
The BlueNRG-1, BlueNRG-2 Flasher SW package

Introduction

This document describes the BlueNRG-1, BlueNRG-2 Flasher SW package (STSW-BNRGFLASHER) which provides the Flasher Utility PC application.

The BlueNRG-1, BlueNRG-2 Flasher Utility is a standalone PC application, which allows the BlueNRG-1, BlueNRG-2 Bluetooth low energy systems-on-chip Flash to be read, mass erased, written and programmed.

Besides, it supports interface to the BlueNRG-1, BlueNRG-2 Flash through both UART and SWD modes by using, respectively, the internal device UART bootloader and the standard SWD interface.

Finally, it also allows a MAC address to be stored on a specific Flash location selected by the user, and supports the automatic mode through SWD and UART interfaces which allow user to enter a programming loop by connecting a new device platform to be programmed.

1 Getting started

This section describes all system requirements to run the BlueNRG-1, BlueNRG-2 Flasher Utility PC application, as well as the relative SW package installation procedure.

1.1 System requirements

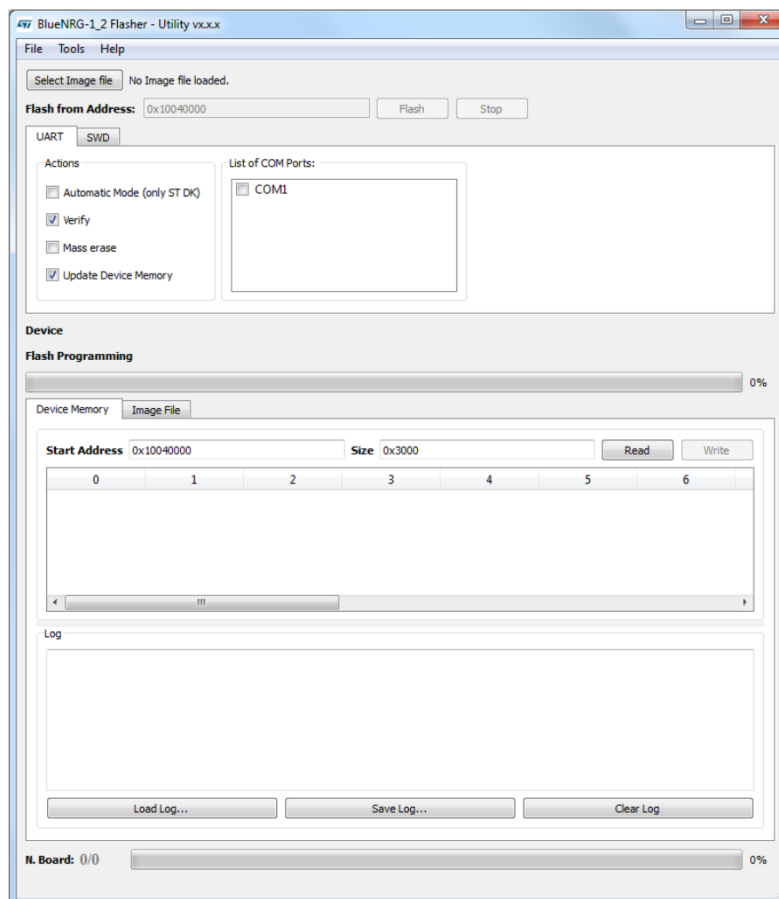
The BlueNRG-1, BlueNRG-2 Flasher Utility has the following minimum requirements:

- PC with Intel® or AMD® processor running one of the following Microsoft® operating systems:
 - Windows Vista
 - Windows 7
- At least 128 MB of RAM
- USB ports
- 40 MB of free hard disk space
- Adobe Acrobat Reader 6.0 or later

1.2 SW package setup

User can run this Utility by clicking on the BlueNRG-1_2 Flasher Utility icon under: Start → STMicroelectronics → BlueNRG -1_2 Flasher Utility X.X.X → BlueNRG1_2 Flasher Utility.

Figure 1. BlueNRG-1, BlueNRG-2 Flasher Utility



2 Toolbar interface

In the toolbar section of the BlueNRG-1_2 Flasher - Utility main window, user can perform the following operations:

- Load an existing .bin or .hex (Intel extended) file (from file menu: open file.. option)
- Save the current memory image in a .bin file (from file menu: save file as option). The start address and the size of the memory section to be saved to file are selectable from the 'Device Memory' tab
- Close an existing .bin or .hex file (from file menu: close file option)
- Mass erase (from tools menu: mass erase option)
- Verify Flash content (from tools menu: verify flash content option)
- Get application version (from help menu: about option)

In the upper section of the BlueNRG-1_2 Flasher – Utility main window, user can select the image file through the 'Select Image File' button.

All these options are available both on UART and SWD modes.

User needs to enable access to the selected mode (UART or SWD), by opening, respectively, the associated COM port for UART mode, or by connecting ST-Link HW tool to the JTAG connector for SWD mode.

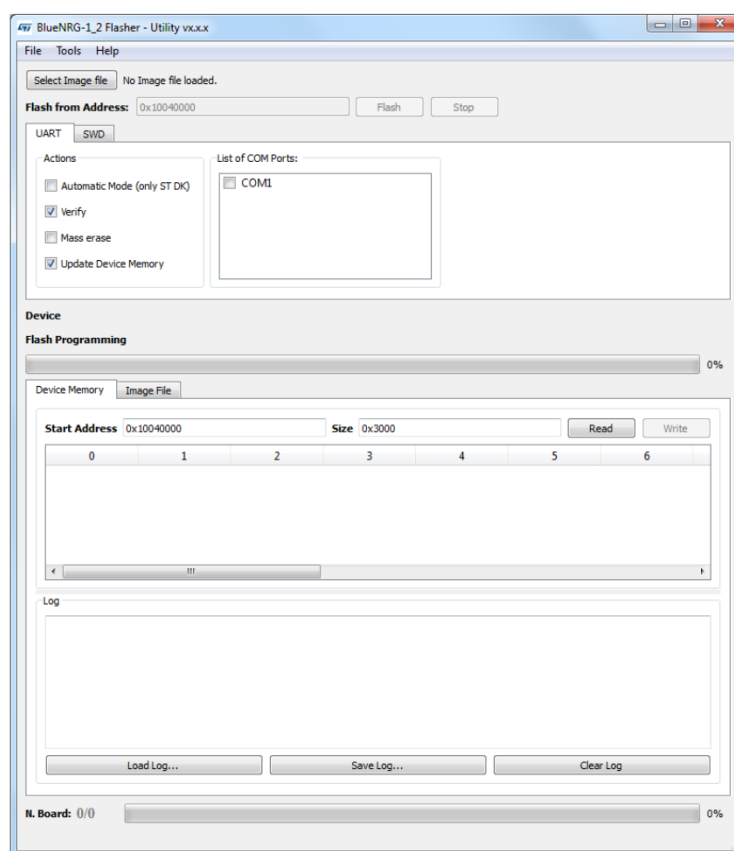
3 UART main window

In the UART main window tab of the BlueNRG-1_2 Flasher – Utility main window, user can select the COM port to be used to interface the device through the 'List of COM Ports' section.

The BlueNRG-1, BlueNRG-2 device memory is read when the associated COM port is opened and displayed on device memory tab.

The serial baudrate used for the BlueNRG-1, BlueNRG-2 evaluation board is 460800 bps.

Figure 2. Flasher Utility UART main window



3.1 UART mode: how to run

Image file selection

Use the 'Select Image File' button on the main page (or the File> Open File... option or clicking on Image File tab) to load an existing .bin or .hex file. The full path of the selected file appears next to the button and the 'Flash' button becomes active at the end of file loading.

The automatic mode option allows all ST DK COM ports to be selected.

By default, the 'Mass erase' option on "Actions" section is not checked, and only the required memory pages are erased and written with the file content. When this option is checked, the memory Flash phase is preceded by a full mass erase.

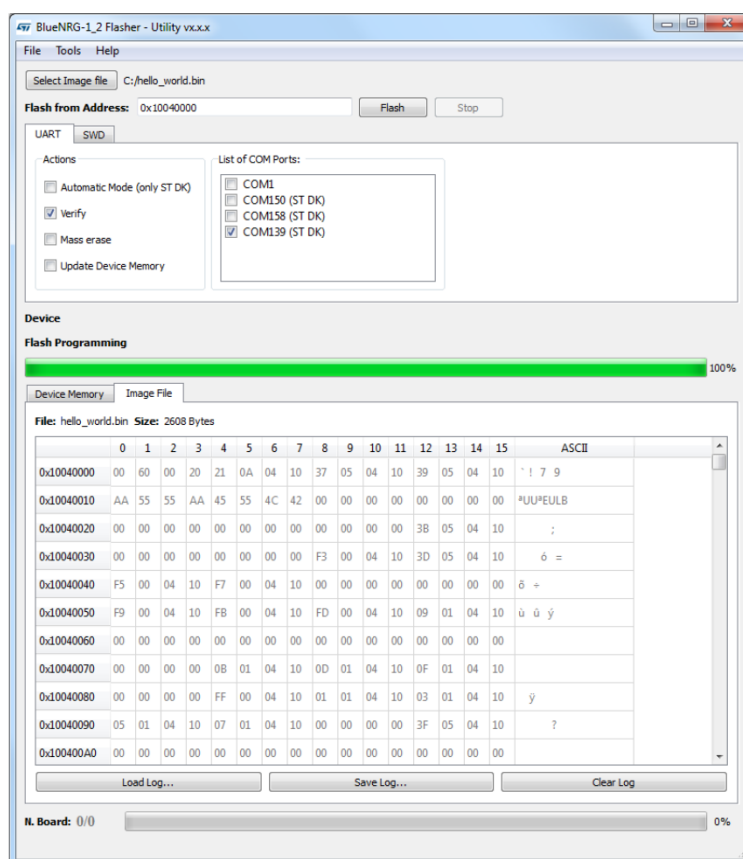
The 'Verify' option forces a check to ensure that the memory content has been written correctly.

Check the 'Update memory table' option to update the 'Device Memory' table after an operation on Flash memory.

'Image File' tab

The selected file name, size and parsed contents to be flashed to the device memory can be viewed in the 'Image File' tab.

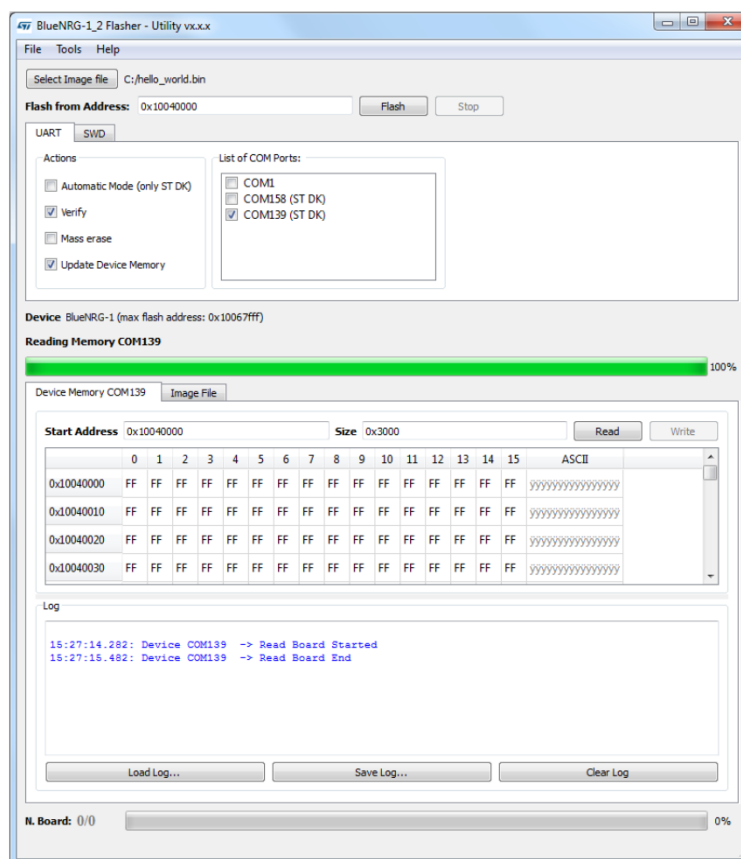
Figure 3. Flasher utility UART mode: image file



'Device Memory' tab

Select this tab to view the memory contents of a connected device and the log about the performed operations on the selected device.

Figure 4. Flasher utility UART mode: device memory



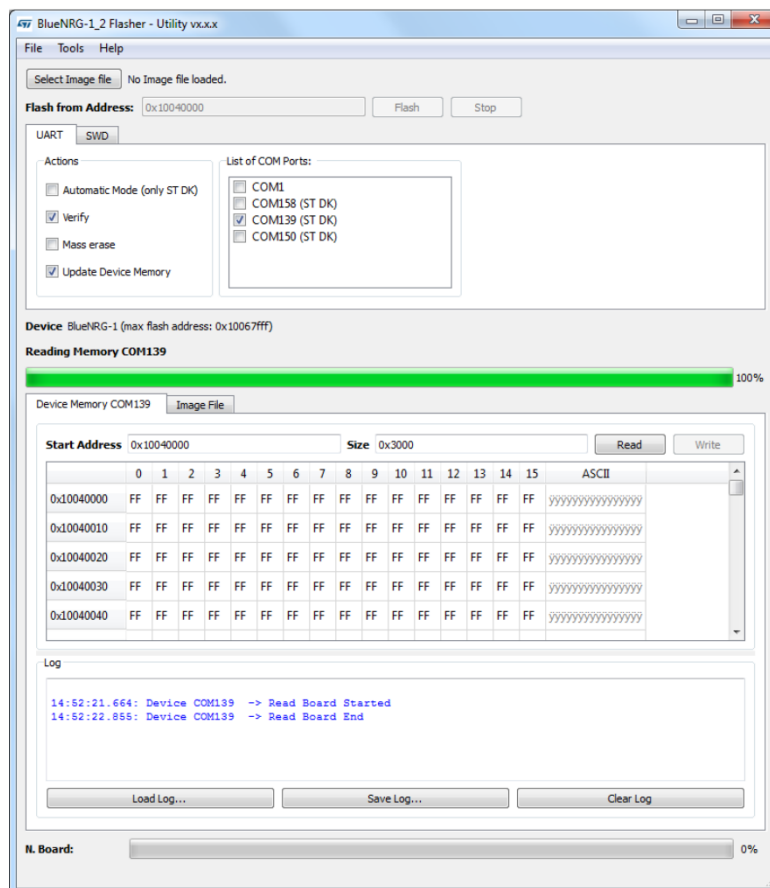
Click the 'Read' button to transfer the memory segment defined by 'Start Address and Size' into the table.

The first column gives the base address of the following 16 bytes in a row (e.g., row 0x10040050, column 4 holds the hexadecimal byte value at 0x10040054).

User can change byte values by double-clicking a cell and entering a new hexadecimal value; edited bytes appear in red.

Click the 'Write' button to flash the entire page with the new byte values into the device memory.

Figure 5. Flasher utility UART mode: changing memory fields



Using the BlueNRG-1_2 Flasher Utility with other boards

The BlueNRG-1_2 Flasher Utility automatically detects the BlueNRG-1, BlueNRG-2 evaluation boards as the STEVAL-IDB007Vx, STEVAL-IDB008Vx (x = 1,2) connected to PC USB ports, and uses an auxiliary STM32 (driven by the GUI) to reset the BlueNRG-1, BlueNRG-2 and put it into UART bootloader mode. The application also works with custom boards providing simple UART access to the BlueNRG-1, BlueNRG-2 device, but user must put the device in bootloader mode manually. Upon the selection of any non-STEVAL COM port, the following pop-up appears

Figure 6. Flasher Utility UART mode: UART 'Comport Setting' pop-up



When this pop-up appears, user must set the BlueNRG-1, BlueNRG-2 pin DIO7 high and reset the BlueNRG-1, BlueNRG-2 device (keeping the DIO7 high); the device should now be in bootloader mode.

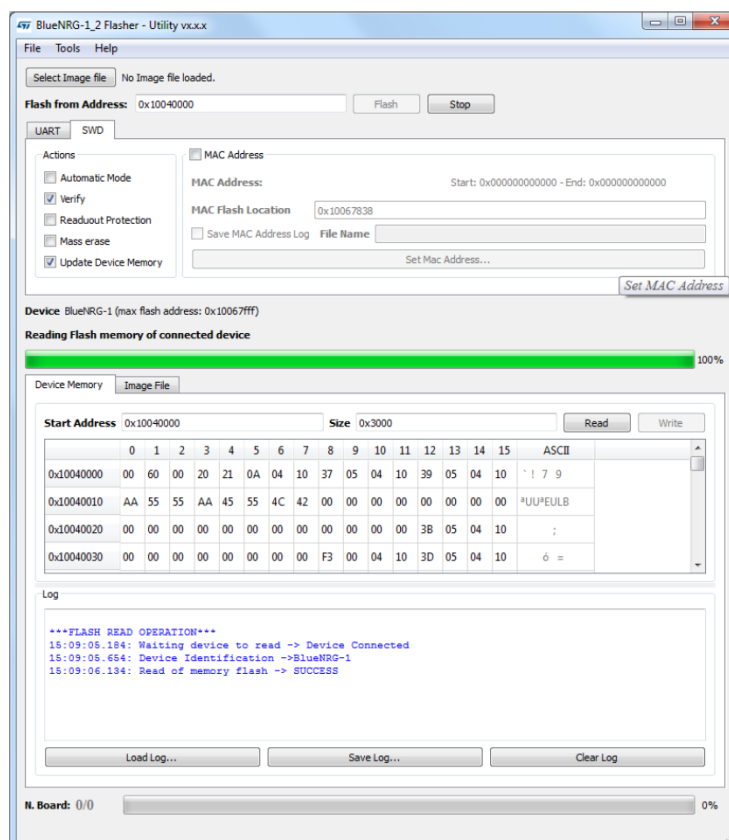
User can also set a preferred baudrate for the UART in the pop-up window and then press OK to return to the GUI.

Note: user must avoid resetting the device while using the BlueNRG-1_2 Flasher Utility unless the "ComPort Setting" pop-up is active. If the device is reset, user must toggle the COM port to use the Flasher Utility again.

4 SWD main window

In order to use the SWD main window tab of the BlueNRG-1_2 Flasher – Utility main window, user must connect ST-Link HW tool to the device JTAG connector.

Figure 7. Flasher Utility: SWD main window



4.1 SWD mode: how to run

Image file selection

Use the 'Select Image File' button on the main page (or the File> Open file... option) to load an existing .bin or .hex file. The full path of the selected file appears next to the button and the 'Flash' becomes active at the end of the file loading.

On Actions tab, user can select the following options:

- Automatic mode: it allows the automatic flash programming mode to be enabled/disabled
- Verify: it allows a check to be forced to ensure that the memory content has been written correctly
- Readout protection: it enables the device readout protection after programming the selected image file
- Mass erase: it allows a device mass erase to be performed before programming the selected image file
- Update Device Memory: it allows the 'Device Memory' table to be updated after a Flash/Read/Write operation

By default, the 'Mass erase' option beside the 'Flash' button is not checked, and only the required memory pages are erased and written with the file content.

'Flash' button allows Flash programming operation to start with the selected option. If the 'MAC address' checkbox is selected user can specify the Flash address where to store the selected MAC address. The MAC address is programmed after image file programming, when the 'Flash' button is selected.

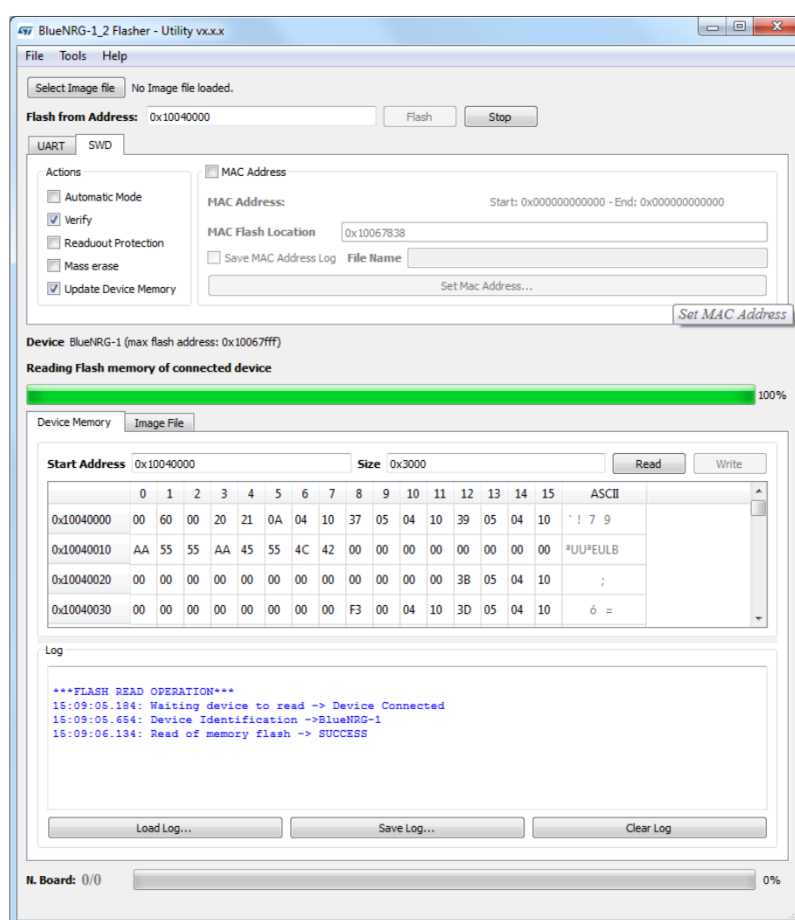
'Image File' tab

The selected file name, size and parsed contents to be flashed to device memory can be viewed in the 'Image File' tab

'Device Memory' tab

Select this tab to view the memory contents of a connected device and the log about the performed operations on the selected device. To view the memory contents of a connected device, it is necessary to select the 'Read' button on the "Device Memory" tab.

Figure 8. Flasher Utility SWD mode: device memory



Click the 'Read' button to transfer the memory segment defined by 'Start Address' and 'Size' into the table.

The first column gives the base address of the following 16 bytes in a row (e.g., row 0x10040050, column 4 holds the hexadecimal byte value at 0x10040054).

User can change byte values by double-clicking a cell and entering a new hexadecimal value; edited bytes appear in red.

Click the 'Write' button to flash the entire page with the new byte values into device memory.

Figure 9. Flasher Utility SWD mode: changing memory fields

0x10040040	97	E7	04	10	00	00	00	00	00	00	00	00
0x10040050	99	E7	04	14	00	00	00	00	A1	E7	04	10
0x10040060	00	00	00	00	00	00	00	00	00	00	00	00

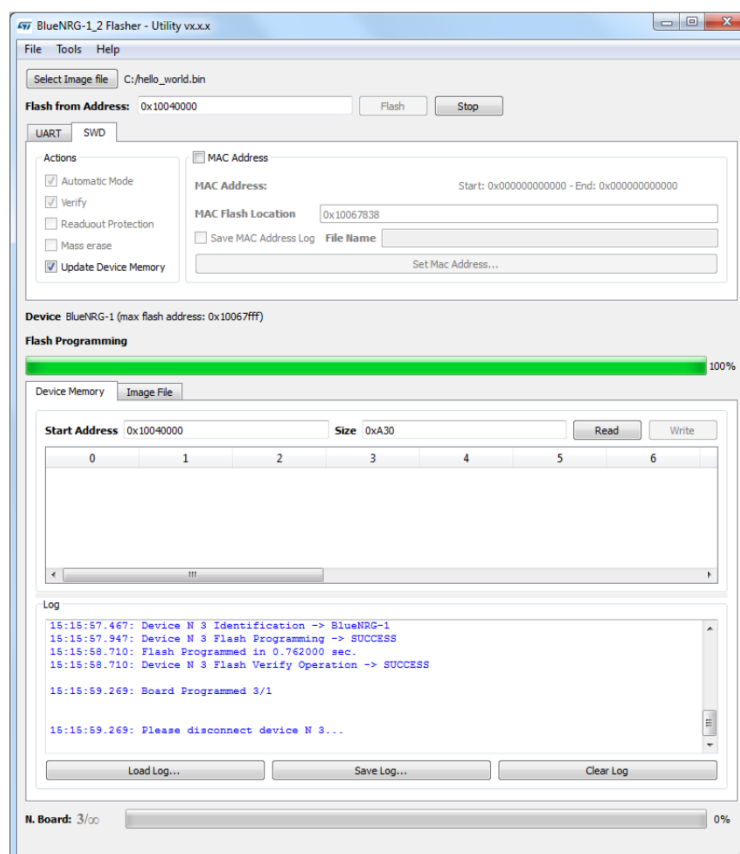
5 SW automatic programming mode

The SWD automatic programming mode allows user to enter a programming loop by connecting a new device platform to be programmed. Once the selected Flash image file and programming actions have been selected, Flasher PC application asks user to connect a device to the SWD interface ("Waiting for Device N. 1" message is displayed).

Once user connects it, "Device N 1 Connected" message is displayed, Flasher starts the device programming with the selected image file and options. Once completed, Flasher displays the message " Please disconnect device N 1 ..." and, then after user disconnects the device, a new message "Waiting for Device N. 2" is displayed. User can stop the automatic mode by selecting the ' Stop' button.

Note: The automatic programming mode is supported on SWD mode only.

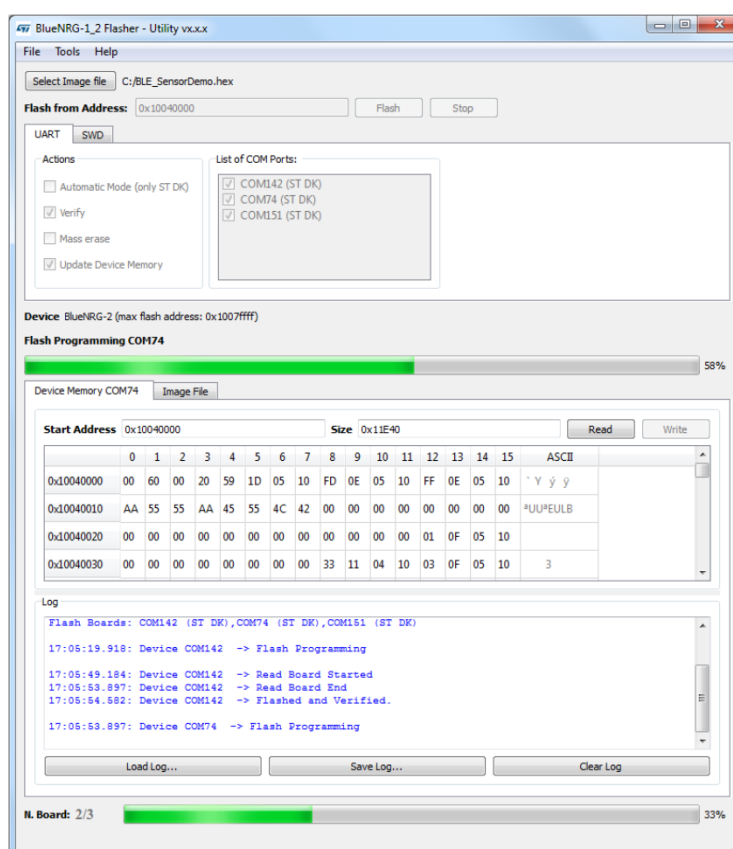
Figure 10. Flasher Utility: SWD automatic mode



6 UART automatic programming mode

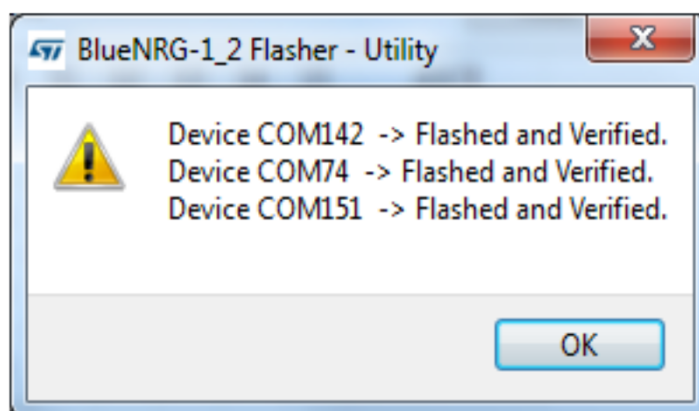
The UART automatic programming mode allows user to enter a programming loop by selecting the connected devices on 'List of COM Ports' and press the Flash button. The selected devices are sequentially loaded with the binary image.

Figure 11. Flasher utility: UART automatic mode



When all the selected devices are loaded, a window is displayed to highlight the end of the UART automatic programming session.

Figure 12. Flasher utility: UART automatic programming is completed



7 MAC address programming

MAC address programming section allows the MAC address and the specific device Flash location to be selected to store MAC address.

User can choose to enable or not the MAC address programming by selecting the 'MAC address' checkbox. Flash location is set through the 'MAC Flash location' tab.

'Set MAC address' button allows to select MAC address as follow:

1. Check 'Range' and provide the 'Start Address' on related field: this is the MAC address to be stored on the first connected device.
 - It is possible to set incremental steps starting from the 'Start address' value, by entering the number of boards to be flashed on Num. Boards tab, or by entering the 'End Address' value:
 - If automatic mode has been selected on Actions tab, the selected MAC address list is used during the automatic programming operations, otherwise only one device is programmed with the 'Start Address' field.
2. User can provide the list of MAC addresses to be used through an input file:
 - Check 'File' and select the input text file through the 'Load File' field
 - If automatic mode has been selected on Actions tab, the selected MAC address list is used during the automatic programming operations, otherwise only the first address is used for a single programming operation.

The 'Save MAC Address log' check box allows the list of used MAC addresses to be stored on a file entered through the 'File Name' field.

As already highlighted, MAC Address programming can be combined with the automatic programming mode. For each connected device, the image file is programmed followed by the MAC address programming. The number of selected MAC addresses (incremental addresses list size or input file size) triggers the automatic programming operations end. Each programmed MAC address is displayed on the Log window.

MAC address programming is supported on SWD mode only.

Figure 13. Flasher Utility: SWD MAC address selection

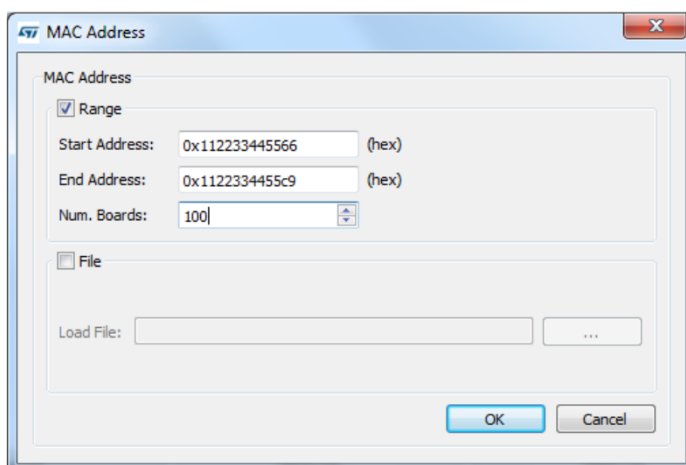
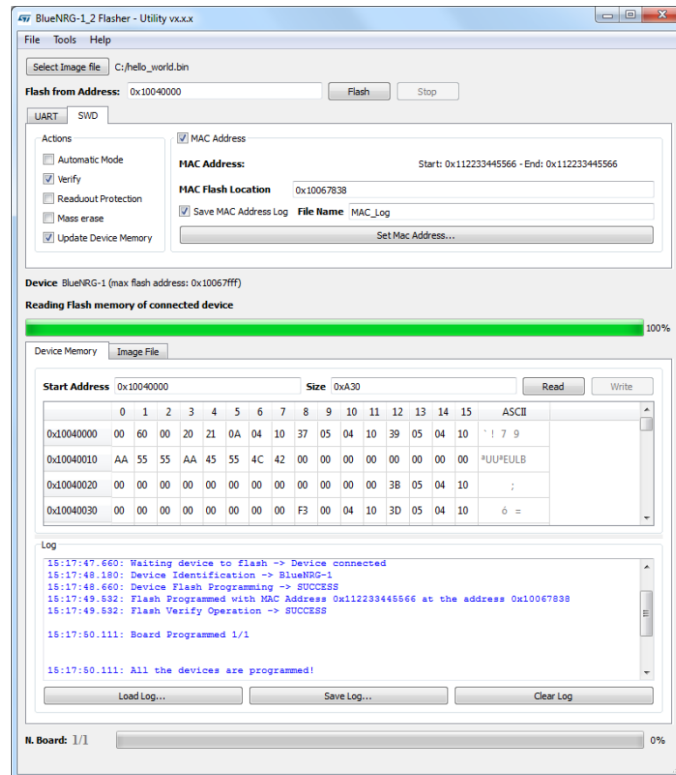


Figure 14. Flasher Utility: SWD MAC address programming



8 List of acronyms

Table 1. List of acronyms

Term	Meaning
BLE	Bluetooth low energy
HW	Hardware
USB	Universal serial bus
SWD	Serial wire debug UART
UART	Universal asynchronous receiver-transmitter

A References

Table 2. Reference

Name	Title
BlueNRG-1 datasheet	BlueNRG-1 datasheet
BlueNRG-2 datasheet	BlueNRG-2 datasheet
STSW-BNRGFLASHER	Databrief for the BlueNRG-1, BlueNRG-2 Flasher SW package
PM0257	The BlueNRG-1, BlueNRG-2 BLE stack programming guidelines

Revision history

Table 3. Document revision history

Date	Version	Changes
15-May-2018	1	Initial release.
03-Jul-2018	2	Updated Figure 1. BlueNRG-1, BlueNRG-2 Flasher Utility, Figure 2. Flasher Utility UART main window, Figure 3. Flasher utility UART mode: image file , Figure 4. Flasher utility UART mode: device memory , Figure 5. Flasher utility UART mode: changing memory fields, Figure 7. Flasher Utility: SWD main window, Figure 8. Flasher Utility SWD mode: device memory , Figure 10. Flasher Utility: SWD automatic mode, Figure 11. Flasher utility: UART automatic mode, Figure 12. Flasher utility: UART automatic programming is completed and Figure 13. Flasher Utility: SWD MAC address selection. Minor text changes throughout the document.

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