EE 192:FRDM-KL25Z Quick Start Guide

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Below are step-by-step instructions on how to get yourself started with your FRDM-KL25Z board and programming with Keil μVision5.

1. Things you should have: 1 FRDM-KL25Z board, 1 micro-USB to USB cable, 1 computer
2. The first thing to do is to check is if your board has the correct bootloader. For Spring 2016, we support the following board firmware version:

   MicroBoot Kernel Version: 1.05

   Bootloader Version: 1.11

   Application version: 0.00

   To check your firmware version, hold the reset button and connect the FRDM board to your computer (be sure to use the port labeled "SDA") . A removable drive named "BOOTLOADER" should appear. Open the drive and open the file named, "SDA_INFO.HTM". If your firmware version does not match, let your GSI know.
3. Install the Pemicro Drivers. They can be downloaded here: `http://www.pemicro.com/opensda/`
4. For Windows users only, install the mbed serial driver. Follow the instructions here: `https://developer.mbed.org/handbook/Windows-serial-configuration`
5. If you are not using the class-supported Keil μVision5 IDE, go ahead and start developing with your chosen platform! If you are using μVision, download it from here (the MDK-ARM dev environment): `https://www.keil.com/download/product/`
6. Once you have installed Keil, a package installer should open up. On the left side menu, navigate down to Freescale->KL2x->MKL25Z128xxx4
7. The right-side menu should now be populated with different software packs with an option to install them. Install the following packs, if they are not already installed:
   (a) Keil::Kinetis_KLxx_DFP
   (b) ARM::CMSIS
   (c) Keil::ARM_Compiler
8. Go to the EE192 Github repo and grab a copy of the skeleton (either use git clone, or download as zip): `https://github.com/ucb-ee192/skeleton`
9. Open the ee192-sp14.uvprojx file in Keil. This file has the typical mbed libraries that most groups use already added and some Hello World! code in main.cpp. Add your own code, and remove any that you don't want (hint, most of the existing code). You will most likely need the license for Keil to be able to compile (32kB build limit on free version).
10. To program the board, connect the FRDM to your computer using the OpenSDA port (without holding down the reset button). It should show up as a removable drive titled MBED.

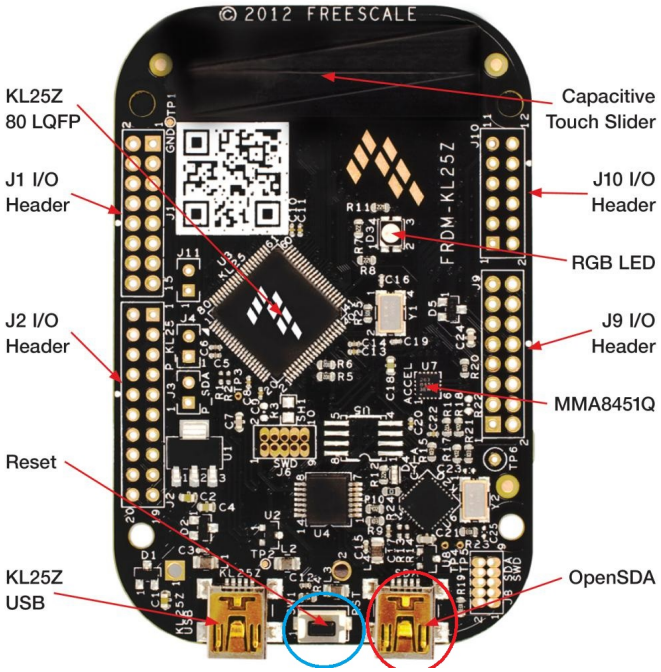

Figure 1: The Reset button circled in blue, and the OpenSDA mini USB port circled in red. The FRDM-KL25Z cannot be programmed through the other mini USB port, but it can be powered through it.

11. Compile your program- this should produce a .bin file located in the build folder.
12. Drag and drop/Copy the compiled .bin file into the MBED drive. The MBED should eject itself at this point, and re-connect as a removable drive shortly.
13. A board reset might be necessary to get it to start running the new program.

Using KEIL debug and download tools with Windows 10. (March 4, 2016)

For static debugging with Keil, you can set breakpoints, watch variables, single step through functions, etc. (It saves adding print statements and recompiling.)

Summary: The KL25Z board needs to have debugger software loaded, and your laptap needs Jungo connectivity for debugger. Directions here:

1. Install Windows 10 drivers:

   `http://www.pemicro.com/downloads/download_file.cfm?download_id=53`

   Adds support for Windows 10. Installs PE drivers to allow applications to communicate with PE hardware. Please note that not all hardware may be supported for your OS. This does not include the application level support which comes with the different products. Version 12.2.0.0 Released 10/29/2015.

   (now under Device Manager → Jungo, see both PEMicro OpenSDA Debug Driver, and WinDriver)

2. Get KL25Z board in bootloader state

   Unplug and plug in board while holding reset.

   Should now see D:Bootloader in top level folder

3. Install Debugger

   Copy `MSD_DEBUG-FRDM-KL25Z_Pemicro_v118.SDA` to D:Bootloader

4. Windows 7 machine connection

   Unplug and plug in board while holding reset, while connected to a Windows 7 machine. Various device drivers may install on PC. Should now see D:FRDM-KL25Z rather than Bootloader in top level folder

5. Board should now work with Keil debugger under Windows 8 or 10.