



ST8500 MM

Firmware Download

ST8500 UM – Firmware Download

User Manual – Preliminary Internal DRAFT DOCUMENT

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The goal of this document is to describe how to download FW on the external SPI flash on ST8500 device.

Python source code is also available in the package and be used as reference for custom developments. For more details on the boot from host procedure and flash download commands, please, refer you to [ST8500 Boot UM](#) available on www.st.com

TABLE OF CONTENTS

1 Document Conventions	3
1.1 List of abbreviations	3
2 Getting Started	4
2.1 Package Description	4
2.2 Hardware and Software Requirements	4
2.3 ST8500 Module GPIO configuration.....	4
3 Image Loader Process Description	5
3.1 Image Loader Commands	5
3.2 RTE and PE Image Load on SPI Flash	5
3.3 Erase SPI Flash.....	6
4 Revision history	8

LIST OF FIGURES

Figure 1: setup	4
Figure 2: download start.....	6
Figure 3: download completion message	6
Figure 4: Erase command result	7

LIST OF TABLES

Table 9. Document revision history	8
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1 Document Conventions

1.1 List of abbreviations

CRC	Cycle Redundancy Check
FSM	Finite State Machine
FW	Firmware
GPIO	General Purpose Input/Output
HI	Host Interface

2 Getting Started

2.1 Package Description

The package contains mainly:

- Executable version of image-loader for ST8500 MM device (compiled version of python script available in the package)
- ST8500_SPI_Loader.img binary file loaded on ST8500 module from image-loader in order to handle SPI flash read/write operations.
- Image-loader application source code (Python 3.x codex) in order to allow users to modify and re-use it accordingly to specific needs.
- Requirements.txt file with full list of python dependencies to be installed in case you need to run the python version of image-loader.

2.2 Hardware and Software Requirements

If executable version is used no additional software need to be installed. Otherwise you need to install Python 3.x and all packages listed into Requirements.txt file included in the package.

The utility included into the package requires to talk directly with ST8500 modem. To connect it to the PC you can use one of following solutions:

1. One FTDI's USB to RS232 converter with the driver installed and properly working on your working machine
2. External microcontroller working as software bridge (Virtual COM) between ST8500 modem and working machine USB with required drivers installed. For this purpose you can use [EVALKITST8500 motherboard](#)

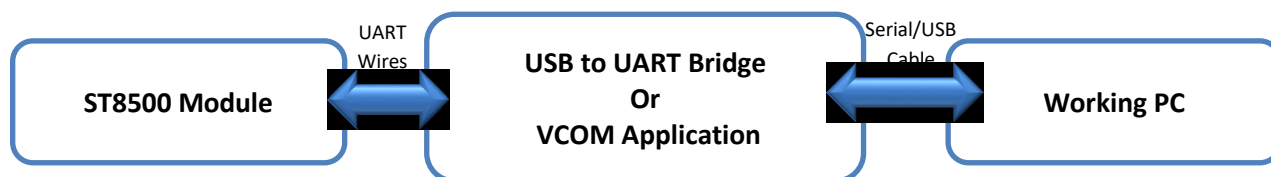


Figure 1: setup

2.3 ST8500 Module GPIO configuration

The image loader utility implements communication protocol described in boot user manual (see [ST8500 Boot UM](#)) available on www.st.com.

In order to get the tool working you must be sure that ST8500 boot0 and boot1 pins are both to 0 as described in table 2 of ST8500 Boot UM.

3 Image Loader Process Description

3.1 Image Loader Commands

In order to get complete info on how to run the script, please run following command:

```
python image-loader-st8500.py --help
```

You should see following output:

```
usage: image-loader-st8500.exe [-h] [--erase] [--pe PE_FILE] [--rte RTE_FILE]
                               [--port COM_PORT]

optional arguments:
  -h, --help            show this help message and exit
  --erase               Force SPI flash erase
  --pe PE_FILE          Pass PE img filename
  --rte RTE_FILE        Pass PE img filename
  --port COM_PORT       Serial port name to be used
```

3.2 RTE and PE Image Load on SPI Flash

If the setup is complete and the ST8500 module has started correctly you can

- Open a windows CMD window
- Copy PE and RTE binary img files directly into the utility directory
- Trigger a reset to the module in order to be sure it is in boot mode and ready to get boot commands over serial interface
- Run following command line:

```
image-loader-st8500.exe --port COMXX --pe ST8500_MM_2.0.0.img --rte
dualmodeMMplc_key_ST8500.flash.v3654.img
```

In particular, arguments required are:

1. - **-port <COM PORT NAME>** : is the COM port associated to the USB interface connected (e.g. COM11)
2. - **-pe "PE image filename"**: pe filename to be loaded into SPI flash
3. - **-rte "RTE image filename"**: RTE image filename to be loaded into SPI flash

If the download procedure starts correctly you should see following log messages scrolling.

```
True
MIB Answer Received: [22, 22, 33, 4, 0, 254, 0, 0, 0, 0, 16, 0, 0, 0, 100, 20]
MIB ID: 33
PAYLOAD LEN: 4
PAYLOAD: [16, 0, 0, 0]
Loading IMG Header
Header OK... start sending file
Done Write 2.8%
Done Write 5.4%
Done Write 8.0%
Done Write 10.6%
Done Write 13.2%
Done Write 15.7%
Done Write 18.3%
Done Write 20.9%
Done Write 23.5%
Done Write 26.1%
Done Write 28.7%
```

Figure 2: download start

On completion instead message in picture below will be displayed confirming that the SPI flash has been programmed successfully.

```
Send data: ('[2, 38, <MM_cmd_id.SFLASH_request_ID: 78>, <SFLASH_operation.WRITE: 2>, 32, 0, 0, 42, 1, 0, 77, 174, 158, 13, 79, 237, 205, 91, 24, 38, 87, 239, 64, 61, 225, 198, 36, 148, 242, 49, 49, 1, 158, 162, 234, 187, 51, 49, 135, 162, 203, 69, 102, 16]')
Received: SFLASH_confirm_ID
SFLASH Confirm
FW Upload status : 3
OK: FW upload completed
```

Figure 3: download completion message

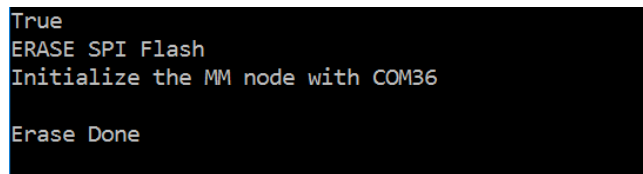
Once completed you can switch boot mode GPIOs in order to boot from SPI flash directly and at this point you can communicate with ST8500 MM device using protocol interface described in the Application Notes released with the package.

3.3 Erase SPI Flash

If you need to erase the SPI flash you can use the following command.

```
image-loader-st8500.exe --port COMXX --erase
```

And you should see following console message



```
True  
ERASE SPI Flash  
Initialize the MM node with COM36  
  
Erase Done
```

Figure 4: Erase command result

Important: this command works only once the MM firmware has been started. If your SPI flash is already empty or loaded with a not working firmware than you can directly proceed with steps described in previous chapter.

Before to continue with a new firmware download you need to trigger one HW reset and redo steps listed in chapter 3.2

4 Revision history

Table 1. Document revision history

Date (yyyy/mm/dd)	Rev	Changes
2019/11/07	0.1	First Draft
2019/11/11	0.2	Firmware download procedure description