UI PIN-CTRL Tool

Revision History

Revision	Date	Author	Changes
0.1	2018/8/14	KH Chang	First draft
0.2	2018/10/16	KH Chang	Add 3.9 Example
0.3	2018/11/22	KH Chang	Add 3.8 Auto pinmux conflict checking

Content

Revision History 2
Content 3
1. Overview 4
2. Features 4
3. Usage 4
3.1 Files 4
3.2 User Interface 5
3.3 Load dtsi file 9
3.4 Generate dtsi file 11
3.5 Clear setting 15
3.6 Update device tree 15
3.7 Version 16
3.8 Auto pinmux conflict checking 17
3.9 Example 18

1. Overview

此UI 工具用來讓使用者可以快速建立平台所需的 pinmux table , 設定 pad driving , 以及 GPIO 需要的設定值. 產出編譯程式需要的 configuration 檔案.

2. Features

1. Setting pinmux table
2. Setting Pad driving
3. Setting GPIO

3. Usage

3.1 Files

1. top.csv
   從 top.h parsing 出來的 define value, 若此 header file 有更新, 需要 update
2. pad.csv
   從 pad.h parsing 出來的 define value, 若此 header file 有更新, 需要 update
3. gpio_def.csv
   GPIO default 值.
4. top_generator.xlsm
   主要 UI tool 介面 (xlsm 代表是具有巨集的 excel file)
5. nvt-na51000-top.dtsi
   產出檔案

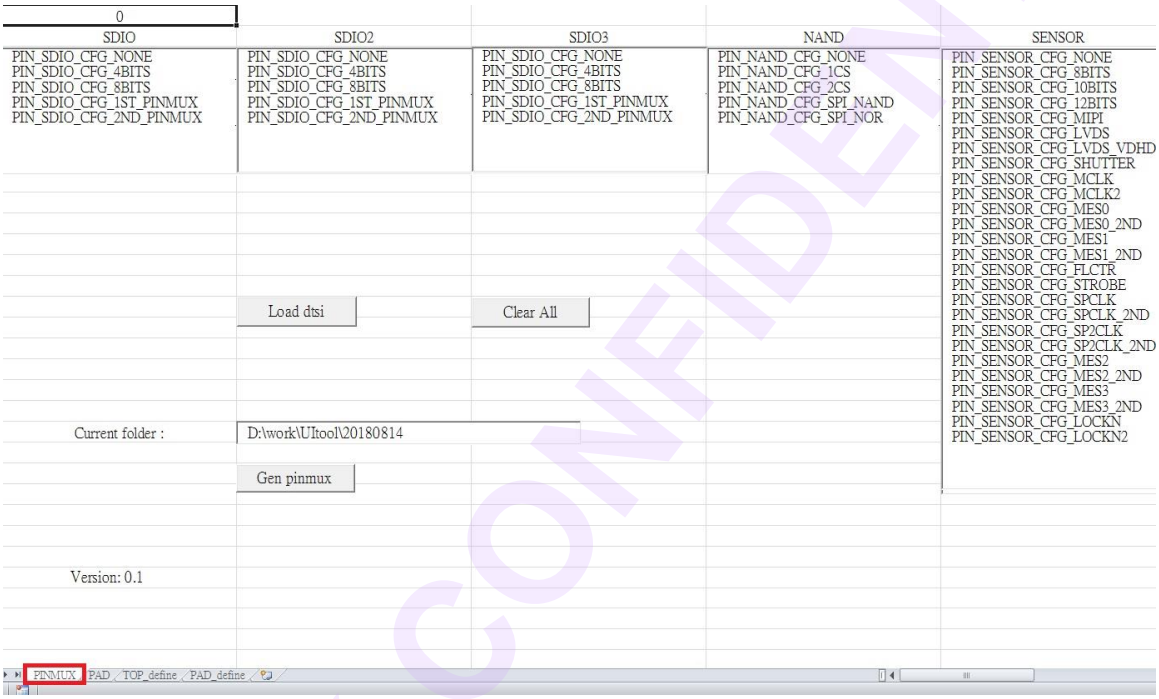
[Tool 擺放位置]

<BSP>\build\nvt-tools\nvt_pinctrl_tool

3.2 User Interface

The UI divided into 4 pages as below.

(1) The first page is “PINMUX”



透過此頁面可以設定使用者平台所需要的 pinmux 設定

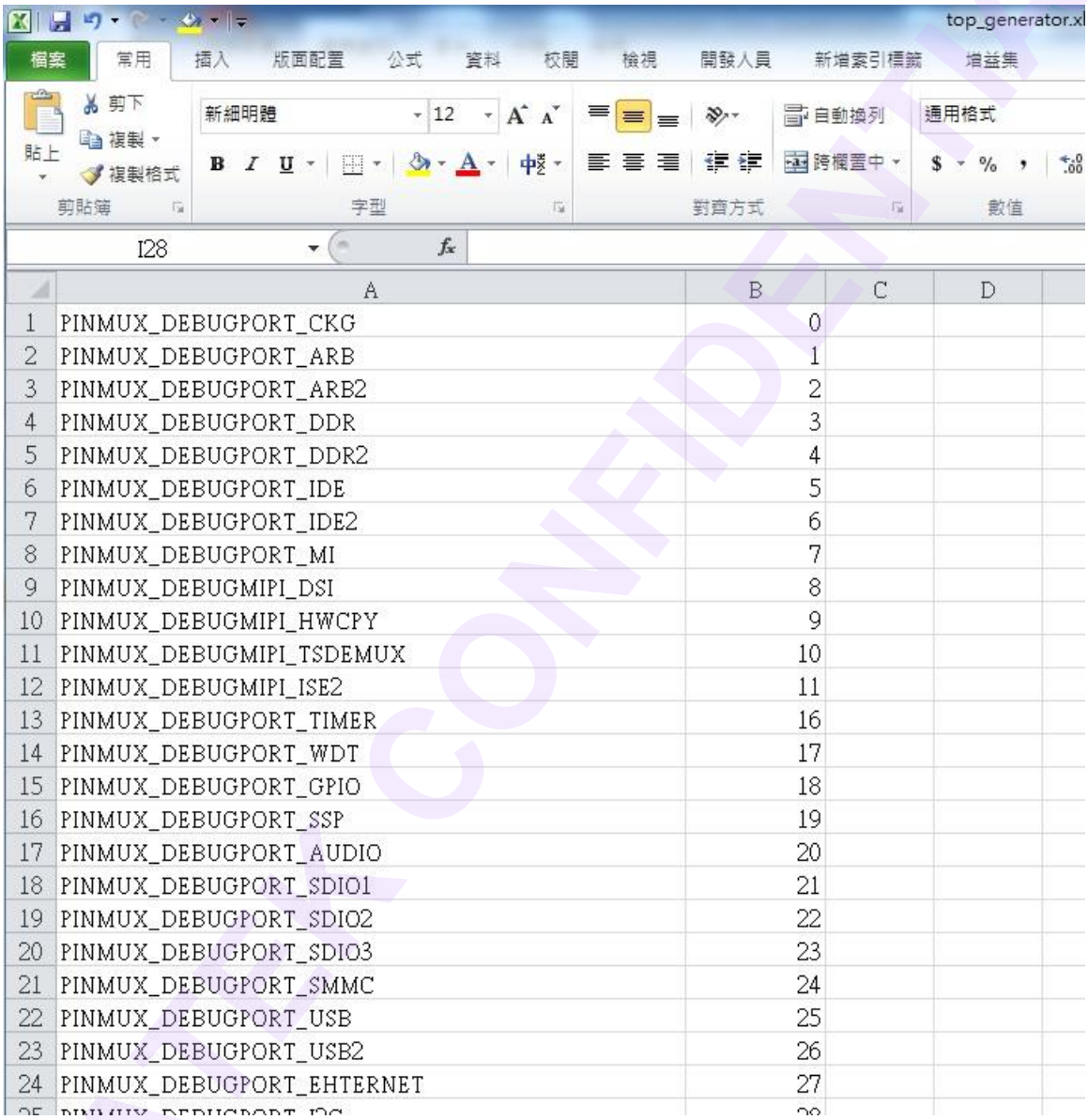
(2) The second page is “PAD”

	A	B	C	D	E	F
1	CGPIO	pin	DRIVINGSINK	PULLDOWN	DIRECTION	OUTPUT
2		CGPIO0	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
3		CGPIO1	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
4		CGPIO2	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
5		CGPIO3	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
6		CGPIO4	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
7		CGPIO5	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
8		CGPIO6	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
9		CGPIO7	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
10		CGPIO8	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
11		CGPIO9	PAD_DRIVINGSINK_6MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
12		CGPIO10	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
13		CGPIO11	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
14		CGPIO12	PAD_DRIVINGSINK_4MA	PAD_PULLDOWN	GPIO_DIR_INPUT	LOW
15		CGPIO13	PAD_DRIVINGSINK_4MA	PAD_PULLDOWN	GPIO_DIR_INPUT	LOW
16		CGPIO14	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
17		CGPIO15	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
18		CGPIO16	PAD_DRIVINGSINK_20MA	PAD_PULLDOWN	GPIO_DIR_INPUT	LOW
19		CGPIO17	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
20		CGPIO18	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
21		CGPIO19	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
22		CGPIO20	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
23		CGPIO21	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
24		CGPIO22	PAD_DRIVINGSINK_20MA	PAD_PULLDOWN	GPIO_DIR_INPUT	LOW
25		CGPIO23	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
26		CGPIO24	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
27		CGPIO25	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
28		CGPIO26	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
29		CGPIO27	PAD_DRIVINGSINK_15MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
30		CGPIO28	PAD_DRIVINGSINK_6MA	PAD_PULLDOWN	GPIO_DIR_INPUT	LOW
31		CGPIO29	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
32		CGPIO30	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
33		CGPIO31	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
34		CGPIO32	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
35		CGPIO33	PAD_DRIVINGSINK_4MA	PAD_PULLUP	GPIO_DIR_INPUT	LOW
36						

PINMUX | PAD | TOP_define | PAD_define

透過此頁面可以設定使用者平台所需要的 Pad driving 還有 GPIO setting value

(3) The third page is “TOP define”



	A	B	C	D
1	PINMUX_DEBUGPORT_CKG	0		
2	PINMUX_DEBUGPORT_ARB	1		
3	PINMUX_DEBUGPORT_ARB2	2		
4	PINMUX_DEBUGPORT_DDR	3		
5	PINMUX_DEBUGPORT_DDR2	4		
6	PINMUX_DEBUGPORT_IDE	5		
7	PINMUX_DEBUGPORT_IDE2	6		
8	PINMUX_DEBUGPORT_MI	7		
9	PINMUX_DEBUGMIPI_DSI	8		
10	PINMUX_DEBUGMIPI_HWCPY	9		
11	PINMUX_DEBUGMIPI_TSDEMUX	10		
12	PINMUX_DEBUGMIPI_ISE2	11		
13	PINMUX_DEBUGPORT_TIMER	16		
14	PINMUX_DEBUGPORT_WDT	17		
15	PINMUX_DEBUGPORT_GPIO	18		
16	PINMUX_DEBUGPORT_SSP	19		
17	PINMUX_DEBUGPORT_AUDIO	20		
18	PINMUX_DEBUGPORT_SDIO1	21		
19	PINMUX_DEBUGPORT_SDIO2	22		
20	PINMUX_DEBUGPORT_SDIO3	23		
21	PINMUX_DEBUGPORT_SMMC	24		
22	PINMUX_DEBUGPORT_USB	25		
23	PINMUX_DEBUGPORT_USB2	26		
24	PINMUX_DEBUGPORT_EHTERNET	27		

此頁面載入 top.csv 的 define value, 作為後續運算產出的參考值 (使用者不要改動此頁面)

(4) The fourth page is “PAD define”

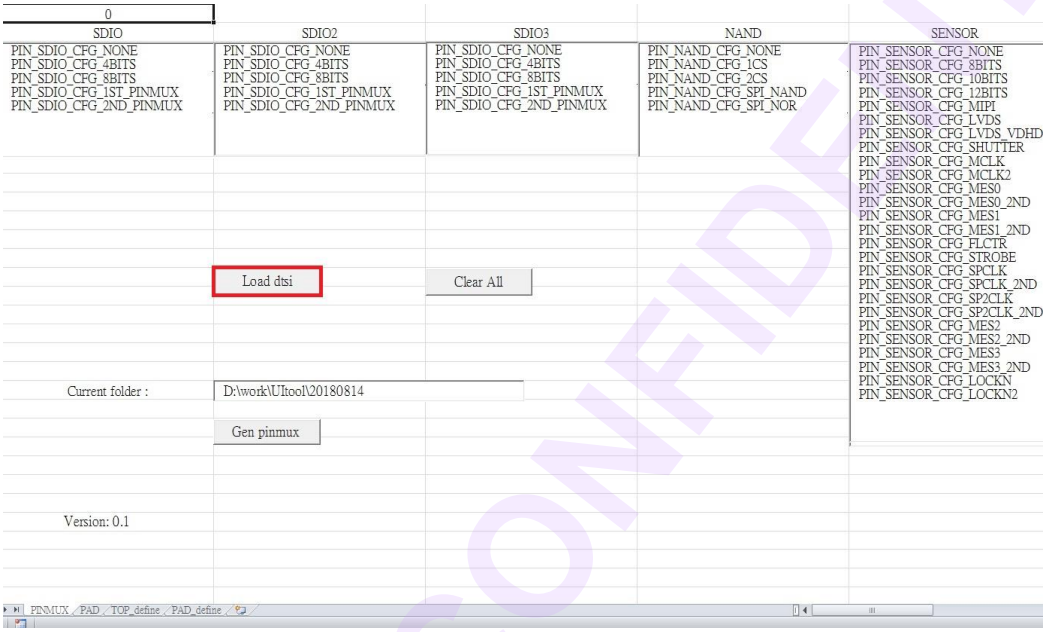
	A	B
1	PAD_NONE	0
2	PAD_PULLDOWN	1
3	PAD_PULLUP	2
4	PAD_KEEPER	3
5		
6	PAD_SLEWRATE_FAST	0
7	PAD_SLEWRATE_SLOW	1
8		
9	PAD_DRIVINGSINK_2P5MA	1
10	PAD_DRIVINGSINK_5MA	2
11	PAD_DRIVINGSINK_7P5MA	4
12	PAD_DRIVINGSINK_10MA	8
13	PAD_DRIVINGSINK_12P5MA	16
14	PAD_DRIVINGSINK_15MA	32
15	PAD_DRIVINGSINK_17P5MA	64
16	PAD_DRIVINGSINK_20MA	128
17	PAD_DRIVINGSINK_25MA	256
18	PAD_DRIVINGSINK_30MA	512
19	PAD_DRIVINGSINK_35MA	1024
20	PAD_DRIVINGSINK_40MA	2048
21	PAD_DRIVINGSINK_4MA	4096
22	PAD_DRIVINGSINK_6MA	8192
23	PAD_DRIVINGSINK_8MA	16384
24	PAD_DRIVINGSINK_16MA	32768
25		
26	PAD_PIN_NOT_EXIST	15
27	PAD_PIN_CGPIO_BASE	0

此頁面載入 pad.csv 的 define value, 作為後續運算產出的參考值 (使用者不要改動此頁面)

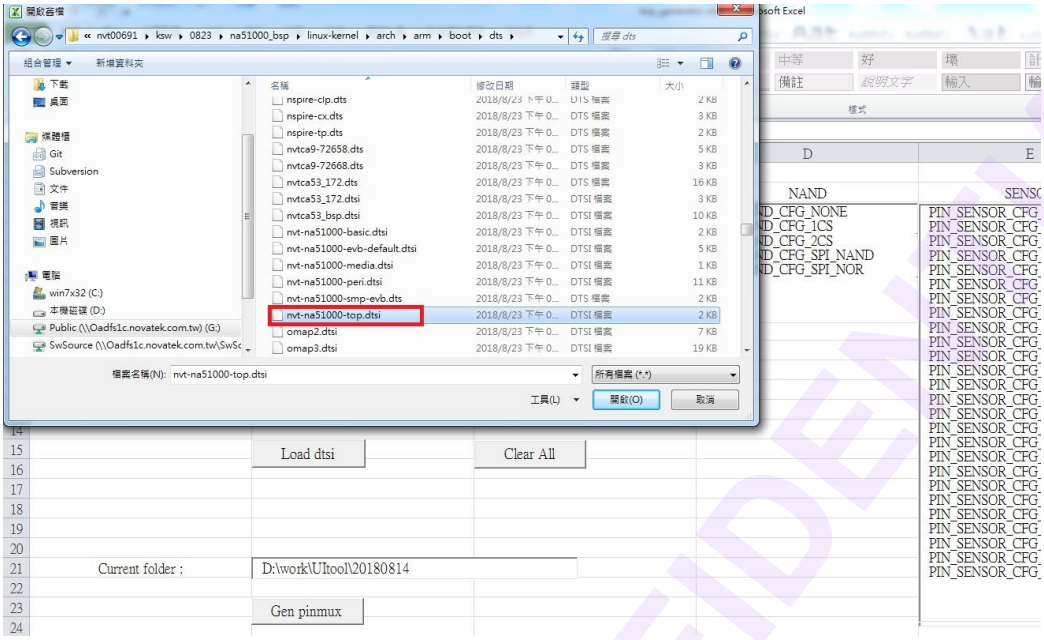
3.3 Load dtsi file

如下圖, 使用者可以利用 load , 將原本 default 的 dtsi 檔案載入

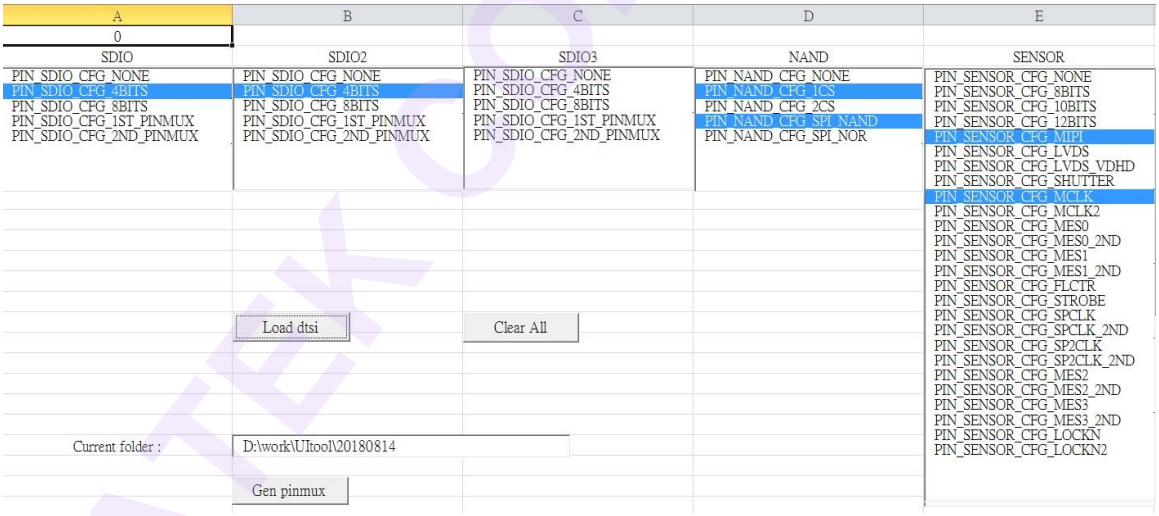
Step1. 按下 load dtsi



Step2. 選擇所要載入的 dtsi 檔案



Step3. 選擇dtsi之後, tool 會進行 parsing，將所取得的設定資訊顯示在 UI 欄位上, 如下圖:

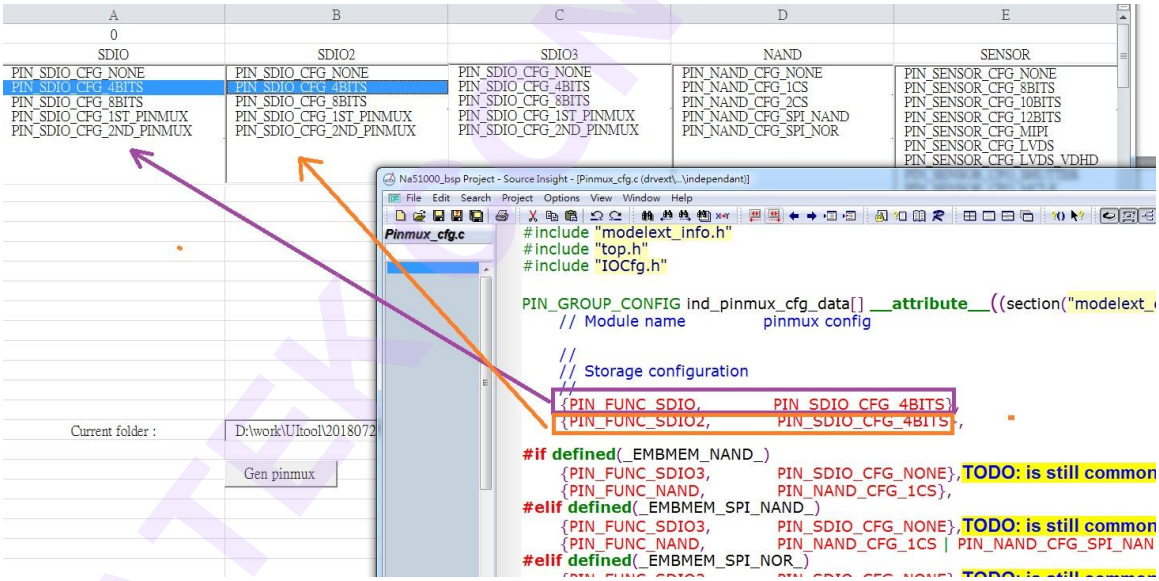


[Note]

1. 目前 default dtsi 檔案位置在 (2018/12/13)
   na51000_linux_sdk\configs\cfg_IPCAM1_EVB

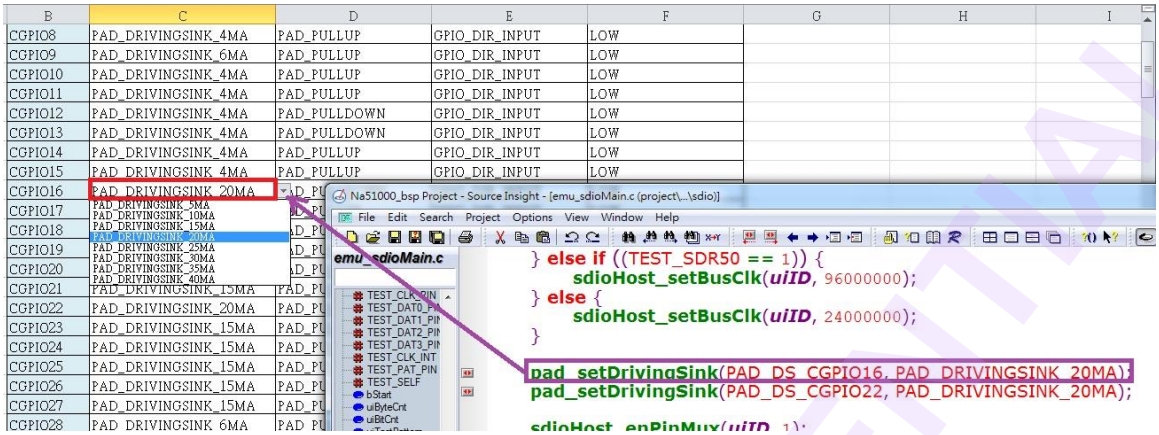
3.4 Generate dtsi file

(1) **Page pinmux** setting

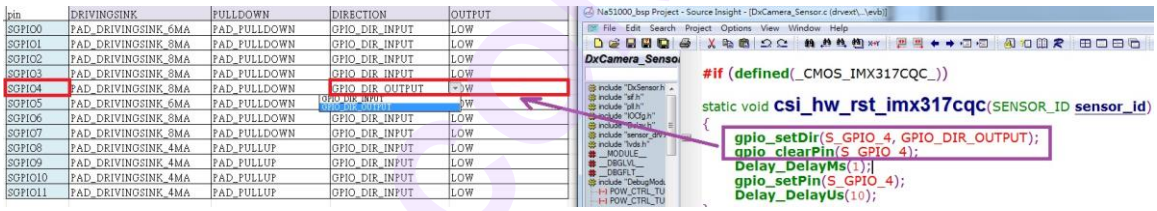


根據原本 pinmux_cfg.c 裡面的設定，逐一將設定點選 (可多選)，如上圖 SDIO 選擇 PIN_SDIO_CFG_4BITS，依此類推，選擇所有需要的設定值

(2) **Page pad** setting

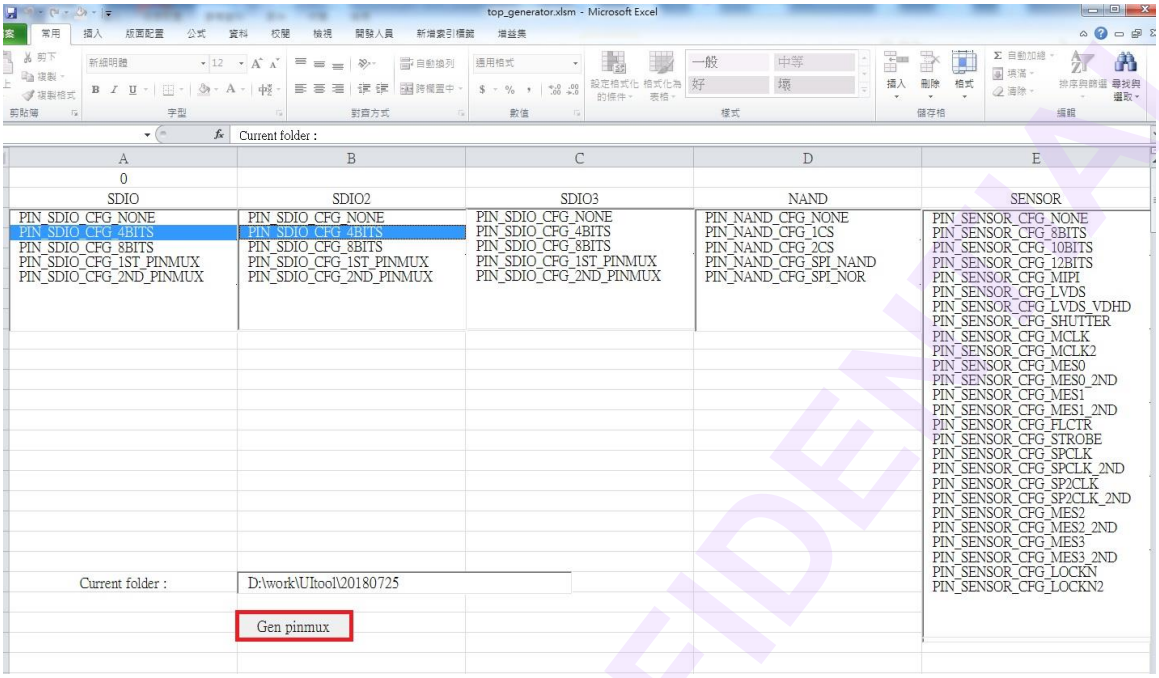


若該平台需要針對部分 pad 調整 driving，可以在此頁面找到所要調整的 pin，然後將所要改的 driving 設定選項改上，如上圖,將 CGPIO16 改成 20mA



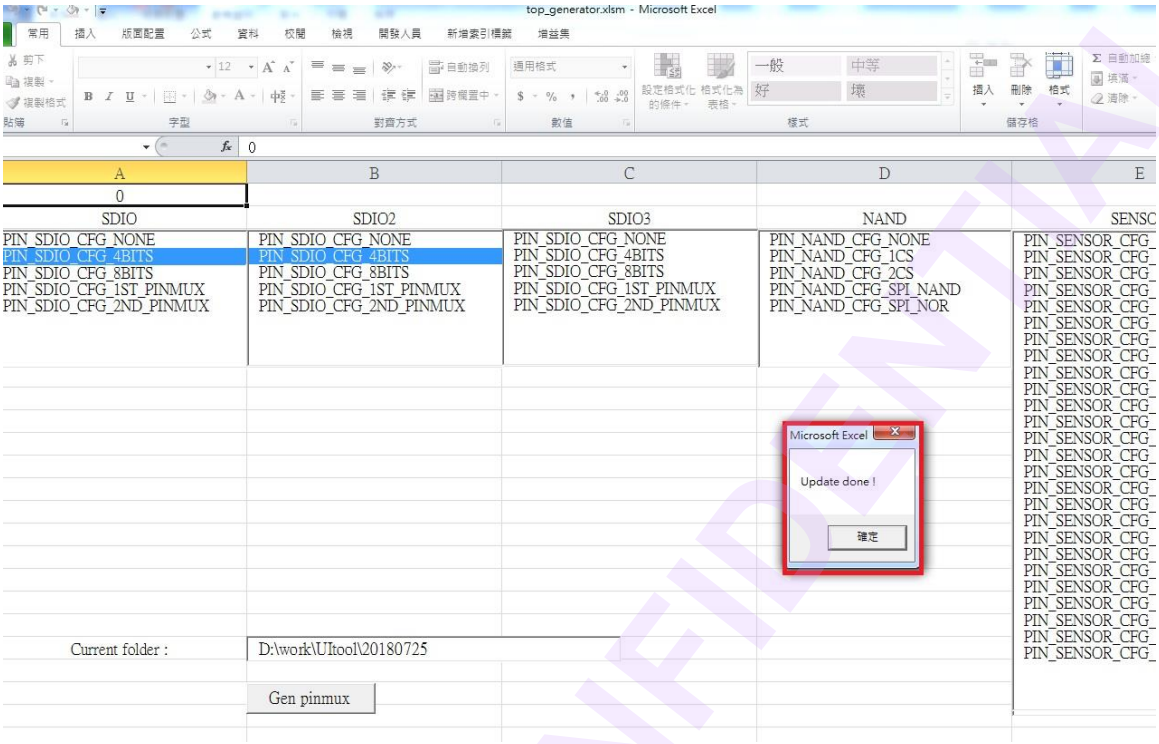
若該平台需要調整 GPIO 設定值，找到對應的 pin 列，然後將需要調整的設定改上，如上圖，將 S_GPIO4 改成 output 值為 0.

(3) 按下按鈕自動產出 nvt-na51000-top.dtsi

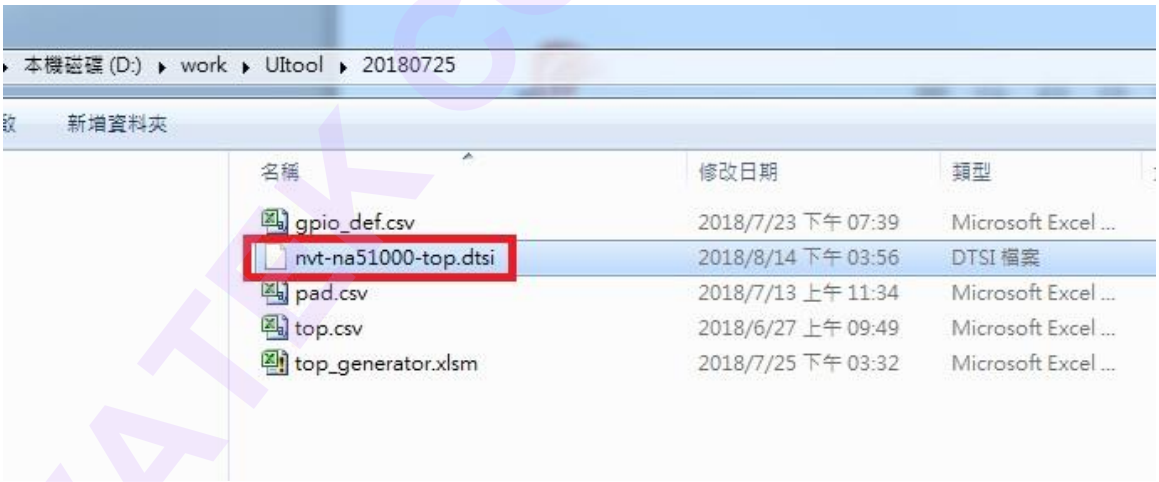


完成上述 pinmux，pad 兩個頁面設定後，在 pinmux 頁面按下 [Gen pinmux] 按鈕 (如上圖紅色框). 則會在該 tool 所在目錄下,自動產出 dtsi 檔案

(4) 完成

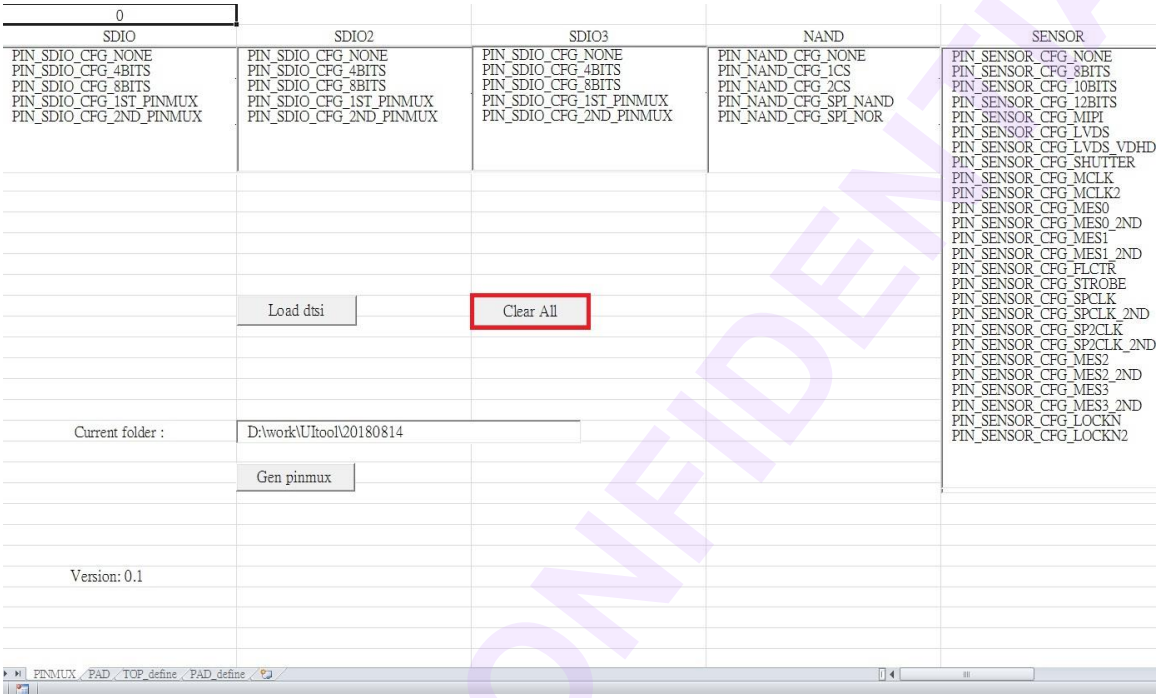


完成後,會彈出 update done 視窗. 並產出 dtsi 檔案



3.5 Clear setting

若是想要清除所有設定，可以按下 Clear All. 將目前所有設定值清除



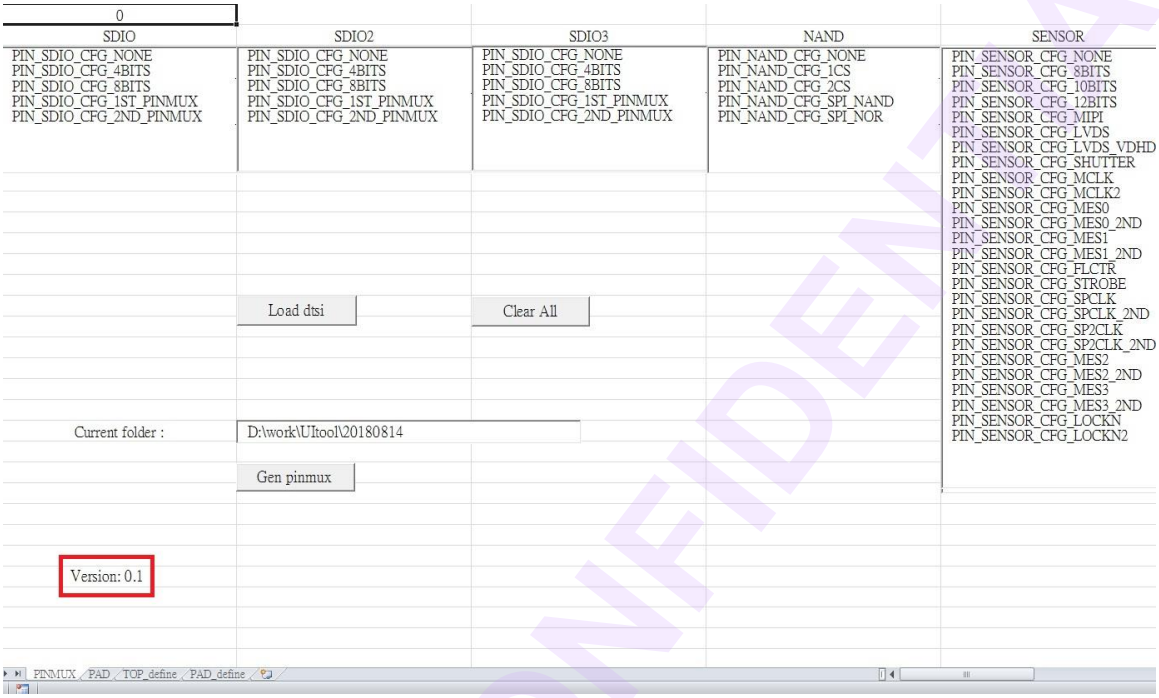
3.6 Update device tree

根據 3.3 說明, UI tool 產出 dtsi 檔案後 ， 可以透過下列方式更新

1. make cfg (生成 nvt-na51000-xxx.dtb)
2. make pack (更新到 dtb partition 即可)

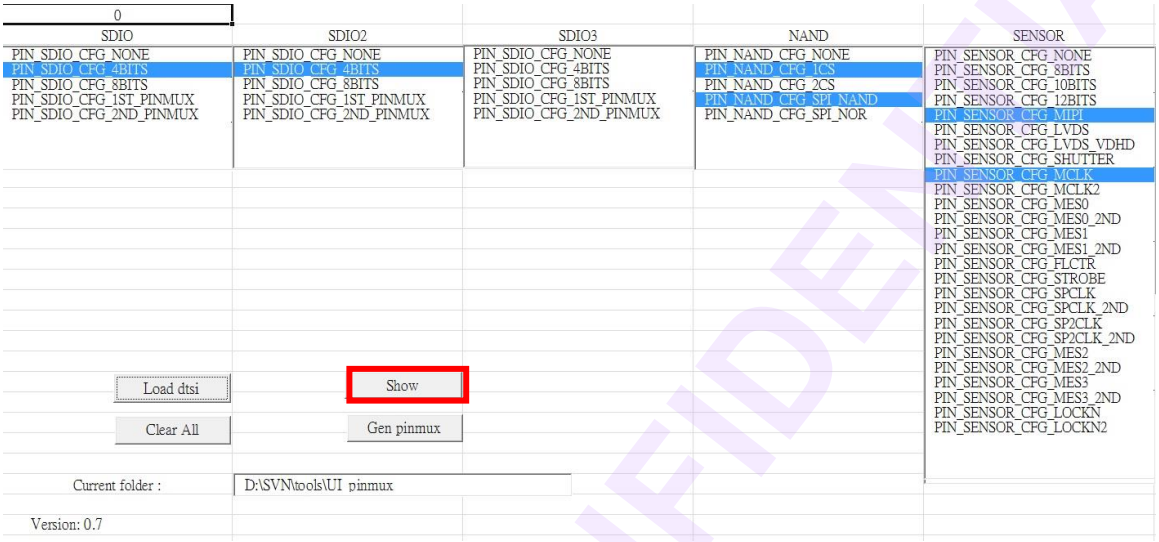
3.7 Version

在 Pinmux 頁面左下角顯示的是目前 UI tool 的版本號

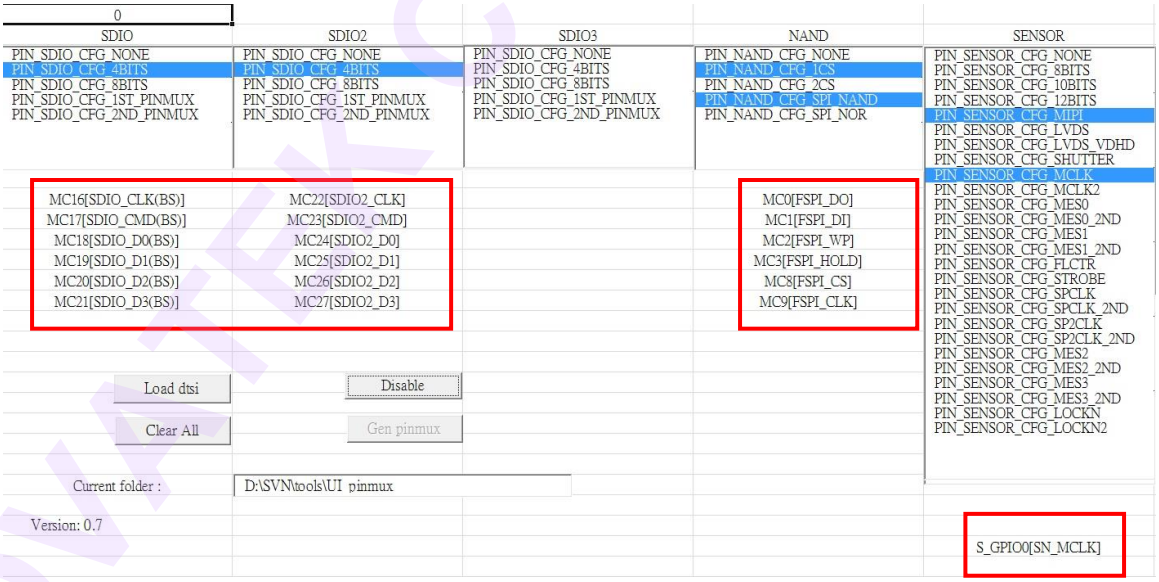


3.8 Auto pinmux conflict checking

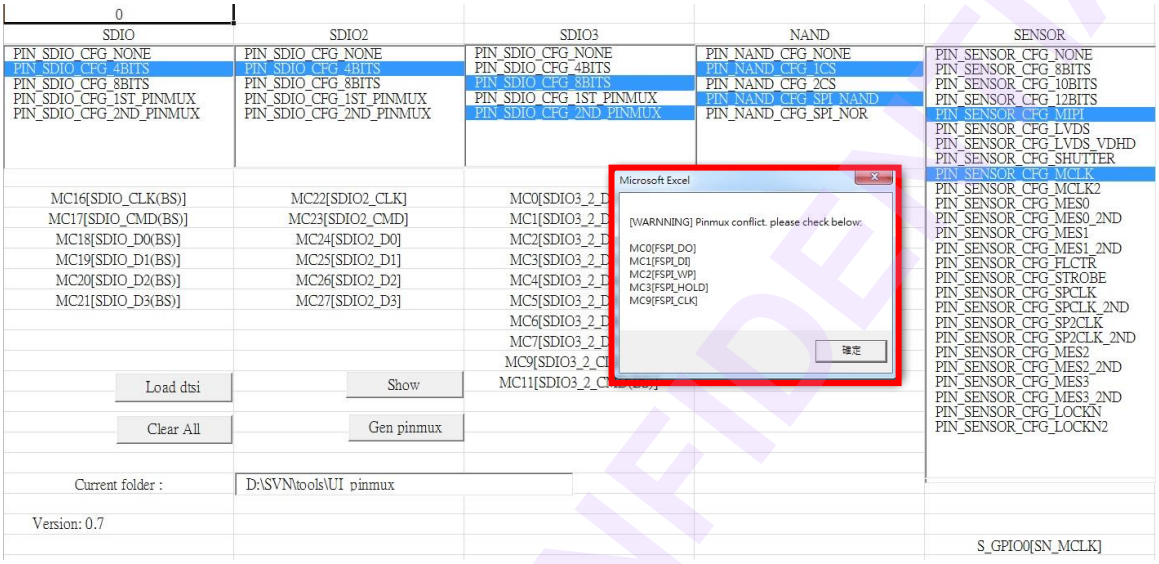
(1) 新增 “Show” buttom. 按下按鈕後，顯示目前選擇到的相關 pin name，如下圖(2)



(2) 按鈕變成 “Disable”，再點選一次會將相關的 pin name 隱藏



(3) 若是選擇的pinmux有互相衝突狀況，按下Gen pinmu 按鈕，將無法 Gen 出 dtsi 檔案. 而且會顯示相關衝突的 pin . 如下圖



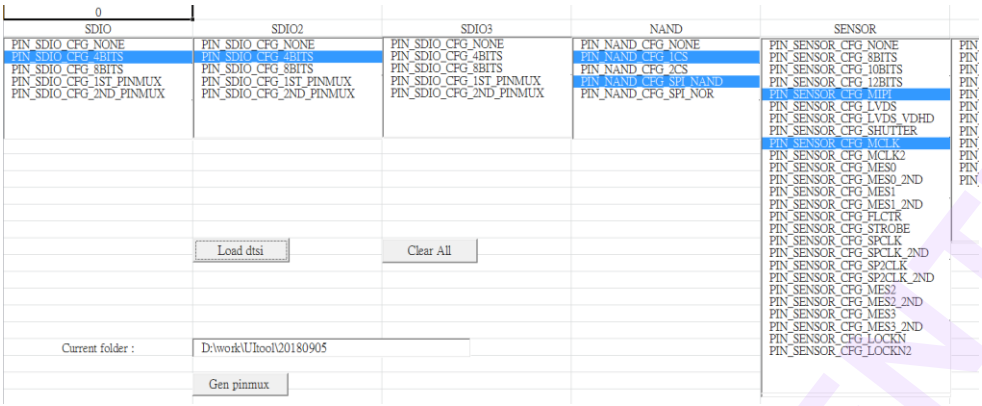
3.9 Example

以下範例, 示範操作如何將以下兩個功能加入 pinmux table

[1] 開啟網路 rmii 介面

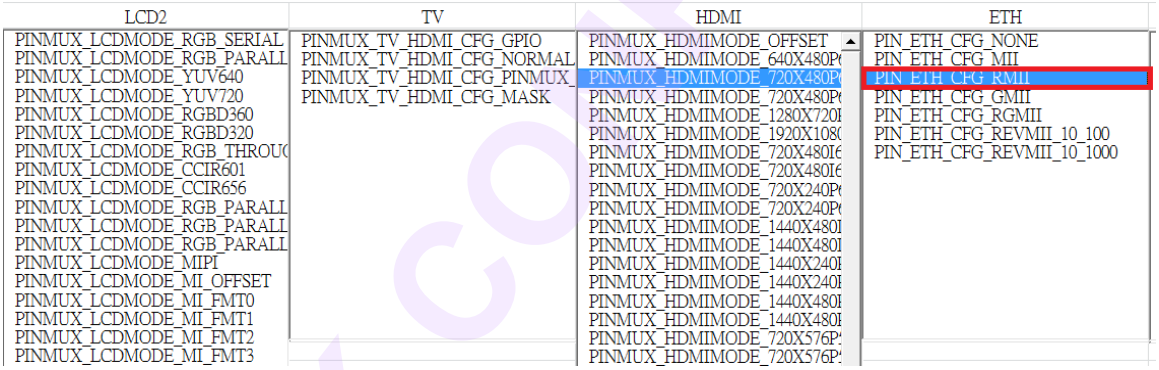
[2] 開啟 special clock

[Step1] 開啟 UI tool , 並載入 default 的 dtsi 檔案 (如 3.3 說明)
載入完畢後, Tool 會顯示目前 default dtsi 的相關設定內容.

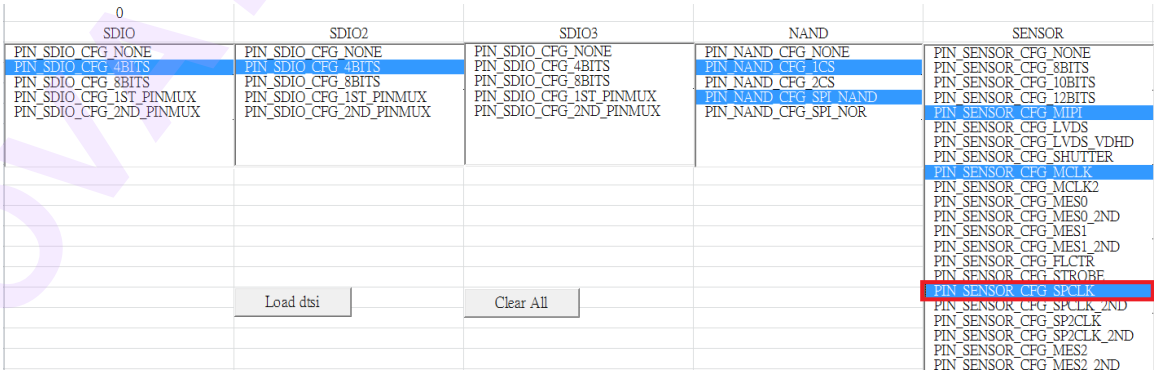


[Step2] 依照需求，直接點選需要加入的項目

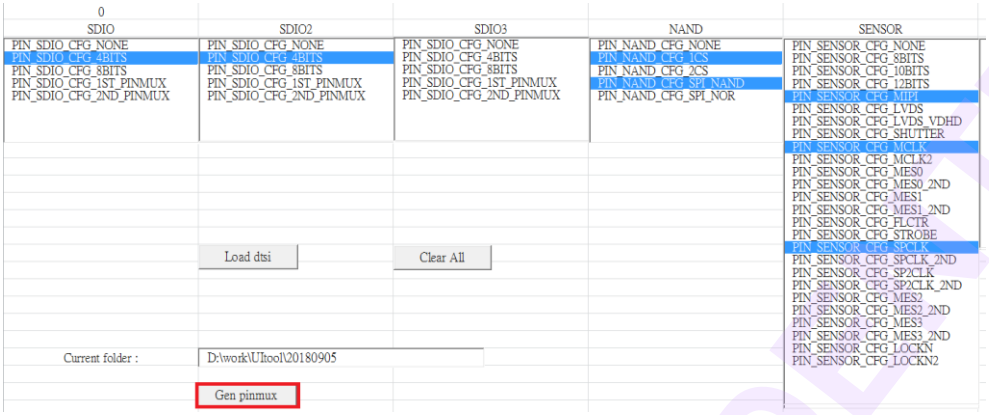
如下: 點選網路 RMII 介面



如下: 點選 special clock



[Step3] 點選 Gen pinmux 按鈕, 即會在該目錄產出 nvt-na51000-top.dtsi



dtsi 檔案內容如下

nvt-na51000-top.dtsi

```
1 &top {
2 sdio{pinmux = <0x1>;};
3 sdio2{pinmux = <0x1>;};
4 sdio3{pinmux = <0x0>;};
5 nand{pinmux = <0x5>;};
6 sensor{pinmux = <0x20220>;};
7 sensor2{pinmux = <0x0>;};
8 sensor3{pinmux = <0x0>;};
9 sensor4{pinmux = <0x0>;};
10 sensor5{pinmux = <0x0>;};
11 sensor6{pinmux = <0x0>;};
12 sensor7{pinmux = <0x0>;};
13 sensor8{pinmux = <0x0>;};
14 mipi_lvds{pinmux = <0xff01>;};
15 i2c{pinmux = <0x10011>;};
16 sif{pinmux = <0x8>;};
17 uart{pinmux = <0x5>;};
18 spi{pinmux = <0x0>;};
19 remote{pinmux = <0x0>;};
20 pwm{pinmux = <0x0>;};
21 audio{pinmux = <0x0>;};
22 lcd{pinmux = <0x10000000>;};
23 lcd2{pinmux = <0x0>;};
24 tv{pinmux = <0x0>;};
25 hdmi{pinmux = <0x42>;};
26 eth{pinmux = <0x2>;};
27 canbus{pinmux = <0x0>;};
28 };
29
```