CEC Continuing Education Center

DesignNews

# Embedded Studio Primer

## DAY 5 : Nordic DFU

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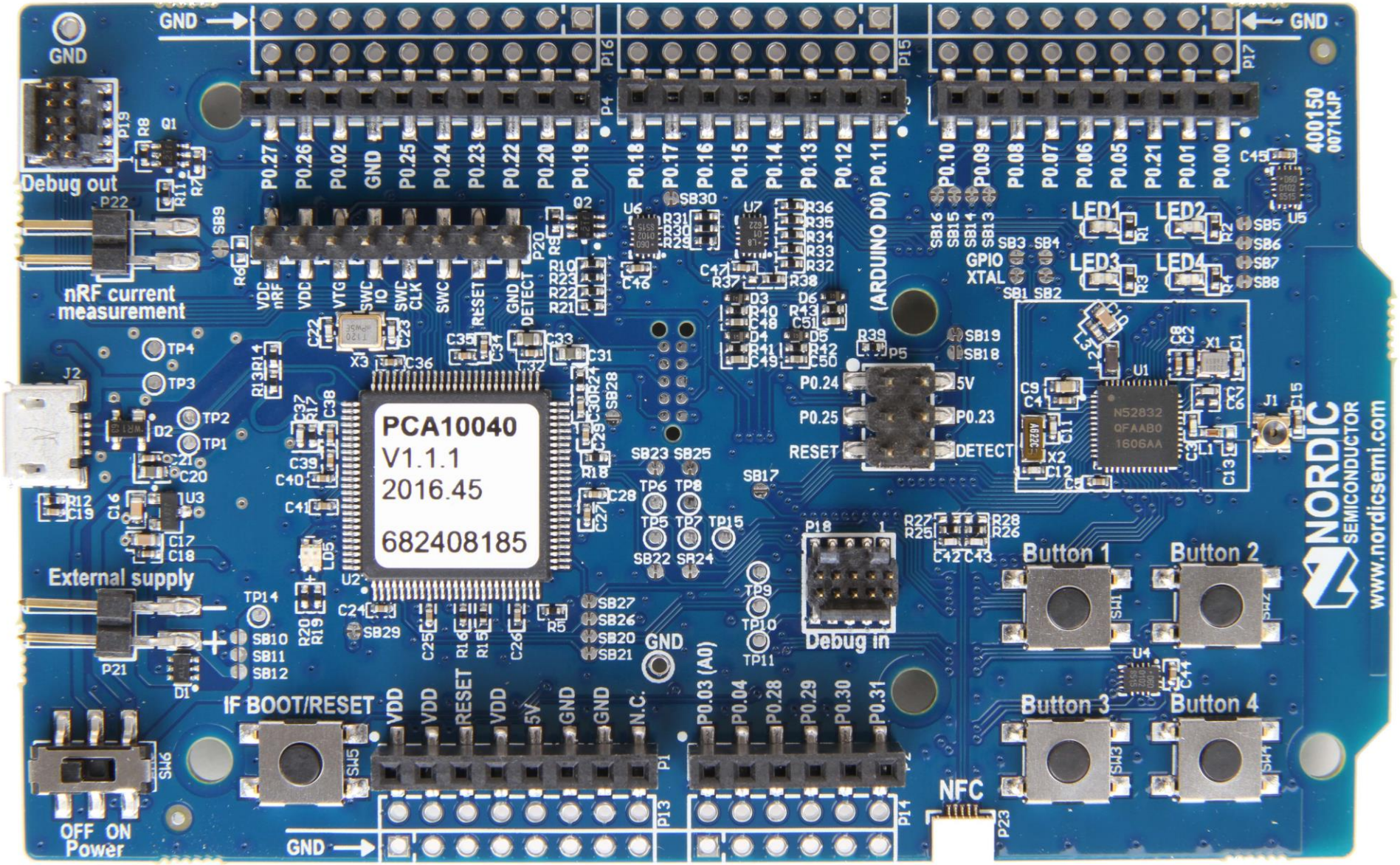
# Webinar Logistics

- Turn on your system sound to hear the streaming presentation.
- If you have technical problems, click “Help” or submit a question asking for assistance.
- Participate in ‘Group Chat’ by maximizing the chat widget in your dock.
- Submit questions for the lecturer using the Q&A widget. They will follow-up after the lecture portion concludes.

# Fred Eady

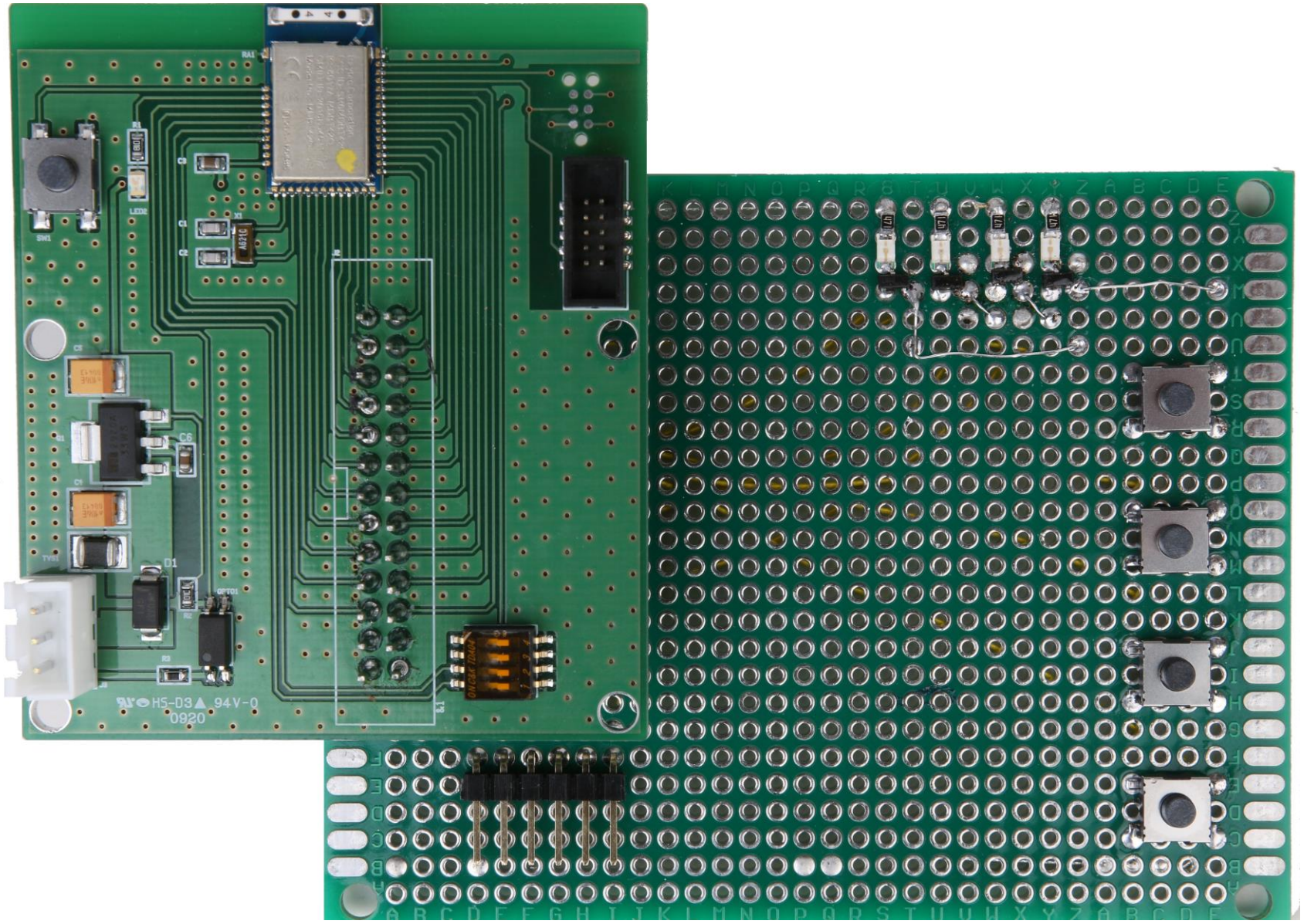
Visit ‘Lecturer Profile’ in your console for more details.

# Nordic DFU (Device Firmware Update)



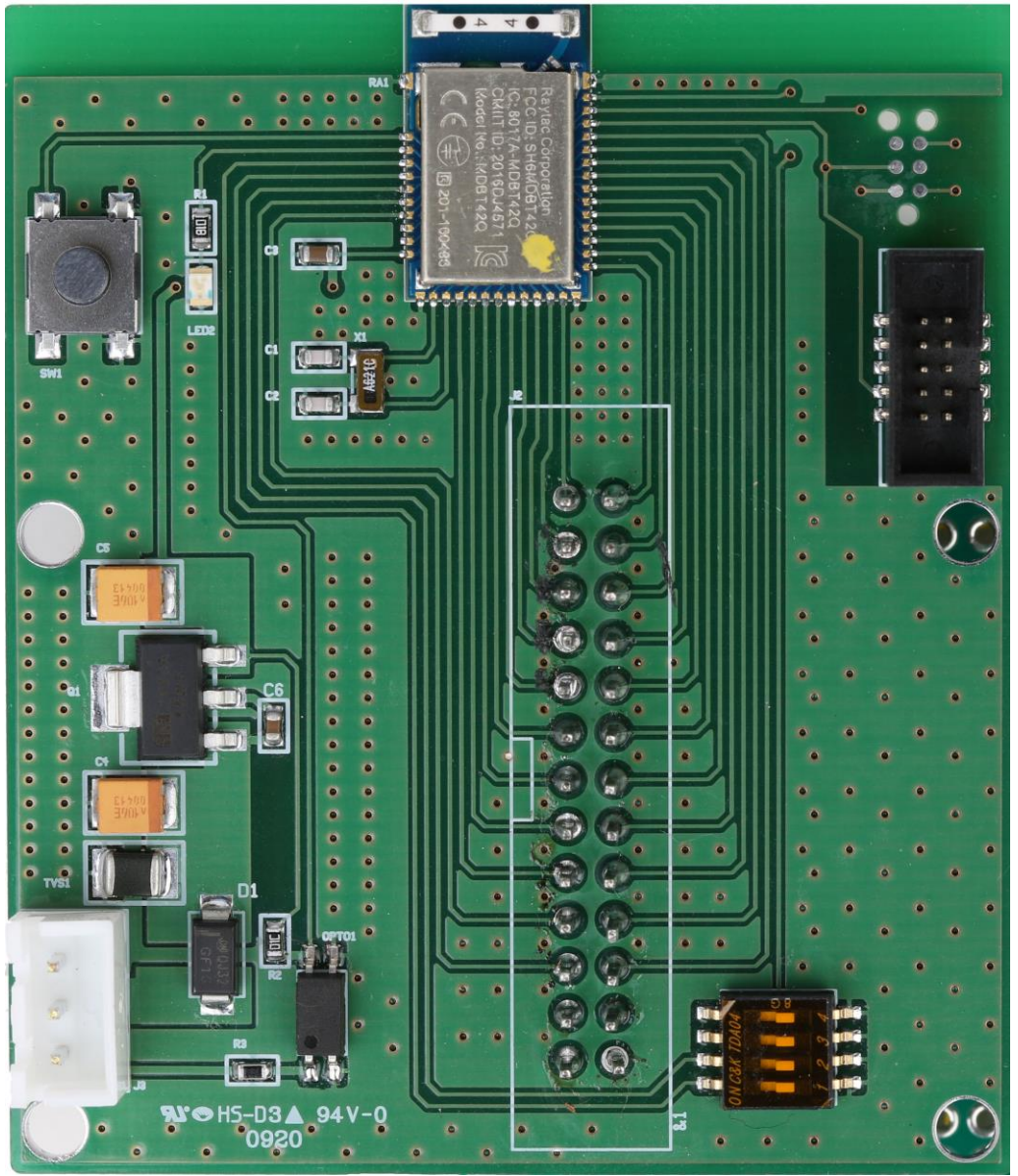
# Nordic DFU (Device Firmware Update)





# AGENDA

- DFU Prerequisites
- Private/Public Key Generation
- Build the Bootloader
- Generate DFU .zip Package
- Executing a DFU



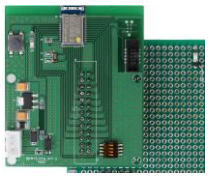
# DFU Prerequisites

## SOFTWARE COMPONENTS:

- nRF5 SDK v17
- Python 3 with PIP
- nRFutil (python –m pip install nrfutil)
- GNU ARM Embedded Toolchain
- MinGW (Make)

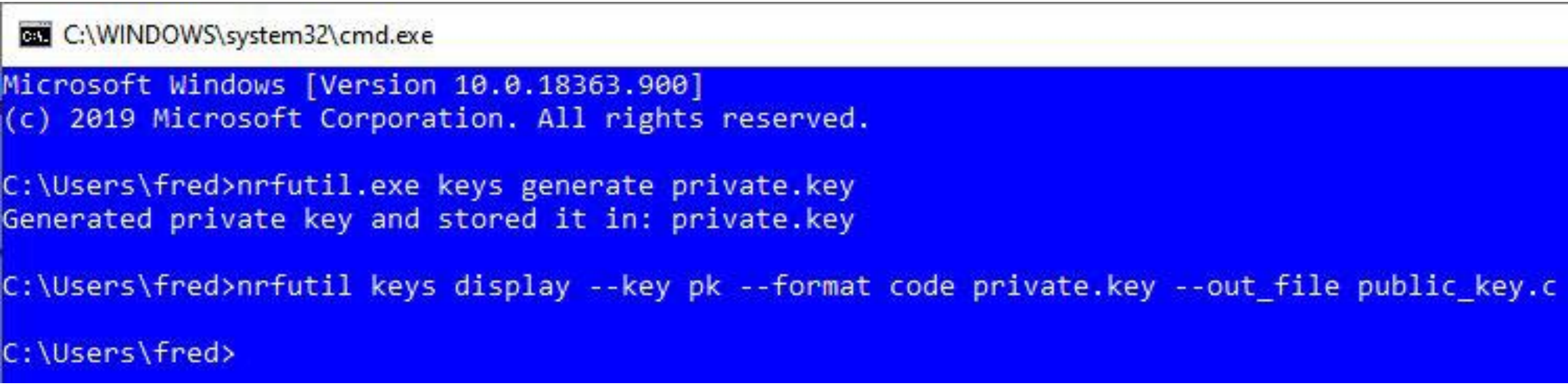
## HARDWARE COMPONENTS:

- nRF5x Board
- BLE-Equipped Phone



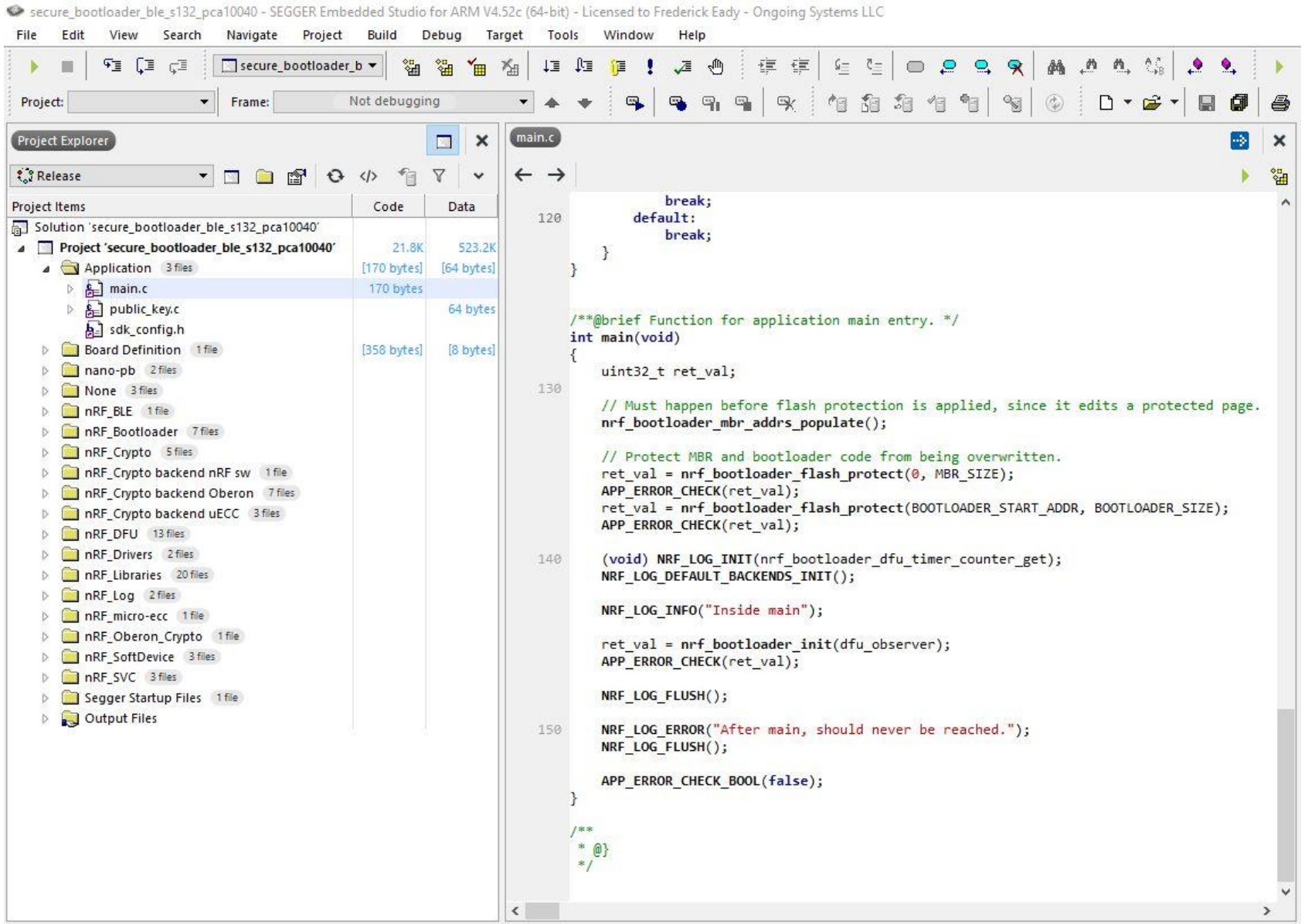
# Private/Public Key Generation





# Build the Bootloader





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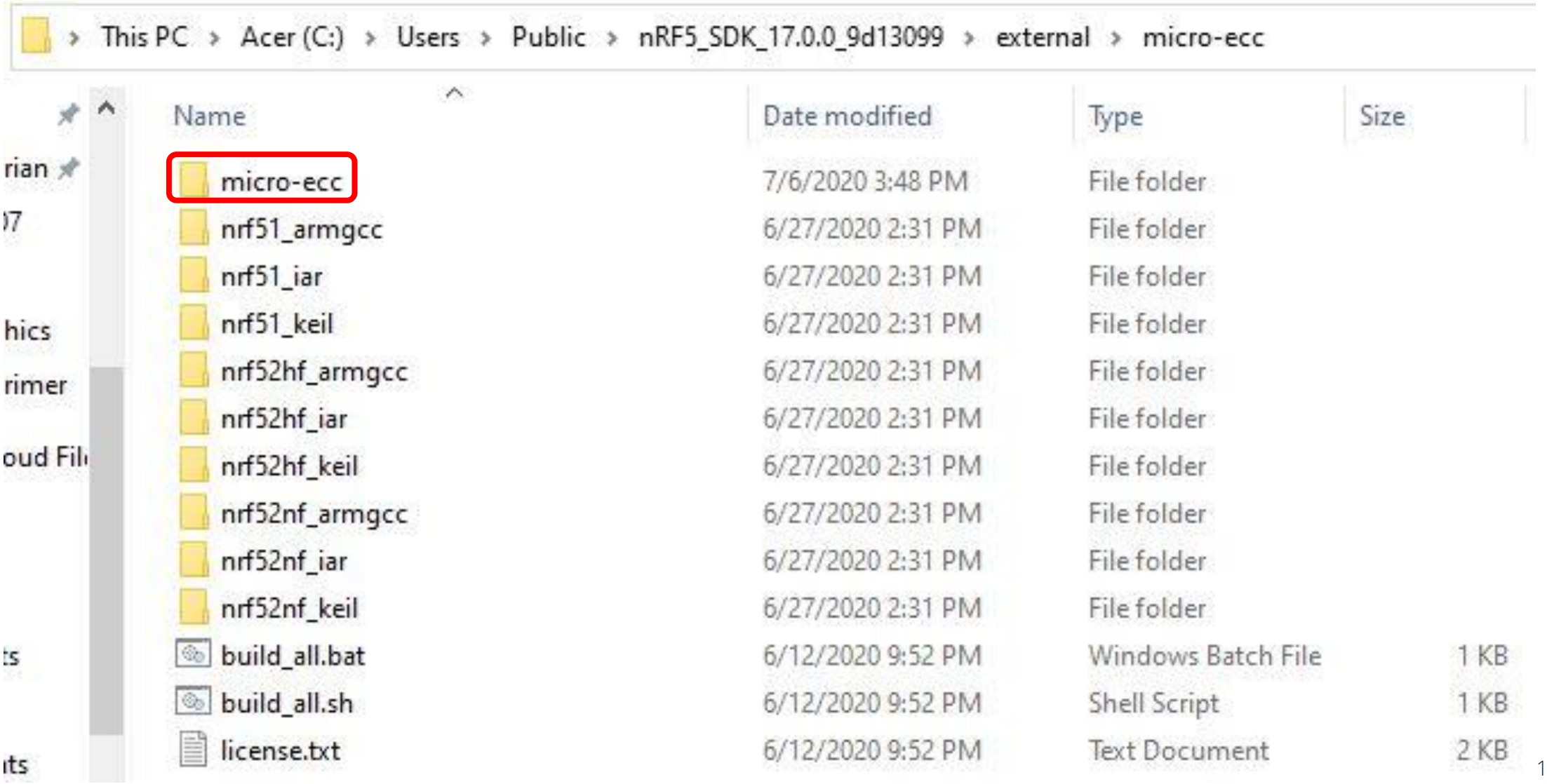

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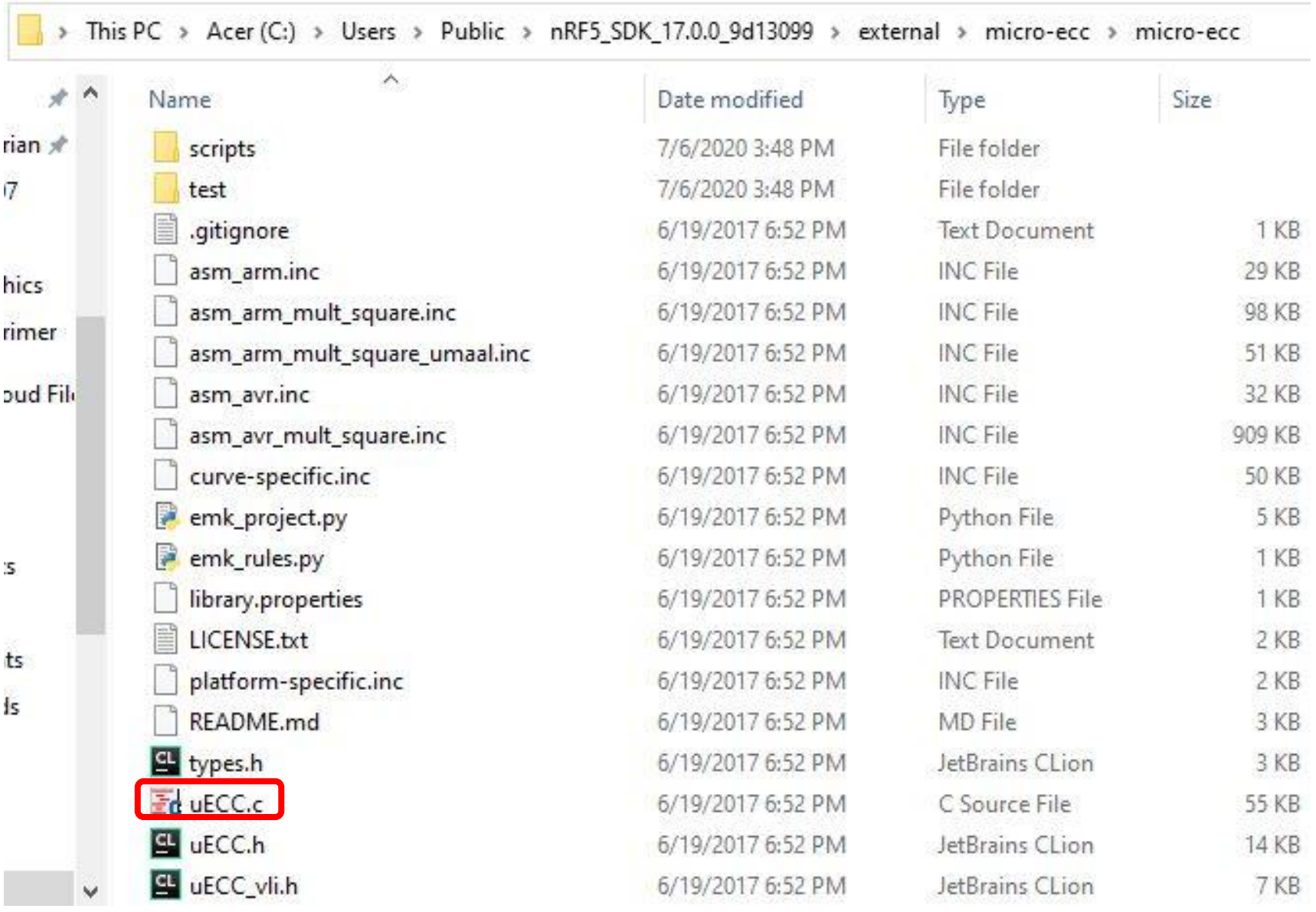
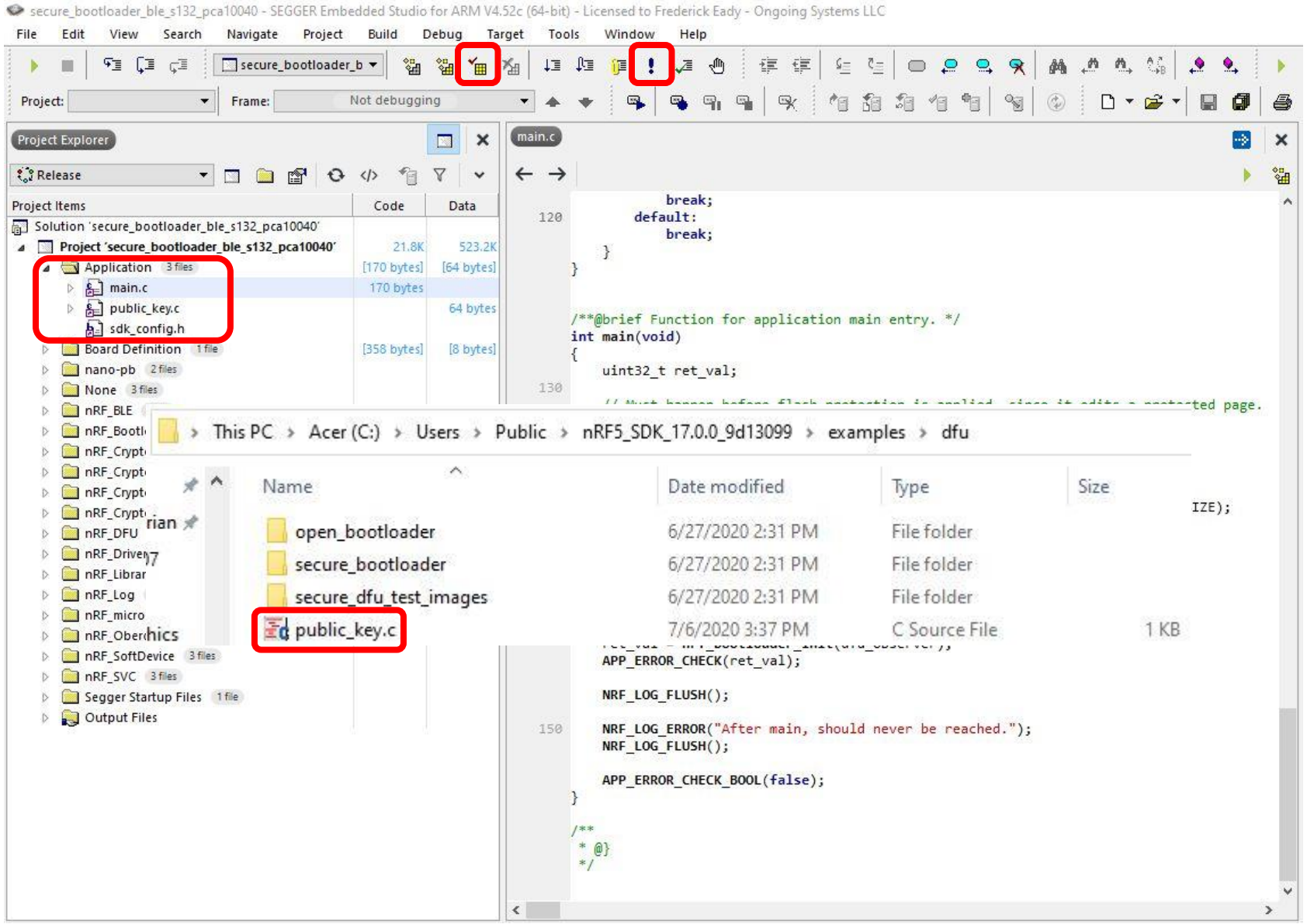


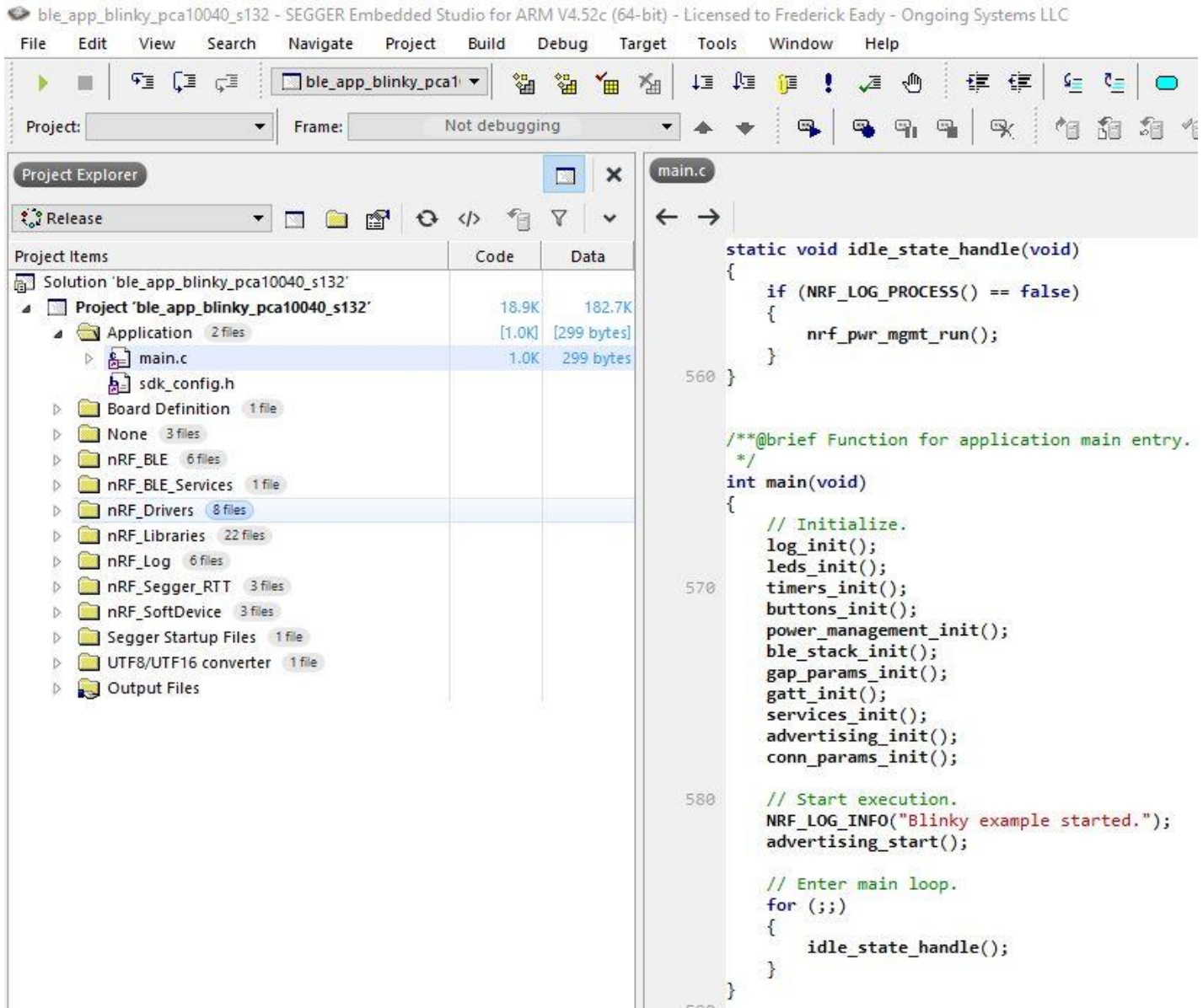
# Build the Bootloader





# Generate DFU .zip Package





# Generate DFU .zip Package

# Generate DFU .zip Package



C:\WINDOWS\system32\cmd.exe

```
Microsoft Windows [Version 10.0.18363.900]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\fred>cd C:\Users\Public\nRF5_SDK_17.0.0_9d13099\examples\ble_peripheral\ble_app_blinky\pca10040\s132\ses\Output
\Release\Exe

C:\Users\Public\nRF5_SDK_17.0.0_9d13099\examples\ble_peripheral\ble_app_blinky\pca10040\s132\ses\Output\Release\Exe>nrfu
til pkg generate --hw-version 52 --application-version 1 --application ble_app_blinky_pca10040_s132.hex --sd-req 0xCB --
key-file private.key blinky_app_DFU_package.zip
Zip created at blinky_app_DFU_package.zip

C:\Users\Public\nRF5_SDK_17.0.0_9d13099\examples\ble_peripheral\ble_app_blinky\pca10040\s132\ses\Output\Release\Exe>
```

« examples › ble_peripheral › ble_app_blinky › pca10040 › s132 › ses › Output › Release › Exe

| Name | Date modified | Type | Size |
|---|---|---|---|
| ble_app_blinky_pca10040_s132.elf | 7/6/2020 6:50 PM | ELF File | 1,663 KB |
| ble_app_blinky_pca10040_s132.hex | 7/6/2020 6:50 PM | HEX File | 64 KB |
| ble_app_blinky_pca10040_s132.map | 7/6/2020 6:50 PM | MAP File | 949 KB |
| blinky_app_DFU_package.zip | 7/6/2020 6:57 PM | WinZip File | 24 KB |
| private.key | 7/6/2020 3:13 PM | KEY File | 1 KB |

# Embedded Studio Primer

## Executing a DFU – Load SoftDevice

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nRF Connect v3.4.1 - Programmer

000174301702

nRF52832

Device is connected

Press READ button to read the memory

File memory layout

Drag & drop one or more HEX files here

File

Add HEX file

Reload files

Clear files

Device

Erase all

Erase & write

Save as file

Reset

Write

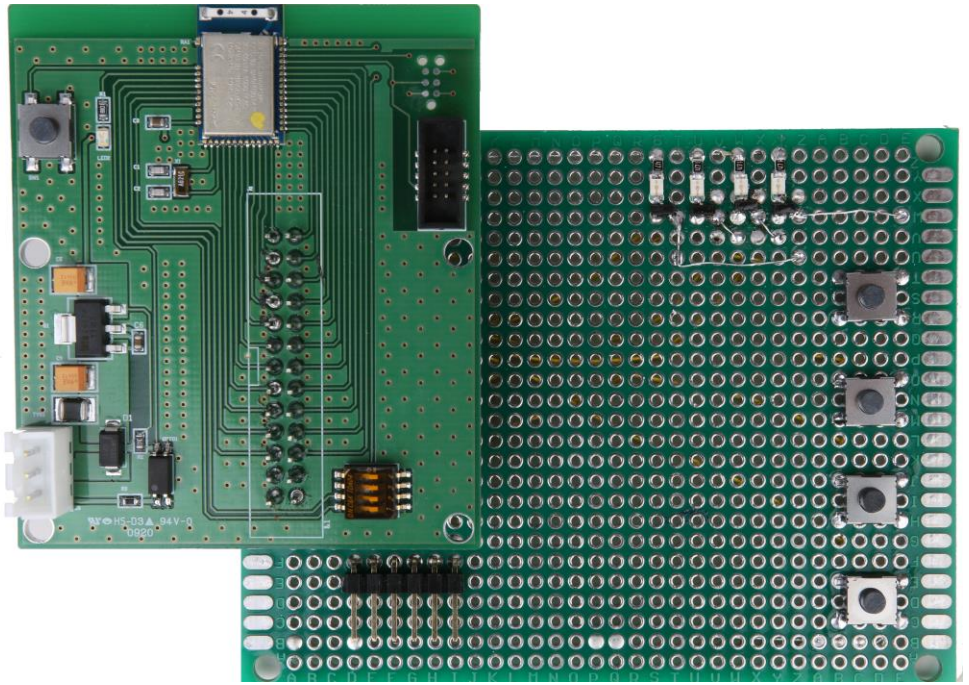
Read

Auto read memory

Enable MCUboot

Log

| | |
|---|---|
| 10:20:26.704 | Core probed: 174301702. |
| 10:20:26.704 | Core RAM: 64KiB. |
| 10:20:26.704 | Core ROM: 512KiB in pages of 4KiB. |
| 10:20:26.809 | Model: NRF52832_xxAA_REV2. |
| 10:20:27.030 | Core0: Reading device non-volatile memory. This may take a few seconds. |
| 10:20:27.065 | Core0: UICR has been read. Click read button to read full non-volatile memory. |



# Embedded Studio Primer

## Executing a DFU – Load SoftDevice

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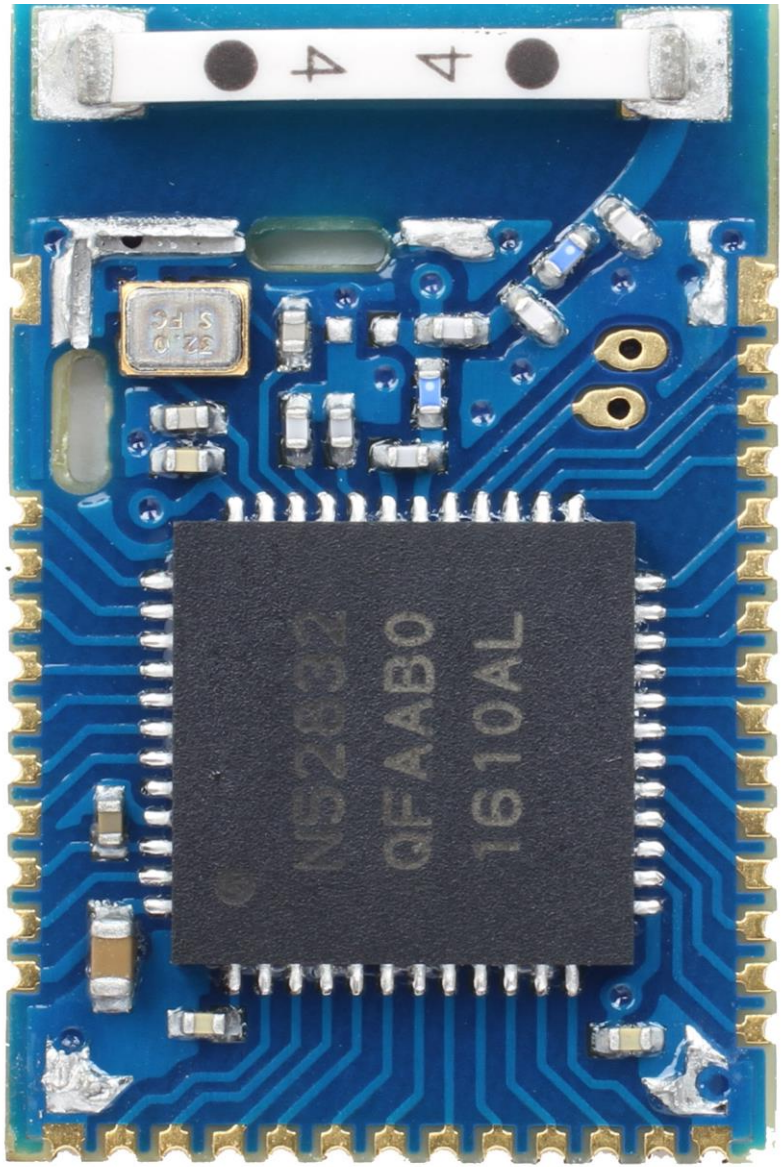


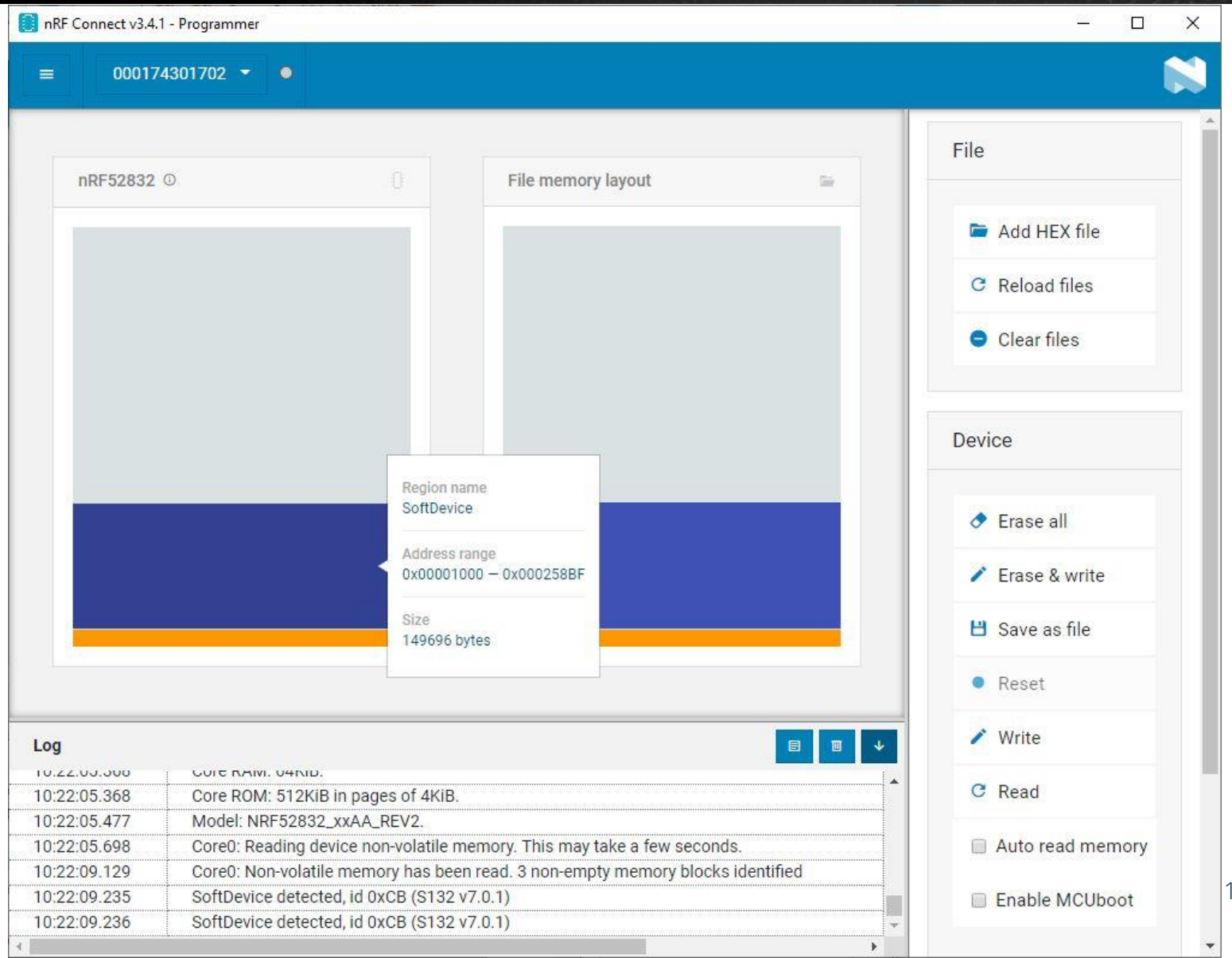

# Embedded Studio Primer

## Executing a DFU – Load Bootloader

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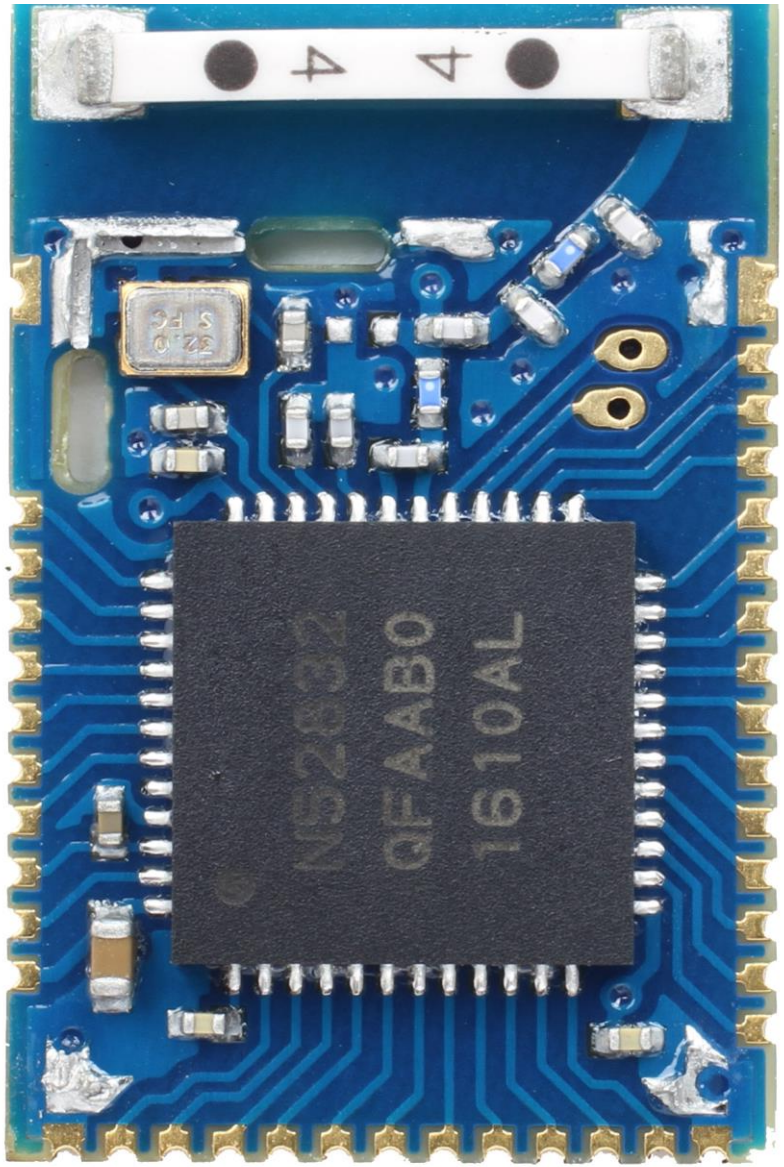


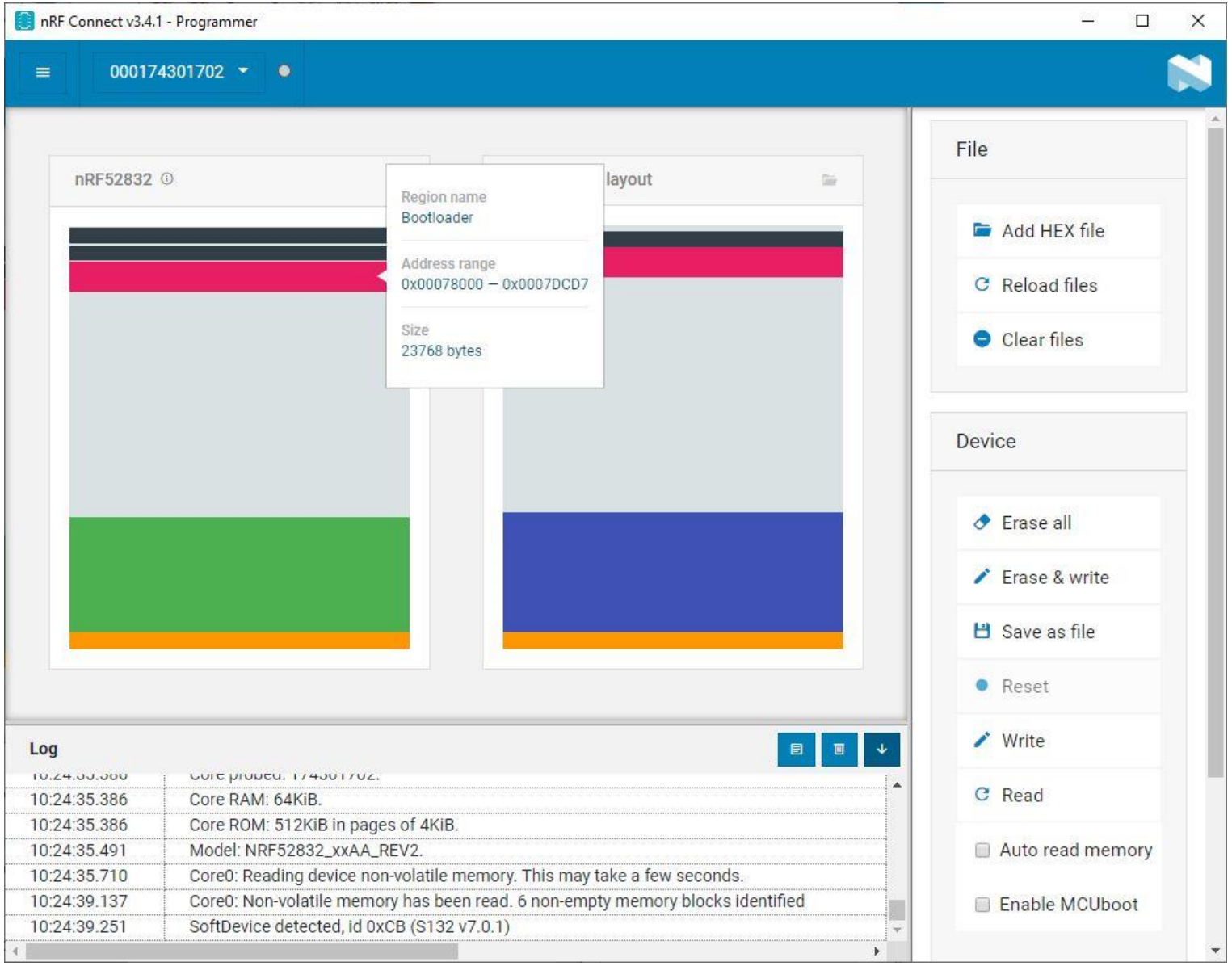

# Embedded Studio Primer

## Executing a DFU – Load Target File/Connect

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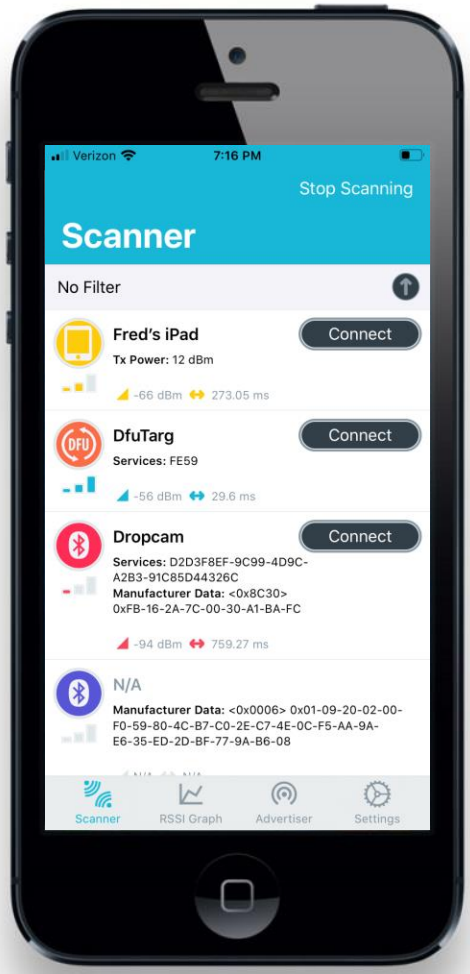


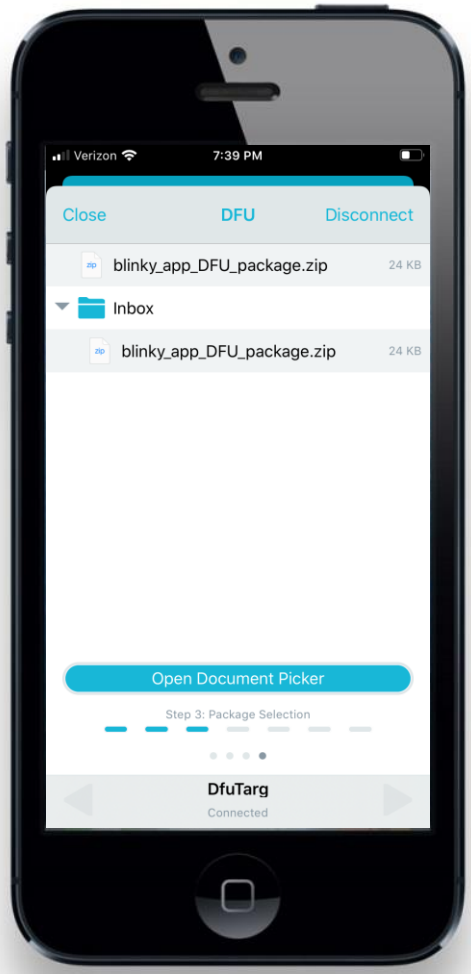


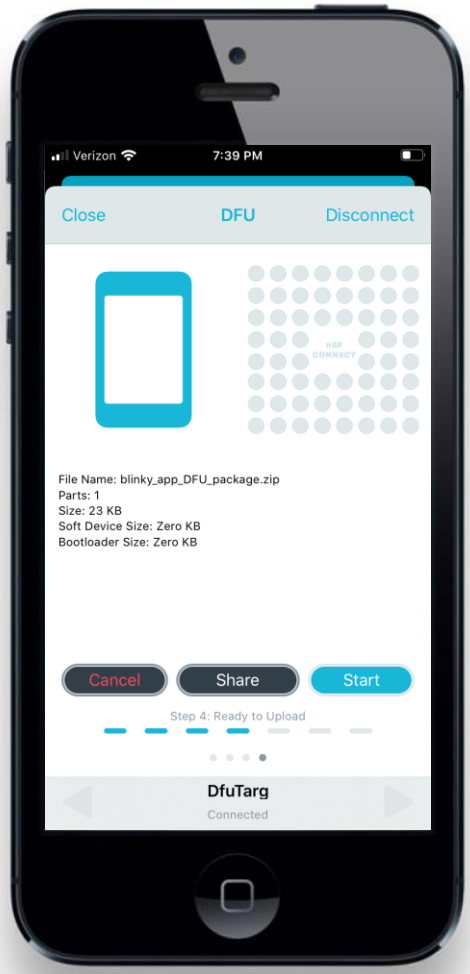

# Embedded Studio Primer

## Executing a DFU – Load Target File/Connect

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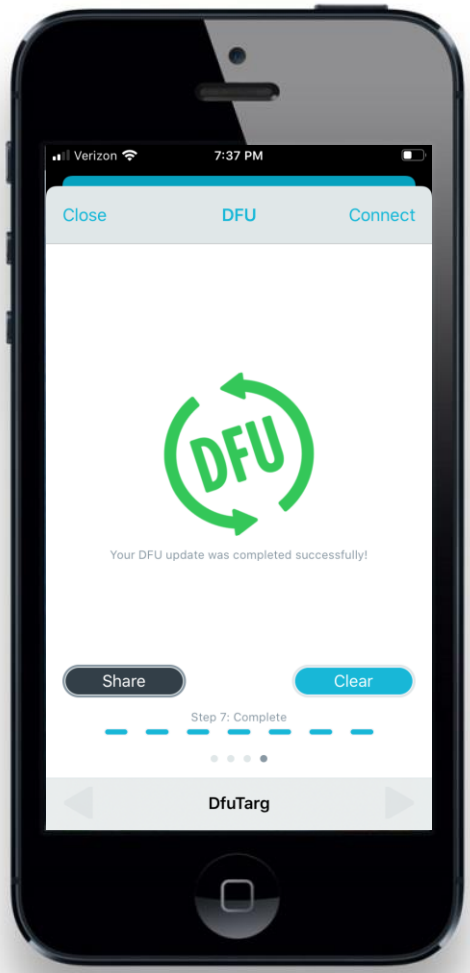
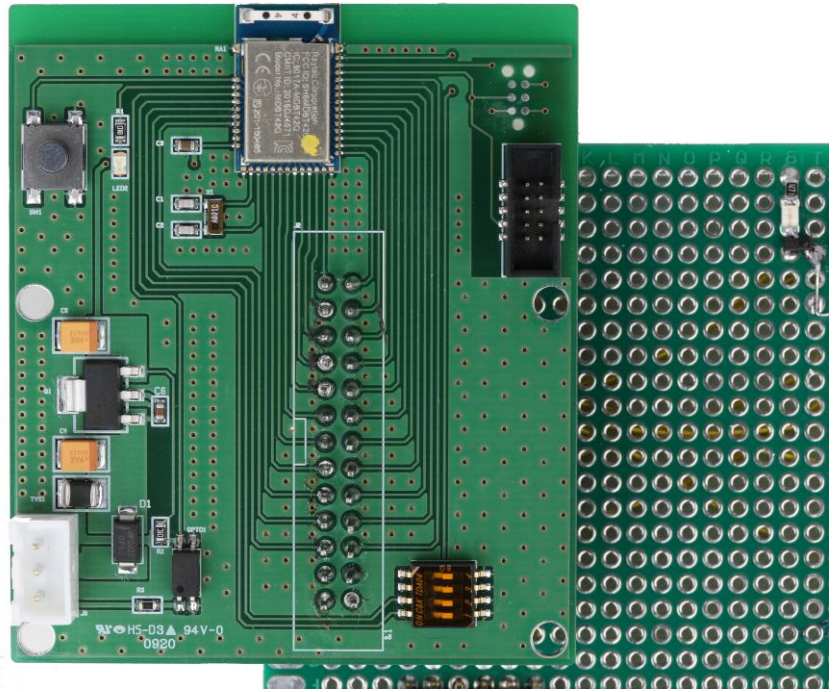
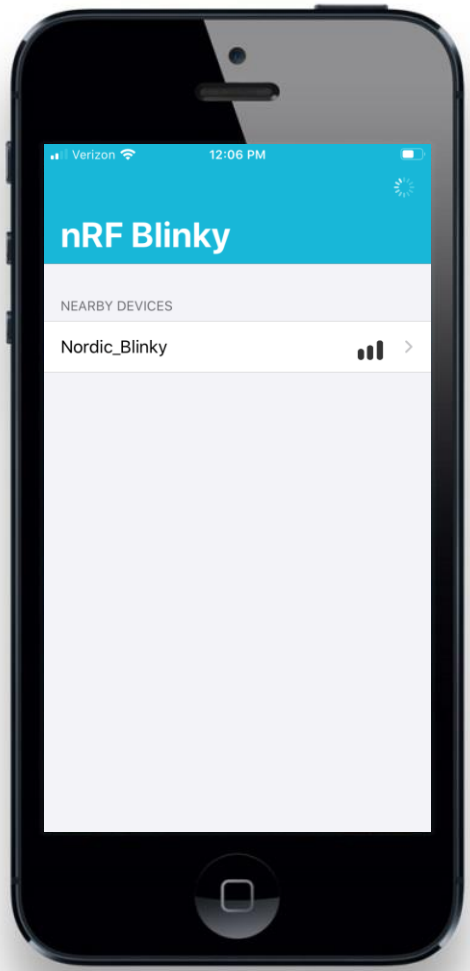


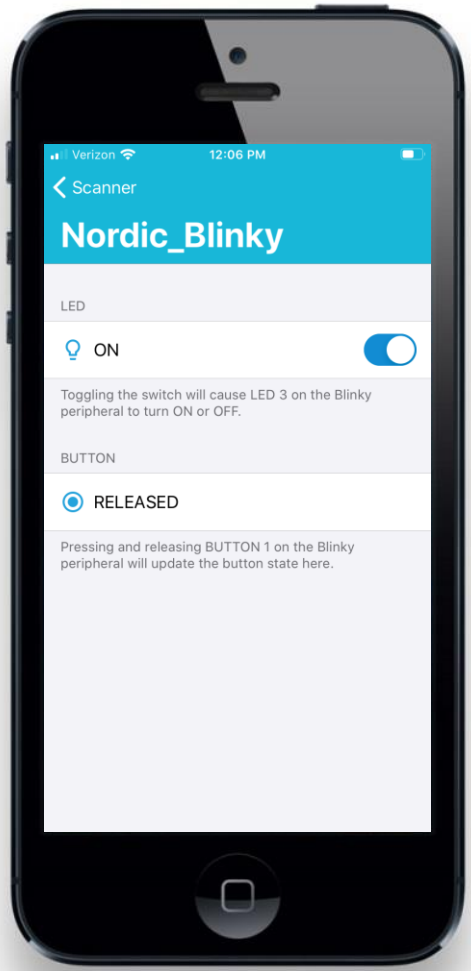


# Embedded Studio Primer

## Executing a DFU – Run the App



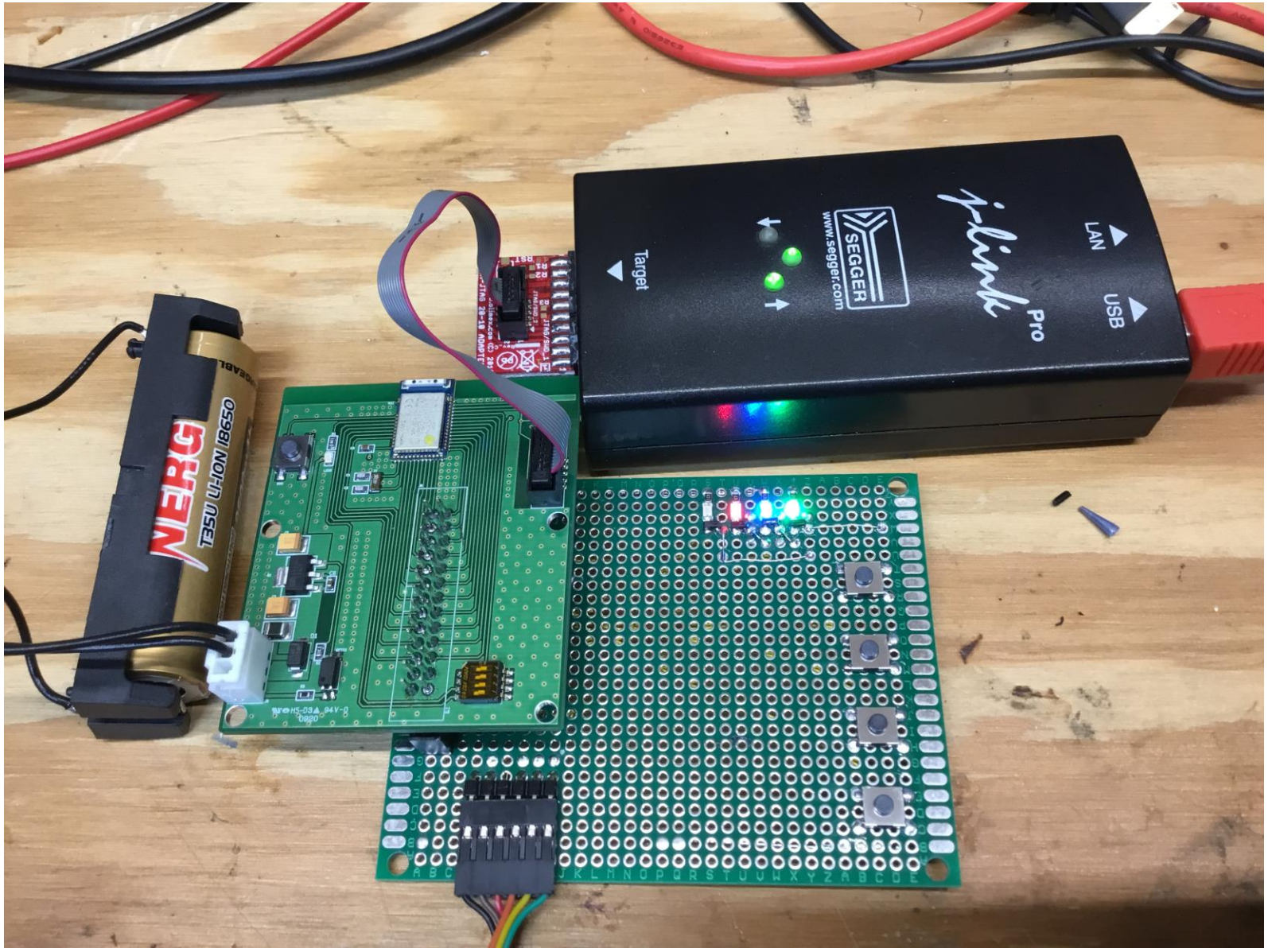


# Embedded Studio Primer

## Executing a DFU – Success!!





# Thank you for attending

Please consider the resources below:

- http://developer.nordicsemi.com/nRF5_SDK/
- http://docs.python-guide.org/en/latest/
- https://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/gnu-rm/downloads/9-2020-q2-update
- http://www.mingw.org/
- https://github.com/NordicSemiconductor/pc-nrfutil/releases
- https://github.com/kmackay/micro-ecc

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# Thank You

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