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## Firmware Update Procedure for WINC1500 Wi-Fi Module

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AN-004

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### Prerequisites

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- **Hardware Prerequisites**
  - Supported Xplained Pro Evaluation Kit
  - Atmel WINC1500 extension
  - USB Micro Cable (TypeA / MicroB)
- **Software Prerequisites**
  - Atmel Studio 6.2
  - Firmware update project

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### Introduction

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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



## Table of Contents







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Prerequisites .....	1
Introduction .....	1
Icon Key Identifiers .....	3
1. Firmware Update Project .....	4
1.1 Atmel Software Framework.....	4
1.2 Project Structure .....	5
2. Firmware Update Procedure .....	6
2.1 Hardware Setup .....	6
2.2 Batch Script.....	6
3. Root Certificates Update Procedure .....	9
4. Frequently Asked Questions .....	10
4.1 When do I need to update the WINC1500 firmware? .....	10
4.2 Why is the update batch script failing? .....	11
5. Revision History .....	12

## Icon Key Identifiers

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

	<b>INFO</b>	Delivers contextual information about a specific topic
	<b>TIPS</b>	Highlights useful tips and techniques
	<b>TO DO</b>	Highlights objectives to be completed
	<b>RESULT</b>	Highlights the expected result of an assignment step
	<b>WARNING</b>	Indicates important information
	<b>EXECUTE</b>	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

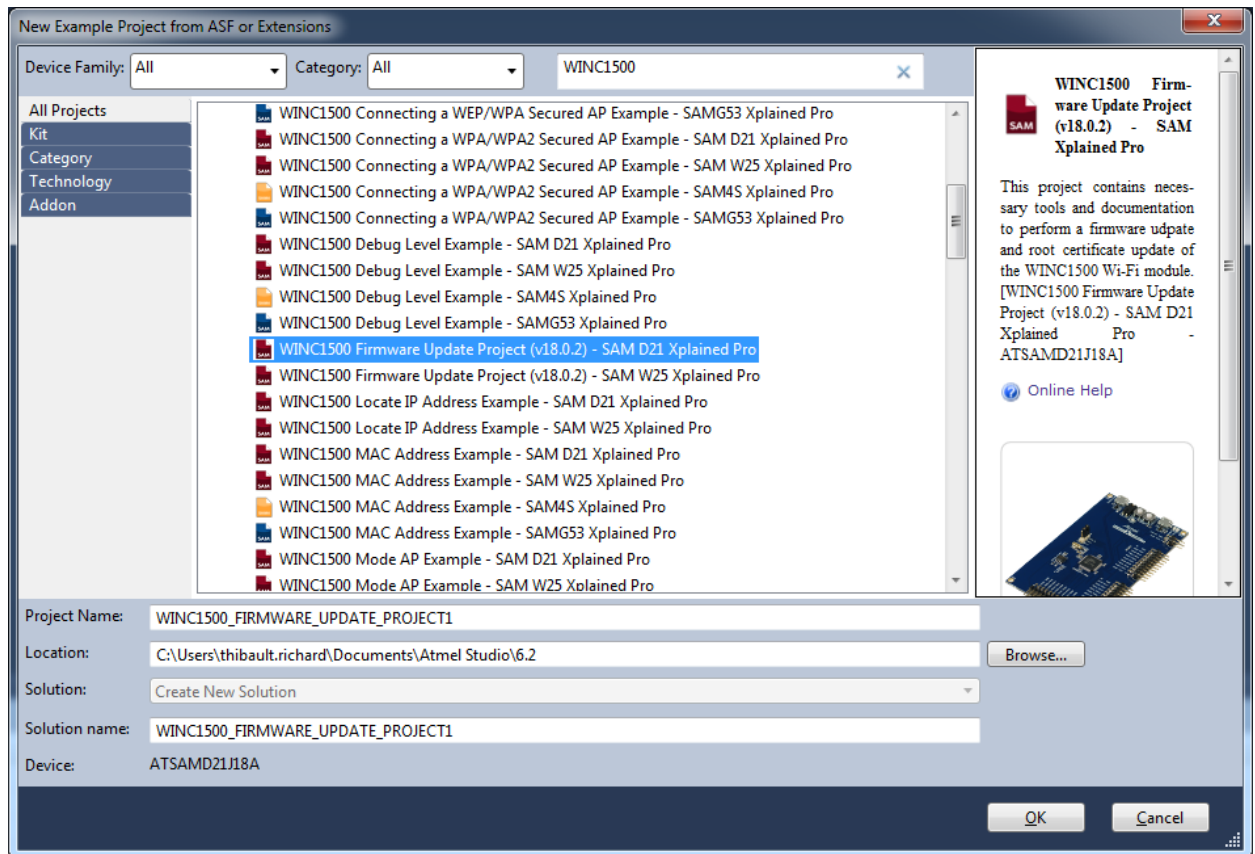
Once the Atmel Software Framework is up-to-date, you can open and search for the Firmware Update Project from the “*New Example Project from ASF...*” menu in Atmel Studio.



#### 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.

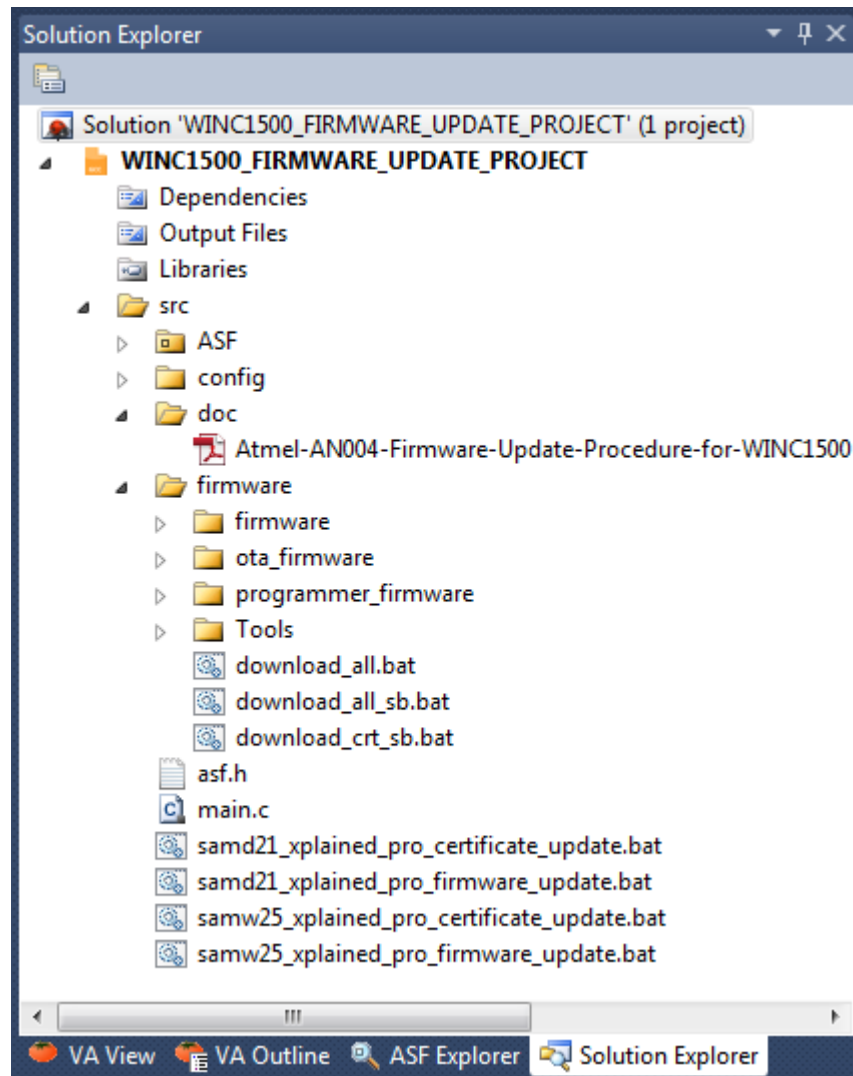


#### TO DO

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.

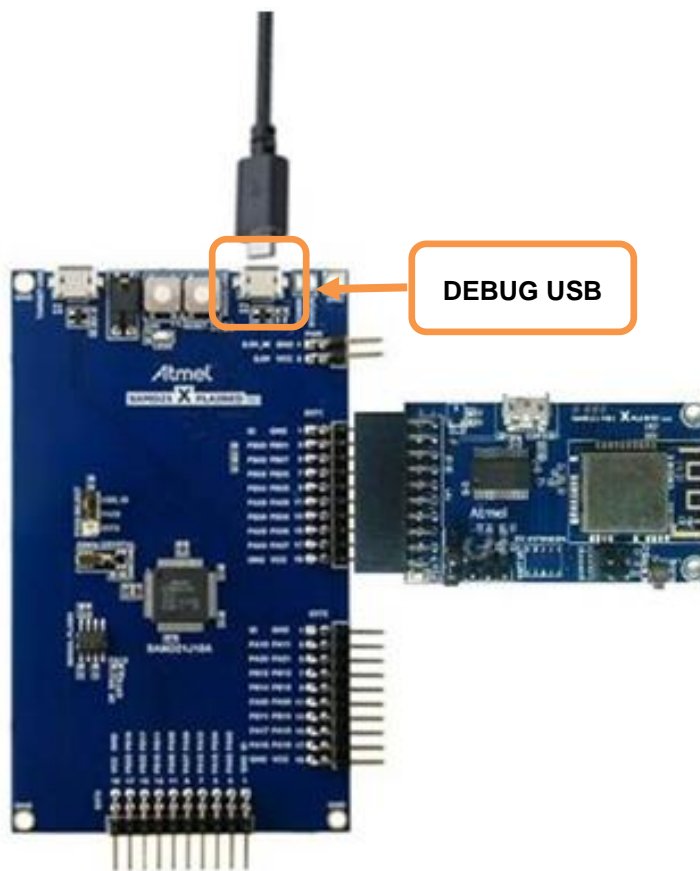
### 2.1 Hardware Setup



#### 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.



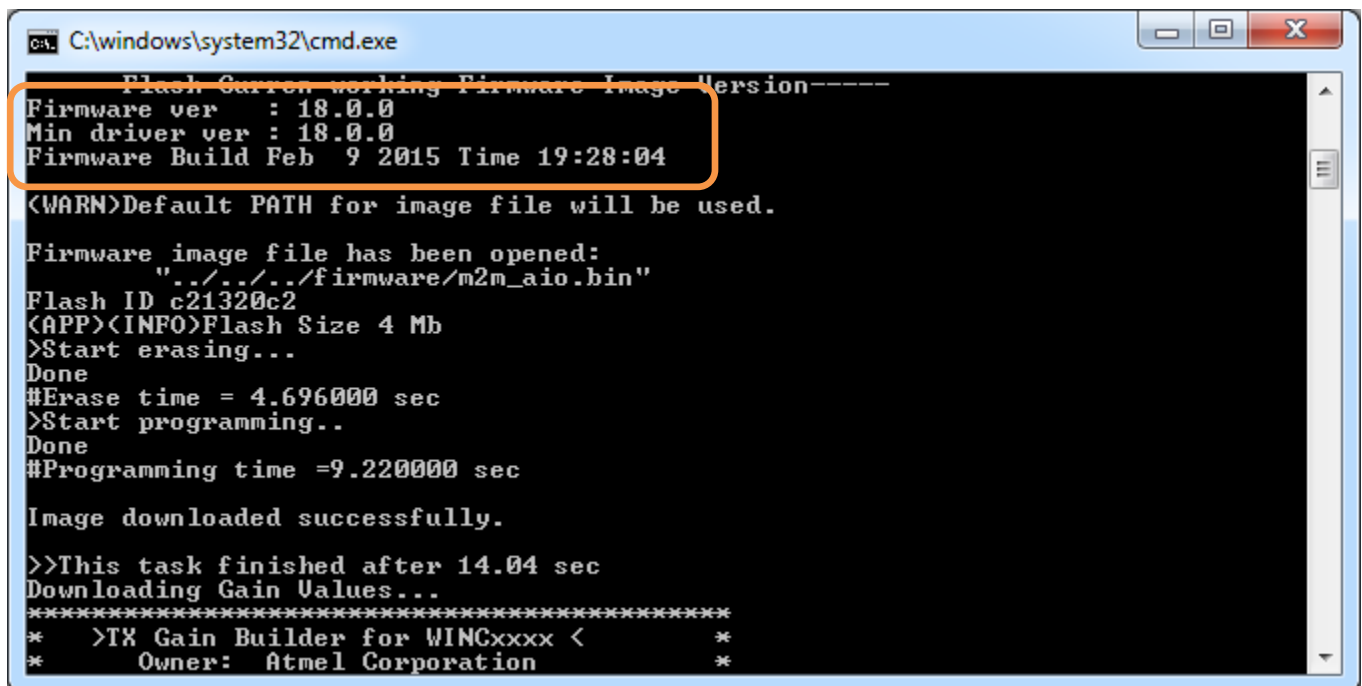
- Run the `samd21_xplained_pro_firmware_update.bat` script



## INFO

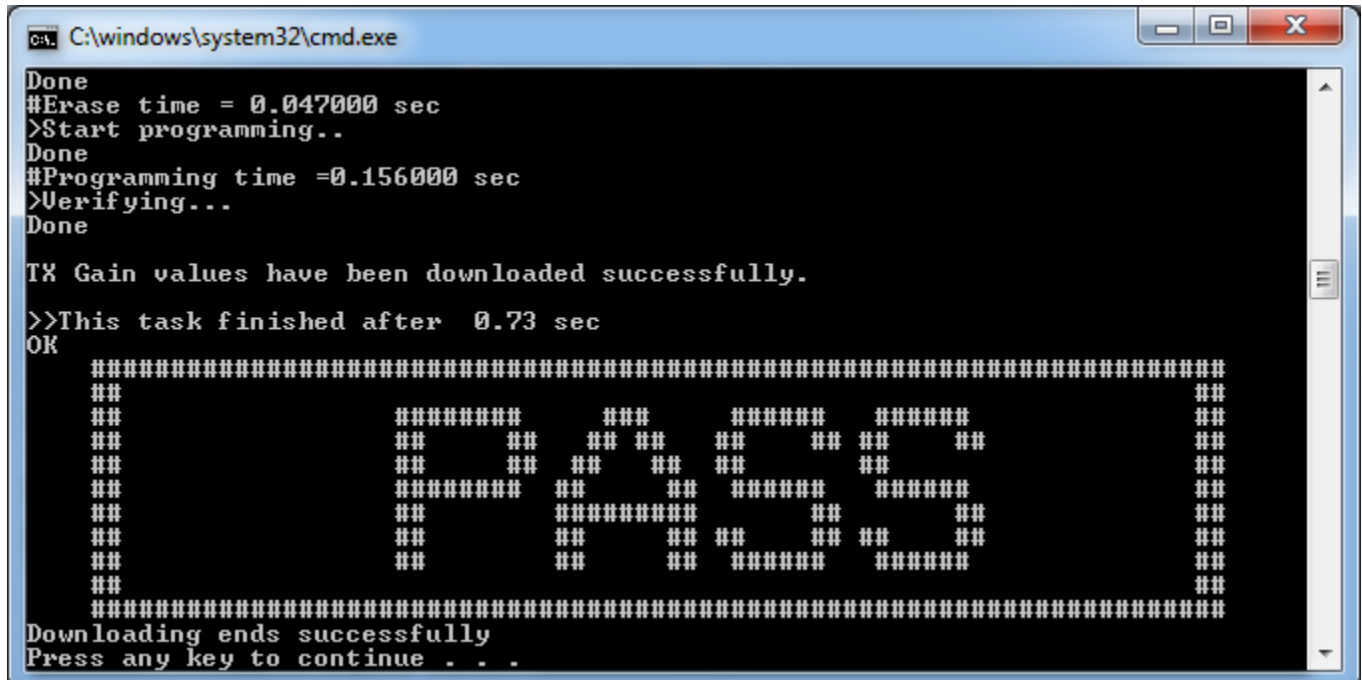
If you intend to use an Xplained Pro board other than SAMD21 Xplained Pro, run the corresponding “firmware\_update.bat” script starting with the appropriate Xplained Pro board name.

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



```
C:\windows\system32\cmd.exe
Flash Current 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

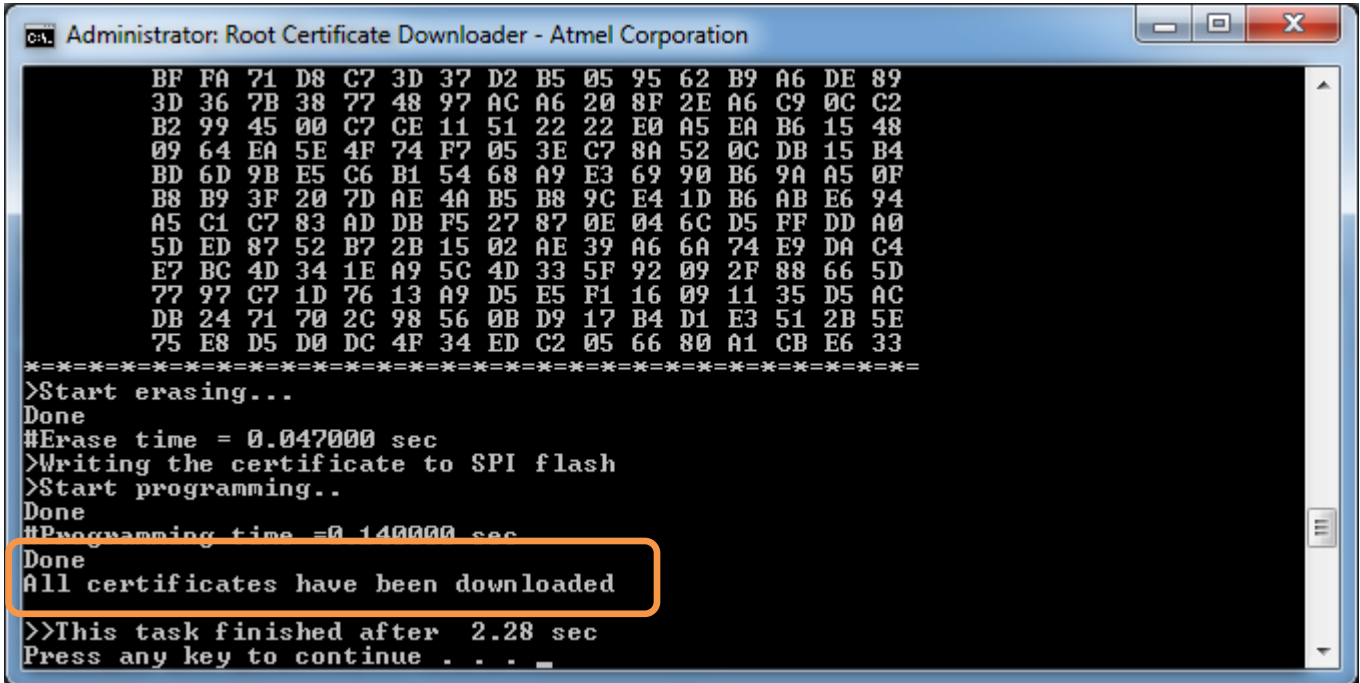
The WINC1500 Wi-Fi module firmware has been updated successfully.



### 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:



```
Administrator: Root Certificate Downloader - Atmel Corporation
BF FA 71 D8 C7 3D 37 D2 B5 05 95 62 B9 A6 DE 89
3D 36 7B 38 77 48 97 AC A6 20 8F 2E A6 C9 0C C2
B2 99 45 00 C7 CE 11 51 22 22 E0 A5 EA B6 15 48
09 64 EA 5E 4F 74 F7 05 3E C7 8A 52 0C DB 15 B4
BD 6D 9B E5 C6 B1 54 68 A9 E3 69 90 B6 9A A5 0F
B8 B9 3F 20 7D AE 4A B5 B8 9C E4 1D B6 AB E6 94
A5 C1 C7 83 AD DB F5 27 87 0E 04 6C D5 FF DD A0
5D ED 87 52 B7 2B 15 02 AE 39 A6 6A 74 E9 DA C4
E7 BC 4D 34 1E A9 5C 4D 33 5F 92 09 2F 88 66 5D
77 97 C7 1D 76 13 A9 D5 E5 F1 16 09 11 35 D5 AC
DB 24 71 70 2C 98 56 0B D9 17 B4 D1 E3 51 2B 5E
75 E8 D5 D0 DC 4F 34 ED C2 05 66 80 A1 CB E6 33
*****
>Start erasing...
Done
#Erase time = 0.047000 sec
>Writing the certificate to SPI flash
>Start programming..
Done
#Programming time = 0.140000 sec
Done
All certificates have been downloaded
>>This task finished after 2.28 sec
Press any key to continue . . .
```



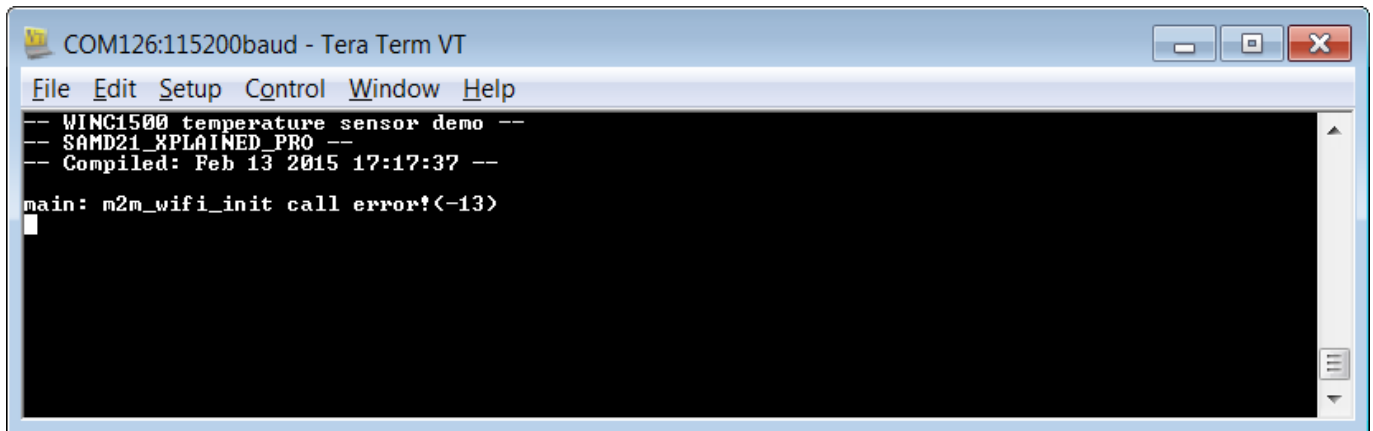
#### RESULT

Certificates have been downloaded successfully on to WINC1500 module.

## 4. Frequently Asked Questions

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

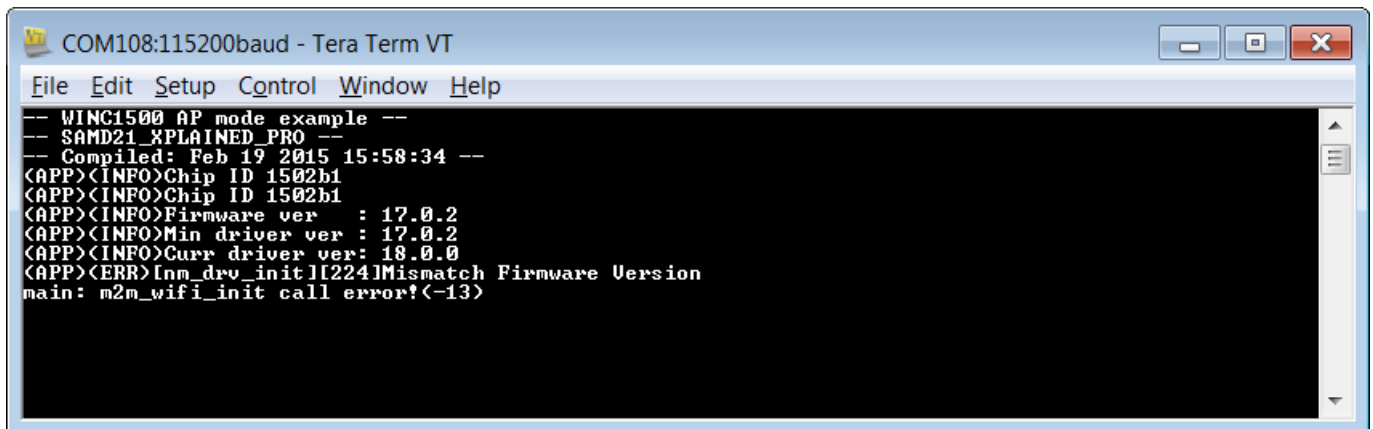
Atmel provides frequent updates of the Wi-Fi software API (host MCU) for the WINC1500 Wi-Fi module. The integrity of the solution is guaranteed using a major/minor/patch version number. When a major or minor version mismatch occurs between the host MCU and the WINC1500 Wi-Fi module, the Wi-Fi software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



The screenshot shows a Tera Term VT window titled "COM126:115200baud - Tera Term VT". The window contains the following text:

```
-- WINC1500 temperature sensor demo --  
-- SAMD21_XPLAINED_PRO --  
-- Compiled: Feb 13 2015 17:17:37 --  
main: m2m_wifi_init call error!(-13)
```

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



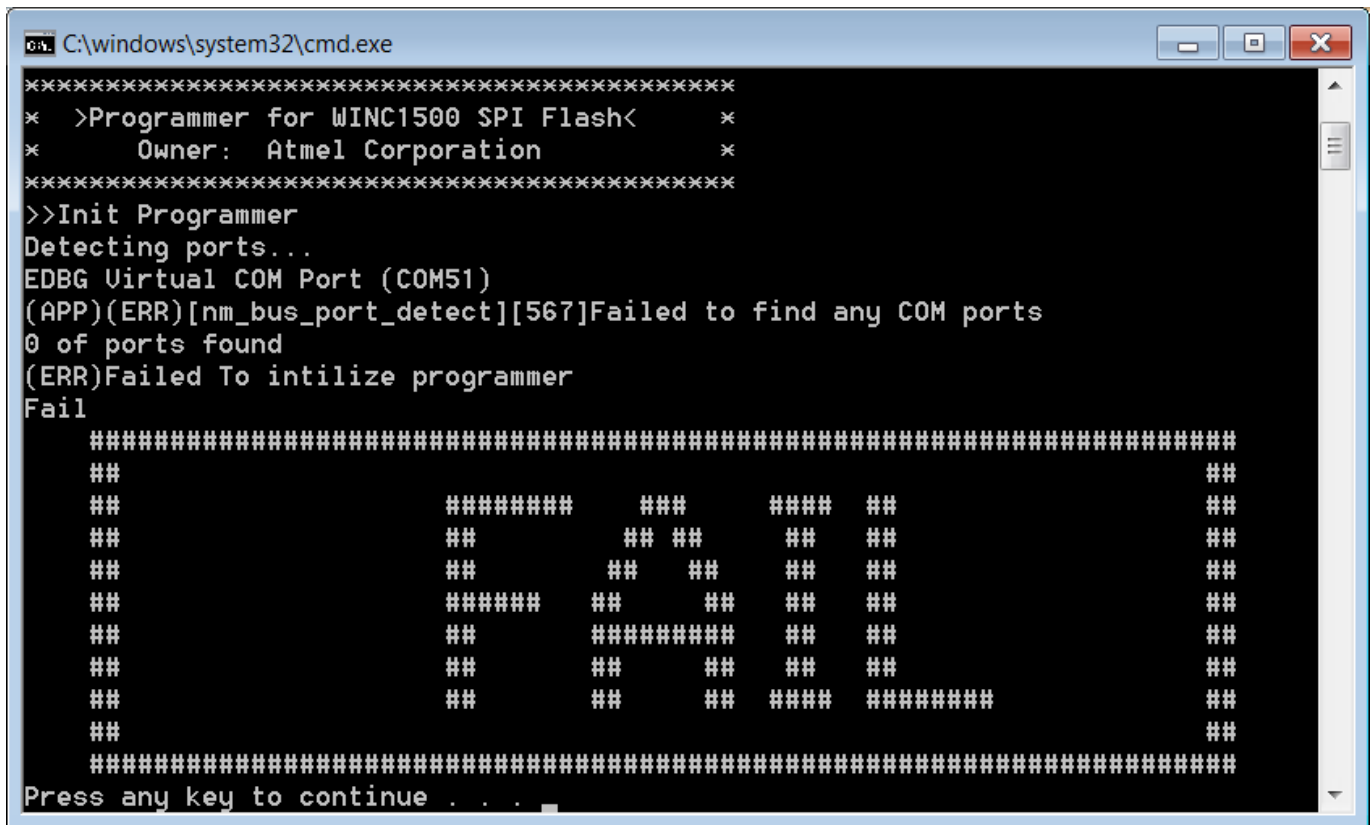
The screenshot shows a Tera Term VT window titled "COM108:115200baud - Tera Term VT". The window contains the following text:

```
-- WINC1500 AP mode example --  
-- SAMD21_XPLAINED_PRO --  
-- Compiled: Feb 19 2015 15:58:34 --  
(APP)<INFO>Chip ID 1502b1  
(APP)<INFO>Chip ID 1502b1  
(APP)<INFO>Firmware ver : 17.0.2  
(APP)<INFO>Min driver ver : 17.0.2  
(APP)<INFO>Curr driver ver: 18.0.0  
(APP)<ERR>[nm_drv_init][224]Mismatch Firmware Version  
main: m2m_wifi_init call error!(-13)
```

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 not 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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