
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.









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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 following Atmel delivery:

- As an Atmel Studio Extension (.vsix file), which can be found on the Atmel Gallery web site (<http://gallery.atmel.com/>) or using the Atmel Studio Extension manager

A firmware update project is included in any Atmel Studio Extension related to the WINC1500 Wi-Fi module. The corresponding version number is printed in the project name as well as in the project description.

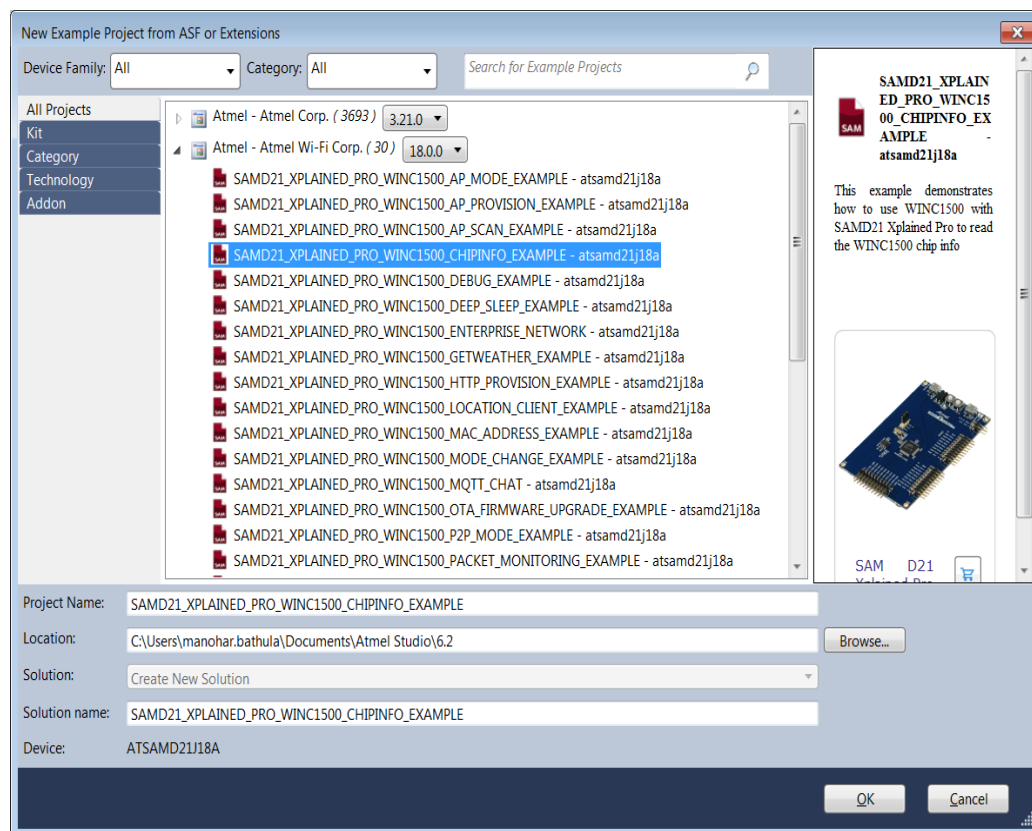
1.1 Atmel Studio Extension (.vsix)

Once a WINC1500 Wi-Fi module extension has been installed, you can open and create the Firmware Update project from the “*New Example Project from ASF...*” menu in Atmel Studio.



INFO

The WINC1500 Wi-Fi module related projects installed through an extension are usually under “*Atmel > Atmel Wi-Fi Corp. Extension Name*”.

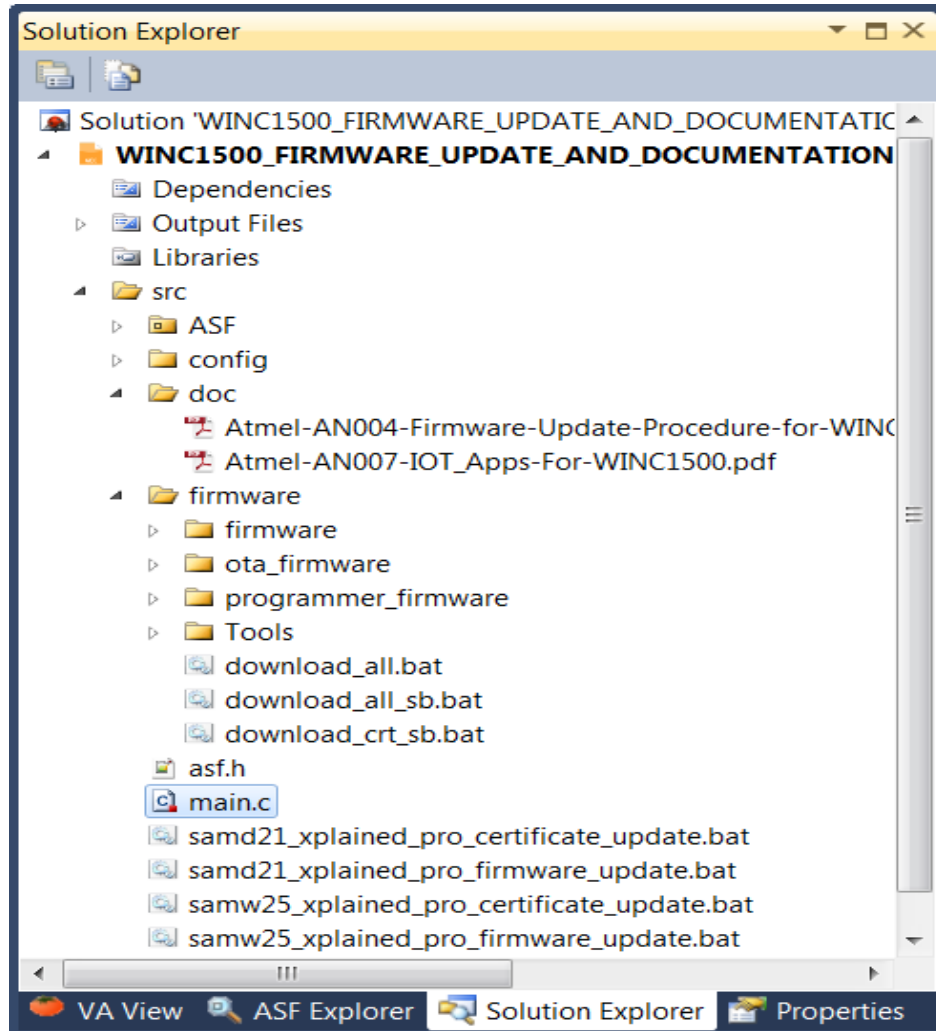


TO DO

Select project “*SAMD21_XPLAINED_PRO_WINC1500_FIRMWARE_UPDATE*” project 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 project for the SAMD21 host processor:



- **/src/doc folder** – List the available documentation regarding firmware update.
- **/src/firmware folder** – Contains actual WINC1500 firmware:
 - One update script per serial update mode (only UART mode will be covered here).
 - TLS/SSL certificates can be found and changed in the following path:
/firmware/Tools/root_certificate_downloader



INFO

The following update procedure takes care of updating the WINC1500 internal firmware, provisioning webpage and TLS/SSL certificates.

2. Firmware Update Procedure

The firmware on WINC1500 can be updated easily by just running a batch script file after setting up the hardware needed for the upgrade

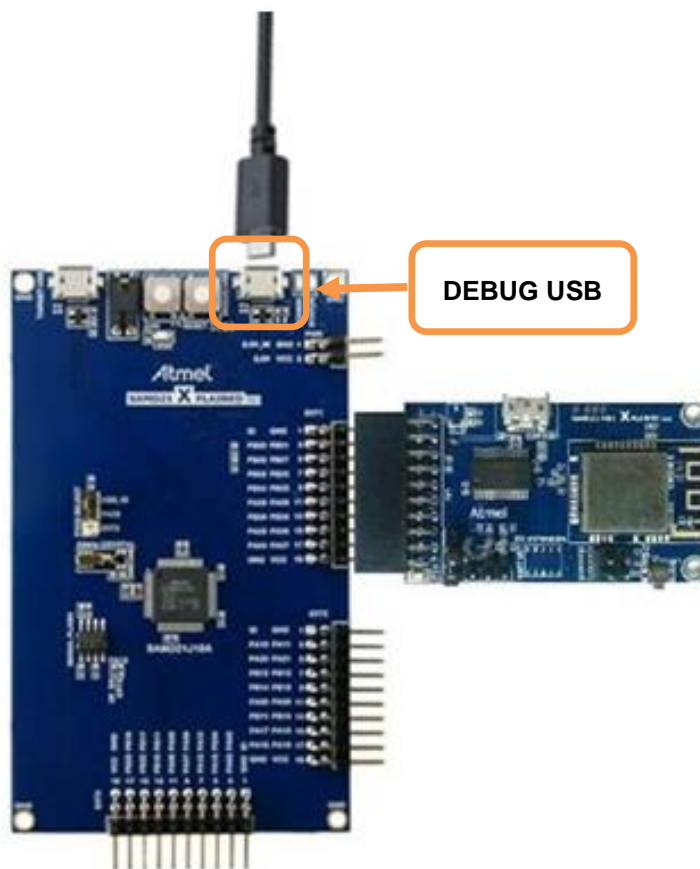
2.1 Hardware Setup



INFO

Although this document explains the upgrade process mainly from SAMD21 Xplained Pro as host, SAMW25 Xplained Pro, SAM4S Xplained Pro and SAMG53 Xplained Pro can also be used to upgrade WINC1500 module with WINC module attached on EXT1 of these evaluation kits.

Connect the WINC1500 Wi-Fi module on EXT1 of the SAM D21 Xplained Pro, and plug a micro USB cable into the debug USB port as displayed below:



2.2 Run Batch Script

In the firmware 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 COM port should remain available for the batch script to work.



WARNING

Do not attempt to open the virtual COM port of the SAMD21 Xplained Pro debug USB 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.



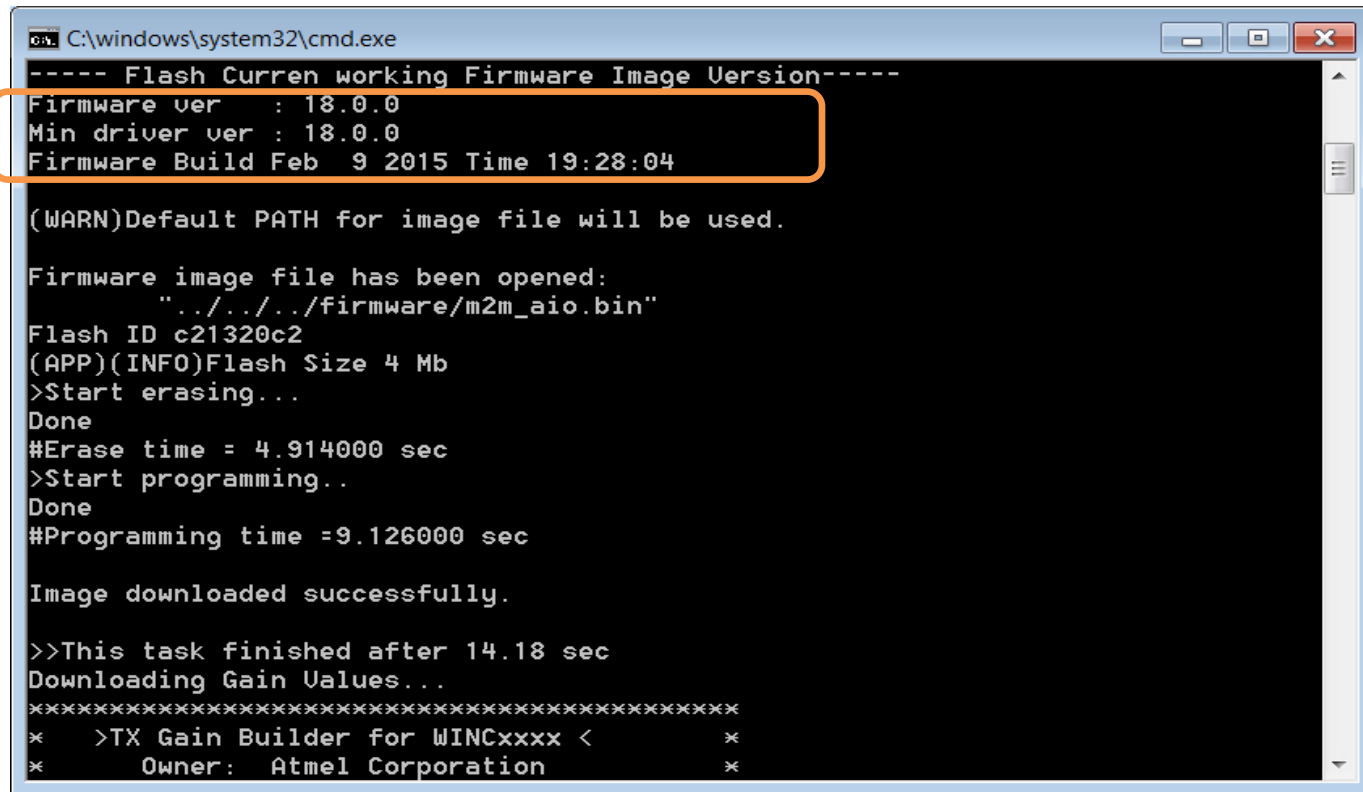
- Run the `samd21_xplained_pro_firmware_update.bat` script



INFO

If you intend to use an Xplained Pro board other than SAMD21 Xplained Pro, run the corresponding batch file `xxxxx_xplained_pro_firmware_update.bat` with `xxxxx` being the name of Xplained Pro board.

During the update process batch script would display the current firmware version on WINC1500 as shown below.



```
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 = 4.914000 sec
>Start programming..
Done
#Programming time =9.126000 sec

Image downloaded successfully.

>>This task finished after 14.18 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
#Programming time =0.172000 sec
>Verifying...
Done

TX Gain values have been downloaded successfully.

>>This task finished after 0.66 sec
OK
#####
##                                     ##
##          #####          ###          #####          ##
##          ##  ##  ##  ##  ##  ##  ##  ##  ##
##          ##  ##  ##  ##  ##  ##  ##  ##
##          #####  ##  ##  #####  #####
##          ##          #####          ##  ##
##          ##          ##  ##  ##  ##  ##  ##
##          ##          ##  ##  #####  #####
##                                     ##
#####
Downloading ends successfully
Press any key to continue . . .
```



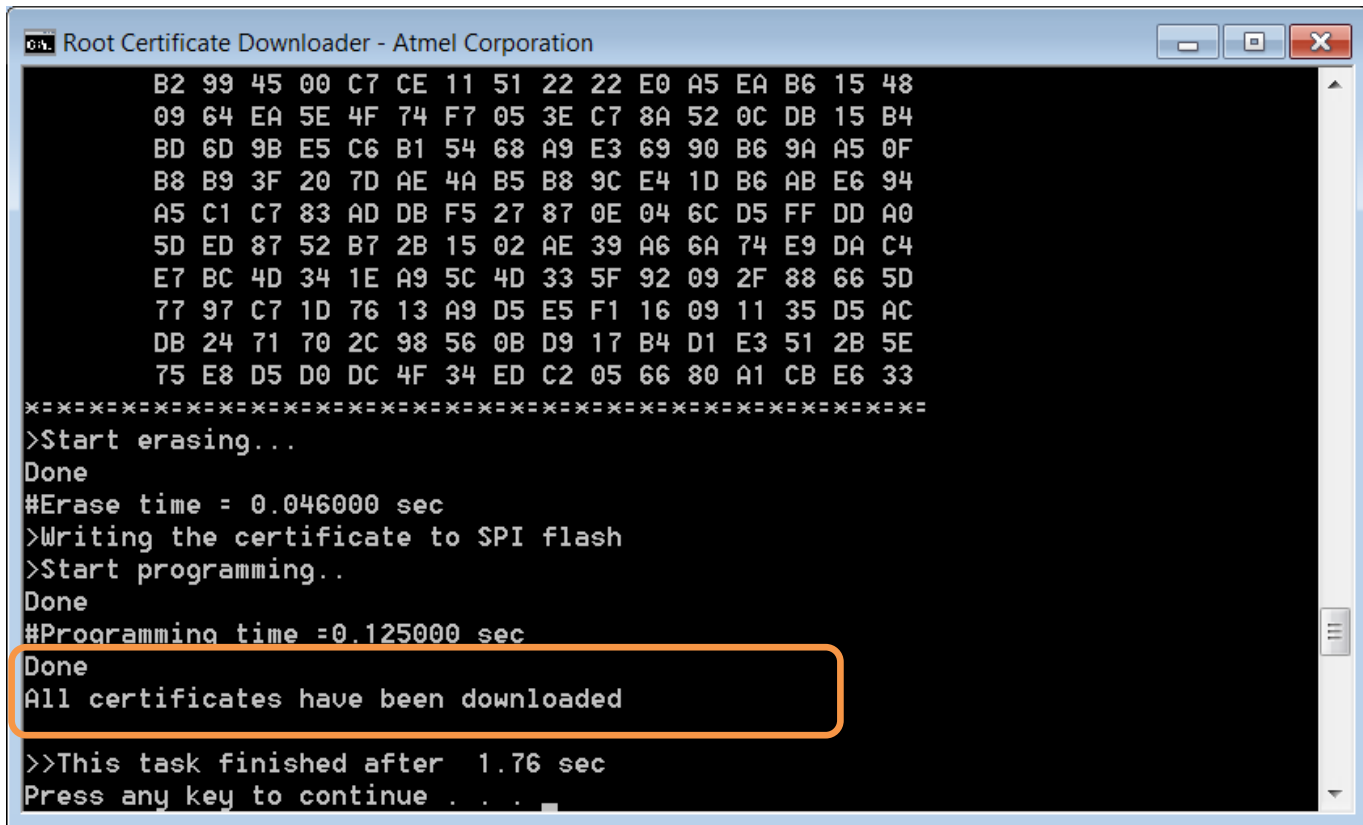
RESULT

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

3. Installing Root Certificates on WINC1500 to use example projects

With some of the examples, WINC1500 uses SSL connections to communicate with certain servers. All the certificates that are needed to get the examples running can be found at `src/firmware/Tools/root_certificate_downloader/crt` folder. To install the certificates on to WINC1500

- Run the `samd21_xplained_pro_certificate_update.bat` script



```
Root Certificate Downloader - Atmel Corporation
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 = 0.046000 sec
>Writing the certificate to SPI flash
>Start programming..
Done
#Programming time = 0.125000 sec
Done
All certificates have been downloaded
>>This task finished after 1.76 sec
Press any key to continue . . .
```



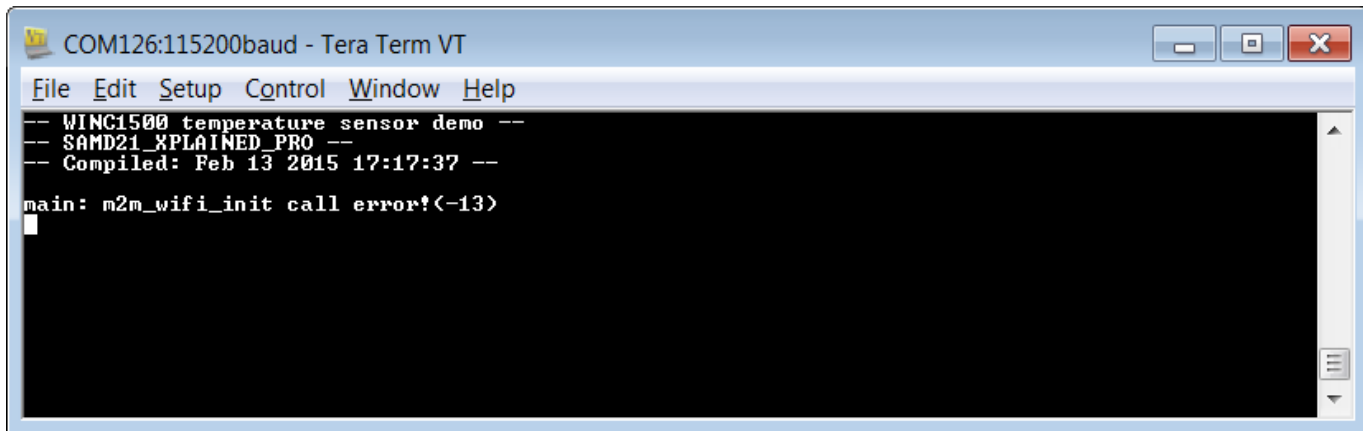
RESULT

Certificates have been downloaded successfully on to WINC1500 module.

4. Frequently Asked Questions

4.1 When do I need to update the WINC1500 firmware?

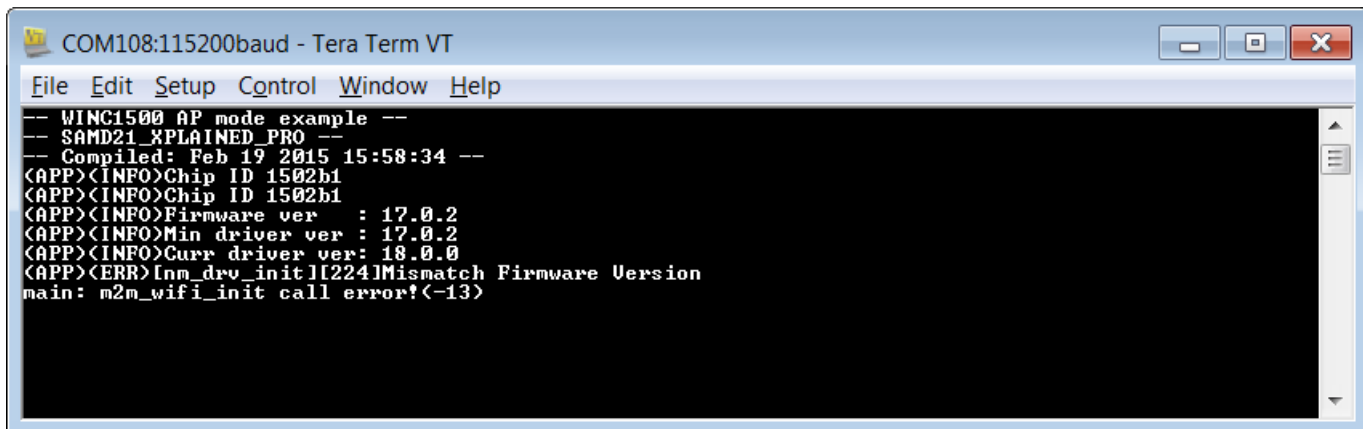
Atmel provides frequent updates of the Wi-Fi software API (host MCU) for the WINC1500 Wi-Fi module. The integrity of the solution is guaranteed using a major/minor version number. When a major version mismatch occurs between the host MCU and the WINC1500 Wi-Fi module, the Wi-Fi software API initialization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



A screenshot of a Tera Term VT window titled "COM126:115200baud - Tera Term VT". The window displays 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:



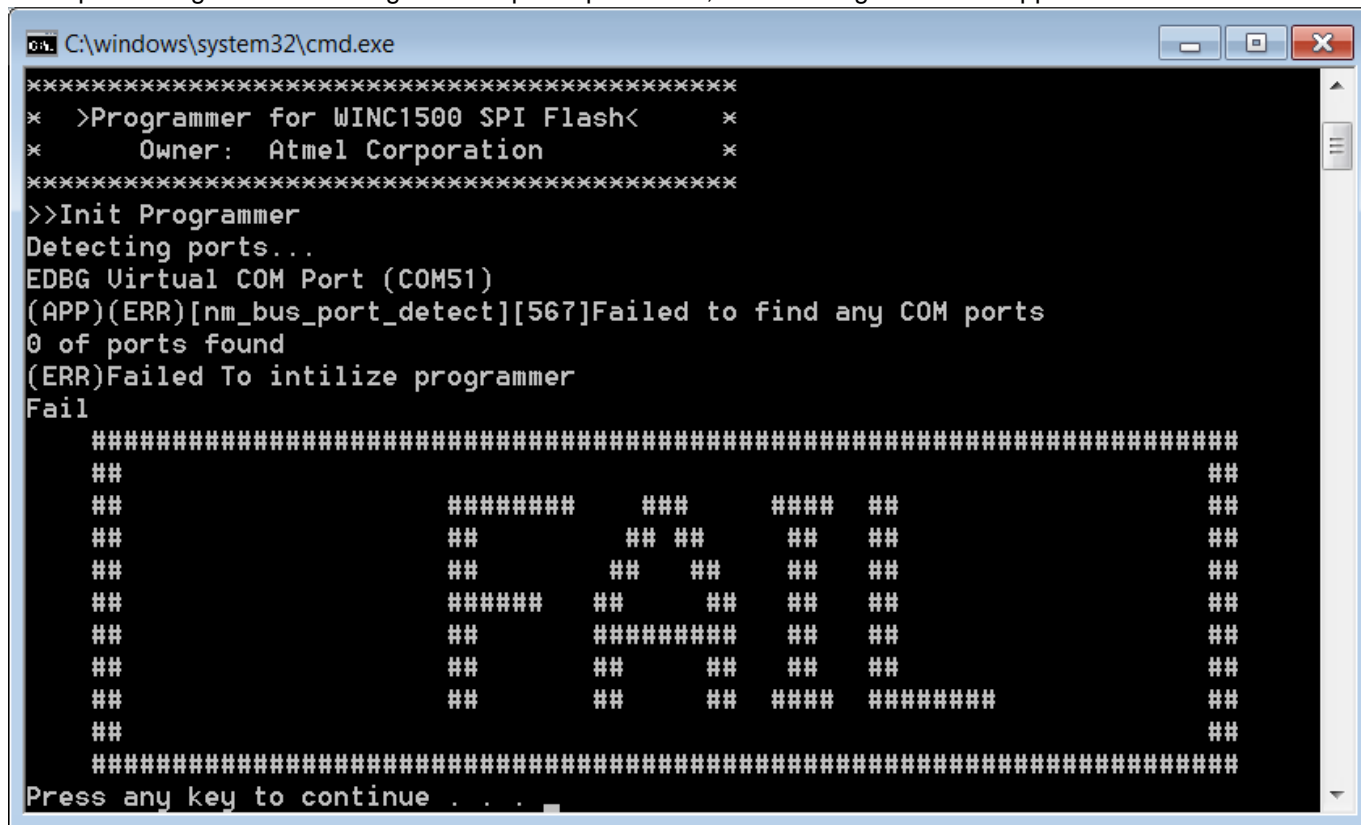
A screenshot of a Tera Term VT window titled "COM108:115200baud - Tera Term VT". The window displays the following text:

```
-- 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 SAMD21 Xplained Pro debug USB port is not connected to your PC USB port.
- The SAMD21 Xplained Pro debug USB virtual COM port is already opened by another application and preventing the batch script to work (terminal application for instance).

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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