User Manual

DA16200 SPI Sflash Downloader

UM-WI-012

Abstract

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

Contents

Figures

Tables

1 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

2 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

3   Prepare

The SPI Sflash downloader tool serves to download the images to SFLASH via an SPI slave interface. For the USB to SPI interface, the FT2232H module needs to be used. There are 3 prepare steps needed to use the SPI Sflash downloader tool.

● The first is to set pin configuration for the SPI slave interface. See section 3.3 and 3.4

● The second is to connect the SPI slave interface with the FT2232H module. See chapter 4

● The third is to download the DA16200 images with the SPI Sflash downloader tool. See section 5

3.1   DA16200 Images

There are three types of images needed to operate the DA16200:

● Bootloader: This image has the important Serial Flash type information

● RTOS: This image contains Wi-Fi libraries and system/user applications

● SLIB: This image includes system libraries such as RF drivers and libraries for DPM operation

3.2   Setup PC Environment

The DA16200 EVK supports the use of a USB port. Use a micro-USB cable to connect the test PC with the EVK. 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.

3.3   Setup Pin Configuration for SPI Slave

The DA16200 SoC has two SPI Slave ports with a GPIO pin mux setting, which are GPIOA0 ~ GPIOA3 and GPIOA6 ~ GPIOA9. The recommendation is to use GPIOA0 ~ GPIOA3, because the DA16200 EVK uses GPIOA6 ~ GPIOA9 for other functions.

But if there is need to use GPIOA6 ~ GPIOA9 on the EVK board and the USB driver chipset board, see Table 1 for the SPI slave pin configuration.

Table 1: Pin Multiplexing for SPI Slave

SPI Slave	GPIO set #1 SW3	GPIO set #2 SW1
SPI_MISO	GPIOA0	GPIOA8
SPI_MOSI	GPIOA1	GPIOA9
SPI_CS	GPI0A2	GPIOA6
SPI_CLK	GPIOA3	GPIOA7

Figure 1: DA16200 EVK Board Version 7

To use `GPIOA0 ~ GPIOA3` for the SPI Slave interface, all switches of SW3 on the EVK board should be changed to the **On** state. See Table 2 and Figure 2.

Table 2: Pin Configuration for SPI Slave

SPI Slave	DA16200 Pin	Switch 3	FT2232H-56Q
SPI_MISO	GPIOA0	On	#34 TDO/DI
SPI_MOSI	GPIOA1	On	#33 TDI/DO
SPI_CS	GPI0A2	On	#35 TMS/CS
SPI_CLK	GPIOA3	On	#32 TCK/SK

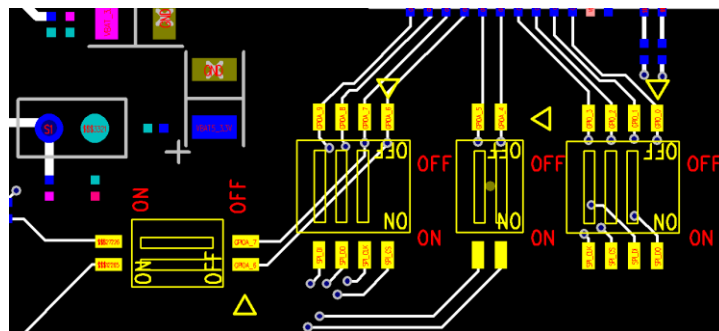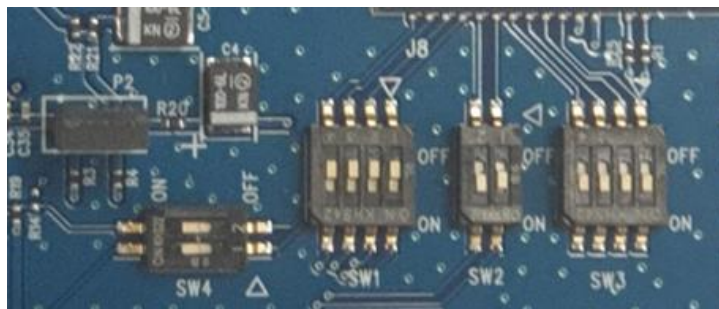**Figure 2: Setup Switch for SPI Slave**
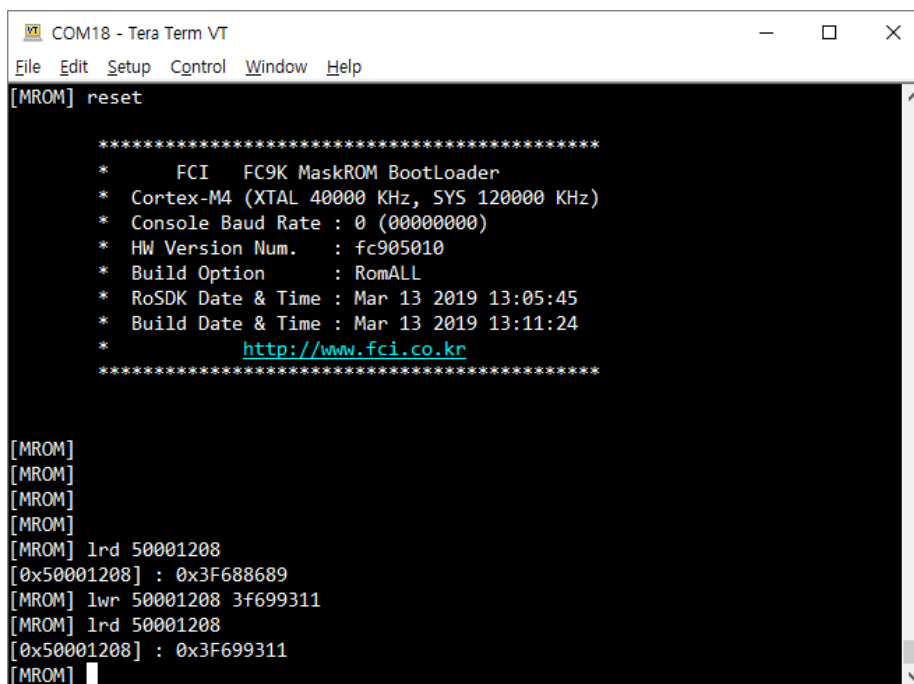
3.4   Setup Register Value of SPI Slave

For the SPI slave pin configuration, the register value needs to be changed to set the switch on the board.

1. Type `reset` command to change the `[/DA16200]` prompt to `[MROM]` prompt. See Figure 3.
2. Type command `lrd 50001208` to read the current pin configuration.
3. Use command `lwr 50001208 3f699311` to write the pin configuration for the SPI slave (`GPIOA0 ~ GPIOA3`).
4. Type command `lrd 50001208` to read the changed Pin configuration.

Command `lrd` means 'long read data'. Command `lwr` means 'long write data' and these commands read and write per 4 bytes. The recommendation is to close the serial window after the register value is set.

Figure 3: Setup Register Value for SPI Slave

Table 3: Register value for SPI slave

Address: [0x50001208]	Default Value: 0x3F688689
GPIOA0 ~ GPIOA3	0x3F699311
GPIOA6 ~ GPIOA9	0x3F611689

4   CLI program for SPI Interface

The CLI program (`wifi_usb2spi_flash_dn.exe`) checks the SPI interface connection between the DA16200 EVK and the FT2232H module. Figure 4 shows a list of files for the SPI Sflash downloader.
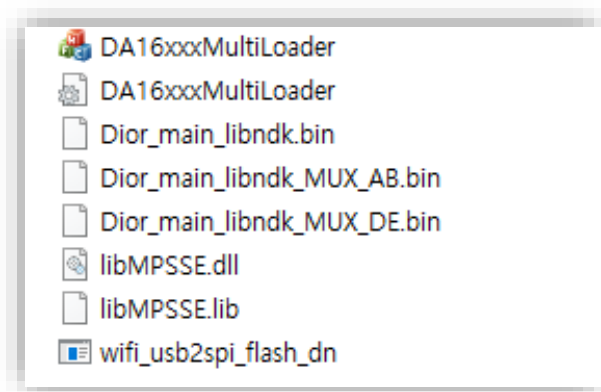

Figure 4: Configuration for GUI

4.1   Setup Pin Mux Binary File

The binary file for wifi_usb2spi_flash_dn.exe is Dior_main_libndk.bin. For the correct SPI slave setup, the binary file name `Dior_main_libndk_MUX_AB.bin` or `Dior_main_libndk_MUX_DE.bin` may need to be changed depending on pin configuration of SPI slave interface.

For example, to change the binary file：

Rename `Dior_main_libndk_MUX_AB.bin` to `Dior_main_libndk.bin`.

The default binary file (`Dior_main_libndk.bin`) is set to use `GPIOA0 ~ GPIOA3`, so in that case there is no need to change the binary file name. See Table 4.

Table 4: Pin Mux Binary Files

Default Binary File	`Dior_main_libndk.bin`
GPIOA0 ~ GPIOA3	`Dior_main_libndk_MUX_AB.bin`
GPIOA6 ~ GPIOA9	`Dior_main_libndk_MUX_DE.bin`

4.2   Check SPI Connection

To check if the SPI connection is successful or failed, read the DA16200 chip ID address of `50080200`. See Figure 5. It is a success if the chip ID is `0XFC905001` in `CLI` program. But if the SPI connect failed, then check the installation of the FT2232H driver on the test PC.

DA16200 SPI Sflash Downloader

Figure 5: Read DA16200 Chip ID

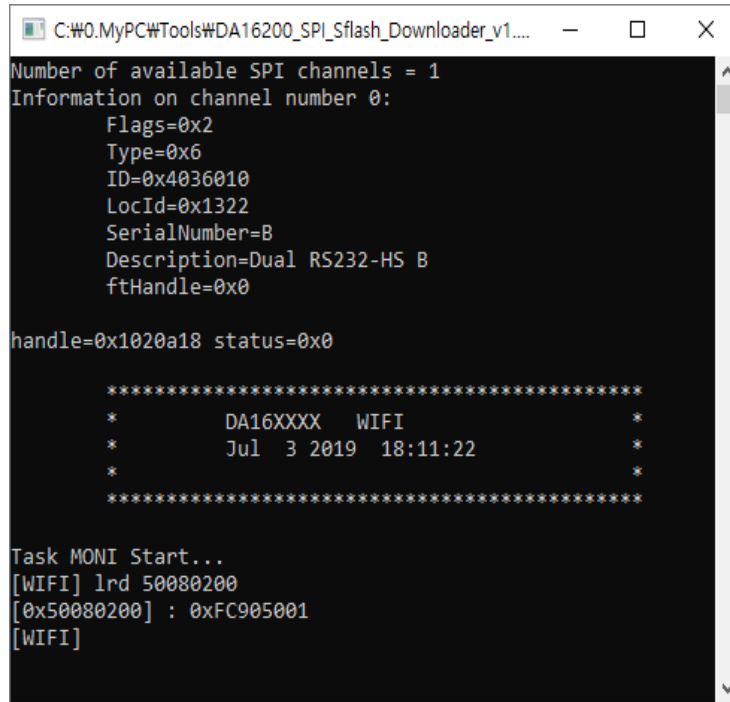## 5   Run SPI Sflash Downloader

Figure 6 shows the SPI Sflash downloader tool (DA16xxxMultiLoader.exe). The Terminals show the number of USBs connected to the SPI interface. The Multi-Downloader GUI can directly control the FT2232H modules. After the CLI program (wifi_usb2spi_flash_dn.exe) is closed, start the SPI Sflash downloader tool to avoid any collisions.
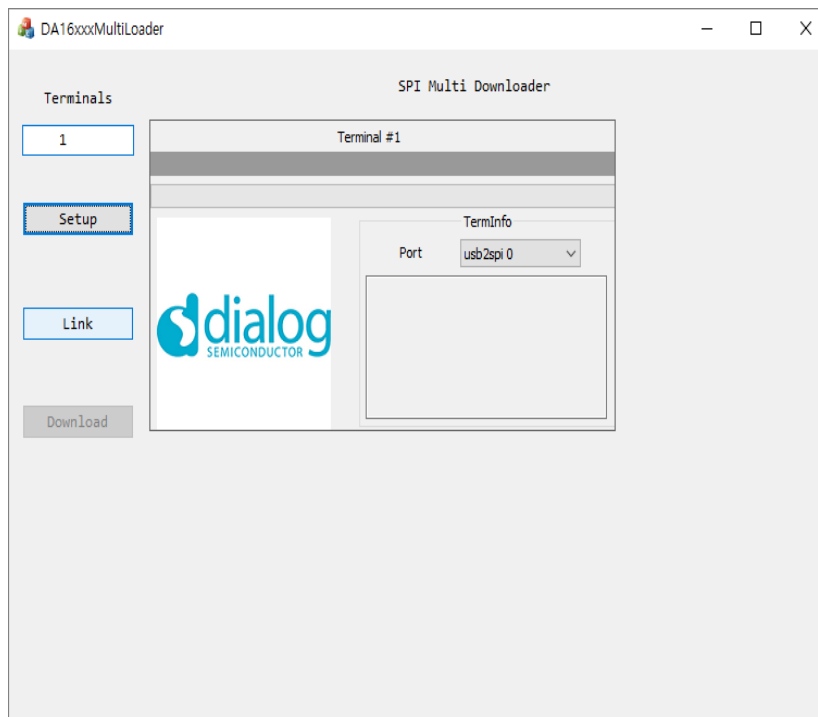
Figure 6: SPI Sflash Downloader

5.1 Setup and Select Images

1. Click the Setup button to setup and select images.
   - Figure 7 shows the Setup window to select image files to download
2. Click on a blank button to select the files.
   - BOOT: Select the Bootloader image that starts with DA16200_BOOT
   - RTOS: Select the Main RTOS image that starts with DA16200_RTOS
   - SLIB: Select the System Library image that starts with DA16200_SLIB
   - MAP: Select serial flash memory size
3. After the file is selected, click **OK** to apply the changes. See Figure 7.

Figure 7: Setup and Select Image

5.2 Link to PC

1. Click the **Link** button to setup a link between the test PC and the DA16200 via the SPI interface. The status changes as shown in Figure 8.
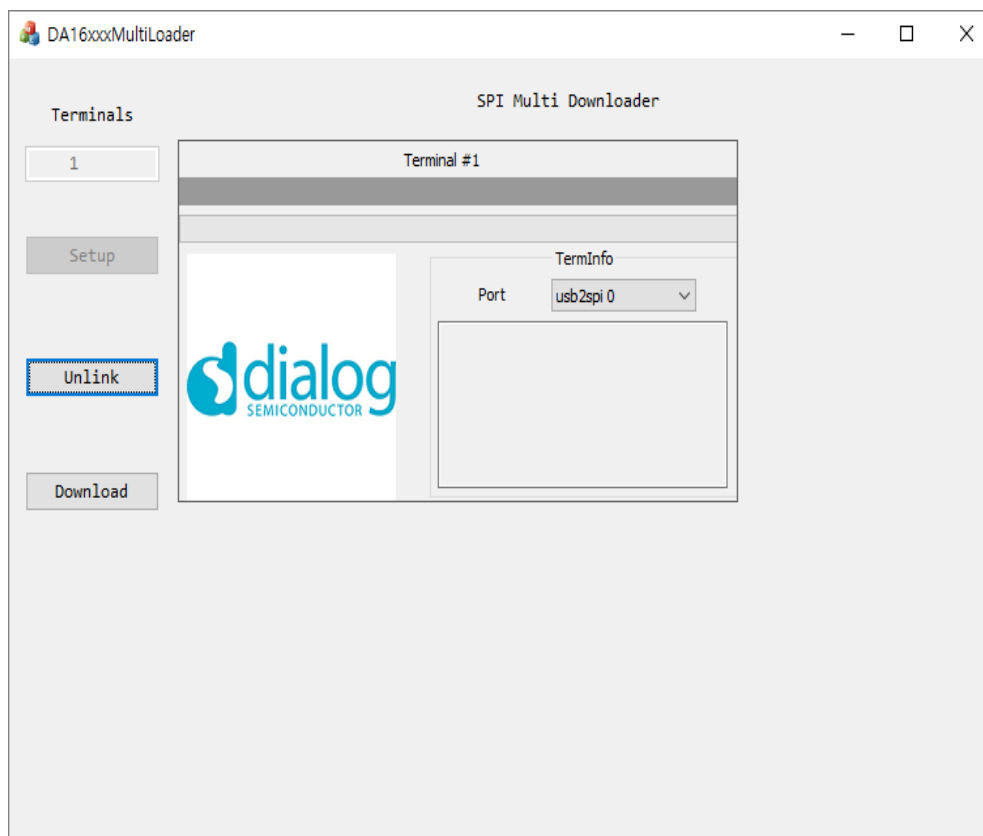
Figure 8: Link to PC

5.3 Download Images

1. Click the **Download** button to start the download of DA16200 images. When the status progress bar goes all the way, all downloads are complete.

DA16200 SPI Sflash Downloader
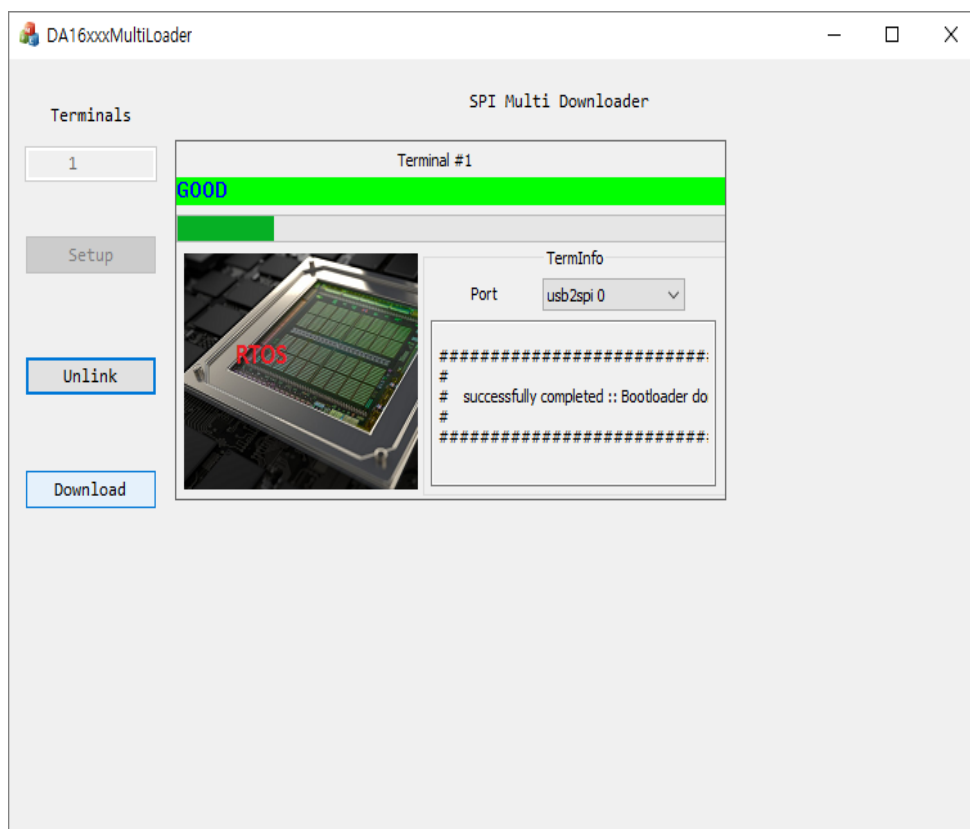
Figure 9: Download Images

5.4 Unlink from PC

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

DA16200 SPI Sflash Downloader

Revision History

Revision	Date	Description
1.5	26-Jun-2020	Update contents and figures for EVK board v7.0 in section 3.3
1.4	26-Nov-2019	Finalized for publication
1.3	19-Nov-2019	Editorial review
1.2	02-Aug-2019	Update the selection of Sflash size in section 5.1
1.1	24-Jul-2019	Update pin configuration in section 3.3 Update CLI program for SPI interface in chapter 4
1.0	05-Jul-2019	Preliminary draft release

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Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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