

## 1. INTRODUCTION

This describes how to use the Winbond Flash Memory Sample Shield. The mbed enabled MCU board, which has an Arduino UNO R3 compatible terminal, is used in this description.

## 2. GENERAL DESCRIPTION

The Winbond Flash Memory Sample Shield from Winbond Electronics is an Arduino-derived shield that will interface with any Arduino-derived microcontroller host board with a standardized Arduino UNO R3 pinout.

The Winbond Flash Memory Sample Shield is mounted with the flash memory listed below.

Part Number	Density	Product Type	Operation Temperature
W25Q80NESNIG	8Mb	1.2V Serial NOR Flash Memory	Industrial (-40'C to +85'C)
W25N01GVZEIG	1Gb	3.3V Serial NAND Flash Memory	Industrial (-40'C to +85'C)
W25M161AVEIT	16Mb + 1Gb	SpiStack 3.3V Serial NOR + Serial NAND Flash Memory	Industrial (-40'C to +85'C)
W74M12FVZPIQ	128Mb	3.3V Serial NOR Flash Memory + Authentication	Industrial (-40'C to +85'C)

# 3. OPERATION CONFIRMED HOST BOARDS

Host Board Supplier	Host Board	MCU
STMicroelectronics	NUCLEO-F411RE	STM32F411

## 4. HOW TO USE WITH NUCLEO-F411RE

Besides the host board and the Winbond Flash Memory Sample Shield, you will need:<sup>1</sup>

- Computer with Internet access and USB port.
- USB cable with standard A to mini B connectors.
- Sample program source code.

<sup>&</sup>lt;sup>1</sup> Please install "Arm Mbed Windows serial port driver" as necessary. <u>https://os.mbed.com/handbook/Windows-serial-configuration</u>



Step.1 Solder the terminal to Winbond Flash Memory Sample Shield

Solder the terminals for CN1~4, JP1~7 and J1~4 as shown in the red frame in the picture below. CN1~4 should be toward below of the board. JP1~7 and J1~4 should be toward above of the board.





Step.2 Place the jumper pin and switch its positions

The Winbond Flash Memory Sample Shield is mounted with 4 kinds of Flash Memory. It is necessary to switch the position of the jumper pin for JP1~7 and J1~4 according to the Flash Memory you want to use. When switching the position of the jumper pin, be sure to do with the Winbond Flash Memory Sample Shield removed from the host board. The position of the jumper pins other than the following 4 types is prohibited. Flash Memory may be damaged.

1. Jumper pin positions for 1.2V Serial NOR Flash Memory



- Place a jumper pin to JP1 for chip select
- Place a jumper pin to JP5 for 1.2V Vcc
- Place jumper pins at positions 1 and 3 of J1~4

Sample program source code: "SPI\_NOR.zip"



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2. Jumper pin positions for 3.3V Serial NAND Flash Memory



- Place a jumper pin to JP2 for chip select
- Place a jumper pin to JP7 for 3.3V Vcc
- Place jumper pins at positions 2 and 4 of J1~4

Sample program source code: "SPI\_NAND.zip"

3. Jumper pin positions for SpiStack 3.3V 16Mb Serial NOR + 1Gb Serial NAND Flash Memory



- Place a jumper pin to JP3 for chip select
- Place a jumper pin to JP7 for 3.3V Vcc
- Place jumper pins at positions 3 and 5 of J1~4

Sample program source code: "SPISTACK.zip"



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4. Jumper pin positions for 3.3V Serial NOR Flash Memory + Authentication



- Place a jumper pin to JP4 for chip select
- Place a jumper pin to JP7 for 3.3V Vcc
- Place jumper pins at positions 4 and 6 of J1~4

Sample program source code: "SPI\_NOR.zip"

#### Step.3 Get sample program source code

Please access URL below to get sample program source code.

http://www.winbond.com.tw/hq/about-winbond/news-and-events/events/productpromotion/promotion00020.html?\_\_locale=en

When you get sample program source code "SPI\_NOR.zip", "SPI\_NAND.zip", "SPISTACK.zip". Then unzip it.<sup>2</sup>

#### Step.4 Plug in the Winbond Flash Memory Sample Shield to your computer

Plug the Winbond Flash Memory Sample Shield into your host board, then connect the host board to your computer using USB cable. The host board will enumerate as a composite USB device that includes a built in debugger, storage device and a virtual com port.

SalesSupport.jp@winbond.com

<sup>&</sup>lt;sup>2</sup> Please use "SPI\_NOR.zip" to operate flash memory of W74M12FVZPIQ. If you would like to use W74M12FVZPIQ authentication function, please contact the following e-mail address.



A new drive will be created on your computer with a drive name as assigned by the host board. We are using the NUCLEO-F411RE as an example for this Setup description.



Before mounting the Winbond Flash Memory Sample Shield



After mounting the Winbond Flash Memory Sample Shield



Step.5 Log in to ARM mbed and create a Workspace

- 1. Log in to developer.mbed.org. (If you don't have an mbed account, please create it.)
- 2. After log in, click on the Compiler button, then the mbed compiler will bring up the Workspace.

<b>arm</b> MBED	Developer Resources	Partners	Cloud	,,	Search Mbed	Q
Hardware 🔻 Documentatio	on <del>-</del> Code Questions	Forum	l 🔮 charken_16 ·	Compiler		
					*	

Step.6 Load the platform for the host board

1. Click on the upper right button to open the available compiler platforms screen. Select the host board platform you wish to load or, if it is not present, then select [Add].

mbed		Wa	orkspace Manageme	nt			
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Program Workspace <	Workspace Management					Workspace Details	
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	Type to filter the list	Match Case	Whole Word		G. Find	Modified 1 day	, 2 hours ago
	Name ^	Tags	Modified	Description		Recently Modified	
	Nucleo_blink_led		27 Jun 2017			main.cpp	1 day, 2 hours ag
	Serial_Flash		1 day, 2 hours ago			main.cpp	12 Jul 2017
	W25N_mbed_sample		12 Jul 2017			e main.cpp	27 Jun 2017
			8				
Ready							

2. If you selected Add, mbed will display a scrolling list of available platforms. Find the host board you are using and click on the image.



3. mbed will open a new window as an information page for that host platform, such as the NUCLEO-F411RE example here. To add this platform to your workspace, click on the [Add to your mbed Compiler] button.



Step.7 Import the sample program source code

1. In your Workspace, click [Import]. The Import a program dialog box will open. Click on the [Upload] tab. Click on the "Add File", select sample program source code and "main.cpp", and click [Import!].





2. Select "Programs" in "Import As:", and input any name in "Import Name:"

mbed	Import Wizard					
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Ready.	ln 1 col 1 1	.53   INS   📟   🖳				

3. One more time, click [Import]. The Import a program dialog box will open. Click on the [Libraries] tab. Search for the "mbed" libraries, select it and click [Import].

mbed			Import Wizard					
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Program Workspace <	Import Wizard						Unpublished	Library Details
	Import a library from mbed.org Select library from the list. You can also drag&drop them in your workspace.					Name Author Published Last Updated	mbed mbed official 15 May 2012 16 Aug 2017	
main.cpp	Programs Libraries	Bookmarked Upload		mbed		Search	Imports	327257
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	5.7 C12832 lcd	application board C12832 LCD	Peter Drescher	8999	27 Oct 2013	Lib for	😔 I	Library Homepage
	s∱z mbed-dev		mbed official	8231	16 Aug 2017	mbed	Tags	
	\$ nRF51822		Team Nordic Semi	5034	14 Sep 2016	Nordic	-	
	숬 Socket	socket	mbed official	4527	19 Aug 2013	mbed		
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	SrastPWM	pwm resolution Speed	Erik Olieman	2494	01 Jan 2017	Library	The official mbe	d C/C++ SDK provides the
	숬 XBee	1 2 digimesh Series Wi-Fi xbee	Suga koubou	1942	18 Dec 2013	XBee-	software platfo	m and libraries to build your
	र्द्ध mbed-rpc	mbed rpc	mbed official	1580	02 May 2016	mbed	applications.	
	☆ MODGPS	<u>GPS</u>	Andy Kirkham	1404	21 Apr 2011	Allows		
	SoftwareSerial	Serial SoftwareSerial UART	<u>chaq</u>	1160	17 Mar 2012	ALPHA		
	Street PowerControl	ethernet power consumption p	<u>JST 2011</u>	1150	11 Oct 2013	*powe		
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4. Select "Library" in "Import As:", and input the same name as inputted in step7-2 to "Target Path:"

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c] W25N.cpp w W25N.h ₪ W25N_mbed_sample	Listing published libraries of Name	Import Library Import a library from mbed.org into a program in Please specify name	your workspace.	Descr The of	Forks 15 Commits 150 Dependents 21847 Dependencies 0		
	었 mbed-rtos 있 EthernetInterface 있 Deel 있 C12832_lcd	Source URL: https://mbed.org/users/mbed Import As: Program @ Library Import Name: Mbed	_official/code/mbed/	Officia Interdi Library Lib for	Followers 4349 Apache 2 License C Library Homepage		
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	었 FastPWM 값 XBee 값 XBee	mbed rpc mbed official	rt Cancel 1580 02 May 2016	Library XBee- mbed	Description The official mbed C/C++ SDK provides the software platform and libraries to build your applications.		
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Ready.	ଟି¦ହ ାଏ ଏ Page 1	of 27 ▶ ▶			INS   🧱   💌		

5. The sample program will now appear in the Program Workspace.



Step.8 Compile the sample code and load to host board

- 1. Highlight the sample program folder in your Workspace tree in the left-hand column.
- 2. Click [Compile] in the top menu.

mbed			/test				
🖺 New 👻 🎦 Import 🛛 🔙 Save	Save All 🔛 Compile 🗸	🕭 Commit 👻 🕜 Rev	ision i 🗠 🗠	#   🗞   🔨   🖽	Help		NUCLEO-F411RE
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Ready.						INS 🔤	

- 3. The program will be compiled and the binary (.bin) file created will automatically be downloaded to your computer's designated download location.
- 4. Drag and drop the binary file into the host board drive that you created in Step.4. When the file is dropped into the folder, your host board will begin to program. When the program is fully loaded, the binary file will automatically delete from your host board drive.

[10]



Step.9 Run sample program by terminal emulator

- 1. Use your favorite terminal emulator. For this example, we used the Tera Term.
- 2. Open Tera Term and select the serial port associated with your host board to create a new connection.

Tera Term: New o	onnection 🗾
© TCP/ĮP	Host myhost.example.com
• <u>Serial</u>	Port COM3: STMicroelectronics STLink   OK Cancel Help

3. Configure the serial port under Setup->Serial port with: 9600 baud, Setup->Terminal with: line feed code as LF.

Tera Term: Serial port	setup 💌	
<u>P</u> ort: <u>B</u> aud rate:	СОМ3 • ОК 9600 •	Tera Term: Terminal setup
<u>D</u> ata: P <u>a</u> rity: <u>S</u> top:	8 bit  Cancel none 1 bit Ease	Image: Terminal size     New-line       80     X       24     Receive:       LF     OK       ✓ Term size     Transmit:       LF     Cancel
Transmit dela	ay ay cc/char 0 msec/line	Auto window resize      Terminal  D: VT100 →     Local echo  Answerback:     Auto switch (VT<->TEK)

4. Press the Reset button on your host board to run the sample program.

COM3 - Tera Term VT	x
<u>File Edit Setup Control Window H</u> elp	
======================================	*
MANUFACTURE ID = EF DEVIDE ID = AA 21 Status Register-1 = 0 Status Register-2 = 18 Status Register-3 = 0 ECC-E = 1 BUF = 1 P-FAIL = 0	
E-FAIL = 0 ==================================	-



# 5. SCHEMATIC





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## 6. PCB LAYOUT





## 7. REFERENCE

1. 1.2V Serial NOR Flash Memory Product Introduction

https://www.winbond.com/hq/product/code-storage-flash-memory/1.2v-serial-nor-flash/?\_\_locale=en

2. 3.3V Serial NAND Flash Memory W25N01GVZEIG Datasheet

https://www.winbond.com/resource-files/w25n01gv%20revg%20032116.pdf

3. SpiStack 3.3V Serial NOR + Serial NAND Flash Memory Datasheet

https://www.winbond.com/resourcefiles/w25m161av%20combo%20reva%20091317%20mod%20final.pdf

4. Authentication Flash Product Introduction

https://www.winbond.com/hq/product/code-storage-flash-memory/authenticationflash/?\_\_locale=en

5. Arm Mbed Windows serial port driver

https://os.mbed.com/handbook/Windows-serial-configuration

https://os.mbed.com/docs/latest/tutorials/windows-serial-driver.html



#### **Revision History**

Version	Date	Page	Description
1.0	11/07/2017	NA	New Create
2.0	12/04/2017	10, 11	Correct step number of title and sentence

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