Windows Studio ITS User Guide

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Revision History

Version	Data	Author	Description
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1.0.0.1	2020/03/09	Max	Text modification
1.0.0.2	2020/07/23	Randy Huang	FW upgrade modification. Auto scan channel modification. Scan frequency spectrum modification. Sensor test modification
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1.0.2.1	2022/05/10	Evayn Cheng	1. Modify sensor test UI. 2. Add console tool description

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1.0.2.2	2022/07/27	Steven Sun	1. Modify sensor test UI-Setting / GPIO / Painting 1. Add new function and UI for uniformity Raw Data Test 2. Add new function read FW ID/Custom ID/EDID…
1.0.3.0	2022/11/03	Evayn Cheng/ Joe Hung/ Steven Sun	1. Modify UI 2. Add C model description
1.0.3.1	2023/05/11	Steven Sun	1. Modify UI 2. Add C model replay description 3. Modify C model description 4. Add Call ITS description 5. Add List of Support Protocol
1.0.3.2	2023/07/31	Evayn Cheng/ Steven Sun	1. When you download others items, you must enter the account and the password. 2. Sensor Test drawing Test - Adding Rectangle3 / Cross3 Explanation 3. GPIO Test Explanation: 4. C Model Replay - Adding Right-Click Instructions:
1.0.3.3	2023/08/16	Steven Sun	1. SensorTest adds GPIO Test - Sensor ID Explanation.
1.0.3.4	2023/08/28	Steven Sun	1. Add explanations for Rectangle3 and Cross3 to the Sensor Test Drawing Test summary table.
1.0.3.5	2024/03/18	Vane Li/ Steven Sun/ Evayn Cheng	1. Barcode setting description modification 2. Description of new features in C Model 3. Modification of SPEC setting method of Sensor Test Setting

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Table of Contents

REVISION HISTORY **1**

1. INTRODUCTION **15**

REQUIREMENT 15

LIST OF SUPPORT PROTOCOL 16

2. WIFI ITS - REMOTE DEVICE CONNECTION VIA WIFI/SOCKET **17**

WIFI ITS - REMOTE DEVICE SETTING AND STEPS 17

SETTINGS FOR REMOTE DEVICE CONNECTION 18

STEPS FOR UBUNTU-OS (OR OTHER LINUX-OS-BASED DEVICE) 21

STEPS FOR ANDROID – ADB WIRELESS SETTING 22

WIFI ITS CONNECTION ANOMALY HANDLING 24

3. MAIN TOOL FUNCTION **25**

HOME 25

ITS TOOL AUTO-UPDATES 28

DOWNLOAD 33

CONSOLE 35

PAINTING 37

CDC (CAPACITIVE TO DIGITAL CONVERTOR) 45

FW UPGRADE 53

TUNING 55

MERGE TO HEX 57

TUNING COMPARE 59

AUTO SCAN CHANNEL 61

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MORE FUNCTIONS 63
FREQUENCY SPECTRUM 64
CHARGE CURVE 68
C MODEL 75
4. SENSOR TEST TOOL 81
RD/OP MODE SWITCH 81
SENSOR TEST 84
SENSOR TEST – SPEC (PROFILE(F)) 86
SENSOR TEST – SPEC (SYSTEM) 87
SENSOR TEST – CALL ITS FUNCTION 94
SENSOR TEST – SPEC (FW UPGRADE) 96
SENSOR TEST – SPEC (IC VERIFY) 98
SENSOR TEST – SPEC (GPIO) 99
SENSOR TEST – SPEC (SHORT TEST) 101
SENSOR TEST – SPEC (OPEN TEST) 103
SENSOR TEST – SPEC (UNIFORMITY TEST) 104
SENSOR TEST – SPEC (DRAWING TEST) 108
SENSOR TEST – SPEC (MICRO OPEN TEST) 119
SENSOR TEST – SPEC (REPORT) 124
SENSOR TEST – SPEC (FPC TEST) 127
SENSOR TEST – SPEC (FPC SETTING) 128
SENSOR TEST – SPEC (FPC SHORT TEST SETTING) 129
SENSOR TEST – SPEC (FPC OPEN TEST SETTING) 130

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MP RESULT (OP MODE) 131

5. MULTI SENSOR TEST 132

RD/ MULTI OP/OP MODE SWITCH 132

MULTI SENSOR TEST MAIN SCREEN 133

6. GENERATE A PROFILE AUTOMATICALLY 134

PROFILE CONTENT DESCRIPTION 134

AUTO GEN. EXECUTIVE PAGE DESCRIPTION 135

AUTO GEN. SETTING PAGE DESCRIPTION 137

AUTO GEN. 139

COLLECTION LOG PROCESS DESCRIPTION 141

7. REPORT MODE 143

8. SENSOR TEST SETTING FLOW 145

9. CONSOLE TOOL COMMAND DESCRIPTION 147

PARAMETER DESCRIPTION - INDEPENDENT COMMAND 148

PARAMETER DESCRIPTION - CDC 151

PARAMETER DESCRIPTION - NOISE FREQUENCY 153

EXAMPLE 155

ERROR CODE 157

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List of Figures

Fig 1-1 I2C interface (ILITEK Bridge must) 15

Fig 1-2 USB interface 15

Fig 1-3 ILITEK Bridge V10 16

Fig 2-1 Wifi ITS Architecture 18

Fig 2-2 Setting window after clicking connection button 19

Fig 3-1 Home function 25

Fig 3-2 no network communication 28

Fig 3-3 update window message 28

Fig 3-4 if you choose not to update, you can set the next time to remind 29

Fig 3-5 update window 29

Fig 3-6 force to update 30

Fig 3-7 update window 30

Fig 3-8 Disable “Enable Auto-Updates in Windows_Studio_ITS.exe” 31

Fig 3-9 Windows_Studio_ITS.exe is the latest version 31

Fig 3-10-2 reminding: "Run as administrator" 32

Fig 3-11.1 login page 33

Fig 3-12 Console function 35

Fig 3-13 Painting function (List mode) 37

Fig 3-14 Painting (Full screen) 40

Fig 3-15 Painting function of supporting key (List mode) 41

Fig 3-16 Painting function of supporting key (Full screen) 42

Fig 3-17 Support hover state of the stylus mode 43

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Fig 3-18 the thickness of the track changes according to the size of the press when using the stylus 43

Fig 3-19 The thickness of the track changes according to the pressure when using the stylus 44

Fig 3-20 CDC (Connected) 45

Fig 3-21 CDC (Connected in key mode) 48

Fig 3-22 the default screen of the stylus (under the connection status) 48

Fig 3-23 There are five modes to choose from when selecting the USI option 49

Fig 3-24 ACK 49

Fig 3-25 Tip_0 49

Fig 3-26 Tip_1 50

Fig 3-27 Tip_2 50

Fig 3-28 ST 50

Fig 3-29 CDC Playback (Disconnect) 51

Fig 3-30 FW Upgrade 53

Fig 3-31 tuning tool 55

Fig 3-32 Tuning compare 59

Fig 3-33 Auto Scan Channel 61

Fig 3-34 More Func Interface 63

Fig 3-35 V3 Frequency Spectrum 64

Fig 3-36 V6.0.0~V6.0.1 Frequency Spectrum ..... 錯誤! 尚未定義書籤。

Fig 3-37 above V6.0.2 Frequency Spectrum ..... 錯誤! 尚未定義書籤。

Fig 3-38 Main Operation Interface 68

Fig 3-39 Scan Mode 68

Fig 3-40 hint message 68

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Fig 3-41 Sine 69

Fig 3-42 Switch-Cap 69

Fig 3-43 Mutual Sine 69

Fig 3-44 Mutual SW-Cap 69

Fig 3-45 Self SW-Cap 69

Fig 3-46 the times of sampling and option of two shot enable 70

Fig 3-47 9 coordinate positions 70

Fig 3-48 Run 70

Fig 3-49 sampling 71

Fig 3-50 Sweep Charge page 71

Fig 3-51 Sweep Dump page 72

Fig 3-52 enable you want to display data type (Max) 72

Fig 3-53 enable you want to display data type (Average) 73

Fig 3-54 74

Fig 3-55 message 74

Fig 3-56 finish sampling 74

Fig 3-57 C-Model Main Window 75

Fig 3-58 C-Model Right-Click Functions 76

Fig 3-59 C-Model Replay MainForm 77

Fig 3-60 Specifying a Frame in C-Model Replay 79

Fig 4-1 Switch mode Password 81

Fig 4-2 Main Setting 81

Fig 4-3 Sensor Test Tool (OP MODE) 82

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Fig 4-4 Show MP Result at Sensor Test Tool (OP MODE) 82

Fig 4-5 Sensor Test Tool (RD Mode) 83

Fig 4-6 Sensot Test main UI which Show Test Detail Info switch to OFF and Show Test Info Viewer switch to ON 83

Fig 4-7 Sensor test 1 84

Fig 4-8 Sensor test 2 84

Fig 4-9 Sensor Test – Profile menu 86

Fig 4-10 Sensor Test – SPEC (System) 1 87

Fig 4-11 Sensor Test – SPEC (System) 2 87

Fig 4-12 Sensor Test – SPEC (System) 3 87

Fig 4-13 Sensor Test – SPEC (System) 4 87

Fig 4-14 GPIO Trigger to Bridge Pin Connection Diagram. 92

Fig 4-15 Call ITS Function Enable Setting Section 94

Fig 4-16 IDPinSetting.ini Example 95

Fig 4-17 Sensor Test – SPEC (FW Upgrade) 96

Fig 4-18 Sensor Test – SPEC (IC Verify) 98

Fig 4-19 Sensor Test – SPEC (GPIO Test) 99

Fig 4-20 Sensor Test – SPEC (Short Test) 101

Fig 4-21 Sensor Test – SPEC (Open Test) 103

Fig 4-22 Sensor Test – SPEC (uniformity Test 1) 104

Fig 4-23 Sensor Test – SPEC (Drawing Test) 108

Fig 4-24 Sensor Test – SPEC (Drawing Rectangle test) 109

Fig 4-25 Sensor Test –Drawing Test (Cross) 111

Fig 4-26 Sensor Test – SPEC (Free Drawing Test) 113

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Fig 4-27 Sensor Test – SPEC (Free Drawing Test with virtual buttons) 113
Fig 4-28 Sensor Test – SPEC (Finger Detection) 114
Fig 4-29 Drawing Test –Rectangle type2.....115
Fig 4-30 Drawing Test –Cross type 2 116
Fig 4-31 Drawing Test –Rectangle type 3 117
Fig 4-32 Drawing Test –Cross type 3 118
Fig 4-33 Sensor Test – SPEC (Micro Open Test – Rx Delta) 119
Fig 4-34 Sensor Test – SPEC (RX_Avg_Delta setting) 122
Fig 4-35 Sensor Test – SPEC (Report) 124
Fig 4-36 Sensor Test – the path of the testing result setting (Report) 124
Fig 4-37 MP-Result V6 serial 125
Fig 4-38 MP-Result V3 serial 125
Fig 4-39 FPC Test UI 127
Fig 4-40 FPC Setting UI 128
Fig 4-41 FPC Setting – Short Test 129
Fig 4-42 FPC Setting – Open Test 130
Fig 4-43 Schematic diagram of FPC test Start 130
Fig 4-44 turn on Show MP Result 131
Fig 4-45 click the Show MP Result then pop-up the result window 131
Fig 5-1 Password Window 132
Fig 5-2 MainSetting Window 132
Fig 5-3 Multi sensor test Main Screen 133
Fig 6-1 Profile contents 135

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Fig 6-2 executive page 135

Fig 6-3 setting page 137

Fig 6-5 setting page 139

Fig 6-6 Auto Gen. Function is in progress. 139

Fig 6-7 the successful information 140

Fig 6-8 jump back to the page of general execution of sensor test. 140

Fig 6-8 folder structure 142

Fig 7-1 Report mode UI。 143

Fig 7-2 The Form that log selection。 143

Fig 7-3 Report Mode - schematic diagram of the execution result。 144

Fig 8-1 FPC setting。 145

Fig 8-2 Module setting。 145

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List of Tables

Table 2-1 Wifi ITS connection 17
Table 2-2 Wifi-ITS Advanced Setting 20
Table 3-1 Home function table 27
Table 3-2 download UI description 34
Table 3-3 Download Item 34
Table 3-4 Console function 35
Table 3-5 Console script description 36
Table 3-6 Painting function (List screen) table 38
Table 3-7 Drawing board function table 40
Table 3-8 Painting function (Full screen) table 41
Table 3-9 Painting function of supporting key (List mode) table 42
Table 3-10 Painting function of supporting key (Full screen) table 42
Table 3-11 Paint function description 44
Table 3-12 CDC function (Connected) table 47
Table 3-13 CDC function (Connected) table 48
Table 3-14 CDC playback table 52
Table 3-15 FW Upgrade table 54
Table 3-16 function table. 56
Table 3-17 merge to hex table 58
Table 3-18 Tuning compare table. 60
Table 3-19 Auto scan channel table. 62
Table 3-20 V3 Frequency spectrum table. 64

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Table 3-21 V6.0.0~V6.0.1 Frequency spectrum table. 67

Table 3-22 above V6.0.2 Frequency spectrum table. ..... 錯誤! 尚未定義書籤。

Table 3-23 C-Model UI Items Description 76

Table 3-24 C-Model Right-Click Functions Description 77

Table 3-25 C-Model Replay UI Items Description 79

Table 4-1 Sensor test table 85

Table 4-2 Profile menu 86

Table 4-3 Sensor Test – SPEC (System) table 92

Table 4-4 Explanation table of conflicts between Trigger Mode and Operator Option. 93

Table 4-5 Explanation table of conflicts between Operator Options. 93

Table 4-6 Sensor Test – SPEC (FW Upgrade) table 97

Table 4-7 Sensor Test – SPEC (IC Verify) table 98

Table 4-8 Sensor Test – SPEC (GPIO Test) table 100

Table 4-9 Sensor Test – SPEC (Short Test) table 102

Table 4-10 Sensor Test – SPEC (Open Test) table 103

Table 4-11 Sensor Test – SPEC (Uniformity test) table 107

Table 4-12 Sensor Test – SPEC (Drawing test) table 109

Table 4-13 Sensor Test – SPEC (Drawing Test-Rectangle) description 110

Table 4-14 Sensor Test – SPEC (Drawing Test-cross) description 112

Table 4-15 Sensor Test –Drawing Test(Free-Drawing) 113

Table 4-16 Sensor Test –Drawing Test(Finger Detection) 114

Table 4-17 Sensor Test –Drawing Test (Rectangle type 2) 115

Table 4-18 Sensor Test –Drawing Test (Cross type 2) 116

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Table 4-19 Sensor Test –Drawing Test (Rectangle type 3) 117

Table 4-20 Sensor Test –Drawing Test (Cross type 3) 118

Table 4-21 Sensor Test – SPEC (Micro Open test) table 122

Table 4-22 Sensor Test – SPEC (Micro Open test - RX_Avg_Delta) table 123

Table 4-23 Sensor Test – SPEC (Report) table 125

Table 4-24 Sensor Test – SPEC (Report) table 126

Table 4-25 FPC Mode description. 127

Table 4-26 FPC Setting description. 128

Table 4-27 FPC Setting – Short Test description. 129

Table 4-28 FPC Setting – Open Test description. 130

Table 5-1 Test item setting (Report) description 133

Table 6-1 Profile 134

Table 6-2 executive page description 136

Table 6-3 setting page description 138

Table 9-1 file list 147

Table 9-2 command list 150

Table 9-3 cdc sub-command list 152

Table 9-4 noise frequency sub-command list 154

Table 9-5 example 156

Table 9-6 error code list 157

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1. Introduction

ILITEK TP Test Studio supports USB and I2C interface (connect with ILITEK Bridge). It has 3 parts of the main function as bellows:

Sensor Test: Quality test of sensors for Mass production

Tuning: Tuning parameters for performance adjustment.

Debug: Performance and data observation.

Requirement

- **RAM**: 4G RAM above.
- (Operation System, OS): Windows 7 above.

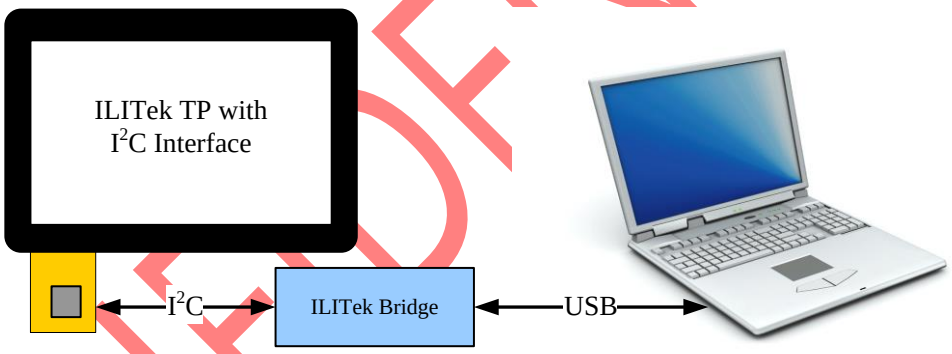


Fig 1-1 I2C interface (ILITEK Bridge must)

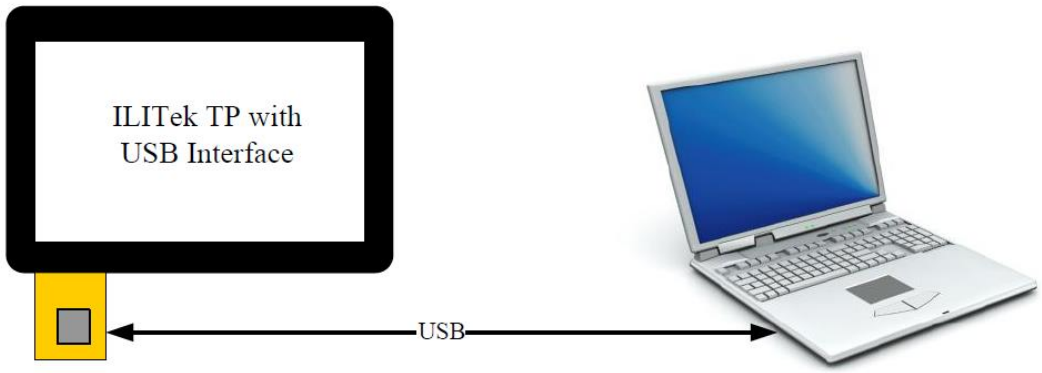


Fig 1-2 USB interface

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- ILITek Bridge (I2C to USB)

Tool must use an ILITEK bridge to connect touch controller while interface is I2C.

The bridge firmware version must be newer than V3.1.0.0(include V3.1.0.0)

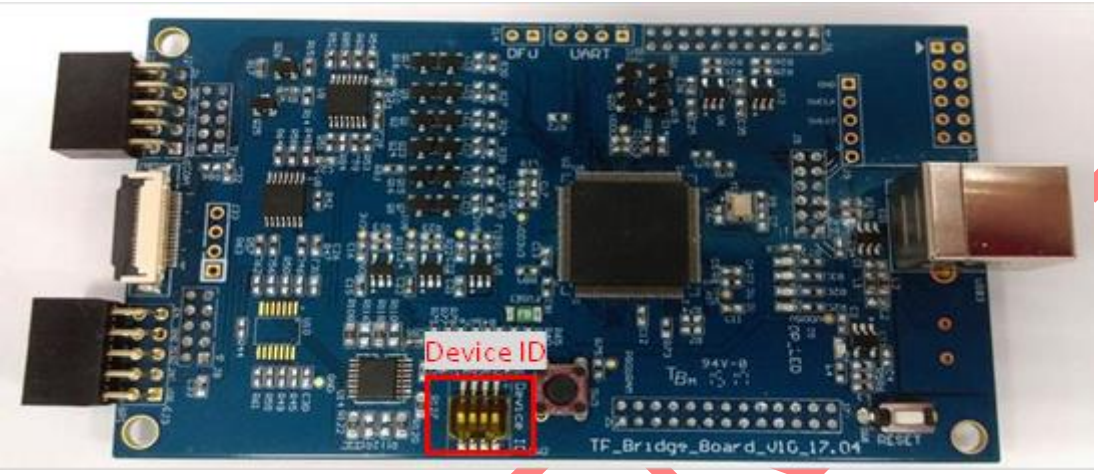


Fig 1-3 ILITEK Bridge V10

List of Support Protocol

List the ICs and protocol versions that this version of ITS Tool can support

Series	IC	Protocol
V3	2312 / 2315 / 2510 / 2511 / 2712	v30C / v310 / v340
V6	**Series** / **IC** **Lego** / 2520 / 2521 / 2323/ 2326 / 2316 **213x** / 2130 / 2131 / 2132/ 2133 **29xx** / 2900 / 2901 / 2910 / 2911 / 2531 / 2532 / 2921 / 2921M **2501x** / 25011 / 25012	v600 / v601 / v602 / v603/ v604 / v605 / v606 / v607 / v608 / v609 / v60A

表 1-1 Support list

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2. Wifi ITS - Remote Device Connection via Wifi/Socket

Wifi ITS - Remote Device Setting and Steps

Wifi ITS is a function that could access the remote Linux-OS-based device which ILITEK Touch IC is connected to. Before connection via Wifi ITS, please check the list as below.

1. Wifi ITS requires two Tools executed at the same time as below.
   - ITS Studio, which supports Wifi ITS function, executed on Windows device.
   - ILITEK Linux Daemon Tool, which supports Wifi command, executed on Linux-OS-based device.
2. Should have Linux Daemon Tool provided by ILITEK.
3. Both Linux-OS-based remote device (Client) and Windows ITS device (Host Server) are connected to the same IP domain.

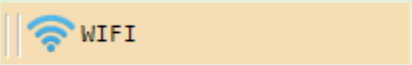
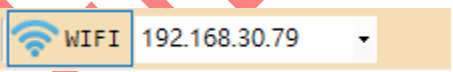
<table>
<tr><th>項目</th><th>名稱</th><th>說明</th></tr>
<tr><td>1</td><td>Wifi ITS</td><td>
<table>
<tr><th>Icon</th><th>Description</th></tr>
<tr><td>
</td><td>Wifi ITS disable</td></tr>
<tr><td>
</td><td>Wifi ITS enable,
Please select the correct server IP</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>Connect button</td><td>
<table>
<tr><th>Status</th><th>Description</th></tr>
<tr><td>Disconnect</td><td>not connected/ Wifi and remote device is disconnect-ed</td></tr>
<tr><td>Wifi Connecting</td><td>Wait for remote device connection</td></tr>
<tr><td>Connect</td><td>Remote device is connected/ click again to disconnect</td></tr>
</table>
</td></tr>
</table>

Table 2-1 Wifi ITS connection

The overall architecture of Wifi ITS is shown below.

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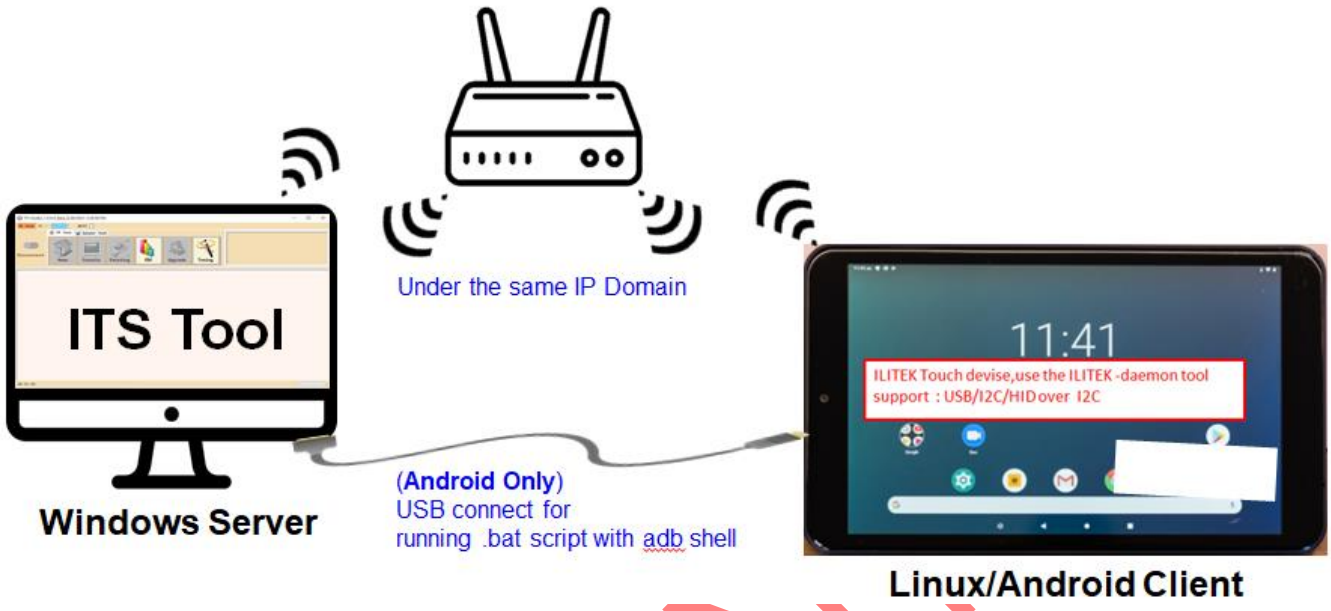
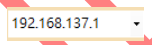


Fig 2-1 Wifi ITS Architecture

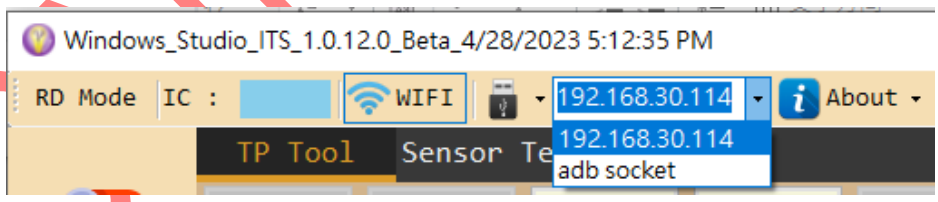
Settings for Remote Device Connection

Please following below steps to connect Wifi ITS with Remote Device.

1. Enable Wifi ITS button 

2. Select corresponding Server IP 

(under the same IP address with Remote Device)
Starting from ITS version 1.0.12.0, Android devices now support direct ADB connection without requiring the remote device to be set up on the same IP network.



3. Click connection button  , Wifi ITS Server would start to wait Slave connection。
4. Use Wifi Setting Windows at down-left side to create script (/Script/Wifi_Daemon_Init.sh), then execute it at Remote Device.
5. After successfully connect  , ITS main functions would be available as usual.

For users, who don't know how to use ILITEK Daemon Tool, setting windows would be shown after enabling Wifi ITS button. After setting and clicking "Apply All" button, it would create a .bat and .sh file in "Script" folder under the same directory of ITS_Studio.exe. .bat file is

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generated for Android remote device, and .sh file is generated for Other Linux-OS-based remote device. If users know how to use ILITEK Daemon Tool on remote device, please ignore the setting window.

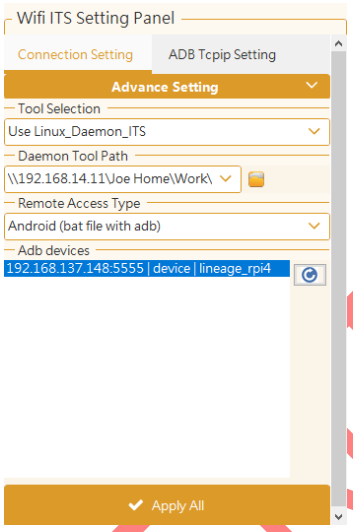


Fig 2-2 Setting window after clicking connection button

Please follow below steps according to different Remote Device.

a. Android Remote Device

1. To automatically adb push ILITEK Linux Daemon Tool into Remote Device, **please firstly connect USB between remote device and ITS host device.**
2. Select “Remote Access Type” as Android, connected android devices would be listed below. If no devices pop up, please check USB connection and press “refresh” button again, then choose a device that ITS should connect to.
3. If users would like to set adb connection wirelessly, please refer to following chapter about adb tcpip setup. **If Android device reboot and unable to connect IP automatically, we suggest that connect USB again then set adb tcpip again.**
4. Select the path of ILITEK Linux Daemon Tool.
5. After press “Apply All” button, .sh and .bat script would be created and automatically executed.

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b. Other Linux-OS based Remote Device

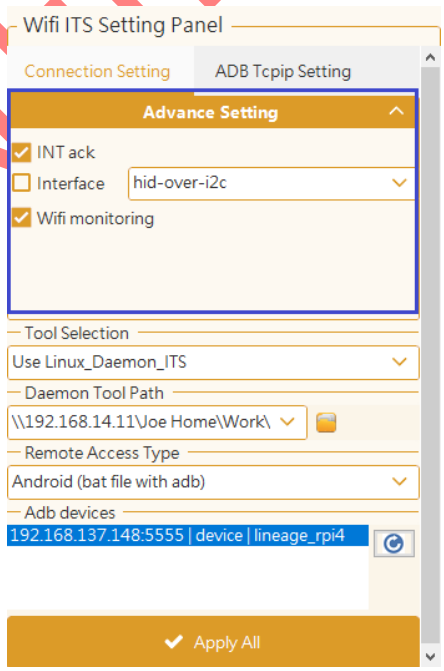
1. Select the path of ILITEK Linux Daemon Tool.
2. Select “Remote Access Type” as Other Linux OS, then press “Apply All” button.
3. Afterward, .sh script would be generated, please put .sh script and ILITEK Daemon Tool under the same directory in remote device via SSH or USB drive. Then, chmod it to be executable, and run the .sh script. Wifi ITS should be connected. Please refer to next page (Ubuntu demo.) for more detailed description.

※ **Created Wifi_Daemon_Init.bat/ Wifi_Daemon_Init.sh script would be put into Script folder in the same directory of ITS_Studio.exe.**

※ **Wifi ITS advanced setting: Open the “Advance Setting”, Wifi ITS provides some advanced setting as below.**

Item	Name	Description
1	INT ack	Enable INT ack for I2C Interface, default enabled.
2	Interface	Specify interface of touch controller, default disabled.
3	Wifi Monitoring	Enabled Wifi connection real-time check, default enabled.

Table 2-2 Wifi-ITS Advanced Setting



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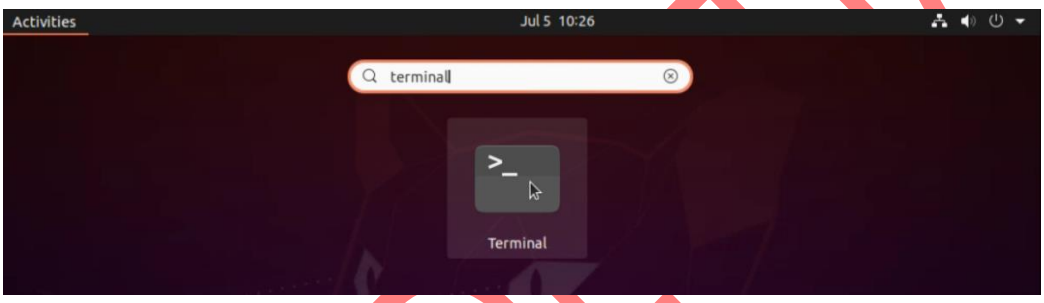
Steps for Ubuntu-OS (or Other Linux-OS-based device).

1. Please finish Wifi ITS setting window first, and “Remote Access Type” should be “Other Linux-OS”. After clicking “Apply All” button, “Wifi_Daemon_Init.sh” would be created under the same directory as ITS_Studio.exe.

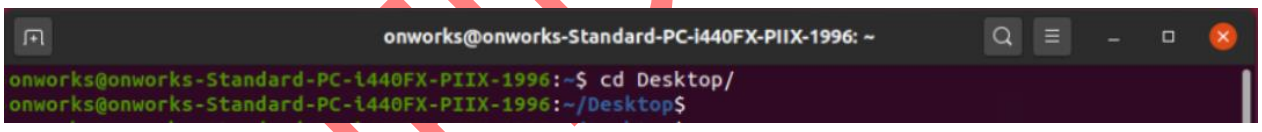
2. Put ILITEK Daemon Tool and “Wifi_Daemon_Init.sh” to the same directory with executable path, ex. Desktop or Download.

3. Open a Terminal (Ctrl + Alt + T), and check ILITEK Daemon Tool is executable as below.

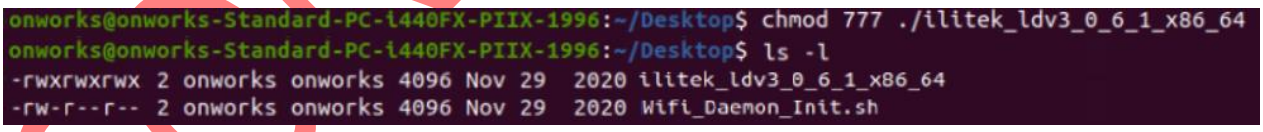
   a. Open a Terminal (Ctrl + Alt + T)



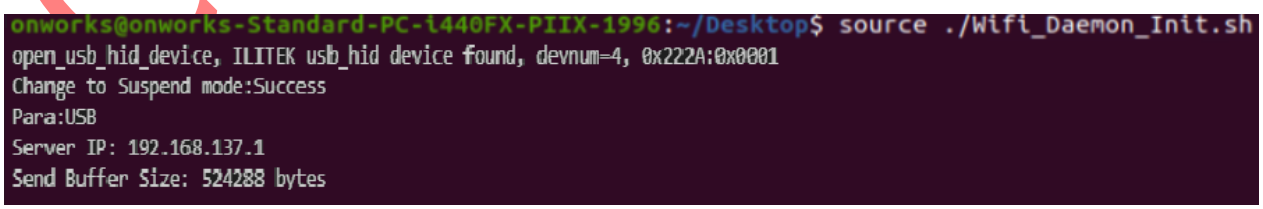
   b. Go to the path of tool and script. cmd: “cd <Path to ILITEK Daemon Tool and .sh file>”



   c. change tool to be executable. cmd: “chmod 777 <ILITEK Daemon Tool Path>”



4. ITS Tool should be Wifi Connecting state, run the scrip, cmd: “source <.sh File Path>”



5. Daemon Tool is ready for Wifi ITS connection, please check connection status of ITS Studio.

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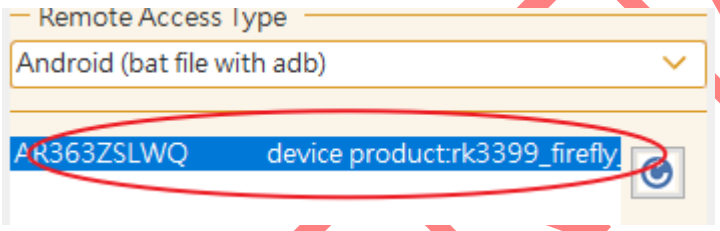
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Steps for Android – ADB Wireless Setting

Before adb wireless had been set up, **or after Android reboot,** please connect USB wire between Android device and Host PC.

1. Enable Android Wifi function, and connect to the same IP domain as Host PC manually.
2. Select “Remote Access Type” as “Android”, ADB Tcpip Setting tab would pop up.
3. Firstly check Android device is shown in devices list below. If usb is connected and devices do not show below, please try to press “refresh” button at right side.



4. Press “ADB Tcpip Setting” tab, please press “Get Remote Device IP” firstly. Wifi connection information would come up below. Please try to find IP address of Android device. If Wifi is connected, please find keyword “wlan”. If Ethernet is connected, please check keyword “eth”.
5. Key in IP address in text box of “Remote Device IP”.

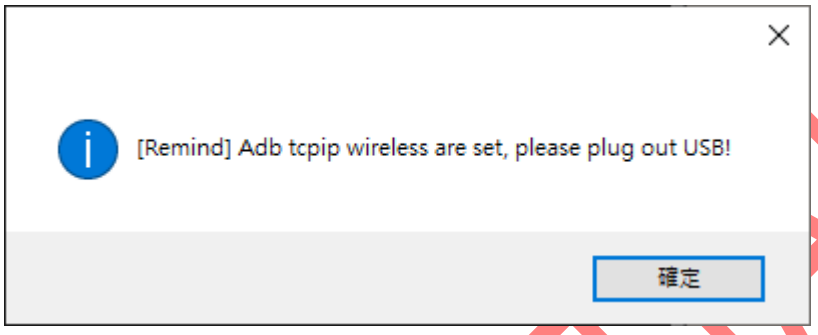


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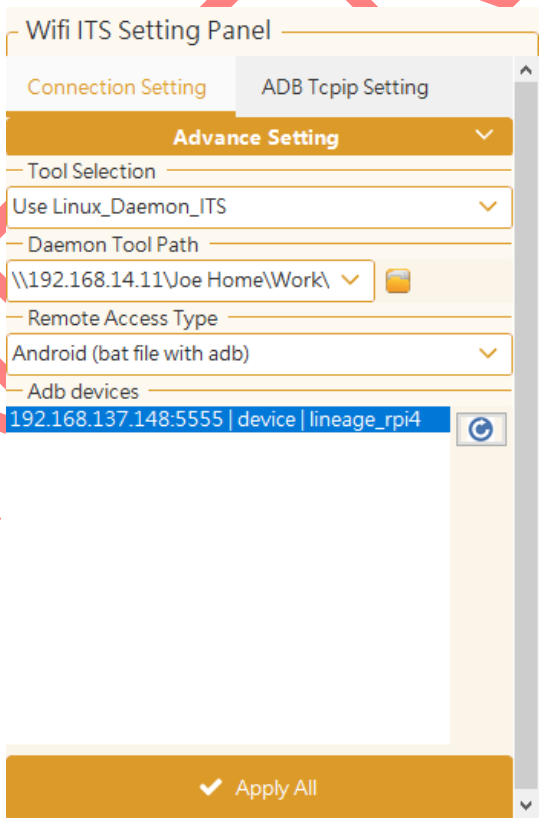
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6. Press “Setup ADB Tcpip” button. If specific window pops up as below figure, it means adb tcpip has been set up successfully. **We suggest user should remove USB connection now at this moment.**



7. Back to “Remote Device Setting” tab, please press “refresh” button again. **New adb device should pop up with Android device IP, which was set before, please choose this one then press “Apply All”.**



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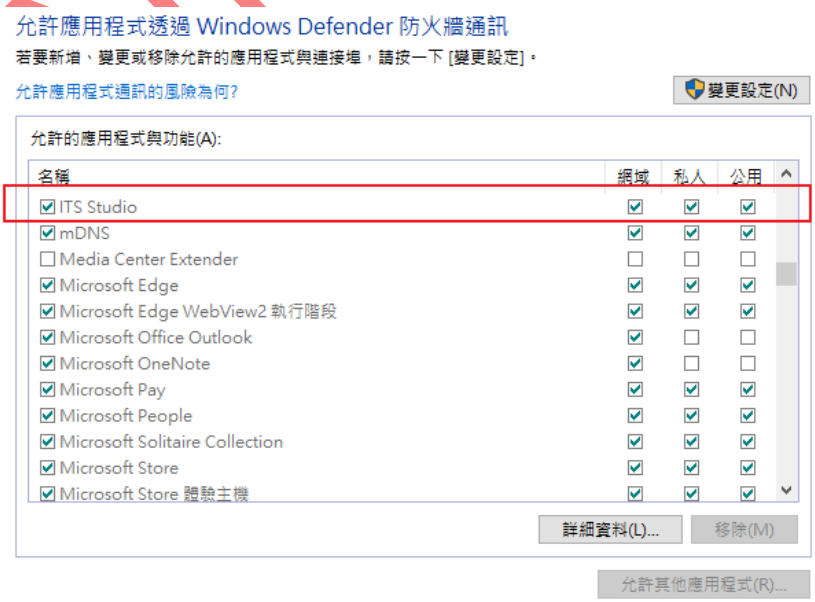
Wifi ITS Connection Anomaly Handling

Please check with steps from top to bottom listed below. **If it could not solve your issue, please notify ILITEK for help.**

a. Please check error message when executing Wifi_Daemon_Init.sh/.bat, the most common error listed below:

- **adb.exe not found**: Please check you do have adb.exe in /Script/. folder, under the same directory of Windows_Studio_ITS.exe.
- **adb.exe run failed**: Please check USB connection between remote device and PC.
- **Linux_Daemon_ITS tool not found**: Please check you do have *_arm/*_arm64/*_x86_64 tools in /Linux_Daemon_ITS/. folder, under the same directory of Windows_Studio_ITS.exe.
- **Linux_Daemon_ITS run failed**: Please check connection between remote device and ILITEK controller. For I2C interface, please check ILITEK I2C Driver is installed normally. For USB interface, please try to find ILITEK devices with command “lsusb”. For HID-over-I2C interface, please check ILITEK file node with /dev/hidraw* is created normally.

b. Please check Windows_Studio_ITS program is allowable as an exception for Windows firewall. Find “Windows Firewall” or “Windows Defender Firewall”, and choose “Allow an app or feature through Windows Firewall”. Please make sure ITS Studio is checked as below.



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3. Main Tool Function

Home

The Home function shows TP information

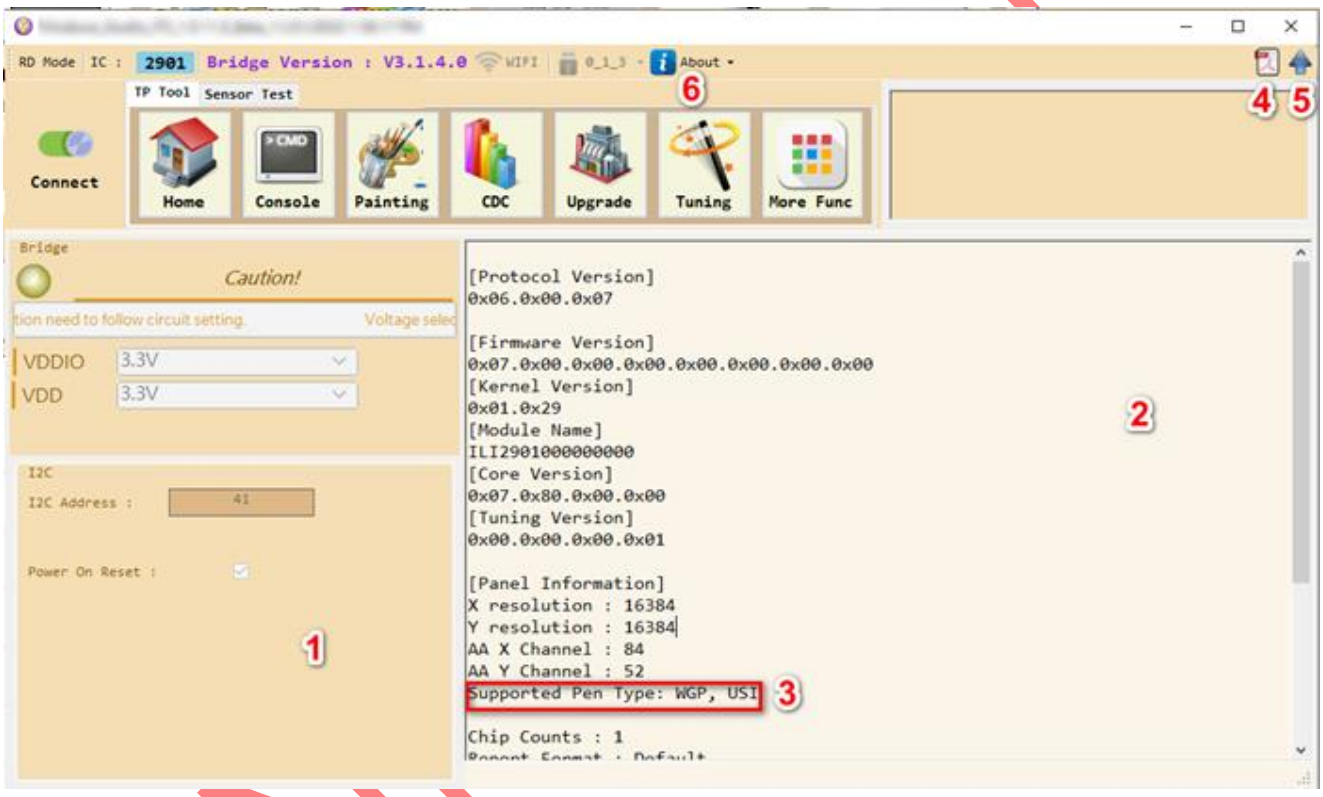


Fig 3-1 Home function

The detailed description of the Home function:

Item	Name	Description
1	Bridge Settings	• For bridge board setting, this screen is hidden automatically if the device is detected as USB. You can use Alt + B to open or close the page. • When using a bridge connection, the bridge fw version will be checked and the following message will pop up if the version is wrong

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2	Protocol Version	Version of report protocol
	Firmware Version	Development version of FW
	Kernel Version	IC type.
	Core Version	Algorithm version of FW.
	Tuning Version	Tuning version.
	X/Y Resolution	X/Y resolution
	AA X/Y Channel	Channel number of TX/RX.
	Support Fingers	Number of support finger.
	Support Touch Keys	Keys numbers.
	Chip counts	The number of chips
	Report Format	Report format
	Current mode	The mode of IC running.(AP mode or BL mode)
	FW CRC	The check code of firmware.
	Support Touch Keys	The number of supporting hardware keys or virtual keys
3	Supported Pen Type	To display stylus mode, it only show on stylus mode
4	Manual	Show the manual
5	collapse	Collapse the function bar

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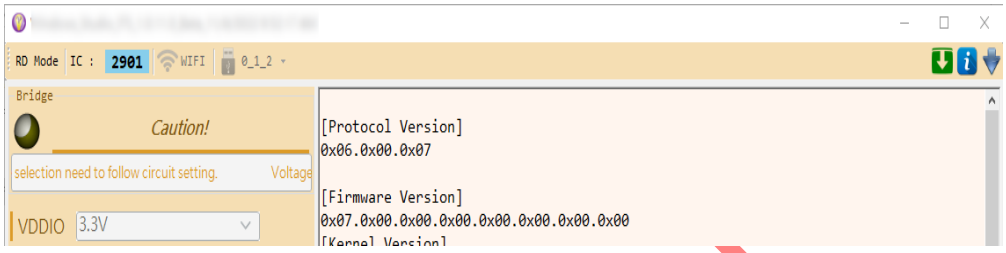
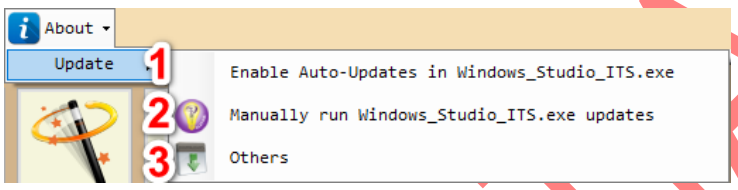
		
6	Download	Click it and pop out of the download tool  1. When running Windows_Studio_ITS.exe, it will start detecting if there is a new version of Windows_Studio_ITS.exe available 2. Update Windows_Studio_ITS.exe manually. 3. Download or update extra functions of Windows_Studio_ITS.exe.

Table 3-1 Home function table

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ITS Tool Auto-Updates

Starting from V1.0.11.0, ITS Tool provides an automatic update function. If a newer version of ITS Tool is detected when running ITS Tool in RD mode in a networked environment, a message will pop up prompting the user to update; conversely, the automatic update function of ITS Tool will be automatically disabled when running sensor test in OP mode.

The following conditions will occur when the automatic update is provided:

Case 1: If there is no network communication, a message will pop up, click confirm then ITS Tool will enter into use.

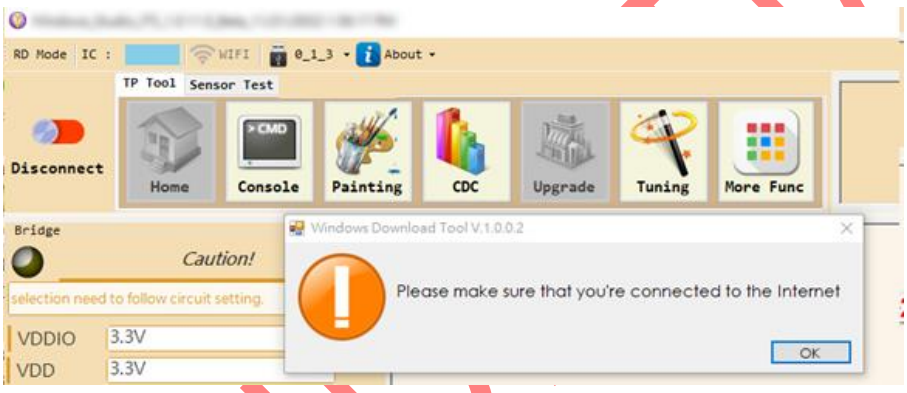


Fig 3-2 no network communication

Case 2: If there is network communication, ITS tool can be updated to the newest version

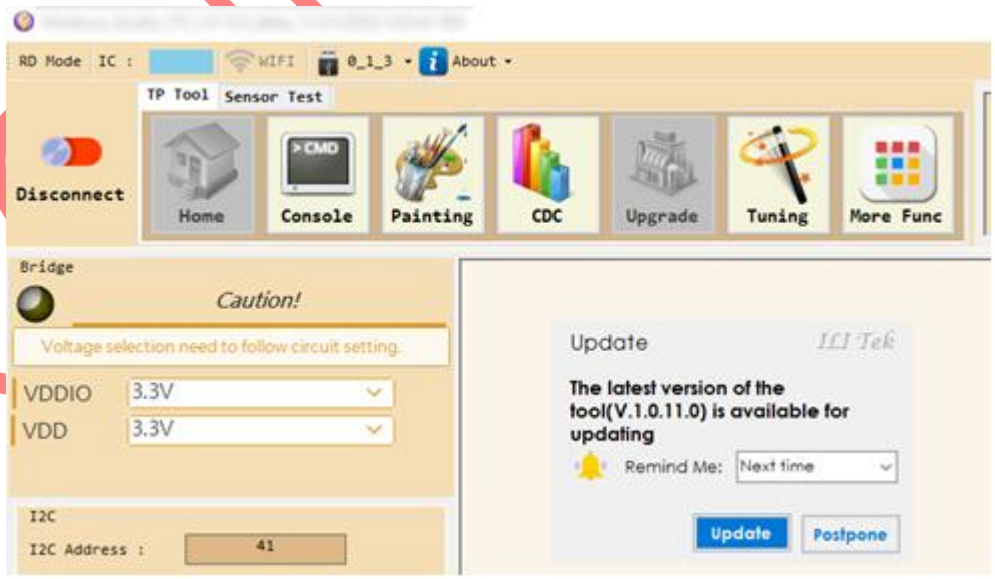


Fig 3-3 update window message

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The message reminds that ITS tool can be updated immediately or be updated next time, if you choose update ITS Tool next time, and you can set a reminder message to tell how often.

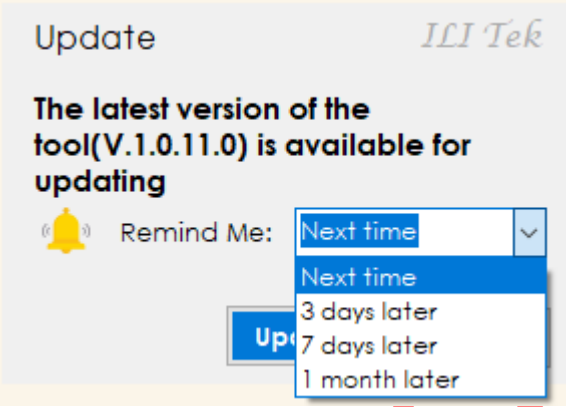


Fig 3-4 if you choose not to update, you can set the next time to remind

After updating, Fig 3-5 will pop-up and to update, re-start ITS Tool immediately.

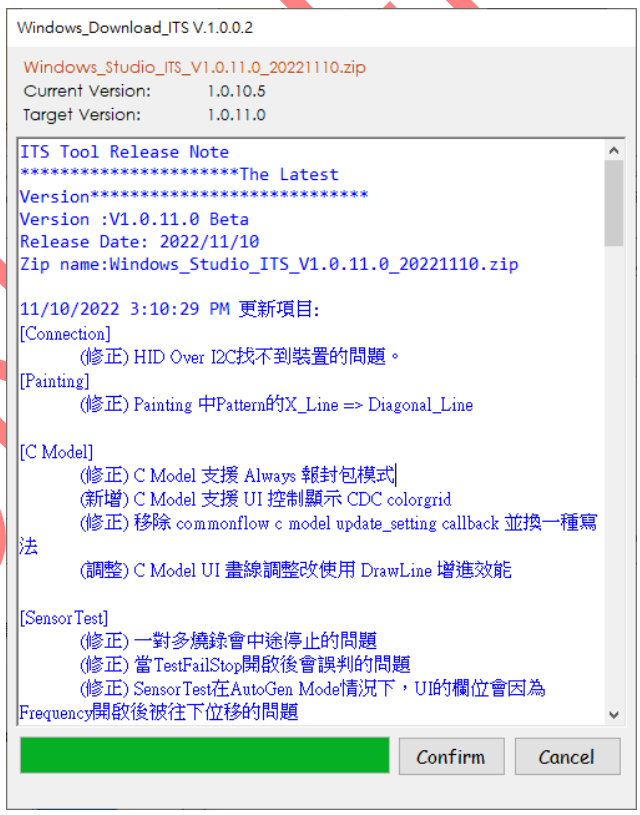


Fig 3-5 update window

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Case 3: If your ITS tool version is detected after the automatic update is turned on in a normal network communication environment, you need to force the update.

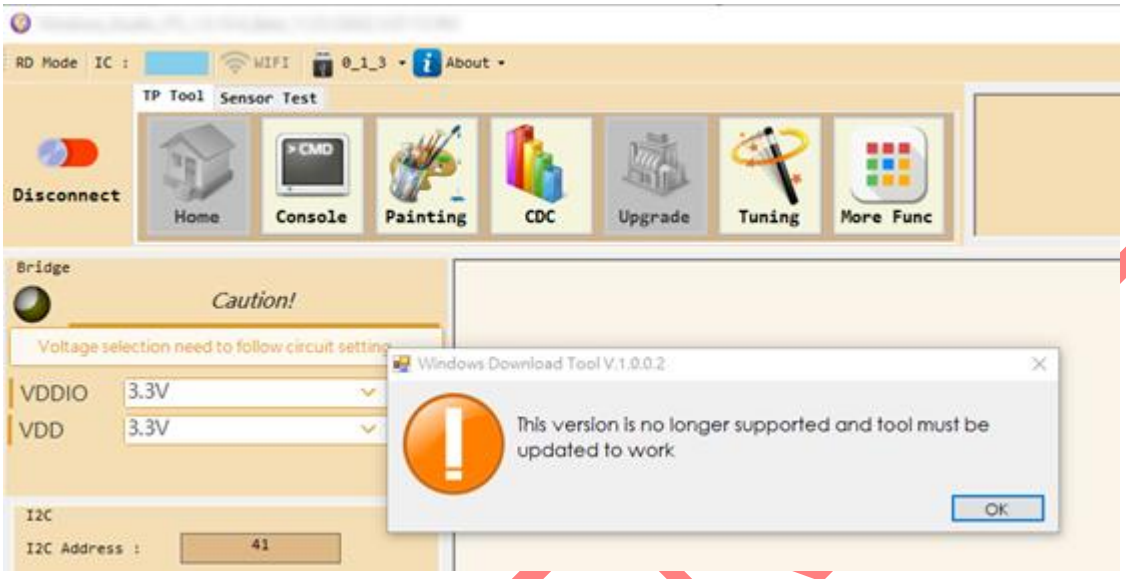


Fig 3-6 force to update

The following icon pops up, perform the update, and after the update, ITS Tool restarts.

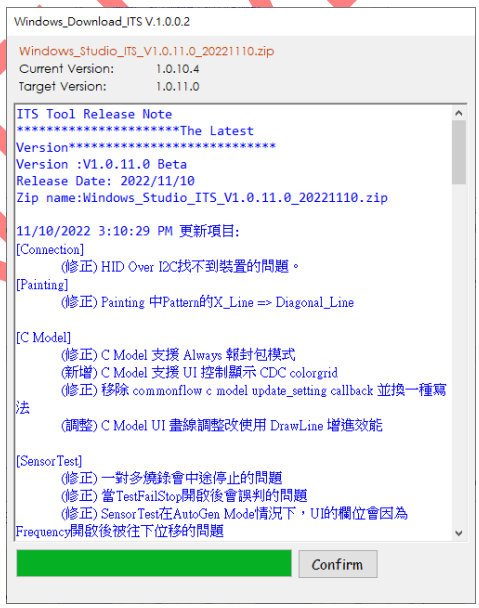


Fig 3-7 update window

Case 4: If you do not want to automatic updates of Windows_Studio_ITS.exe, please uncheck Enable Auto-Updates Windows_studio_ITS.exe.

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Fig 3-8 Disable “Enable Auto-Updates in Windows_Studio_ITS.exe”

Case 5: Windows_Studio_ITS.exe is shown as the latest version.

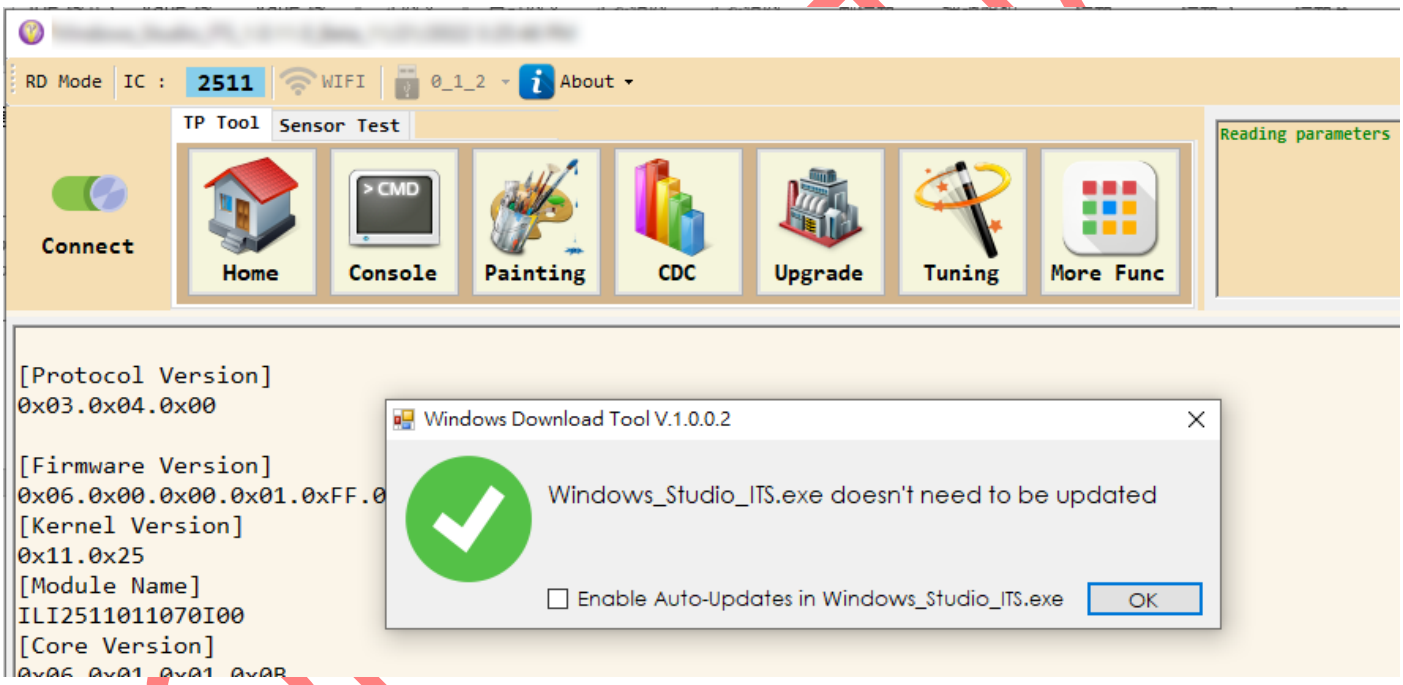


Fig 3-9 Windows_Studio_ITS.exe is the latest version

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Case 6: When lunchs ITS tool for the first time, please use "Run as administrator", otherwise the following warning will pop up. (Reason: You need to add ITS tool to the white list of firewall as system administrator)

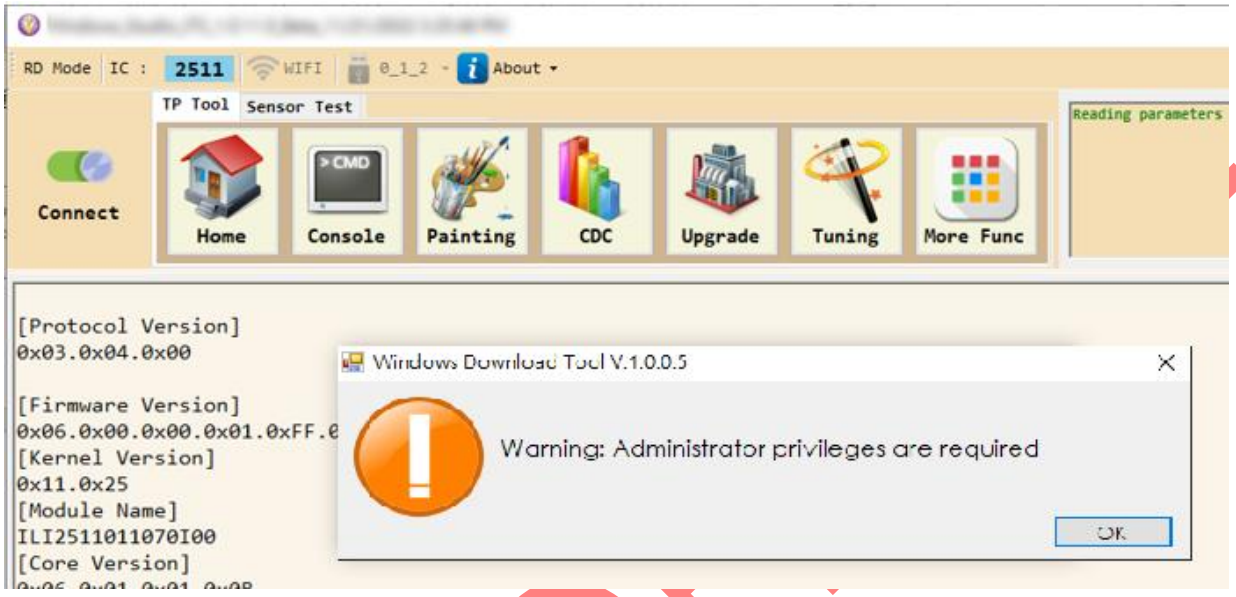


Fig 3-10-2 reminding: "Run as administrator"

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Download

To download the extra tools of ITS Tool, when you click the download button, you must enter your account and password in login page, and then download tool will pop out, tool shows what tools can be downloaded, tool size and tool exists or not.

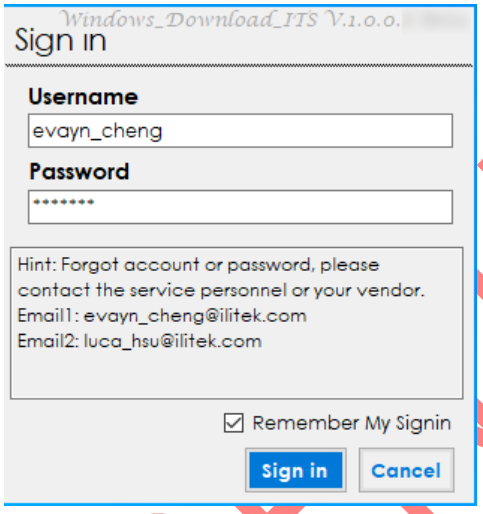


Fig 3-11.1 login page

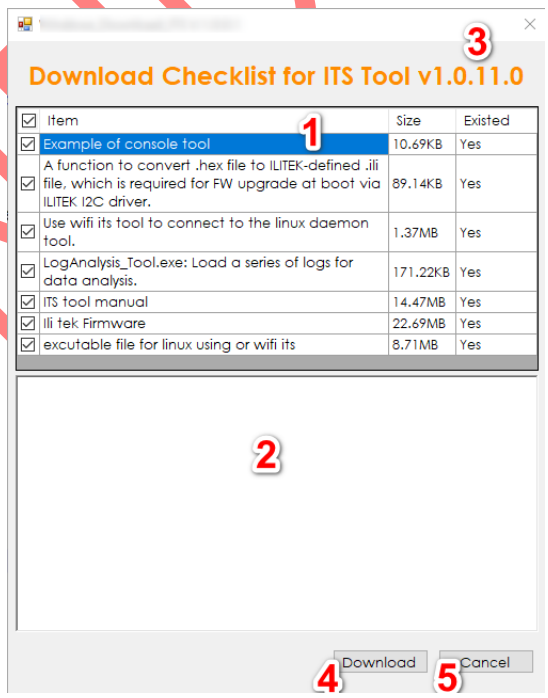


Fig 3-11.2 download page

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Item	Name	Description
1	Item List	List the items available for download and the size of each item and whether the item exists in the current folder
3	Status	Show download progress
4	Show Version	Show the ITS Tool version
5	Start to download	Start to download
6	Cancel	Cancel

Table 3-2 download UI description

Name	Description
Example of console tool	To download Batch\
A function to convert .hex file to ILITEK-defined .ili file, which is required for FW upgrade at boot via ILITEK I2C driver.	To download ILITek_HexToILI.exe;ilitek_ic_info.ini
Use wifi its tool to connect to the linux daemon tool.	To download Script\
LogAnalysis_Tool.exe: Load a series of logs for data analysis.	To download LogAnalysis_Tool.exe
ITS tool manual	To download the manual
Ili tek Firmware	To download firmware files.
excutable file for linux using or wifi its	To download Linux_Daemon_ITS\

Table 3-3 Download Item

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Console

The Console function can get/set commands.

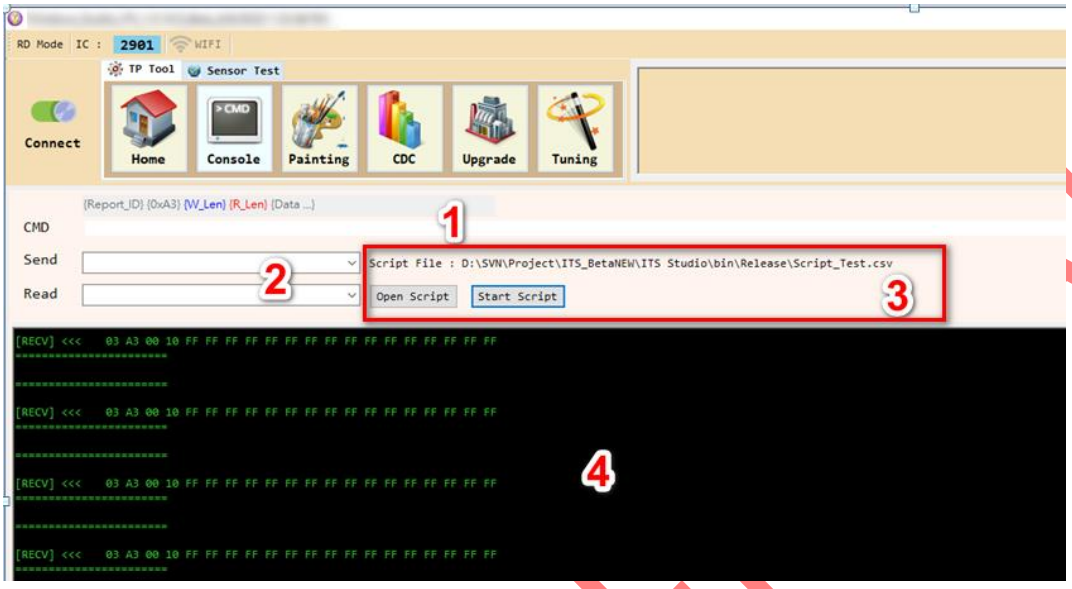


Fig 3-12 Console function

The detailed descriptions of the Console function:

Item	Name	Description
1	CMD	Key-in CMD box. Send active: Click "Enter".
2	CMD List	Send: a list of basic commands for sending data. Read: a list of basic commands for receiving data.
3	Script	Open Script: choose *.csv to execute. Script File: show the full path of the script file Start Script: run the script
4	Screen control box	[SEND] Sending CMD data · [RECV] Receive CMD data.

Table 3-4 Console function

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Item	Command	Format
1	Write	Write [Report ID] [Cmd Header] [Length] [Cmd Data] Ex: 03 A3 01 20 The command only supports hexadecimal system
2	Read	Read [Report ID] [Cmd Header] [Length] Ex: 03 A3 10 The command only supports hexadecimal system
3	Delay	Delay [Time ms] Ex: Delay 10 The command only supports decimal system
4	Forloop	Forloop,int(repeat Time) #The commands under for need to be tabbed, please do not use spaces #For loop only supports single layer, please do not use multiple layers Ex: Forloop,100 Write,03,A3,01,20 Delay,10 Read,03,A3,10 Delay,10
5	#	Note

Table 3-5 Console script description

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Painting

The Painting function (List mode) can show drawing, FW status and coordinates.

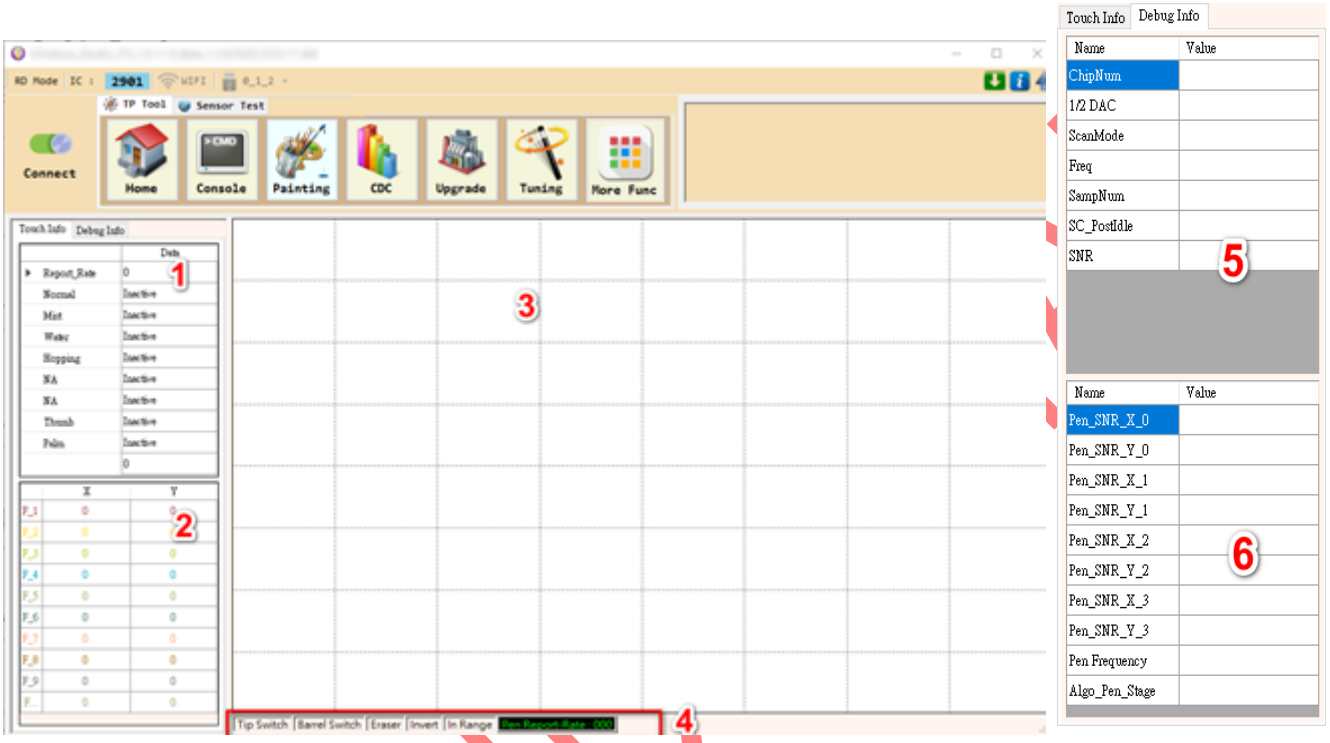


Fig 3-13 Painting function (List mode)

The detailed descriptions of the Painting function (List mode)

Item	Name	Description
1	Mode status	Show report rate and FW mode.
2	Coordinate	Show touch coordinate.

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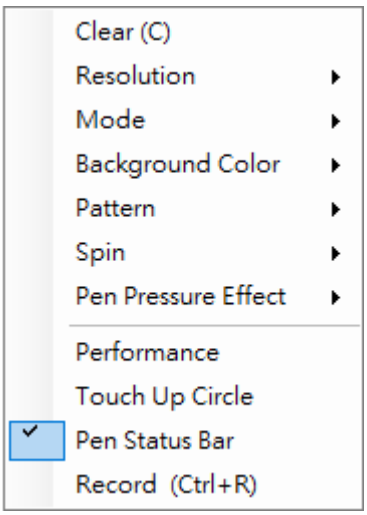
3	Drawing board	Click right button can activate further functions.  The detailed descriptions of the drawing board function (List mode) as (table 3-7)
4	The status of stylus	Shows the information of using stylus New Pressure: the value by pressure.
5	Location	show the coordinate point
6	SNR	Calculate SNR of the pen

Table 3-6 Painting function (List screen) table

Function	Description
Clear (Keyboard "C")	Clear drawing canvas
Resolution	**Keep_aspect_ratio**: shrink drawing area with same aspect ratio for border checking. **Fill Form**: full screen in drawing box.
Mode	**ListMode**: Non-full screen **FullScreen**: Full screen
Background Color	Canvas Color ● White ● Black
Pattern	Canvas Auxiliary Lines ● Straight Line ● X Line

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Spin	• Horizontal: rotate the image to flip it horizontally • Vertical: rotate the image to flip it vertically
Pen Pressure Effect	Tracking thickness of stylus • None : normal • X1: one time the size of original tracking • X2: two times the size of original tracking
Performance	This function provides real-time touch report performance analysis. Two columns would appear on the info. panel as below. 1. GapRatio: What is the biggest ratio of the gaps between consecutive reported positions ? This item measures the Euclidean distance between each (x, y) coordinate for a finger id, then computes the ratio of those distances and their neighbors. A smooth and constant speed tracking line should have roughly equal gaps between consecutive reports. If there are dropped frames, smoothing issues or inconsistent scans, some gaps may be much larger than others, then causing larger gap ratio as the result. 2. Gitter: How stationary was the finger ? This item measures the maximum distance between any two (x, y) coordinates reported for a finger id and makes sure there wasn't too much movement. This is used when a finger is meant to be completely

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	stationary, and reported coordinates should be locked in certain range. If LCM_PHYSICAL_X/LCM_PHYSICAL_Y are set in PaintTool.ini file, maximum distance would be unit in mm.
Touch Up Circle	Show the circle icon when touch release.
Pen Status Bar	Whether to show Pen Status Bar (Full Screen can use it too)
Show Trajectory Dot	Whether to show the trajectory of the line drawn.
Record(Ctrl+R)	Start to record or stop recording.

Table 3-7 Drawing board function table

The Painting function (Full screen) is same with List mode, but it has the extra function button do clear and exit.

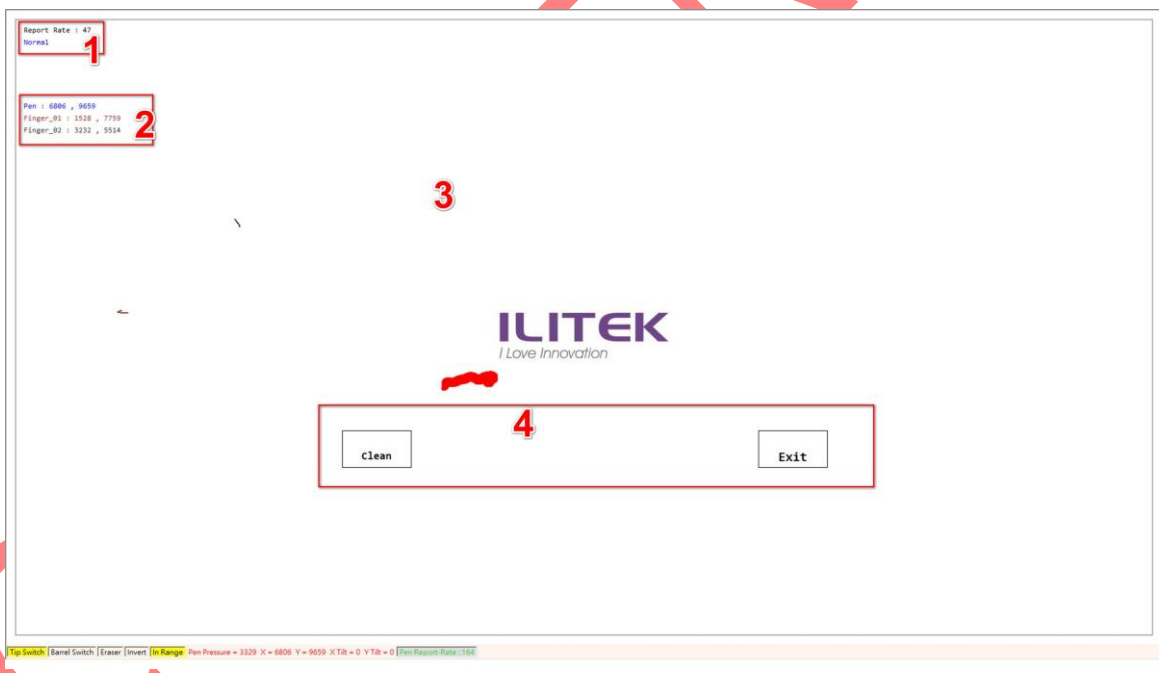


Fig 3-14 Painting (Full screen)

The detailed descriptions of the Painting function (Full screen) as (table 3-8):

Item	Name	Description
1	Mode status	Show report rate and FW mode.

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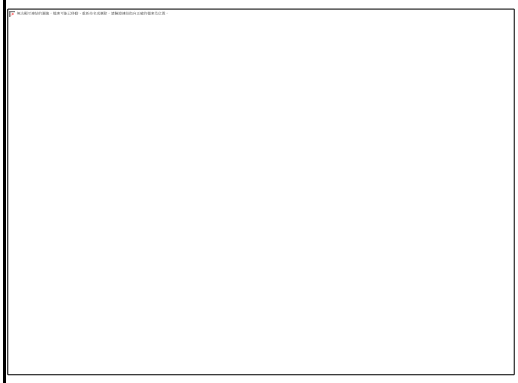
2	Coordinate	Shows touch coordinate.
3	Drawing board	Click right button can activate further function.  The detailed descriptions of the drawing board function (List mode) as (table 3-7)
4	Function button	**Clear**: Clear drawing board **Exit**: Exit Painting and back to Home function.

Table 3-8 Painting function (Full screen) table

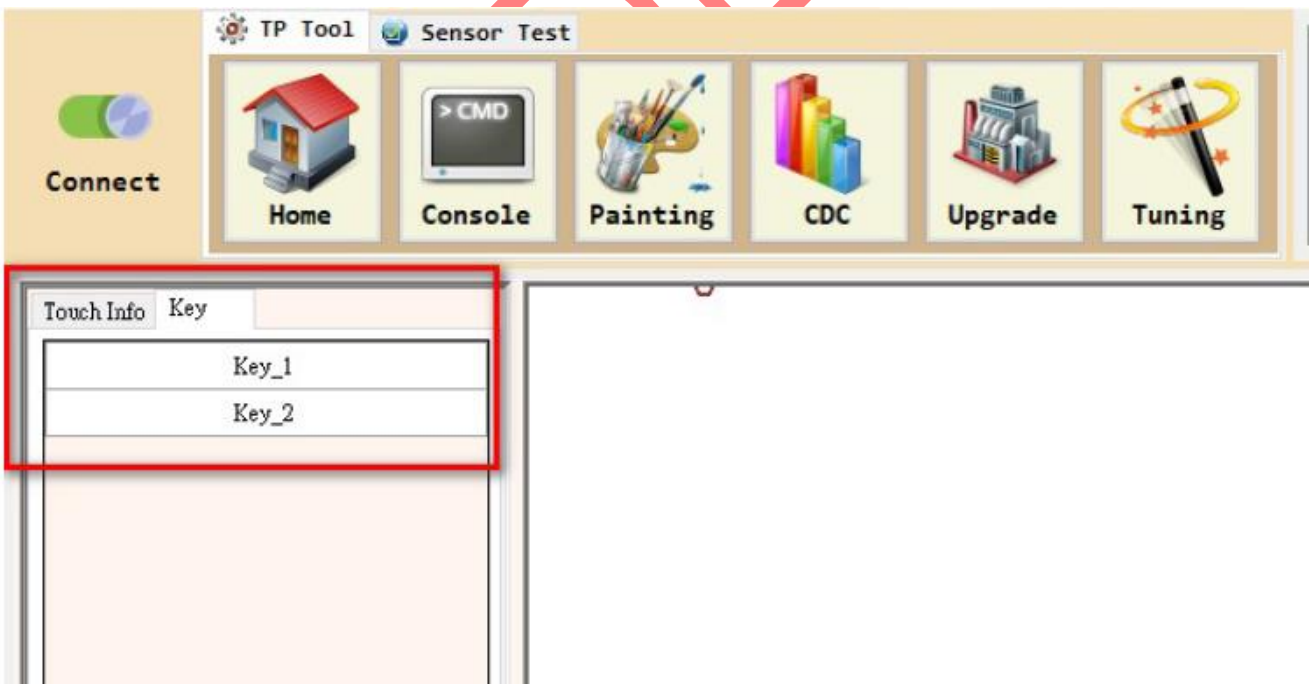


Fig 3-15 Painting function of supporting key (List mode)

Item	Name	Description

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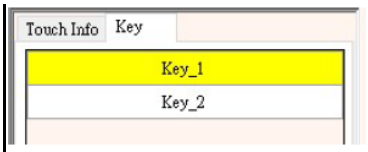
1	Key	 It will add a sheet to display key status when this is a version of firmware supporting key. If you press the key, the relative button will change it's the color.

Table 3-9 Painting function of supporting key (List mode) table

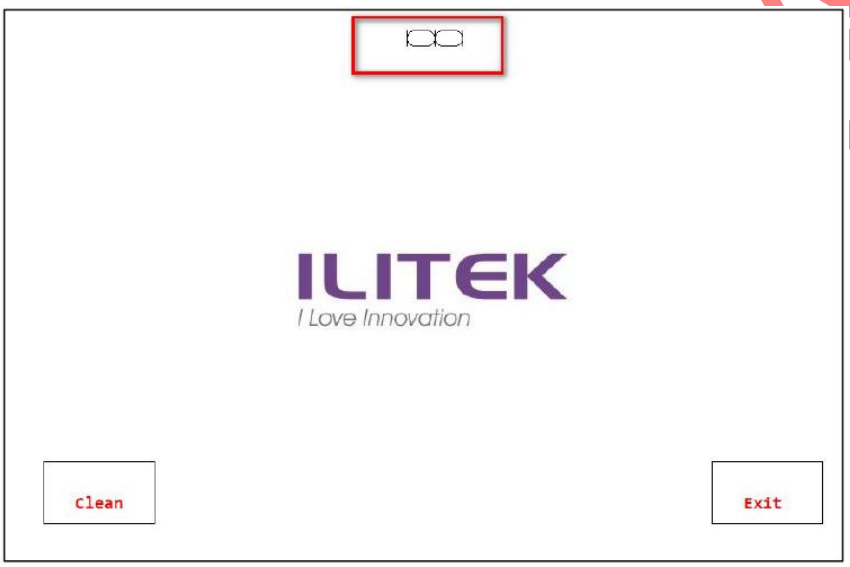


Fig 3-16 Painting function of supporting key (Full screen)

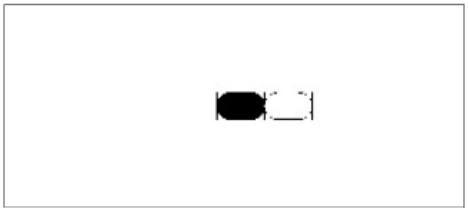
Item	Name	Description
1	Key	 It will add a figure to display key status when this is a version of firmware supporting key. If you press the key, the relative button will change it's the color.

Table 3-10 Painting function of supporting key (Full screen) table

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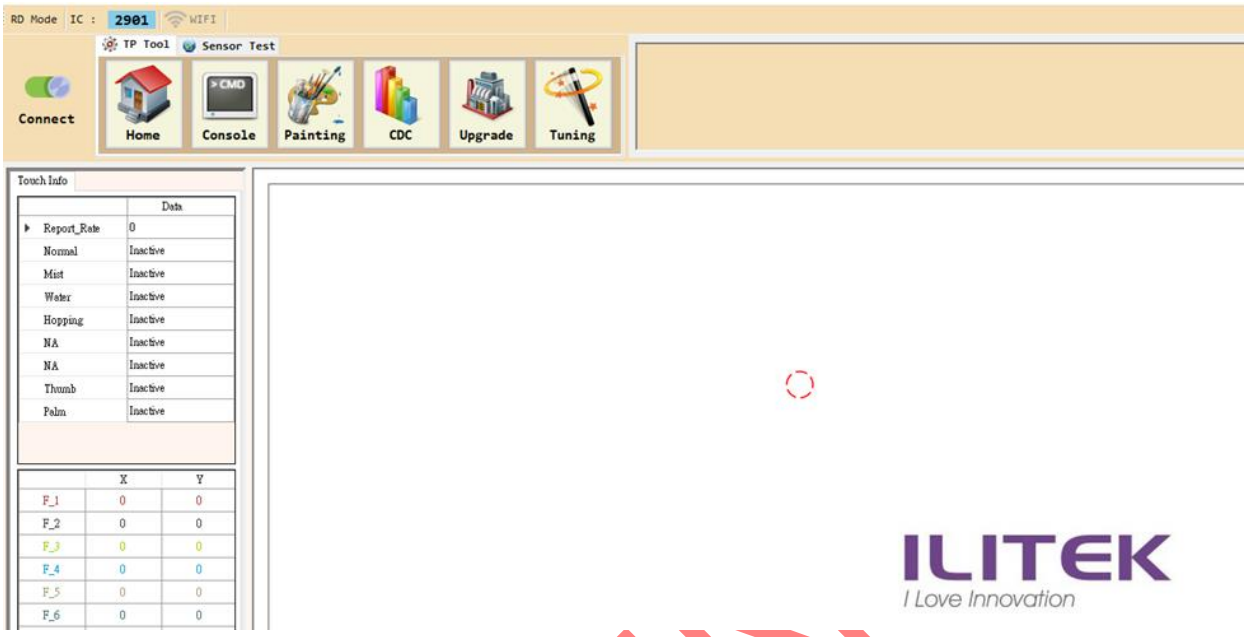


Fig 3-17 Support hover state of the stylus mode

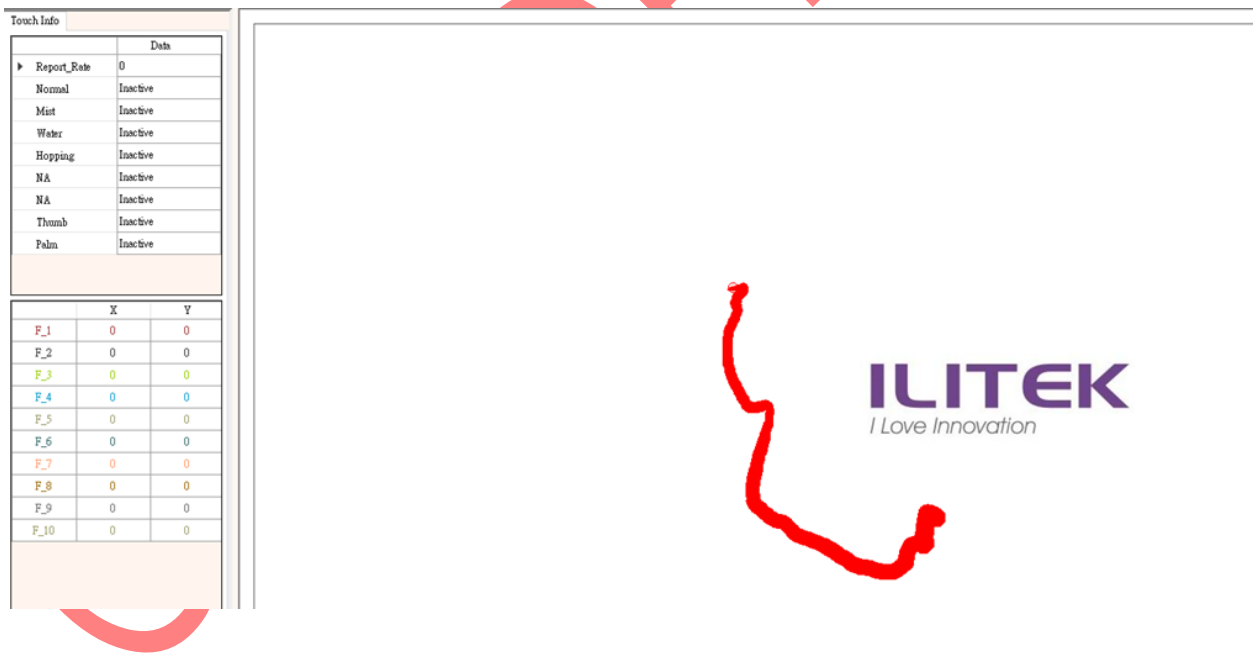


Fig 3-18 the thickness of the track changes according to the size of the press when using the stylus

When tool disconnect, you can playback a file.

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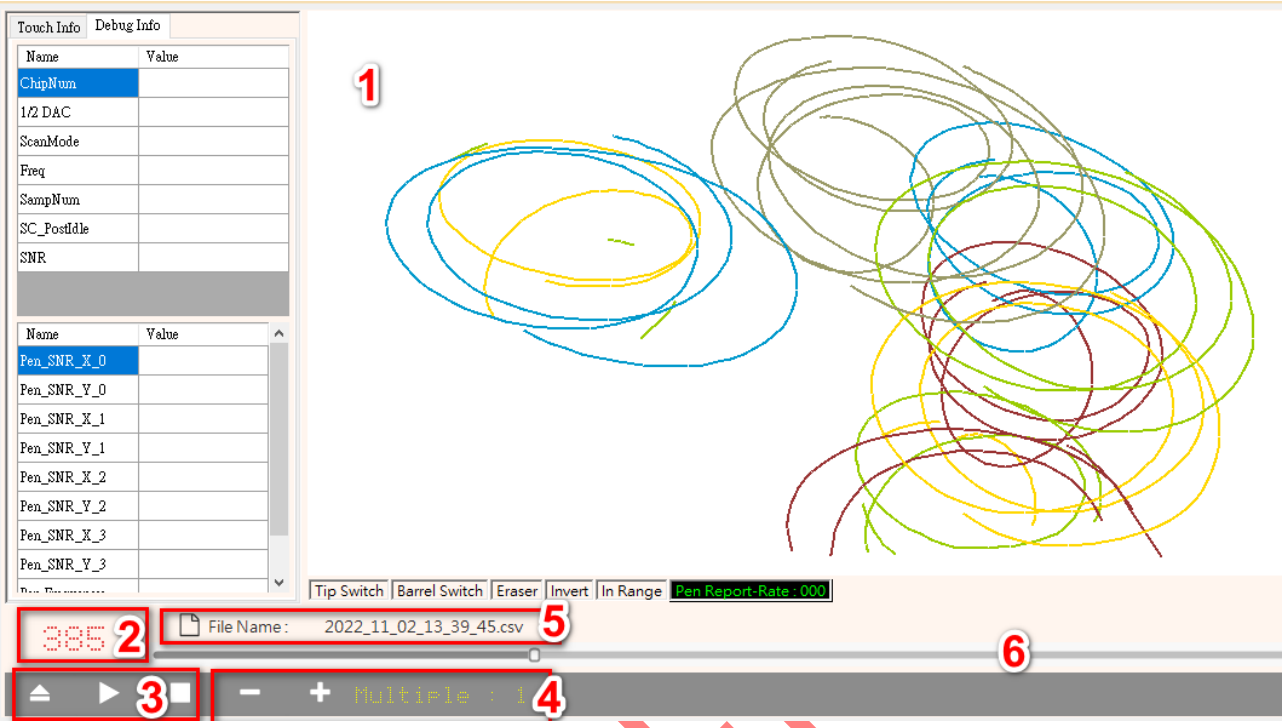


Fig 3-19 The thickness of the track changes according to the pressure when using the stylus

Item	Name	Description
1	Painting Area	Show the track
2	Frame number	Frame number
3	Button	Functions: ● Load: load a file ● Stop: stopping play. ● Play: start to play
4	Speed Control	● Control the paly speed
5	File name	File name
6	Frame bar	Progress bar

Table 3-11 Paint function description

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CDC (Capacitive to Digital Convertor)

The CDC functions (Connected) display digital data of touch panel. If the product supports stylus, please refer to Figure 3-12.

- Connected: Record mode

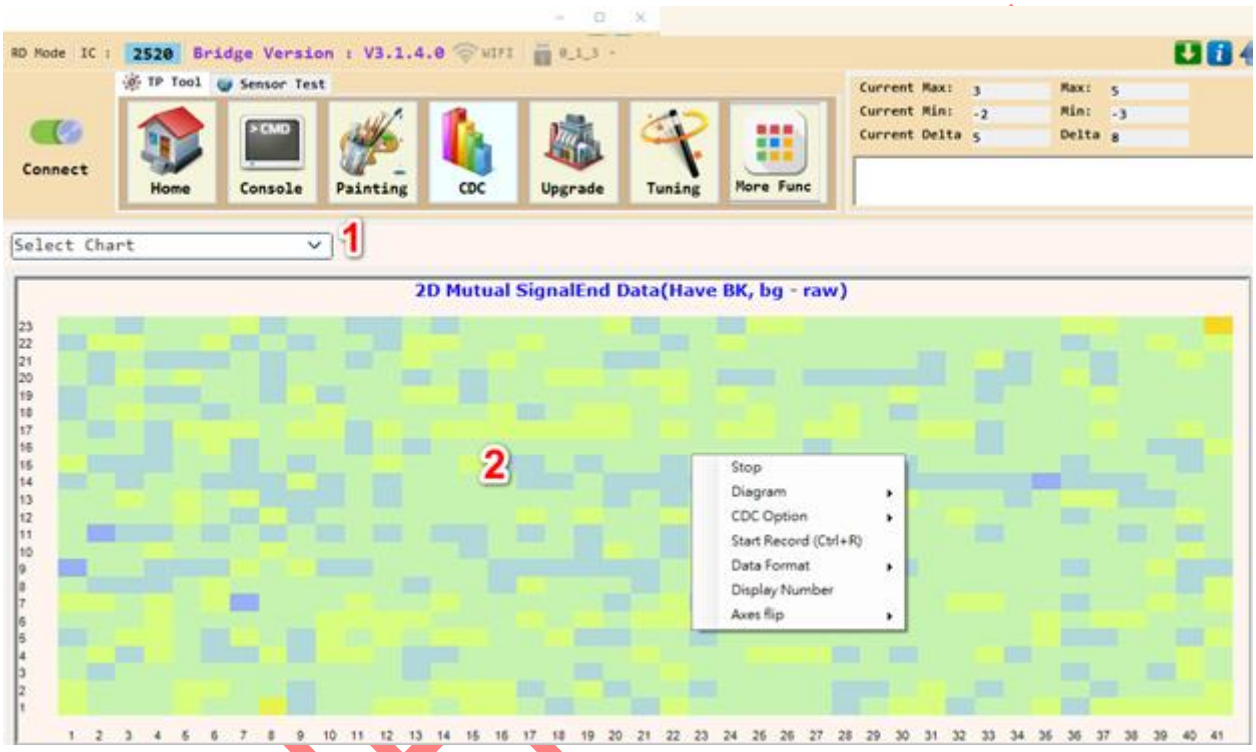


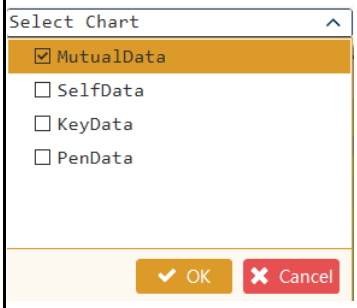
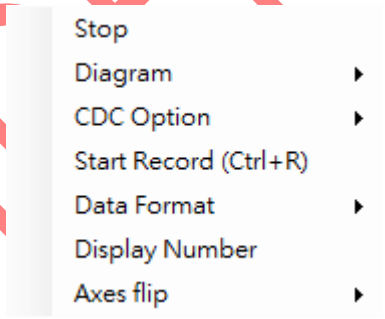
Fig 3-20 CDC (Connected)

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The detailed descriptions of the CDC function (Connected) as (table 3-10):

<table>
<tr><th>Item</th><th>Name</th><th>Description</th></tr>
<tr><td>1</td><td>Select Chart</td><td>The drop-down menu selects which data types to display in the CDC value display area.
-Mutual Data
-Self Data
-Key Data
-Pen Data

</td></tr>
<tr><td>2</td><td>CDC function</td><td>Click right button can activate further function.


<table>
<tr><th>Control</th><th>Description</th></tr>
<tr><td>Stop</td><td>Stop updates CDC data.</td></tr>
<tr><td>Diagram</td><td>2-D: Show data by 2D.
3-D: Show data by 3D.
2-D / 3-D: Show data by both</td></tr>
<tr><td>CDC Option</td><td>Mutual Raw Data(BK): Original Data
Mutual Raw Data(No BK): Internal debug data.
Mutual BG Data(Have BK): Background Data
Mutual SignalEnd Data(BG –Raw): Data for algorithm.
Mutual All Node: MP uniformity test data.
Mutual Open Data: MP open test data..</td></tr>
</table></td></tr>
</table>

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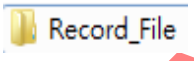
	Calibration Data(DAC_P, Mutual): Internal debug data. Calibration Data(DAC_N, Mutual): Internal debug data. ● USI: Only the stylus state can be selected. (參考圖 3-11) ■ ACK ■ Tip_0 ■ Tip_1 ■ Tip_2 ■ ST Sensor pin short data: MP short test data
Start Record (Ctrl+R)	Click to start/stop record(Ctrl + R) data and save the log to the "Record_File" folder in ITS tool folder.  **File name**: YYYY_MM_DD_hh_mm_ss.csv
Data Format	**Original**: Show original data. **Max Hold**: Show maximum value of every node. **Min Hold**: Show minimum value of every node. **Delta (Max – Min)**: Show Peak-to-Peak data of every node (Max-Min). **Signal**: Show difference between 1st frame and current frame. (Simulate Signal End data) **Windows2**: The result of subtracting the Rx channel adjacent to each other and then subtracting the Tx channel adjacent to each other. When the DataFormat is set to Window2, you can configure the Threshold in the upper right corner of the statistical win-dow. The system will then calculate the number of nodes that exceed the Threshold. 
Axis flip	**Axis X**: rotate the image to flip it horizontally **Axis Y**: rotate the image to flip it vertically

Table 3-12 CDC function (Connected) table

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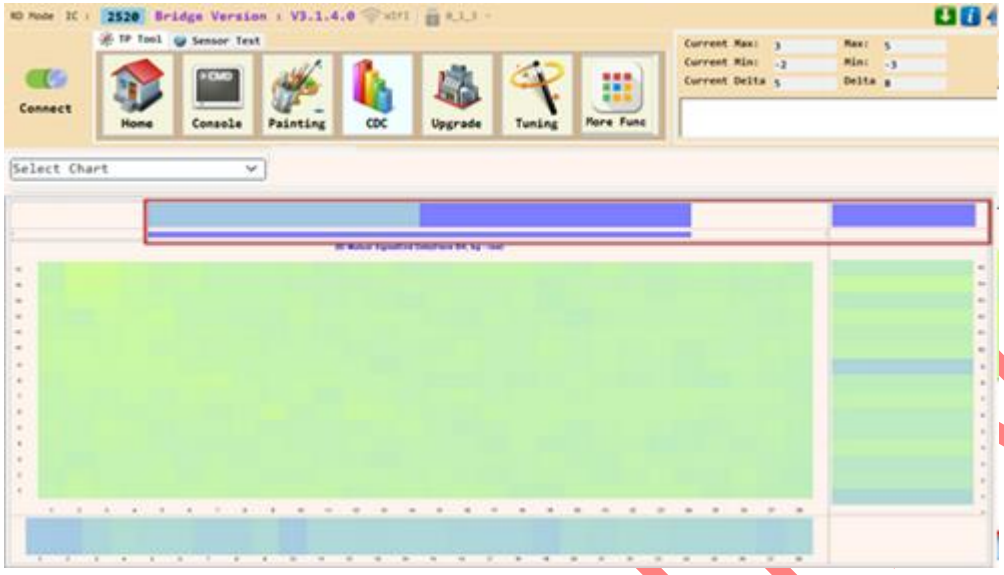


Fig 3-21 CDC (Connected in key mode)

Item	Name	Description
1	KEY display area	This area will display the volume of touching screen.

Table 3-13 CDC function (Connected) table

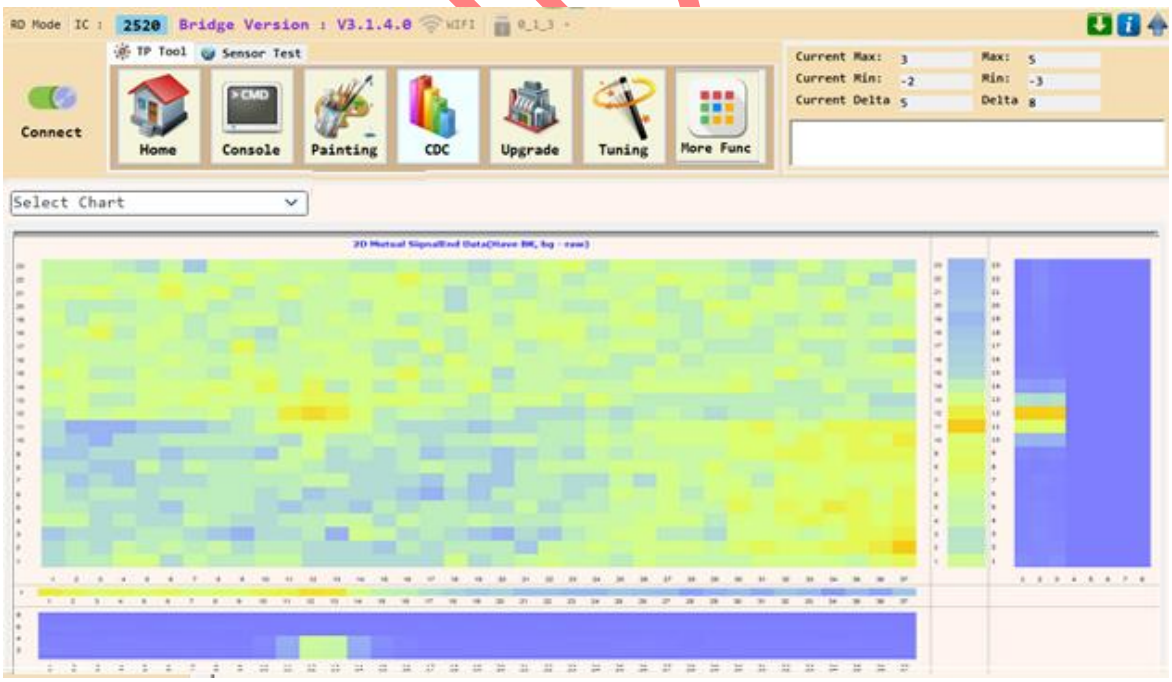


Fig 3-22 the default screen of the stylus (under the connection status)

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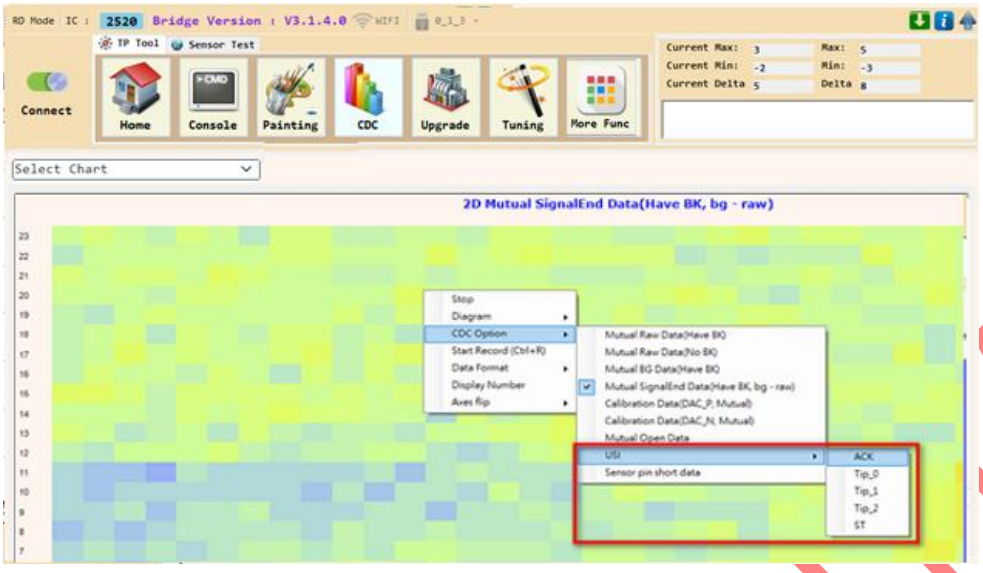


Fig 3-23 There are five modes to choose from when selecting the USI option

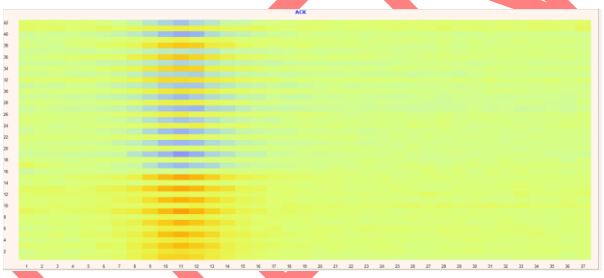


Fig 3-24 ACK

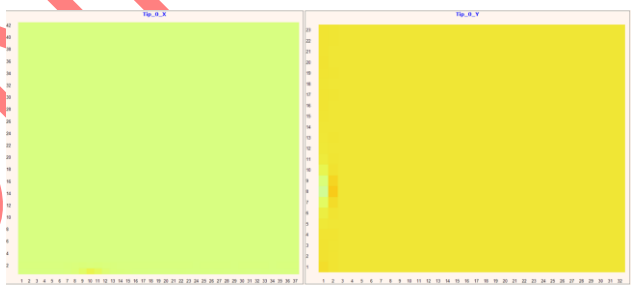


Fig 3-25 Tip_0

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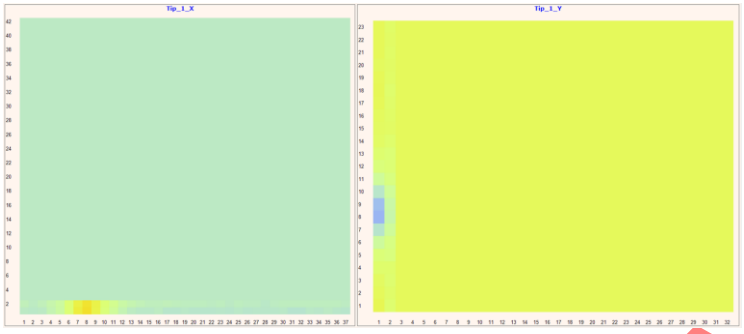


Fig 3-26 Tip_1

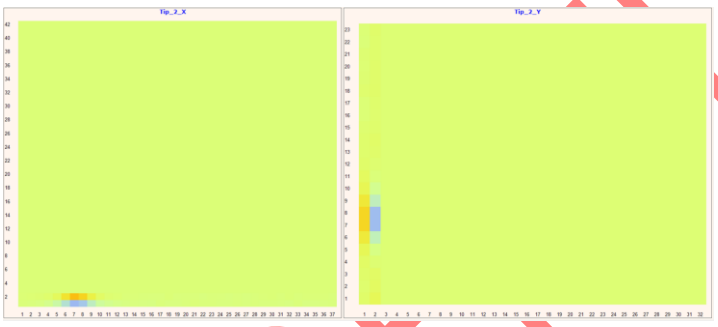


Fig 3-27 Tip_2

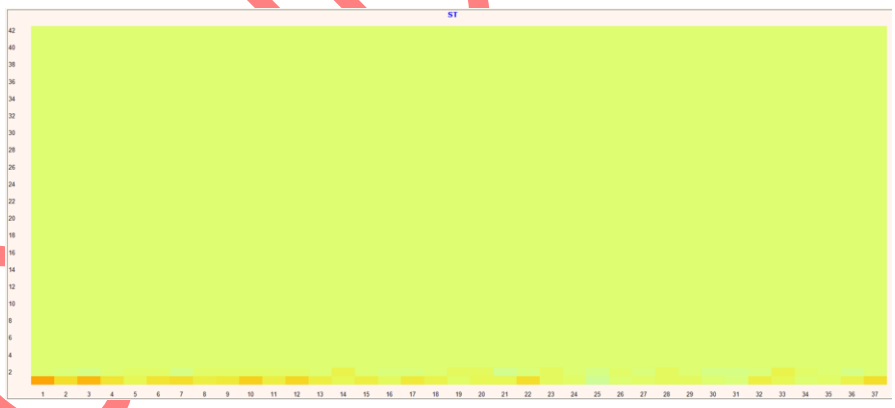


Fig 3-28 ST

The CDC function (Disconnect) has a playback function.

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- Disconnect: Playback mode

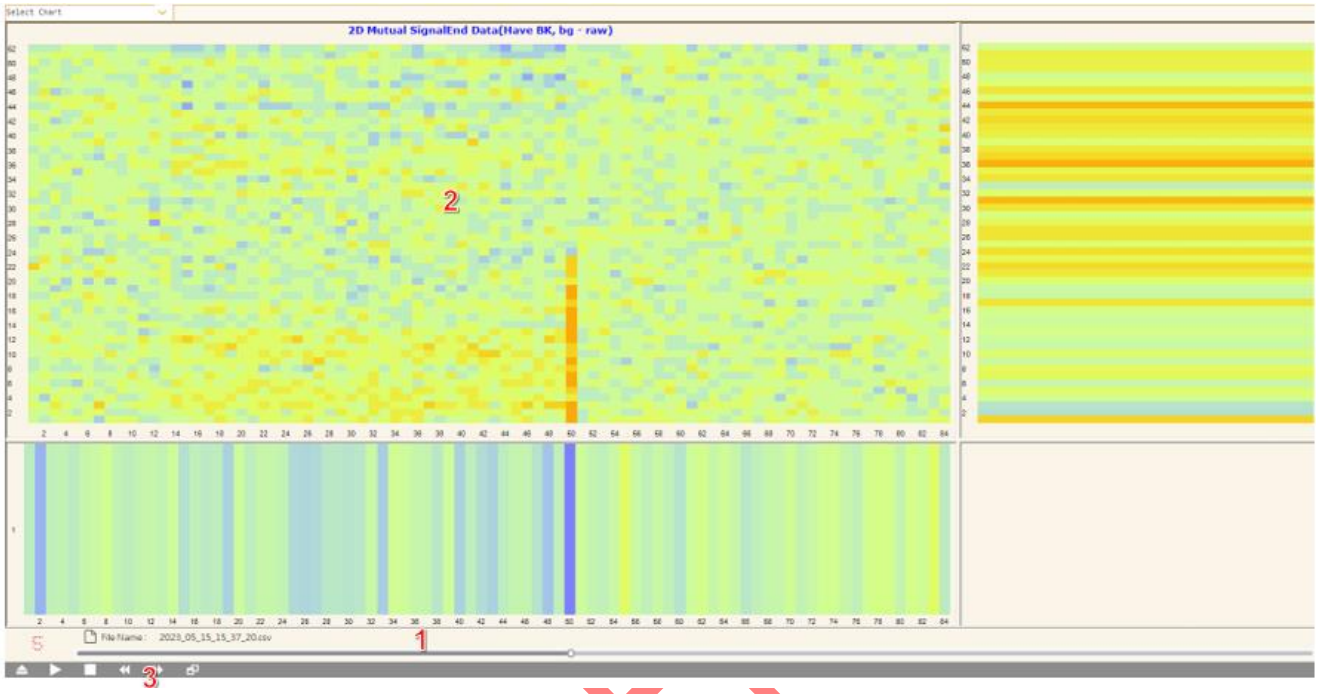
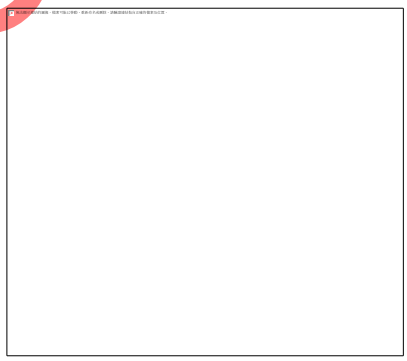


Fig 3-29 CDC Playback (Disconnect)

The detailed descriptions of the CDC playback function (Disconnect) as (table 3-12):

Item	Name	Description
1	Frame bar	Plays the frames and shows the progress. **Click bar**: Stop playback and forward/backward 3 frame. **Drag bar**: Can dragged to the aim frame. **File name:** show the currently playing file name
2	CDC Area	*Show CDC data *right-click menu 

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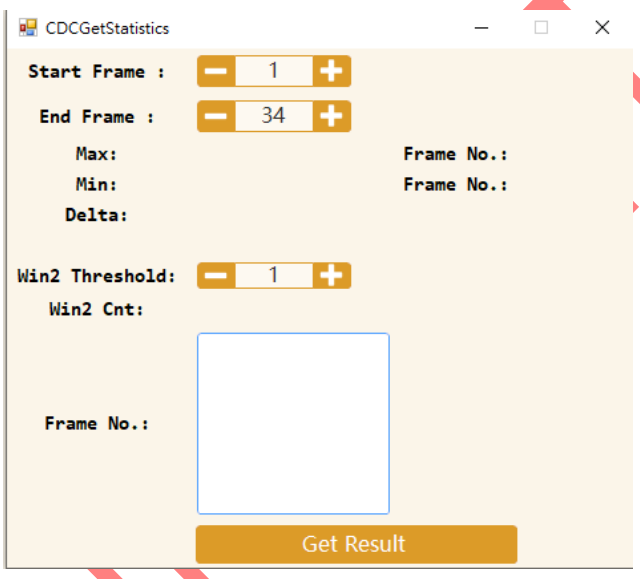
3	Button	**Load**: Open record file. **Stop**: Stop playback. **Play**: Start playback. **Next Frame:** Frame Number plus 1. **Prev Frame:** Frame Number minus 1. **Statistic:** Support input of Start / End Frame, and calculate the Max / Min / Delta of the entire data within the specified range. Support is provided for setting the Win2 Threshold and calculating the number of frames within the range that exceed the Threshold. The Frame No. for each of these frames will be displayed. 

Table 3-14 CDC playback table

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FW Upgrade

The FW upgrade function can do the FW update function.



Fig 3-30 FW Upgrade

The detailed descriptions of the FW upgrade function as (table 3-15):

Item	Name	Description
1	Hex File Path	Click the button to select .hex file which user wants to upgrade.
2	Progress bar	Upgrade process status.
3	Run	Click button to upgrade firmware.
4	Open FW file	Click to open hex file in file system.
5	Check box	● Force Upgrade: force to upgrade AP and DATA code without checking different between Hex file and IC code. ● FW_CheckOnly: Show the differences between HEX file and IC code.

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		Check FW Format Set Touch Mode ================> Before Upgrade ================> Read IC All CRC16 Block_0 CRC : IC = 0xF22F, Hex = 0x2CAE (Different) Block_1 CRC : IC = 0x512A, Hex = 0xE37D (Different) Block_2 CRC : IC = 0x87F0, Hex = 0x87F0 (Same) CRC different!! ● I2C_HW_Reset(After Upgrade): reboot IC using I2C interface after burning done. ● I2C ByPass INT: enable this function, it makes the speed of the upgrading fw speed up.
6	Message box	Show upgrade message.

Table 3-15 FW Upgrade table

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Tuning

The tuning function can fine-tune the touch performance with tuning function.

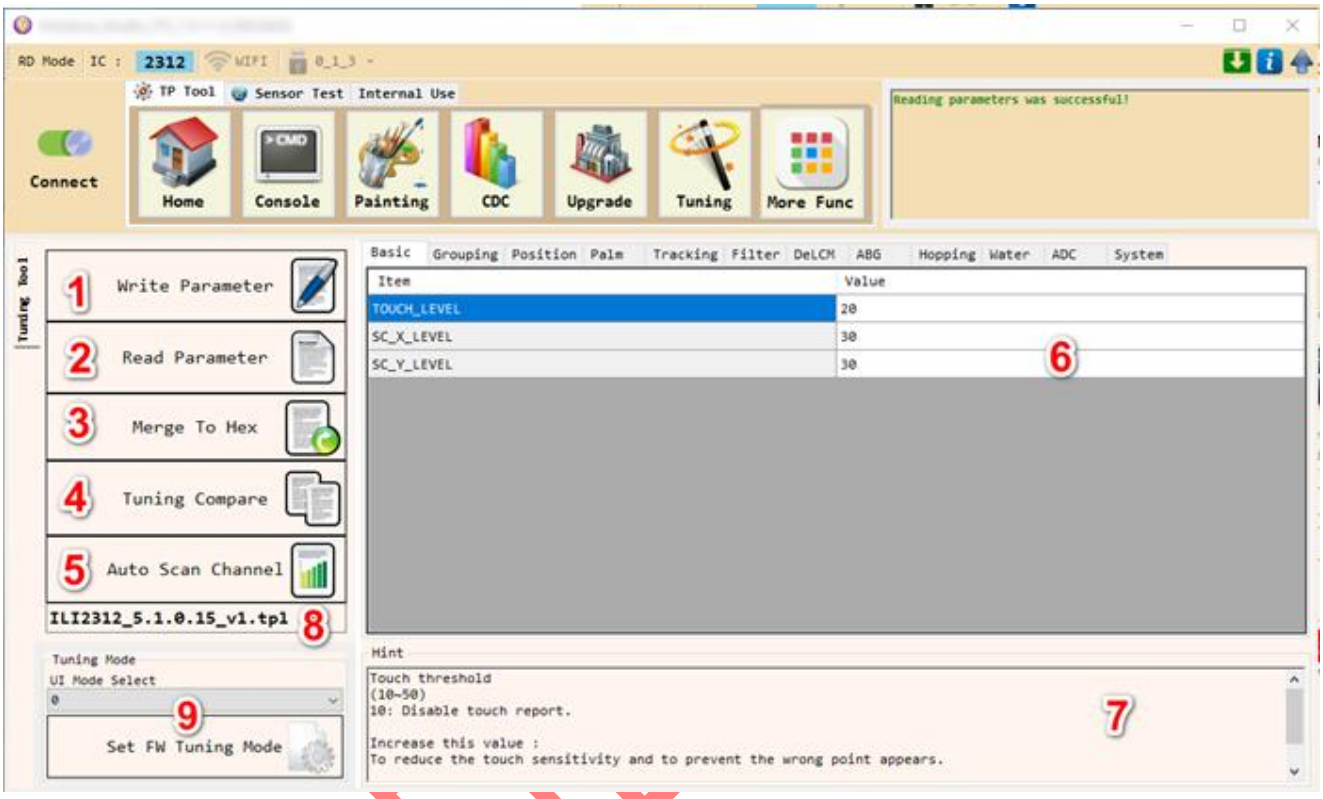


Fig 3-31 tuning tool

The detailed descriptions of the Tuning function

Item	Name	Description
1	Write Parameter	Write parameters from touch controller.
2	Read Parameter	Read parameters into Touch controller.
3	Merge To Hex	Generate hex file with parameters.
4	Tuning Parameter	Parameters editing area
5	Auto Scan Channel	Find sensor channel automatically.
6	Parameters	Edit area
7	Parameter Hint	Clicking on the Tuning field will prompt for the function of this parameter.
8	TPL name	TPL name of FW core version (Path : \ParaData\ILI{IC_Type}\ILI{IC_Type}_{TuningVersion}_v1.tpl)

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9	Tuning Mode Selection	There are more modes in the hex file, it can be used to switch mode.

Table 3-16 function table.

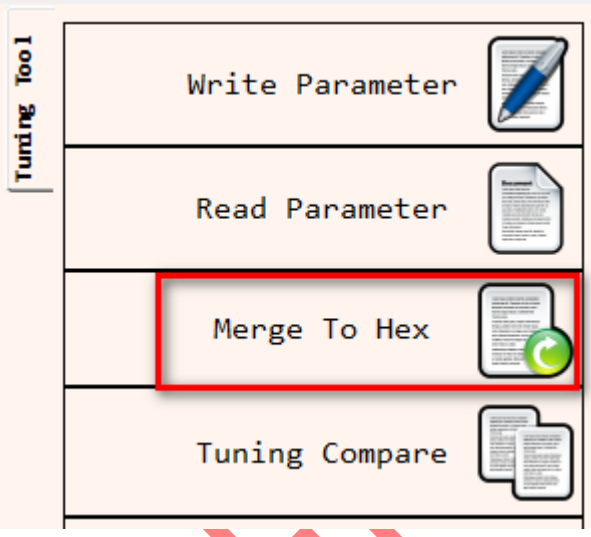
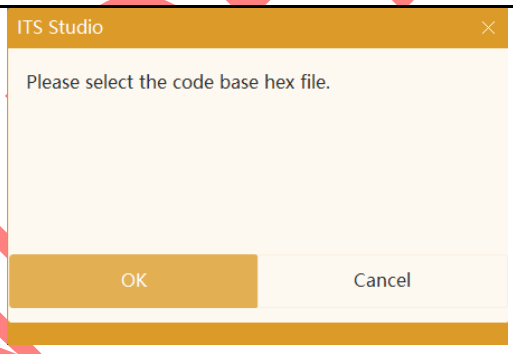
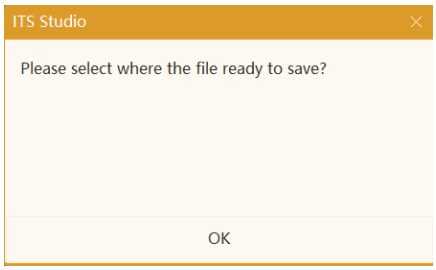
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Merge To Hex

Generate a new hex file with parameters.

Item	Name	Description
1	Merge To Hex	 Choose the function.
2	Code base hex file	 Select a hex file as the base FW。
3	Save file	 Set firmware name and select firmware type to hex file.

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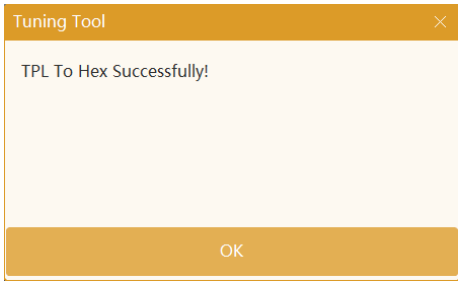
4	Result information	 Save a hex file

Table 3-17 merge to hex table

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Tuning Compare

Compare tuning parameters between selected hex files.

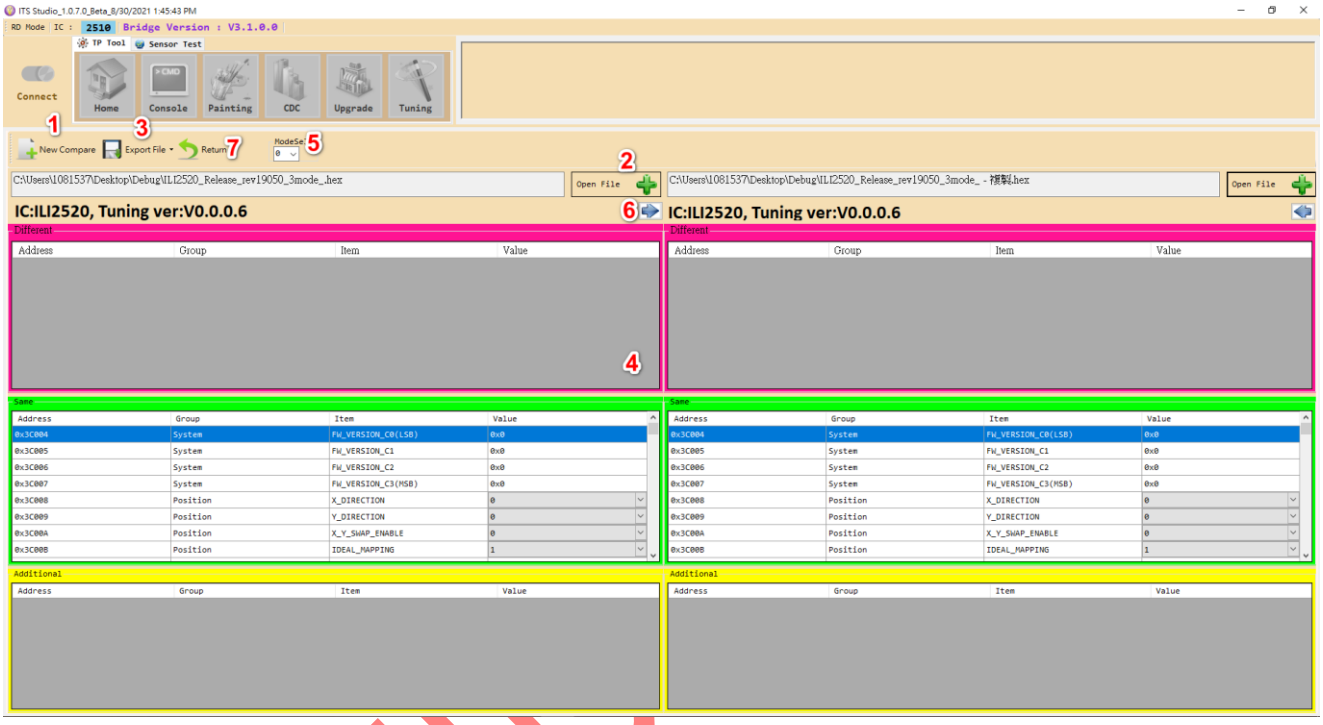


Fig 3-32 Tuning compare

The detailed descriptions of the Tuning compare function:

Item	Name	Description
1	New comparison	A list of available comparison templates is shown.
2	Open File	Select hex file in file system.
3	Export File	**Export Left File**: Generate a new hex file with left parameters. **Export Right File**: Generate a new hex file with right parameters.
4	result	Show different parameters between left and right hex files. Show the same parameters between left and right hex files. Show additional parameters between left and right hex files.

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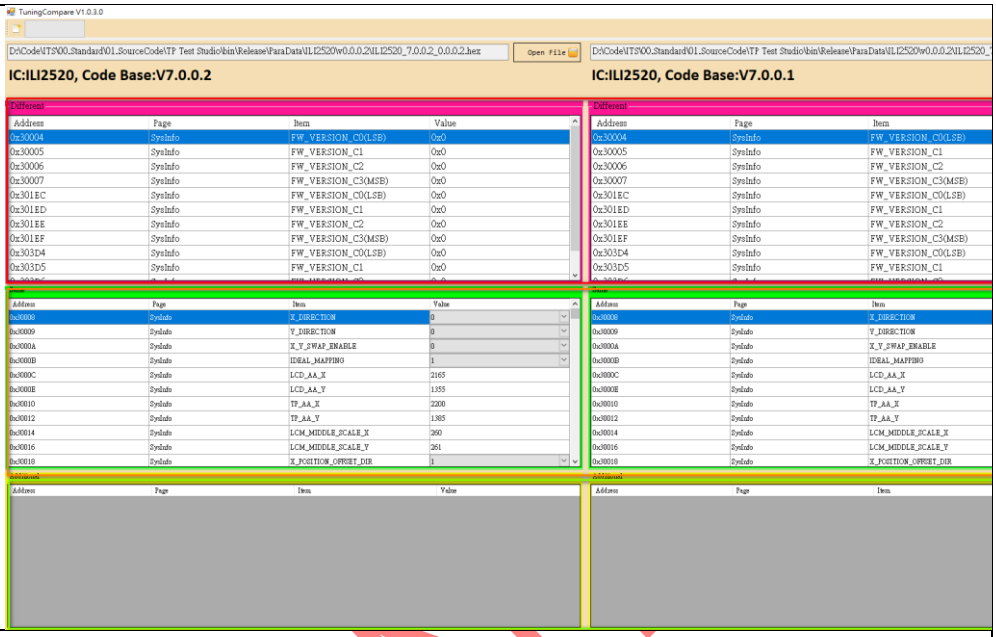
		
5	Mode select	If the hex file includes multiple modes, the combo box will show in the tool, you can select the mode you want using combo box.
6	copy	Use ctrl or shift key to select multiple fields then use this button to copy fields to another side.
7	Return	Exits

Table 3-18 Tuning compare table.

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Auto Scan Channel

This function can find sensor channel automatically.

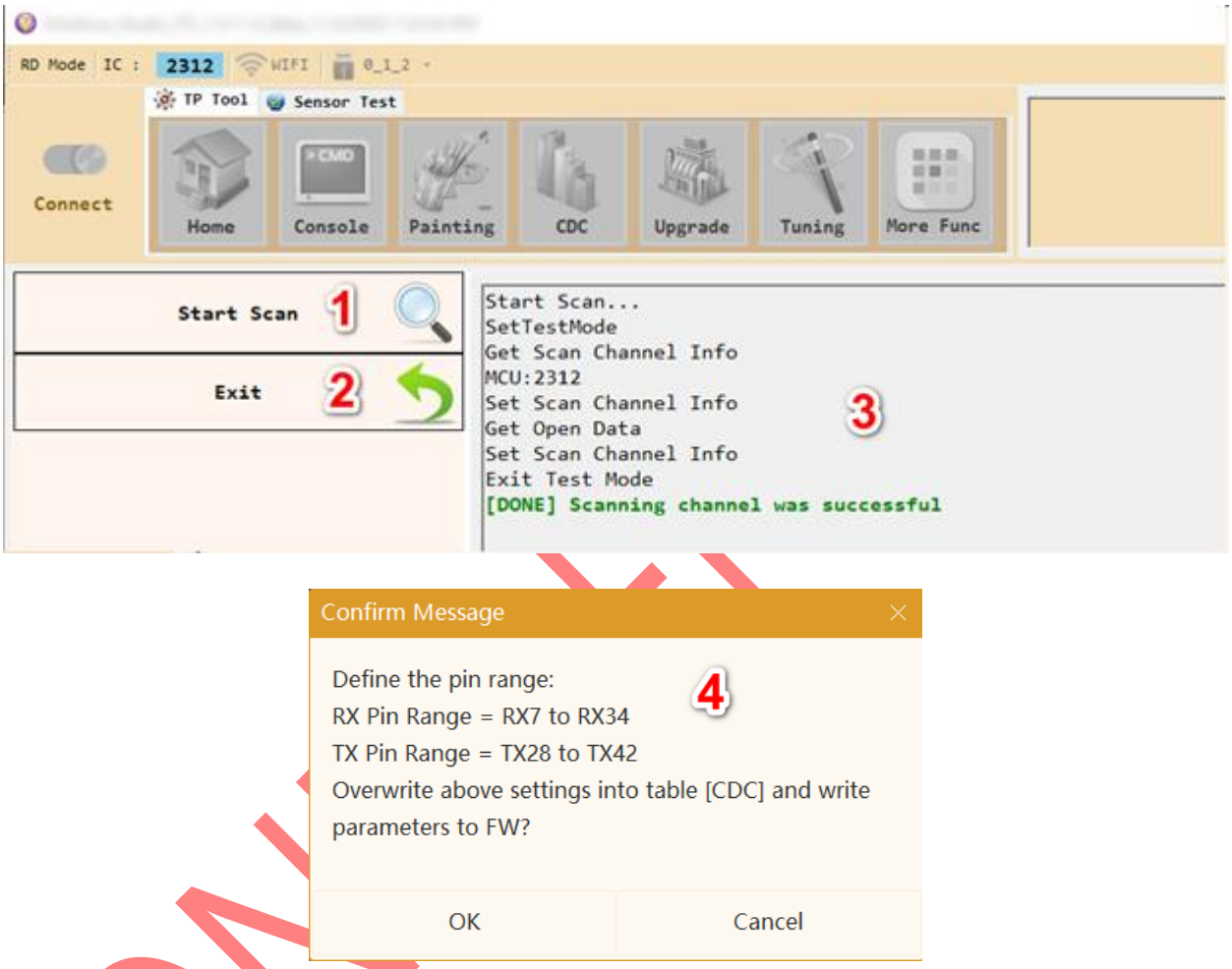


Fig 3-33 Auto Scan Channel

The detailed descriptions of the Auto scan channel function as (table 3-19):

Item	Name	Description
1	Scan Channel Range	**Start**: Start to find sensor channel.
2	Exit	**Exit**: Exit function.
3	Information	Show the running and searching status, if there are some errors in the progress, it will show the reasons why it fails, otherwise, it will get the confirm message window.

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4	Confirm Message	Show result. **Yes**: Set result into parameters. **No**: Skip result.

Table 3-19 Auto scan channel table.

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More Functions



Fig 3-34 More Func Interface

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Frequency Spectrum

Noise detects and shows as a spectrum diagram.

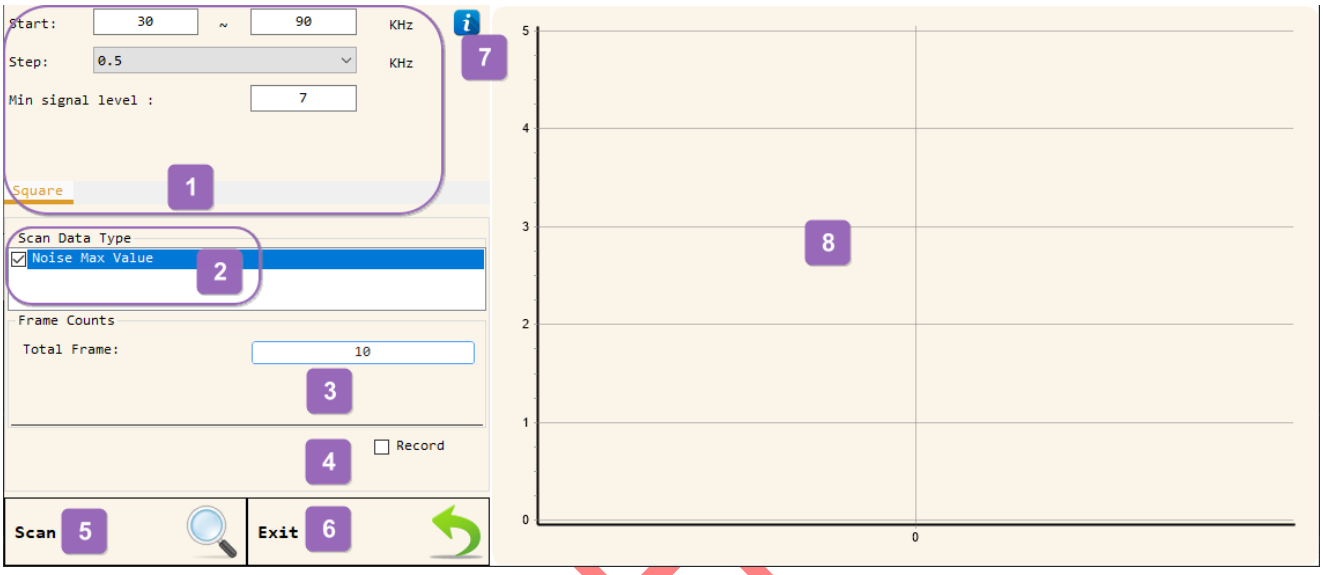


Fig 3-35 V3 Frequency Spectrum

The detailed descriptions of the Frequency spectrum function

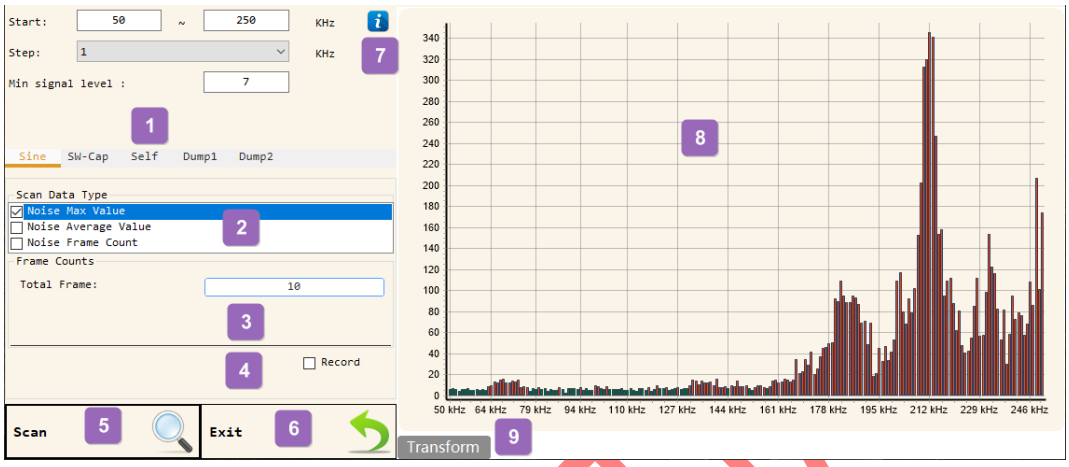
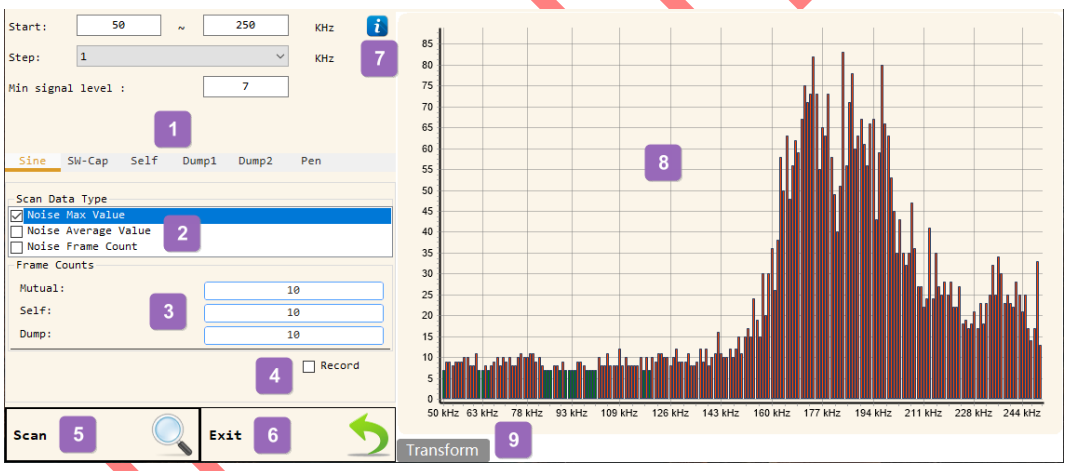
Item	Name	Description
1	Setting	Settings for frequency sweep range (start) / sweep interval (step) / minimum signal level
2	Scan Data Type	Data calculation type (only one type for Protocol V3).
3	Frame Count	Number of frames to sample.
4	Record	Save frequency sweep results, file location: NoiseFrqLog/NoiseFrequency_yyyy_mm_dd_T.csv
5	Scan	Start frequency sweep action / readback and display results (in offline mode).
6	Exit	Exit frequency sweep tool.
7	Formula	Display calculation formula for frequency sweep.
8	Chart	Display the noise values for each channel, with those exceeding the minimum signal level threshold shown in red, and those below it shown in green.

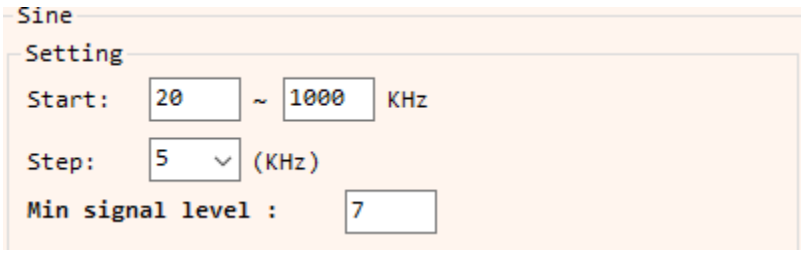
Table 3-20 V3 Frequency spectrum table.

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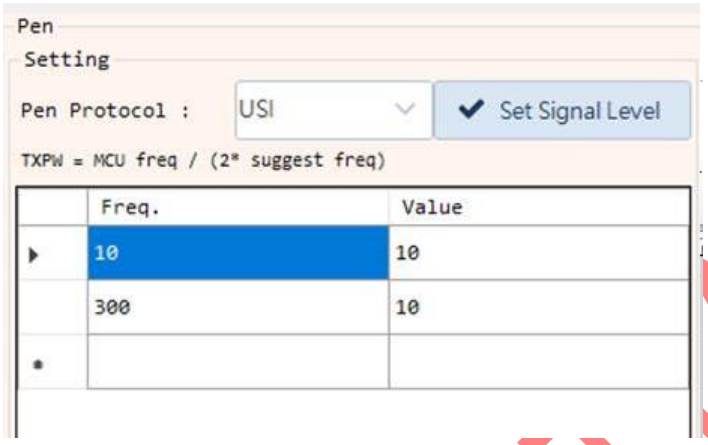
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Before Protocol V6.0.9	
After Protocol V6.0.A	

Item	Name	Description
1	Setting	a. Settings for Mutual Sine, Mutual SW-Cap, and Self SW-Cap: Frequency sweep range (start) / Frequency sweep interval (step) / Minimum signal level threshold 

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		b. Settings for the Pen, accessible only with FW support:  Pen Protocol: Divided into WPG/USI/MPP. If FW unsupported mode is selected, the settings will be ineffective. Threshold Setting: Used to edit threshold values for frequency bands. After editing, use "set signal level" to apply the settings.
2	Scan Data Type	Data Calculation Type: You can select the results of driving noise. If the device supports touchscreen functionality, an additional option for "pen" will be available. ※ *When FW supports Pen functionality, it's not possible to simultaneously scan for both Pen and non-Pen data. Separate scans are required for each.*
3	Frame Count	Number of frames to sample (After version 6.0.A, parameters are divided into 3 sets).
4	Record	Save frequency sweep results, file location: NoiseFrqLog/NoiseFrequency_yyyy_mm_dd_T.csv.
5	Scan	Initiate frequency sweep action / Readback and display results (in offline mode).
6	Exit	Exit frequency sweep tool.
7	Formula	Display the calculation formula for frequency sweep.
8	Chart	Noise values for each channel, with those exceeding the minimum signal level

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		threshold shown in red, and those below it shown in green.

Table 3-21 V6 Frequency Spectrum Introduction

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Charge Curve



Fig 3-36 Main Operation Interface

On Fig 2-32, the left side is operation display of Charge Curve, the right side is the display area.

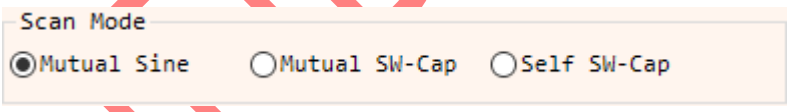


Fig 3-37 Scan Mode

On Fig 2-33, it shows the scan mode what type data do you want to capture, there are three types supports currently, every type has default value and range, if you set the value is out of range, the tool will show hint to remind you and restore the value to default.



Fig 3-38 hint message

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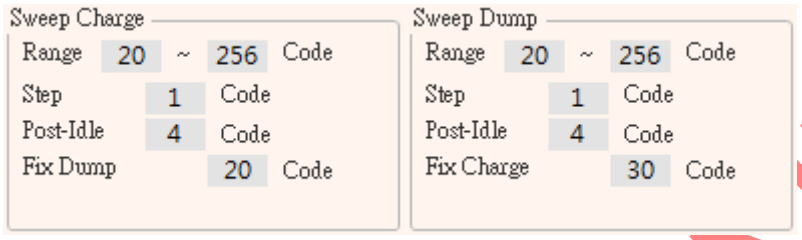
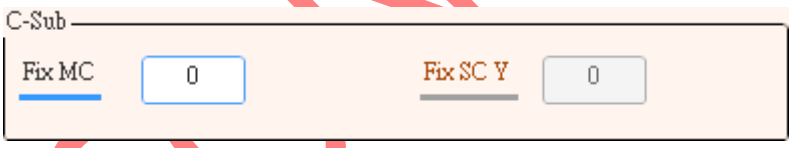
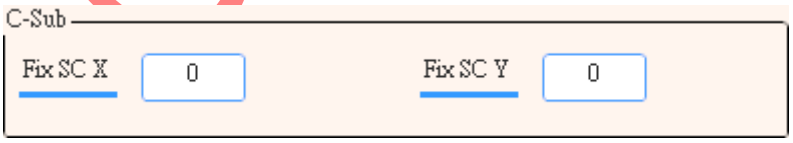
 Fig 3-39 Sine	The value is default, you must set the scanning range and step, the unit is KHz.
 Fig 3-40 Switch-Cap	The value is default, you must set the sampling range, scanning step, Post-Idle and Fix value.

 Fig 3-41 Mutual Sine	Mutual Sine didn’t support C-Sub.
 Fig 3-42 Mutual SW-Cap	Mutual SW-Cap just only one set of parameters.
 Fig 3-43 Self SW-Cap	Self SW-Cap set the X and Y sapa-rately.

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How to use the one-time sampling function

Step1: turn off the twice sampling function and then set the times you want to sample.



Fig 3-44 the times of sampling and option of two shot enable

Step2: make sure the corresponding to the coordinate position of TP

Enable	X - CH	Y - CH
☑	2	2
☑	20	2
☑	40	2
☑	2	11
☑	20	11
☑	40	11
☑	2	22
☑	20	22
☑	40	22

Fig 3-45 9 coordinate positions

Step3: go to run

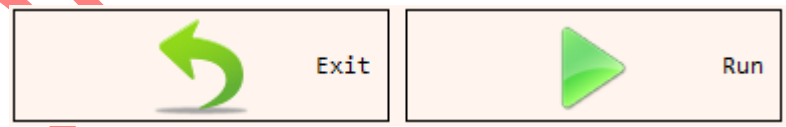


Fig 3-46 Run

Step4: wait to finish.

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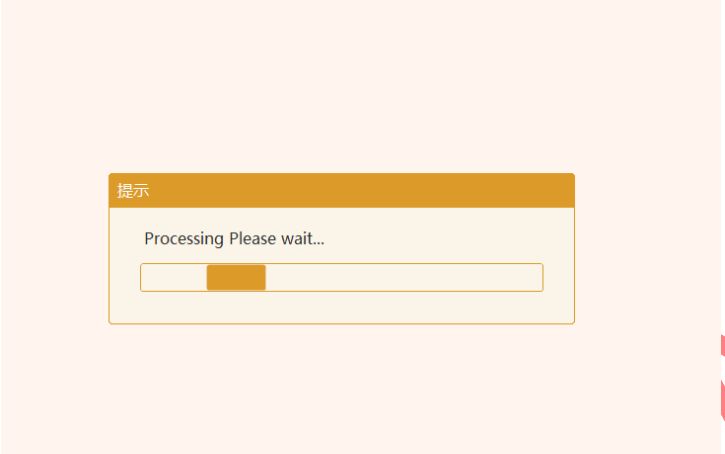


Fig 3-47 sampling

Step5: make sure the information after sampling



Fig 3-48 Sweep Charge page

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Fig 3-49 Sweep Dump page



Fig 3-50 enable you want to display data type (Max)

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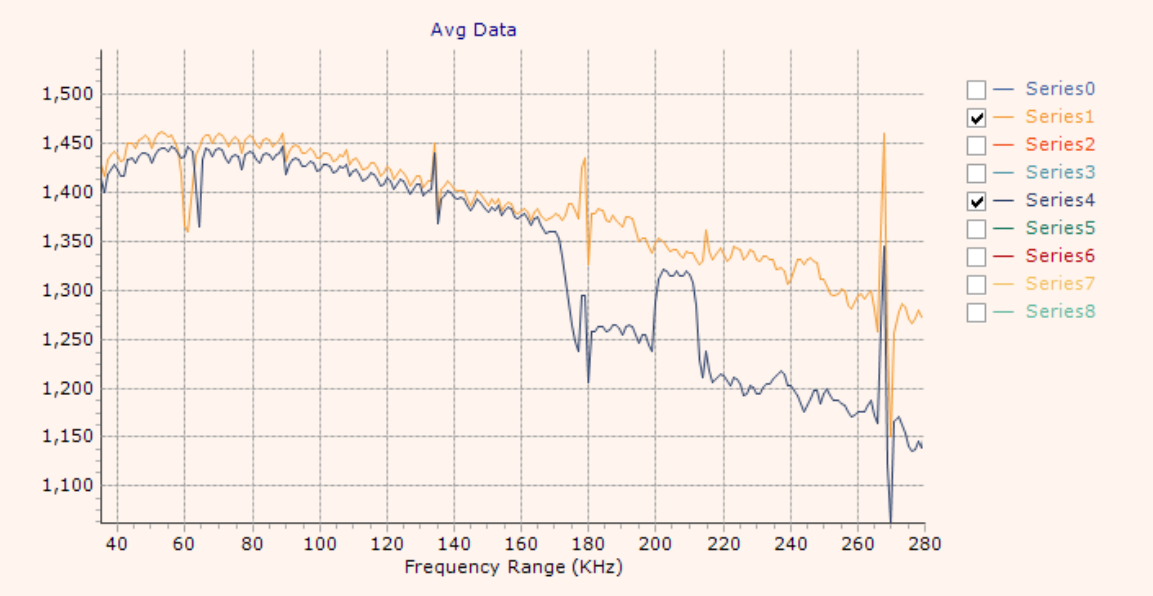


Fig 3-51 enable you want to display data type (Average)

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How to tune on the function of sampling difference

Step1: Tune on the Two Shot



Fig 3-52

Repeat the step2 to step4

Step5：Puts on the copper pillar on the TP you want to test and then presses “sure”

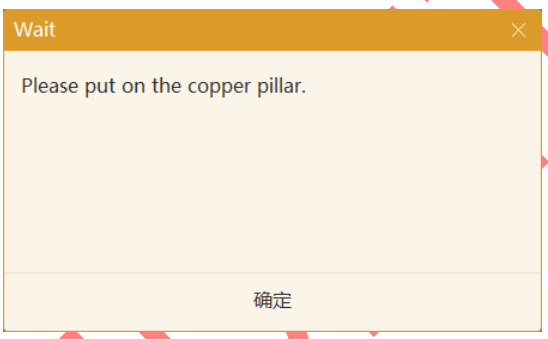


Fig 3-53 message

Step6：Make sure the difference value



Fig 3-54 finish sampling

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C Model

C-Model provides higher report rate then CDC, and shows raw data and report data at the same time. The raw data of frame is only updated within size of Region of Interest (RoI). The A block on the left side is C-Model setting panel, and B block on the right side shows frame raw data and report data. Each item is introduced in below table. Different setting would result in different data size and data update rate.

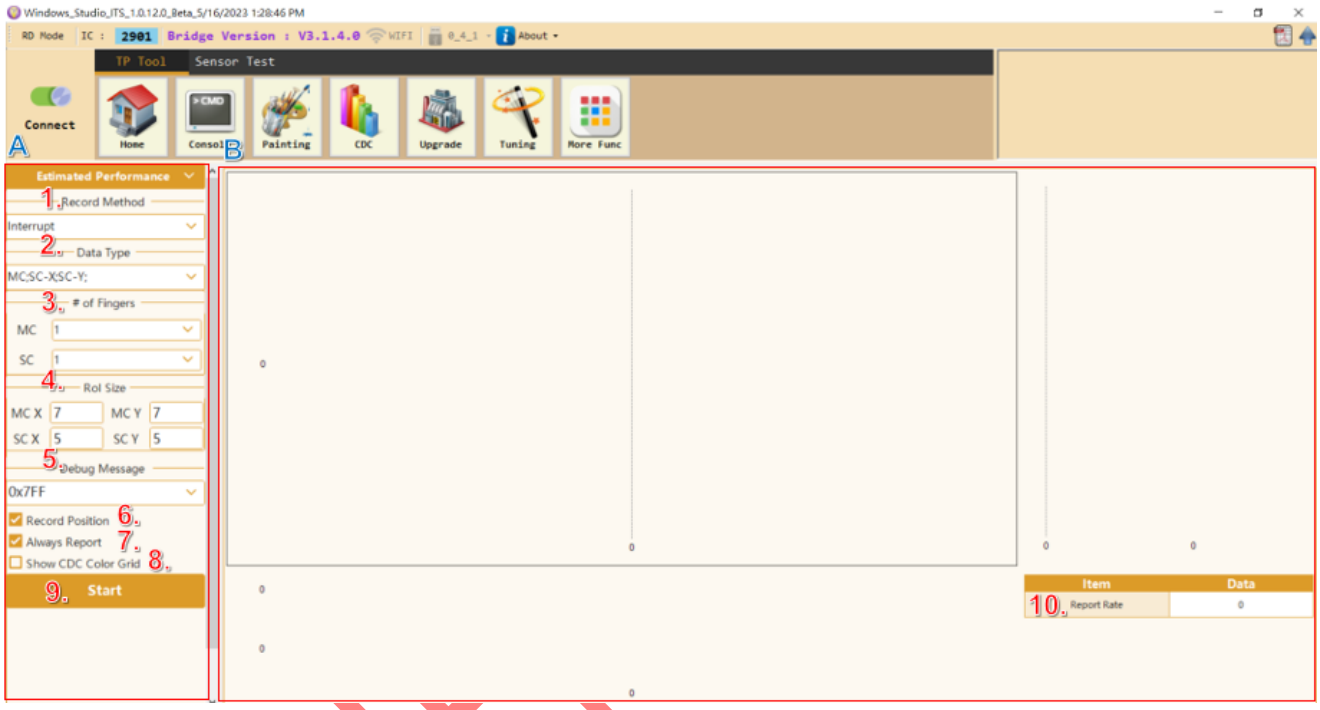


Fig 3-55 C-Model Main Window

No	Name	Description
1	Record Method	a. Interrupt: Packet size is 64 bytes, data is composed of several packets. b. Ctrl: Packet size is 256/1024/2048 bytes, data is parsed from single packet.
2	Data Type	a. MC: Mutual data, touch report data is included b. SC-X: Self X-axis data c. SC-Y: Self Y-axis data d. PEN-TIP: Stylus Tip data, stylus report data is included e. PEN-RING: Stylus Ring data Multiple-choice, not support showing both Finger/Pen data at the same time
3	# of Finger	Max finger count, the count of stylus is constant 1
4	RoI Size	Size of Region of Interest (RoI), unit in channel count

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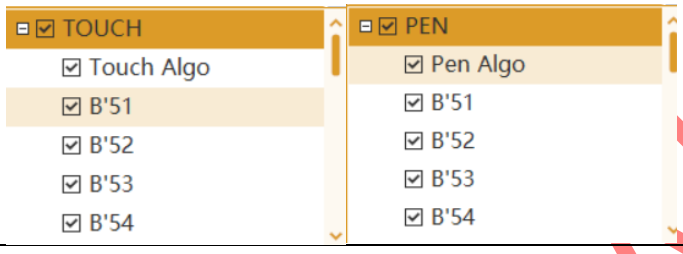
5	Debug Message	Protocol 6.0.8 and onwards are supported. When CDC packets are configured, they will include DBG messages. Please refer to the settings within the PaintTool.ini file for the parsing method. 
6	Record Position	If the option to include Paint coordinates data in the packets is not selected, there will be no point reporting data, thus creating more space for CDC Data.
7	Always Report	If the option to send packets when the finger/pen is not pressed is not selected, the firmware will only report packets when the finger/pen is pressed on the panel.
8	Show CDC Color Grid	Show CDC frame raw data, default disabled.
9	Start/Stop Button	Start/Stop receiving C-Model packets.
10.	Information Section	Show real-time report rate when start receiving C-Model packets and Debug messages.

Table 3-22 C-Model UI Items Description

After setting and starting C-Model, users could right-click on the right panel to select below functions.

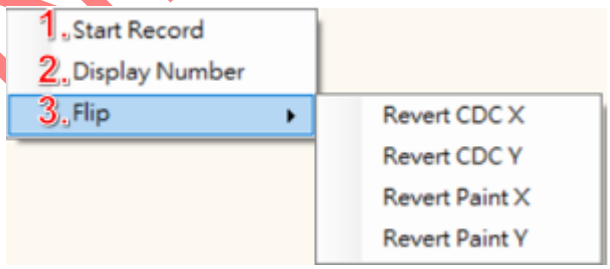


Fig 3-56 C-Model Right-Click Functions

No	Name	Description
1	Start/Stop Record	Click to start/stop data recording, same as shortcut Ctrl-R keys. When recoding, information shows above the panel as below figure, which means count of CDC frames and report data. Both data would be separately saved

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		under directory "Debug_Record_File" and "Debug_Record_Paint". **Recording... cdc 345 frames, paint 158 frames** Saved .csv file could be separately replayed by CDC and Paint Functions.
2	Display Number	Show data number in CDC color grid, default disabled.
3.	Flip	Set whether to flip CDC/Paint data.

Table 3-23 C-Model Right-Click Functions Description

When not connected, playback of previously recorded files is available.

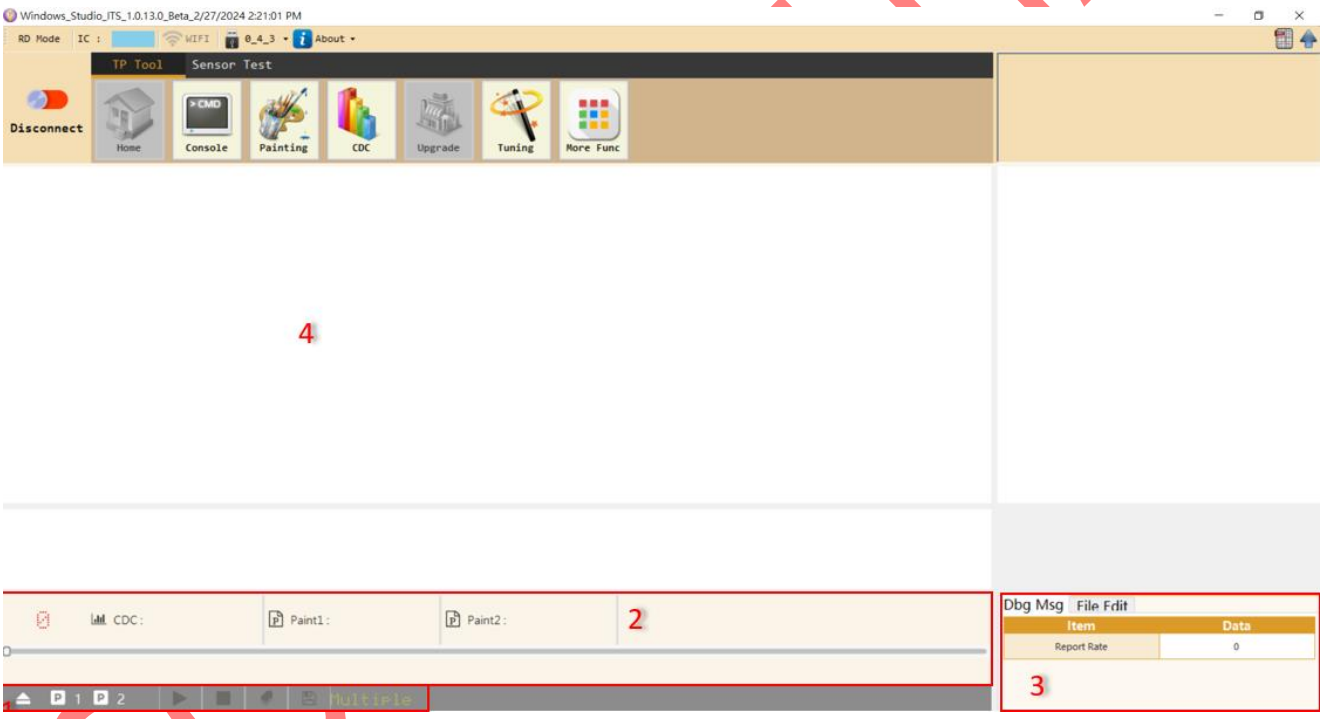


Fig 3-57 C-Model Replay MainForm

Item	Name	Description
1	Button	Function ● Load CDC: Load the recorded .cdc file. ● Load Paint1: Load the recorded .paint file. ● Load Paint2: Load the recorded . paint file. ● Play: Start Paly.

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		• Stop: Stop Paly. • Mark: Mark the Start/End Frame (for file extraction). • Save: Generate clipped .cdc/.paint files based on the marked frames.
2	Frame bar	Displaying frame and progress bar: • Clicking on the progress bar: Pause continuous playback and navigate backward or forward by 3 frames. • Dragging the progress bar: Allows you to seek to the desired frame. • File name: Displays the name of the currently playing file.
3	DBG Msg	Display debug messages or record marker points.
4	CDC Area	• Display CDC values. • Right-click to bring up a menu, where you can choose options such as displaying numbers, reversing CDC or Paint, selecting data format, color and set the UI is visible or not. • Enable Support Line : Displaying grid lines for reference points to facilitate the visibility of reference point positions. • Show Paint Panel : Choose whether to display the painting window. • Show Coordinates : Choose whether to display coordinates in the Minecraft (MC) area. • Draw Coordinates : Select whether to display coordinates on the Paint Panel (Show Paint Panel needs to be enabled). • Show Trajectory Dot : Choose whether to display trajectory points on the Paint Panel (Show Paint Panel needs to be enabled).

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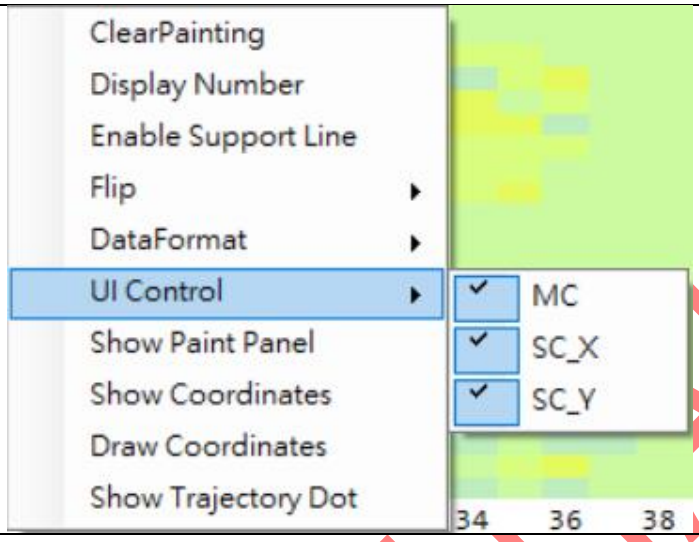
		

Table 3-24 C-Model Replay UI Items Description

Double-clicking on the frame number allows you to enter the editing mode (in blue color). You can input a specific frame number and press Enter to directly jump to and play that frame.



Fig 3-58 Specifying a Frame in C-Model Replay

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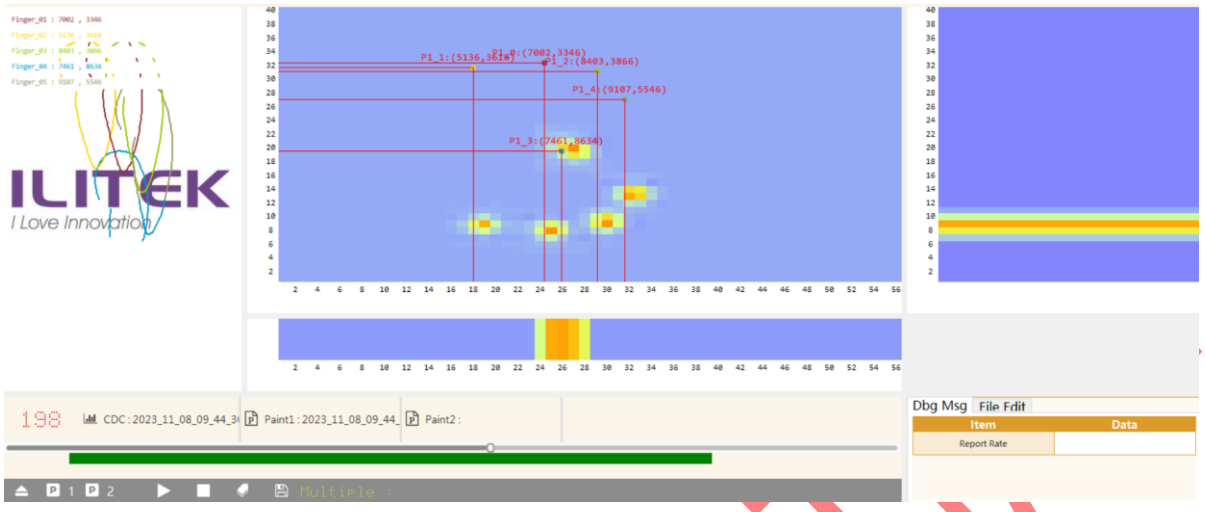


Fig 3-59 C-Model Replay

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4. Sensor Test Tool

RD/OP Mode switch

In Home or Sensor Test window press keyboard “**Alt+Z**” to switch RD mode. Password is followed Tool version.

For example:

If tool version is V 1.0.0.14, it means password is **10014**。

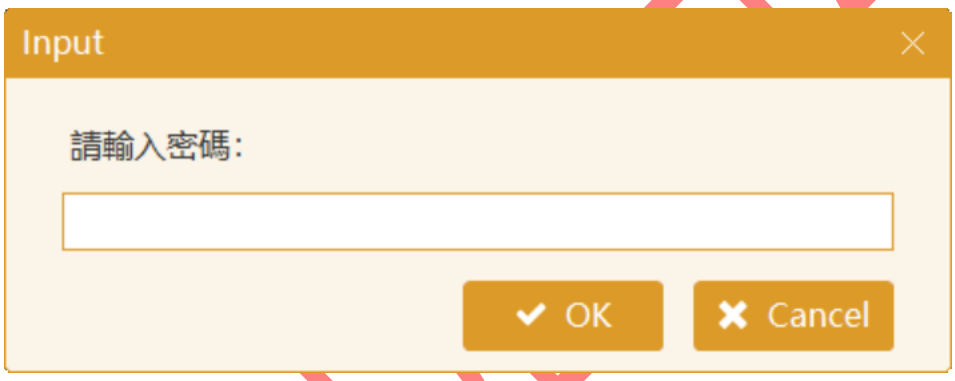


Fig 4-1 Switch mode Password

After key-in the correct password, the MainSetting box will pop-up. (Fig 4-1)

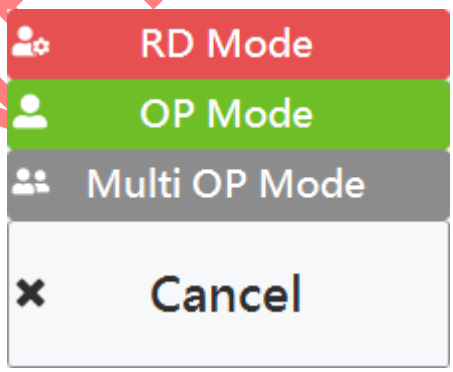


Fig 4-2 Main Setting

※OP Mode: Tool for mass production only. If want to edit configuration, it must be switched to RD mode. (Fig 4-2)

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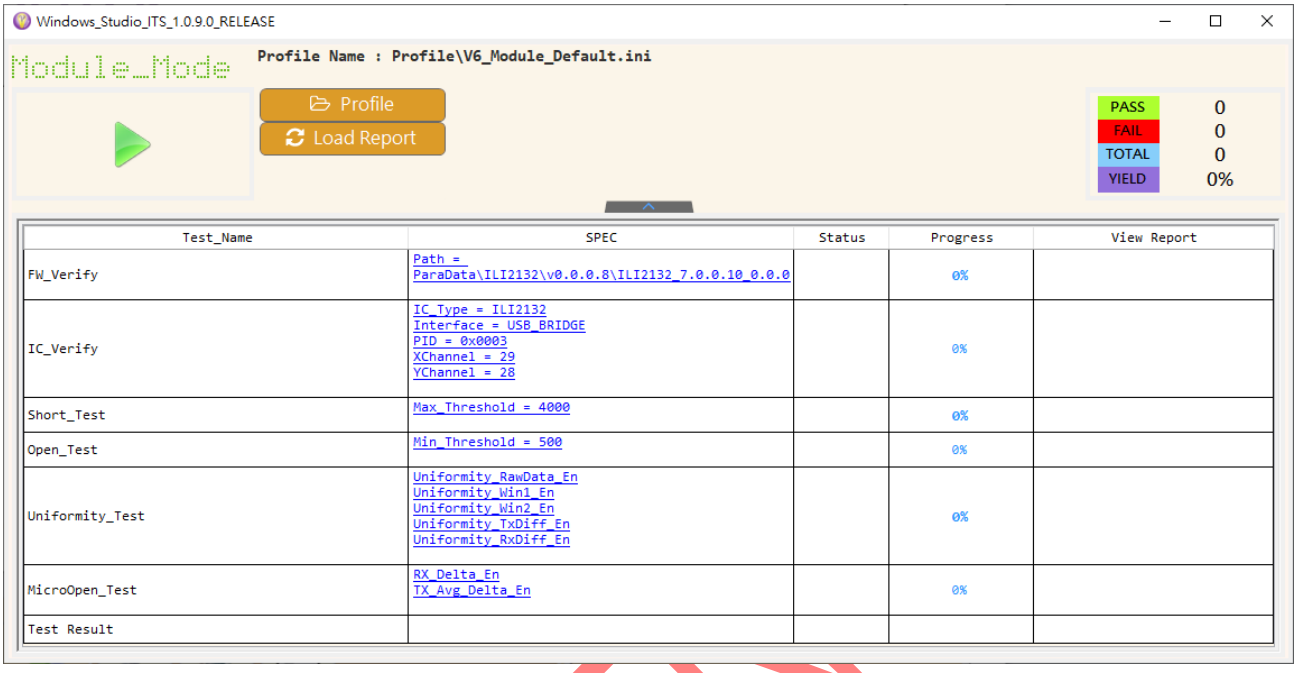


Fig 4-3 Sensor Test Tool (OP MODE)

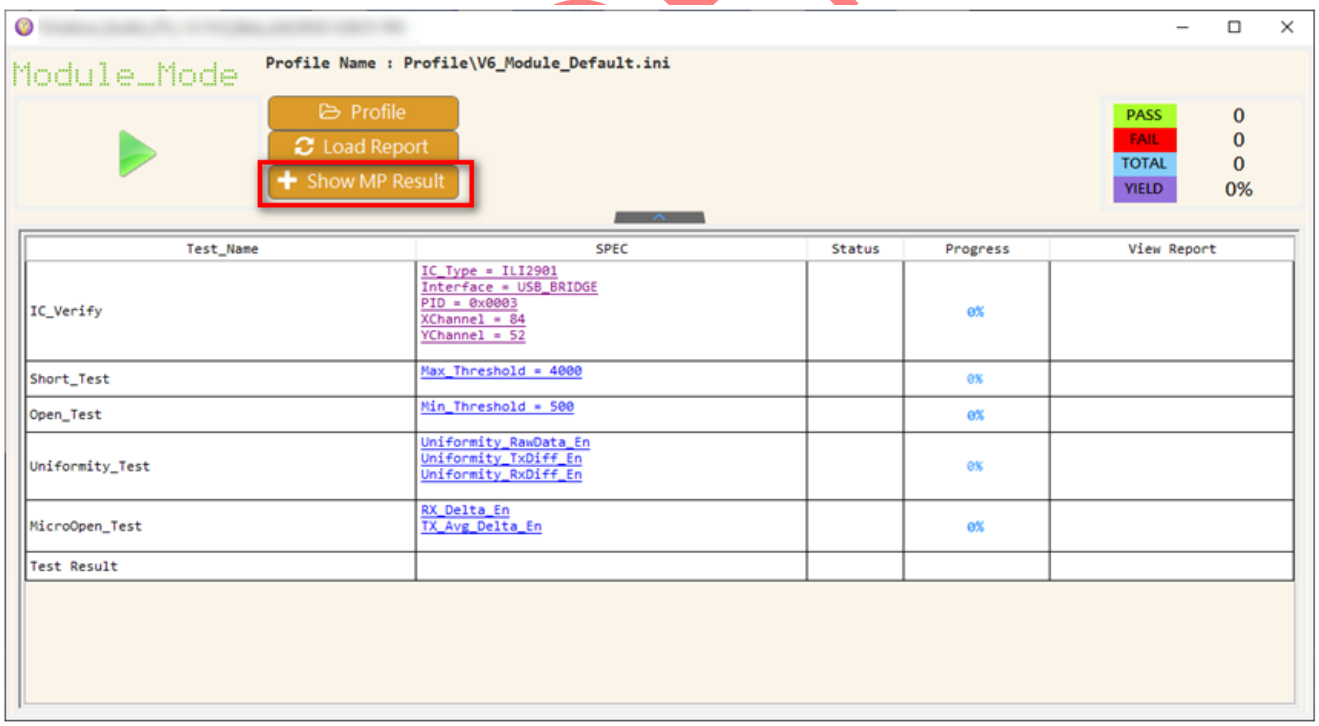


Fig 4-4 Show MP Result at Sensor Test Tool (OP MODE)

※RD Mode: All functions are available

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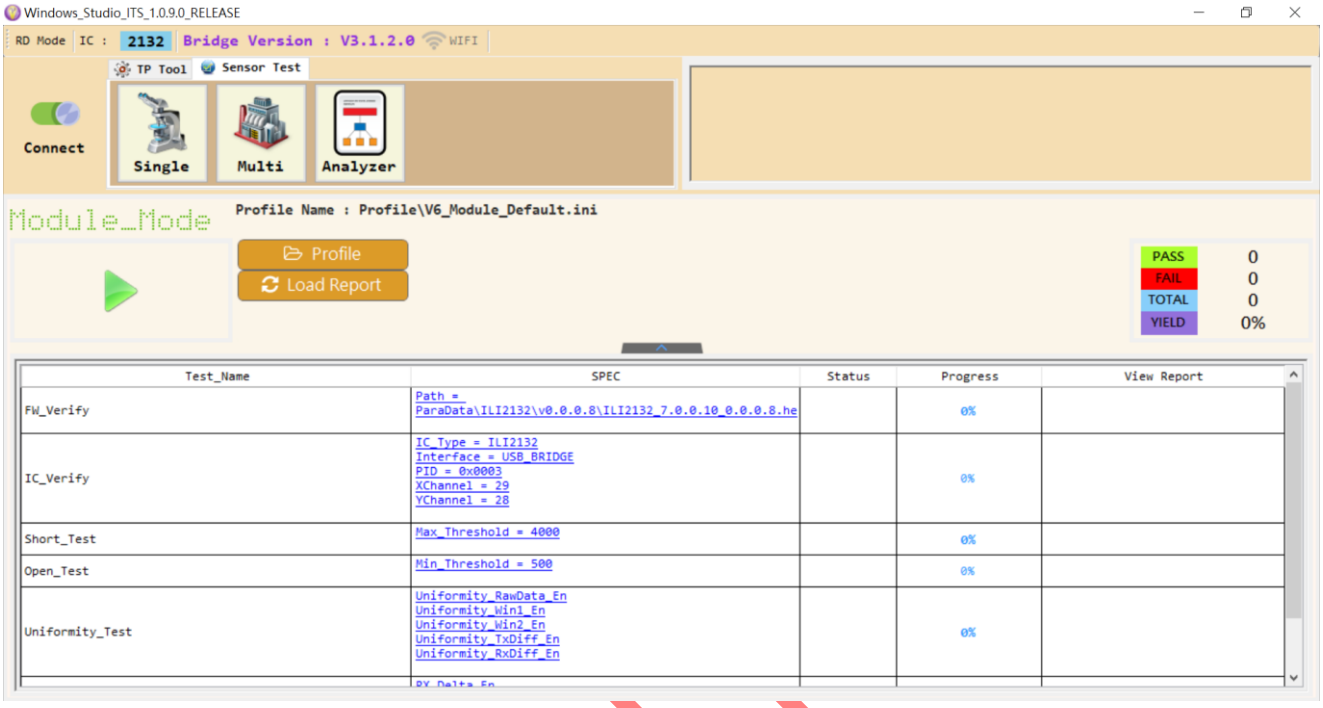


Fig 4-5 Sensor Test Tool (RD Mode)



Fig 4-6 Sensot Test main UI which Show Test Detail Info switch to OFF and Show Test Info Viewer switch to ON

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Sensor Test

Tool show tests items on the screen (Sensor + PCB) as follows. (Fig 4-7)

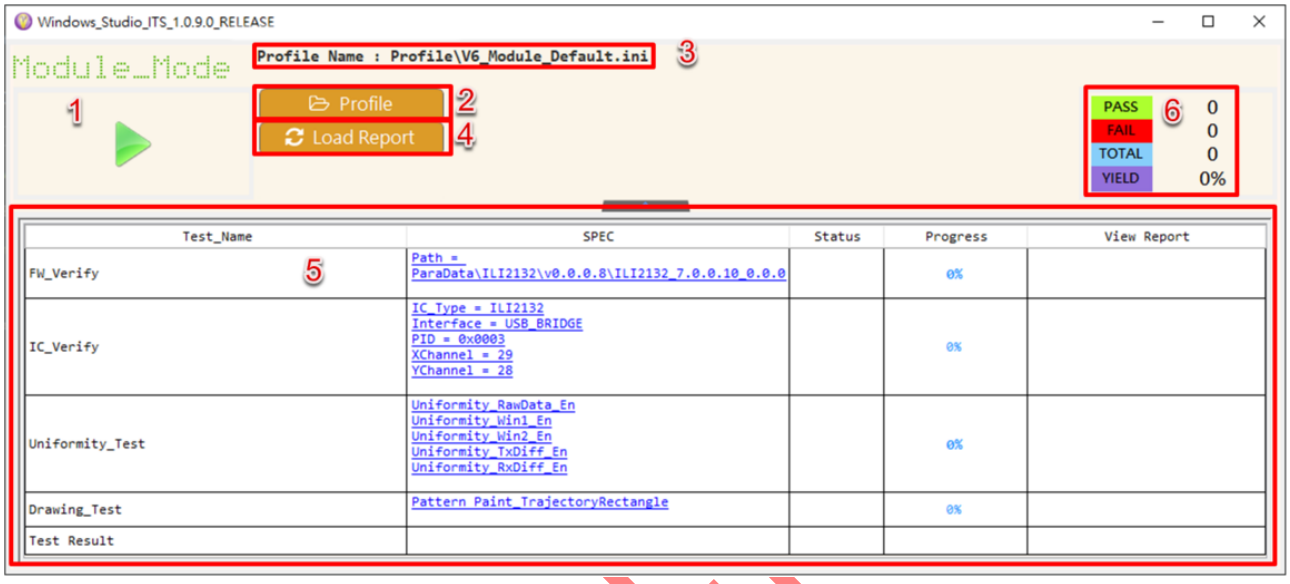


Fig 4-7 Sensor test 1

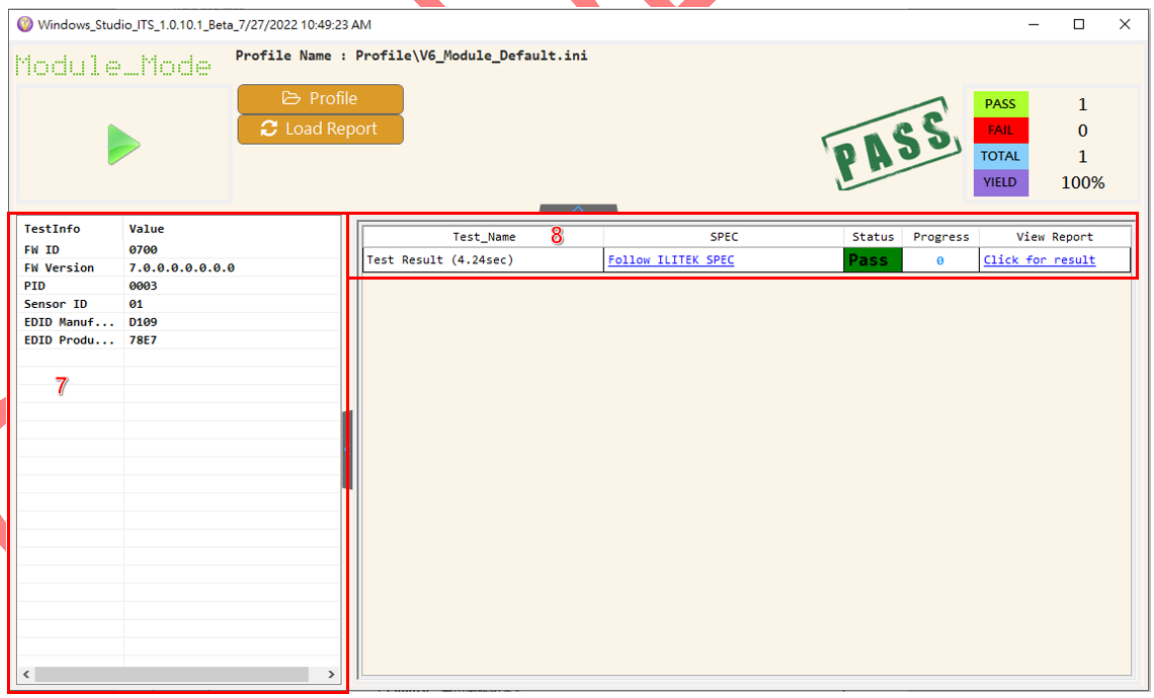


Fig 4-8 Sensor test 2

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The detailed descriptions of the Sensor test function:

Item	Name	Description
1	Start Test	Click button to start test.
2	Load Profile	Select configuration with proper IC type and interface.
3	Profile Name	Show the selected profile path.
4	Load Report	Select test log and show test result on UI.
5	Test List	[Enable]：Test item enable when it is selected. [Test Name]：Test item name [SPEC]：Test criteria and click to do modification. [Status]：Show result. (Pass/Fail) [View Report]：Click "Click for result" show test item result
6	Test Result	Total results
7	Test Info Viewer	A window used to display additional information after the test was finish. You can control whether to switch on or off through Setting - Operator Option - Show Test Info Viewer [FW ID]: The value that protocol 6.0.7 and above supports writing . [FW Version] : The FW version after the test. [PID] : Product ID [Sensor ID] : The Sensor ID written by the FW [EDID Manufacturer Name] : The name of the manufacturer read from the display EDID [EDID Product Code] : A Product Code read from the display EDID
8	Test Result(Simplify)	The form which displayed when Setting - Operator Option - Show Test Detail Info is OFF. It will only display the final result instead of the detailed test content. When Show Test Detail Info was closed, the Setting window cannot be opened by clicking SPEC. Please use the right mouse button to open the Setting page

Table 4-1 Sensor test table

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Sensor Test – SPEC (Profile(F))

The Profile function can load and save configurations.

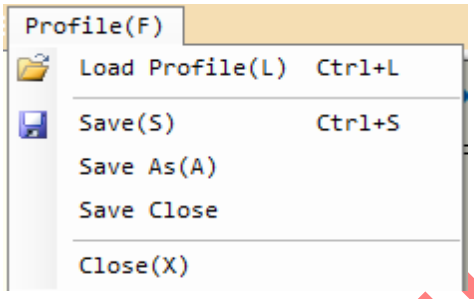


Fig 4-9 Sensor Test – Profile menu

The detailed descriptions of the Profile function as below:

Item	Name	Description
Profile menu	Load Profile	Load configuration from file (profile).
	Save(S)	To save modification into file (profile).
	Save As	It can save a new configuration.
	Save Close	Do Save(S) and close.
	Close(X)	Close edit function.

Table 4-2 Profile menu

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Sensor Test – SPEC (System)

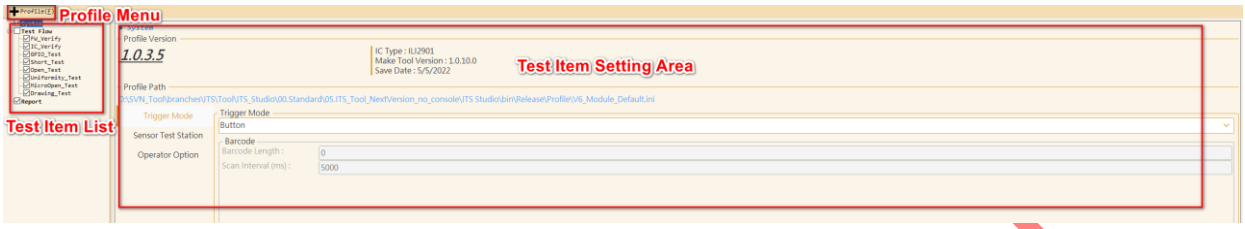


Fig 4-10 Sensor Test – SPEC (System) 1

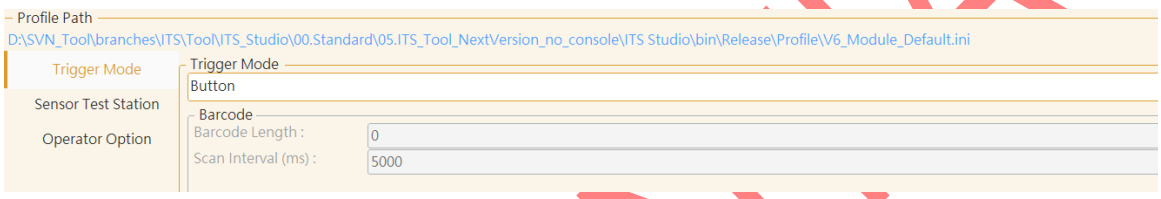


Fig 4-11 Sensor Test – SPEC (System) 2

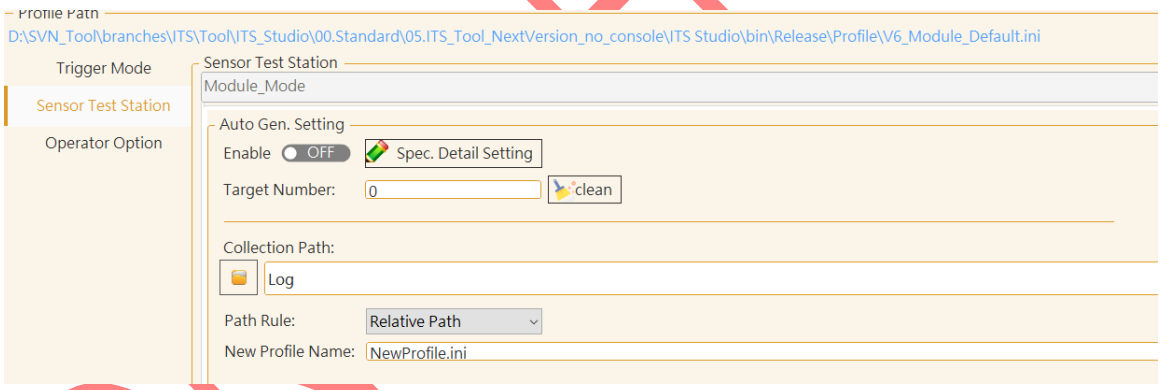


Fig 4-12 Sensor Test – SPEC (System) 3

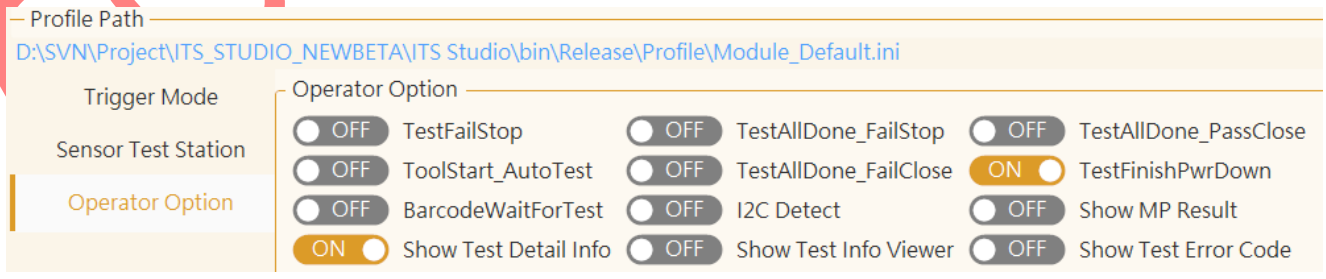


Fig 4-13 Sensor Test – SPEC (System) 4

The detailed descriptions of the System function:

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<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>INI Path</td><td>Show absolute path of configuration file.</td></tr>
<tr><td>Profile version</td><td>Show profile version.
Make Tool Version: tool version
Save Date: Profile edited date.
IC Type: IC Type of profile</td></tr>
<tr><td>Test Item Area</td><td>Users can select test items and decide whether they want to join the test or not.</td></tr>
<tr><td>Test Setting Area</td><td>Users can set the specifications or parameters of the test item.
<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>File Path</td><td>Profile Data Path</td></tr>
<tr><td>Profile Version</td><td>The version of profile</td></tr>
<tr><td>Save Date</td><td>Current date.</td></tr>
<tr><td>Make Tool Version</td><td>The tool version</td></tr>
<tr><td>IC Type</td><td>The IC name</td></tr>
<tr><td>Trigger Mode</td><td>[Trigger Mode]
<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>Button</td><td>Use button to start test</td></tr>
<tr><td>Bar Code</td><td>Scan bar code to start test</td></tr>
<tr><td>BarCode Button</td><td>After scanning the bar-code, you need to press the button to start the test.</td></tr>
<tr><td>Bridge GPIO</td><td>The test is initiated by de-tecting the specific GPIO pin on the bridge as either high or low. Based on the test result, the specific IO will be changed to either high or low.</td></tr>
</table></td></tr>
<tr><td>Barcode</td><td><table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>Barcode Length</td><td>set barcode length. (e.g. The barcode is “123” that means Barcode</td></tr>
</table></td></tr>
</table></td></tr>
</table>

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<table>
<tr><td></td><td>
<table>
<tr><td></td><td>Length is “3”)</td></tr>
<tr><td>Scan Interval (ms)</td><td>Interval of test in barcode mode.</td></tr>
<tr><td>Focus Enter</td><td>Needs to get “Enter” key to judge the barcode length, and starts to test when barcode length is enough.</td></tr>
</table>
</td></tr>
<tr><td>Test Function Setting</td><td>[Sensor Test Station]
<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>Module_Mode</td><td>PCB + Sensor.</td></tr>
<tr><td>FPC_Mode</td><td>PCB Onlt</td></tr>
<tr><td>AutoGen_Mode</td><td>Auto generate profile</td></tr>
<tr><td>Report_Mode</td><td>Load test log.</td></tr>
</table>
</td></tr>
<tr><td>Fixture_Tip</td><td>
<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>Pick up</td><td>Set the hint for pick up fixture.</td></tr>
<tr><td>Put down</td><td>Set the hint for put down fixture.</td></tr>
<tr><td>Change connector</td><td>Set the hint for change connector.</td></tr>
<tr><td>Blink Timer</td><td>Set the time for blink message</td></tr>
</table>
</td></tr>
<tr><td>Operator Option</td><td>[Operator Option]
<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>TestFailStop</td><td>Stop the whole test when one item test fail.</td></tr>
<tr><td>TestAllDone_FailStop</td><td>Stop the whole test after test finish if have one or more fail.</td></tr>
</table>
</td></tr>
</table>

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			TestAllDone_PassClose	Close the program if test finish and all results are pass .
			TestStart_AutoTest	Auto start the test when program was launched.
			TestAllDone_FailClose	Close the program if test finish and have one or more fail.
			TestFinishPwrDown	Shut down the Vdd power after finish test.
			BarcodeWaitForTest	Start test after bar code was scanned
			I2C Detect	OP Mode Only. Auto start the test if it detects I2c data.
			Show MP Result	OP Mode use only Show the button to get MP Result information.
			Show Test Detail Info	Show/Hide the test detail information. (When this item is OFF, please open the Setting page with the

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			right mouse button instad of click SPEC)
		Show Test Info Viewer	A window used to display additional information after the test was finish
		Show Test Error Code	Show/Hide Test Error Code
		Show Bar Code Watermark	Choose whether to display a watermark in the barcode scanning area.
	Auto Gen. Setting	[Auto Gen. Setting]	
		Options	**Description**
		Enable	Enable or not
		Path Rule	Select the abs path or rleati pate
		Spec. Detail Setting	Set the new spec value of profile.
		Collection Path	Set the path to collecting logs.
		Folder Selection	select the path
		Target Number	Set the number of Logs to collect
		Clean	clear all logs under the path of the specified Log collection
		New Profile Name	New profile name
Trigger mode Setting	Trigger mode setting.		

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	Button: start test when press button **Barcode**: start test when barcode is scanned.
Sensor Test Station	**Module Mode**: PCB + Sensor. **FPC Mode**: PCB only. **Auto Gen. Mode:** Collect the results of sensor test to generate new profiles **Report Mode:** Get the *.csv to show the result on the main frame.

Table 4-3 Sensor Test – SPEC (System) table

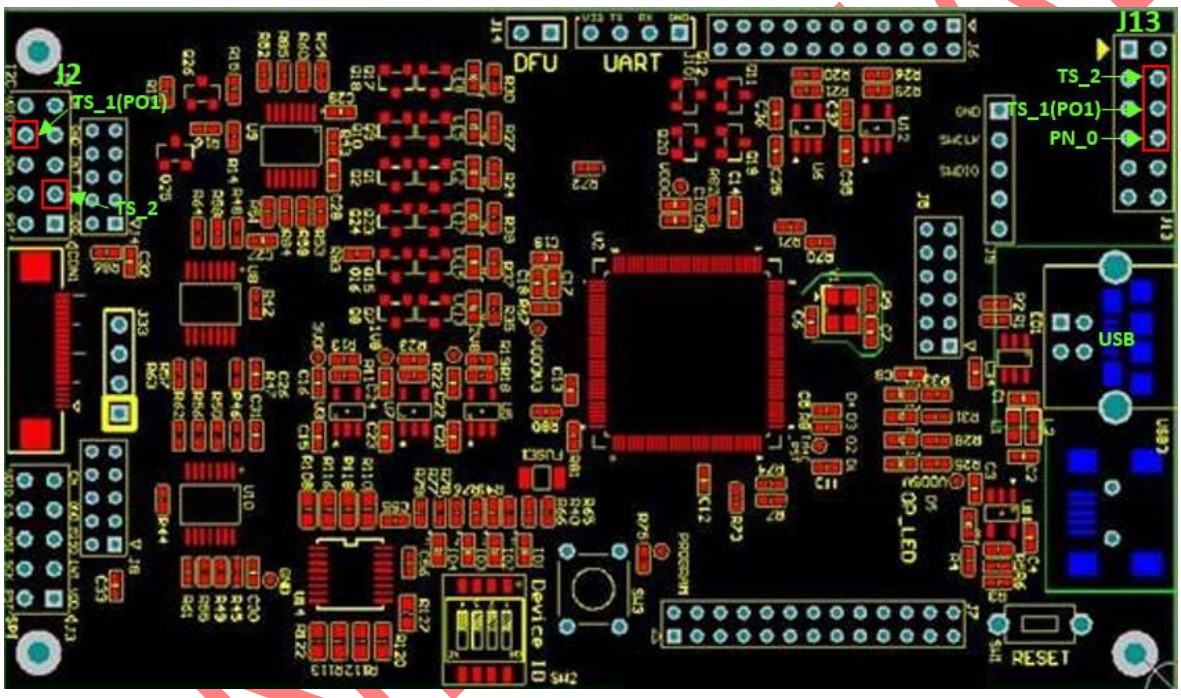


Fig 4-14 GPIO Trigger to Bridge Pin Connection Diagram.

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Please provide the table describing the precautions when Trigger Mode and Operator Option interact.

Triger Mode	Operator Option
Button	None
Bar Code	The items that cannot be set simultaneously: TestStart_AutoTest I2C Detect
Bar Code Button	The items that cannot be set simultaneously: TestStart_AutoTest I2C Detect
Bridge GPIO	The items that cannot be set simultaneously: TestStart_AutoTest I2C Detect

Table 4-4 Explanation table of conflicts between Trigger Mode and Operator Option.

The following table describes the precautions to be taken when Operator Options interact with each other.

Operator Option	
TestStart_AutoTest	The items that cannot be set simultaneously: I2C Detect
I2C Detect	The items that cannot be set simultaneously: TestStart_AutoTest TestFinishPwrDown

Table 4-5 Explanation table of conflicts between Operator Options.

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Sensor Test – Call ITS Function

Explanation: Starting from version 1.0.12.0, ITS_Studio supports the built-in "Call ITS" feature. This feature allows the selection of the desired profile during Tool execution by arranging combinations of Sensor_ID, EDID, FWID, PID, and other parameters.

*Note: This feature can only be used in OP Mode.

Configuration method:

1. Open the ".\Config\Setting.ini" file and set the "EnableCallITS" parameter inside the "[SensorTest]" section to "True".

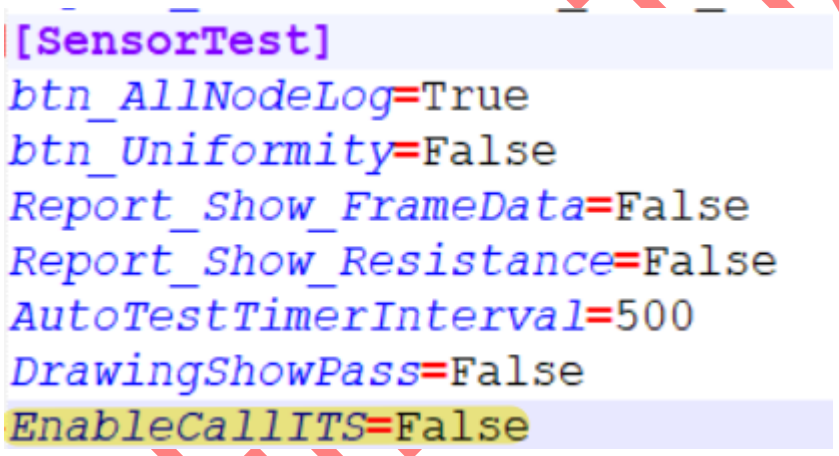


Fig 4-15 Call ITS Function Enable Setting Section

2. Ensure that the Mode setting of the Tool is set to "OP_Mode" (RD_Mode will not execute).
3. Run "Windows_Studio_ITS.exe". After execution, the Profile will be automatically selected based on the corresponding parameters.

IDPinSetting.ini Configuration:

Explanation: The IDPinSetting.ini file located in the Config folder needs to be configured according to specific requirements.

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```
[INI_FILE]
#可以根據自身需求設定需要判斷幾個條件
#(You can set the number of conditions to be evaluated based on your specific needs.)

#會按照Test_Sequence的順序組成字串，和下面Mode_Setting比對
#(The string will be formed according to the order of the Test_Sequence and compared with the Mode_Setting below.)

#請注意Test_Sequence順序修改時字串的順序也會跟著修改
#(Please note that if you modify the order of Test_Sequence, the order of the string will also be modified accordingly.)

#Test_Sequence最少一個條件，最多目前四個條件，條件之間要用&符號串接
#(Test_Sequence can have a minimum of one condition and a maximum of four conditions currently. The conditions should be connected using the "&" symbol.)

Test_Sequence=SENSOR_ID&EDID&FWID&PID
[Mode_Setting]
#SENSOR_ID&EDID&FWID&PID 用四個條件當判斷舉例，順序為SENSOR_ID ->EDID ->FWID ->PID
#(Here's an example of using the four conditions: SENSOR_ID, EDID, FWID, and PID, for evaluation, in the specified order: SENSOR_ID -> EDID -> FWID -> PID.)

#Example:
#SENSOR_ID=1
#EDID=06AF998B
#FWID=1122000A
#PID=0003

#Setting:1_06AF998B_1122000A_0003 字串設定的順序要和Test_Sequence一致，範例為SENSOR_ID ->EDID ->FWID ->PID，中間用_分隔。
#(Setting: 1_06AF998B_1122000A_0003 The order of the string should match the Test_Sequence. The example follows the sequence: SENSOR_ID -> EDID -> FWID -> PID, with underscores (_) separating the values.)
1_06AF998B_FFFFFFFF_0001=Profile\A1.ini
1_06AF998B_FFFFFFFF_0002=Profile\A2.ini
1_06AF998B_FFFFFFFF_0003=Profile\A3.ini
1_06AF998B_FFFFFFFF_0004=Profile\A4.ini
[EDID]
#此處為EDID預設讀取長度，目前只讀取四個Bytes。按照EDID標準8~11Bytes分別為Manufacture Code & Product Code
#(This is the default length for reading EDID, which currently reads only four bytes. According to the EDID standard, bytes 8 to 11 represent the Manufacturer Code and Product Code.)
#0~127
EDID_StartByte=8
EDID_EndByte=11
```

Fig 4-16 IDPinSetting.ini Example

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Sensor Test – SPEC (FW Upgrade)

The FW_Upgrade function can compare CRC of selected hex and CRC of testing TP module.

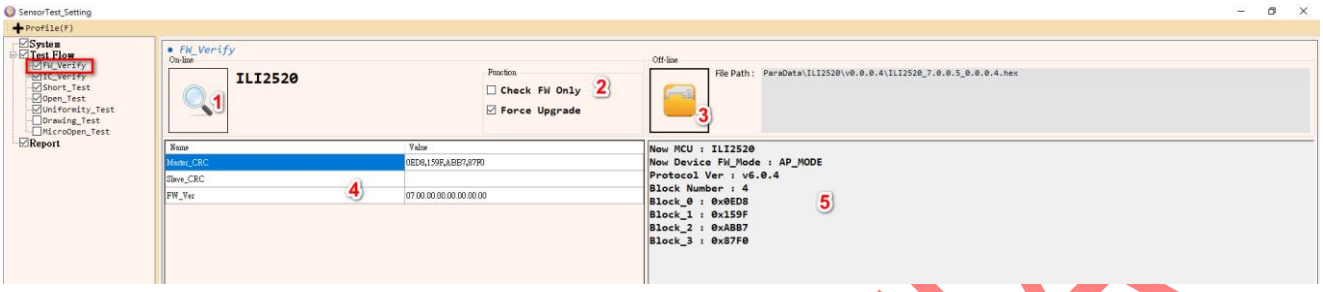
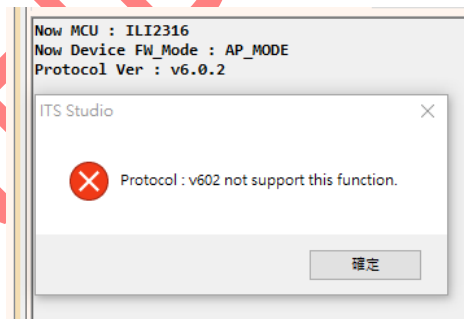


Fig 4-17 Sensor Test – SPEC (FW Upgrade)

Item	Name	Description
1	Scan	Detects the current IC type.
2	Check Box	Force Upgrade: Decide whether to force upgrading. Check FW Only: check the version between hex file and IC. Above two functions can only be chosen one.
3	Select Path	Select the path of the hex file (the path must be all English)
4	CRC Check	Return the CRC value, when some versions could not support, it will show an error message. 
5	FW information	Display Firmware information, the title is named as below: Hex Block_ : means CRC of the hex file. Device Block_: means CRC of IC. The result of comparison uses font color to highlight, if the color is green, it means CRC is same, if the color is red, it means CRC is differ.

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		Hex Block_0 Checksum : 0x550CDA Device Block_0 Checksum : 0x00550CDA Hex Block_1 Checksum : 0x0000 Device Block_1 Checksum : 0xF50A

Table 4-6 Sensor Test – SPEC (FW Upgrade) table

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Sensor Test – SPEC (IC Verify)

The IC_Verify function can load information from touch controller.

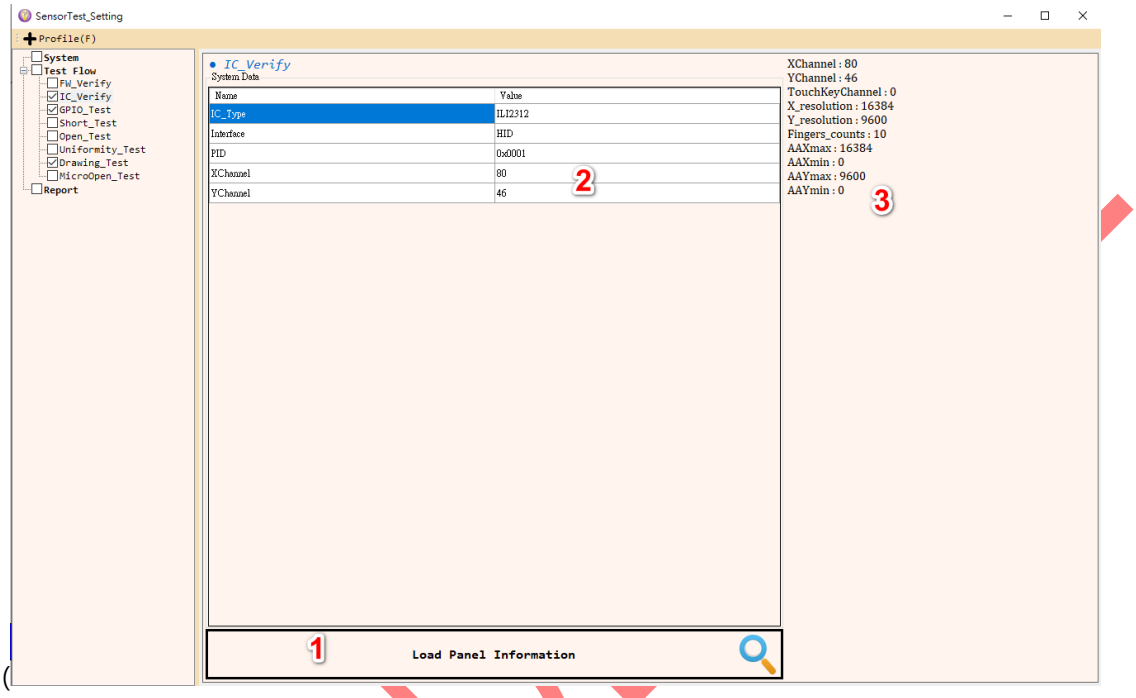


Fig 4-18 Sensor Test – SPEC (IC Verify)

The detailed descriptions of the IC verify function as (table 3-5):

Item	Name	Description
1	Load Panel Information	Load information from touch controller.
2	System Data	Show the system data. **Name** / **Description** **IC_Type** – IC type. **Interface** – Interface. **PID** – USB product ID. **XChannel** – Channel number of X direction **YChannel** – Channel number of Y direction
3	Panel Info	Show the TP basic information.

Table 4-7 Sensor Test – SPEC (IC Verify) table

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Sensor Test – SPEC (GPIO)

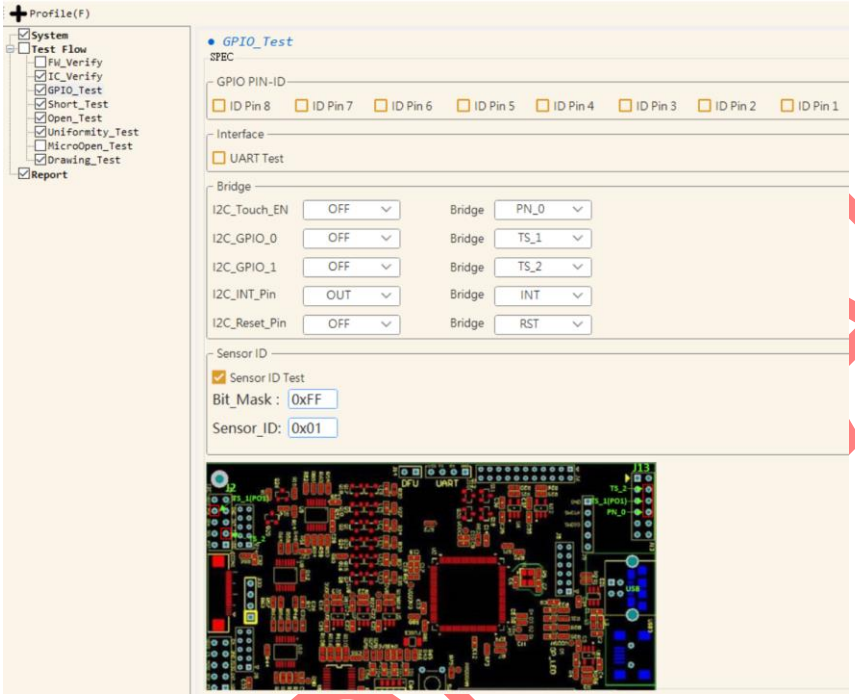


Fig 4-19 Sensor Test – SPEC (GPIO Test)

Name	Description
SPEC	[GPIO PIN-ID] Depend on the defined code of customized case to compare with FW [Interface] Depend command to get the UART pin self test result from FW。 [Touch_En / GPIO] It only enable to test using I2C interface, the goal is to check INT pin of bridge and Reset Pin workable.  IN: The DUT (Device Under Test) GPIO is configured as an Input, while the Bridge Pin is set as an Output. The Bridge Pin is toggled between High and Low states, and the DUT Pin reads the input and returns whether the correct state is received.

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	OUT: The DUT GPIO is configured as an Output, while the Bridge Pin is set as an Input. The DUT Pin is toggled between High and Low states, and the Bridge Pin reads the input and returns whether the correct state is received. [Sensor ID] This test verifies the correctness of the Sensor ID of the DUT (Device Under Test). Bit_Mask: The mask applied to the Sensor ID; the obtained Sensor ID will be bitwise ANDed with the Bit_Mask to filter out unnecessary bits. Sensor_ID: The Sensor ID obtained after applying &= Bit_Mask should match the value set here for the test to pass.

Table 4-8 Sensor Test – SPEC (GPIO Test) table

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Sensor Test – SPEC (Short Test)

The Short_test function can modify short test criteria.

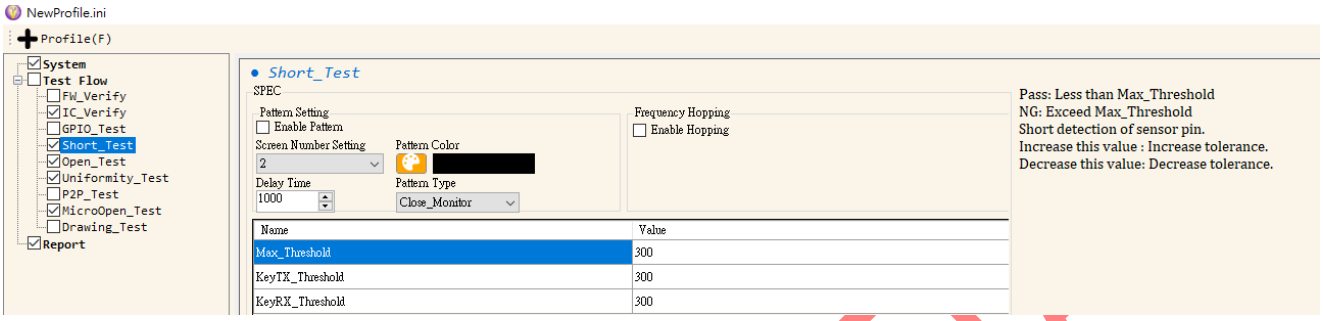
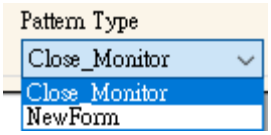


Fig 4-20 Sensor Test – SPEC (Short Test)

The detailed descriptions of the Short test function as (table 3-7):

Item	Name	Description
1	SPEC	[Pattern Setting] Display Fixed Color for Testing before Noise Frequency & Short Test. If the Pattern Type is "NewForm," the desired color to be displayed can be determined by modifying the Pattern Color. If the Pattern Type is "Close_Monitor," a screen saver program displaying a pure black screen will be shown. The Delay Time represents the interval between the screen change and the start of the test.  [Frequency Hopping] Enable the ShortTest using the best PostIdle value found using Noise Frequency. (This feature is supported only in Protocol 6.0.9 or above.)

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		[Max_Threshold] Set the allowable maximum value [KeyTX_Threshold] Set the allowable maximum value of Key_TX [KeyRX_Threshold] Set the allowable maximum value of Key_RX

Table 4-9 Sensor Test – SPEC (Short Test) table

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Sensor Test – SPEC (Open Test)

The Open_test function can modify open test criteria.

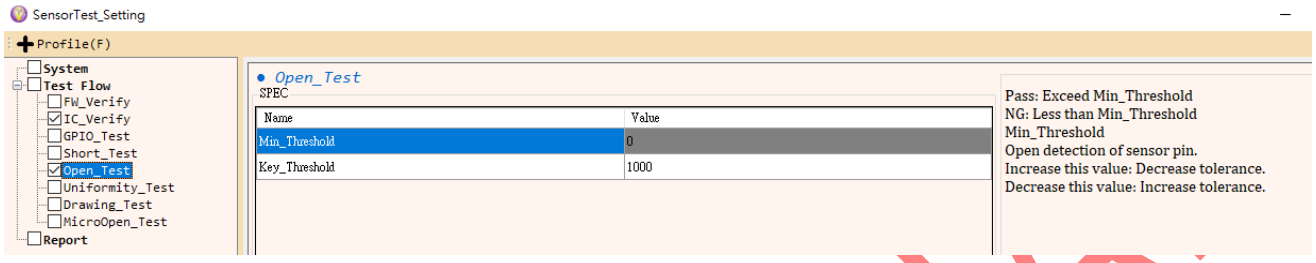


Fig 4-21 Sensor Test – SPEC (Open Test)

The detailed descriptions of the Open test function as (table 3-8):

Item	Name	Description
1	SPEC	**Min_Threshold**: Define threshold for fully-open. **TX_Average_Diff_Gap**: Define threshold for micro-open.

Table 4-10 Sensor Test – SPEC (Open Test) table

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Sensor Test – SPEC (Uniformity Test)

Set the node of the threshold for Uniformity_RawData / Uniformity_Win1 / Uniformity_Win2 / Uniformity_TxDiff / Uniformity_RxDiff

Use this function to cut a complete frame into several blocks, set the threshold value for each block, the default block is set to 3x3, and the corners are each cut into 1 channel, cutting the complete Frame into 9 blocks. If users want to modify the range of blocks, they can use the function on this page to set it.

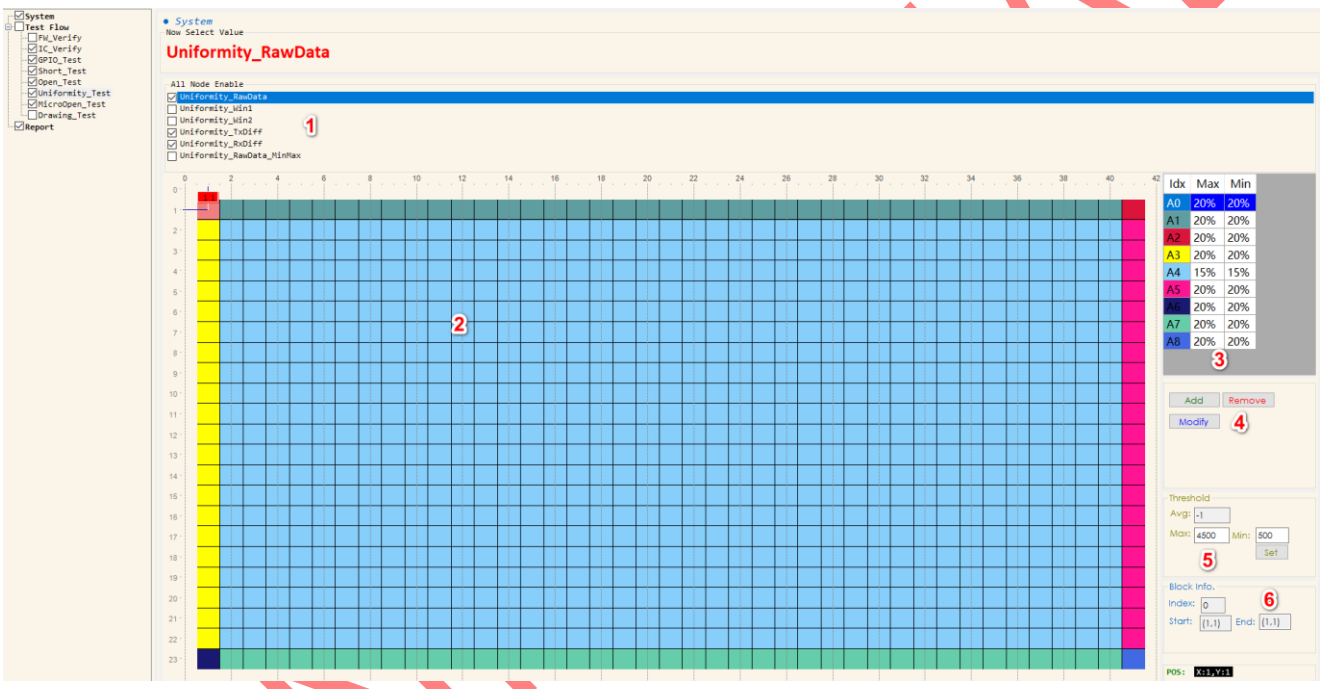
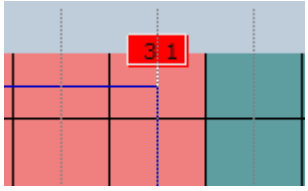


Fig 4-22 Sensor Test – SPEC (uniformity Test 1)

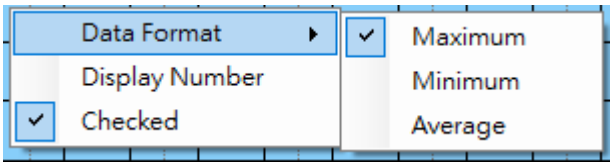
Item	Name	Description
1	Test item selection	Shows the currently selected measurements
2	Block layout	● use color to demonstrate blocks, block color will correspond to the display threshold list index ● 

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<table>
<tr><td></td><td></td><td>

Ctrl + drag the mouse to zoom in and out.。
Clicking on a node displays the value of the node's coordinates, with details in the right-hand column of the screen.

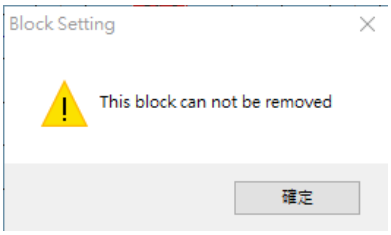
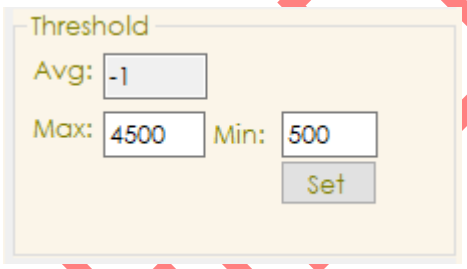
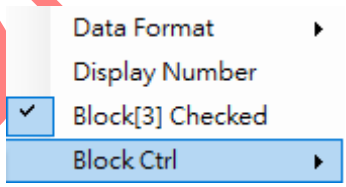


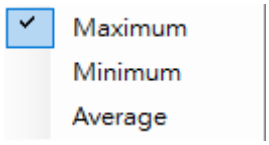
There are three settings when you right-click on it
<table>
<tr><td>Function</td><td>Description</td></tr>
<tr><td>Data Format</td><td>To display the value of the node, select the type to display.
Maximum / Minimum / Average</td></tr>
<tr><td>Display Number</td><td>Show the value of the node</td></tr>
<tr><td>Checked</td><td>If canceled, the node is not included in the pass/fail determination and the node is grayed out.</td></tr>
</table>
</td></tr>
<tr><td>3</td><td>Display threshold</td><td>Displays the threshold settings for each block. Uniformity raw data has a maximum and minimum relaxation percentage setting condition, while non-uniformity raw data measurements use a fixed value to set the threshold.</td></tr>
<tr><td>4</td><td>Block operation</td><td>
<table>
<tr><td>Icon</td><td>Description</td></tr>
<tr><td>Add</td><td>Add new block, the new block can not overlap with the existing block completely (can be partially).
If there is a partial overlap, the stringency of the threshold will be determined, and the stringent setting will be replaced by a less stringent one.</td></tr>
<tr><td>Remove</td><td>After clicking a block, the block is deleted. If the node after this block is deleted and it does not belong to any</td></tr>
</table>
</td></tr>
</table>

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<table>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>of the blocks, then this block cannot be deleted.

</td></tr>
<tr><td>Modify</td><td>After clicking a block, change the threshold of the block.。</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>Threshold</td><td>Displays the upper and lower constants of the block.
If the option is Uniformity raw data and average is -1, the following window appears, indicating that you can set the upper and lower fixed values for the block.

</td></tr>
<tr><td>6</td><td>Block in-formation</td><td>Shows the block area in which the point is located and the coordinates of the start and end points of the open block.</td></tr>
<tr><td>7</td><td>More func-tions</td><td>Right-Clicking on Item2 or Item3 brings up the following list


Data Format: If there is a value displayed, what type is it?


Display Number: Whether to display the value or not</td></tr>
</table>

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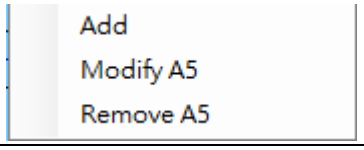
		Block[X] Checked: Selected means that the node will be included in the judgment of the test results, and vice versa. Block Ctrl: Adjustment for block layout。 

Table 4-11 Sensor Test – SPEC (Uniformity test) table

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Sensor Test – SPEC (Drawing Test)

This item is a line drawing test, there is a finger drawing (Finger) and a touch pen drawing (Pen).

Pen page can be used as long as the FW has support for the touch pen function.

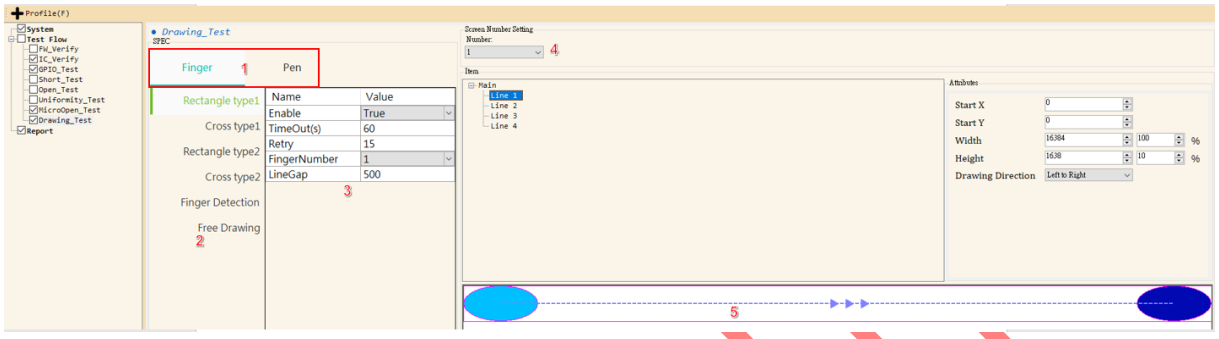


Fig 4-23 Sensor Test – SPEC (Drawing Test)

Item	Name	Description
1	Drawing Method	The setting page for finger drawing and pen drawing.
2	Type	Drawing type a. Rectangle type1: draw box test. it can support one or two fingers test. b. Cross type1: draw cross test c. Finger detection: detect N-finger touch panel results d. Rectangle type2: draw a box test without restricting the direction, and adjust the width of the drawing line to fill the drawing area. e. Cross type2: draw cross test, no restriction on the direction, you can adjust the width of the drawing line to fill the drawing area. f. Rectangle type3: Starting from any of the four corners, draw a rectangle for testing. It supports one-finger or two-finger testing. There are no orientation restrictions, but the lines cannot be interrupted midway. g. Cross type3: Start from any of the four corners and draw a cross for testing. There are no orientation restrictions, but the lines cannot be interrupted midway. h. Free Drawing: painting test, you can count down or press virtual button to end the test.

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3	setting	To set the conditions for each drawing line type.
4	Screen Number Setting	Projected screen settings when you are testing.
5	preview	Line-type preview window

Table 4-12 Sensor Test – SPEC (Drawing test) table

Rectangle type1

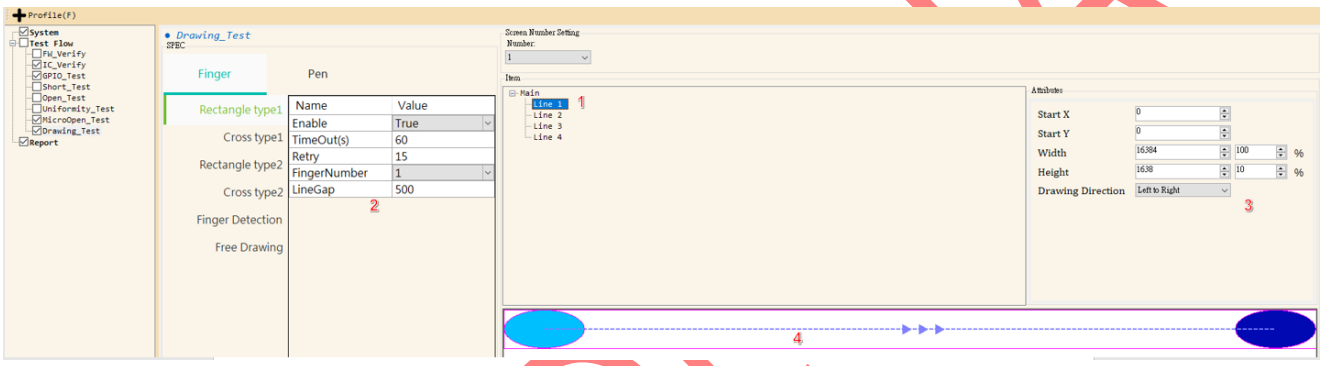


Fig 4-24 Sensor Test – SPEC (Drawing Rectangle test)

Item	Name	Description
1	Line Selection	The line setting
2	Sub Item Setting	The setting value of rectangle test Enable: True: enable ; False: disable TimeOut(s): Time out. LineSetting: Display the Coordinate point and size and direction setting value of each line using text. Retry: Maximum retry times. Finger Number: There are one or two fingers to test. Line Gap: If it is a two-finger test, the test distance between the two fingers (unit is pixel)
3	Preview	preview
4	Line Description	Name: Group Description: Set the sequence of the line drawing test · 1->2->3->4

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		X、Y	The coordinate position of the upper left corner of the judgment range, the unit is the pixel of the screen.
		Width、Height	The distance from the starting coordinate of the upper left corner of the judgment range, in pixels of the screen.
		Direction	The drawing direction of the test can be set up and down to draw from left to right or from right to left, and left and right can be set to draw from top to bottom or draw from bottom to top.
5	Screen Number	Screen settings projected during the test	

Table 4-13 Sensor Test – SPEC (Drawing Test-Rectangle) description

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Cross type1

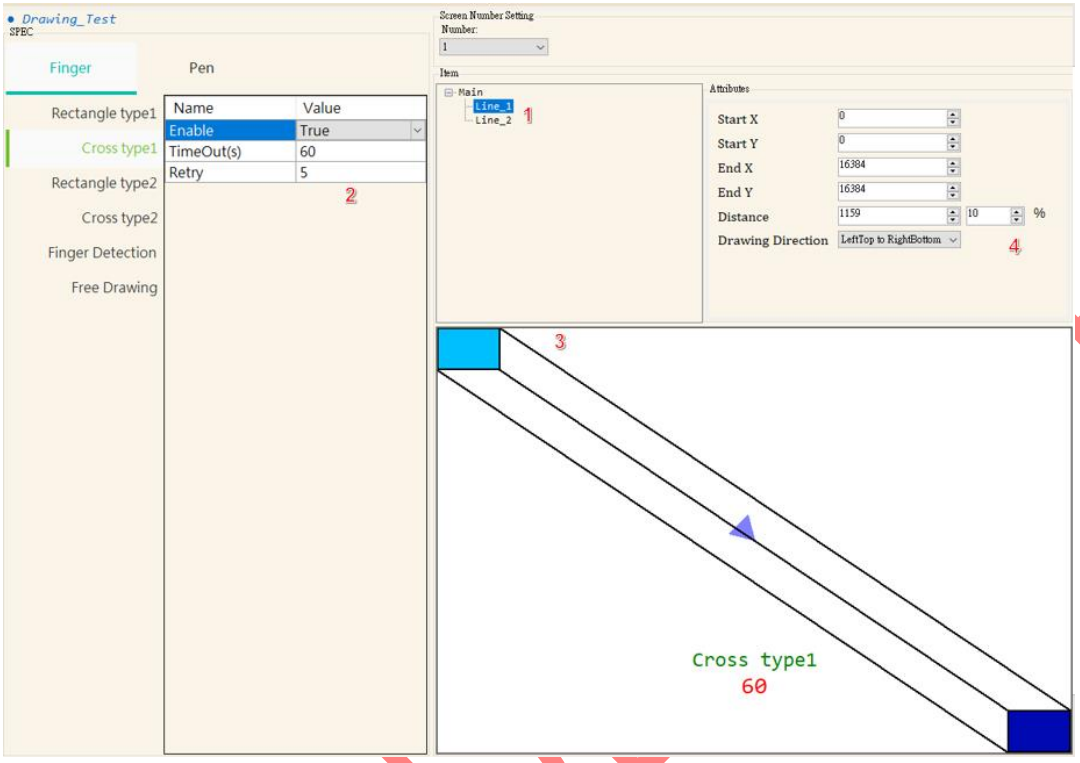


Fig 4-25 Sensor Test –Drawing Test (Cross)

Item	Name	Description
1	Line Selection	Line setting
2	Sub Item Setting	setting Enable: True: enalbe ; False: disable TimeOut(s): Time out. LineSetting: Display the Coordinate point and size and direction setting value of each line using text. Retry: Maximum retry times.
3	Preview	Preview area
4	Line Description	Name / Description Group: Set the sequence of testing ，1->2->3->4 X、Y: The coordinate position of the upper left corner of the judgment range, the unit is the pixel of the screen. Width、: The distance from the starting coordinate of the upper left

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		Height	corner of the judgment range, in pixels of the screen.	
		Direction	The drawing direction of the test can be set up and down to draw from left to right or from right to left, and left and right can be set to draw from top to bottom or draw from bottom to top.	

Table 4-14 Sensor Test – SPEC (Drawing Test-cross) description

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Free Drawing

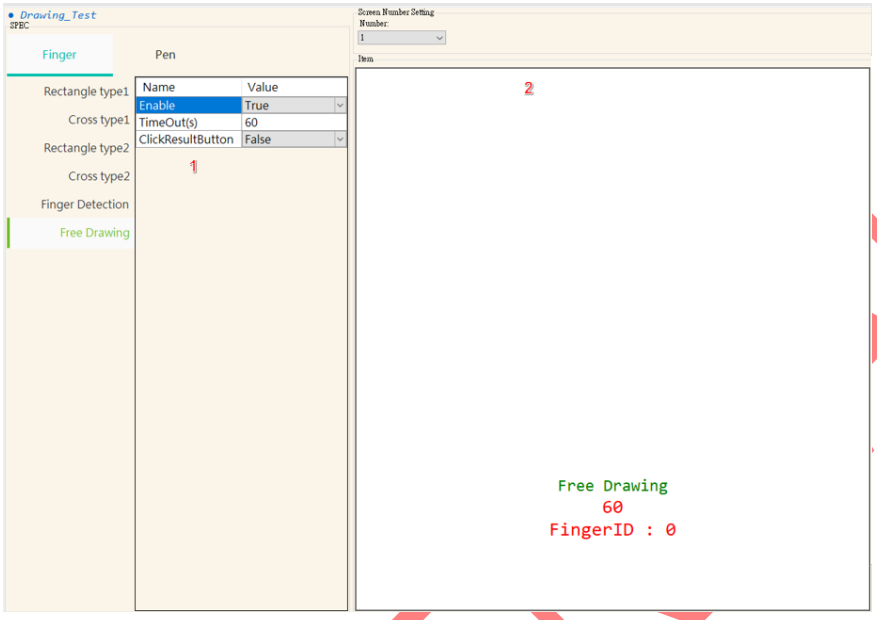


Fig 4-26 Sensor Test – SPEC (Free Drawing Test)

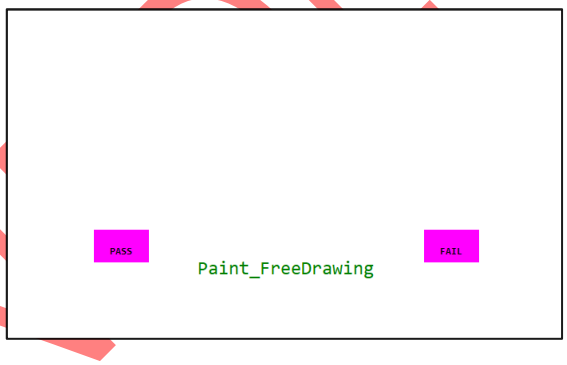


Fig 4-27 Sensor Test – SPEC (Free Drawing Test with virtual buttons)

Item	Name	Description		
1	Sub Item Setting	Enable	True: enable ; False: disable	
		TimeOut(s)	Time out.	
		Click Result Button	Using virtual button to decide the test is pass or fail.	
2	Preview	Preview picture.		

Table 4-15 Sensor Test –Drawing Test(Free-Drawing)

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Finger Detection

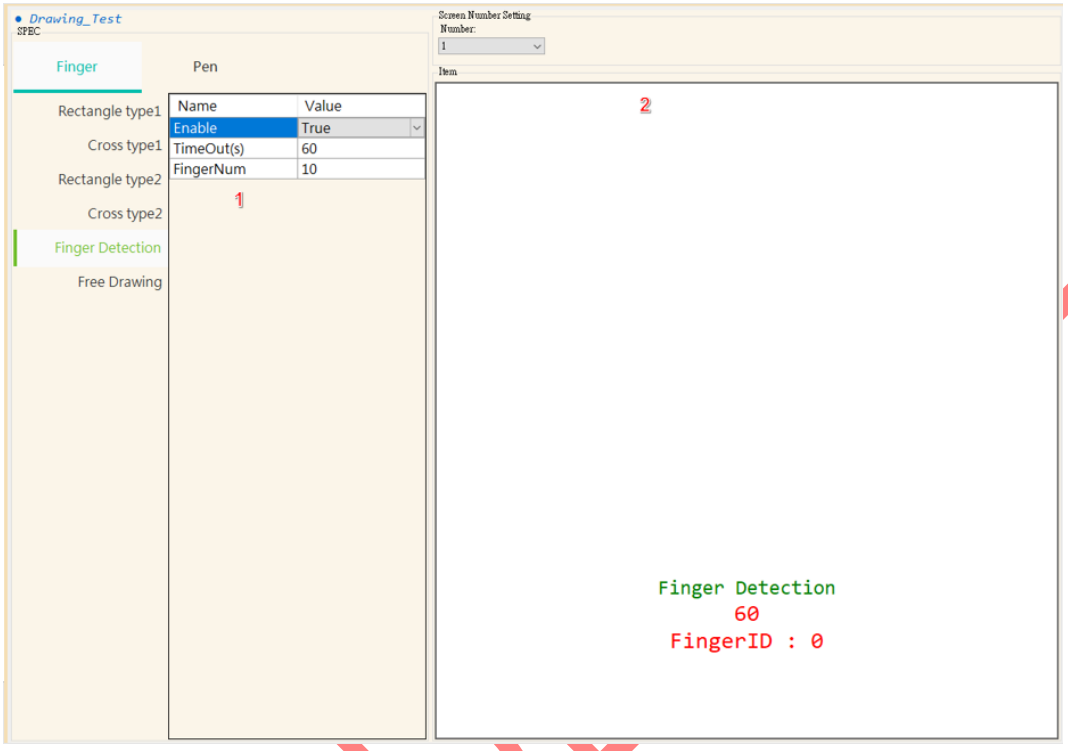


Fig 4-28 Sensor Test – SPEC (Finger Detection)

Item	Name	Description	
1	Sub Item Setting	Enable	True: enable ; False: disable
		TimeOut(s)	Time out.
		Finger Number	Detect the number of fingers on the touch panel
2	Preview	Preview picture.	

Table 4-16 Sensor Test –Drawing Test(Finger Detection)

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Rectangle type2

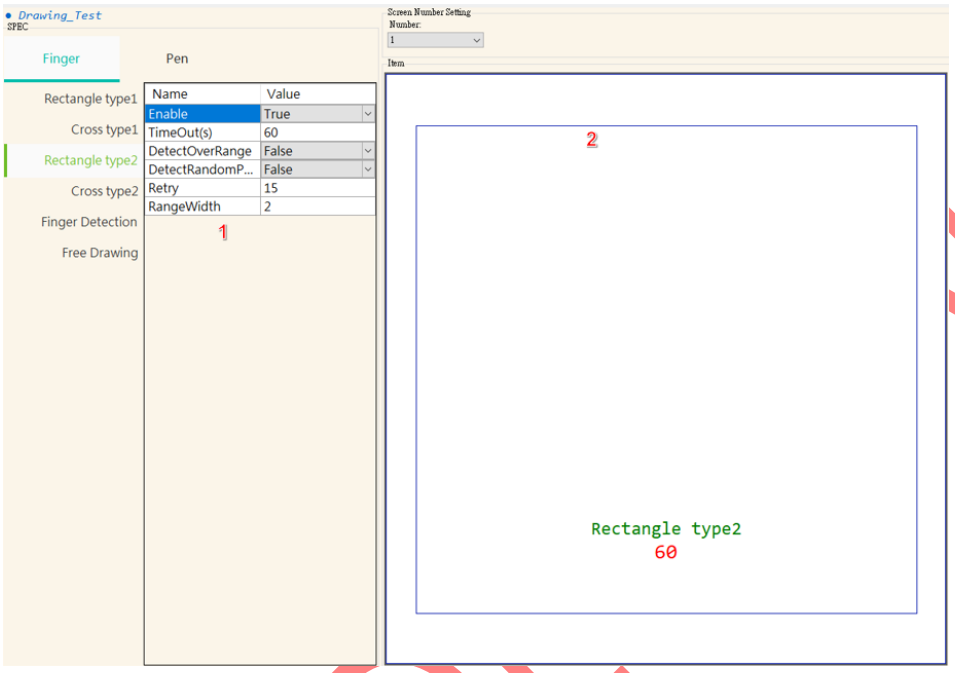


Fig 4-29 Drawing Test –Rectangle type2

Item	Name	Description	
1	Sub Item Setting	Enable	True: enable ; False: disable
		TimeOut(s)	Time out.
		DetectOver-Range	True: Turn on the check if the boundary is exceeded ; False: Turn off the check if the boundary is exceeded
		DetectRandomPoint	True: Turn on the check if tool gets any the random points ; False: Turn off the check if tool gets any the random points
		Retry	Maximum retry times. ("DetectRandomPoint" is not in the scope of this limitation.)
		RangeWidth	The width of drawing area (unit is channel)
2	Preview	Preview area	

Table 4-17 Sensor Test –Drawing Test (Rectangle type 2)

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Cross type2

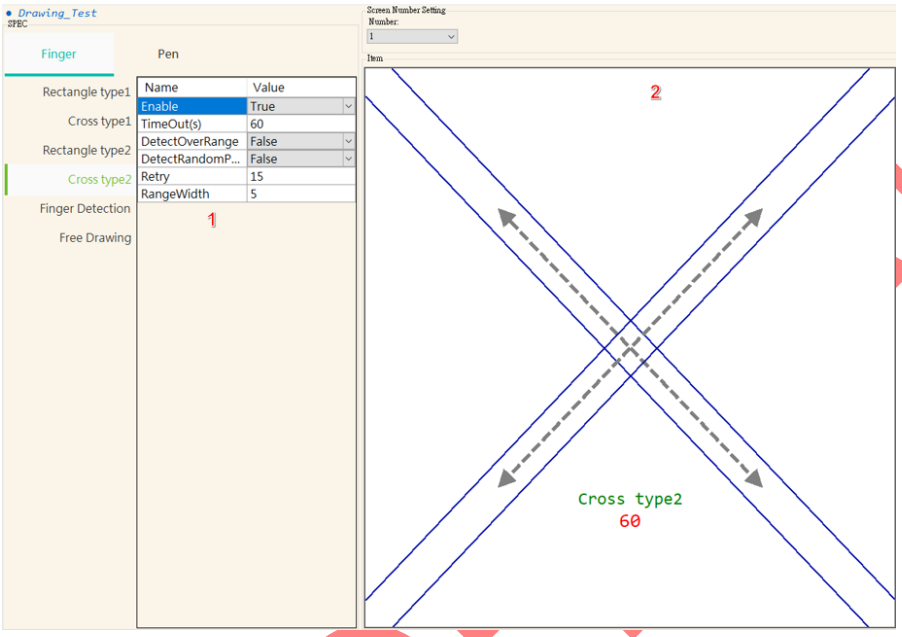


Fig 4-30 Drawing Test –Cross type 2

Item	Name	Description	
1	Sub Item Setting	Enable	True: enable ; False: disable
		TimeOut(s)	Time out.
		DetectOver-Range	True: Turn on the check if the boundary is exceeded ; False: Turn off the check if the boundary is exceeded
		DetectRandomPoint	True: Turn on the check if tool gets any the random points ; False: Turn off the check if tool gets any the random points
		Retry	Maximum retry times. ("DetectRandomPoint" is not in the scope of this limitation.)
		RangeWidth	The width of drawing area (unit is channel)
2	Preview	Preview	

Table 4-18 Sensor Test –Drawing Test (Cross type 2)

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Rectangle type3

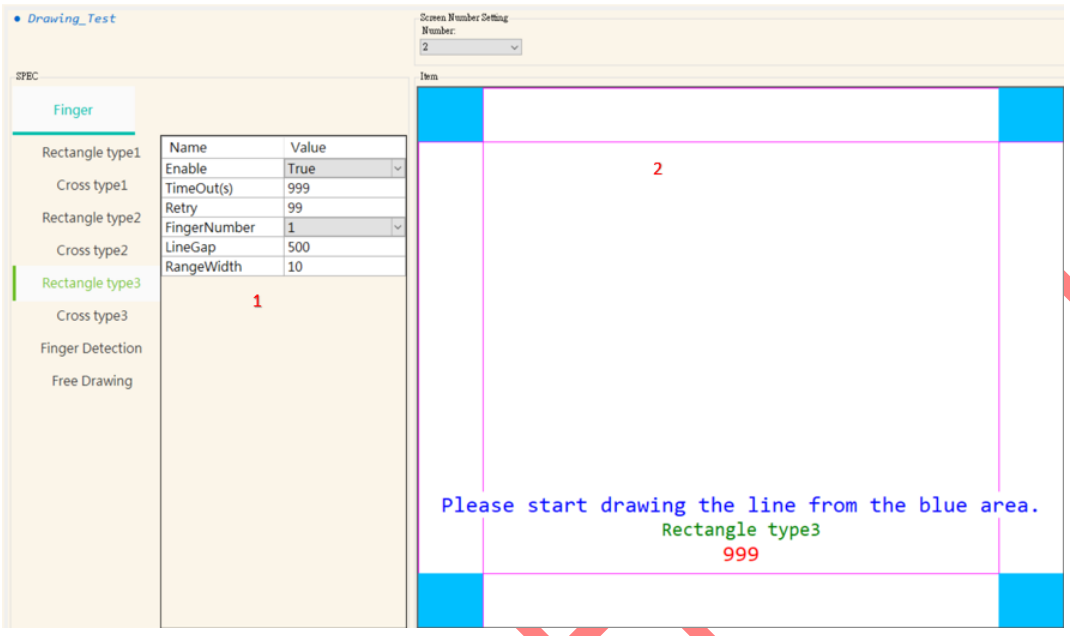


Fig 4-31 Drawing Test –Rectangle type 3

Item	Name	Description	
1	Sub Item Setting	Enable	True: enable ; False: disable
		TimeOut(s)	Time out.
		Retry	Maximum retry times. ("DetectRandomPoint" is not in the scope of this limitation.)
		Finger Number	There are one or two fingers to test.
		Line Gap	Reserved.
		RangeWidth	The width of drawing area (unit is channel)
2	Preview	Preview area	

Table 4-19 Sensor Test –Drawing Test (Rectangle type 3)

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Cross type3

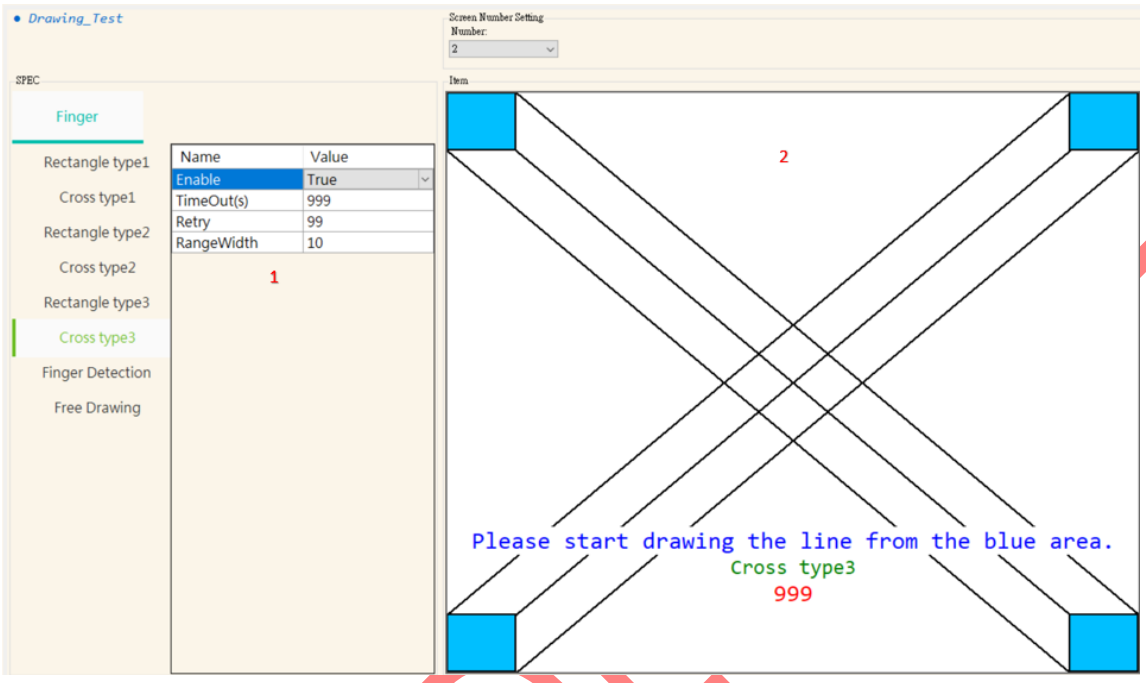


Fig 4-32 Drawing Test –Cross type 3

Item	Name	Description	
1	Sub Item Setting	Enable	True: enable ; False: disable
		TimeOut(s)	Time out.
		Retry	Maximum retry times. ("DetectRandomPoint" is not in the scope of this limitation.)
		RangeWidth	The width of drawing area (unit is channel)
2	Preview	Preview	

Table 4-20 Sensor Test –Drawing Test (Cross type 3)

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Sensor Test – SPEC (Micro Open Test)

Set the node of the threshold for Micro Open Rx Delta

Use this function to cut a complete frame into several blocks, set the threshold value for each block, the default block is set to 3x3, and the corners are each cut into 1 channel, cutting the complete Frame into 9 blocks. If users want to modify the range of blocks, they can use the function on this page to set it.

Test Item Description

RX_Delta: 2-dimensional screen, RX direction is reduced by two, RX bar count is reduced by one, TX bar count remains unchanged.

TX_Avg_Delta: 1-dimensional screen, TX direction is subtracted by two and then averaged, so there is only one RX bar and one TX bar less.

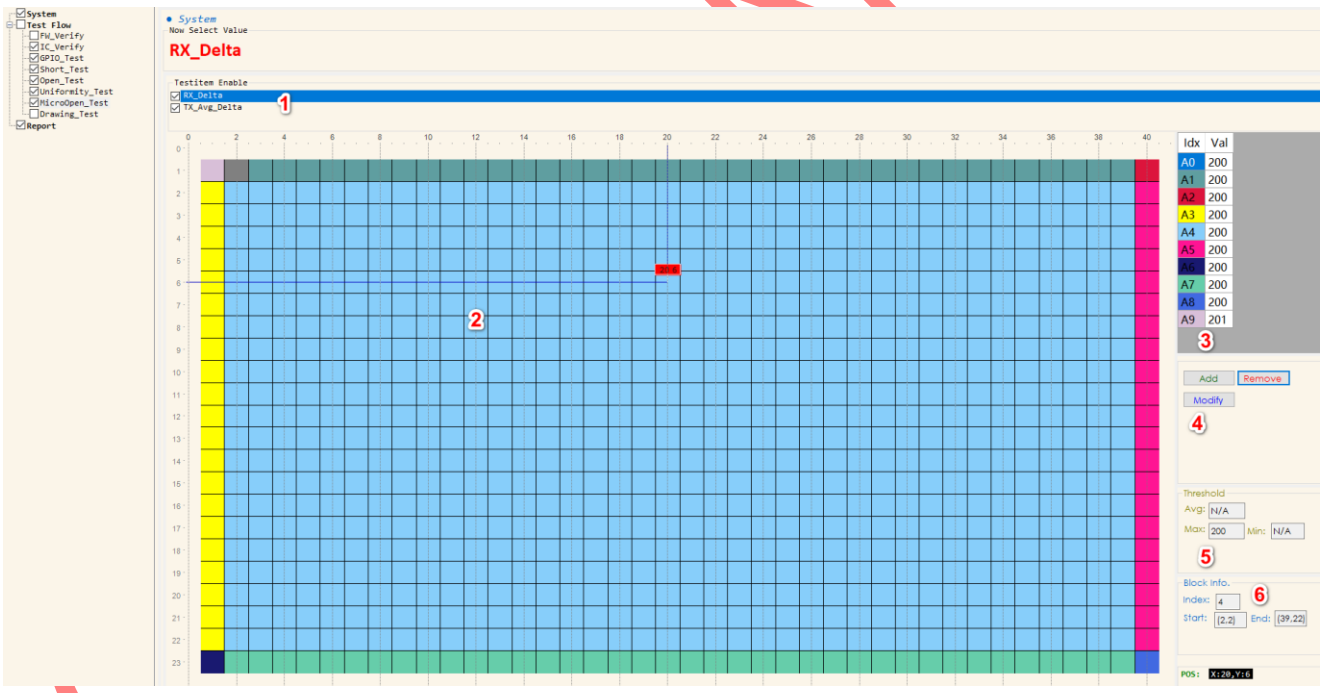


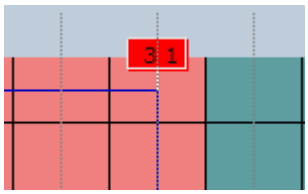
Fig 4-33 Sensor Test – SPEC (Micro Open Test – Rx Delta)

Item	Name	Description
1	Test item selection	Shows the currently selected measurements
2	Block layout	● use color to demonstrate blocks, block color will correspond to the display

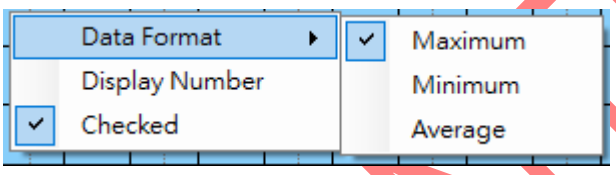
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threshold list index



- Ctrl + drag the mouse to zoom in and out.。
- Clicking on a node displays the value of the node's coordinates, with details in the right-hand column of the screen.



There are three settings when you right-click on it

Function	Description
Data Format	To display the value of the node, select the type to display. Maximum / Minimum / Average
Display Number	Show the value of the node
Checked	If canceled, the node is not included in the pass/fail determination and the node is grayed out.

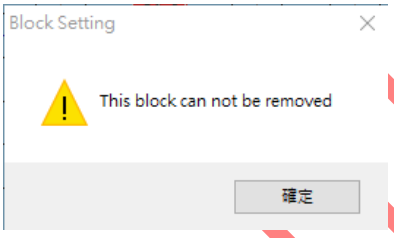
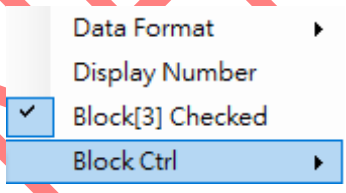
3	Display threshold	Displays the threshold settings for each block. Uniformity raw data has a maximum and minimum relaxation percentage setting condition, while non-uniformity raw data measurements use a fixed value to set the threshold.
4	Block operation	

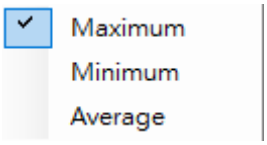
Icon	Description
Add	Add new block, the new block can not overlap with the existing block completely (can be partially).

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<table>
<tr><td></td><td></td><td>
<table>
<tr><td></td><td>If there is a partial overlap, the stringency of the threshold will be determined, and the stringent setting will be replaced by a less stringent one.</td></tr>
<tr><td>Remove</td><td>After clicking a block, the block is deleted. If the node after this block is deleted and it does not belong to any of the blocks, then this block cannot be deleted.

</td></tr>
<tr><td>Modify</td><td>After clicking a block, change the threshold of the block.。</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>Threshold</td><td colspan="2">Displays the upper and lower constants of the block.</td></tr>
<tr><td>6</td><td>Block information</td><td colspan="2">Shows the block area in which the point is located and the coordinates of the start and end points of the open block.</td></tr>
<tr><td>7</td><td>More functions</td><td colspan="2">Right-Clicking on Item2 or Item3 brings up the following list


Data Format: If there is a value displayed, what type is it?


Display Number: Whether to display the value or not
Block[X] Checked: Selected means that the node will be included in the judgment of the test results, and vice versa.
Block Ctrl: Adjustment for block layout。</td></tr>
</table>

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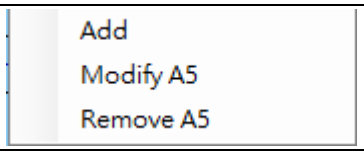
		

Table 4-21 Sensor Test – SPEC (Micro Open test) table

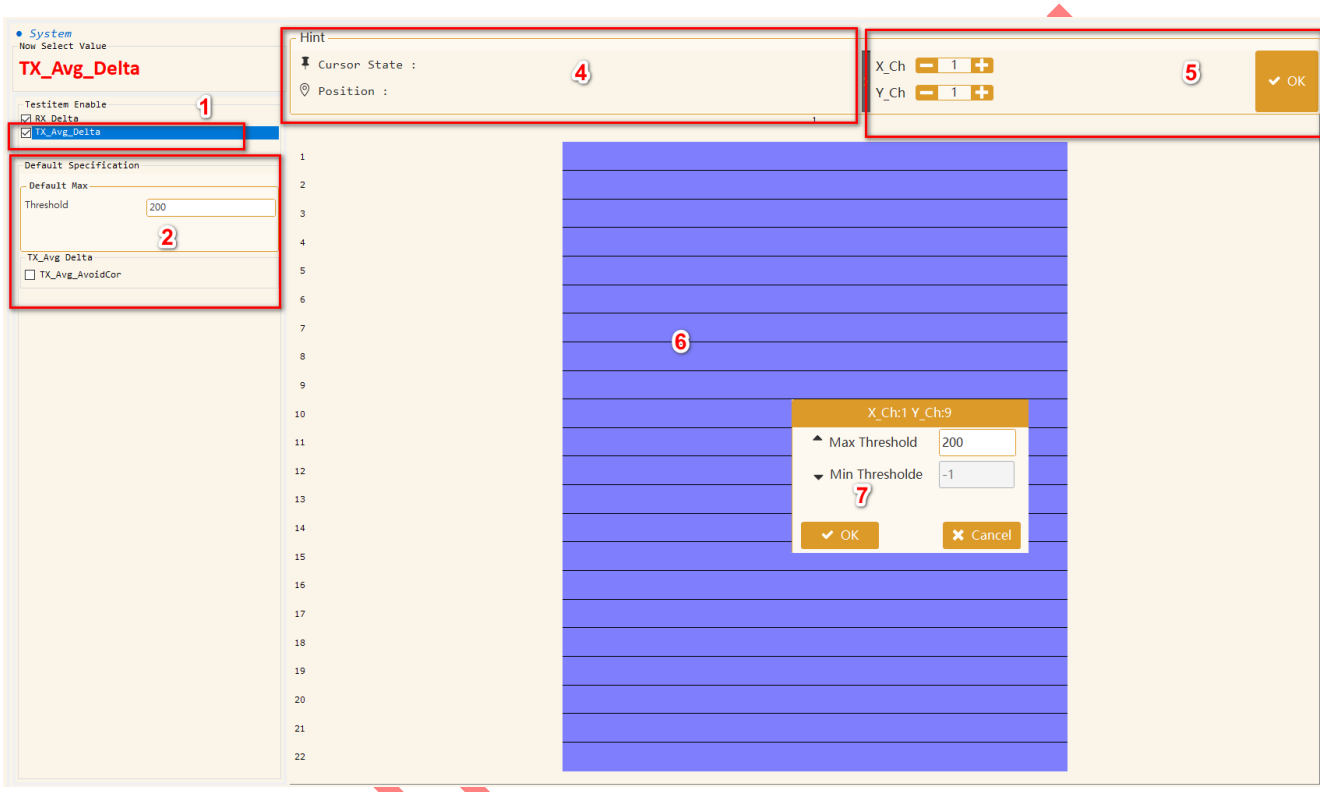


Fig 4-34 Sensor Test – SPEC (RX_Avg_Delta setting)

Item	Name	Description
1	Now select value	Shows the currently selected measurements
2	Default Specification	Select a test item to set the value for that measurement. ◦

Test item	UI
TX_Avg_Delta	

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		Tx_Avg_AvoidCorner: Don't include the corners in your averaging。
4	Coordinate and Mouse Status	Mouse clicks on the corresponding Node will show the X/Y Channel and mouse status (Select / Zoom) on this side.
5	Node Selection	Turn on the Fold button, enter the X/Y Channel you want to set and press OK to open the window (Item8) for users to set the Max/Min Threshold.
6	Node UI	Pressing left button in Screen Node will show the X/Y Channel coordinates and the Up/Low Limit of the point. Double click left button at Screen Node will bring up a window (Item8) for user to set Max/Min Threshold. Right-click and drag on the screen to enable Zoom function.
7	Max / Min Threshold	To set Max / Min Threshold of node。

Table 4-22 Sensor Test – SPEC (Micro Open test - RX_Avg_Delta) table

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Sensor Test – SPEC (Report)

The Report function can define the saving log file name and path.

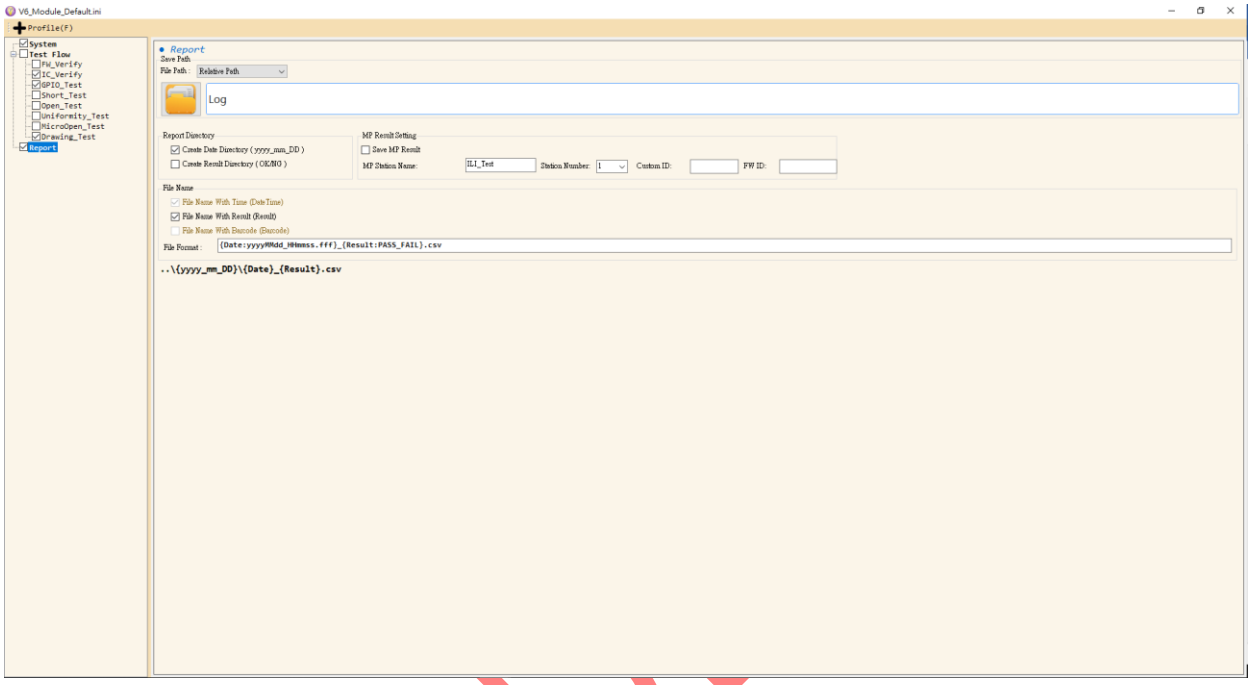


Fig 4-35 Sensor Test – SPEC (Report)

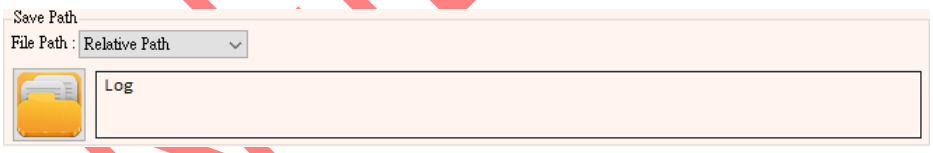


Fig 4-36 Sensor Test – the path of the testing result setting (Report)

The detailed descriptions of the Report function:

Item	Name	Description	
1	Save Path	**Name**	**Description**
		Absolute Path	User-defined save log path.
		Relative Path	System defines save log path.
2	Report Directory	**Name**	**Description**
		Create Date Directory(yyyy_mm_DD)	Create the log repository sub-folder for the record date.

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		Create Result Directory(OK/NG)	Create the log repository sub-folder for the record OK/NG.
3	File Name	**Name**	**Description**
		File Name With Time (Date Time)	Define the log file format show the test date.
		File Name With Result (Result)	Define the log file format show the test result.
		File Name With Barcode (Barcode)	Define the log file format show the bar-code.

Table 4-23 Sensor Test – SPEC (Report) table

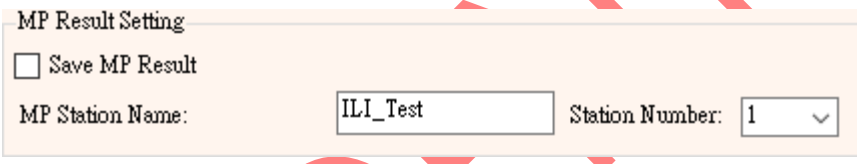


Fig 4-37 MP-Result V6 serial

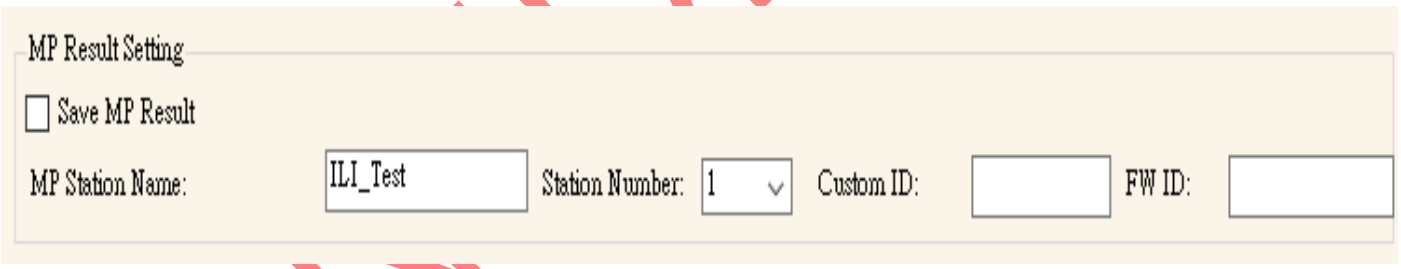


Fig 4-38 MP-Result V3 serial

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<table>
<tr><th>Name</th><th>Description</th></tr>
<tr><td>Log file name setting</td><td>Default format of file name has data information, if want to add the result to file name string, please check the File Name With Result(Result)</td></tr>
<tr><td>Testing station setting</td><td>
<table>
<tr><th>Options</th><th>Description</th></tr>
<tr><td>Save Block Box</td><td>Save the test result to flash</td></tr>
<tr><td>Station Name</td><td>Station name</td></tr>
<tr><td>Station Number</td><td>Station number.</td></tr>
<tr><td>Custom ID</td><td>The Custom ID that record to IC</td></tr>
<tr><td>FW ID</td><td>The FW ID that record to IC</td></tr>
</table>
</td></tr>
</table>

Table 4-24 Sensor Test – SPEC (Report) table

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Sensor Test – SPEC (FPC Test)

FPC testing is an Open Test on a PCBA that needs to be used with a dedicated Profile and fixture.

The home screen functions was the same as the Sensor Test main screen. The method of initiation is to import the FPC-specific Profile to enter the FPC_Mode.

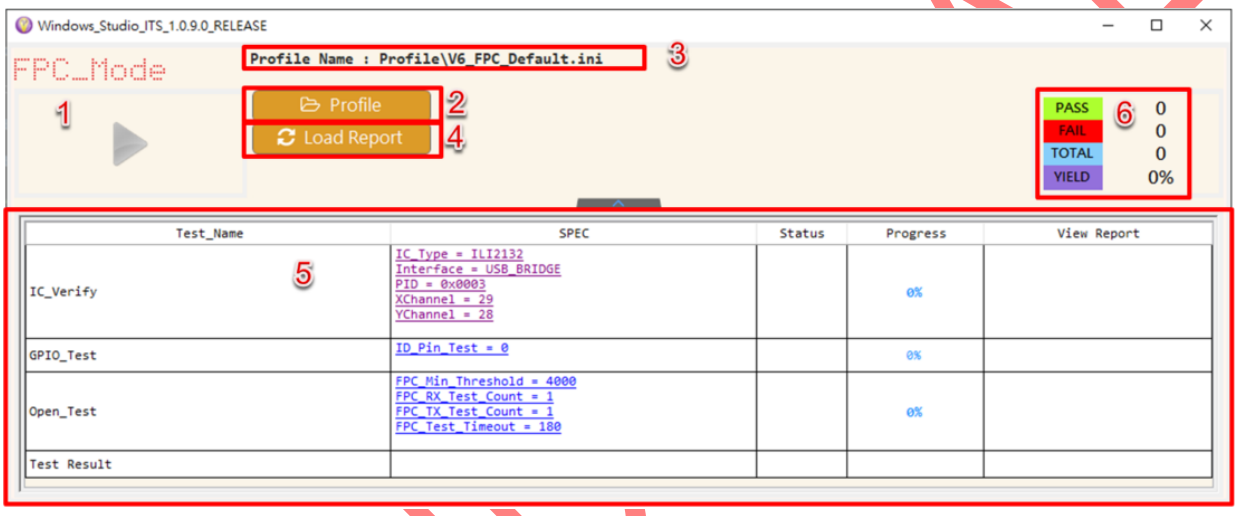


Fig 4-39 FPC Test UI

Name	Description
Start Test	Click to start the test.
Load Profile	Select the profile file.
Profile Name	Show the profile name that was selected.
Load Report	Select the test log and show data into UI .
Test Content	[Enable]：Check the test item was selected or not. [Test Name]：The name of test items [SPEC]：The spec for test item. [Status]：Show the test results. [View Report]：The Results Data window will be displayed when clicked.
Test Result	Display test success/failure/yield/total number of times information

Table 4-25 FPC Mode description.

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Sensor Test – SPEC (FPC Setting)

The FPC setting function is shared with Module Test, and the FPC operation prompts in the red box below can be modified according to the text you actually want to display.

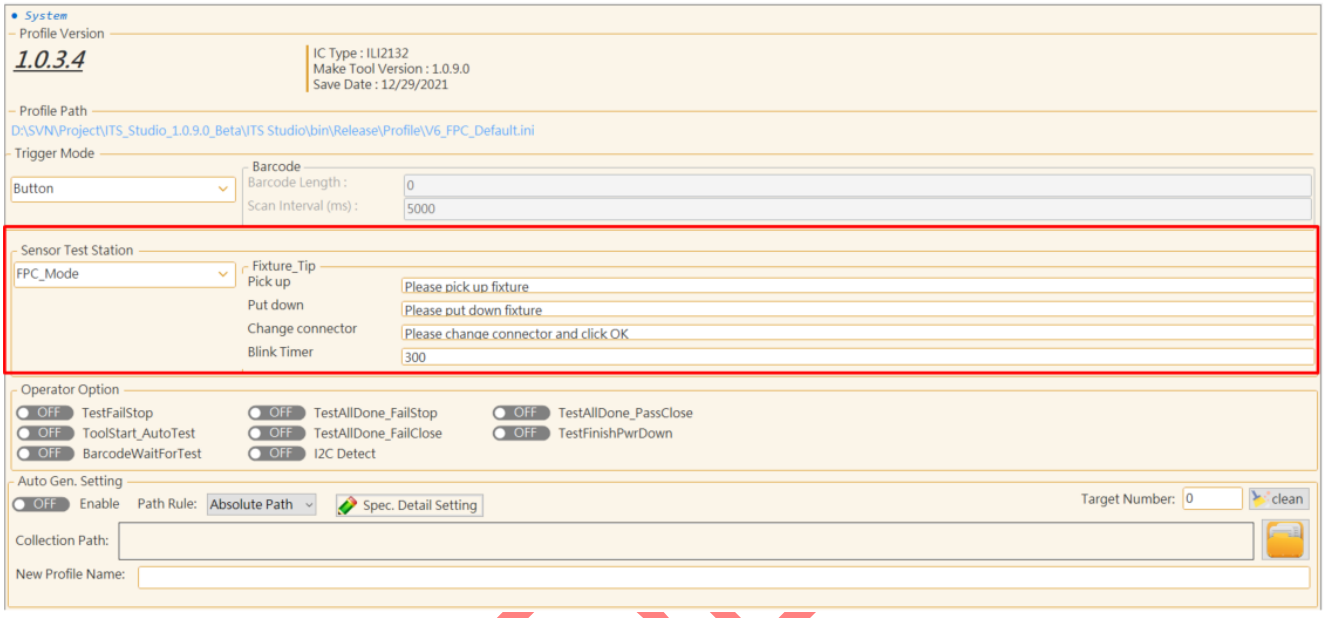


Fig 4-40 FPC Setting UI

Name	Description
Fixture_Tip	**Fixture_Tip** **Options** / **Description** **Pick up** – Set the hint for pick up fixture. **Put down** – Set the hint for put down fixture. **Change connector** – Set the hint for change connector. **Blink Timer** – Set the time for blink message

Table 4-26 FPC Setting description.

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Sensor Test – SPEC (FPC Short Test Setting)

Except for the Open Test and Short Test settings, FPC is common to the Module Test.

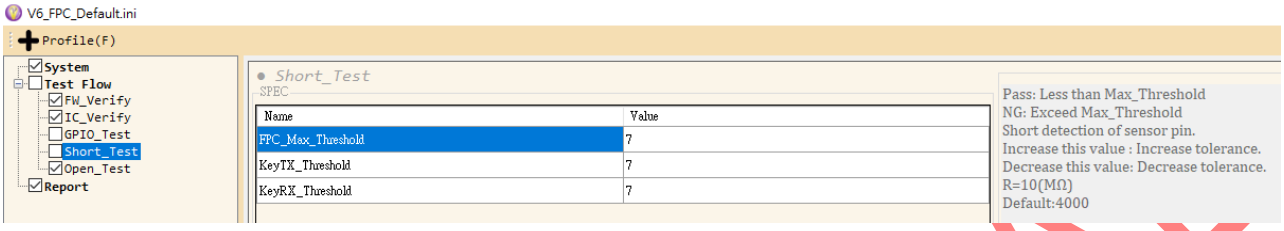


Fig 4-41 FPC Setting – Short Test

Name	Description
SPEC	[FPC_Max_Threshold] Setting the up limit of the Threshold. [KeyTX_Threshold] Setting the up limit of the KeyTx. [KeyRX_Threshold] Setting the up limit of the KeyRx.

Table 4-27 FPC Setting – Short Test description.

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Sensor Test – SPEC (FPC Open Test Setting)

Except for the Open Test and Short Test settings, FPC is common to the Module Test.

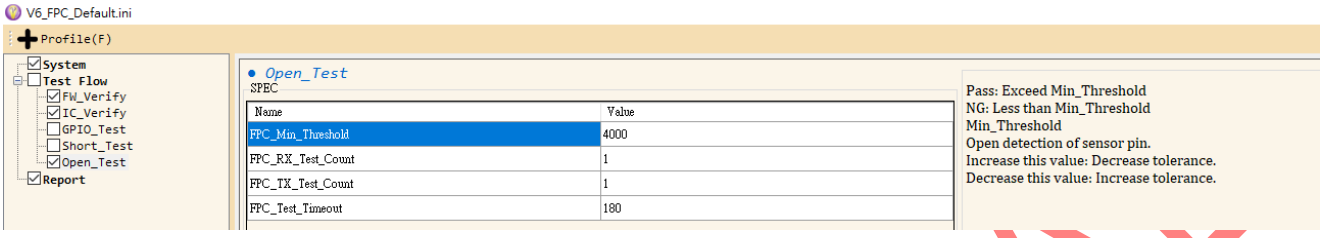


Fig 4-42 FPC Setting – Open Test

Name	Description
SPEC	[FPC_Min_Threshold] Setting the lower limit of Threshold. [FPC_RX_Test_Count] Setting the test times for RX Test. [FPC_TX_Test_Count] Setting the test times for TX Test. [FPC_Test_Timeout] Setting the timeout values.

Table 4-28 FPC Setting – Open Test description.

Starting the test will jump out the message statement, prompting the OP to press down the fixture. The text content displayed can be modified from the Put Down field in Setting..

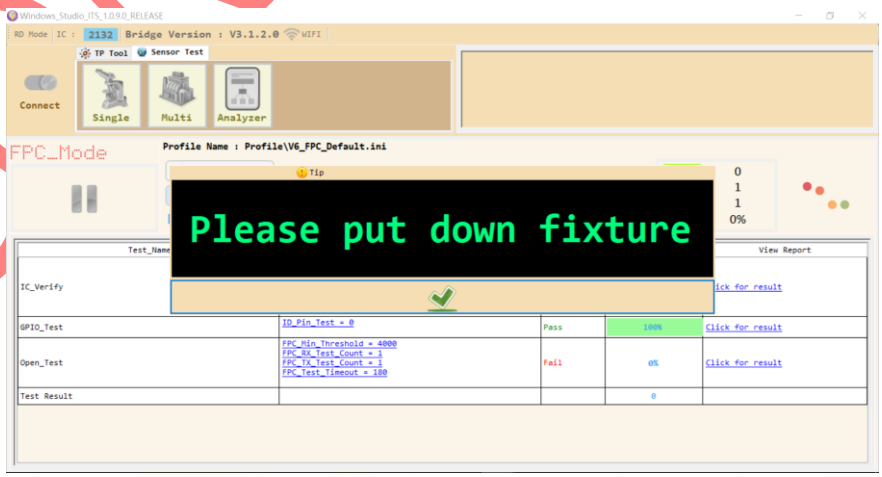


Fig 4-43 Schematic diagram of FPC test Start

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MP Result (OP mode)

When tool is op mode, you can turn on system->Operation->Show MP Result option, then show the MP Result.

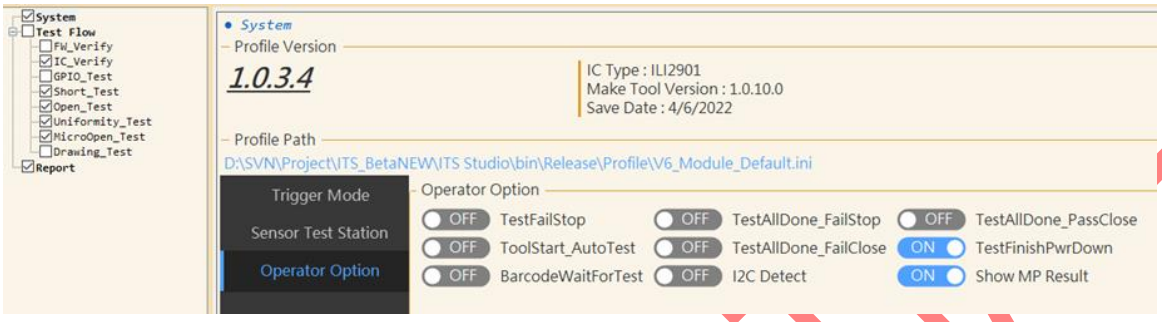


Fig 4-44 turn on Show MP Result

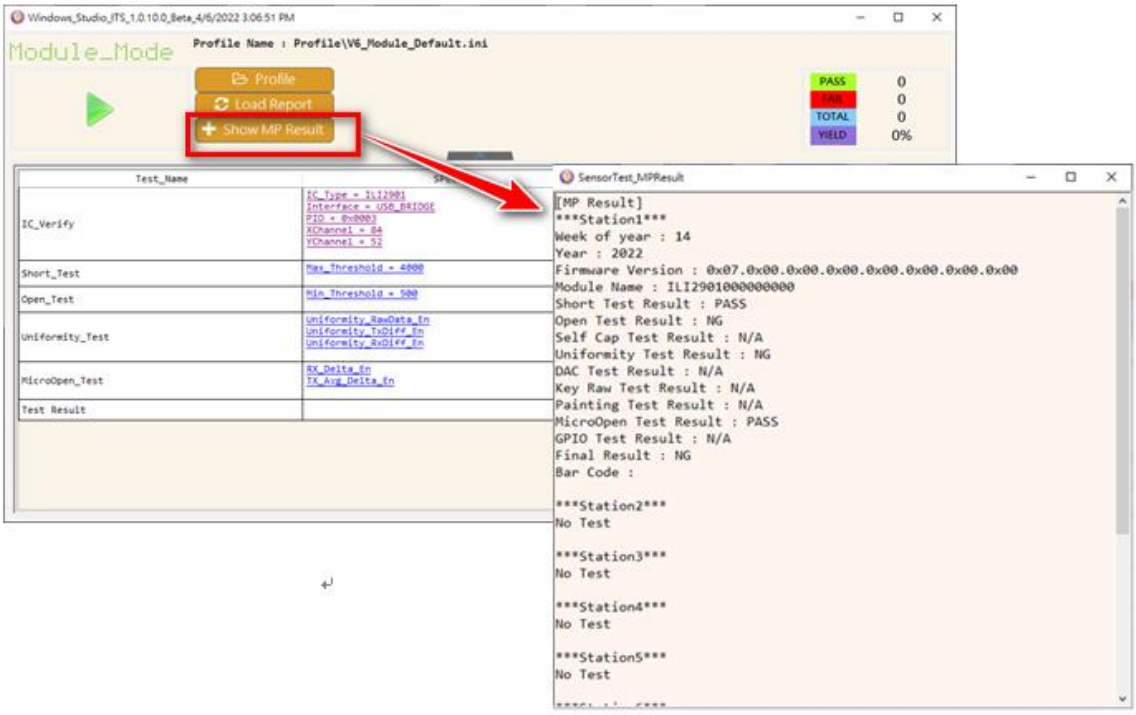


Fig 4-45 click the Show MP Result then pop-up the result window

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5. Multi Sensor Test

RD/ Multi OP/OP Mode Switch

Pressing ALT+Z on the Home or Sensor Test page will launch the Password window,

The password is the Tool version number, such as V 1.0.0.14, then enter 10014。

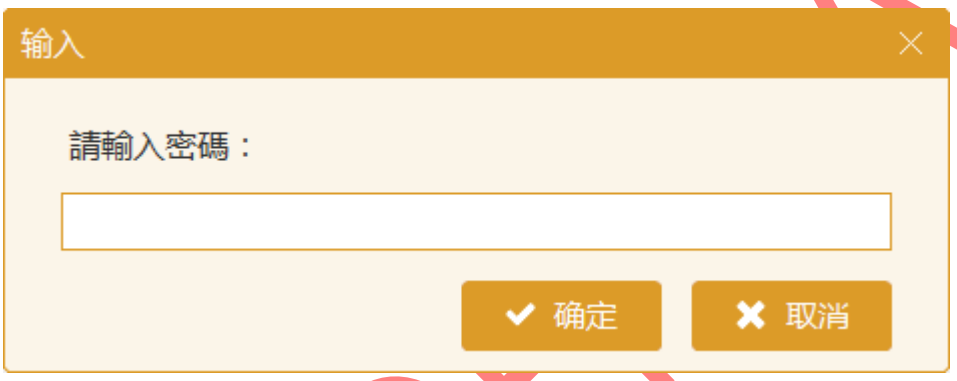


Fig 5-1 Password Window

After entering the correct password, press Enter again to open the Main Setting window。

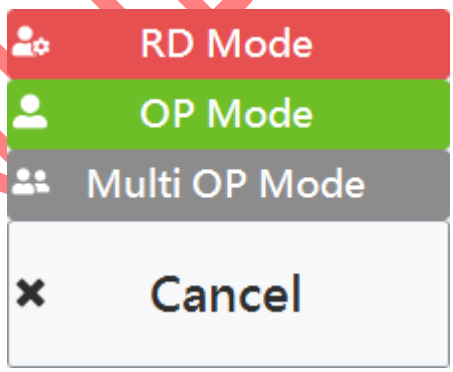


Fig 5-2 MainSetting Window

(Multi OP Mode) Only provide the tester to press the test button, the other settings need to enter a password to prevent the operator from misoperation。

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Multi Sensor Test Main Screen

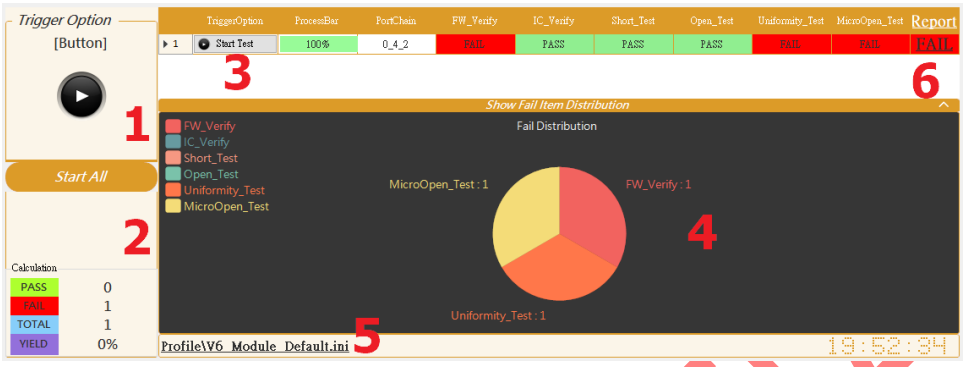


Fig 5-3 Multi sensor test Main Screen

Note: This Sensor Test supports multi testing at the same time. At the same time, it can reach up to 32 devices online for multi programming, or multi testing. However, the current limitation is that Multi Line Drawing test not supported.

The profile setting method must be switched back to Single Sensor Test to make adjustments before the profile settings can be read and used. Currently, profile adjustments here are not supported.。

Item	Name	Description
1	Trigger Option & All-Test button	Use pictures and text to show that the current test uses Button or Bar-code to test. If you press StartAll, all device tests will be performed directly.
2	Test statistics	Record the number of Pass and Fail and the yield rate.
3	Independent test button	Independent testing of this device.
4	Fail Item statistical analysis	Count all the fail test items, and to analyze what item is the max counts current Fail projects are.
5	Profile Select	Display the currently used files, click to change files.。
6	Test Report	After the test, click to open the text file to view the Report.。

Table 5-1 Test item setting (Report) description

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6. Generate a Profile Automatically

This function is used to collect the result of several executed sensor test and send the results to the log analysis tool running in the background for data analysis to generate a new profile.

Profile Content Description

To support the "Auto Gen." function, V1.0.3.4 or above is required.

[Auto Gen.]		
Key name	Value	Description
Enable	True / False	The switch of Auto Gen. function
PathRule	Relative Path / Absolute Path	The format of the specified collection path
CollectionPath	Collection	Set the collection path
NewProfileName	Test.ini	New profile name
Count	5	Set the number of logs to be collected, if the number is sufficient, it will do "Auto Gen." automatically.
Uniformity_Judgement	True / False	Add the result of uniformity test to determine the final result.
AddDate_toNewProfileName	True / False	Add date string to the new profile name.

Table 6-1 Profile

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```
[System]
Save_Date=11/30/2021
ProfileVersion=1.0.3.4
ITS_Tool_Ver=1.0.9.0
IC_Type=ILI2520
Interface=USB_BRIDGE
ProtocolVersion=6.0.5
Screen_Number=1
[Auto_Gen.]
Enable=True
PathRule=Relative Path
CollectionPath=Collection
NewProfileName=test.ini
Count=1
```

Fig 6-1 Profile contents

Auto Gen. Executive Page Description

If you load a profile with the “Auto Gen.” function enabled, you will see the following screen.

After loading a profile,

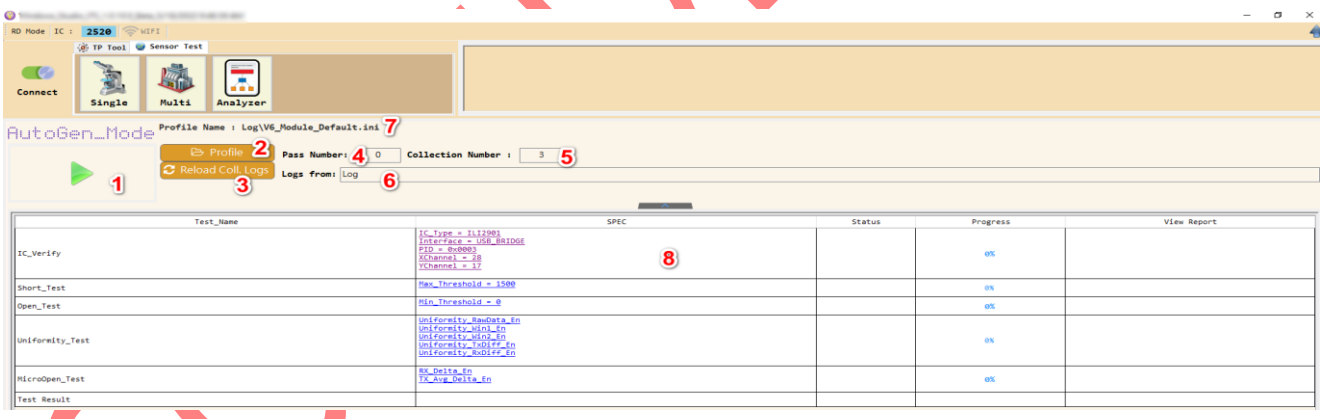


Fig 6-2 executive page

Item	Name	Description
1	Run	Execute the sensor test
2	Load Profile	Select the currently running profile.
3	Reload Coll. Logs	Change the log collection path of “Auto Gen.” . When this collection path is changed, the number of logs matching the cur-

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<table>
<tr><td></td><td></td><td colspan="3">rent profile will be judged again and update the value of Pass Number.</td></tr>
<tr><td>4</td><td>Pass Number</td><td colspan="3">Show the number of logs that match the current profile.</td></tr>
<tr><td>5</td><td>Target Number</td><td colspan="3">Show the number of logs that need to be passed.</td></tr>
<tr><td>6</td><td>Logs from:</td><td colspan="3">Show the currently running log path.</td></tr>
<tr><td>7</td><td>Profile Name:</td><td colspan="3">The path to the currently running profile.</td></tr>
<tr><td>8</td><td>Test Item List</td><td colspan="3">Current tests by Auto Gen.
<table>
<tr><td>Required Tests:</td><td colspan="2">IC Verify
Short
Open
Uniformity – raw data / win1 / win2 / rx diff / tx diff</td></tr>
<tr><td>Option tests</td><td colspan="2">FW Verify
Micro Open</td></tr>
<tr><td>No test</td><td colspan="2">GPIO
P2P
Drawing</td></tr>
<tr><td>Test items that affect judgment results</td><td>FW Verify
IC Verify
Uniformity – raw data
Short
Open</td><td>Only the test results on the left side is used to judge the test result (PASS or FAIL)</td></tr>
<tr><td>Test items that didn’ t affect judgment results</td><td>Micro Open
GPIO
P2P
Drawing</td><td></td></tr>
</table></td></tr>
</table>

Table 6-2 executive page description

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Auto Gen. Setting Page Description

After clicking the sensor test page, go to the profile setting page then click the “system->Sensor Test Station” option, you can see the following information and set the action of Auto Gen.

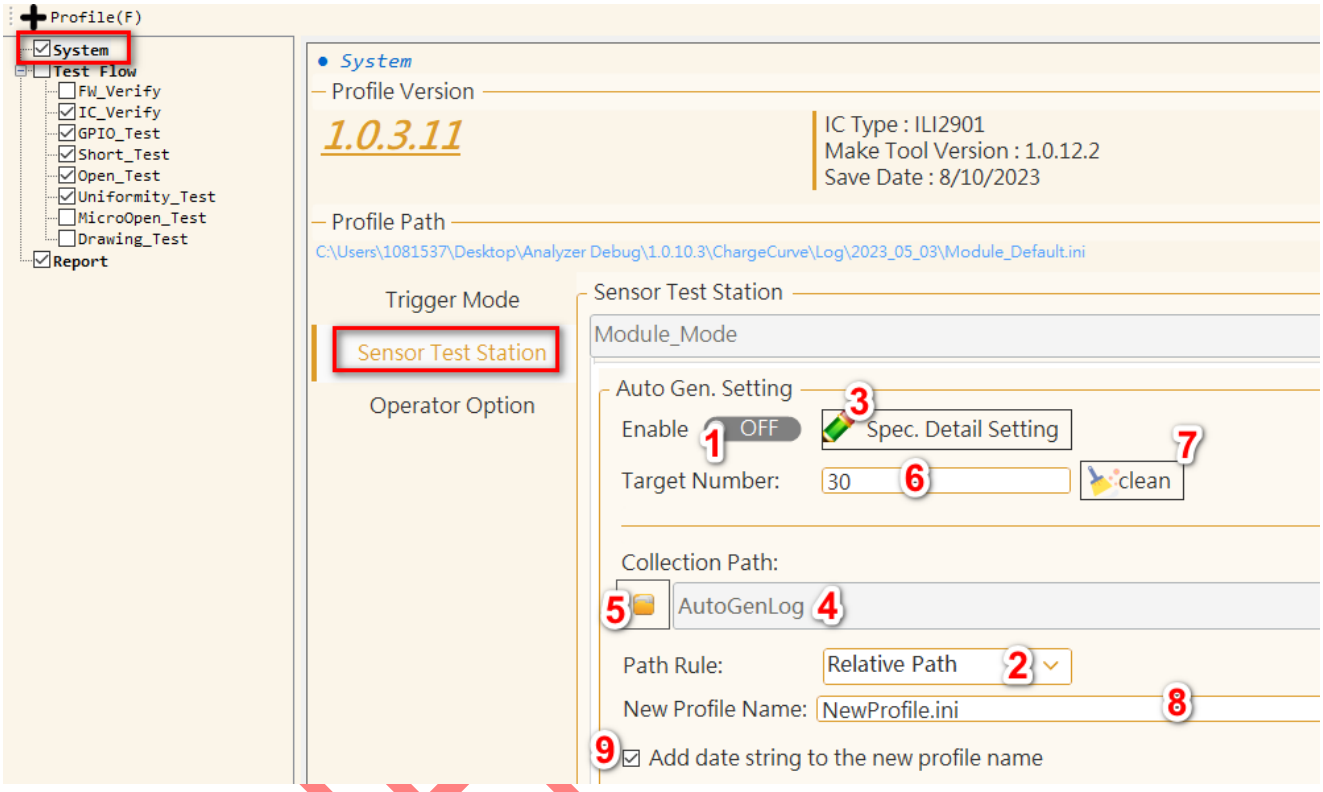


Fig 6-3 setting page

Item	Name	Description
1	Enable	Whether to turn on the Auto Gen. function.
2	Path Rule	Relative Path / Absolute Path Whether to use the absolute path or the relative path for the specified collection path.

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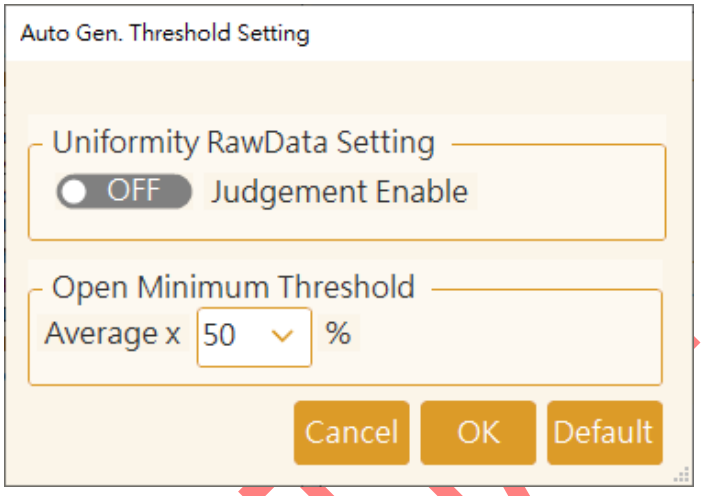
3	Spec.Detail Setting	 Set the spec. value of the new profile, each item has a drop-down menu that you can use, you can’ t enter the value by yourself. If the setting is wrong, you can press Default button to set the default value.
4	Collection Path	Set the path of the collection logs, the path can’t be empty. If the path is empty, the Auto Gen. function will be dis-able.
5	Folder Selection	You can use dialog method to assign the path of the collection logs.
6	The number of collected files	You can set the number of collection logs, and the tool will analyze the data automatically when the number is matched this value.
7	Clean	To clear all logs under the path specified to collection logs.
8	New Profile Name	The name of the new profile.
9	AddDate_toNewProfileName	Add date string to the new profile name.

Table 6-3 setting page description

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Auto Gen.

Step1: start to run “Auto Gen. Function”, press the Run button, the result will be displayed at the bottom of the status. If the result is pass, then the pass number will be count automatically.

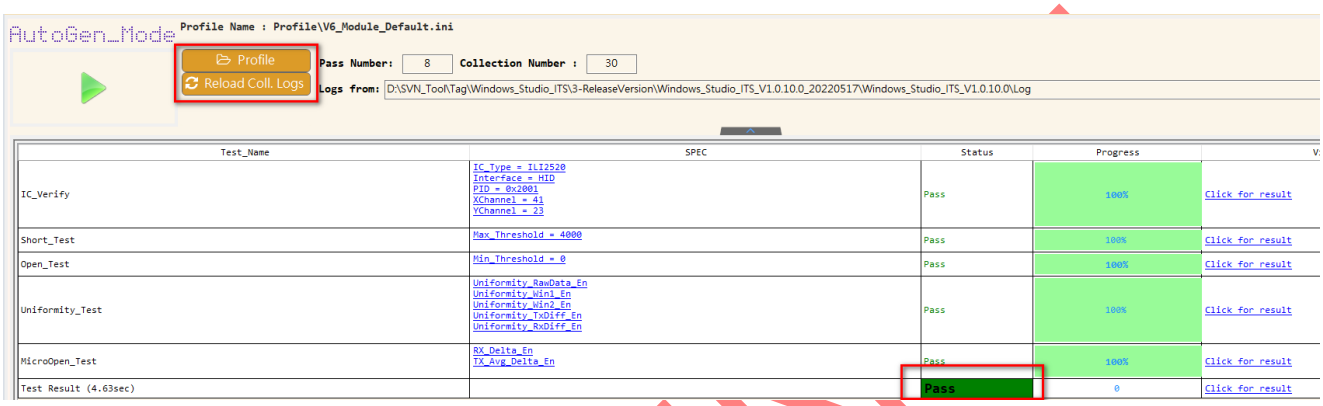


Fig 6-4 setting page

Step2: Run the Auto Gen. Function, if this status is passed, and the number of collection logs is matched, the following window will pop up, it means that Auto Gen. Function is in progress.

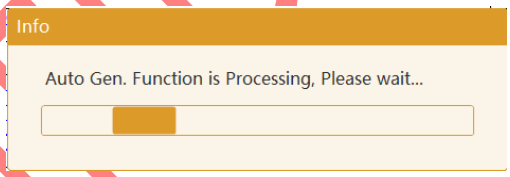
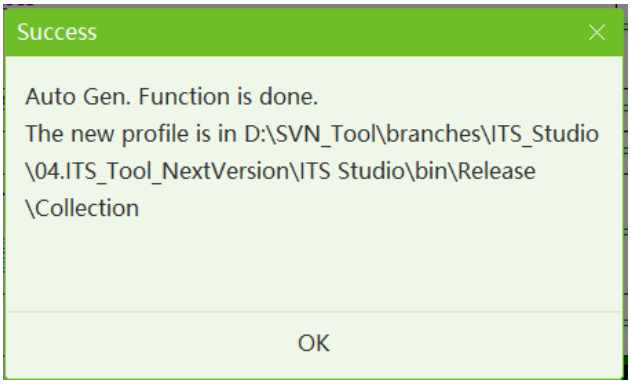


Fig 6-5 Auto Gen. Function is in progress.

Step3: to show that the Auto Gen. Function has completed correctly.



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Fig 6-6 the successful information

Step4: Auto Gen. Function is done， the main page will change to the following page automatically and specify the profile that generates after Auto Gen. is finished.

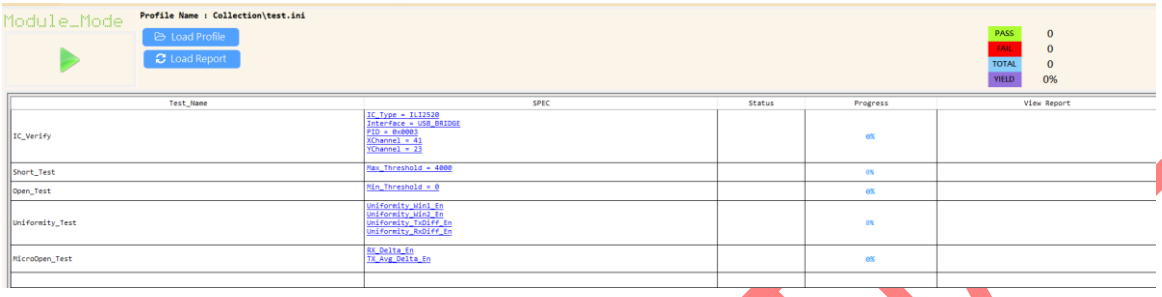


Fig 6-7 jump back to the page of general execution of sensor test.

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Collection Log Process Description

In the setup page (Fig.6-3), after specifying the path of the collected folder, the program will detect the existence of the folder when the Auto Gen. action is executed in the first time, and if it is not, the program will generate the folder itself and add the AutoGenPass\ folder under the folder.

When executed, the result (*.csv) will be placed in the specified folder, and if the action is passed, a copy will be made to the AutoGenPass\ folder.

Q: When will Auto Gen. be performed? A: Once the number of logs in the AutoGenPass\ folder is matched the target number of logs, the Auto Gen. action will be performed.
Q: Where is the Auto Gen. generated profile located? A: it will be under the specified folder · If the test result is successful, it will also be copied to the AutoGenPass\ folder.
Q: Does running the Auto Gen. profile generate a copy to the specified folder? A: Yes, it will be copied to the AutoGenPass\ folder as well.
Q: Which folder do you want to clean up using the empty folder button on the settings page? A: Deletes all files and subfolders under the specified folder.
Q: What else does AutoGenPass\ have to offer? A: If you want to know which logs the new profile is based on, you can pack this folder, which contains the profile where the auto gen. was performed, the newly generated profile, and the pass logs.

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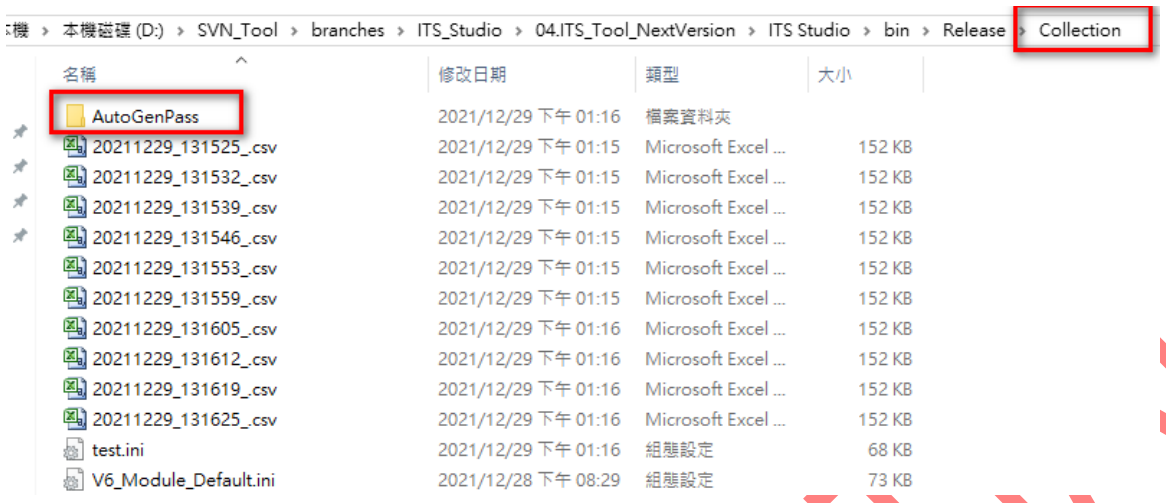


Fig 6-8 folder structure

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7. Report Mode

This feature can import Test Log and show data from the Log into the UI display.

Step 1: Click the Load Report button on the Sensor Test Tool screen.

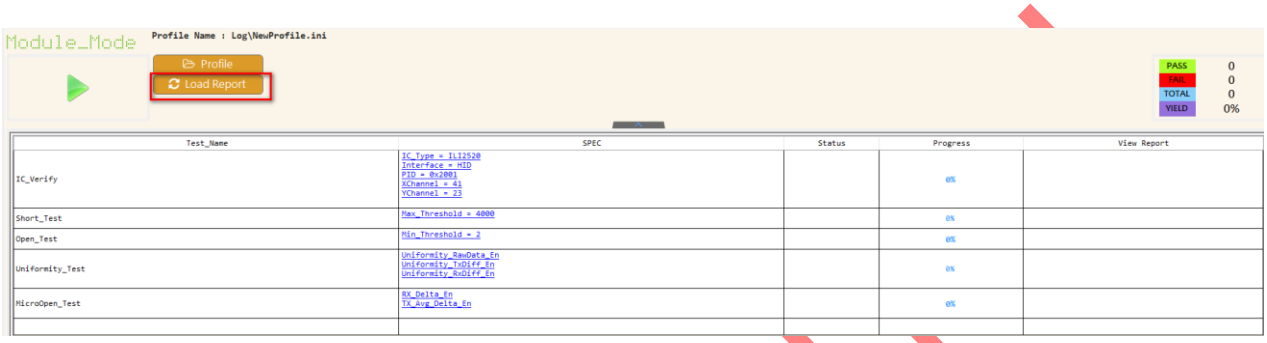


Fig 7-1 Report mode UI。

Step 2: Select the Log which you want to analyze and press Open.

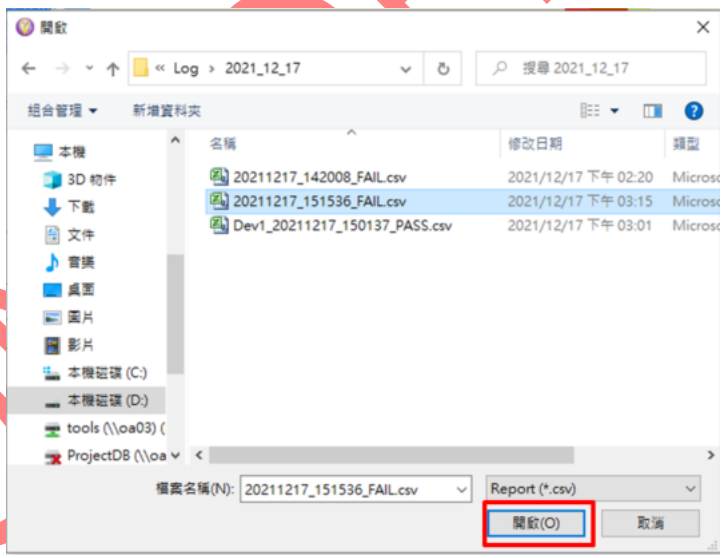


Fig 7-2 The Form that log selection。

Step 3: The Sensor Test Tool will display Report_Mode in the upper left corner, and the middle display area will be the Test Log data just imported.You can click “Check for result” to check test data.

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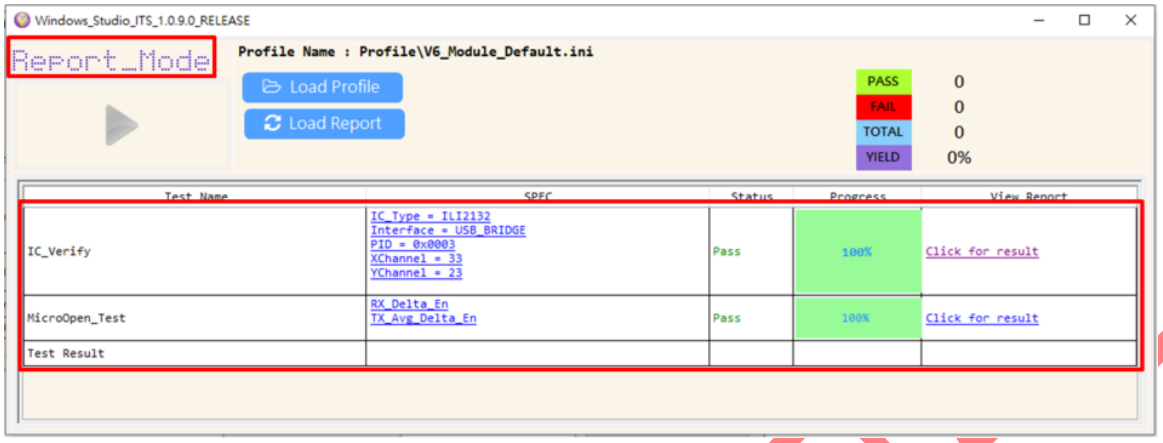


Fig 7-3 Report Mode - schematic diagram of the execution result。

Hint: the test result window is frozen; you must reload the profile before setting the detail of sensor test.

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8. Sensor Test Setting Flow

Step 1: choose the profile related to IC to set, there are two type (FPC and Module), please refer to Fig 4-7.

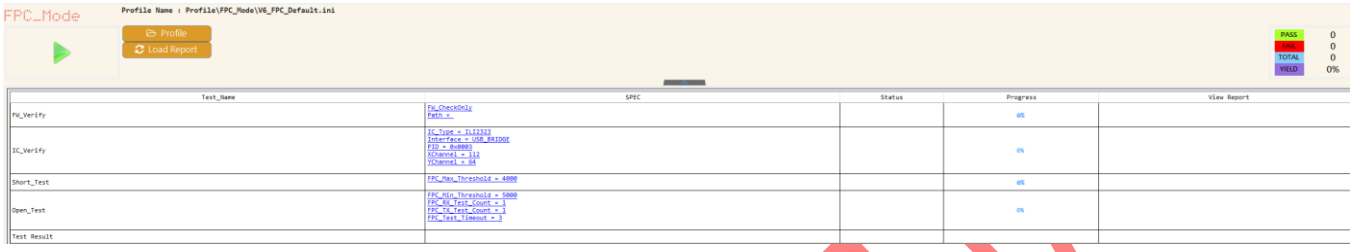


Fig 8-1 FPC setting。



Fig 8-2 Module setting。

Step 2: click the SPEC item and set the related setting.

Step 3: click “system” to set to OP mode，two types(button and barcode)can be chosen ，please refer to Fig 4-10.

Step 4: click ”Load Panel Information ” to get the newest IC information before executing Step 5。

Step 5: switch to “FW_Verify” to check the FW version, if wants to update the FW, please set the Hex file path, please refer to section 4-17.

Step 6: settle other test items clearly. (Short_Test \ GPIO Test \ Open_Text \ Uniformity_Test \ Drawing_Test \ MicroOpen_Test)

Step 7: switch to “Report” to set the report path and the format of the file name.

Step 8: confirm to save the result to flash after testing, check the item”Save MP Result”

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Step 9: finish ，click the “save close” to record this setting value.

Step 10: start to test.

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9. Console Tool Command Description

The functions provided by the ITS tool are performed by giving commands, and when they are performed, there is no UI display at all.

Type	Name	Desc.
Execution File	Windows_Studio_ITS.exe	Main code
Library	CommonDefine.dll FuncMethodCmd.dll GDI_32.dll Ilitek_HID.dll ITSToolLib.dll ThirdPartyTool.dll	Shared with ITS Tool's underlying library
setting	Config/Setting.ini	The initial configuration file of the program, you can specify the device's VID

Table 9-1 file list

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Parameter description - independent command

CMD	Description	Example
/log	Generate a log file under the current path at the end of the execution · its file name is ITS_Log_yyyy_MM_dd_THHmmss.txt · you can use "/path=" to assign the save path	
/show	Whether to display information in the console	
/p	If it is not set, the console will turn off automatically.	
/hide	Minimize the console	
/i	Shows the ic information	
/c	Check if the FW of the current IC is the same as the hex file you want to compare, if it is not, the error code is -13	
/s	Perform FW burning and only burn CRC different programs.	
/f	Force to burn programs.	
/chkic=	Check if the IC model number is the same as the specified one	/chkic=2510, if IC is not 2510, then console tool will terminate the program
xxx.hex	Specify the hex file, usually used with /s /f	

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/path=	Specify the output path of the log file. The default path is the current path. Relative path is supported and if the path contains space character, you should add “”.	/path=test /path=../test
/setmode=	Switch the tuning mode，it only support 0~2	/setmode=0 /setmode=1 /setmode=2
/getmode	Get the current tuning mode.	
/sw_rst	Execute “software reset”。	
/touch=	Support on or off to control whether to turn on the touch function	/touch=on /touch=off
/delay=	Set the delay time, you can set how long between the command and the command need to be executed, the unit is ms	/delay=100
/cmd=	Support SET REPORT command, you can input 0x for hexadecimal, you need to add "" to include all parameters.	/cmd=”0x03 0xA3 0x01 0x04 0x43”
/sensortest=	Run the sensor test function, = with the edited profile at the back	/sensortest=”default.ini” /sensortest="default.ini,12345"
/call_its	Execute call its function	/call_its

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/ignore	Allow more than two programs to run at the same time	/ignore

Table 9-2 command list

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Parameter description - CDC

<table>
<tr><th>CMD</th><th>Description</th></tr>
<tr><td>/cdc=</td><td>Get the CDC data, format is
/cdc="{cnt} {type} {fmt} {record}"
Ex: /cdc="10 open ori r"
<table>
<tr><th>Para.</th><th>Data</th><th>Descrip-tion</th></tr>
<tr><td>cnt</td><td>0~65535</td><td>Get frame count</td></tr>
<tr><td>type</td><td>[Non-pen]
<table>
<tr><td>raw_bk</td><td>open</td><td>raw_nbk</td><td>se_bk</td></tr>
<tr><td>dac_p</td><td>dac_n</td><td>short</td><td>se_bk0</td></tr>
<tr><td>se_bk1</td><td>se_bk2</td><td>se_bk3</td><td></td></tr>
</table>
[Pen]
MPP :
<table>
<tr><td>mpp_BeaconLF</td><td>mpp_DigitalLF</td><td>mpp_PortTypeHF</td></tr>
<tr><td>mpp_DigitalHF</td><td>mpp_Presure</td><td>mpp_BeaconHF</td></tr>
</table>
USI :
<table>
<tr><td>usi_ACK</td><td>usi_Tip_0</td><td>usi_Tip_1</td></tr>
</table></td><td>CDC type, where the number in se_bkN represents the type of IDX, ranging from IDX0 to IDX3</td></tr>
</table></td></tr>
</table>

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		usi_Tip_2	usi_ST				
		WGP :					
		wgp_TipRing0	wgp_TipRing1	wgp_TipRing2			
		wgp_TipRing3	wgp_ST				
	fmt	Ori	max	min	delta	singal	format
	record	r: start to record n/a					
	The above parameters need to be included with " "						

Table 9-3 cdc sub-command list

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Parameter description - Noise Frequency

<table>
<tr><th>CMD</th><th>Description</th><th>example</th></tr>
<tr><td>/nf</td><td>Scan the frequency，format is
/nf="{Sine} {SWCAP} {Self}"
<table>
<tr><th>Para.</th><th>format</th><th>Desc.</th></tr>
<tr><td>Sine</td><td>{start_frq}:start
{end_frq}:end
{gap}:gap
{minimum level}:minimum level，0~7</td><td>30 90 5 7</td></tr>
<tr><td>SWCAP</td><td>{start_frq}: start
{end_frq}: end
{gap}: gap
{minimum level}: minimum level，0~7</td><td>4 300 2 7</td></tr>
<tr><td>Self</td><td>{start_frq}:start
{end_frq}:end
{gap}:gap
{minimum level}: minimum level，0~7</td><td>4 30 2 7</td></tr>
</table>
The above parameters need to be included with " "</td><td>/nf="30 90 5 7 4 300 2 7 4 30 2 7"</td></tr>
</table>

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<table>
<tr><td>/nf_cnt=</td><td>, only applicable to V6, set the number of SC/MC/Dump frame to be taken consecutively, when the protocol is V6.0.A, you need to input three parameters, on the contrary, just SC frame will do.</td><td>/nf_cnt=”10 10 10”</td></tr>
<tr><td>/nf_type=</td><td>only available in V6, uses bit form to set the type
<table>
<tr><th>frame count</th><th>average</th><th>maximum</th><th>value</th></tr>
<tr><td>○</td><td>○</td><td>●</td><td>1</td></tr>
<tr><td>○</td><td>●</td><td>○</td><td>2</td></tr>
<tr><td>○</td><td>●</td><td>●</td><td>3</td></tr>
<tr><td>●</td><td>○</td><td>○</td><td>4</td></tr>
<tr><td>●</td><td>○</td><td>●</td><td>5</td></tr>
<tr><td>●</td><td>●</td><td>○</td><td>6</td></tr>
<tr><td>●</td><td>●</td><td>●</td><td>7</td></tr>
</table></td><td>/nf_type=7</td></tr>
<tr><td>/pen</td><td>wgp mpp usi</td><td></td></tr>
<tr><td>/pen_signal</td><td>"[frequency,threshold]; [frequency,threshold]…"
/pen_signal="10,10;300,10"</td><td>Set the threshold of frequency.</td></tr>
</table>

Table 9-4 noise frequency sub-command list

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Example

Action	Command
ShowICInfo.bat	/i /show /log
GetMode.bat	/getmode /show /log /p
CheckIC.bat	/chkic=2520 /show /log /p
CheckFW.bat	/c "ILI2132_7.0.0.8_0.0.0.7.hex" /show /log /p
Enable_touch.bat	/touch=on /show /log /p
Disable_touch.bat	/touch=off /show /log /p
Mode0.bat	/setmode=0 /show /log /p
Mode1.bat	/setmode=1 /show /log /p
Mode2.bat	/setmode=2 /show /log /p
UpgradeFW.bat	"ILI2520_3mode_Release_rev18646.hex" /s /show /log /p /hide
Force_UpgradeFW.bat	"LI2520_3mode_Release_rev18646.hex" /f /show /log /p
NoiseFrequency_V3.bat	/nf="30 90 5 7" /show /log
NoiseFrequency_V6.bat	/nf="30 90 5 7 4 300 2 7 4 30 2 7" /nf_cnt=10 /nf_type=7 /show /log
NoiseFrequency_V6_pen.bat	/nf="30 90 5 7 4 300 2 7 4 30 2 7" /pen=Mpp /pen_signal="10,10;300,10" /nf_cnt=10 /nf_type=7

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SensorTest.bat	/sensortest=”Default.ini” /show /log
CDC_V3_Record.bat	/cdc="100 open ori r" /show /log
CDC_V3_NoRecord.bat	/cdc="100 open ori" /show /log /p
CDC_V6_Record.bat	/cdc="10 raw_bk delta r" /show /log /p
CDC_V6_NoRecord.bat	/cdc="10 raw_bk delta" /show /log /p
CDC_V6_noRecord_pen.bat	/cdc="10 mpp_BeaconHF ori" /show /log /p
CDC_V6_Record_pen.bat	/cdc="10 mpp_DigitalLF ori r" /show /log /p

Table 9-5 example

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Error Code

Error Code	Desc.
0	success
-5	Firmware update was failed
-13	IC version inconsistency
others	Ambiguous errors

Table 9-6 error code list

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