

# NT38350 Android Touch Driver Detail V1.1



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# Revision History

Version	Contents	Prepared by	Checked by	Date
V1.0	- First Version	Amber Huang	J X Lee Taylor Chuang	2020/07/21
V1.1	- Update the Self-Test Criteria Setting of page15 for google	Amber Huang	J X Lee Taylor Chuang	2020/10/12

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## NT38350 I2C address (7-Bit Addressing)

- (ISP) HW i2c address
  1. 0x62
  2. It is used for chip bootloader commands. Ex. Firmware update...etc.
  3. **Please use HW i2c address to register touch driver.** Ex. dts file...etc.
- FW i2c address
  1. 0x01
  2. It is used for firmware protocol. Ex. Pointer report...etc.

## DTS Example

- DTS(Device Tree) Example for Novatek touch driver.
  1. **compatible**: Should be "novatek,NVT-ts".
  2. **reg**: I2C slave address of the device should be set as 0x62.
  3. **novatek,irq-gpio**: Irq gpio which is to provide interrupts to host.

```
novatek@62 {  
    compatible = "novatek,NVT-ts";  
    reg = <0x62>  
    novatek,irq-gpio = <&msm_gpio 13 0x2001>;  
};
```

## Supported Interrupt Trigger Type

- Only support **edge trigger** type interrupt by FW
- INT trigger type be configured in *nt38350.h*

```
//---INT trigger mode---  
//#define IRQ_TYPE_EDGE_RISING 1  
//#define IRQ_TYPE_EDGE_FALLING 2  
#define INT_TRIGGER_TYPE IRQ_TYPE_EDGE_RISING
```

## Enable Wakeup Gesture Feature

- Enable WAKEUP\_GESTURE in *nt38350.h*

```
#define WAKEUP_GESTURE 1
```



## Extra Touch Information

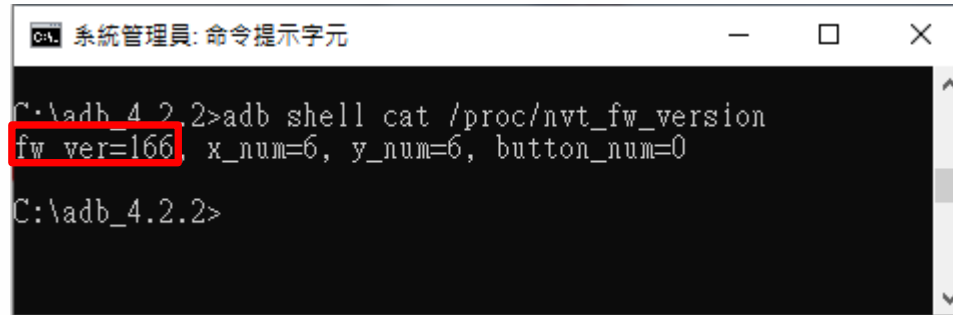
- Enable NVT\_TOUCH\_EXT\_PROC in *nt38350.h*

```
#define NVT_TOUCH_EXT_PROC 1
```

- Touch driver will create four proc system nodes. You can use “adb shell cat /proc/xxxxx” command to get extra touch information by these system nodes.
  1. /proc/**nvt\_fw\_version**: Get fw version, x channel number and y channel number
  2. /proc/**nvt\_raw**: Get raw data
  3. /proc/**nvt\_baseline**: Get baseline data
  4. /proc/**nvt\_diff**: Get difference data

## Check FW Version

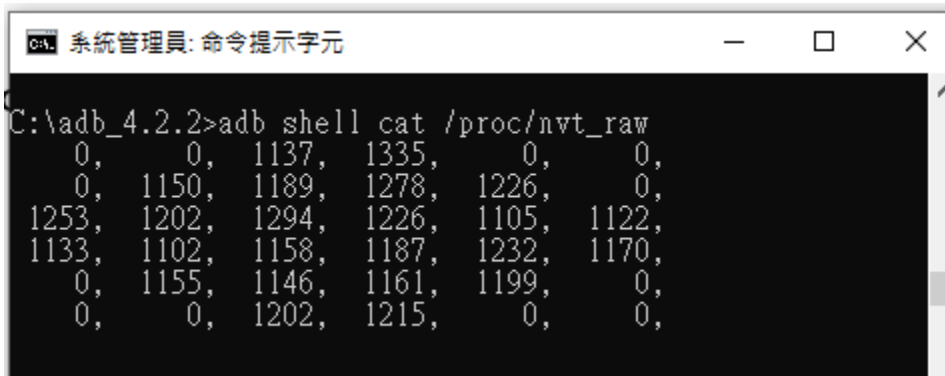
- adb shell cat /proc/nvt\_fw\_version



```
系統管理員: 命令提示字元
C:\adb_4.2.2>adb shell cat /proc/nvt_fw_version
fw_ver=166, x_num=6, y_num=6, button_num=0
C:\adb_4.2.2>
```

## Read Raw Data

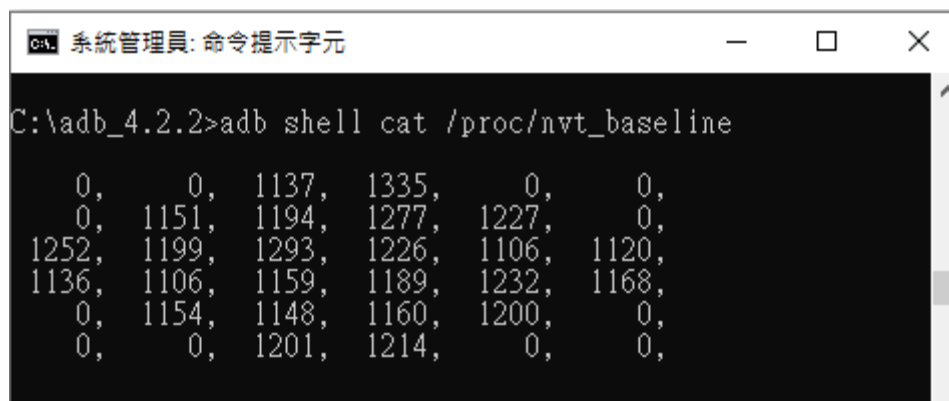
- adb shell cat /proc/nvt\_raw



```
C:\adb_4.2.2>adb shell cat /proc/nvt_raw
0,      0,    1137,  1335,     0,     0,
0,    1150,  1189,  1278,   1226,     0,
1253,  1202,  1294,  1226,   1105,  1122,
1133,  1102,  1158,  1187,   1232,  1170,
0,    1155,  1146,  1161,   1199,     0,
0,      0,   1202,  1215,     0,     0,
```

## Read Baseline Data

- adb shell cat /proc/nvt\_baseline

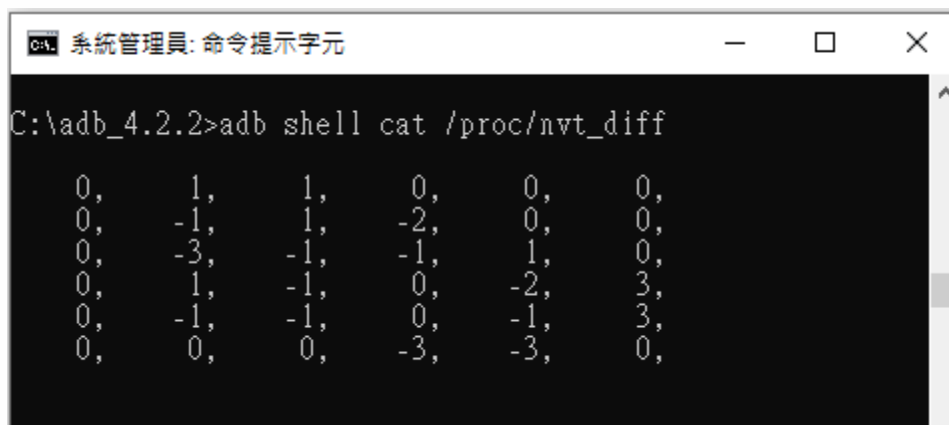


```
C:\adb_4.2.2>adb shell cat /proc/nvt_baseline
```

0,	0,	1137,	1335,	0,	0,
0,	1151,	1194,	1277,	1227,	0,
1252,	1199,	1293,	1226,	1106,	1120,
1136,	1106,	1159,	1189,	1232,	1168,
0,	1154,	1148,	1160,	1200,	0,
0,	0,	1201,	1214,	0,	0,

## Read Diff Data

- adb shell cat /proc/nvt\_diff



```
系統管理員: 命令提示字元
C:\adb_4.2.2>adb shell cat /proc/nvt_diff
0, 1, 1, 0, 0, 0,
0, -1, 1, -2, 0, 0,
0, -3, -1, -1, 1, 0,
0, 1, -1, 0, -2, 3,
0, -1, -1, 0, -1, 3,
0, 0, 0, -3, -3, 0,
```

# MP Self-Test

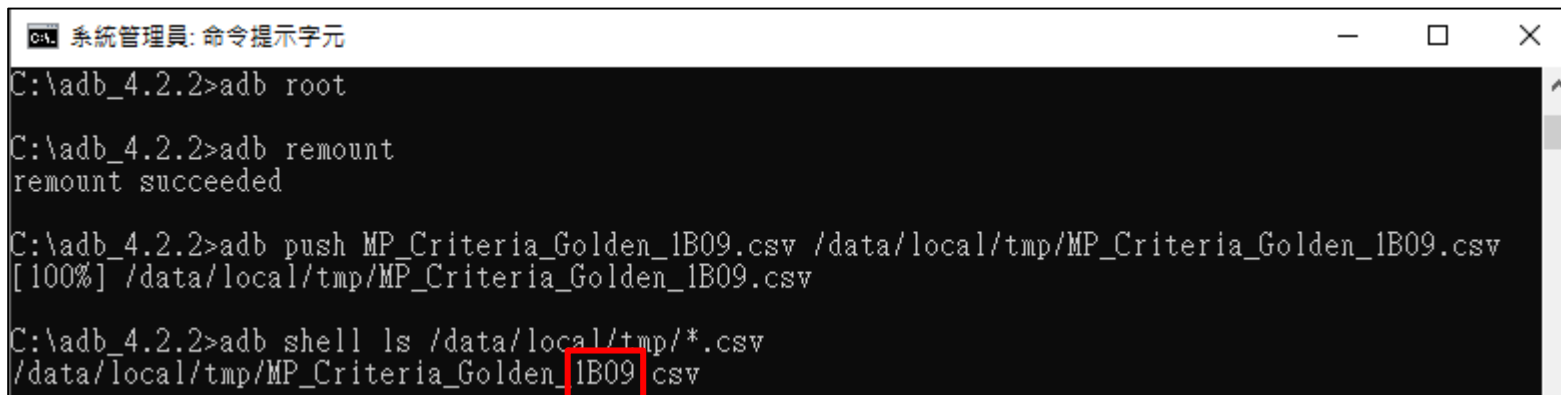
- Self-Test items
  1. Open Test
  2. Short Test
  3. FW Rawdata (also include FW CC) Test
  4. Noise Test

# MP Self-Test

## ■ Self-Test Criteria Setting

1. The criteria settings (test limits) of each test item are in *MP\_Criteria\_Golden\_PID.csv*
2. Put *MP\_Criteria\_Golden\_PID.csv* into device */data/local/tmp/* before running selftest
3. In addition, the string "PID" in filename is the Novatek internal project id, setting example is as bellow.

Ex. "PID" is **1B09**



```
C:\adb_4.2.2>adb root
C:\adb_4.2.2>adb remount
remount succeeded
C:\adb_4.2.2>adb push MP_Criteria_Golden_1B09.csv /data/local/tmp/MP_Criteria_Golden_1B09.csv
[100%] /data/local/tmp/MP_Criteria_Golden_1B09.csv
C:\adb_4.2.2>adb shell ls /data/local/tmp/*.csv
/data/local/tmp/MP_Criteria_Golden_1B09.csv
```

# MP Self-Test Configuration

- Test Configuration
  1. IC maximum sensor number in x, y direction
    - IC\_X\_CFG\_SIZE
    - IC\_Y\_CFG\_SIZE
  2. Used sensor number in x, y direction
    - X\_Channel
    - Y\_Channel
  3. Open test output data remapping table in x, y direction
    - AIN\_X[]
    - AIN\_Y[]
  4. Please contact Novatek MP owner to get configurations of your panel module, and set it before running Self-Test.



# MP Self-Test Criteria Setting

## ■ Test Criteria Setting

1. Open test
  - Upper bound: PS\_Config\_Lmt\_Open\_Rawdata\_P[ ]
  - Lower bound: PS\_Config\_Lmt\_Open\_Rawdata\_N[ ]
2. Short test
  - Upper bound: PS\_Config\_Lmt\_Short\_Rawdata\_P[ ]
  - Lower bound: PS\_Config\_Lmt\_Short\_Rawdata\_N[ ]
3. FW Rawdata (also include FW CC) Test
  - Upper bound: PS\_Config\_Lmt\_FW\_Rawdata\_P [ ]
  - Lower bound: PS\_Config\_Lmt\_FW\_Rawdata\_N [ ]
  - Upper bound: PS\_Config\_Lmt\_FW\_CC\_P[ ]
  - Lower bound: PS\_Config\_Lmt\_FW\_CC\_N[ ]
4. Noise Test
  - Upper bound: PS\_Config\_Lmt\_FW\_Diff\_P[ ]
  - Lower bound: PS\_Config\_Lmt\_FW\_Diff\_N[ ]
5. Please contact Novatek MP owner to get criteria settings of your panel module, and set it before running Self-Test.

## How to Run Self-Test

- Enable NVT\_TOUCH\_MP in *nt38350.h*

```
#define NVT_TOUCH_MP 1
```

- Test command is “adb shell cat /proc/nvt\_selftest”

- Test data samples are saved in \*.csv

1. Open Test sample is saved in  
/data/local/tmp/OpenTest.csv
2. Short Test sample is saved in  
/data/local/tmp/ShortTest.csv
3. FW Rawdata Test sample is saved in  
/data/local/tmp/FWMutualTest.csv  
FW CC Test sample is saved in  
/data/local/tmp/FWCCTest.csv
4. Noise Test sample is saved in  
/data/local/tmp/NoiseTest.csv

```
C:\Windows\system32\cmd.exe
C:\adb_4.2.2>adb shell cat /proc/nvt_selftest
FW Version: 2

Short Test PASS!

Open Test PASS!

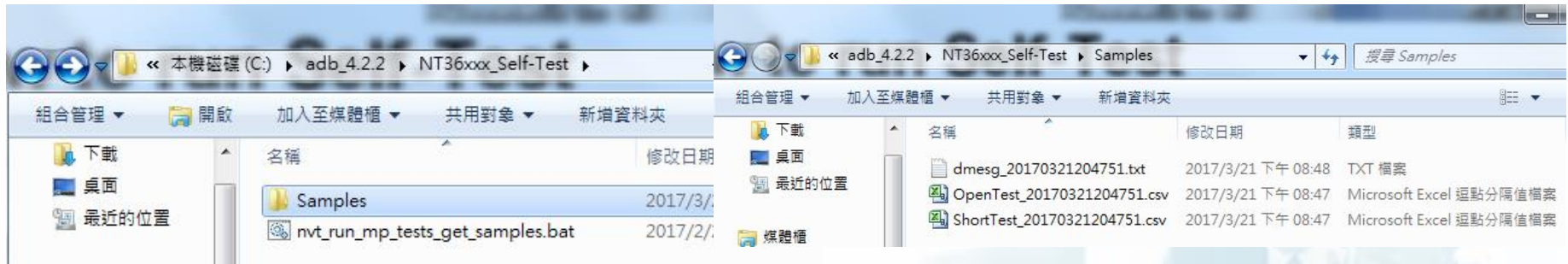
FW Rawdata Test PASS!

Noise Test PASS!

C:\adb_4.2.2>adb shell ls /data/local/tmp/*.csv
/data/local/tmp/FWCCTest.csv
/data/local/tmp/FWMutualTest.csv
/data/local/tmp/NoiseTest.csv
/data/local/tmp/OpenTest.csv
/data/local/tmp/ShortTest.csv
```

## How to Run Self-Test (cont.)

- You can use batch file ***nvt\_run\_mp\_tests\_get\_samples.bat*** to run Self-Test and get test samples
  1. Change filename from “*nvt\_run\_mp\_tests\_get\_samples.txt*” to “*nvt\_run\_mp\_tests\_get\_samples.bat*”
  2. Double click “*nvt\_run\_mp\_tests\_get\_samples.bat*”
  3. Test samples CSV files and dmesg log will be pulled to “Samples” folder with date time in filename.



## Novatek Tools Usage Support

- We have command line tool and android apk for debug. It supports read/write command and data thru created system nodes /proc/NVTflash.
- Enable NVT\_TOUCH\_PROC in *nt38350.h*

```
#define NVT_TOUCH_PROC 1
```

- Make sure system node /proc/NVTflash has been created.
- This node is configured with only read permission that it is not banned in CTS test.

**Do not set NVT\_TOUCH\_PROC to 0 !!**

## Boot-UP FW Update

- Enable BOOT\_UPDATE\_FIRMWARE in *nt38350.h*

```
#define BOOT_UPDATE_FIRMWARE 1  
#define BOOT_UPDATE_FIRMWARE_NAME "novatek_ts_fw.bin"
```

- Put firmware binary file in your device with path “/etc/firmware/novatek\_ts\_fw.bin”
- The firmware file name should be same as driver code. The default file name is novatek\_ts\_fw.bin
- Update Check Rules
  1. FW binary file size equals 116KB
  2. FW binary (FW version + FW version bar) equals 0xFF
  3. Checksum not match
  4. Binary FW version **>=** IC FW version
    - You can modify this checking rules with your use case.