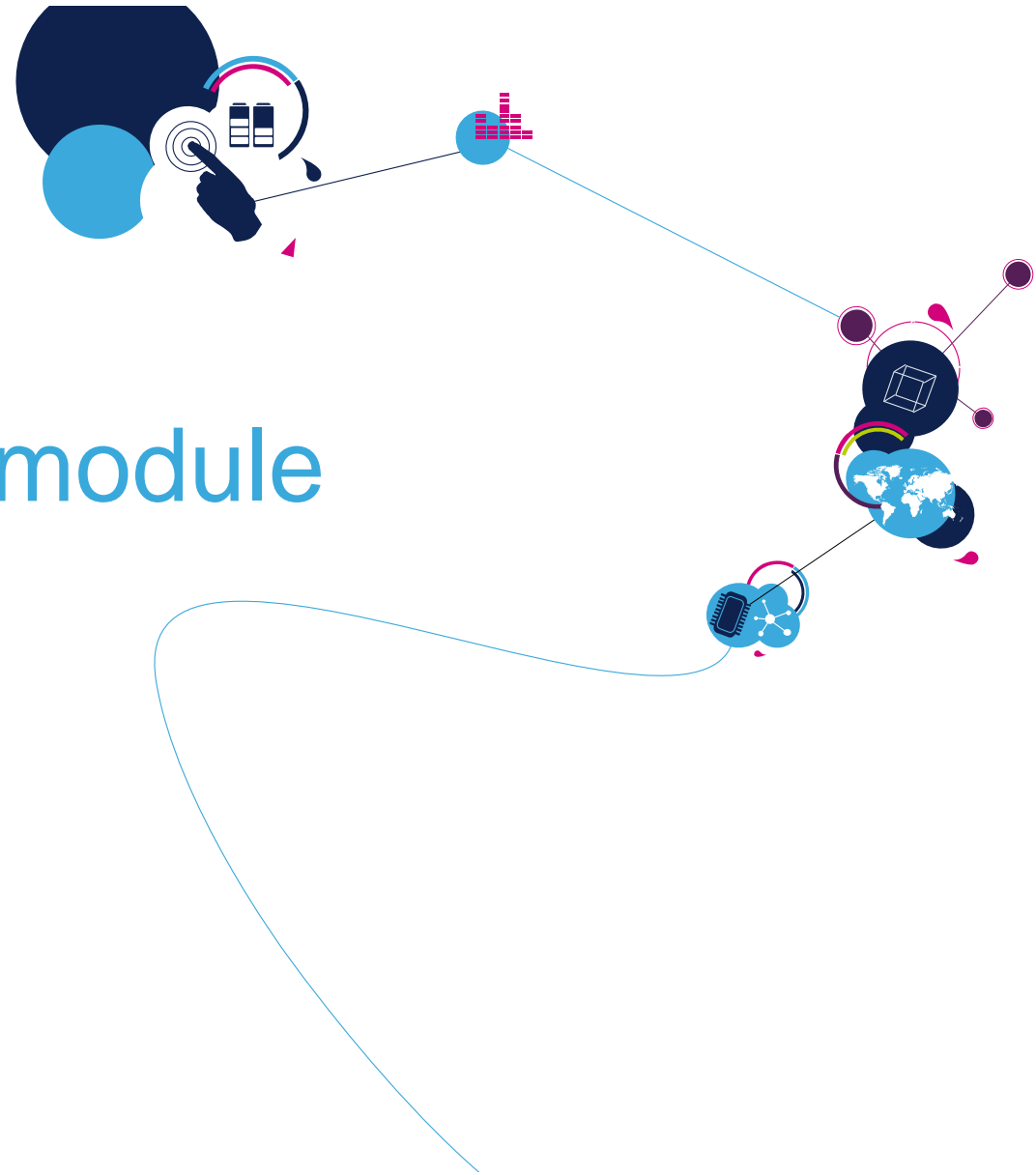


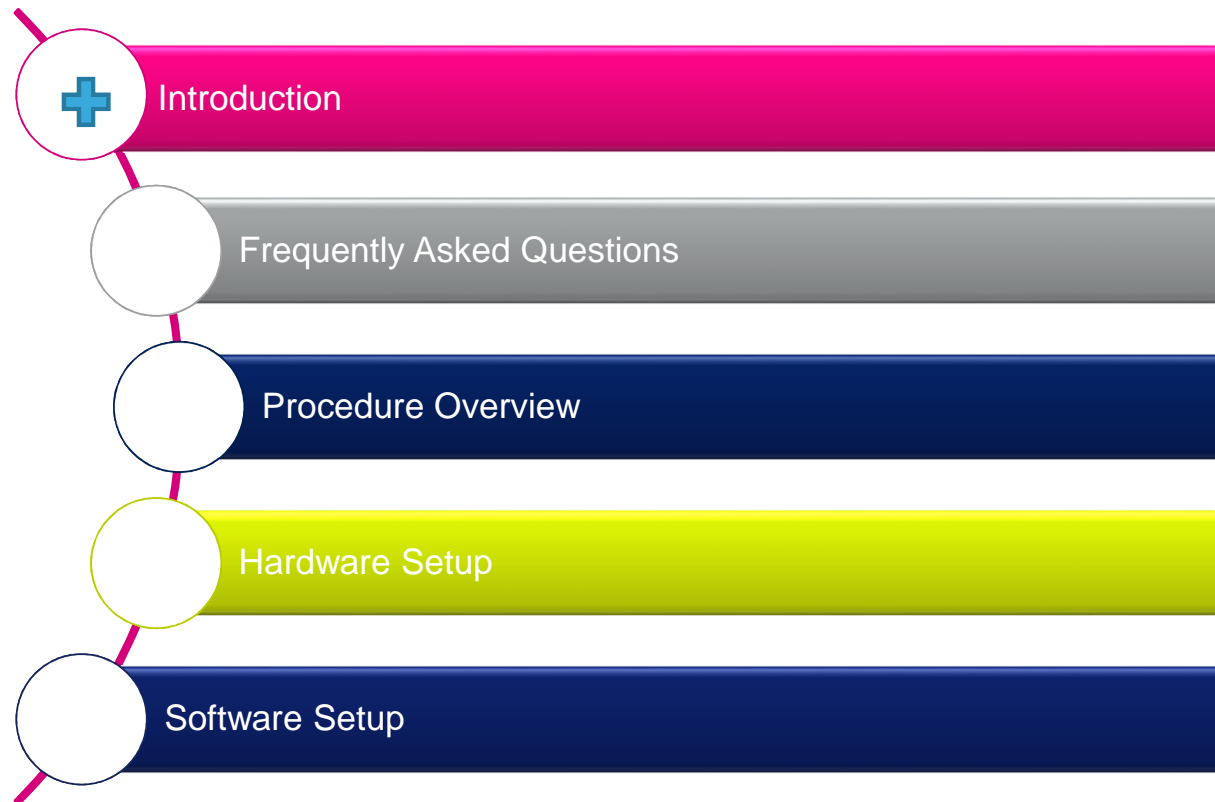
SPBT3.0DPx BT module

Firmware Update Procedure

Revision 1.0



Agenda



Why ST customers should take care of firmware update ?

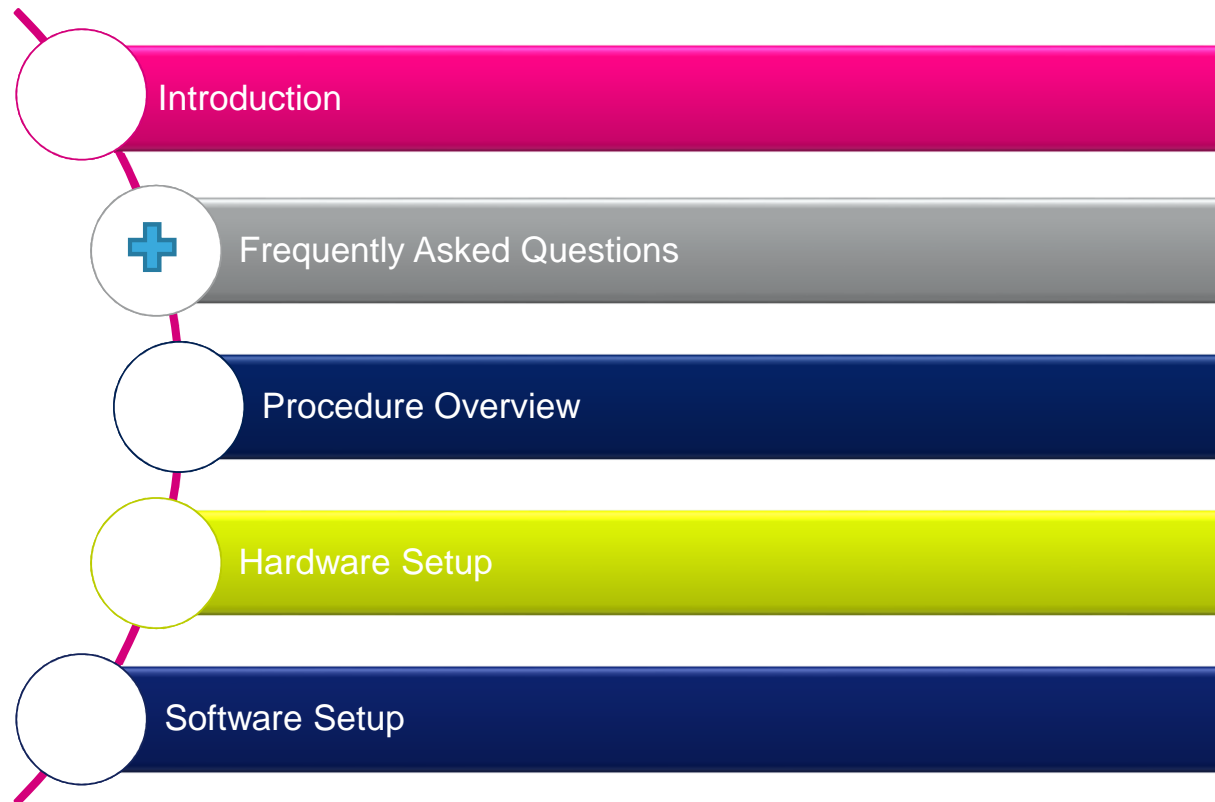
- Take immediate advantage of the latest features and bug fix while customer product are still in the developments phase
- Take control of the FW version loaded in a module when the customer product is in production phase
 - ST always programs with latest version available
 - Modules coming from distributor stocks may have different FW versions



ST strongly encourage customers to implement a FW update procedure

This presentation shows different methods, from a manual mode that can be easily used during evaluation, to a fully automated mode suitable for customer production.

Agenda



Firmware Update - FAQ

Why module comes with different FW versions?

As most of the software, the FW of the SPBT3.0DPx modules keeps evolving with new features and bug fix. Moreover, even if the BT classic is a well consolidated standard, sometime new interoperability issues may arise whenever a new version of mobile OS is launched.

Does all the SPBT3.0DPx module are pre-programmed with the same FW version?

No. ST always program the module with the latest FW version available. So modules manufactured in different period, may have different FW versions.

Moreover, ST can not guarantee that modules acquired through distributors have the latest FW version.

Why ST recommend to implement the firmware programming capability in production line?

- To check that the desired FW version is programmed
- To upgrade (or downgrade) the module to the desired FW version

Firmware Update - FAQ

6

Where can I get a the FW to program my module?

All the official FW versions are available on line (STSW-BT3.0DP1 Or STSW-BT3.0DP2).

Where can I find details on the FW update procedure?

The FW update procedure is described in the module datasheet, in the user manual and the following slides.

Does ST provide tools for the FW update procedure?

Yes, for PC based procedure, refer to the STM32 Flash Loader available on line. For embedded procedure based, sample code is available on request.

In which case the FW version should be downgraded by ST customer?

In case ST customer wants to keep a former FW version because it is has been used to validate its product.

Firmware Update - FAQ

7

Is it possible to damage the module during the FW upgrade procedure?

No. The procedure could be repeated in case something goes wrong.

Does the BT module keep the same BT address after FW upgrade?

Yes. The module always keeps the same BT address.

Does FW update invalidate product certifications?

No. New FWs, unless explicitly mentioned, does not have any impact on the RF layer, thus it does not require any update to certification documents.

How can I know which FW version is installed on a module?

You should use the AT command “AT+AB Build”. The answer is something like:
“AT-AB DataPackage FW Build 010117 – **M.m.xxx**” where **M.n** indicates the version.

Firmware Update - FAQ

Is there a unique HW setup for FW update procedure in production line?

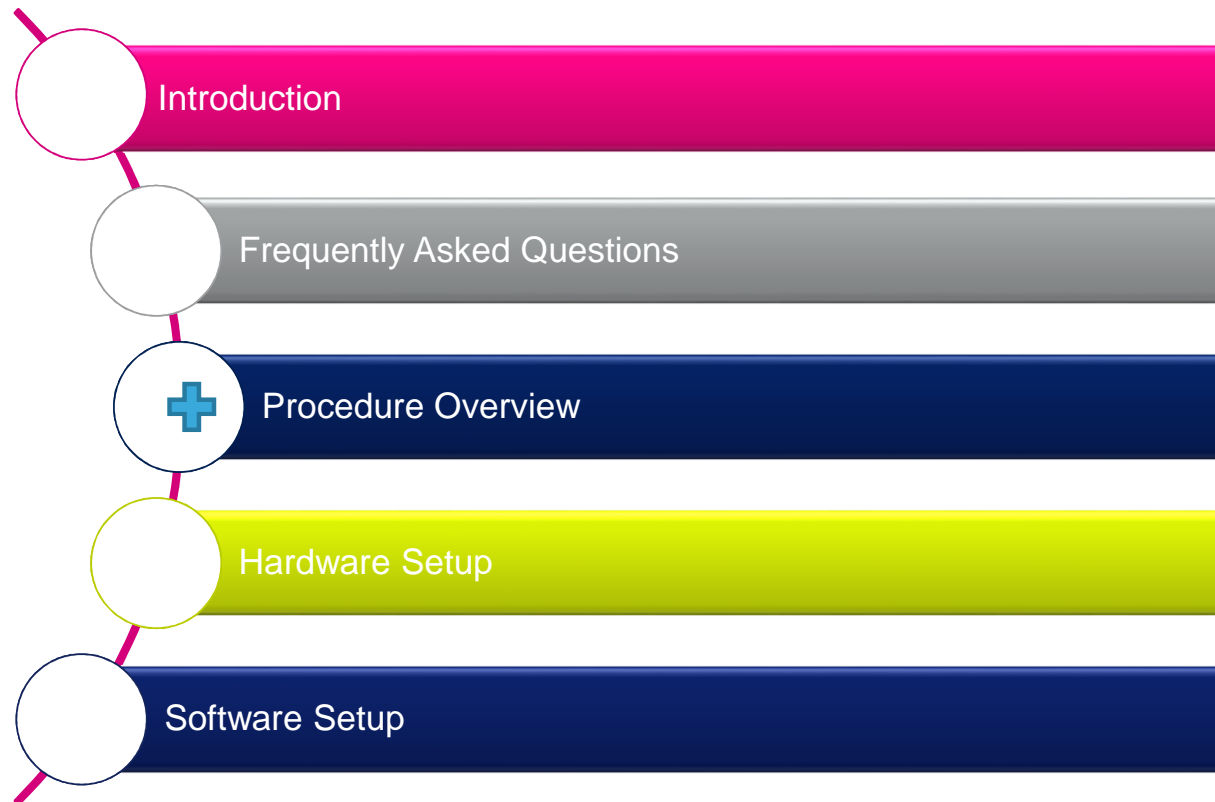
No. Different setup feasible, based on

- HW capabilities of the Customer Main Board
- HW/SW resources available of the production line
- Level of automation required
- Level of time optimization required

It could be managed directly by the HOST microcontroller, or by external machines.

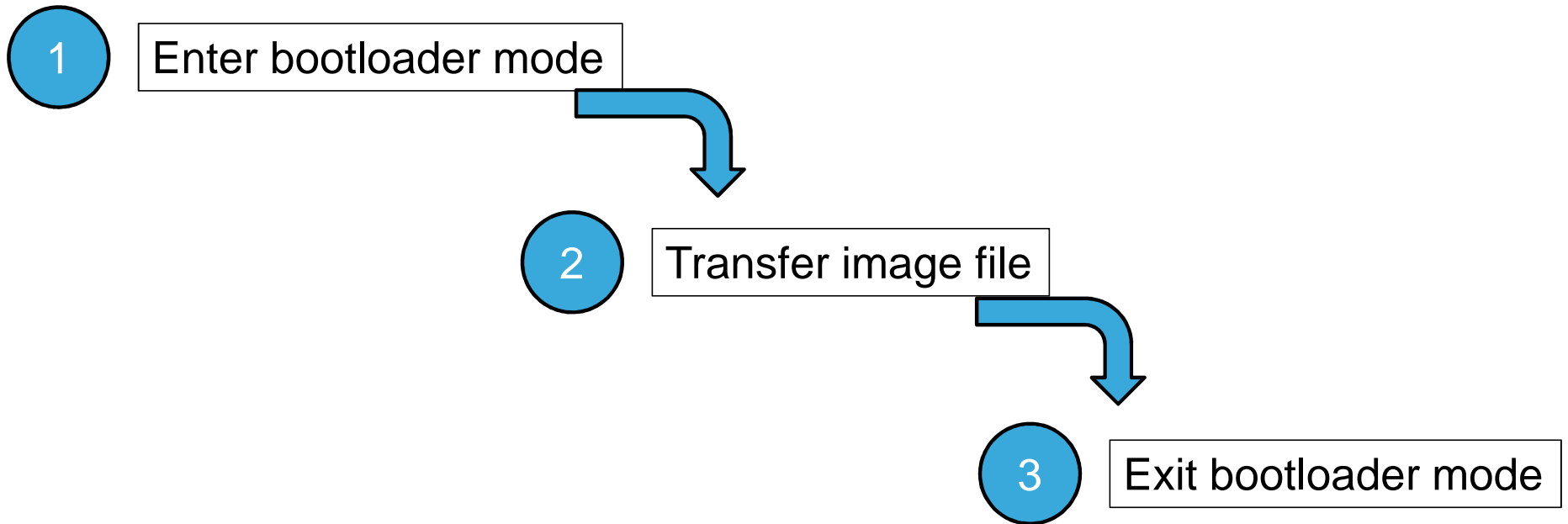
In the next slides, an example of a simple manual setup is presented.

Agenda



Procedure Overview

The FW update is a 3 steps procedure:



1 Enter Bootloader mode

Options to enter bootloader mode:

1. Hardware option: BOOT0 pin is high at power on
2. Software option: send AT command "AT+AB StartFwUpdate"

Notes:

- Option 1 is suggested.
- In case of Option2, the module will remain in bootloader mode for few seconds. Step 2 should be started within 30 seconds.

Specifications of the Bootloader protocol: AN3155

http://www.st.com/content/ccc/resource/technical/document/application_note/51/5f/03/1e/bd/9b/45/be/CD00264342.pdf/files/CD00264342.pdf/jcr:content/translations/en.CD00264342.pdf

Suggested steps:

- Send INIT sequence
- Send GET command
- Send GET VERSION command
- Send GET ID command
- Send EXTENDED ERASE command
- Send WRITE MEMORY commands

FLASHER-STM32

- Windows tool
- GUI and CLI available

3 Exit Bootloader mode

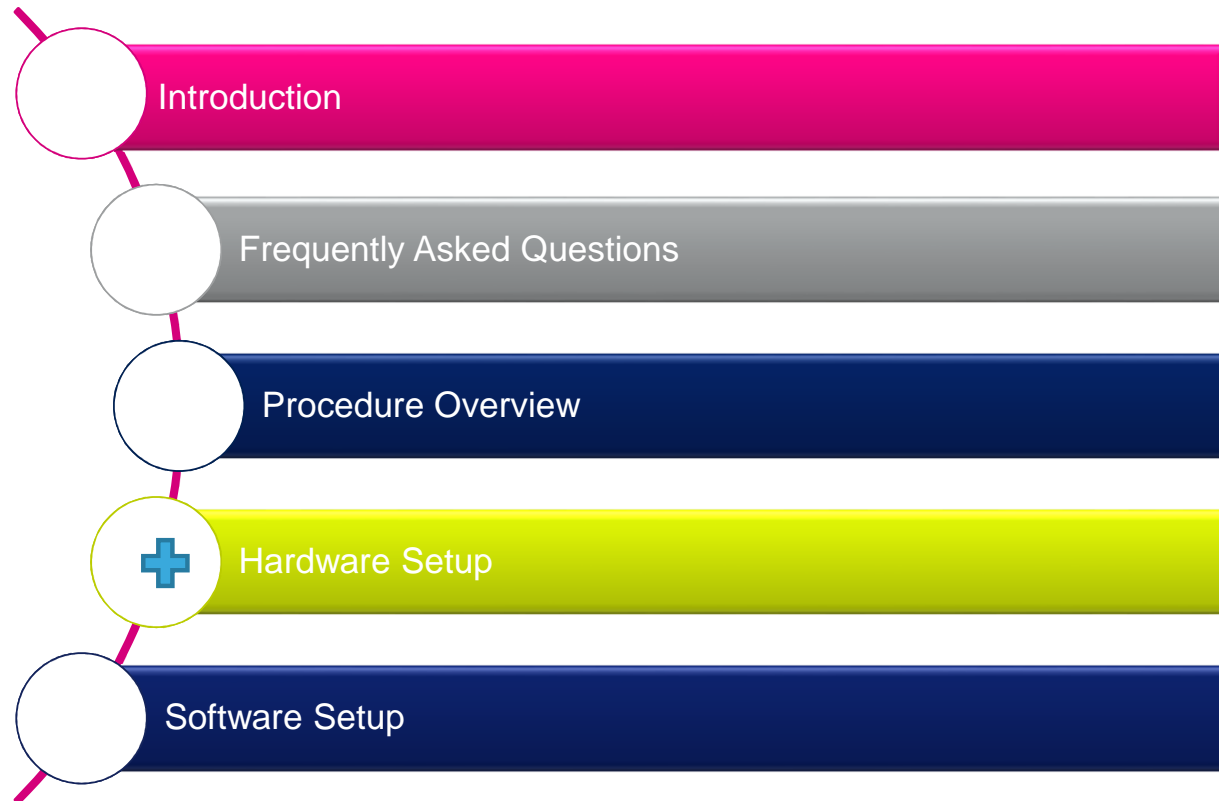
How to Exit Bootloader Mode:

1. Set BOOT0 pin low (or leave it floating, the module has internal pull down)
2. Reset the module (power on reset or HW pin reset)

Notes:

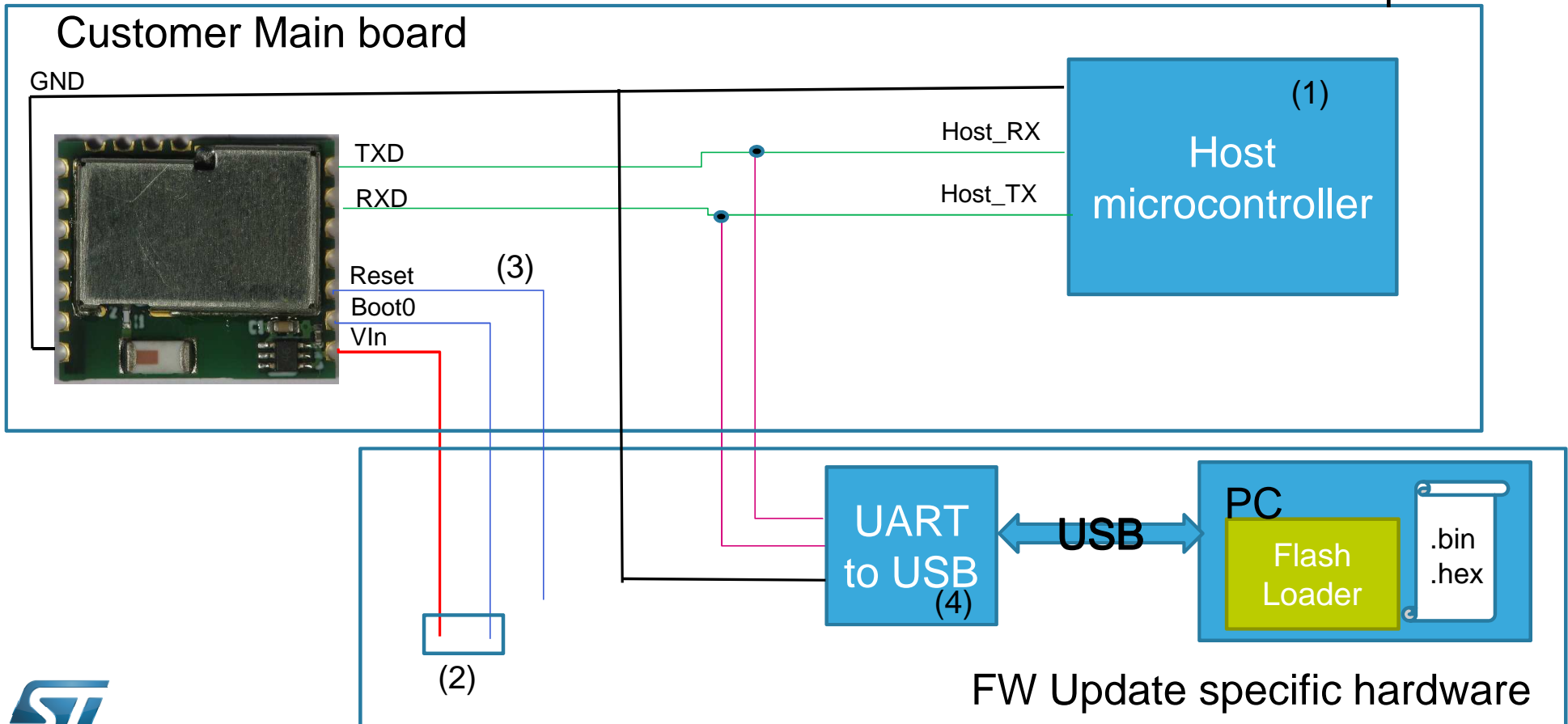
- the FW upgrade also perform a factory reset of the configuration variable values
- the BT address of the module remains unchanged

Agenda



Hardware Setup

Option 1



- Notes:

- 1) The Host Microcontroller should not drive the UART lines:
 - Host Microcontroller UART pins shall be set to input floating state (it could be keep under reset, or the flash could be erase)
- 2) Short Boot0 and Vin pin to set the SPBT3.0DP2 module in Bootloader mode. The short shall be done before enabling the power to the module. (=Boot0 pins should be high at power on to enter bootloader mode)
- 3) Make sure BT module exit reset state. Reset pin should be set HIGH.
- 4) To connect 1.8V UART lines to a PC, a UART to USB converter could be used. For example:
 - CP210x (commercial cables with CP210x chip embedded are available, like the **TTL-232RG-VREG1V8-WE** cable)

- Pro:

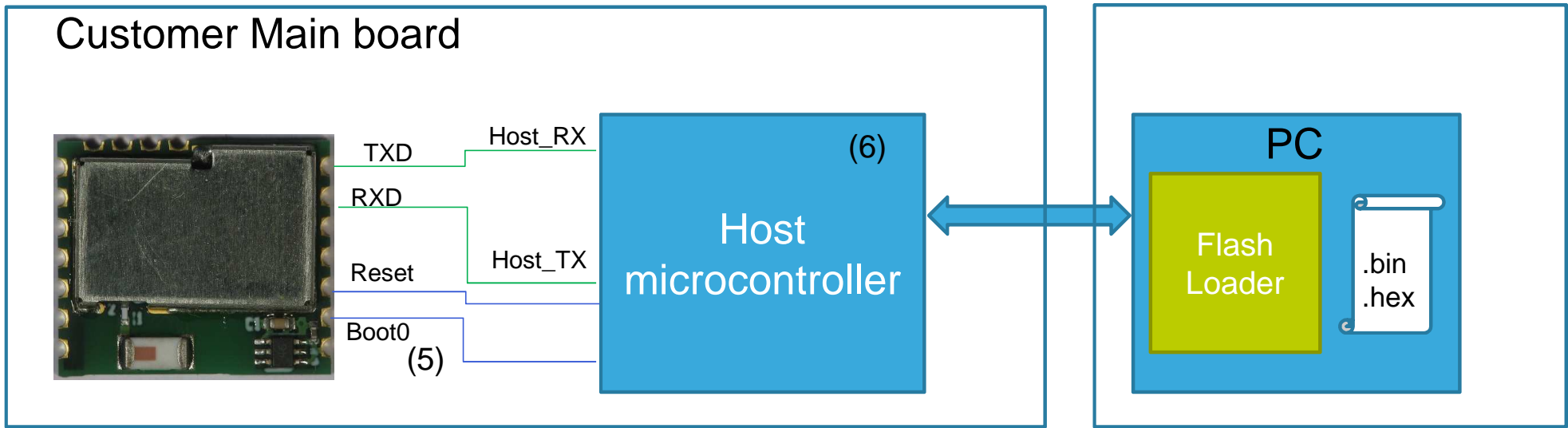
- No impact on HOST firmware
- Software tools available from ST

- Cons:

- dedicated HW

Hardware Setup

Option 2

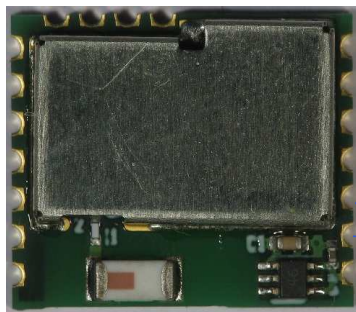


- Notes:
 - (5) The Host set the BT module in Bootloader mode with Boot0 and Reset lines
 - (6) The Host is acting as PC to UART transparent bridge
- Pro:
 - No dedicated HW (because typically the HOST already has a communication port to connect to a PC)
- Cons:
 - Feature to be added into HOST firmware

Hardware Setup

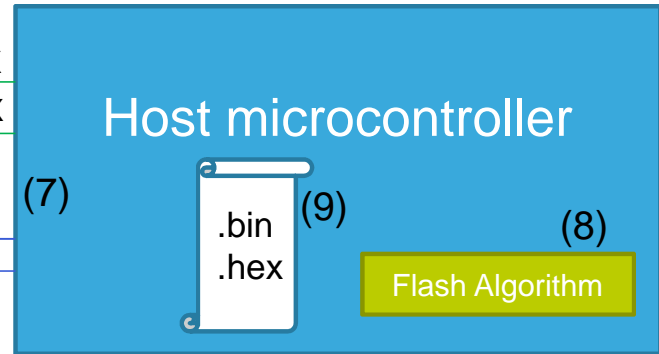
Option 2

Customer Main board



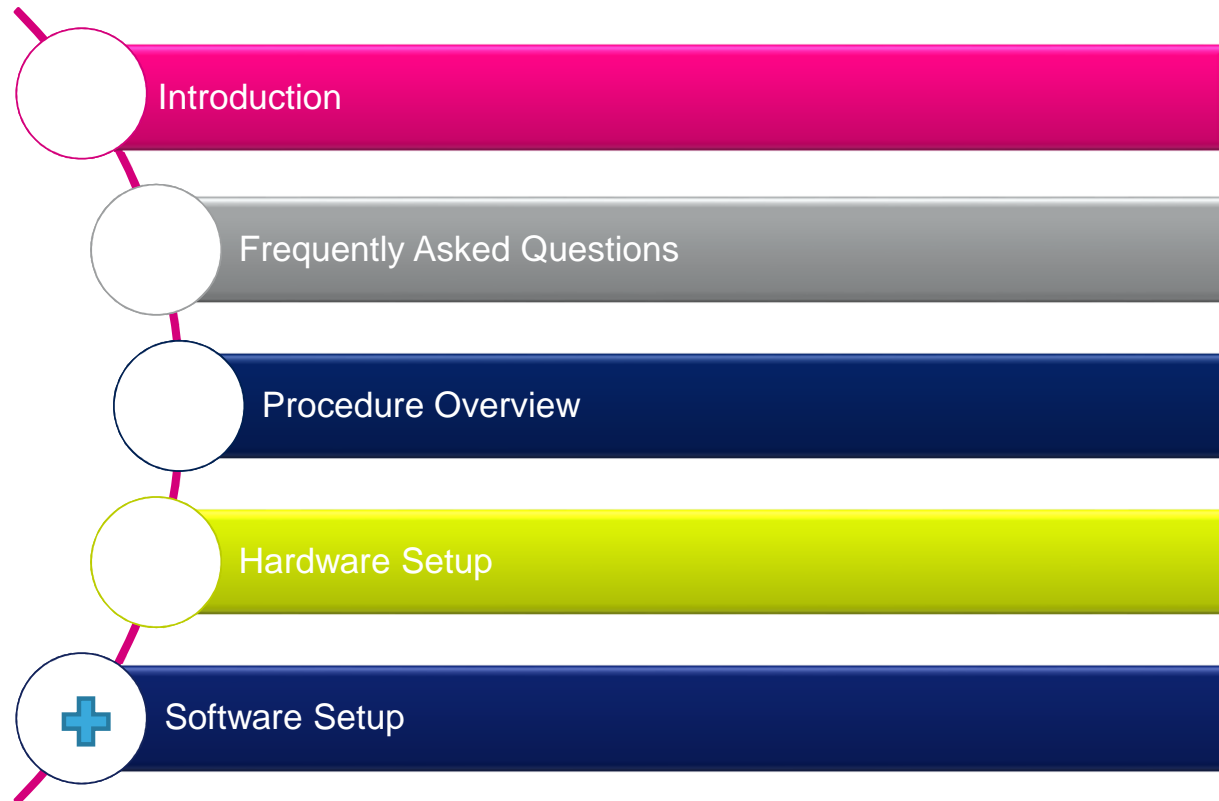
TXD
RXD
Reset
Boot0

Host_RX
Host_TX



- Notes:
 - (7) The Host set the BT module in Bootloader mode with Boot0 and Reset lines
 - (8) The flash programming algorithm is implemented in the Host microcontroller
 - (9) The binary file to be programmed is kept into HOST system
- Pro:
 - No dedicated HW
 - Allows FW update on the field (binary file could be transferred via BT)
 - Programming algorithm sample code available from ST
 - Optimized in time
- Cons:
 - Software feature to be added into HOST firmware
 - HOST need to have space to keep the binary file (around 350 KBytes)

Agenda



Software Setup

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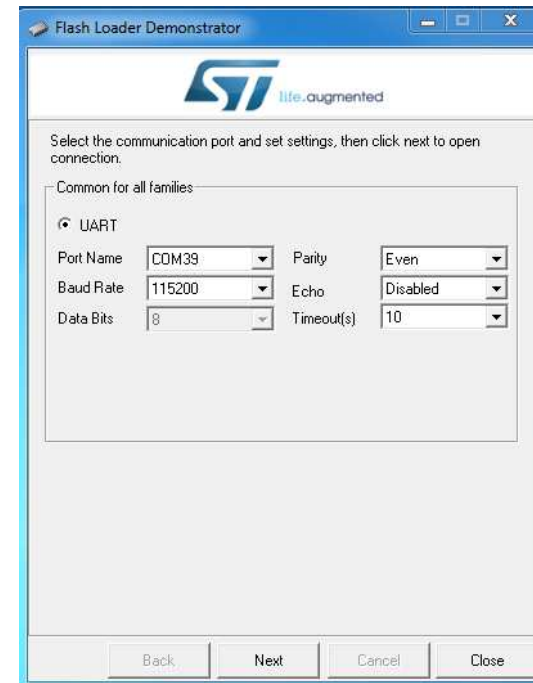
1. Download the FLASHER-STM32 GUI
(<http://www.st.com/en/development-tools/flasher-stm32.html>)
2. Install the software

Software Setup

1. Find the Demonstrator GUI

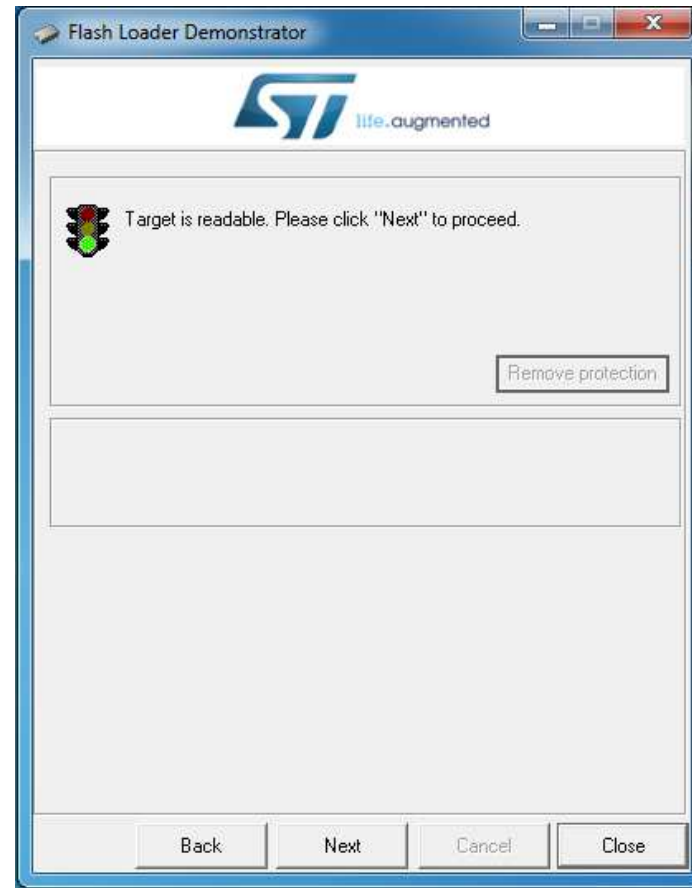


2. Launch the GUI Demonstrator

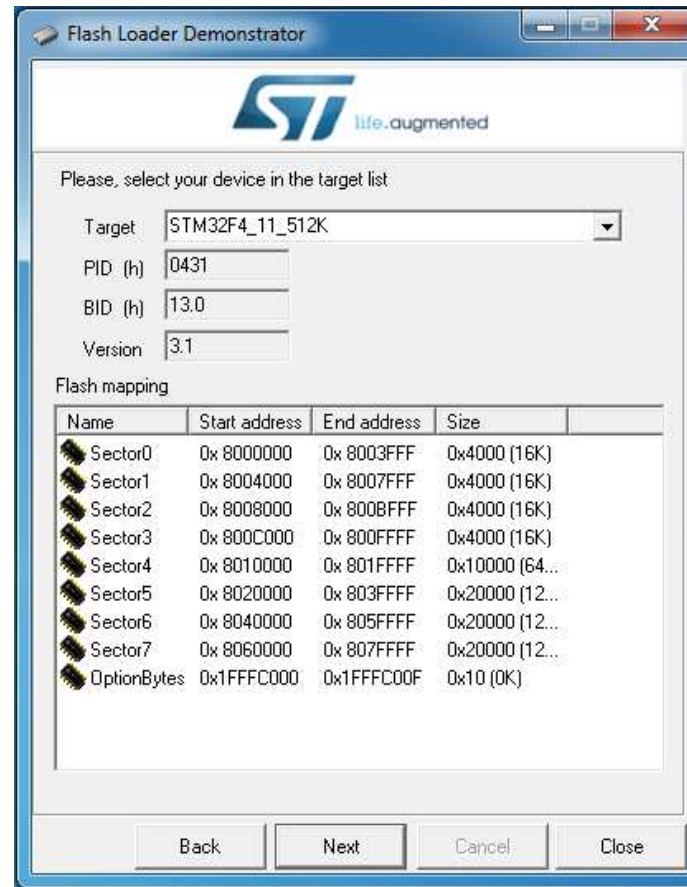


Software Setup

- 3. Select the COM port
- 4. Click on Next



5. Click on Next



Software Setup

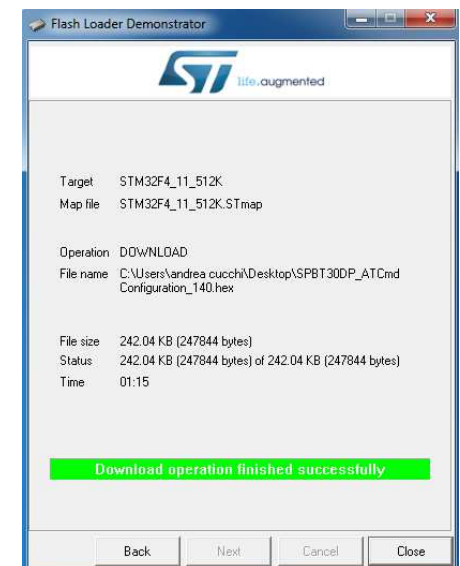
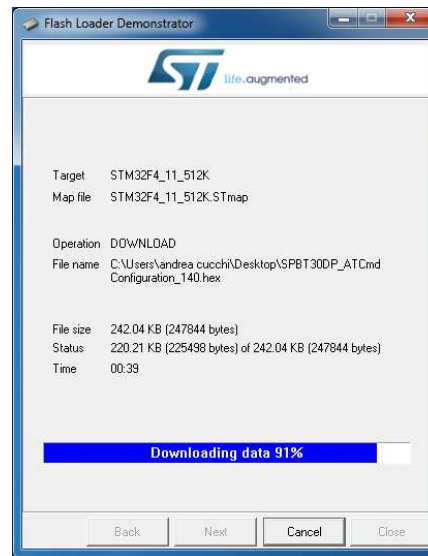
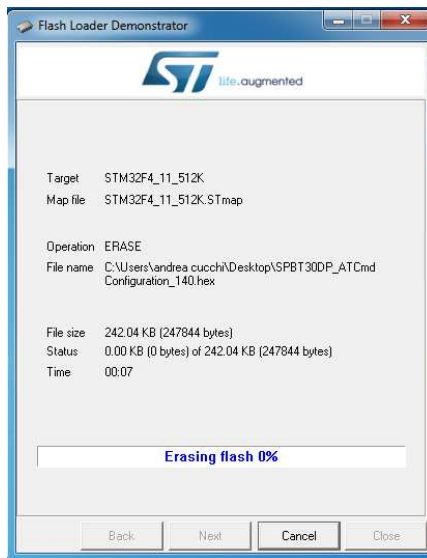
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6.
 - Check “Download to device”
 - Select file to download
 - Check Global Erase
 - Check Verify after Download

7. Click on Next



8. Wait until procedure is successfully completed



- Notes:

- 1) A Command Line Interface of the FLASHER-STM32 tool is also included in the package.
- 2) The version of the FW installed can be check with the AT command:

```
[TX] - AT+AB Build
```

```
[RX] - AT-AB DataPackage FW Build 160120 - 1.0.140
```

In this example it is build 1.0.140, that is:

- FW version major: 1
- FW version minor: 0
- FW version point: 140