Firmware Update Procedure for WINC1500 Wi-Fi Module

AN-004

Prerequisites

- **Hardware Prerequisites**
    - Supported Xplained Pro Evaluation Kit
    - Atmel WINC1500 extension
    - USB Micro Cable (TypeA / MicroB)

- **Software Prerequisites**
    - Atmel Studio 6.2
    - Firmware update project

Introduction

This application note provides useful information to perform firmware update for the WINC1500 Wi-Fi module.

The following topics will be covered:

- Firmware update procedure
- Root certificate update procedure

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Icon Key Identifiers

Icons are used to identify different assignment sections and reduce complexity. These icons are:

INFO   Delivers contextual information about a specific topic

TIPS   Highlights useful tips and techniques

TO DO   Highlights objectives to be completed

RESULT Highlights the expected result of an assignment step

WARNING Indicates important information

EXECUTE Highlights actions to be executed out of the target when necessary

1. Firmware Update Project

The WINC1500 Wi-Fi module firmware update project can be retrieved through the Atmel Software Framework.

- The latest version of the Atmel Software Framework can be found on the Atmel Gallery web site (http://gallery.atmel.com/) or using the Atmel Studio Extension manager
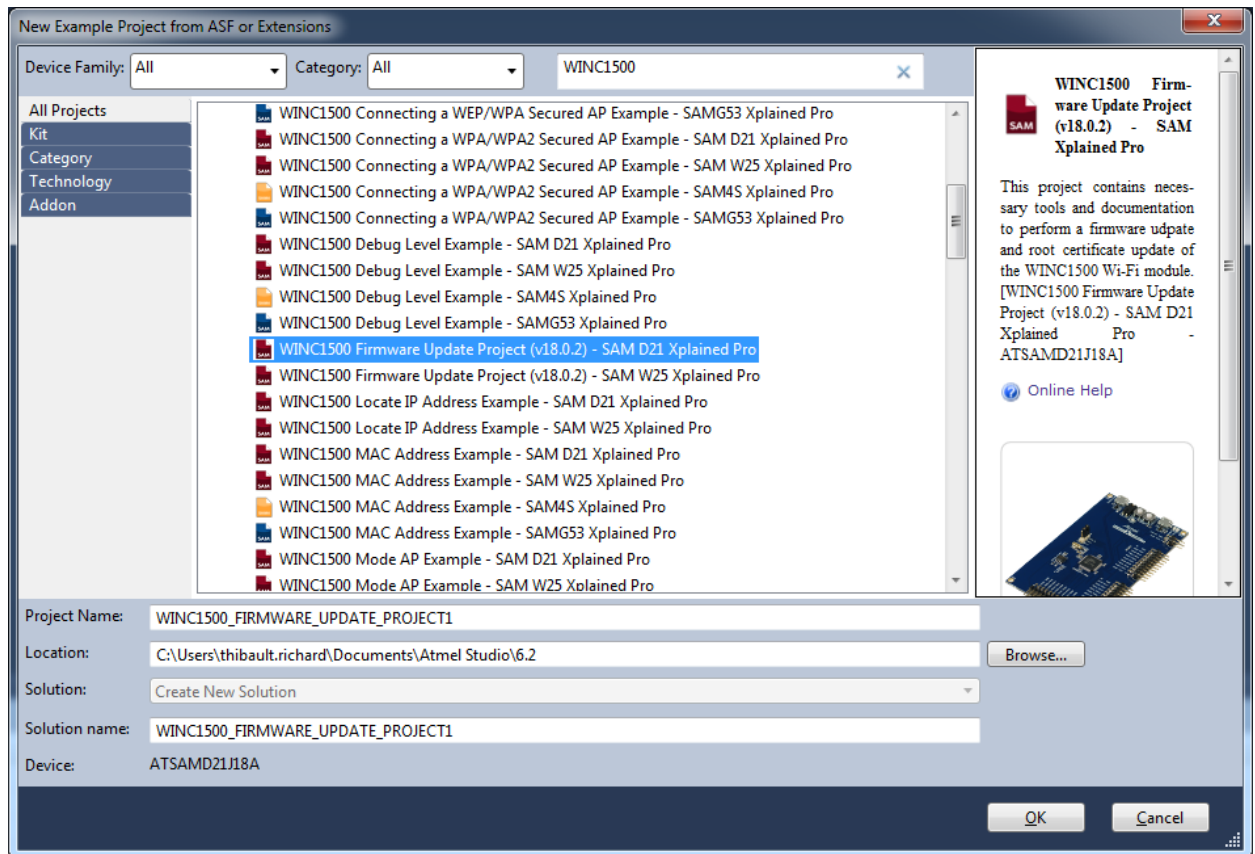
1.1 Atmel Software Framework

Once the Atmel Software Framework is up-to-date, you can open and search for the Firmware Update Project from the *"New Example Project from ASF..."* menu in Atmel Studio.

INFO   WINC1500 Wi-Fi module related projects are all prefixed with "WINC1500" making it easier to filter the project in the dialog.
The firmware update version is printed both in the project name and in the project description.
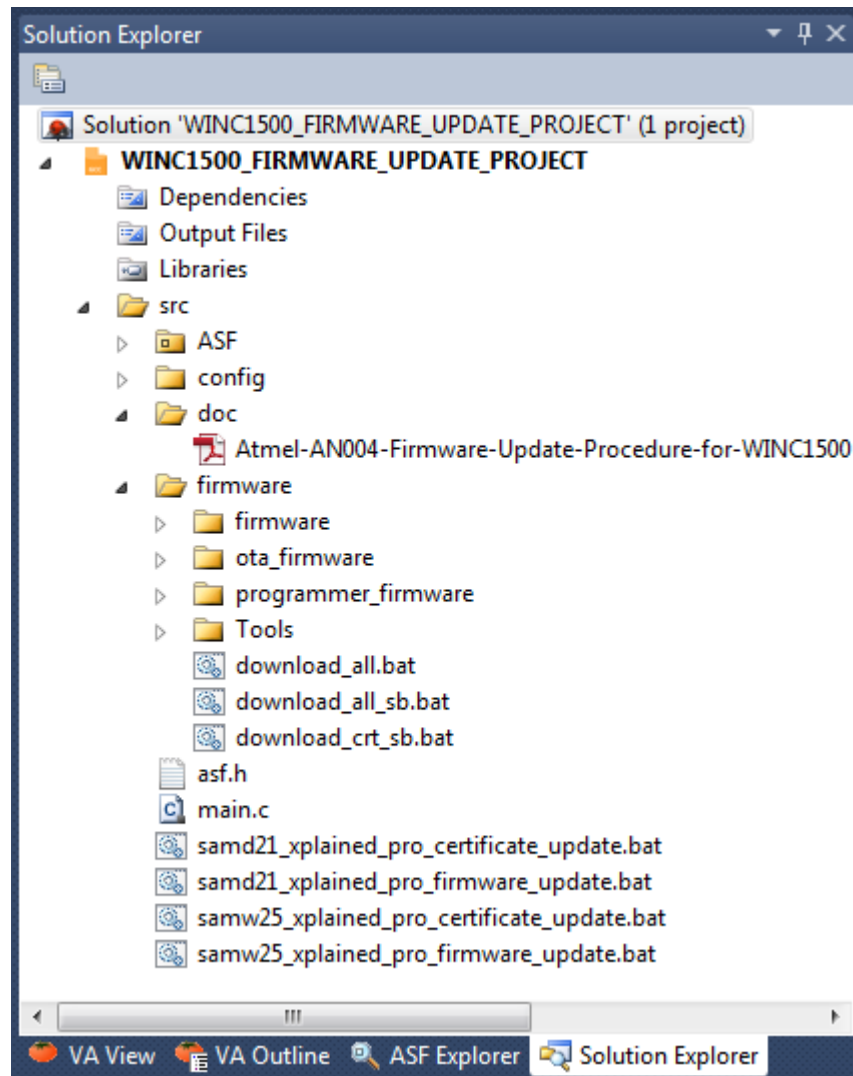

TO DO   Select the appropriate "*WINC1500 Firmware Update Project (vxx.x.x)*" project corresponding to your Xplained Pro board and then press OK button to import firmware update project and related documentation.

1.2   Project Structure

The firmware update project appears as a regular Atmel Studio 6 ASF project:

- **/src/doc folder** – List the available documentation regarding firmware update.
- **/src/firmware folder** – Contains the new WINC1500 firmware.
- **/src folder** – Contains the update batch scripts:
    - One firmware update batch script per board.
    - One TLS/SSL root certificate update batch script per board.

INFO   The following update procedure takes care of updating the WINC1500 internal firmware and TLS/SSL root certificates.

2. Firmware Update Procedure

Prior to running any update script, you must ensure that the hardware is setup as required.
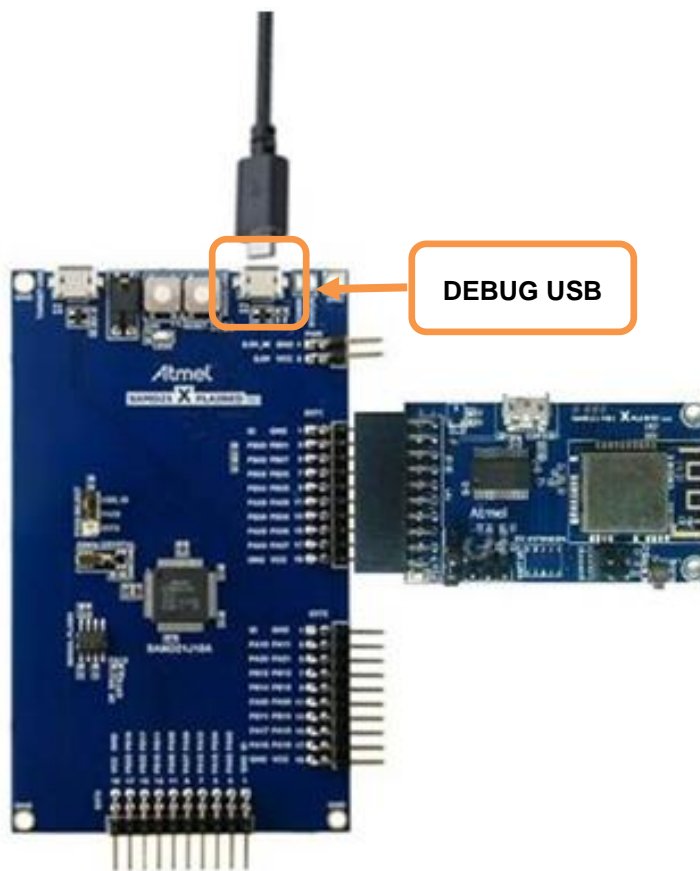
2.1 Hardware Setup

ℹ️ **INFO**	Although this document explains the upgrade process mainly from SAMD21 Xplained Pro as host, SAMW25 Xplained Pro can also be used to upgrade WINC1500 module. The update procedure requires that WINC1500 module is attached on EXT1 of the Xplained Pro kit.

Connect the WINC1500 Wi-Fi module on EXT1 of the SAM D21 Xplained Pro. Then plug a micro USB cable from your laptop to the debug USB port of the Xplained Pro kit as displayed below:

2.2 Batch Script

In the src folder of the "*WINC1500_FIRMWARE_UPDATE_PROJECT*" you will find a list of batch (.bat) script files used to trigger a firmware update.

- Ensure that the SAMD21 Xplained Pro is connected to your laptop via the debug USB port. The underlying virtual EDBG COM port should remain available for the batch script to work.

WARNING   Do not attempt to open the virtual EDBG COM port of the Xplained Pro board with a terminal application as it would prevent the batch script to perform the firmware update.
If the WINC1500 module features a USB port, it is recommended to leave it unconnected while performing this update procedure.
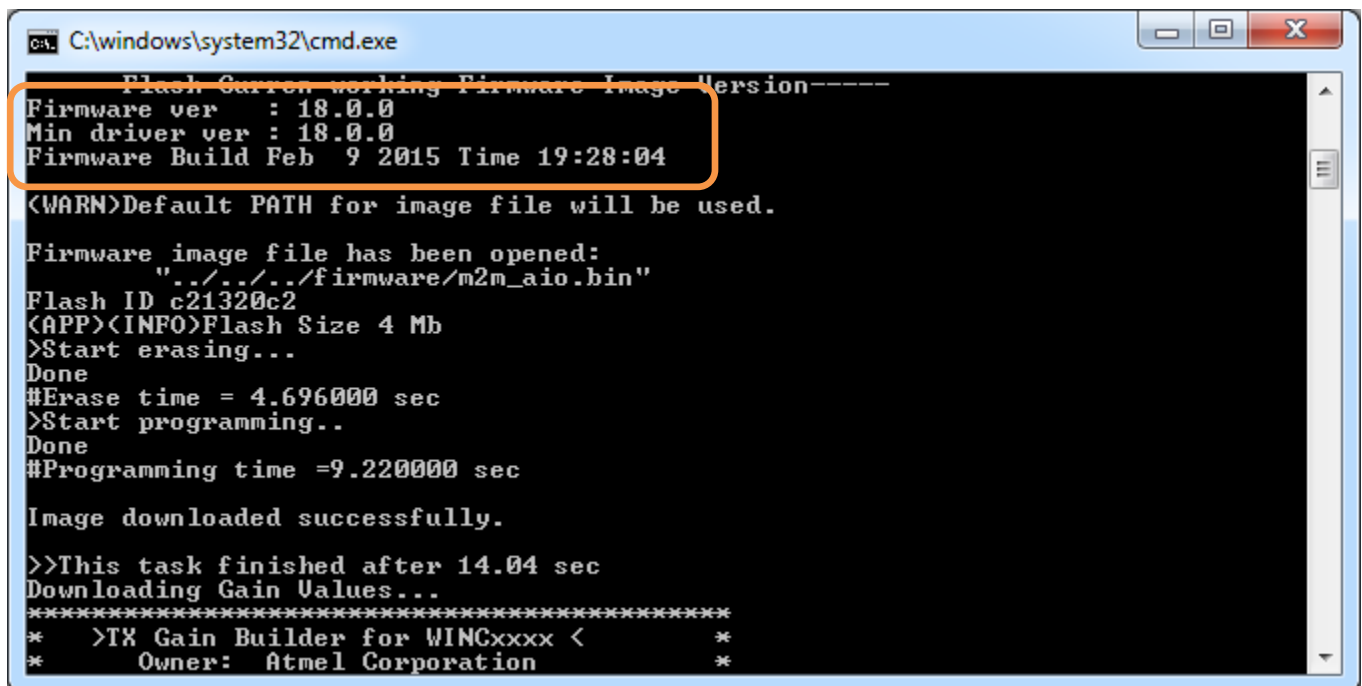

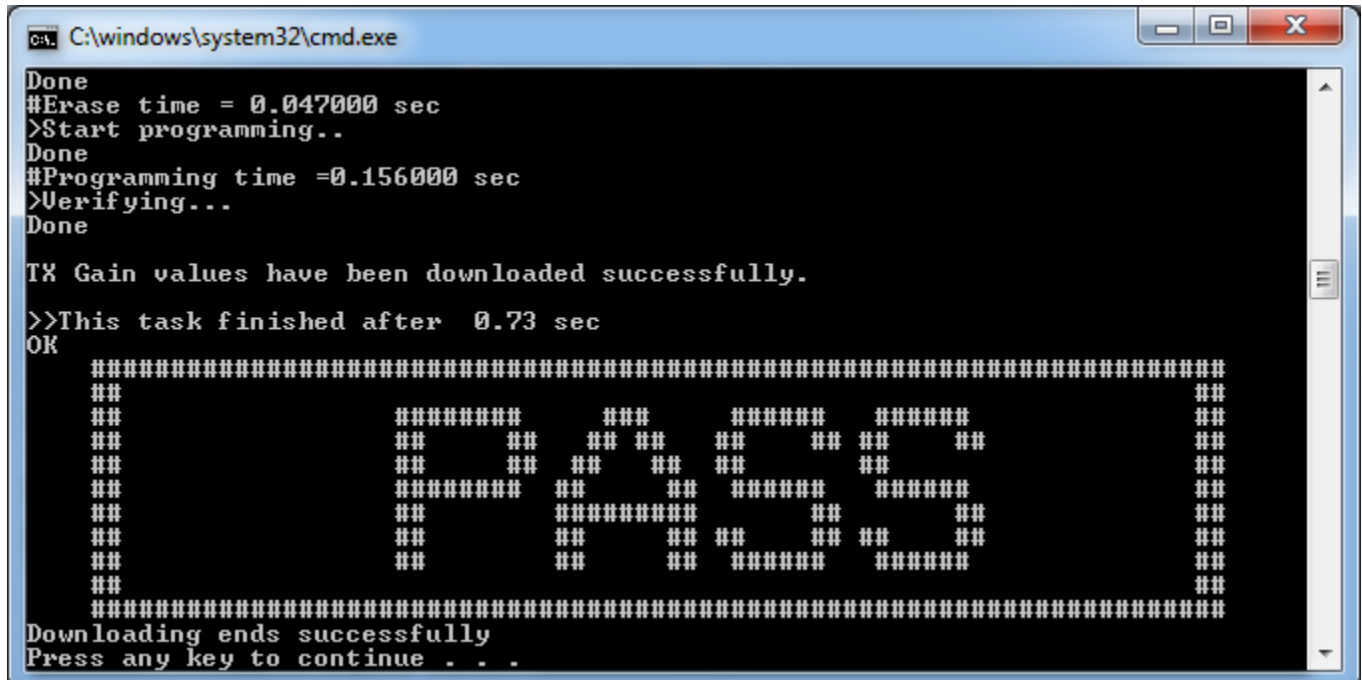- Run the *samd21_xplained_pro_firmware_update.bat* script

INFO   If you intend to use an Xplained Pro board other than SAMD21 Xplained Pro, run the corresponding "firmware_update.bat" script starting with the appropriate Xplained Pro board name.

During the update process, the batch script will output the previous installed firmware version on WINC1500:

```
C:\windows\system32\cmd.exe
        Flash Curren working Firmware Image Version-----
Firmware ver    : 18.0.0
Min driver ver : 18.0.0
Firmware Build Feb  9 2015 Time 19:28:04

<WARN>Default PATH for image file will be used.

Firmware image file has been opened:
        "../../../firmware/m2m_aio.bin"
Flash ID c21320c2
<APP><INFO>Flash Size 4 Mb
>Start erasing...
Done
#Erase time = 4.696000 sec
>Start programming..
Done
#Programming time =9.220000 sec

Image downloaded successfully.

>>This task finished after 14.04 sec
Downloading Gain Values...
**************************************************
*    >TX Gain Builder for WINCxxxx <        *
*       Owner:  Atmel Corporation           *
```

After several seconds the following message should appear, meaning that the WINC1500 Wi-Fi module update procedure is complete:

```
C:\windows\system32\cmd.exe
Done
#Erase time = 0.047000 sec
>Start programming..
Done
#Programming time =0.156000 sec
>Verifying...
Done

TX Gain values have been downloaded successfully.

>>This task finished after  0.73 sec
OK
    ####################################################################
    ##                                                              ##
    ##              ########   ###    ######   ######               ##
    ##              ##    ##  ## ##  ##    ## ##    ##              ##
    ##              ##    ##  ## ##  ##       ##                   ##
    ##              ########  ##  ##   ######   ######              ##
    ##              ##       #########      ##       ##            ##
    ##              ##       ##    ## ##  ## ##    ##              ##
    ##              ##       ##    ##  ######   ######             ##
    ##                                                              ##
    ####################################################################
Downloading ends successfully
Press any key to continue . . .
```
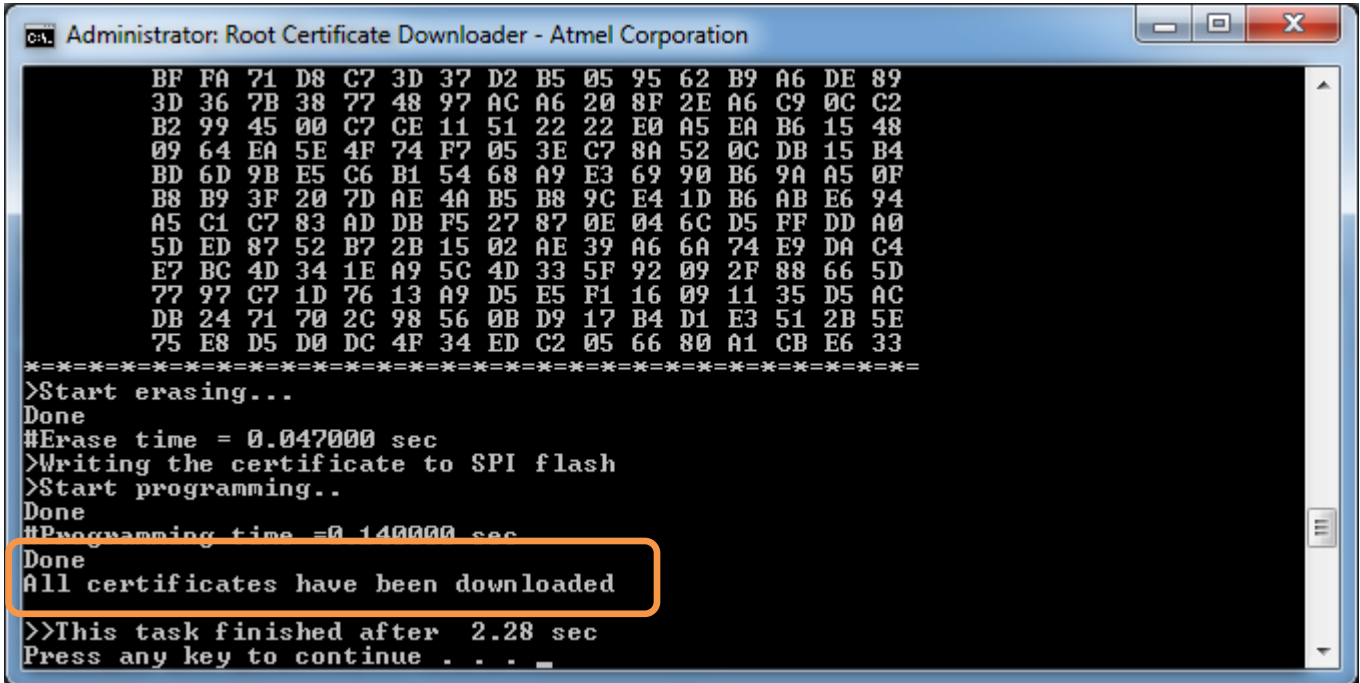
☑ **RESULT**   The WINC1500 Wi-Fi module firmware has been updated successfully.

Atmel

3. Root Certificates Update Procedure

You may need to install root certificates in order to connect to secured servers using TLS/SSL encryption in your application. Adding a new certificate is very easy and only requires you to copy your certificate files (.cer) in the src/firmware/Tools/root_certificate_downloader/crt folder. This folder also contains root certificates used by all the secured TLS/SSL WINC1500 ASF examples. Finally, to install these certificates on the WINC1500, proceed as following:

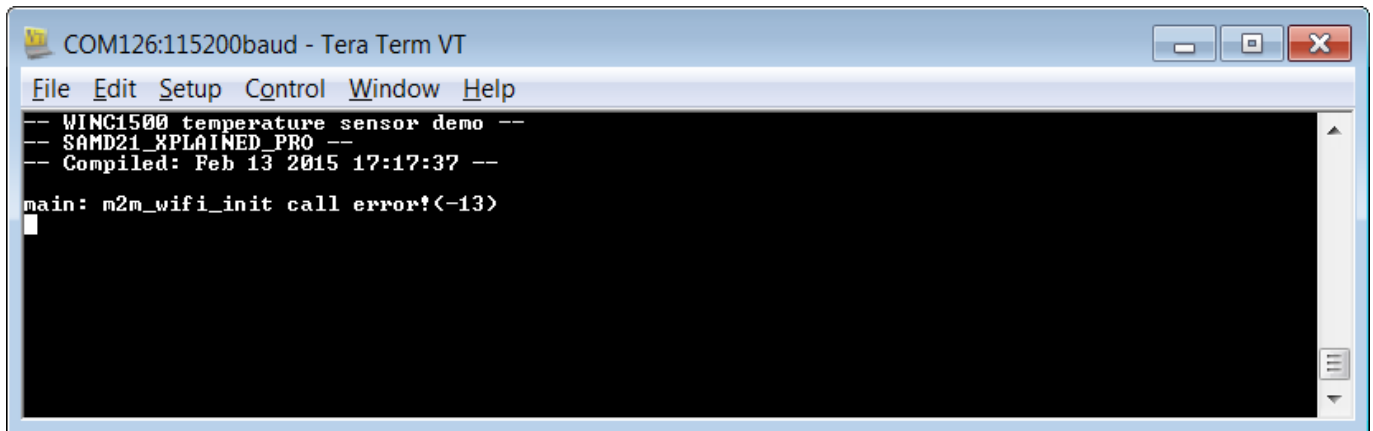- Run the *samd21_xplained_pro_certificate_update.bat* script:

✅ **RESULT**   Certificates have been downloaded successfully on to WINC1500 module.

4. Frequently Asked Questions

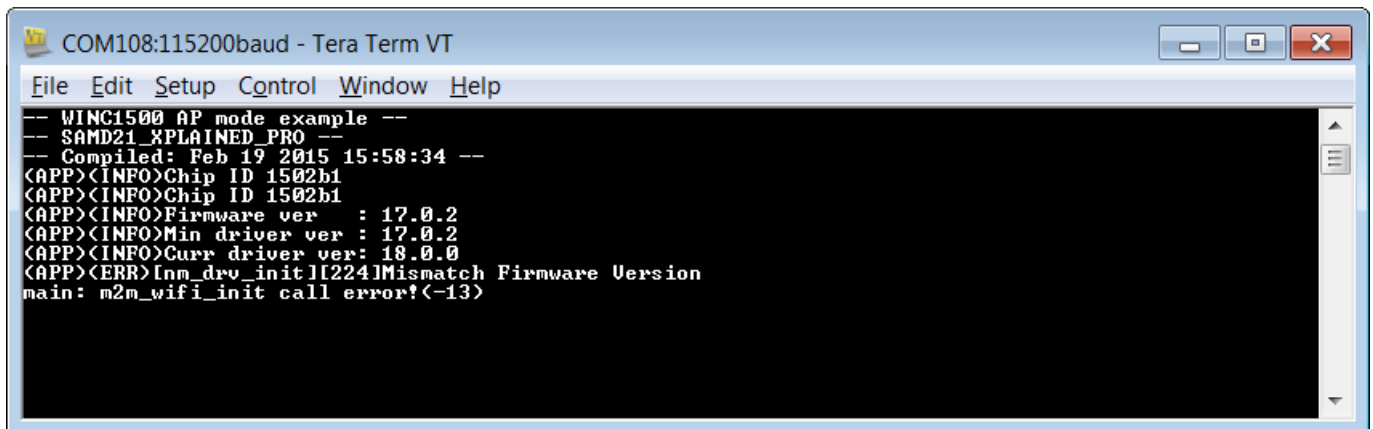## 4.1 When do I need to update the WINC1500 firmware?

Atmel provides frequent updates of the Wi-Fi software API (host MCU) for the WINC1500 Wi-Fi module. The integrity of the solution is guaranteed using a major/minor/patch version number. When a major or minor version mismatch occurs between the host MCU and the WINC1500 Wi-Fi module, the Wi-Fi software API initialization will fail and a `m2m_wifi_init()` function call will return an error value:

Setting the `CONF_WIFI_M2M_DEBUG` to 1 in the `conf_winc.h` configuration file will provide more information about the version mismatch error:
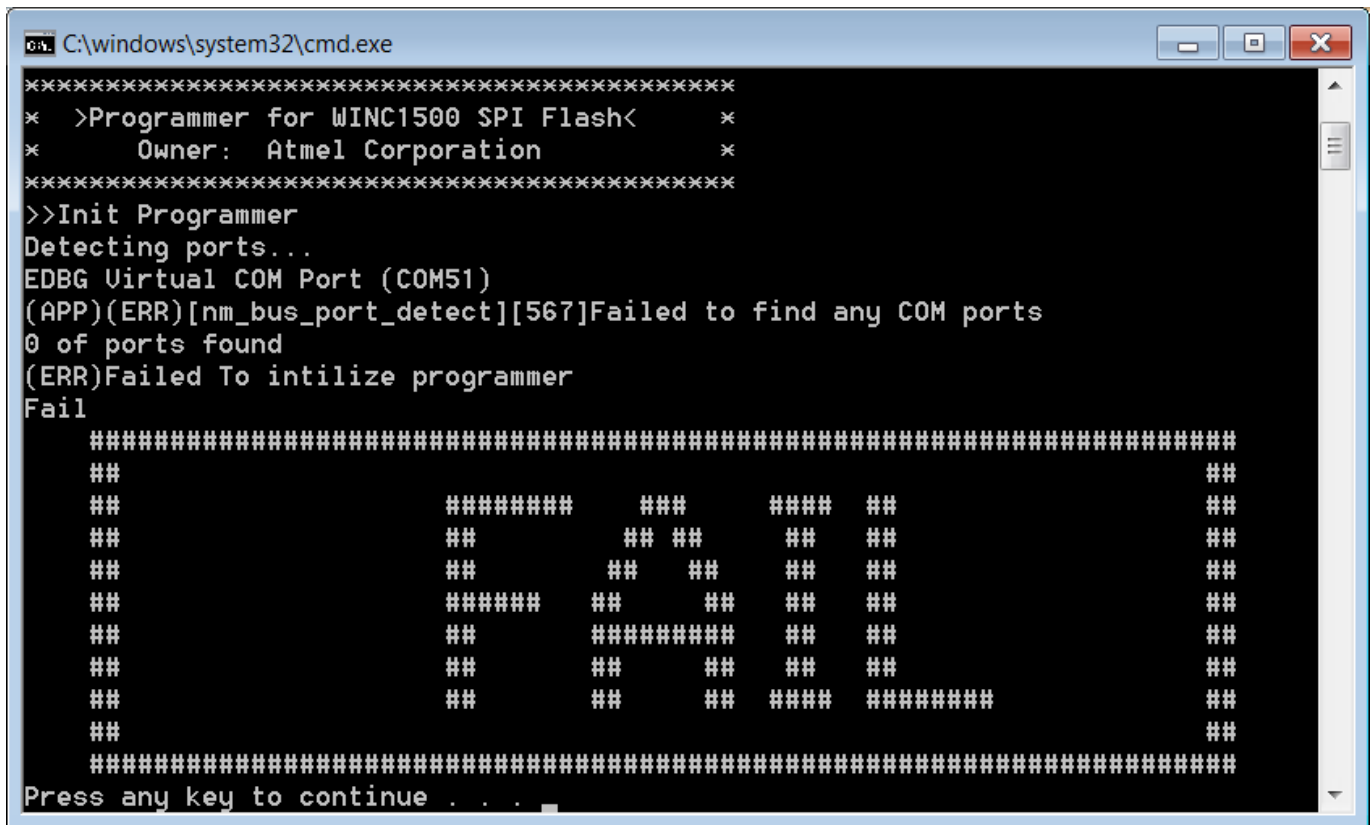

In this scenario a firmware update with the appropriate firmware version number is expected.

4.2   Why is the update batch script failing?

While performing the second stage of the update procedure, the following error can happen:

```
C:\windows\system32\cmd.exe                                    [_][□][×]

************************************************
*   >Programmer for WINC1500 SPI Flash<       *
*       Owner:  Atmel Corporation             *
************************************************
>>Init Programmer
Detecting ports...
EDBG Virtual COM Port (COM51)
(APP)(ERR)[nm_bus_port_detect][567]Failed to find any COM ports
0 of ports found
(ERR)Failed To intilize programmer
Fail
    ###################################################################
    ##                                                             ##
    ##                    ########   ###    ####  ##               ##
    ##                    ##          ## ##     ##    ##               ##
    ##                    ##          ##   ##   ##    ##               ##
    ##                    ######   ##     ##   ##    ##               ##
    ##                    ##       #########    ##    ##               ##
    ##                    ##       ##     ##   ##    ##               ##
    ##                    ##       ##     ##  ####  ########           ##
    ##                                                             ##
    ###################################################################
Press any key to continue . . . _
```

Possible reasons for such a failure include:

- The SAM Xplained Pro debug USB port is <u>not</u> connected to your PC USB port.
- The SAM Xplained Pro debug USB virtual COM port is already opened by another application and preventing the batch script to work (terminal application for instance).

5.   Revision History

Doc. Rev.	Date	Comments
XXXXXC	02/2015	Updated firmware update procedure (batch file)
XXXXXB	12/2014	Updated firmware update procedure (serial bridge)
XXXXXA	11/2014	Initial document release

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Atmel Corporation
1600 Technology Drive
San Jose, CA 95110
USA
Tel: (+1)(408) 441-0311
Fax: (+1)(408) 487-2600
www.atmel.com

Atmel Asia Limited
Unit 01-5 & 16, 19F
BEA Tower, Millennium City 5
418 Kwun Tong Road
Kwun Tong, Kowloon
HONG KONG
Tel: (+852) 2245-6100
Fax: (+852) 2722-1369

Atmel Munich GmbH
Business Campus
Parkring 4
D-85748 Garching b. Munich
GERMANY
Tel: (+49) 89-31970-0
Fax: (+49) 89-3194621

Atmel Japan G.K.
16F Shin-Osaki Kangyo Bldg.
1-6-4 Osaki, Shinagawa-ku
Tokyo 141-0032
JAPAN
Tel: (+81)(3) 6417-0300
Fax: (+81)(3) 6417-0370