

**SN820X**

**Firmware  
Downloading**

**Application Note**

## Revision History

Revision	Date	Author	Change Description
V 0.1	8/14/2012	RF Product Department	Initial version
V 0.2	8/15/2012	RF Product Department	Preliminary version
V 0.3	8/27/2012	RF Product Department	Added downloading procedure
V 0.4	2/21/2013	RF Product Department	Sync with ST-Link Utility Tool v2.4.0
V 1.0	8/2/2013	RF Product Department	Added SN8205 support
V1.1	9/20/2013	RF Product Department	Changed to SN820X
V1.2	4/17/2014	RF Product Department	Added UART Interface
V1.3	6/10/14	R. Willett	Reformatted to match Murata VI

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# 1 Purpose

Different from a traditional single function Wi-Fi module, SN820X modules can be programmed with different firmware for diverse advanced software features. There is no default application firmware version pre-loaded in the module. Customers are required to download the firmware after they receive the module. This application note describes the tools, software and the procedure of module firmware downloading.

## 2 Overview

Murata provides an integrated firmware image for controlling the embedded STM32 Cortex M3 microcontroller and Broadcom Wi-Fi IC. The firmware image may be customized using the Murata SNIC Monitor to suite the customer specific platform. User needs to load the firmware image to the on-board STM32. If firmware customization is needed, please refer to the respective SN820X SNIC EVK+ User Guide for detail.

This application note applies to the following SN820X modules:

Model #	P/N	Built-in STM	RAM Size	Flash Size
SN8200	88-00151-00	STM32F103RFT6TR	96KB	768KB
SN8200UFL	88-00151-02	STM32F103RFT6TR	96KB	768KB
SN8205	88-00158-00	STM32F205RGT6TR	128KB	1024KB
SN8205UFL	88-00158-02	STM32F205RGT6TR	128KB	1024KB

**Table 1: SN8200 Wi-Fi Network Controller Module Family Configuration Comparison**

To load the firmware image to the module, there are two options available. J-TAG interface and UART interface. Section 3 and 4 describe the detail procedures respectively.

## 3 Loading firmware through J-TAG interface

### 3.1 Equipment and Setup

#### 3.1.1 Equipment

The figure below shows the configuration for SN820X module firmware downloading via JTAG interface. The ST-Link/V2 tool converts the JTAG into USB. The ST-Link PC Utility provides the programming function that loads the user selected firmware into the SN820X module.



**Figure 1: Firmware Downloading Setup Connection**

Required software:

Note: All information listed below can be found on ST Microelectronics homepage (<http://www.st.com/>). Use "ST-link/v2" as the search key word.

1. ST-LINK/V2 USB driver for Windows 7, Vista and XP.
2. STM32 ST-Link Utility Software.

### 3.1.2 Module Connection Configuration

To load firmware through the JTAG interface, test fixture is needed to connect SN82XX to the ST-Link/V2. Figure 2 shows the connection between SN820X and the ST-Link/V2. The Table 2 shows the pin mapping.

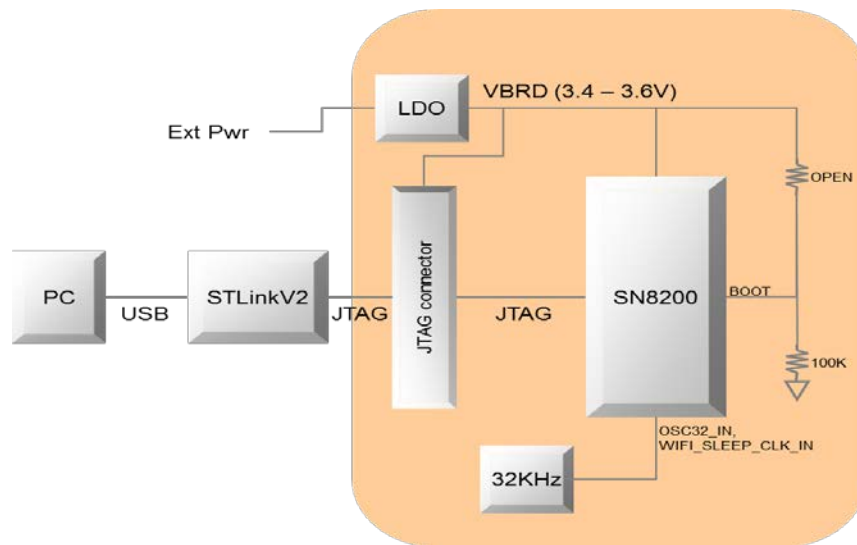
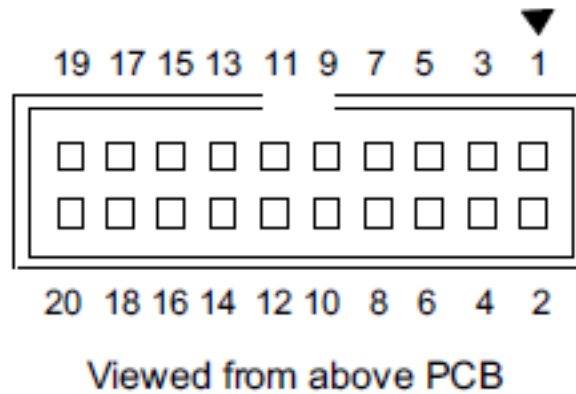


Figure 2: SN82XX ST-Link Connection Diagram

Table 2: SN820X Pin Mapping for Firmware Downloading

JTAG Connector Pin#	SN82XX Pin#	Description
1	8, 26, 48	VBRD for STLinkV2
2	8, 26, 48	VBRD for STLinkV2
3	41	JTAG TRSTN
4	GND	GND
5	37	JTAG TDI
6	GND	GND
7	36	JTAG TMS
8	GND	GND
9	38	JTAG TCK
10	GND	GND
11	-	Not connected
12	GND	GND
13	40	JTAG TDO
14	GND	GND
15	47	NRST
16	GND	GND
17	-	Not connected
18	GND	GND
19	-	Not connected
20	GND	GND

The figure below shows the JTAG ribbon cable pin layout.



**Figure 3: JTAG debugging flat ribbon layout**

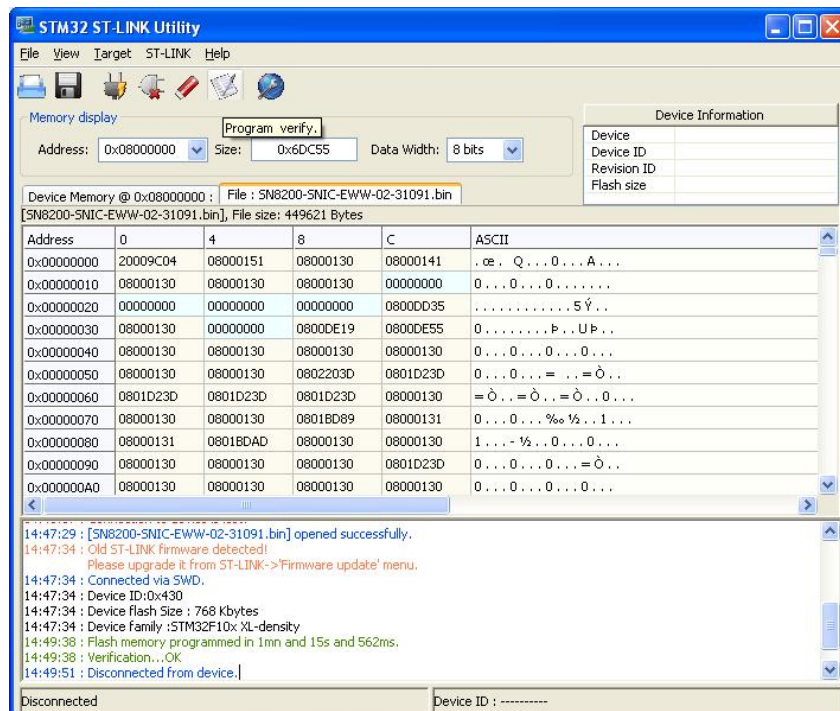
For details about the ST-Link/V2, please refer to ST Microelectronics user manual: *UM1075 ST-LINK/V2 in-circuit debugger/programmer for STM8 and STM32*.

### 3.2 Firmware Downloading Procedure

For detail firmware downloading procedure, please refer to ST Microelectronic *UM0892 User manual STM32 ST-LINK Utility software description*. The procedure and screen shot shown below refer to ST-Link Utility tool v2.4.0. Contents may vary for different versions of the tool; user should obtain the latest update provided from ST website.

Make sure that SN820X module is powered on, and ST-Link/v2 tool is connected properly (see Figure 2). Launch the ST-Link Utility Software and proceed as follows:

1. File->Open File then select the target firmware, e.g. SN8200-SNIC-EWW-03-37191.bin.
2. Click on "Program verify", you shall see the following output in the output window.



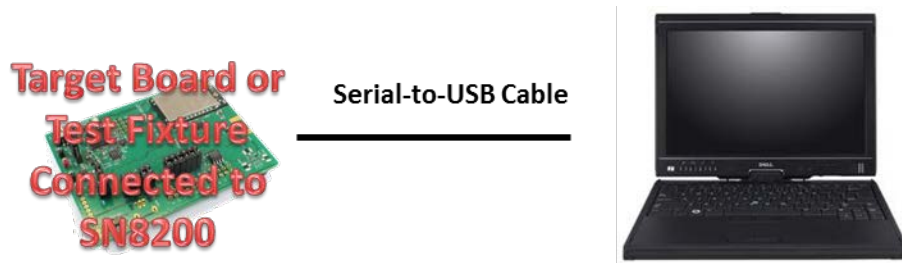
**Figure 4: STM32 ST-Link Utility Software Screenshot**

## 4 Loading firmware through UART interface

### 4.1 Equipment and Setup

#### 4.1.1 Equipment

The figure below shows the configuration for SN820X module firmware downloading via UART interface. The ST Flash Loader provides the programming function that loads the user selected firmware into the SN820X module.



**Figure 5: Firmware Downloading Setup Connection**

Required software:

1. STM32 and STM32™ and STM8™ Flash loader demonstrator software, ST website ([www.st.com](http://www.st.com))
2. USB driver for the serial-to-USB cable for PC. This driver is cable vendor specific.

#### 4.1.2 Module Connection Configuration

Table 3 shows the pin mapping.

**Table 3: SN820X Pin Mapping for Firmware Downloading**

RS232 DB-9 Pinout #	Description	SN82XX Pin#	STM32F103RF/STM32F205RG pin
1	DCD		
2	RXD	33	PA10/UART1_RX
3	TXD	32	PA9/UART1_TX
4	DTR		
5	GND		
6	DSR		
7	RTS	35	PA12/UART1_RTS /USB2_DP/CAN_TX
8	CTS	34	PA11/UART1_CTS/USB2_DM/CAN_RX
9	RI		

BOOT pin (pin45) and MICRO\_RST\_N pin (pin 47) are also needed to put module into boot mode before loading the firmware.

## 4.2 Firmware Downloading Procedure

To load the firmware image to the module, the module needs to be put into boot mode first. The following procedure may be used to achieve this:

1. Pull BOOT (pin 45) high
2. Reset the board

The firmware then can be loaded to the module following the instruction in this section. After the firmware loading completed, the user need to:

1. Remove pull-up for BOOT.
2. Reset the board to run the updated FW.

The procedure below may be used to loading the firmware to the module.

1. Install the USB driver for the serial-to-USB cable.
2. Download and install the tool “STM32 and STM8 Flash Loader Demonstrator” from ST website ([www.st.com](http://www.st.com)) to the PC. The keyword to search is “flash loader”. The snapshots shown below are based on STSW-MCU005 (version 2.6.0). Details can be found in ST Microelectronics, “UM0462: STM32™ and STM8™ Flash loader demonstrator”
3. Double click the installer in the package. Once the installation process is completed, check the option to launch the program then click on finish.

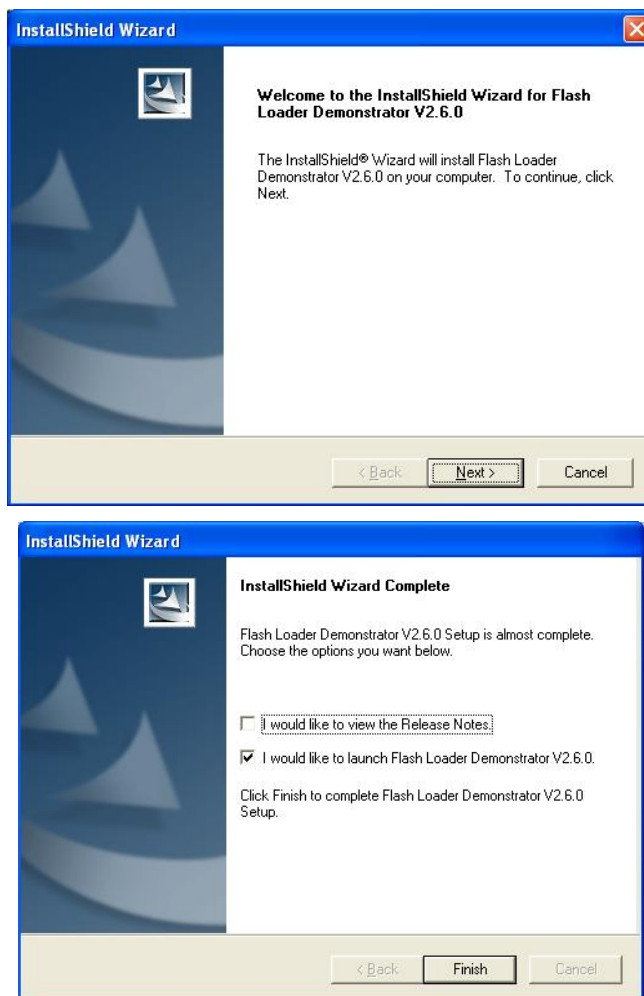
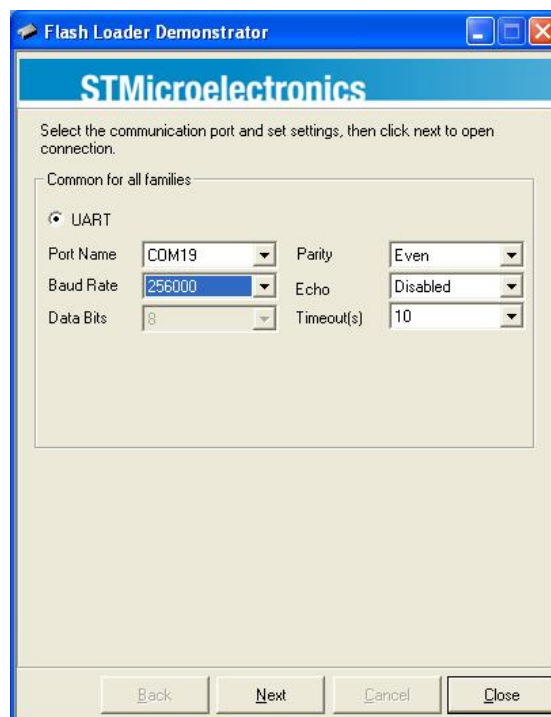
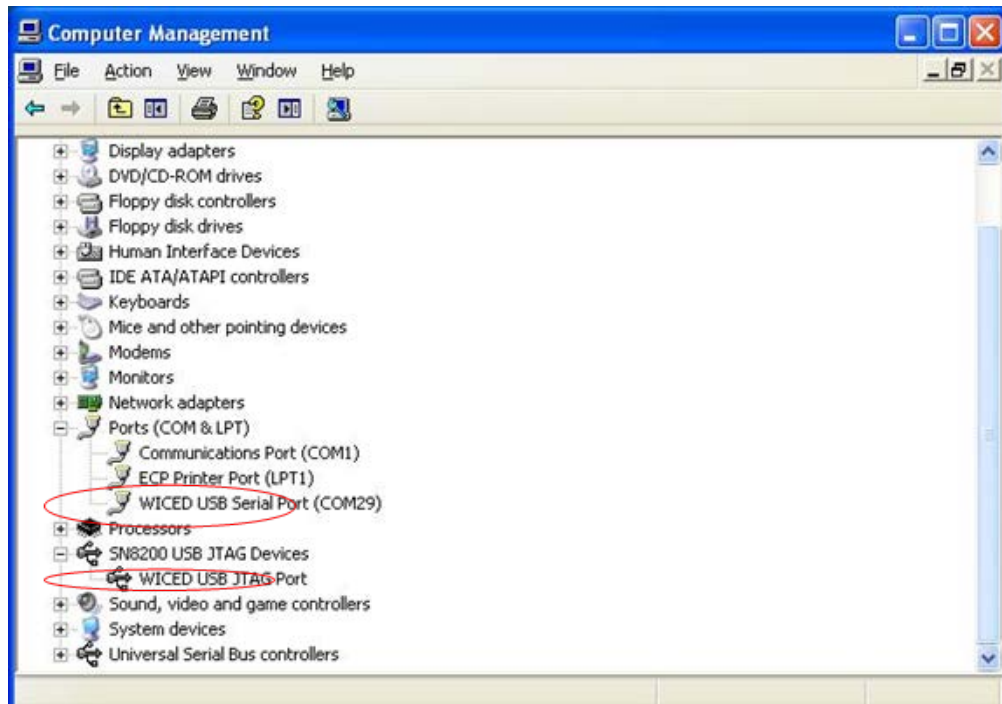


Figure 6: STM32 and STM8 Flash Loader Demonstrator download

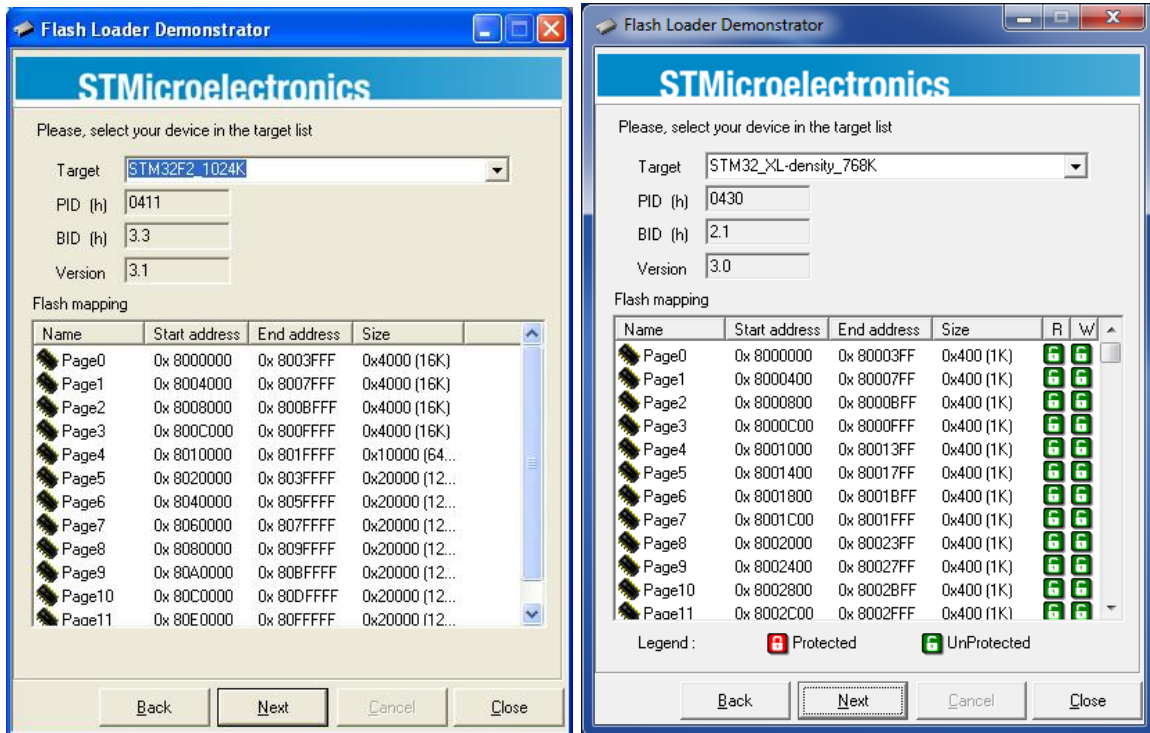


4. Some configurations need to be specified to the tool, as shown below:
- a. For UART setting, the COM port can be verified through Device Manager as shown below. Timeout is set as 10 sec, but user can adjust to a bigger interval if needed, e.g., if the erase phase exceeds 10 sec to finish, use a larger value to avoid the erase failure. The baud rate may also be changed to a larger value. Click “Next” when done.



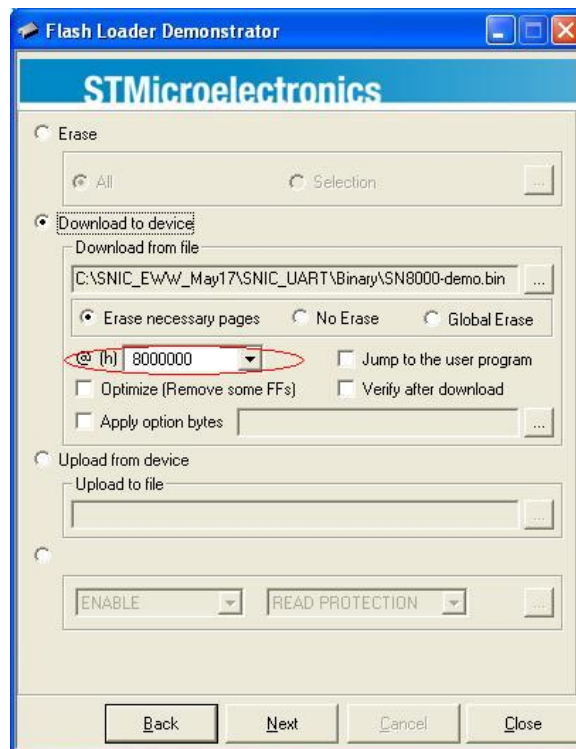
**Figure 7: Specifying UART setting**

- b. Select the correct STM target, i.e., STM32\_XL-density\_768K for STM32F1035RF for SN8200 and SN8200UFL; STM32F2\_1024K for STM32F205RG for SN8205 and SN8205UFL.



**Figure 8: Selecting the correct STM target**

- c. When selecting the target bin file, note that the starting address MUST be 0x8000000. Click Next to start FW downloading.



**Figure 9: Starting FW downloading**



**Figure 10: FW Downloading complete**

- Once the download is successful, close the tool and disconnect the mini-USB cable. Drive STM32 BOOT0 pin back to low to enable the firmware to run upon subsequent power up.

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### 4.3 Loading firmware through UART interface from host

To use the bootloader that is pre-loaded in the built-in STM32, please refer to ST Microelectronics application note:

1. Application note AN2606, STM32™ microcontroller system memory boot mode.
2. Application note AN3155, USART protocol used in the STM32™ bootloader.

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## 5 Technical Support Contact

Contact Wireless module application support at [modules@murata.com](mailto:modules@murata.com)

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