

User Manual DA16200 SPI SFlash Downloader UM-WI-012

Abstract

This User Manual explains how to setup and use the DA16200 SPI Sflash Downloader.

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DA16200 SPI SFlash Downloader

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Terms and Definitions

DPM	Dynamic Power Management
GUI	Graphical User Interface
SPI	Serial Peripheral Interface
SFDP	Serial Flash Discoverable Parameter
UART	Universal Asynchronous Receiver Transmitter

References

- [1] DA16200, Datasheet, Dialog Semiconductor
- [2] DA16200, SDK Programmer Guide, Dialog Semiconductor
- [3] DA16200, EVK User Manual, Dialog Semiconductor
- [4] DA16200, AT Command User Manual, Dialog Semiconductor



1 Preparation

The Multi-Downloader GUI can download the images to SFLASH with the use of function SPI_SLAVE. The Multi-Downloader GUI needs to use the FT2232H module for the USB to SPI interface.

1.1 Images to Download

There are three types of images needed to operate DA16200 in a normal way:

- BOOT: This image has the important SFlash type information known as SFDP
- RTOS: This image contains Wi-Fi libraries and system/user applications
- SLIB: This image includes system libraries: RF drivers and libraries for DPM operation

1.2 PC Preparation

The DA16200 EVK supports the use of an USB port. The user just has to connect with a micro-USB cable and then two COM ports will be detected automatically.

• Please install the FT2232 Driver for windows. In most cases, the driver will be installed automatically. If not installed automatically, use the following URL to download and install the driver: http://www.ftdichip.com/Drivers/CDM/CDM21224_Setup.zip.

1.3 HW Preparation

The DA16200 SoC has two SPI Slave sets with GPIO pin mux setting: GPIOA0 \sim GPIOA3 and GPIOA6 \sim GPIOA9. The DA16200 EVK supports SPI download if GPIOA0 \sim GPIOA3 are used, because the DA16200 EVK already uses GPIOA6 \sim GPIOA9 for other functions. But if you like to use GPIOA6 \sim GPIOA9 on your own module and your own USB driver chipset board, then see Table 1 for the SPI slave mux.

SPI Slave	GPIO set #1	GPIO set #2
SPI_MISO	GPIOA0	GPIOA8
SPI_MOSI	GPIOA1	GPIOA9
SPI_CS	GPI0A2	GPIOA6
SPI_CLK	GPIOA3	GPIOA7

Table 1: DA16200 SPI Slave GPIO Mux

1.3.1 Hardware Modification on DA16200 EVK

On the DA16200 EVK you need to wire and install a resistor for the SPI interface. Do the following steps:

- 1. Make a jumper between 12pin of CON7 and Pin #2 of R33. See Figure 1 and Table 2.
- 2. Make a jumper between 11pin of CON7 and Pin #1 of R35. See Figure 1 and Table 2.
- 3. Install a 0 Ohm resistor at R36 and R38. See Figure 1.

Table 2: Pin Configuration on DA16200 EVK

SPI Slave	DA16200 Pin	Con17 Pin	FT2232H-56Q
SPI_MISO	GPIOA0	#11	#34 TDO/DI
SPI_MOSI	GPIOA1	#14	#33 TDI/DO
SPI_CS	GPI0A2	#10	#35 TMS/CS
SPI_CLK	GPIOA3	#12	#32 TCK/SK



Figure 1: DA16200 EVK, Top

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4. Install a 0 Ohm resistor at R6, R7, R8 and R9. See Figure 2.



Figure 2: DA16200 EVK, Bottom



2 Run the Multi-Downloader GUI

This GUI consist of five files:

- DA16xxxMultiLoader.exe this is the Graphical User Interface
- Dior_main_libndk.bin the default setting to use is GPIOA0~3
- libMPSSE.dll
- libMPSSE.lib
- wifi_usb2spi_flash_dn.exe this is a CLI program to check the SPI connection

To select the pin configuration of the SPI slave interface, there are two files names, of which part of the name is Dior_main_libndk and each of these files support a specific GPIO pin number. The user is asked to use the correct file for GPIO pins.

- Dior_main_libndk_MUX_AB.bin
 Remove existing Dior_main_libndk.bin
 Please modify file name to Dior_main_libndk.bin if GPIOA0~3 is used for SPI download
- Dior_main_libndk_MUX_DE.bin Remove existing Dior_main_libndk.bin Please modify file name to Dior_main_libndk.bin if GPIOA6~9 is used for SPI download

2.1 SPI Connect Check

2.1.1 Check MROM State and Set GPIO MUX According to Hardware Configuration

2.1.1.1 Check MROM State Using Serial Terminal Utility

This procedure is not needed with an empty SFlash.

To be able to load an image, at [/DA16200] prompt, type reset to go to the [MROM] prompt.

2.1.1.2 Set GPIO MUX According to Hardware

If GPIOA0~GPIOA3 is used, change the Pin mux setting as follows:

```
[MROM] lrd 50001208
[0x50001208] : 0x3F611389
```

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[MROM] lwr 50001208 3f699311 [MROM] lrd 50001208 [0x50001208] : 0x3F699311

To use GPIOA6~GPIOA9, change the Pin mux setting as follows:

```
[MROM] lrd 50001208
[0x50001208] : 0x3F688689
[MROM] lwr 50001208 3f611689
[MROM] lrd 50001208
[0x50001208] : 0x3F611689
```

2.1.2 SPI Connection Check

Execute wifi_usb2spi_flash_dn.exe file to check the SPI connection.

Number	Number of available SPI channels = 1 // found SPI channel		
Inform	Information on channel number 0:		
Flags=0x2			
Type=0x6			
	ID=0x403	6010	
	LocId=0x	11432	
	SerialNu	mber=B	
	Description=Dual RS232-HS B		
	ftHandle=0x0		
handle	handle=0x597858 status=0x0		
	******	*********************************	****
	*	DA16XXXX WIFI	*
	*	Jul 3 2019 18:11:22	*
	*		*
	******	********************************	****
Task N	Task MONI Start		
[WIFI]	[WIFI] Ird 50080200		
[0x500	[0x50080200] : 0xFC905001 // DA16200 Chip ID, If FC905001 read well, communication is ok		

If there is no available SPI channel information, then check the installation of the FT2232H driver on your PC. And then type "lrd 50080200", which means that the register value of 0x50080200 address is read per 4 bytes. It is possible to check value 0xFC905001, which is the chip ID when the connection is normal. Please check the GPIO mux settings when the chip ID cannot be checked.

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2.2 Execute Multi-Downloader

The CLI tool (wifi_usb2spi_flash_dn.exe) must be exited before the Multi-Downloader GUI can be started. To open the Multi-Downloader GUI, execute file DA16xxxMultiLoader.exe. See Figure 3.

🔏 DA16xxxMultiLoade	er 💧	
Terminals	SPI Multi Downloader	
1	Terminal #1	
Setup	TermInfo Port usb2spi 0	
Link		
Download		

Figure 3: Multi Downloader

The Terminals shows the number of USBs connected to the SPI interface.

The Multi-Downloader GUI can control multi-FT2232H modules at once.

2.2.1 Setup Button and Assign the Files to Download

Click the Setup button (Figure 3) to show the setup dialog. With the Setup button the user can assign which files to download. See Figure 4.

Setup	×		
SFLASH_#0 image			
BOOT	\16200_BOOT-GEN01-01-0-000000_IS25LQ032B.in		
RTOS	DA16xxx_RTOS_icv.img		
RaLIB	DA16xxx_slib_tim_icv.img		
PTIM			
NVRAM			
MAP SFLASH_#1 ir	● 2MB ○ 4MB mage		
RTOS	DA16200_RTOS1.img		
RaLIB	DA16200_SLIB1.img		
PTIM			
NVRAM			
	OK Cancel		

Figure 4: Setup Windows

Please press a blank button to assign the files.

BOOT: Select the Bootloader image that starts with DA16200_BOOT

RTOS: Select the Main RTOS image that starts with DA16200_RTOS

RaLIB: Select the System Library image that starts with DA16200_SLIB

MAP: Select Sflash memory size

After the files are assigned, click the **OK** button for the changes to take effect.





2.2.2 Link Button

To setup a link between the GUI and the DA16200 via SPI, click the **Link** button. You can find the status changes as shown in Figure 5.

A DA16xxxMultiLoade	r 🔒 haged 👘 nig	
Terminals	SPI Multi Downloader	
1	Terminal #1	
Setup	TermInfo Port usb2spi 0 v	
Unlink	READY	
Download		

Figure 5: Ready Status

And in the DA16200 console the printed information is as shown below. If the READY status cannot be reached, then check if the SPI connection is correct.

```
[MROM] init mem profiler step1 is skipped due to SRAM overflow !!
      ******
      *
            FCI FC9K Project
      *
        Cortex-M4 (XTAL 40000 KHz, SYS 120000 KHz)
      *
        Console Baud Rate : 0 (0000000)
        OS : ThreadX 5.7 , IAR
      *
      *
        HW Version Num. : fc905010
      *
        Build Option : LibNDK (SRAM)
      * RoSDK Date & Time : Mar 13 2019 13:05:45
      *
        SVN Revision : 6804
        SVN Repository : ^/FC9050/trunk/2.%20Software/FC9050 SLR/trunk
      *
      * RaLIB Version : FC9K-20190705:145540:SVN7140
      * Build Date & Time : Jul 2 2019 17:38:29
      *
                 http://www.fci.co.kr
      CODE/RO : 0008B800 , size 00037800
             RWDATA : 000C3000 , size 00006000
             FREE (POOL): 000C9000 , size 00037000
gpio num: 6
BUF Address = 0xcaa98
AT Address = 0xcbaa0
```

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2.2.3 Download Button

Click the **Download** button to start the download of the images.



Figure 6: Images Download

The user can check the progress in the Multi-Downloader GUI. And the DA16200 log prints the download status as shown below.

gpio num: 6		
BUF Address = 0xcaa98		
AT Address = 0xcbaa0		
addr=0xf81000, dst0x0, length=28784 issfdpinclude=1		
addr=0xf81000, dst0xa000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x12000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x1a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x22000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x2a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x32000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x3a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x42000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x4a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x52000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x5a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x62000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x6a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x72000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x7a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x82000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x8a000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x92000, length=32768 issfdpinclude=0		
addr=0xf81000, dst0x9a000, length=32768 issfdpinclude=0		

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addr=0xf81000, dst0x	a2000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	aa000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	b2000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	22768 kba000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	c2000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	ca000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	d2000, length=32768	issfdpinclude=0	
addr=0xf81000, dst0x	da000, length=18704	issfdpinclude=0	
addr=0xf81000, dst0x	f1000, length=29344	issfdpinclude=0	
RaLIB is relocated t	O RETMEM (20f815c0,	566, 7306952, 7306952)	
P.TIM is relocated to RETMEM (20f835c0, 2)			

After the download is done correctly, the message **GOOD** is shown. See Figure 7.



Figure 7: Download Done

2.2.4 Unlink Button

Click the **Unlink** button and the DA16200 will reset and boot with the new image. After the Unlink operation is done, the SPI connection depends on the new boot image.



3 Revision History

Revision	Date	Description
1.4	26-Nov-2019	Finalized for publication
1.3	19-Nov-2019	Editorial review
1.2	02-Aug-2019	Add selection of Sflash size in setup windows in page 10
1.1	24-Jul-2019	Add H/W modification on DA16200 EVK for choosing GPIOs Add description on Dior_main_libndk for GPIOs
1.0	05-Jul-2019	Preliminary DRAFT release



Status Definitions

Status	Definition
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Contacting Dialog Semiconductor

United Kingdom (Headquarters) Dialog Semiconductor (UK) LTD Phone: +44 1793 757700

Germany

Dialog Semiconductor GmbH Phone: +49 7021 805-0

The Netherlands

Dialog Semiconductor B.V. Phone: +31 73 640 8822

Email: enquiry@diasemi.com

North America

Dialog Semiconductor Inc. Phone: +1 408 845 8500

Japan

Dialog Semiconductor K. K. Phone: +81 3 5769 5100 Taiwan

Dialog Semiconductor Taiwan Phone: +886 281 786 222 Web site:

www.dialog-semiconductor.com

Hong Kong

Dialog Semiconductor Hong Kong Phone: +852 2607 4271

Korea

Dialog Semiconductor Korea Phone: +82 2 3469 8200

China (Shenzhen)

Dialog Semiconductor China Phone: +86 755 2981 3669

China (Shanghai) Dialog Semiconductor China Phone: +86 21 5424 9058

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