Application Note

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.
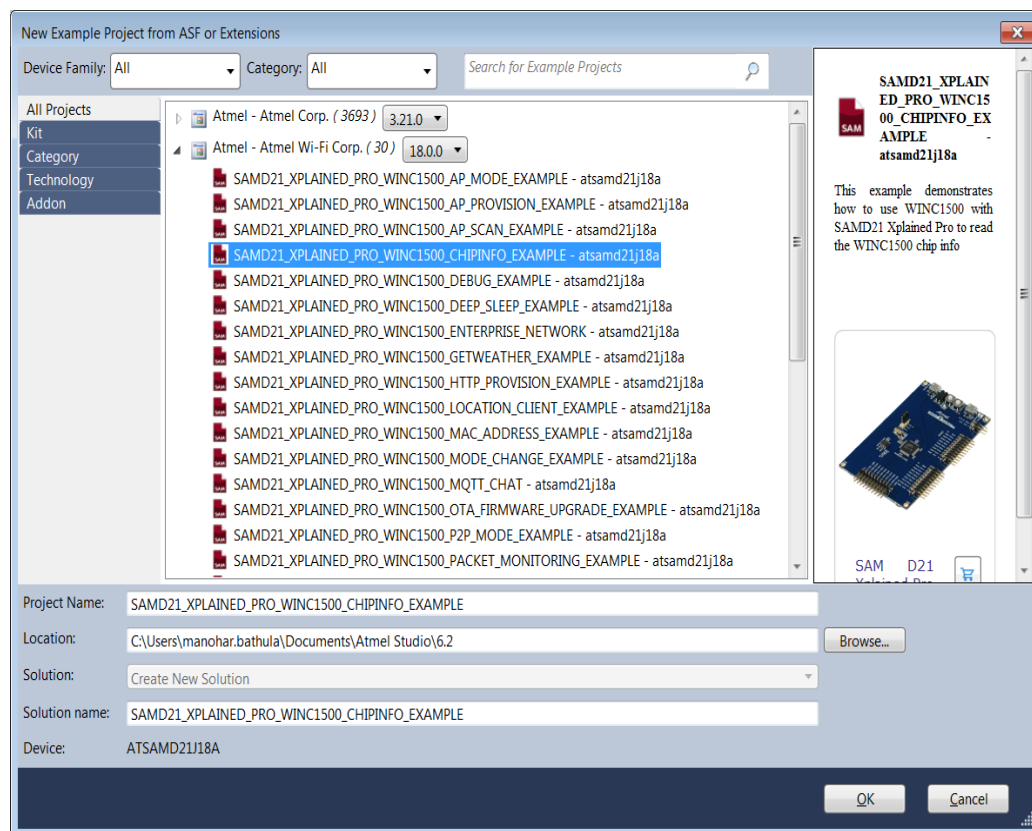
1.1 Atmel Studio Extension (.vsix)

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*".
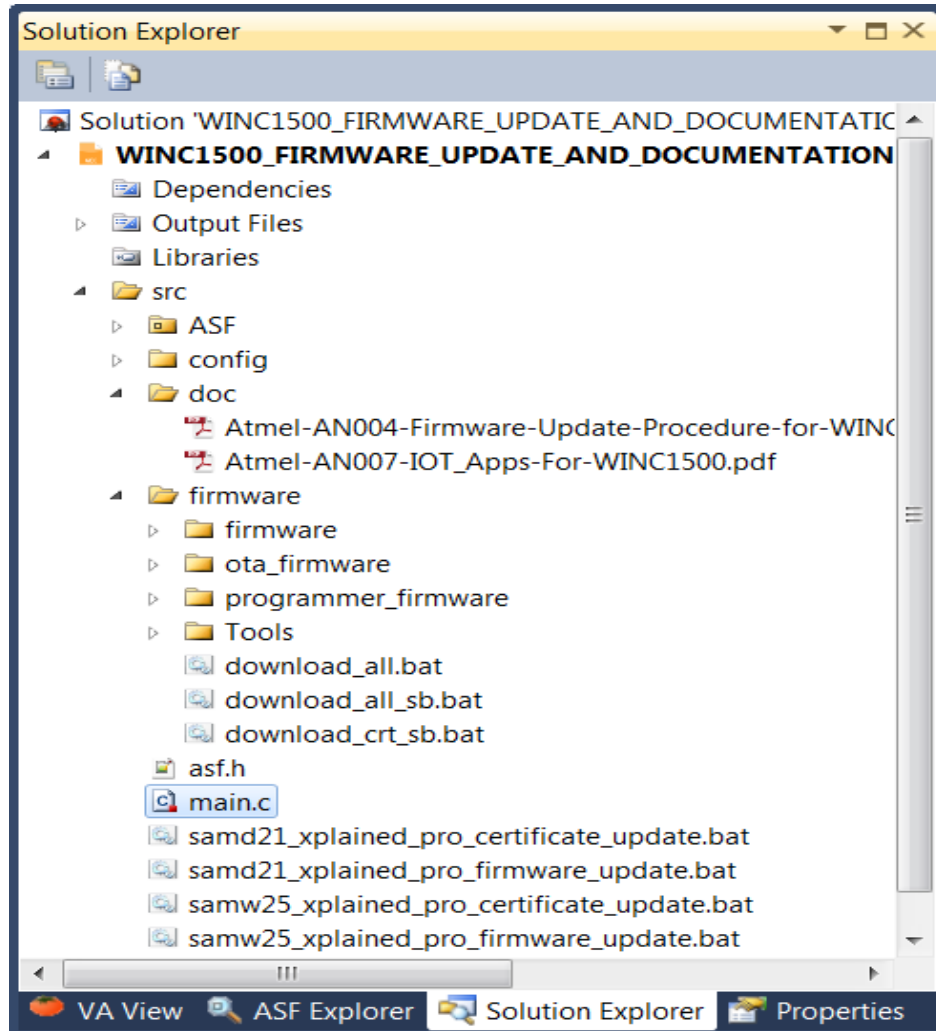
TO DO   Select project "*SAMD21_XPLAINED_PRO_WINC1500_FIRMWARE_UPDATE*" project and then press OK button to import firmware update project and related documentation.

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

ℹ️ **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:
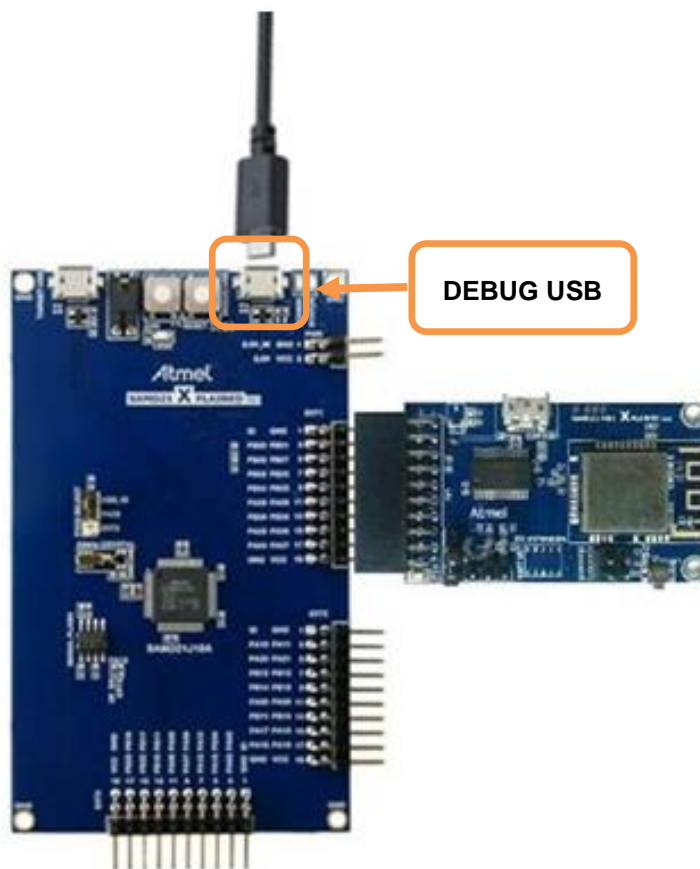
2.2 Run Batch Script

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.
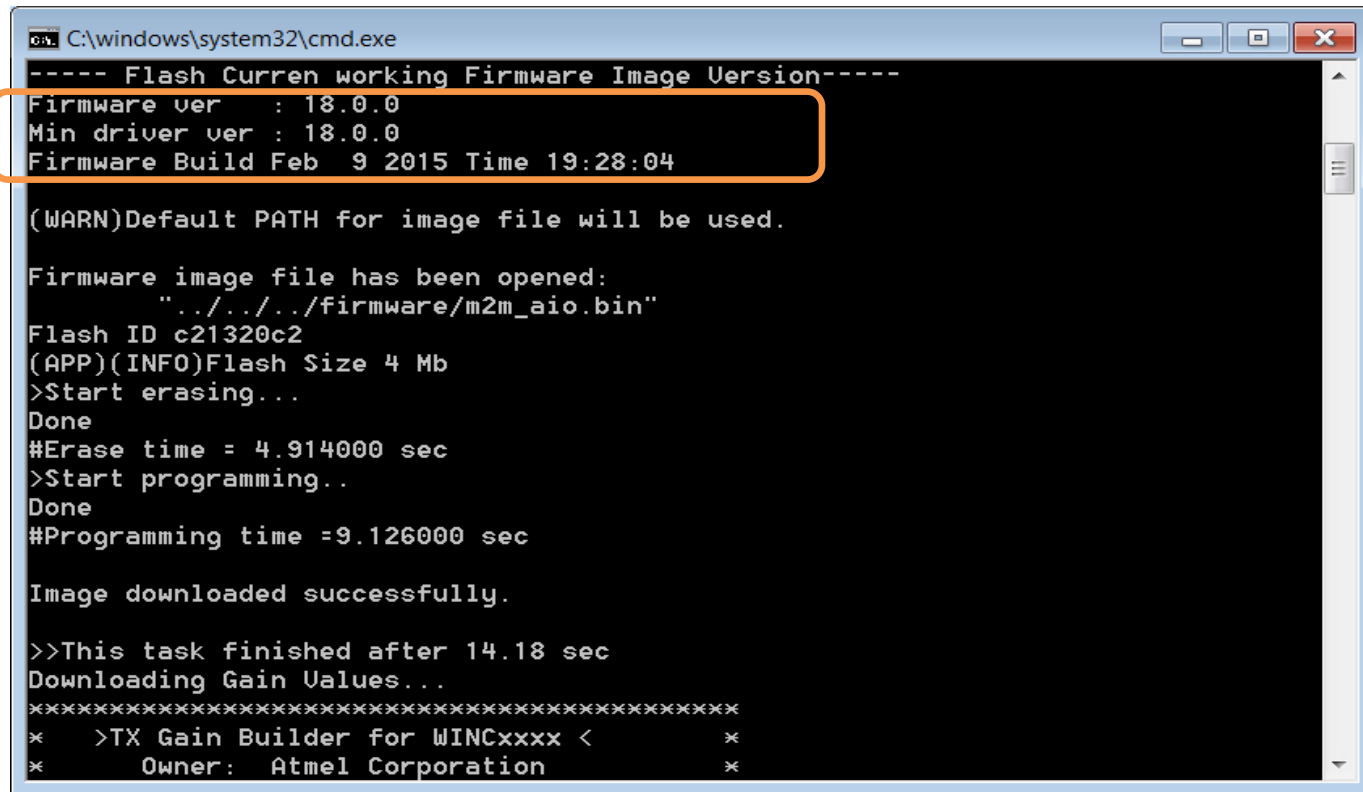

- Run the *samd21_xplained_pro_firmware_update.bat* script

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:
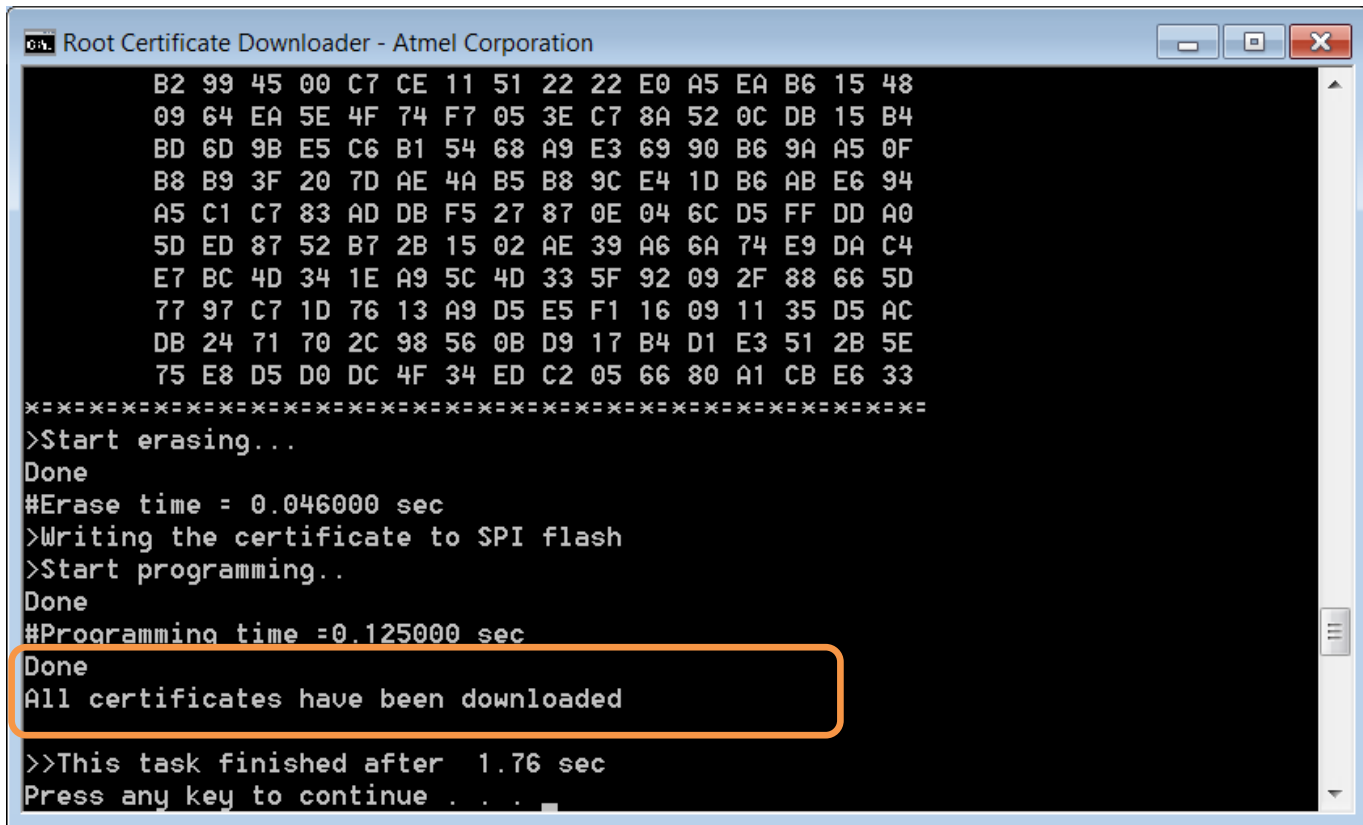
☑ **RESULT**   The WINC1500 Wi-Fi module firmware has been updated successfully.

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

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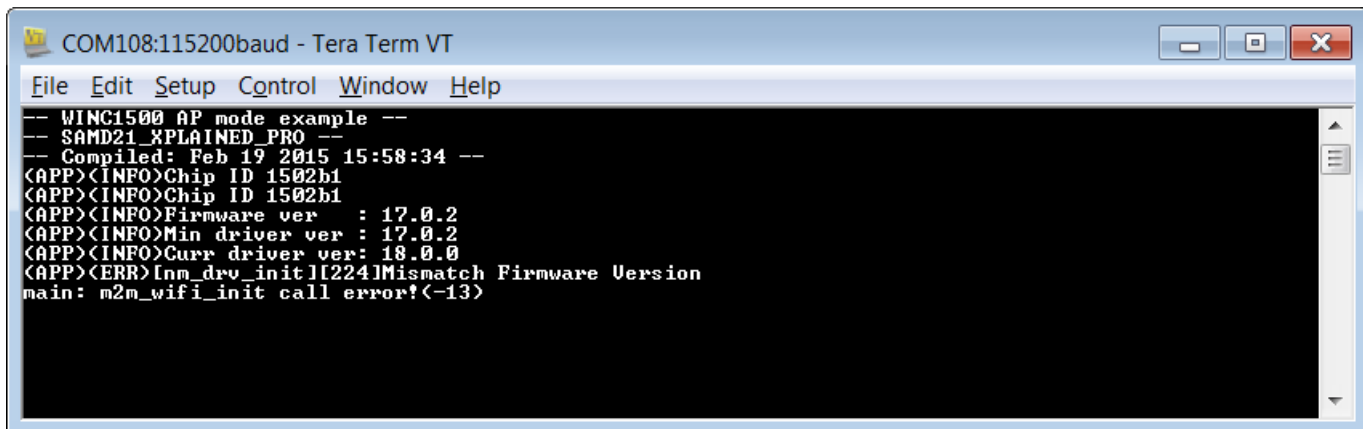
Atmel provides frequent updates of the Wi-Fi software API (host MCU) for the WINC1500 Wi-Fi module. The integrity of the solution is guaranteed using a major/minor version number. When a major version mismatch occurs between the host MCU and the WINC1500 Wi-Fi module, the Wi-Fi software API initialization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

Setting the `CONF_WIFI_M2M_DEBUG` to 1 in the `conf_winc.h` configuration file will provide more information about the version mismatch error:
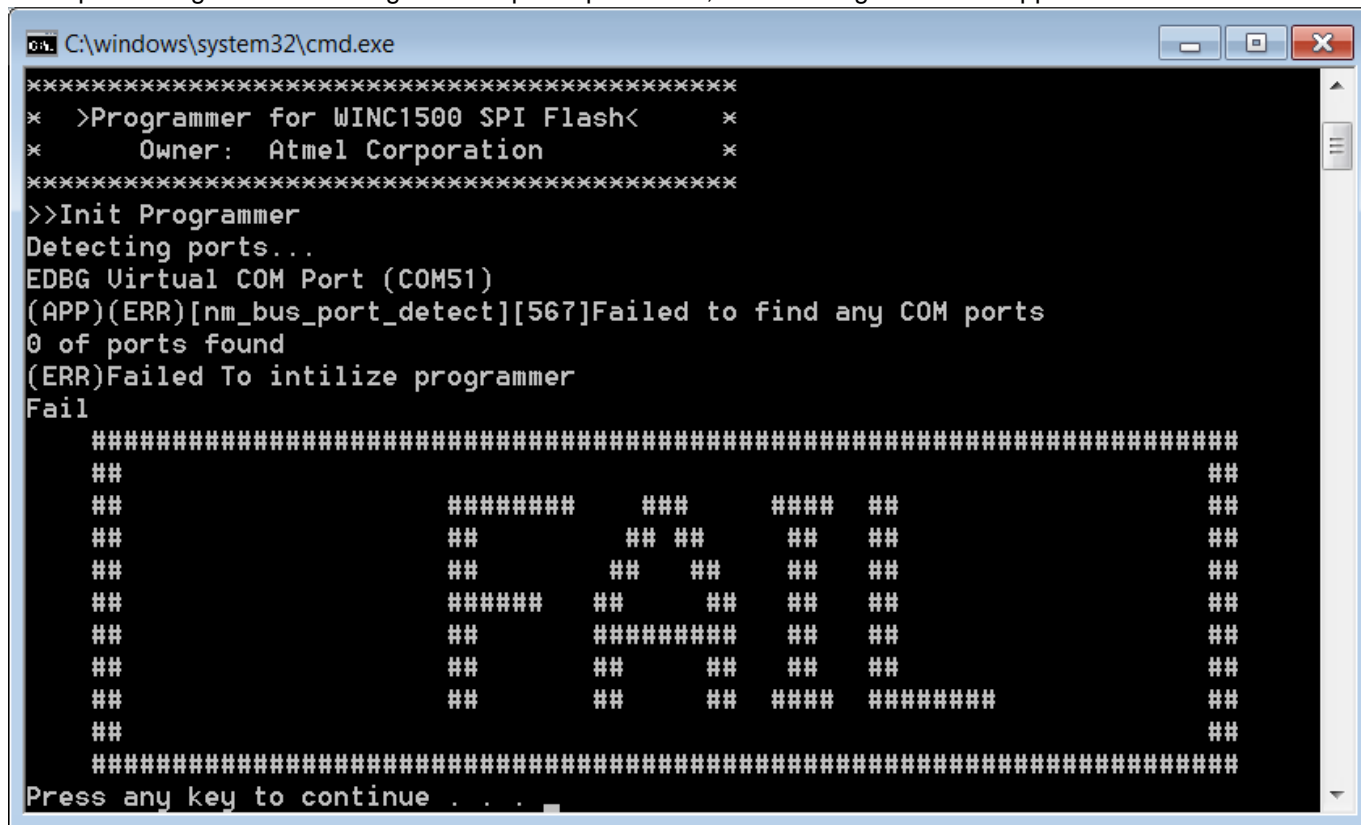
In this scenario a firmware update with the appropriate firmware version number is expected.

4.2 Why is the update batch script failing?

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

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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