

Watch Bringup Guide

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Installations:

- NRF Command Line Tool - For erasing flash
 - Download: <https://www.nordicsemi.com/Software-and-tools/Development-Tools/nRF-Command-Line-Tools/Download>
- Python 2.7
 - pip install **nrfutil**
- Segger Embedded Studio for ARM Release 4.12 Build 2018112601.37855 Windows x64

Setup:

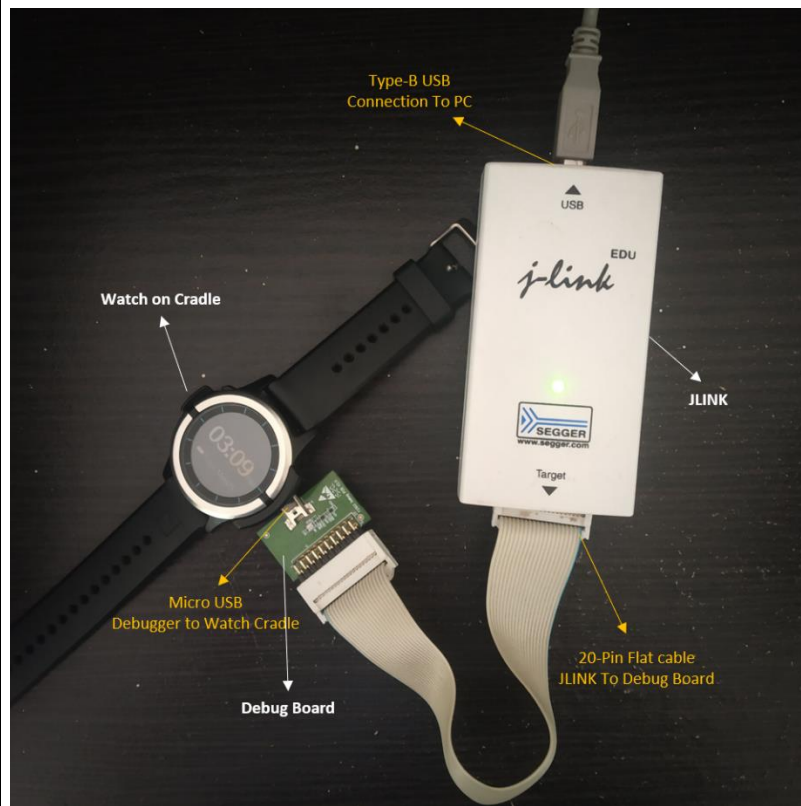
Components needed are

- Study Watch (DVT1/DVT2/DVT3)
- Watch Cradle/Dock
- Debug Board (FD103 Debug PCB V1.0/V2.0)
- Segger J-LINK
- 20-Pin Flat Cable
- Type-B USB Cable
- Micro-USB cable (This is not part of the below image. This will be needed to download firmware once the bootloader is loaded using the J-Link setup)

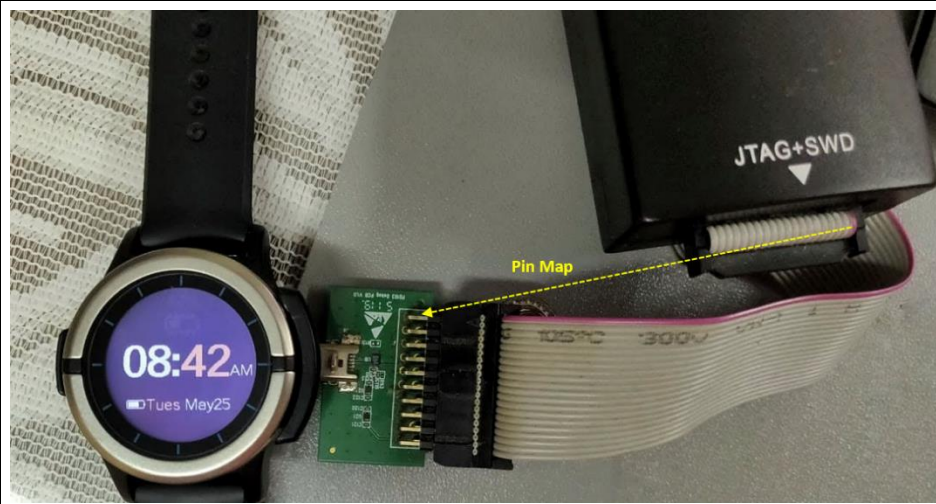
Please refer to the below image for information on needed connections.

Note: The pin mapping of debug board is different between V1.0 and V2.0 and the ribbon cable might need a flipped connection depending on the version of debug board you are using.

V2.0 FD103 Debug PCB



V1.0 FD103 Debug PCB



Considerations:

- For any JLINK download to work, the watch is expected to be connected to a battery and it must be charged (more than 5%)
- Once the JLINK and Debugger is connected to the watch, it is advisable to power cycle/hard reset the watch
- Python 2.7 should be your default python, if not, make necessary environment switches to make Py2.7 the active python environment.
- Be sure to also add the "C:\Python27\Scripts" to the system PATH as well
- Install the Microsoft Visual C++ Compiler for Python 2.7: aka.ms/vcpython27 << You must finish this before you can complete the following steps.
- Use pip (Python package manager, installed along with Python) to install the CLI dependencies (It is possible that previous older Python, pre 2.7.13 installs do not have the "pip" included) Step 1) is recommended)

a) Basic dependencies (Using the CLI only)

i. Install the pywin package using the executable installer:

<https://sourceforge.net/projects/pywin32/files/pywin32/Build%202020/pywin32-220.win32-py2.7.exe/download>

ii. pip install pyserial colorama numpy

b) Plotting dependencies (If you want to plot data)

i. Install PyQt4 using the executable installer:

<https://sourceforge.net/projects/pyqt/files/PyQt4/PyQt-4.11.4/PyQt4-4.11.4-gpl-Py2.7-Qt4.8.7-x32.exe/download>

ii. pip install pyqtgraph PySide

Bring-Up Procedure:

- To make a fresh start, erase the flash using the NRF CLI. This will avoid any issues due to faulty firmware already loaded on the DVT board
 - In order to erase the Flash, you'll need NRF CLI (download link mentioned above) and JLINK + Debugger connection setup
 - After making JLINK and Debugger connections to the DVT watch, open Segger Embedded Studio (SES) and from the "Target" menu, select 'Connect J-Link'. Make sure that this step is executed successfully before proceeding to further steps.
 - If the watch connection to the J-LINK is not proper, this may return 'Low Voltage' error. In such cases, kindly verify the connections and try the previous step again.
 - Once the connection is successful open a command prompt and cd into the drive 'C:\Program Files (x86)\Nordic Semiconductor\nrf-command-line-tools\bin'
 - From the above directory in cmd, run the command '**nrfjprog.exe --eraseall**'
 - If the above command returns success, the flash is erased.

- Now that we have an empty flash, we can start with downloading the BootLoader into the DVT board
 - Open the BootLoader SES project (*study_watch\nrf5_sdk_15.2.0\adi_study_watch\bootloader\ses*), build the binary and load it through J-LINK by running the SES build (F5)
 - Once the bootloader is loaded successfully, you'll see the watch in BootMode (White arrow on black screen) on the watch display.
- Once the device is in Boot mode, we are ready to download the firmware using the nrfutil through USB
 - Disconnect the JLINK debugger from the watch port and connect it to a micro usb cable connected to your pc
 - Open the watch firmware project in SES and build the firmware (*study_watch\nrf5_sdk_15.2.0\adi_study_watch\app\nRF52840_app\ses*)
 - open a command prompt and cd into the location *'study_watch\nrf5_sdk_15.2.0\adi_study_watch\bootloader\boot_zip'*
 - Make sure your default python is 2.7. If you are using a python virtual environment, switch to Py2.7 environment.
 - Run the bat file from the command prompt (**APP_zip_generate.bat release**). This will generate a zip file with the firmware binary (Release Mode) in the same location.
 - Open Device Manager and verify the COM port details where the watch USB is connected. Example: COM4
 - Run the bat file from the command prompt (**APP_usb_download.bat COM4**). Replace COM4 in this command with the comport from your setup. This should roughly take 60 seconds. 'nrfutil' python library is expected to be installed in your py27 environment for this step to work.
 - Once the above step is successfully completed, the watch should be setup with latest firmware and bootloader and the display should be showing the time.

Debugging Common Errors:

- May 14 2020 master firmware if loaded on the device, will create issues while switching to the Bootloader mode. This makes the device come out of bootloader mode automatically in ~5 to 10 seconds.
- Continuous USB re-connection may be noticed after the FW download sometimes. Unplugging the USB and power cycling the device usually fixes this. If not, you may have to erase the flash and repeat the complete procedure above.
- JLINK download from SES may return 'No Idcode' error, this could be due to any one of the below cases
 - Low/No battery power
 - incorrect cable connections
 - Faulty debugger (ideal case voltage level at the debugger should be 3.3V)
 - Using debugger with EVT specific hardware modifications, for downloading firmware into DVT boards (removing the wire soldered on the debugger can fix this)

- USB not detected during testing - This could happen due to the soldering on the DVT board micro usb socket getting broken.