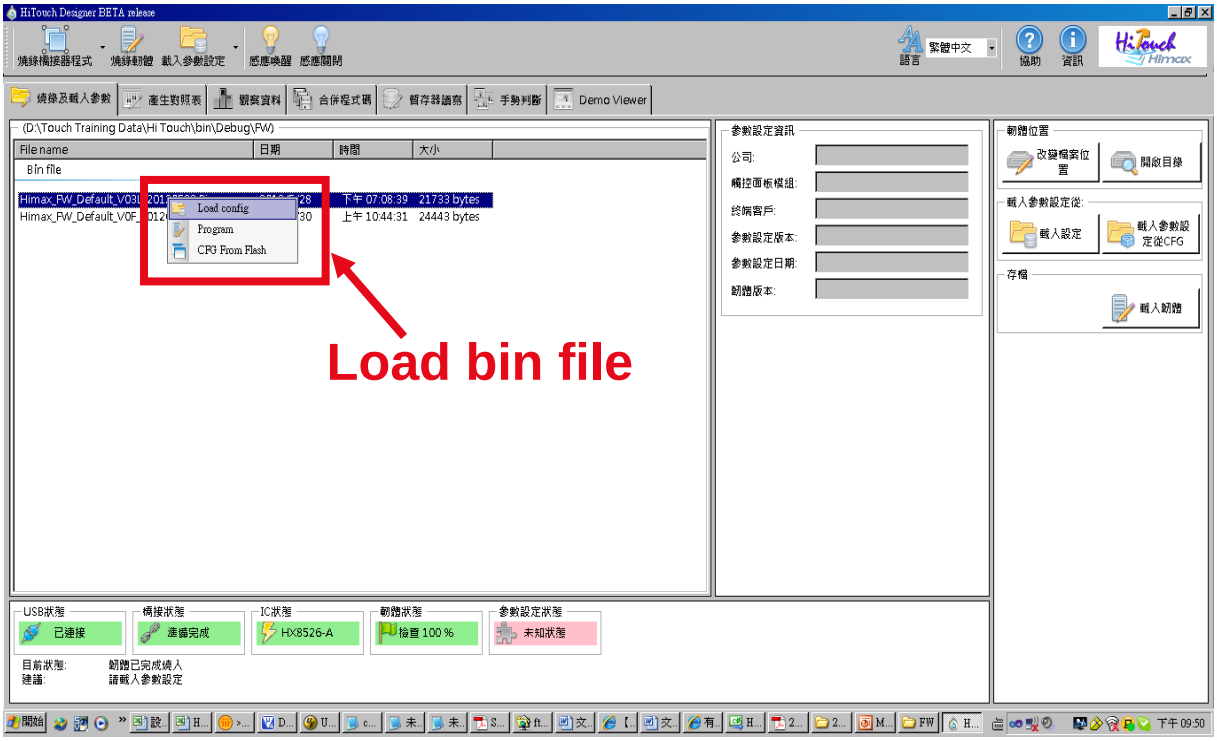




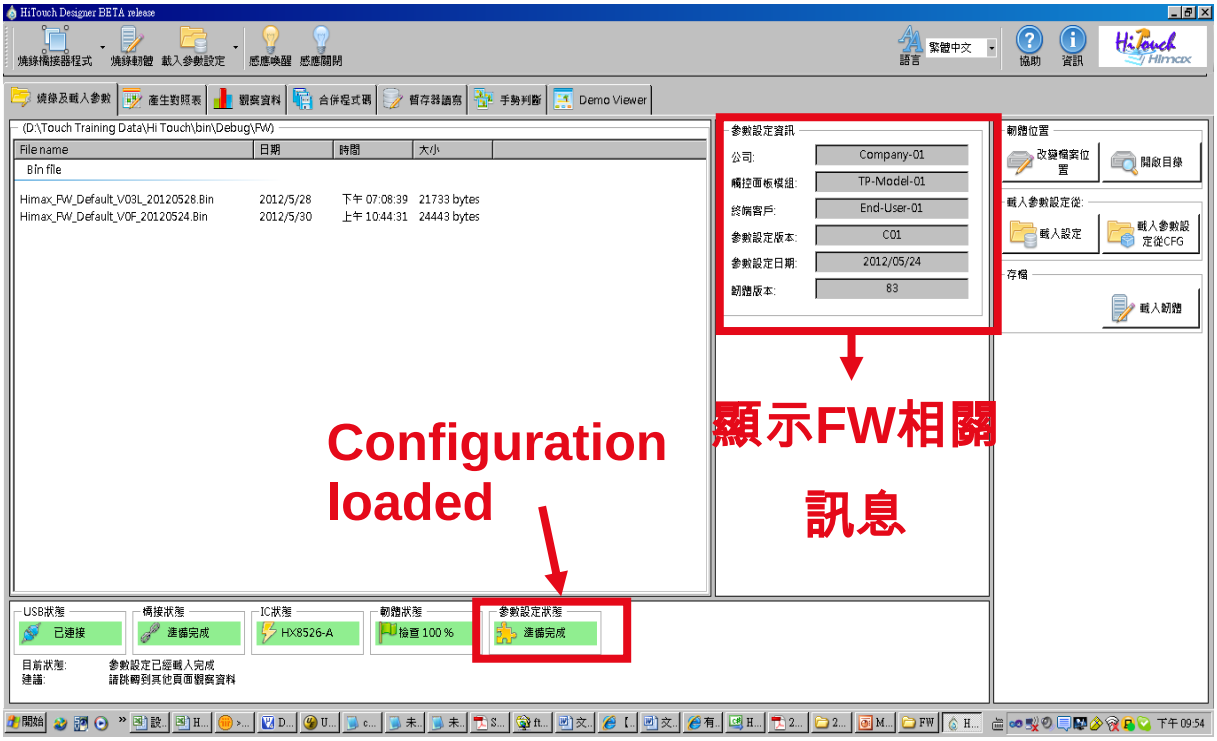
Step 6. Check the programming finished



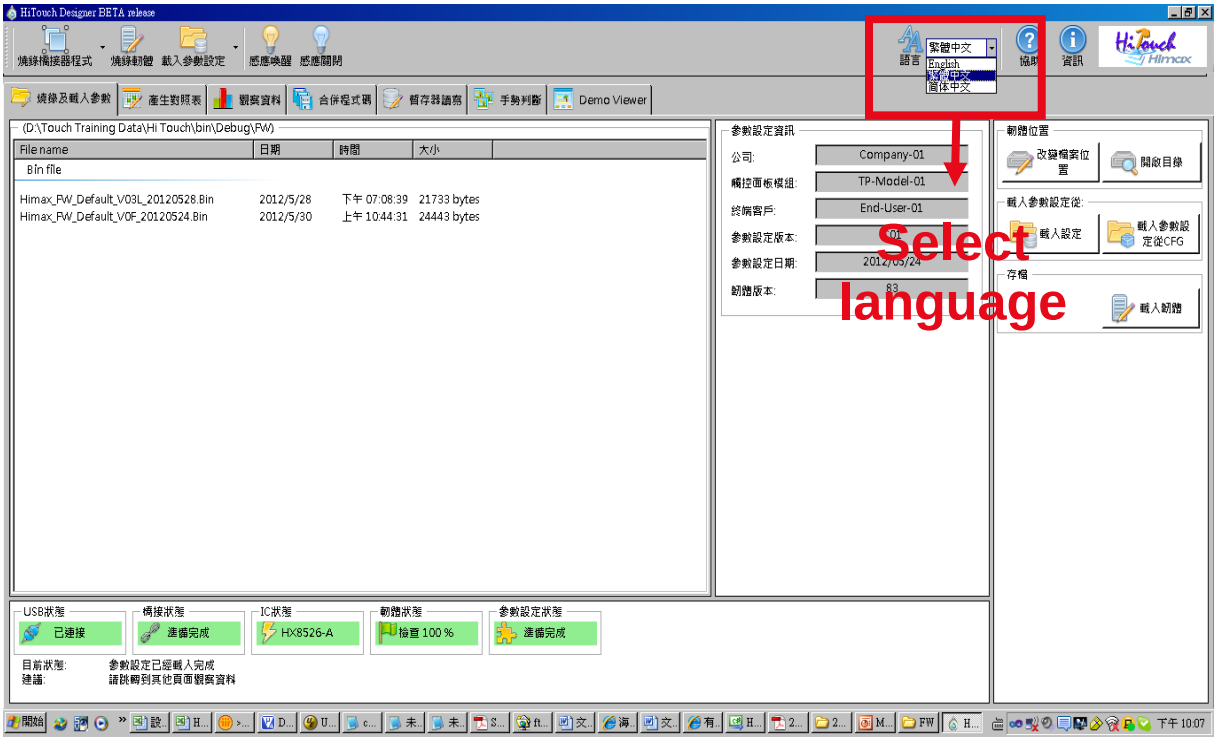
Step 7. Load bin

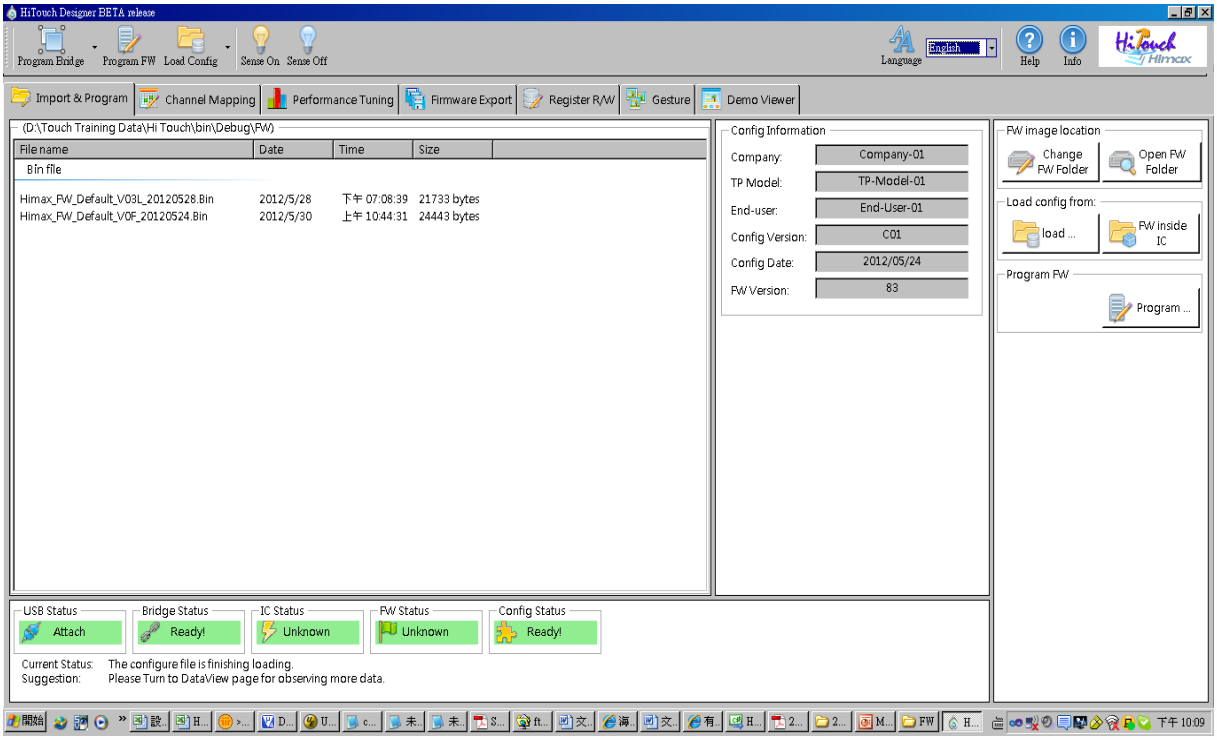


Step 8. Load finished and show the information

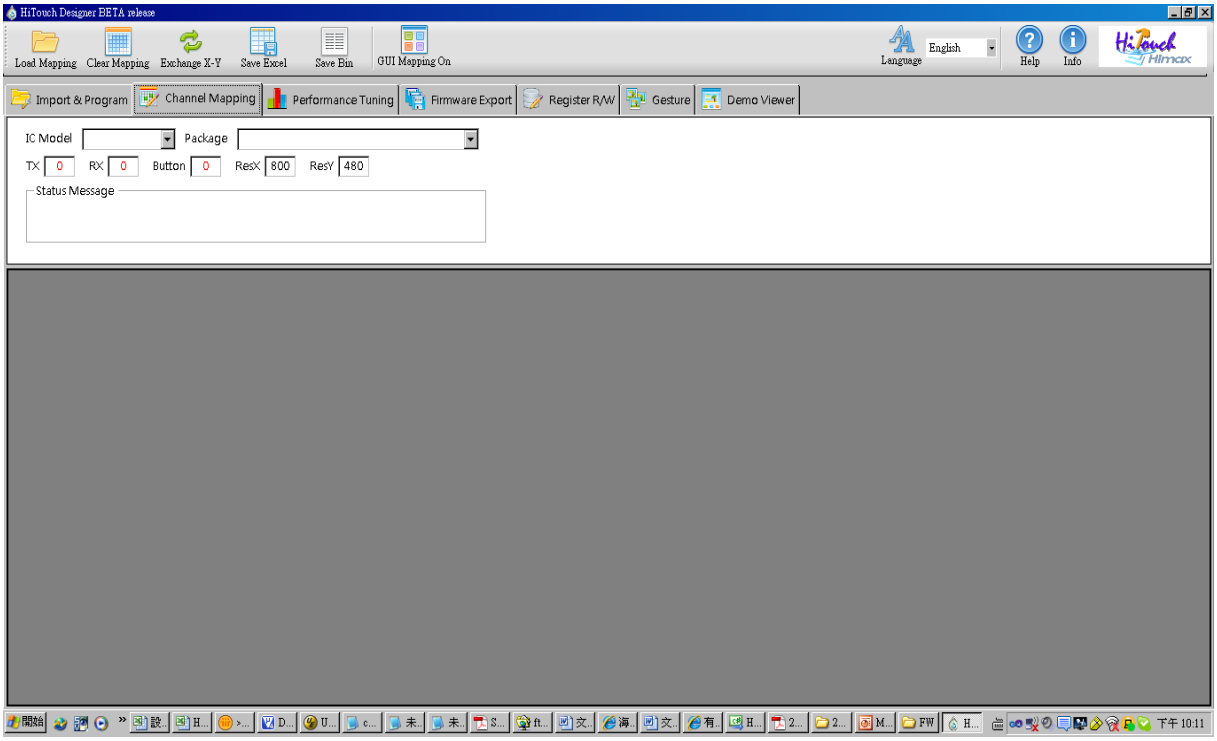


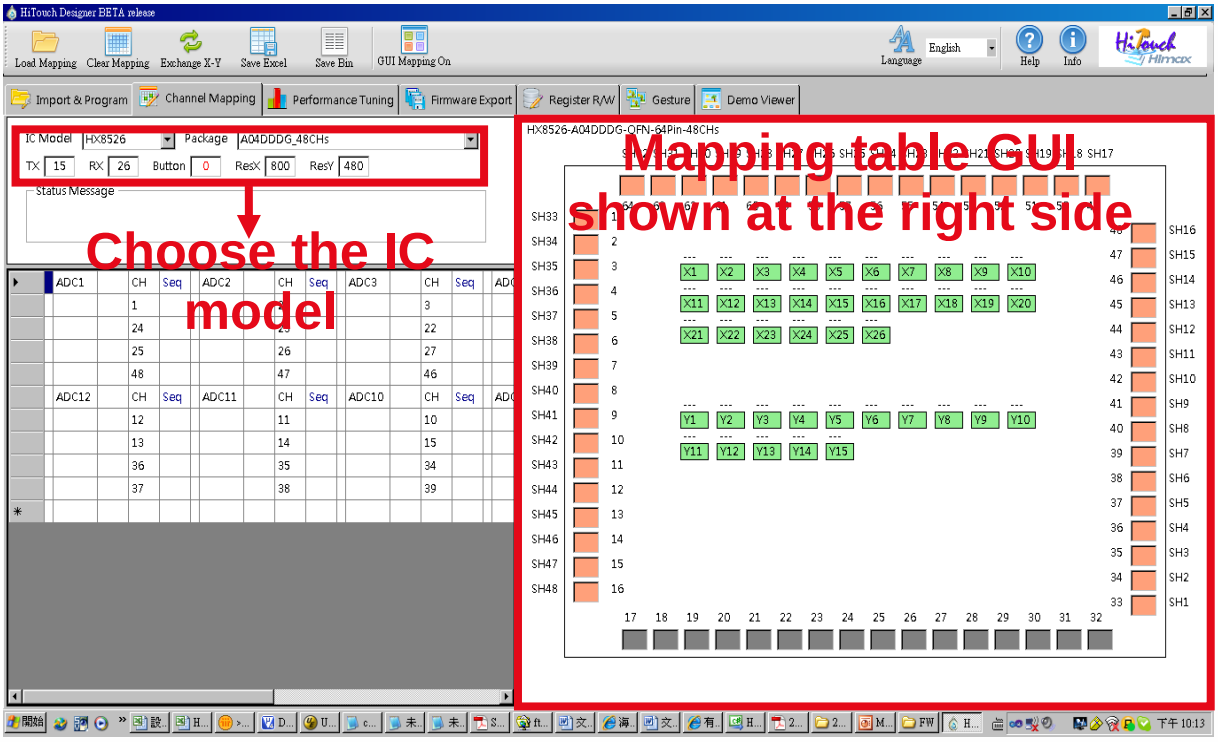
Step 9. Language changed after selected



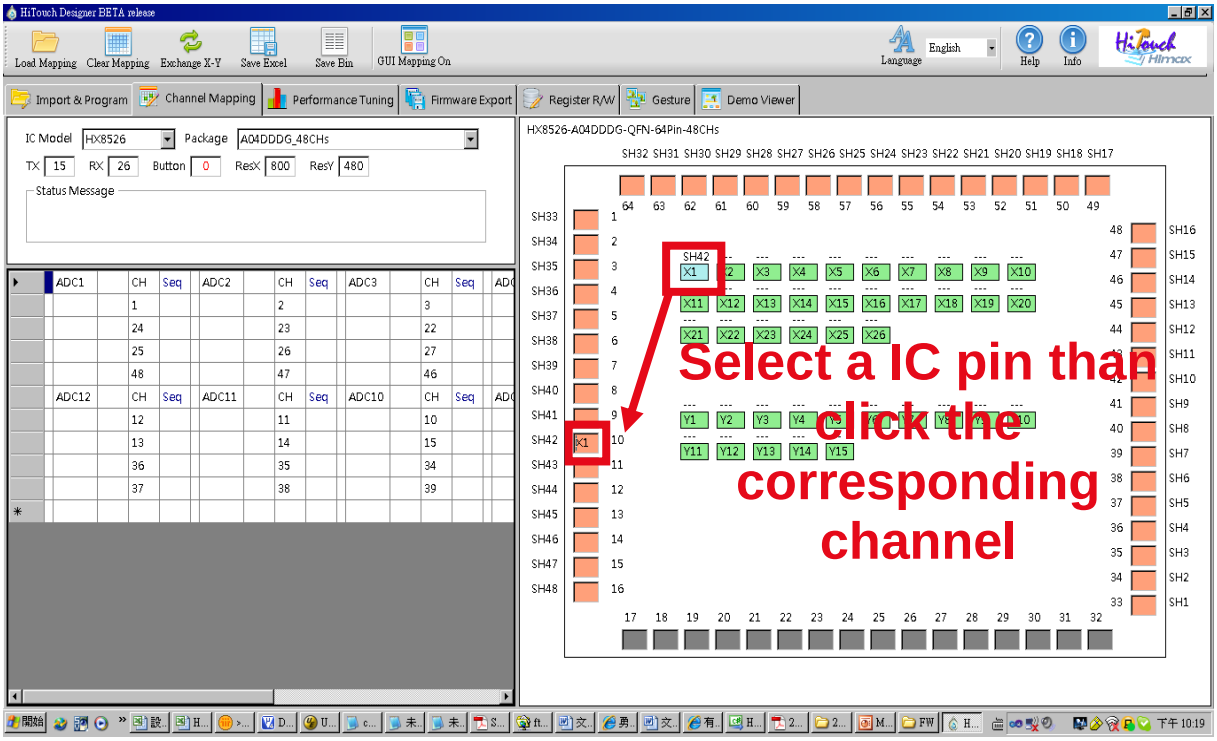


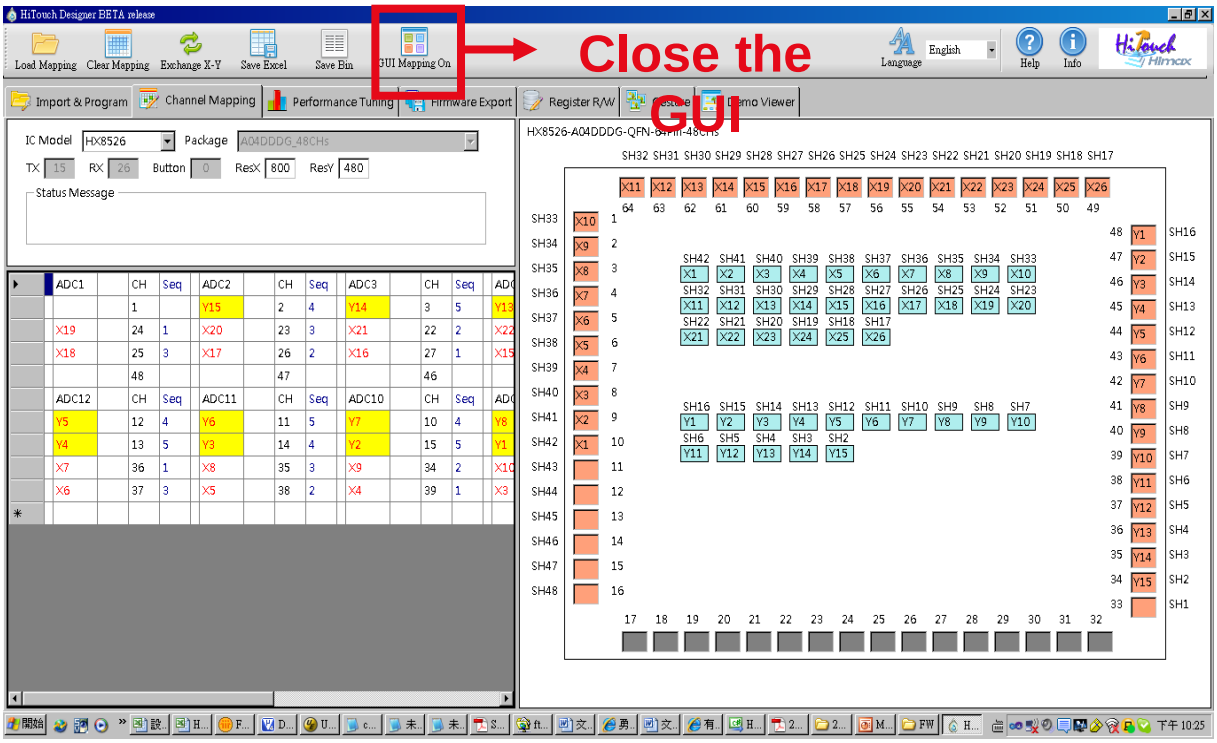
Step 10. Go to the mapping table page



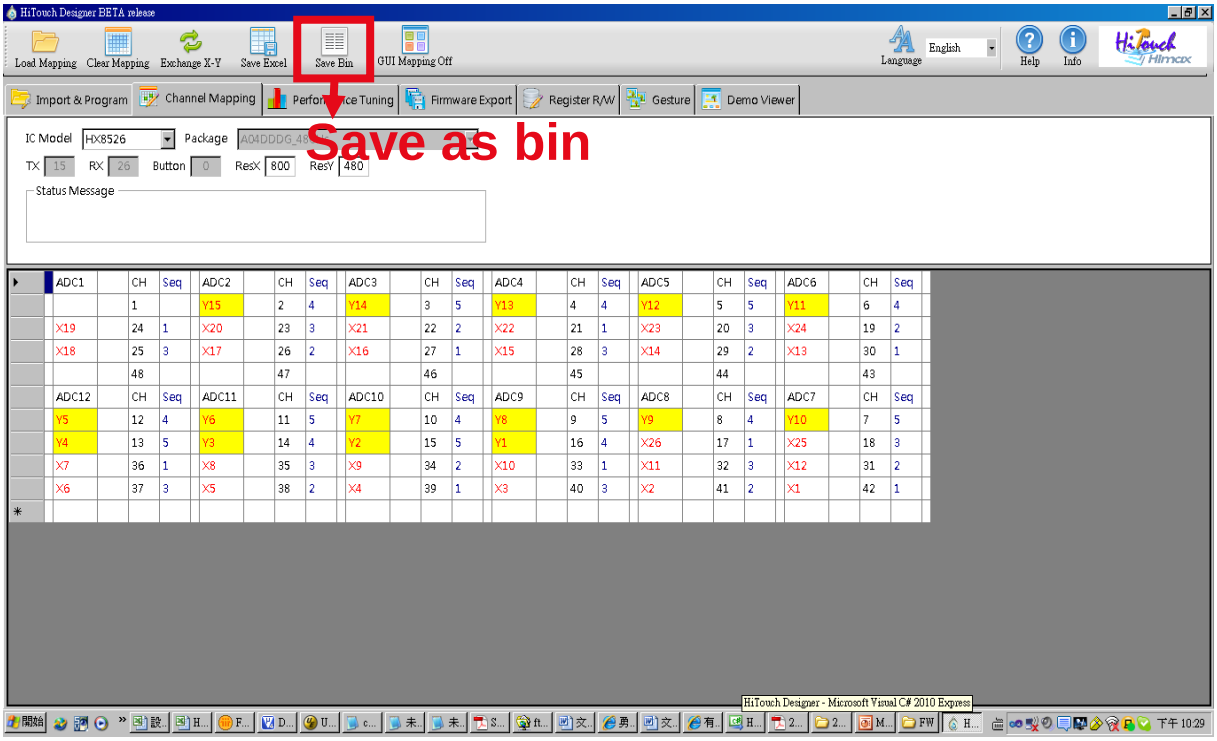


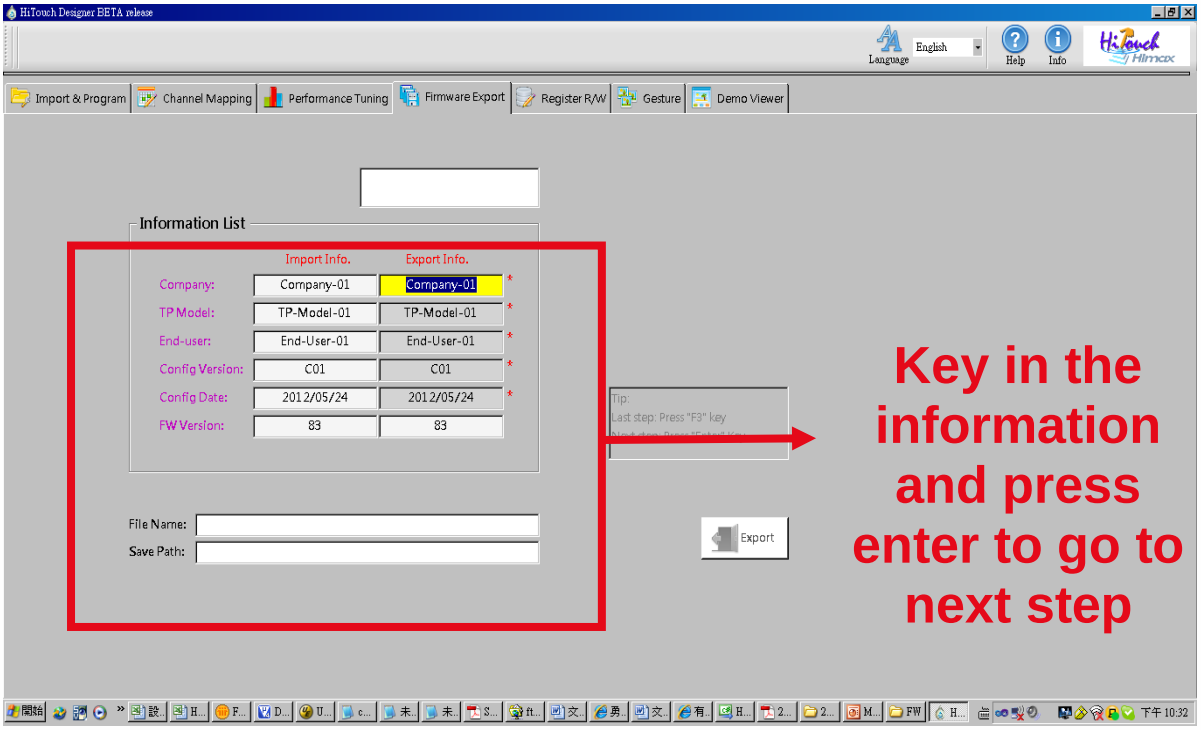
Step 11. Build mapping table

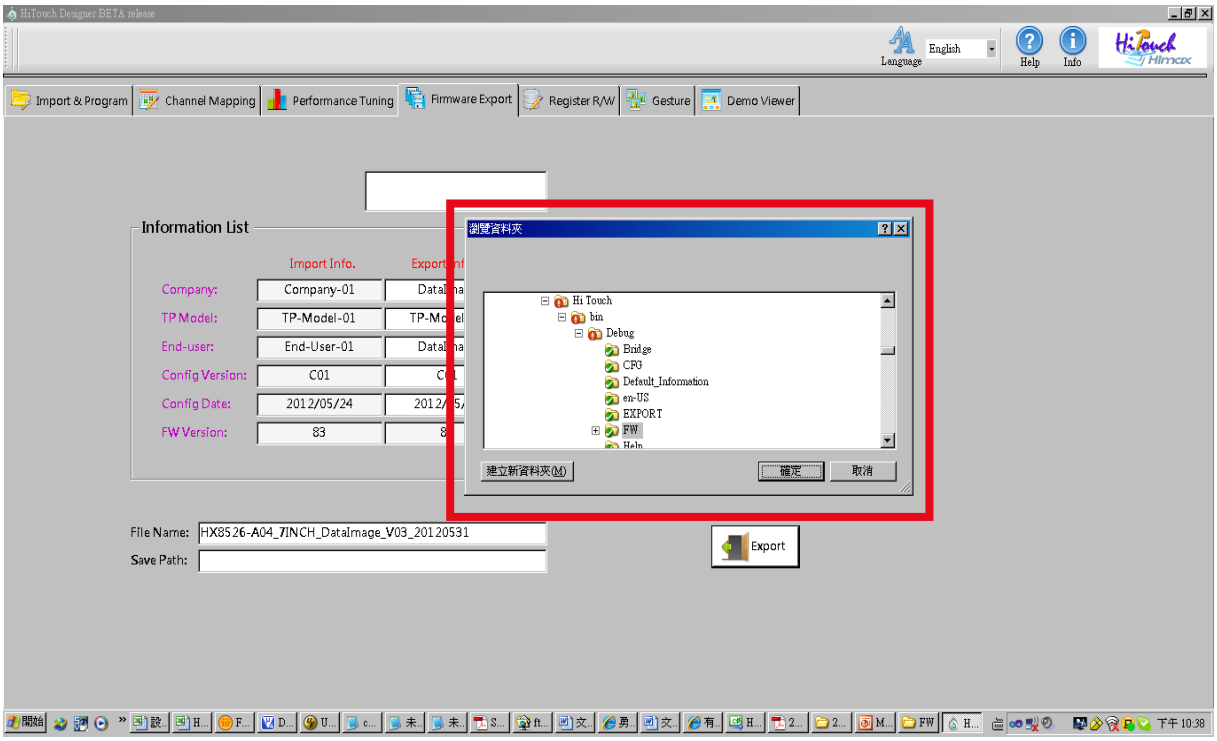




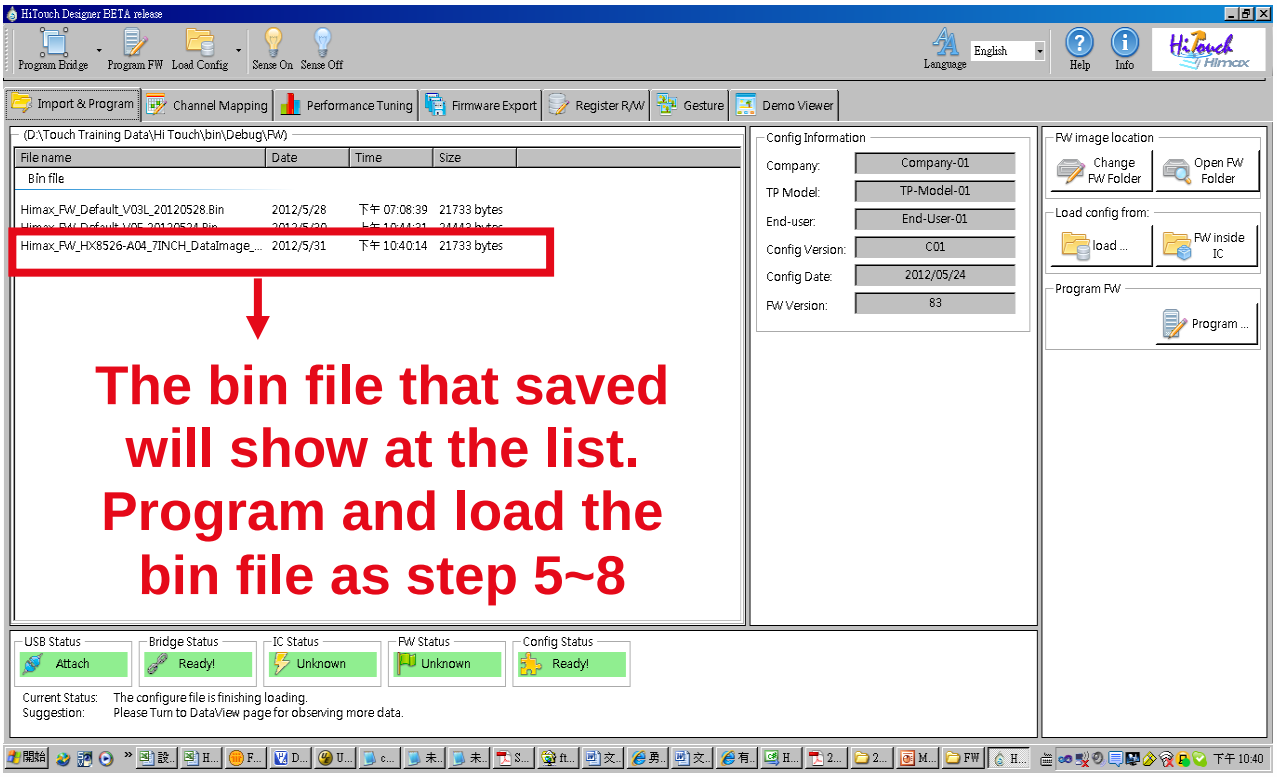
Step 12. Save bin again



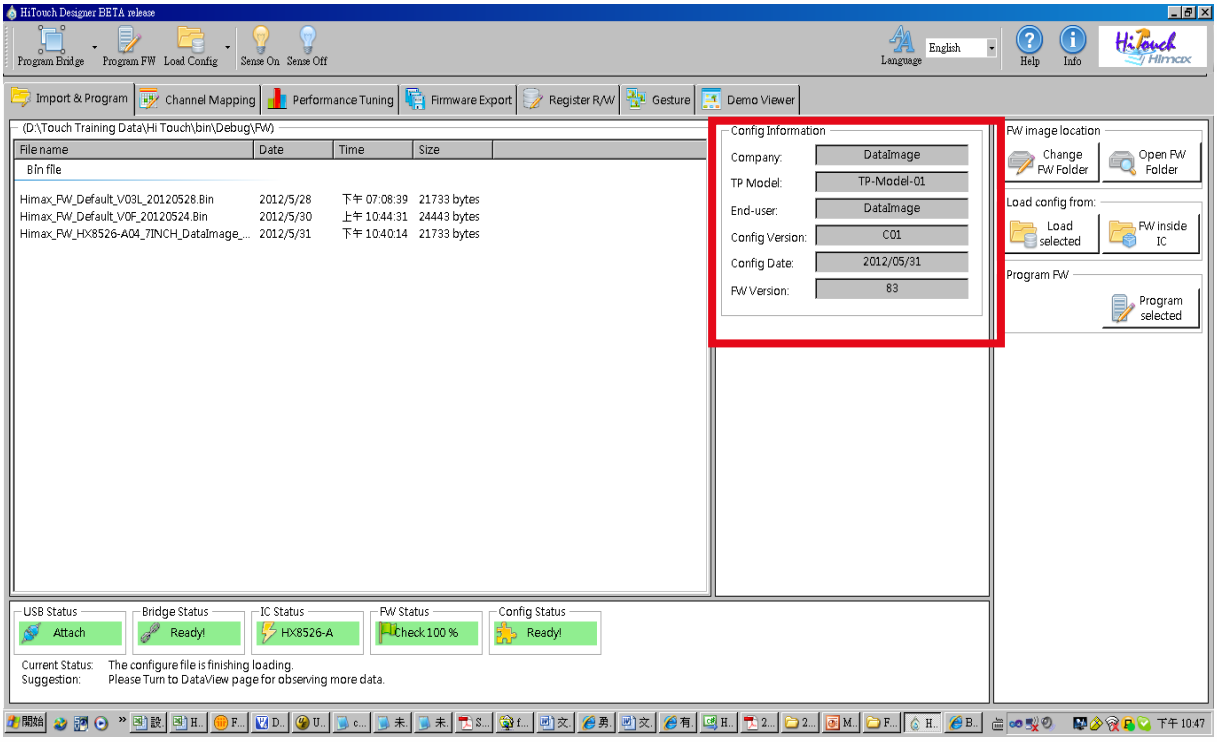




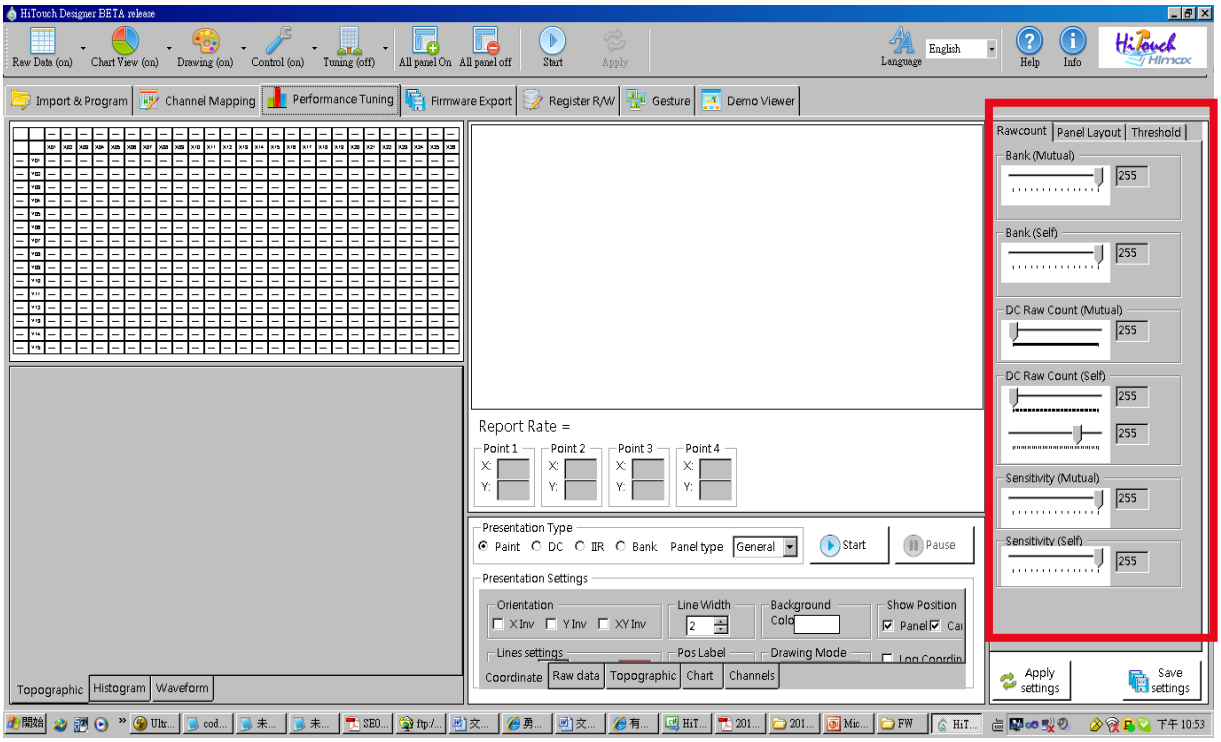
Step 13. Reload new bin



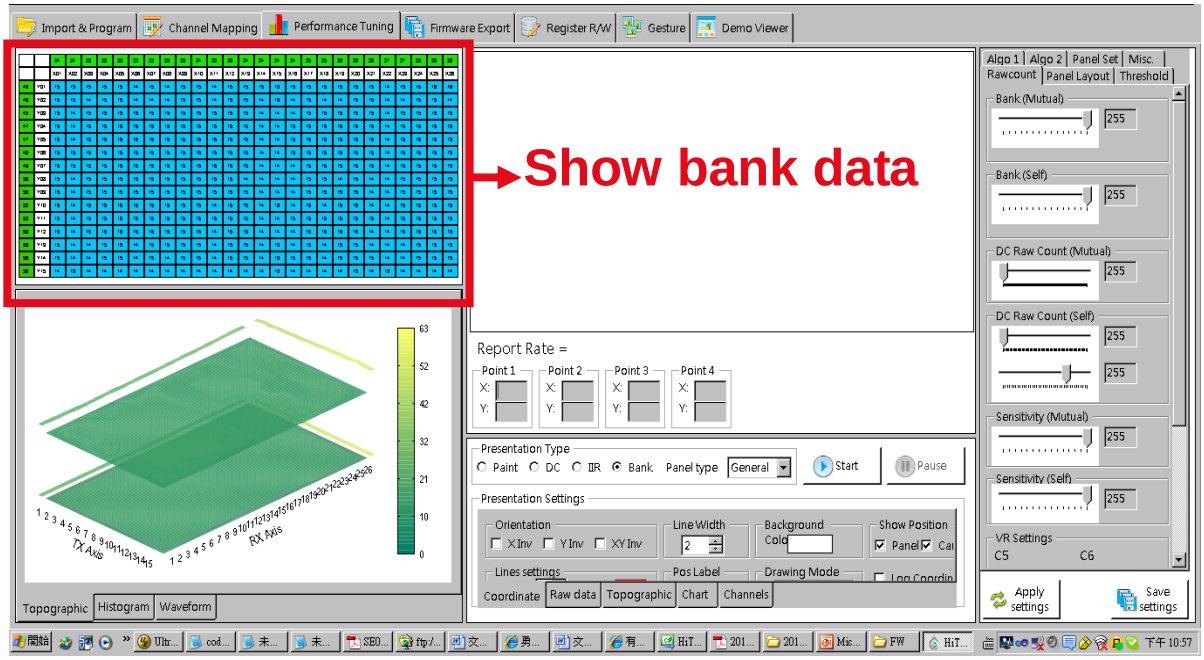
Step 14. Information of the new bin



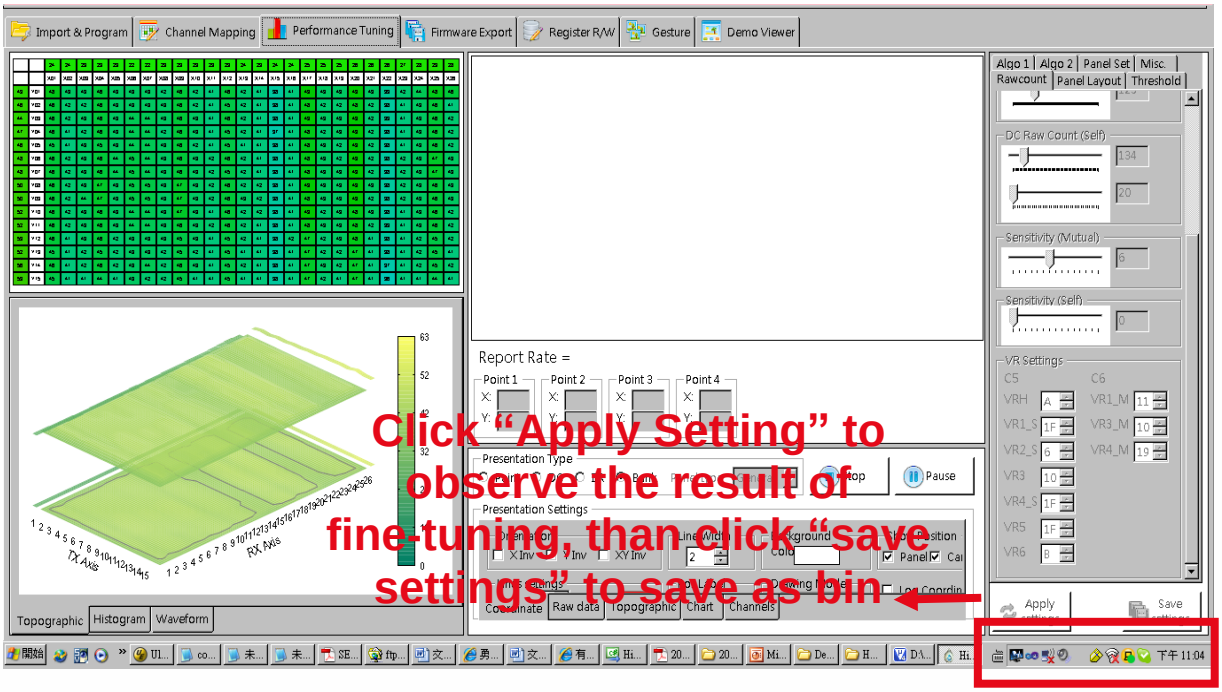
Step 15. Fine-tune page

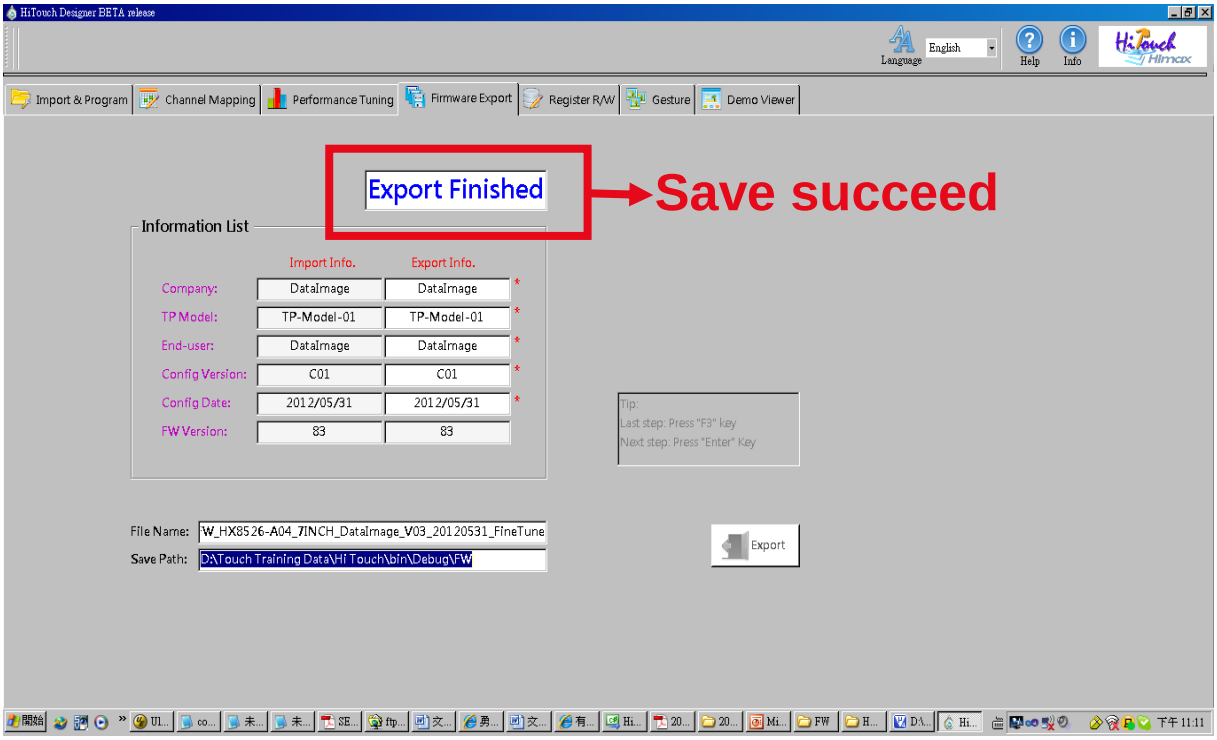


Step 16. Select “Bank“ and start

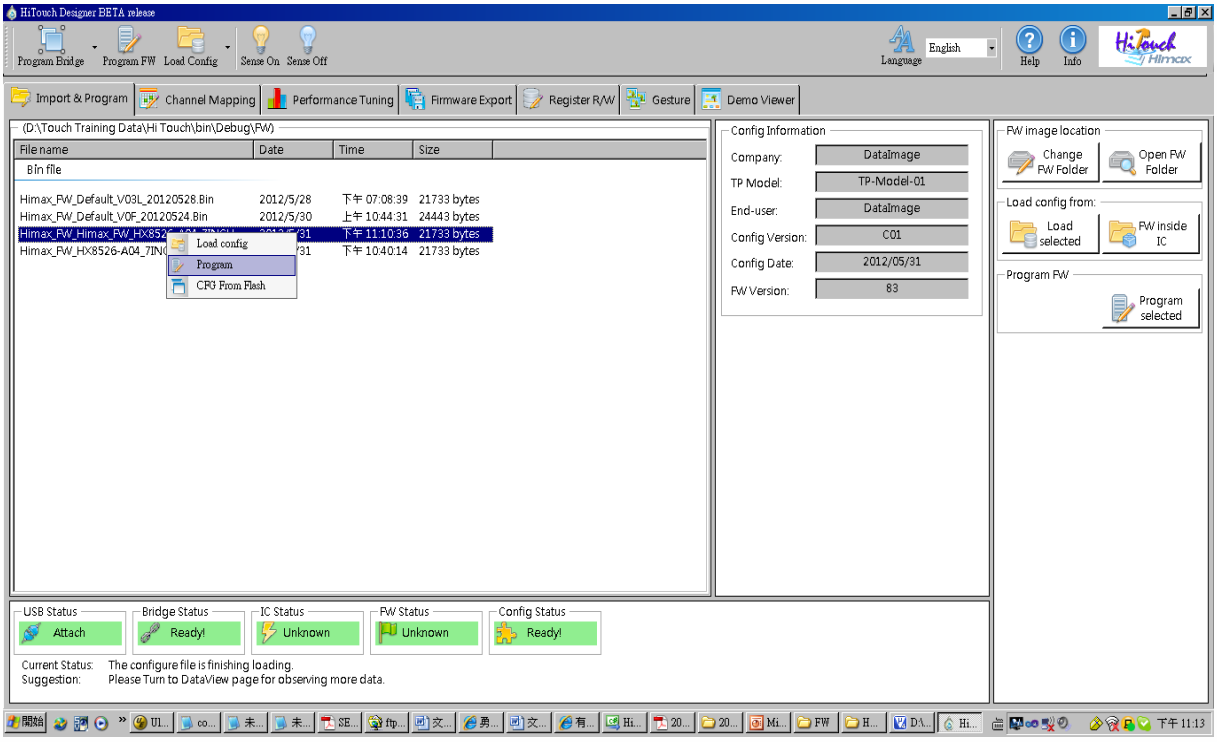


Step 17. Fine-tuning at the right side, and observe at the left side

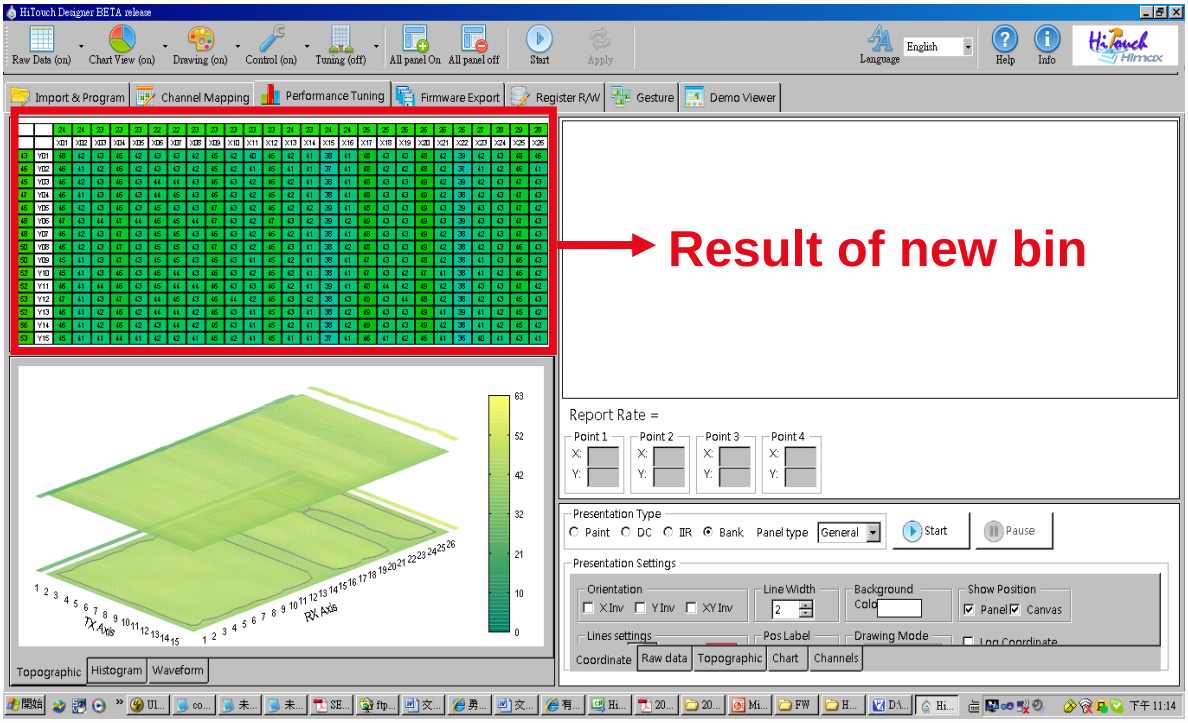




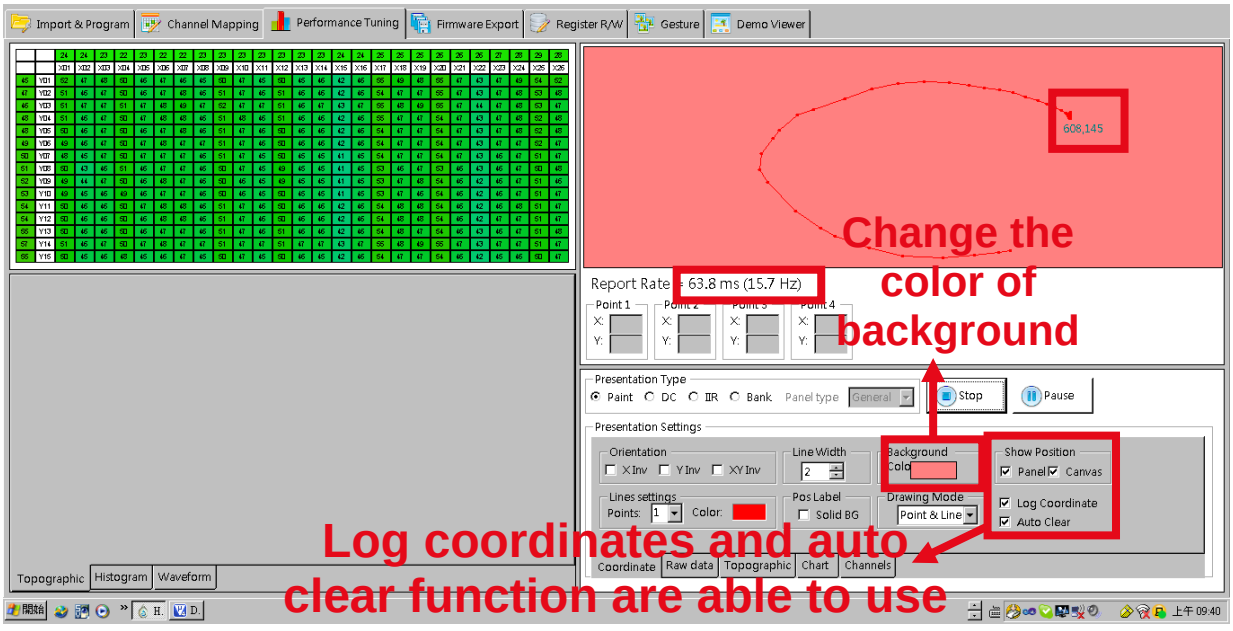
Step 18. Re-programming the new bin file



Step 19. Go to the data viewer and observe the variation



Step 20. Use paint function



Step 21. Use orientation inverse when the orientations are wrong