



Introduction

This user manual provides information regarding the STR9 dongle device firmware upgrade (hereafter referred to as DFU), guiding the user on how to:

- flash the DFU firmware into the STR9 microcontroller
- create a DFU image from an application
- download the image via DFU
- run an application on the target device

A brief troubleshooting section is also included in this document.

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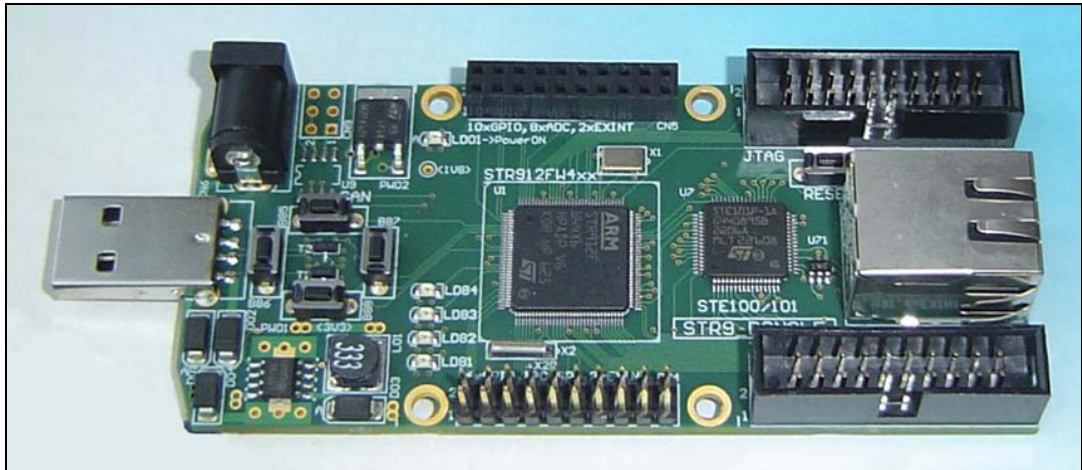
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1 Requirements

1.1 Hardware

- **STEVAL-IFD001V1 (STR9 dongle)**
For details on this board, please refer to user manual UM0282.

Figure 1. STR9 dongle demonstration board



- **IAR J-link**
IAR J-Link is a small ARM[®] JTAG hardware debug probe, which connects via USB to the PC host running Windows[®].

Figure 2. IAR J-link



- **RLink-ST**

The RLink is Raisonance's versatile, low-cost, in-circuit debugger/programmer for the STM32, STR9, STR7, ST7 and μ PSD microcontrollers. It connects to applications or evaluation boards for programming and debugging via a JTAG standard connection for ARM™ core-based and μ PSD microcontrollers, or via STMicroelectronics' in-circuit communication (ICC) connection for ST7 microcontrollers.

The RLink can be driven by RIDE, Raisonance's integrated development environment for debugging and programming of applications for STM32, STR9, STR7, ST7 and μ PSD microcontrollers. In combination with Raisonance's free RFlasher programming software, RLink provides a very low cost, dedicated in-circuit programmer for ST microcontrollers.

Figure 3. RLink-ST



- **USB cable⁽¹⁾**

1.2 Software

- **PC with Windows XP®**
- **Promotional CD** (hereafter referred to only as CD)⁽¹⁾
Provided with the package.
- **IAR Embedded Workbench®** for ARM
The IAR Embedded Workbench for ARM is an integrated development environment for building and debugging embedded applications. It provides extensive support for a wide range of ARM devices, hardware debug systems and RTOSs and generates very compact and efficient code. For further information, please visit: www.iar.com.
- **Configuration and programming software (CAPS) tool** for STR9 families⁽²⁾⁽³⁾.
The CAPS configuration tool allows you to easily configure the STR9 using simple drag-and-drop and point-and-click operations. CAPS also supports in-system programming through an external JTAG adapter, allowing fast in-system programming of the STR9 in both development and production environments.

Installing CAPS

Follow these procedures and the on-screen instructions to install CAPS:

- Download the compressed CAPS software from the web site
- Extract the contents of the .zip file into a temporary directory
- Double-click the extracted executable, setup.exe, to initiate the installation, and follow the on-screen prompts to install CAPS in the development environment. This executable installs all the necessary files and configures the PC environment for running CAPS. You may be prompted to restart your PC before running CAPS for the first time following the installation.

CAPS installation includes a number of utilities. Documentation for the utilities is located in the subdirectory \Docs where CAPS is installed.

For more information regarding the CAPS tool, please refer to user manual UM0225.

- **STR91xFA firmware library**⁽²⁾

Please refer to user manual UM0233, which describes the STR91xFA peripheral firmware library: a collection of routines, data structures and macros that cover the features of each peripheral.

- **DFU firmware**⁽²⁾⁽³⁾

Load the DFU firmware into the micro internal Flash memory using the desired toolchain. The DFU firmware is a part of the USB development kit and is available for download from the STMicroelectronics website: www.st.com. This firmware has been tested with IAR Embedded Workbench version 4.41A.

- **DFU PC software - DfuSe demo**⁽²⁾⁽³⁾

The DfuSe demonstration user interface is designed to work with all STMicroelectronics devices that support USB device firmware upgrade. The installation software and the documentation are available for download from the ST web site: www.st.com.

Software installation:

Run the setup.exe file. The Installshield Wizard will guide you through the installation of the DfuSe applications and source code on your computer. The driver files are located in the Driver folder in the installation path (default: C:\Program Files\STMicroelectronics\DfuSe).

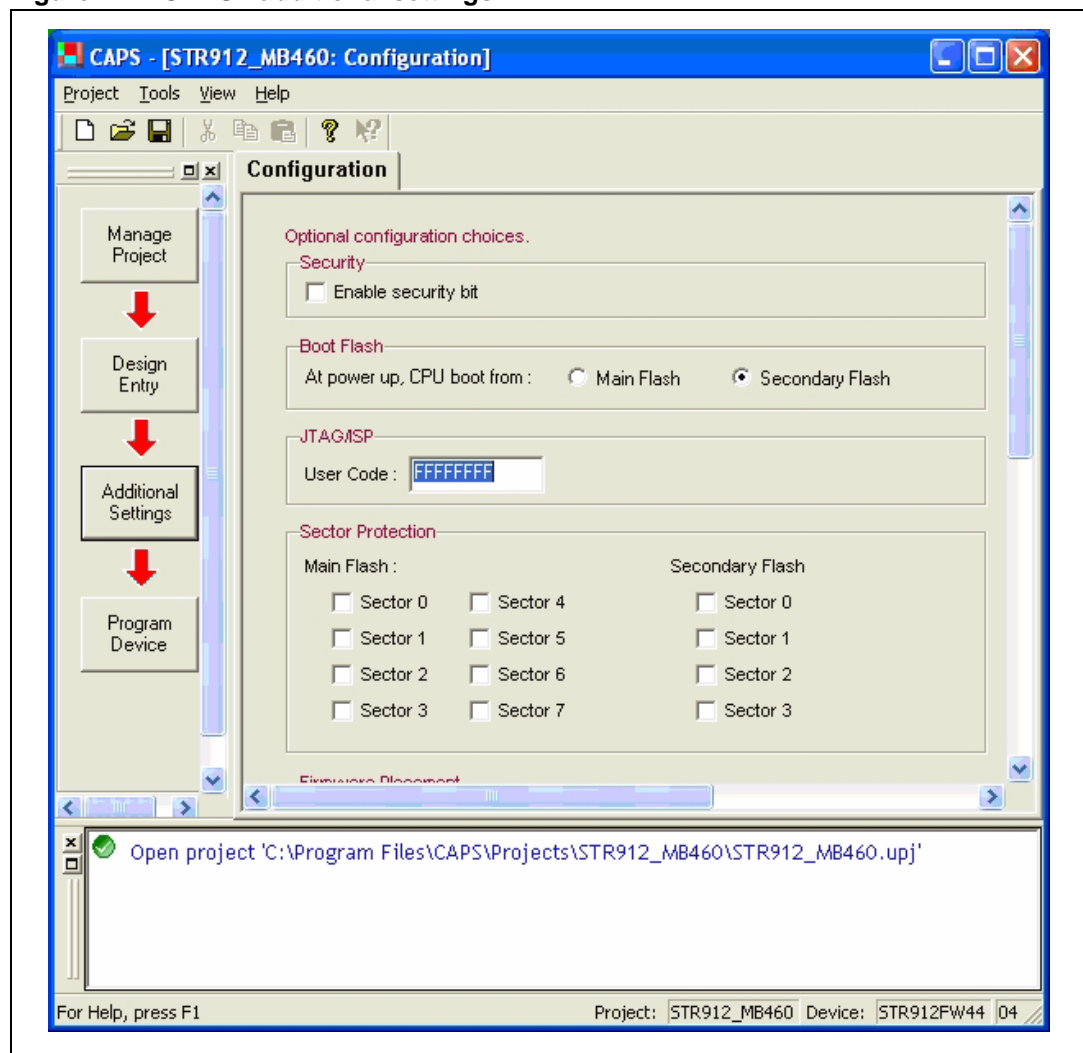
- Note:
- 1 *Part of the STEVAL-IFD001V1 package.*
 - 2 *Software is available on the CD.*
 - 3 *Also available at www.st.com/mcu.*

2 STR9 configuration - CAPS

This section explains how to configure the STR9 microcontroller for DFU firmware use. Ensure that your STR9 dongle is already configured, then follow these steps:

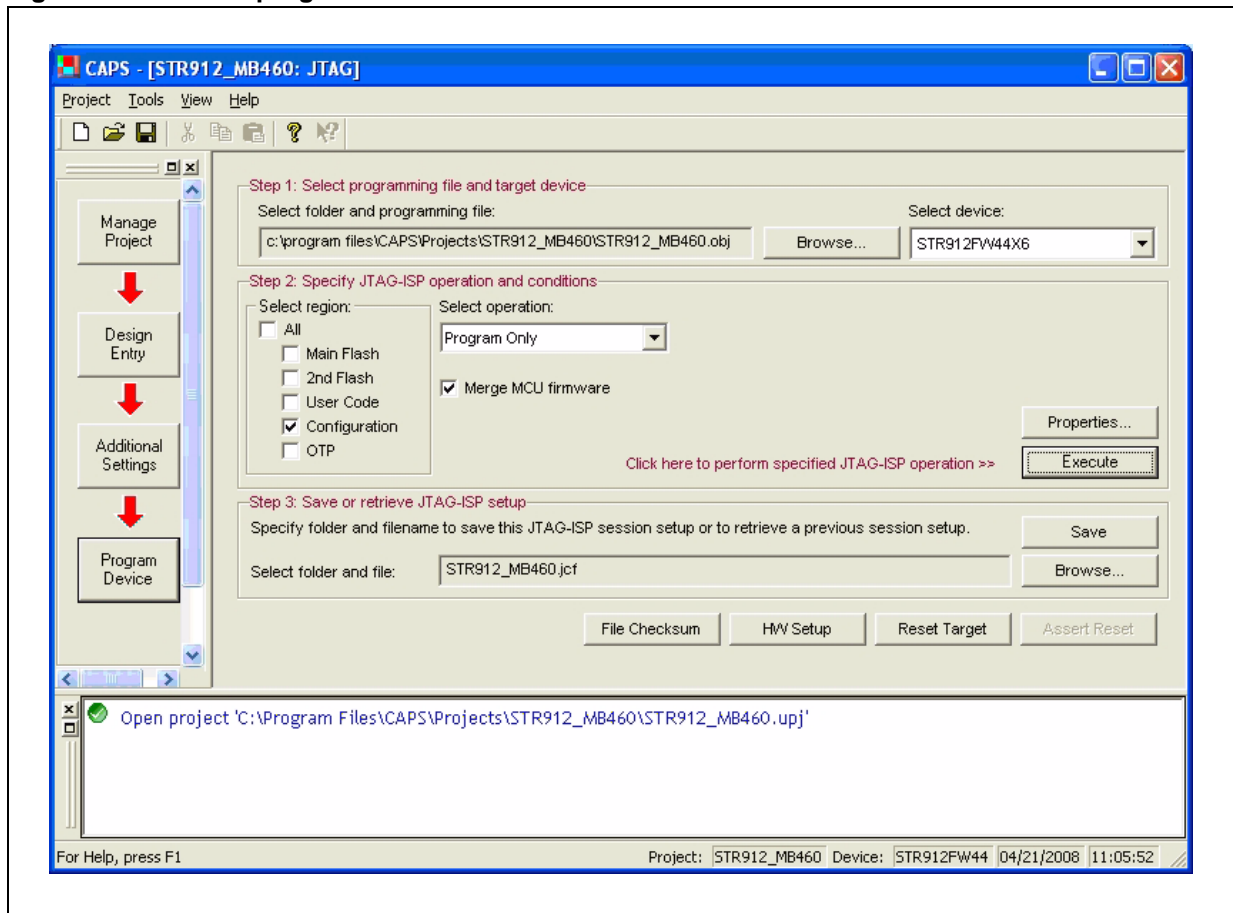
- Connect the dongle to the supply (e.g. connect to a USB port)
- Connect the RLINK-ST JTAG connector (ST link plugged into a USB of your PC)
- Run CAPS
- Create a new project for the STR912. Alternatively you can open an existing project from the CD
- Make sure "Secondary Flash" is selected, as this is the topic of the configuration

Figure 4. CAPS - additional settings



- Flash the device by pressing the Execute button

Figure 5. CAPS - program device



3 Flash the DFU project into the STR9 - IAR Embedded Workbench®

This section explains how to flash the DFU firmware into your STR9 microcontroller. The STR9 dongle should already be pre-flashed with this firmware.

Follow these steps:

- Connect IAR J-link to JTAG connector of the dongle

Figure 6. Dongle programming



- Extract the DFU.zip file, which is located in the \sw directory of the CD
- Open the project:

DFU\str91x demos\Device Firmware Upgrade\project\EWARM\Device Firmware Upgrade.eww.

- Flash the software (enter into and leave it in debug mode)
- When complete, close the IAR Embedded Workbench tool and unplug the dongle

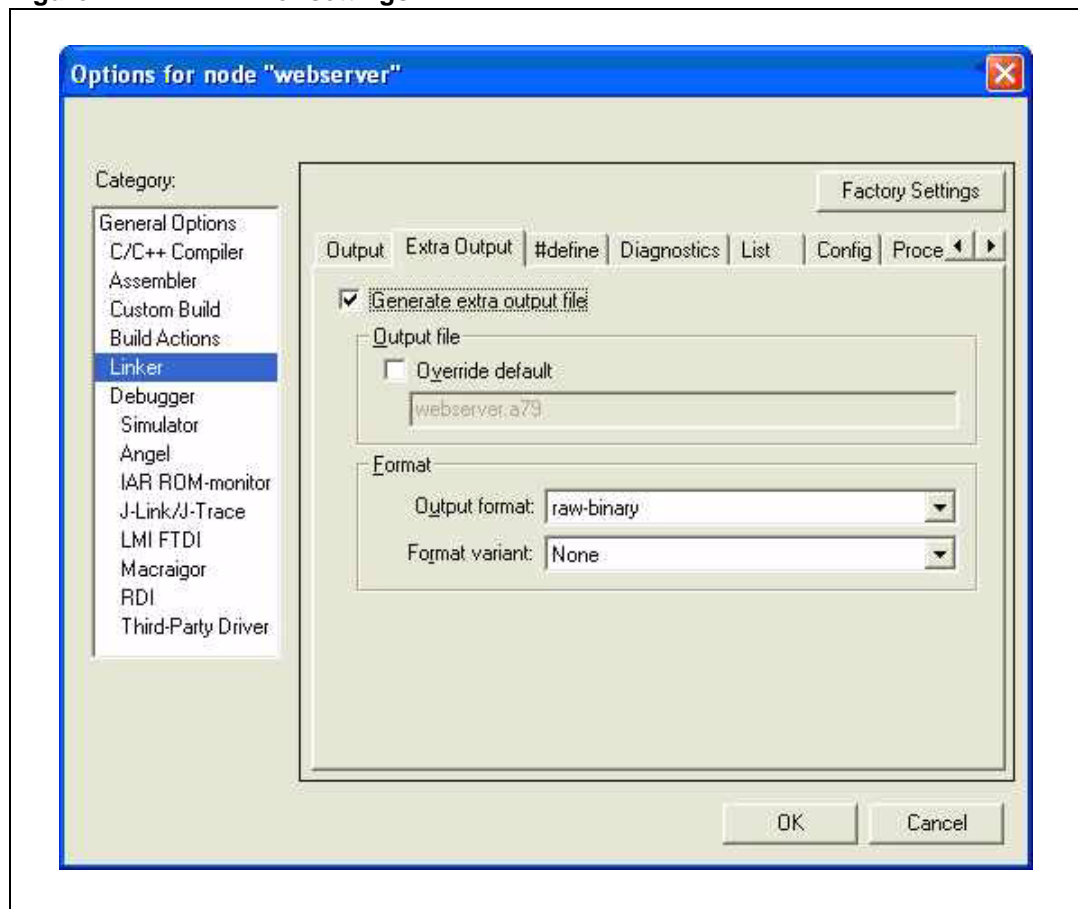
4 Create output for the DFU image - IAR Embedded Workbench

This section explains how to create an output from. The output is going to be used for creation of the DFU image later.

Follow these steps:

- The DFU uses remapping of memory by FMI, therefore you must comment all your FMI settings. Let's check the 91x_init.s file in your application.
- Create a79 output, set to *raw-binary* format as shown in [Figure 7](#).

Figure 7. IAR - linker settings

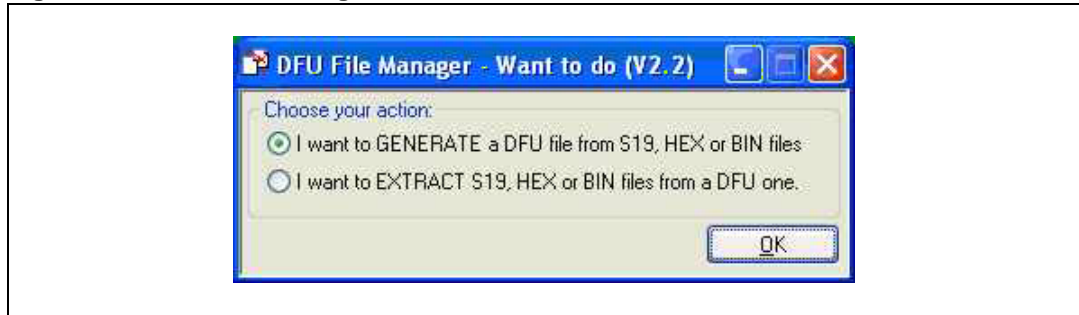


You should have the a79 file into your \debug\exe directory. This file will be used later for the DFU image (refer to [Chapter 5](#)).

5 Create the DFU image - DFU file manager

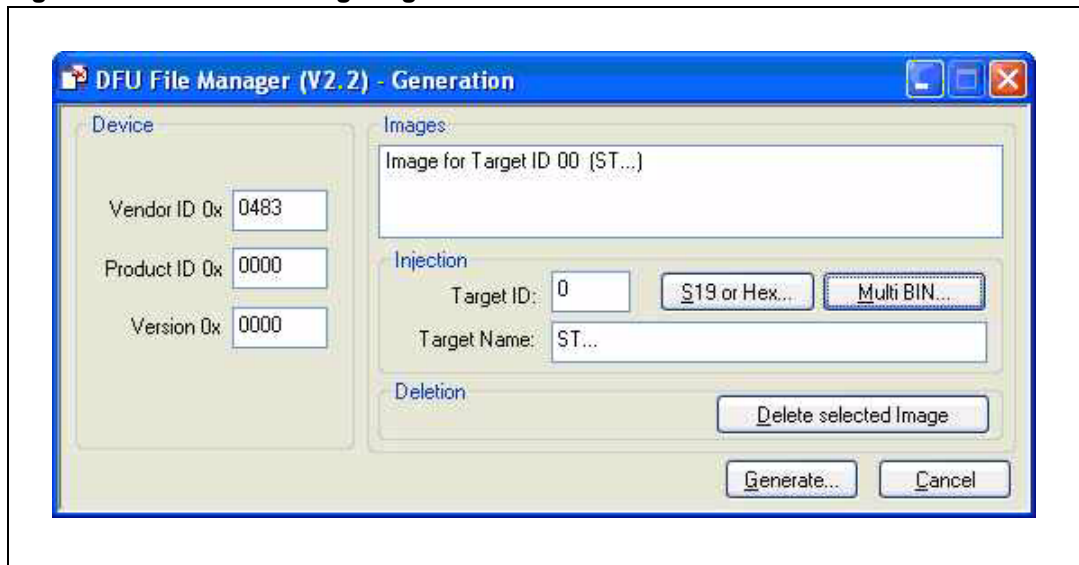
- Run the DFU file manger

Figure 8. DFU file manager



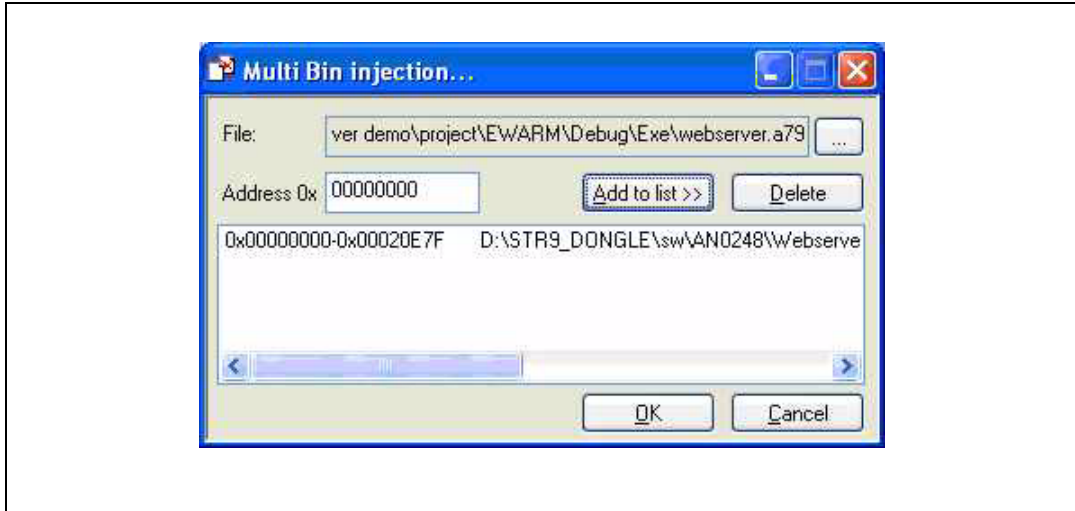
- Click Multi BIN

Figure 9. DFU file manager - generation



- Select the .a79 file generated by IAR Embedded Workbench and click Add to list (the address should be all zeros).

Figure 10. Multi Bin injection



- Generate the DFU image by clicking on the Generate button (see [Figure 9](#)).

Figure 11. DfuFileMgr

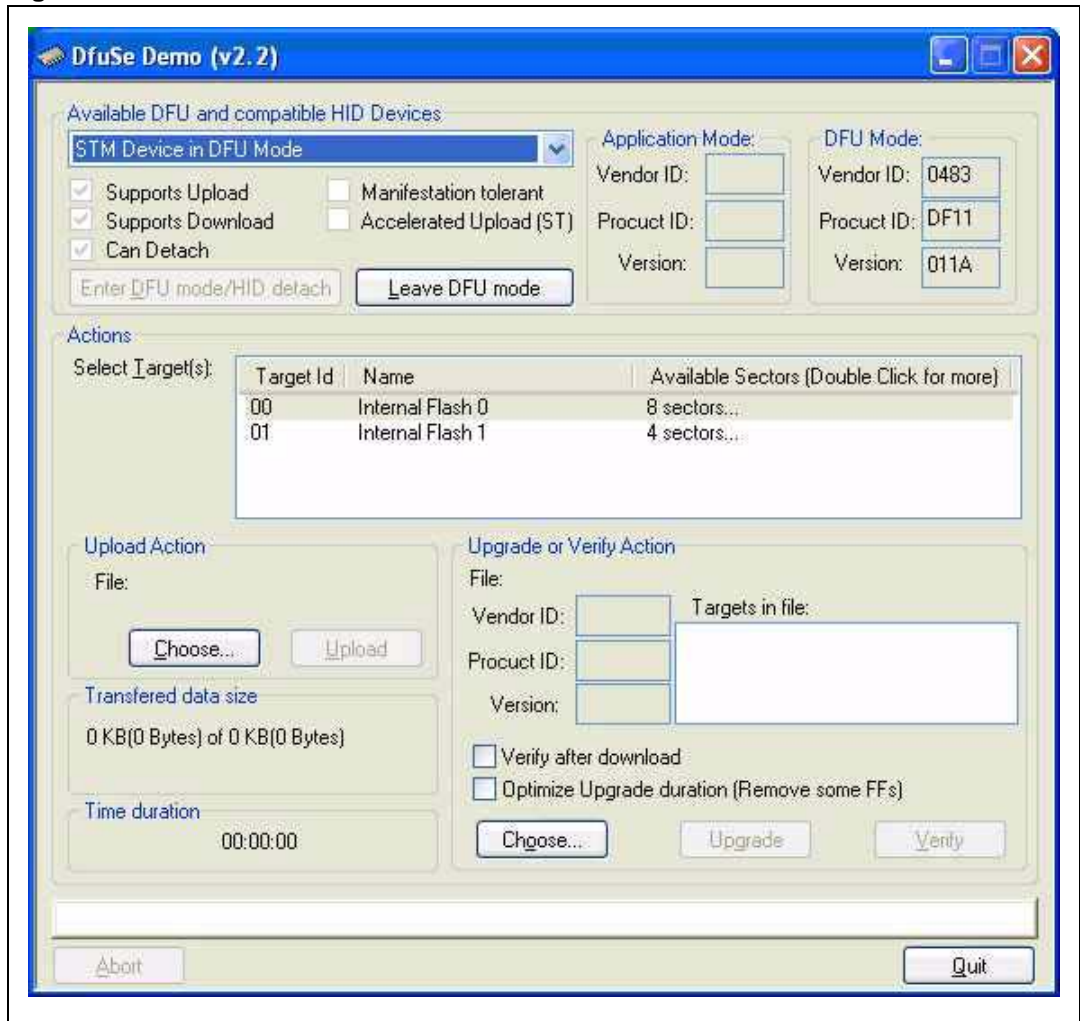


- You should have a .DFU file on your PC (e.g. webserver.dfu).

6 Firmware upgrade - download your application image

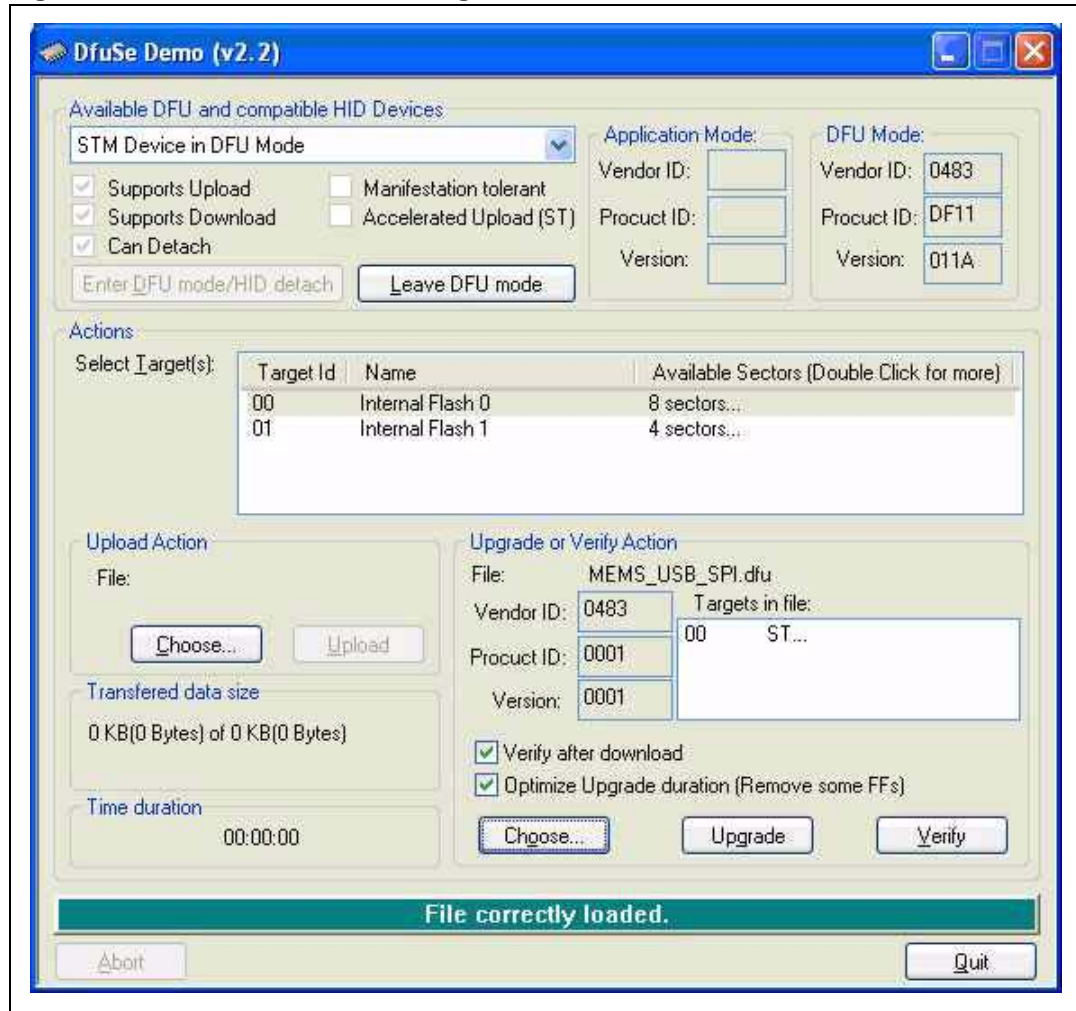
- Hold down button B81 on the dongle and plug the dongle into the USB port. When the DFU firmware starts, the red LED LD81 starts blinking.
- Run C:\Program Files\STMicroelectronics\DfuSe\BIN\DfuSeDemo.exe.

Figure 12. DfuSe demo - initial screen



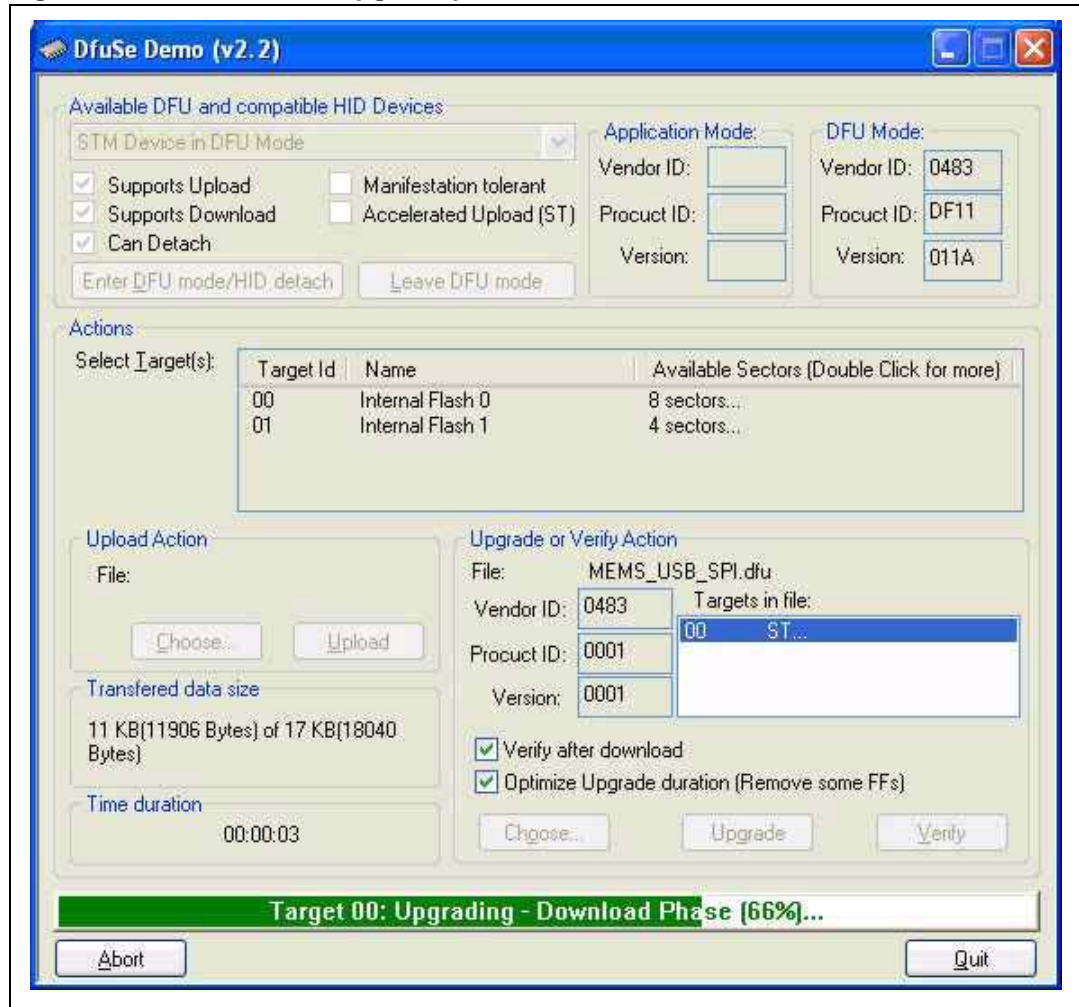
- Put a check in the boxes next to: "Verify after download" and "Optimize Upgrade duration". Click "Choose button" and select your image. Once done, the message "File correctly loaded" should appear, as in figure *Figure 13*.

Figure 13. DfuSe demo - select target



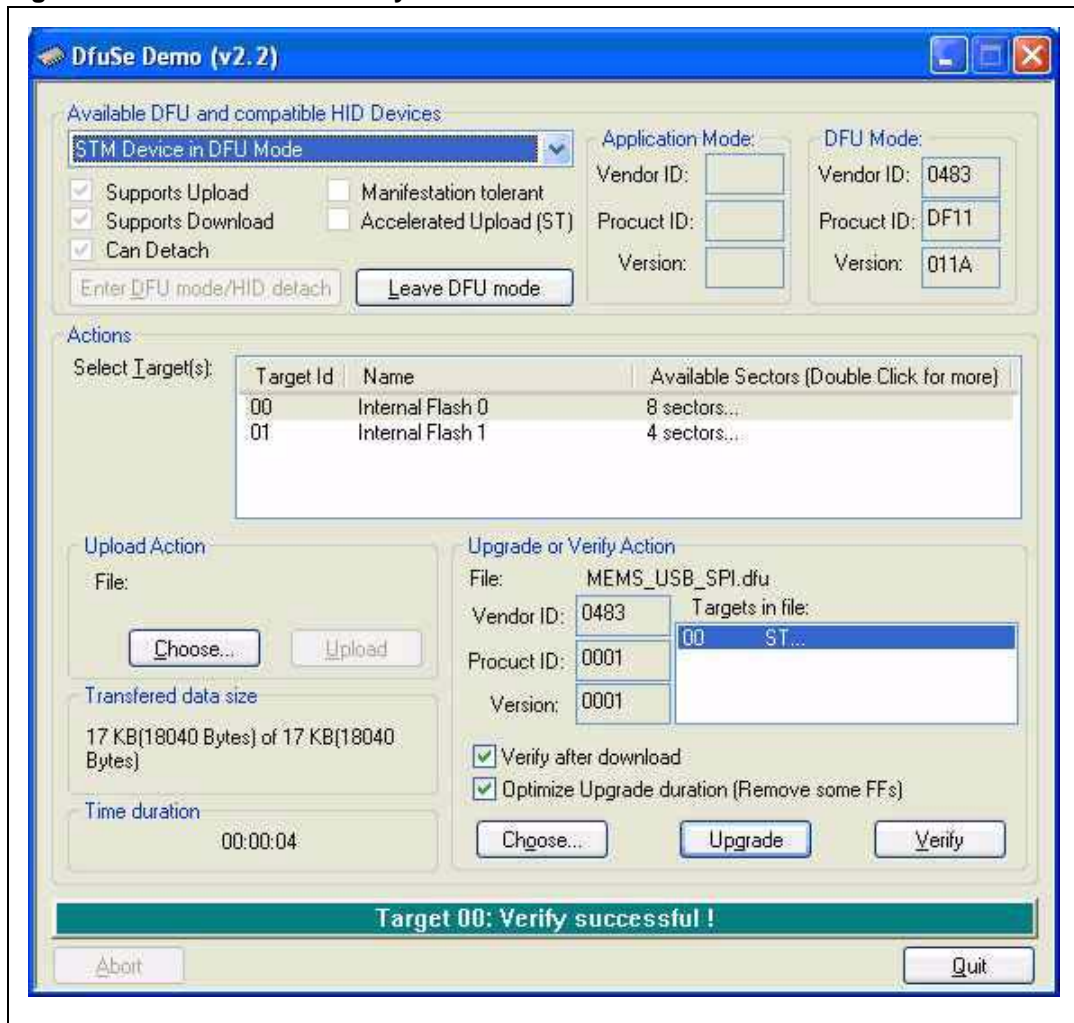
- Select the target in the Select Target section (see [Figure 14](#)) and click "Upgrade". The device will start to flash.

Figure 14. DfuSe demo - upgrade process



- You can click "Verify" at any time

Figure 15. DfuSe demo - verify



- Your image is downloaded in the dongle. You can unplug the dongle and turn off the DfuSe software.

7 Running the downloaded application

To run your application, simply plug the STR9 dongle into a supply (e.g. a USB port), and the application will start automatically.

8 Troubleshooting

If, after downloading your application into the dongle, the application doesn't run:

- Check the 91x_init.s file for the FMI configuration (it must be unused)
- Check your system clock settings, keeping in mind that the clock is already running and the situation is different with respect to a startup after hardware reset. In this case you should follow the correct order for register re-configuration. For the first approach you can comment this section and try your application without these settings. If it begins working, then the clock settings are the root cause of the failure.

9 Revision history

Table 1. Document revision history

Date	Revision	Changes
10-Jul-2008	1	Initial release.

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