

本文件是 ArduinoDue_SpiFlashProgramWithSdCard 專案的使用說明,這個專案的操作內容 是利用 Arduino Due 經由按鍵觸發後,開始讀取 SD 內指定檔名 All_Pic.bin 檔資料,並透過 SPI 介面將讀取的資料燒寫至 RA8876 或 RA8877 驅動板上的 SPI FLASH,其過程的狀態可以經由 Arduino IDE serial monitor 檢視,詳細說明如下:

硬件需求

1.Arduino Due 開發板

- 2.SD Card Adapter
- 3.Push Button

4.RA8876 or RA8877 驅動板

板上必須有預留 serial flash 燒路連接阜, TEST[2:1] PIN 設定切換開關.

5.SD card (maximum 4GB)









— RA8876 or RA8877 晶片

強制 SPI master 界面引腳保持在浮動狀態(floating state) (這個操作是給 serial flash 在線燒寫 使用)

--- Serial Flash ROM 給 DMA 功能使用

— SPI Flash 外部燒錄埠

1	SPI_CS1	
2	SPI_SO	
3	SPI_SI	
4	SPI_SCLK	
5	3.3V	
6	GND	

Note:

- 1. Arduino Due SPI interface, GND, 3.3V PIN 必須連接到這個連接阜, 如果 RA8876 or RA8877 驅動板有供電, Arduino Due 則不需要為 RA8876 or RA8877 驅動板提供 3.3V.
- 2. RA8876 or RA8877 提供兩個 SPI master interface,我們建議 CS0 連接到 Genitop Font ROM,CS1 連接到 serial flash.



當 RA8876 or RA8877 TEST[2:1] pin set to [01],SPI master interface pin 狀態會是懸空,如果 CS0 有連接至 Genitop Font ROM,則 CS0 必須有連接提升電阻到 3.3V,以避免 Arduino Due 無法正常燒寫 CS1 線路上的 serial flash.

軟件需求 Arduino IDE 1.5.7 <u>http://arduino.cc/en/Main/Software</u> RA8876 Image_Tool_1.0 <u>www.raio.com.tw</u>

操作流程

- 1. 根據上述連接好硬體線路.
- 2. 透過 PC 複製 file2sdcard 檔案夾內的 All_Pic.bin,wp1.bin 文件到 SD 卡. 完成後將 SD 卡插入已經連接到 Arduino Due 開發板的 SD 卡轉接板.

註:All_Pic.bin(28125KB)與 wp1.bin(938KB)是使用 RA8876Image_Tool_1.0 圖檔轉換工具 轉換好的 bin 檔文件.

3. 開啟 ArduinoDue_SpiFlashProgramWithSdCard.ino 專案,選擇 flash type,重新編譯後下載.



RA8876 SPI FLASH PROGRAMMER



註:

當 Serial flash 容量 > 128Mbit(16MByte) 選擇 #define FLASH_32BIT_ADDR

4. 開啟 Arduino Due serial monitor 檢視目前的狀態.



RA8876 SPI FLASH PROGRAMMER

💿 Spi	💿 SpiFlashProgramWithSdCard Arduino 1.5.7				
File E	idit Sketch Tools Help				
Spi	Auto Format Ctrl+T Archive Sketch FlashProgram Spl. Flash Program	<u>م</u>			
1	Hind Inde Seriel Meeiter Child Shift M	-			
2	#include Sena Monton Containterior	E			
3	finclude -				
4	#include				
5	rincluda Programmer ►				
6	Burn Bootloader				
7	boolean FlashErase(void);				
8	<pre>boolean ByteProgramBinToFlash24BitAddr(char * filename);</pre>				
9	<pre>boolean ByteProgramBinToFlash32BitAddr(char * filename);</pre>				
10	<pre>boolean PageProgramBinToFlash24BitAddr(char * filename);</pre>				
-11	<pre>boolean PageProgramBinToFlash32BitAddr(char * filename);</pre>				
12	<pre>boolean VerifyDataFlash24BitAddr(char * filename);</pre>				
13	boolean VerifyDataFlash32BitAddr(<mark>char</mark> * filename);				
14					
15	/*sd card scs*/				
16	<pre>const int SD_CARD_SCS = 4;</pre>				
17	17 /*spi flash scs*/				
18	const int XNSUS = 52;				
19	/*rabb/b XNSCS and XNFeset*/				
20	const int $PA8276$ XNDESET = 52;				
21	$\cos \varepsilon$ int knows_int_set = 51,	-			
	4	- F			
Done	uploading.				
Verify successful					
Set boot flash true					
CPU :	CPU reset.				
24	Arduino Due (Programmi	ing Port) on COM9			



RA8876 SPI FLASH PROGRAMMER



正常應該要看到如上圖顯示,如果不是,請再檢查線路.

5. 按下按鍵開始執行 serial flash 燒寫.Serial flash 燒寫過程包含,擦除,燒寫,資料驗證. 本文範例為燒寫 28125KByte 資料到 256Mbit(32MByte) serial flash,操作時間如下表.

Flash erase	60秒
Flash erase + Program 28125KByte	375 秒
Flash erase + Program 28125Kbyte +	848 秒
Verify	



正常操作的情況應該顯示如下圖:

💿 SpiFl	ashProgramWithSdCard	I Arduino 1.5.7			
File Edi	t Sketch Tools Help				
ØC			2		
SpiFla	ashProgramWithSdCard				
82	/*Verify		^		
83	<mark>if</mark> (Verify	Sead			
84	analog∛ri	Spi Flash Program			
85	else	SD card initialized			
86	analogWri	Click button to start flash program!			
87	}	Flash erase start			
88	else	Flash erase done	E		
89	{	File open ok!			
90	analog∛rit	Program 32bit address start			
91	}	Program done!			
92	#endif	File open ok!			
93		Verify start			
94	#ifdef FLASH	Verify done!			
95	SFP.setSeria				
96	<mark>if</mark> (PageProgr				
97	{				
98	analog∛ri				
99	/*Verify				
100	<mark>if</mark> (Verify				
101	analog₩ri				
102	else				
103	analog#r1				
104	}				
Done up	Done uploading.				
Verify	Verify successful				
Set boot flash true					
LFU TESET.					
53	53 Arduino Due (Programming Port) on CDM9				



如要節省時間,可以選擇不執行資料驗證.

File Edit Skatch Tools Help SpiFiashProgramWithSoCaros Ecu_Fiash_Program.cpp Ecu_Fiash_ProgramMithSoCaros Ecu_Fiash_Program. SpiFiashProgramWithSoCaros Ecu_Fiash_Program. SpiFiashProgramWithSoCaros Ecu_Fiash_Program. Socure 1 int SD card initialized SD const int SD card initialized SD click button to start flash program! File beach erase start. Files erase done SD pi_Files File open ck! Program done! Program done!	💿 SpiFlashProgram	nWithSdCard Arduino 1.5.7				
SpifishProgramWundCords SpifishProgramWundCords SpifishProgramWundCords SpifishProgramWundCords SpifishProgramWundCords SpifishProgramWundCords SpifishProgramWundCords SpifishProgramMundCords SpifishProg	File Edit Sketch Tools Help					
SpiFlashProgramWMD6Cards Dufflash_Programs 2 #define FLASH_32BIT_ADDR 2 ///define VERIFY_DATA /#Verify will spend a lot of time#/ 2 //LDD pin © COM9 (Arduino Due (Programming Port)) 3 const int 3 const int 3D const int SD card initialized 3/ / Yusha by SD card initialized 3/ / Yusia Click button to start flash program! 7 Flash erase start Plash erase start. Program 32bit address start Program 32bit address start Program 40ne! 4 4 6 7/FButt 4 6 7/FPIO 7/Batt 4 4 1 7/Batt 4 6 7/FPIO 7/Finite 7/Batt 7/Finite 7/Finite 7/Finite 7/Finite 7/Finite 7/Finite 7/Finite						
<pre>25 #define FLASE_32BIT_ADDR 26 27 ///define VERIFY_DATA /#Verify vill spend a lot of time*/ 29 /*LED pin COMMS (Andwine Due (Programming Port)) 20 const int 30 const int 31 /* variab 31 /* variab 41 fb batto to start flash program! 31 int batto 32 Spi_Flash Flash erase start 33 Flash erase done 34 Spi_Flash Flie open ok! 35 Program 32bit address start 36 void setur 37 /*Drit 39 /*LED 40 pinMod 41 analos 42 43 /*Pitt 44 pinMod 45 digita 49 **********************************</pre>	SpiFlashProgram	WithSdCard \$ Spi_Flash_Program.cpp Spi_Flash_Program.h				
<pre>////define VERIFY_DATA /*Verify will spend a lot of time*/ //LED pin COMMS (Arduino Due (Programming Port)) Const int SD card initialized Const int SD card initialized Const int Flash erase start Flash erase start Flash erase start Flash erase start Program 32bit address start Void setur Program 32bit address start Void setur Program done! //LED //L</pre>	25 #define I	LASH_32BIT_ADDR		*		
27 ///Adefine VERIFY_DATA /*Verify will spend a lot of time*/ 29 /*LED pin 20 COM8 (Arduino Due (Programming Port)) 21 /*push bit 31 /*push bit 32 Const int 33 // varial 21 rest 33 // varial 21 rest 34 int batto 25 Plash erase done 26 Spi_Flash 27 Program 32bit address start 37 Program 32bit address start 38 void setu 39 /*LED 41 analog 42 /*Butto 43 /*Butto 44 pinkod 45 /*Dimensioner 46 /*P10 47 pinkod 48 digita 49 ************************************	26					
22 /*LED p1 29 /*LED p1 20 const int 31 /*push b1 32 const int 32 const int 32 const int 33 // variab 4 int butto 4 land tot 5 Spi_Flash 7 Flash erase start. 36 Spi_Flash 7 Flog ran 32bit address start 37 Program 32bit address start 38 void setu 39 /*LED 41 analog 42 43 /*Butt 44 pinklod 44 analog 45 46 /*Pl0 47 pinklod 48 digita 49 ••••••••••••••••••••••••••••••••••	27 //#defin	: VERIFY_DATA /*Verify will spend a lot of time*/		=		
29 74ED pin Sunt 30 const int Spi Flash Program 32 const int Spi Flash Program 32 const int SD card initialized 33 // variab Click button to start flash program! 34 int butto Flash erase start Flash erase done Flash erase done 36 Spi_Flash Program 32bit address start 37 Program 32bit address start 38 void setu 39 /*LED 41 analog 42 Program done! 43 /*Butt 44 pinklod 45 /*Pit0 47 pinklod 48 digita 49 * * * * * * * * * * * * * * * * * * * * * * * <t< td=""><td>28</td><td>S COM9 (Arduino Due (Programming Port))</td><td></td><td></td></t<>	28	S COM9 (Arduino Due (Programming Port))				
30 Const Int 31 /*push bit 32 Const Int 32 Const Int SD card initialized 33 // variab 34 int butto 35 SpiFlash 36 SpiFlash 37 Plash erase start 38 void setu 39 /*LED 40 piNkod 41 analog 42 /*Putt 44 piNkod 45 /*Puto 46 /*P10 47 piNkod 48 digita 49 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *	29 /*LED pin		Send			
2 Const int SD card initialized 32 Const int SD card initialized 34 int batto Flash erase start. 35 Flash erase done 36 Spi_Flash 37 Program 32bit address start 38 void setu 39 /*LED 40 pinklod 41 analog 42 /*Smith 43 /*FButh 44 pinklod 45 /*PIO 46 /*PIO 47 pinklod 48 digita 49 *	31 /*nush h	Cri Elash Durana				
3 // varia 3 // varia 4 int butto Flash erase start 5 Flash erase done 3 Spi_Flash 7 Program 32bit address start 9 void setur 9 r/uED 40 pinkod 41 analog 42 43 /*Butt 44 pinkod 45 /*P10 47 pinkod 48 digits 49 ***********************************	32 const in:	Spiriasn riogram SD cord initialized				
<pre>34 int butto Flash erase start. 35 Flash erase done 36 Spi_Flash File open ok! 37 Program 32bit address start 38 void setur 39 /*LED 40 pinklod 41 analog 42 43 /*Butt 44 pinklod 45 46 /*P10 47 pinklod 48 digita 49 **********************************</pre>	33 // varial	Click button to start flash program!				
35 Flash erase done 36 Spi_Flash 37 Program 32bit address start 38 void setup 39 /*LED 40 pinMod 41 analog 42 43 /*Butt 44 pinMod 45 46 /*PIO 47 pinMod 48 digita 49 * 7 7 9	34 int butte	Plash erase start				
<pre>36 Spi_Flash 7 Program 32bit address start 38 void setur 39 /*LED 40 pinMod 41 analog 42 43 /*Butt 44 pinMod 45 46 /*P10 47 pinMod 48 digita 49 Verify success Set boot flash CPU rest.</pre>	35	Flash erase done				
37 Program 32bit address start 38 void setur 39 /*LED 40 pinkod 41 analog 42 43 /*Butt 44 pinkod 45 46 /*PIO 47 pinkod 48 digita 49 Verify success Set boot flasi CPU rest. Plane uploading Plane upl	36 Spi_Flas	File open ok!				
38 void setu 39 /*LED 40 pinkod 41 analog 42 43 44 pinkod 45 - 46 /*PIO 47 pinkod 48 digita 49 Verify success Set boot flash CPU reset. IPI Automnil	37	Program 32bit address start				
39 /*LED 40 pinMod 41 analog 42 43 43 /*Butt 44 pinMod 45 - 46 /*P10 47 pinMod 48 digita 49 - * * Pone ugloading * Verify success Set boot flash CPU reset. * * *	38 void setu	Program done!				
40 pinNod 41 analog 42 43 /*Butt 44 pinNod 45 46 /*PIO 47 pinNod 48 digita 49 • • • • • • • • • • • • •	39 /*LED					
41 analog 42 43 /*Butt 44 pinNod 45 46 /*PIO 47 pinNod 48 digita 49 Verify success Set boot flash CPU reset.	40 pinMoo					
42 43 /*Butt 44 pinNod 45 46 /*PIO 47 pinNod 48 digita 49 Verify success Set boot flash CPU reset.	41 analog					
43 / "Butu 44 pinNod 45 46 /*PIO 47 pinNod 48 digita 49 Verify success Set boot flash CPU reset. □ Automil □ No line ending = 9600 band =	42 42					
45 46 /*PIO 47 pinNod 48 digita 49 Verify success Set boot flash CPU reset.	45 /*But					
46 /*PIO 47 pinNod 48 digita 49 • • • • • • • • • • • • •	44 p11140					
47 pinkod 48 digita 49 Verify success Set boot flash CPU reset.	46 /*PIO					
48 digita 49 Cone uploading Verify success Set boot flash CPU reset.	47 pinMos					
49 Cone uploading Verify success Set boot flash CPU reset.	48 digit:					
Cone uploading Verify success Set boot flash CPU reset.	49			-		
Done uploading Verify success Set boot flash CPU reset.	4			Þ		
Verify success Set boot flash CPU reset.	Done uploading.					
Set boot flash CPU reset. Autosmil No line ending - 9600 hand -	Verify succes:			•		
UPU reset. No line ending - 9600 hand -	Set boot flas					
	CPU reset.	Iloraedu A 🕥	[No line ending 👻] [9600 baud 👻]			
23 Arduino Due (Programming Port) on COM9	23		Arduino Due (Progr.	amming Port) on COM9		

6.本文件的範例在燒寫完成之後,可以搭配 RA8876_Lite_DMA.ino 顯示圖片.