Micriμm

μC/OS-III and μC/Probe on the Freescale FRDM-KL46Z

Introduction

This document will guide you through the necessary steps to run the precompiled example of Micriμm's μC/OS-III and μC/Probe on the FRDM-KL46Z Rev. C.

The process involves the use of the onboard *OpenSDA adapter*. OpenSDA features a mass storage device bootloader, which provides a quick and easy mechanism for loading different OpenSDA applications such as flash programmers and run-control debug interfaces.

The process also requires the use of the following files found in the *Micriμm Quick Start Package for the FRDM-KL46Z*:

- **MSD-FRDM-KL46Z48M_Pemicro_v113.SDA**
  OpenSDA application to program the flash.

- **CMSIS-DAP_OpenSDA.S19**
  OpenSDA application that implements the CMSIS-DAP debugging interface.

- **Micrium_FRDM-KL46Z_OS3.srec**
  Precompiled example of Micriμm's μC/OS-III in S-record format.

- **Micrium_FRDM-KL46Z_OS3.out**
  Precompiled example of Micriμm's μC/OS-III in ELF format.

- **Micrium_FRDM-KL46Z.wspx**
  Workspace example of Micriμm's μC/Probe.

Quick Start Guide

The following steps will guide you through the process of loading the Micriμm's precompiled example and the CMSIS-DAP debug interface.

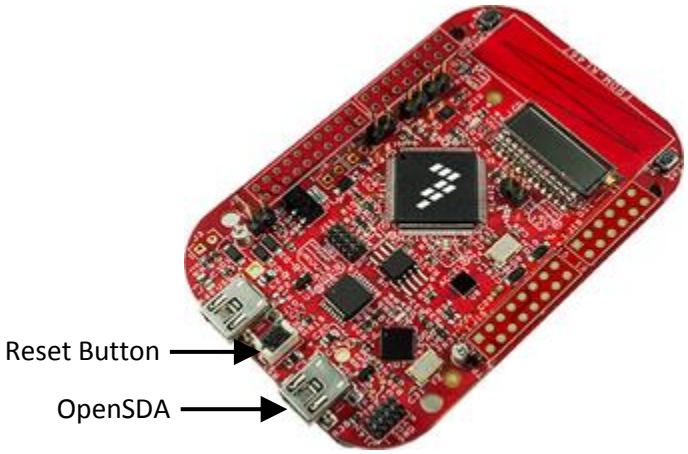
1. Download the ***Micriμm Quick Start Package for the FRDM-KL46Z*** from the following link:

   http://micrium.com/probe/Micrium_FRDM-KL46Z_QSP.zip

2. Download and install the ***Windows USB Drivers*** to support OpenSDA from the PE micro website:

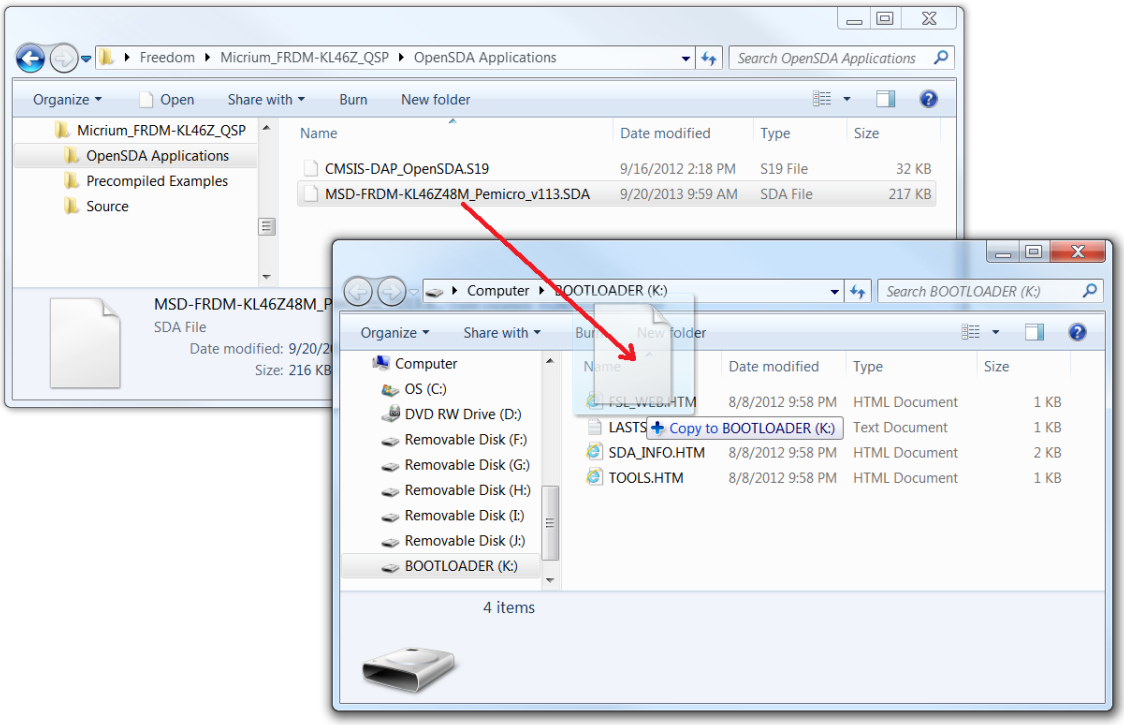
   http://www.pemicro.com/opensda/

3. Place the board in ***Bootloader*** mode by holding the ***Reset*** button down while connecting a USB cable between the Board's ***OpenSDA*** mini-B USB connector and a Windows PC as shown in the image below:



4. After a few seconds, your board will then appear in the PC file system as a removable drive with a volume labeled "BOOTLOADER". At this time, you can release the ***Reset*** button.

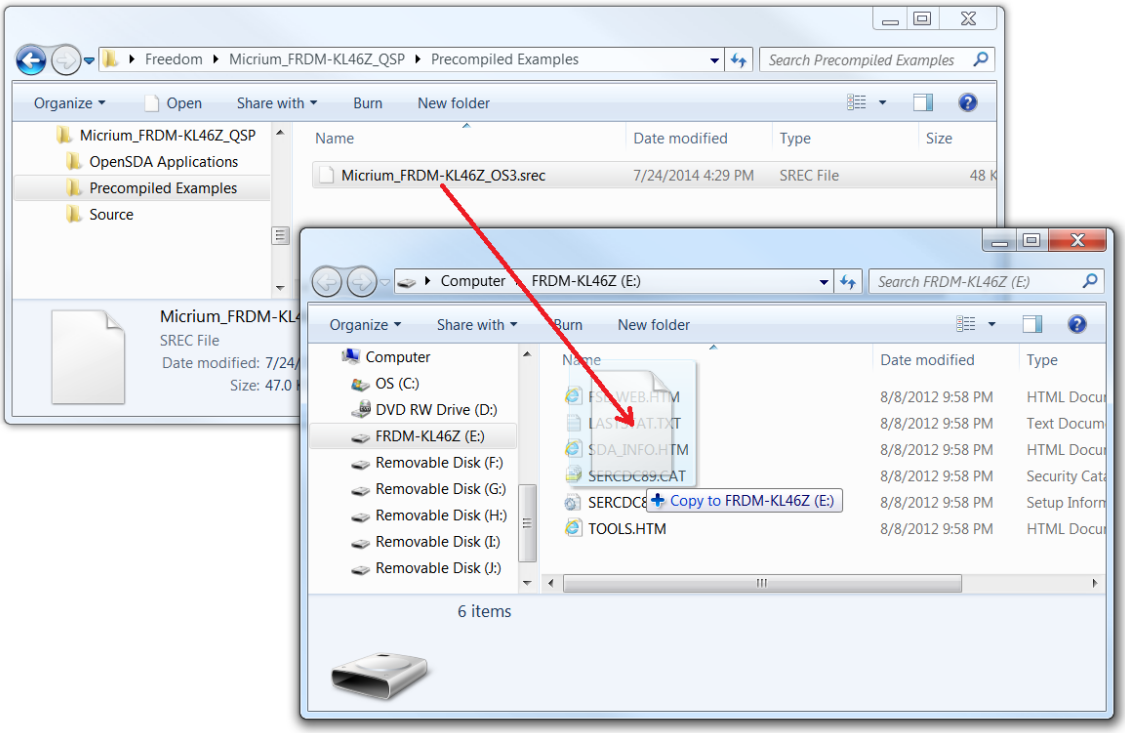
5. Copy the file ***MSD-FRDM-KL46Z48M_Pemicro_v113.SDA*** from the Quick Start Package for the FRDM-KL46Z that you downloaded in Step # 1 by simply dragging and dropping it onto the ***BOOTLOADER*** drive as shown in the image below:



6. Power cycle the board by disconnecting and reconnecting the USB cable to the ***OpenSDA*** connector (do not press the ***Reset*** button).

7. This time your board will appear in the PC file system as a removable drive with a volume labeled ***FRDM-KL46Z***.

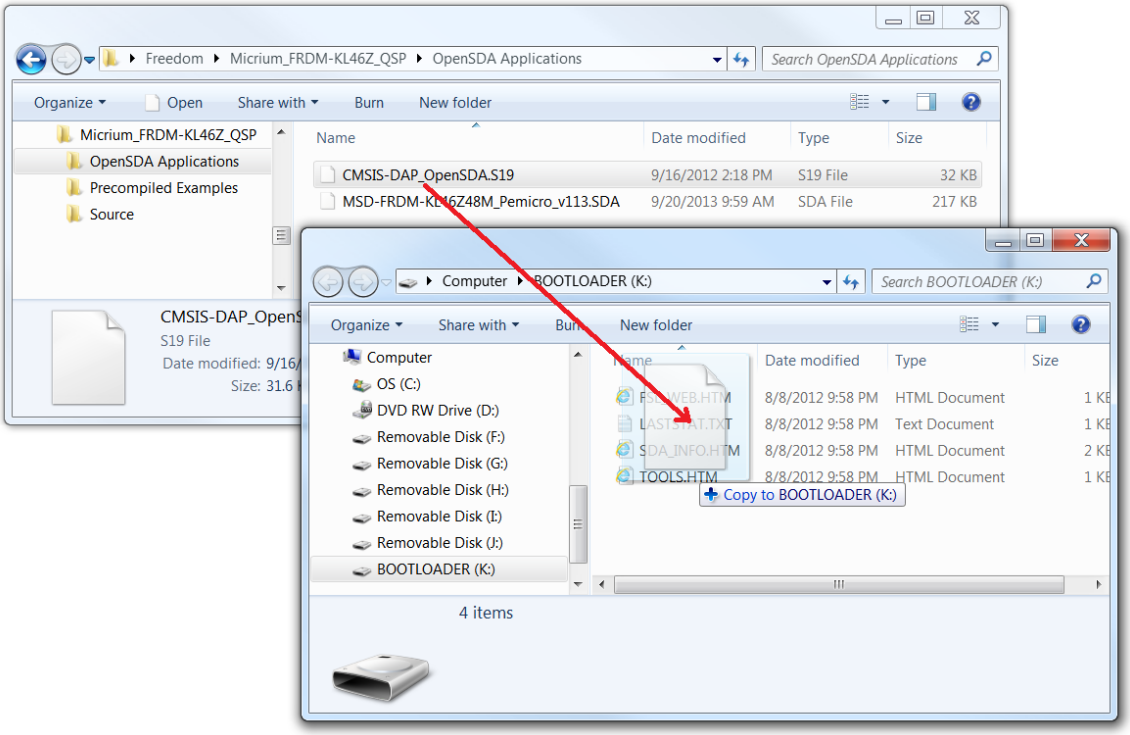
8. Copy the file ***Micrium_FRDM-KL46Z_OS3.srec*** from the Quick Start Package for the FRDM-KL46Z that you downloaded in Step # 1 by simply dragging and dropping it onto the ***FRDM-KL46Z*** drive as shown in the following image:



9. Place the board once again in ***Bootloader*** mode by holding the ***Reset*** button down and connecting a USB cable between the Board's ***OpenSDA*** mini-B USB connector and a Windows PC as previously described in Step # 3.

10. After a few seconds, your board will then appear in the PC file system as a removable drive with a volume labeled "BOOTLOADER". At this time, you can release the ***Reset*** button.

11. Copy the file ***CMSIS-DAP_OpenSDA.S19*** from the Quick Start Package for the FRDM-KL46Z that you downloaded in Step # 1 by simply dragging and dropping it onto the ***BOOTLOADER*** drive as shown in the image below:



12. Now you can power cycle the board which will not only start μC/OS-III but also be μC/Probe ready because of the CMSIS-DAP interface you loaded in Step # 11.

13. Download and install ***μC/Probe 3.3 Windows Installer*** from the following link:

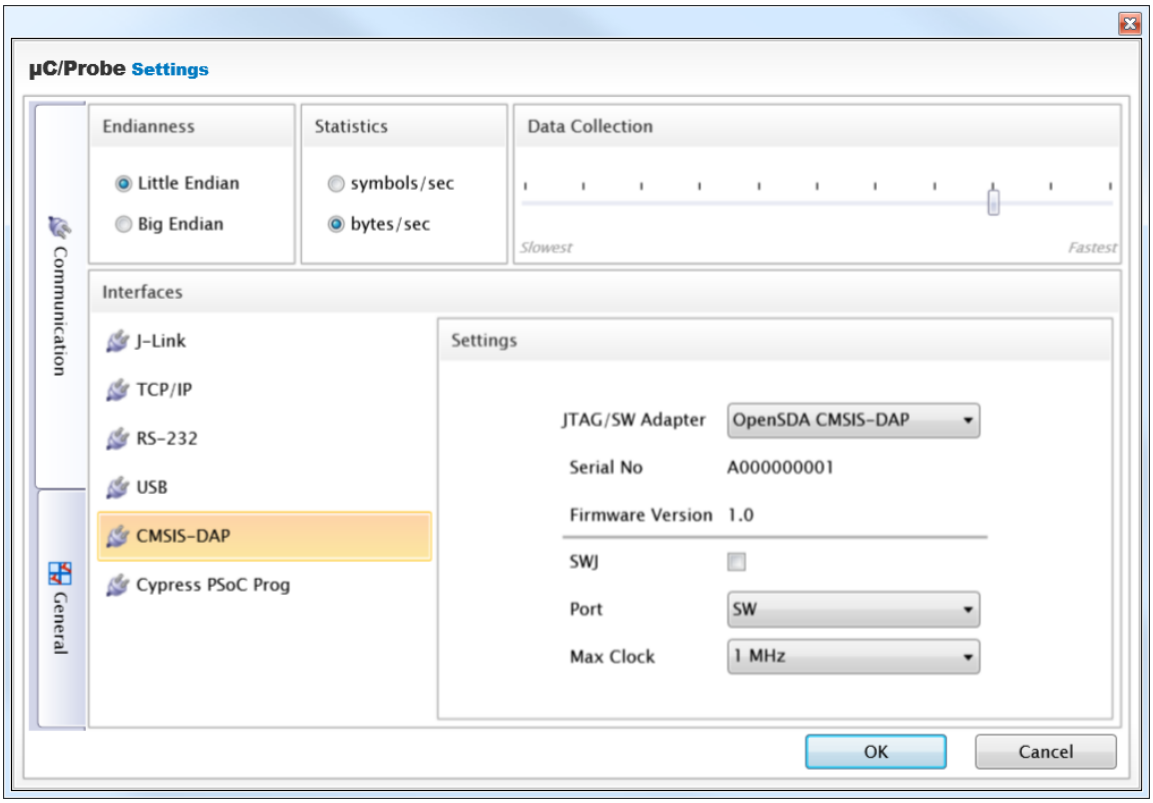
    http://micrium.com/tools/ucprobe/software-and-docs/

14. With the purchase of the FRMD-KL46Z from Premier-Farnell, you are eligible for a 1-month subscription to the Professional Edition of μC/Probe. You can choose to activate your license at any time, but because the subscription period begins from the moment you activate it, we recommend activating it at a later time as this demo simply requires the Evaluation Edition of μC/Probe. Whenever you are ready to activate your license, you will need internet access and then you can activate it by simply clicking File -> Activation and enter the 20-characters license key provided by Premier-Farnell.

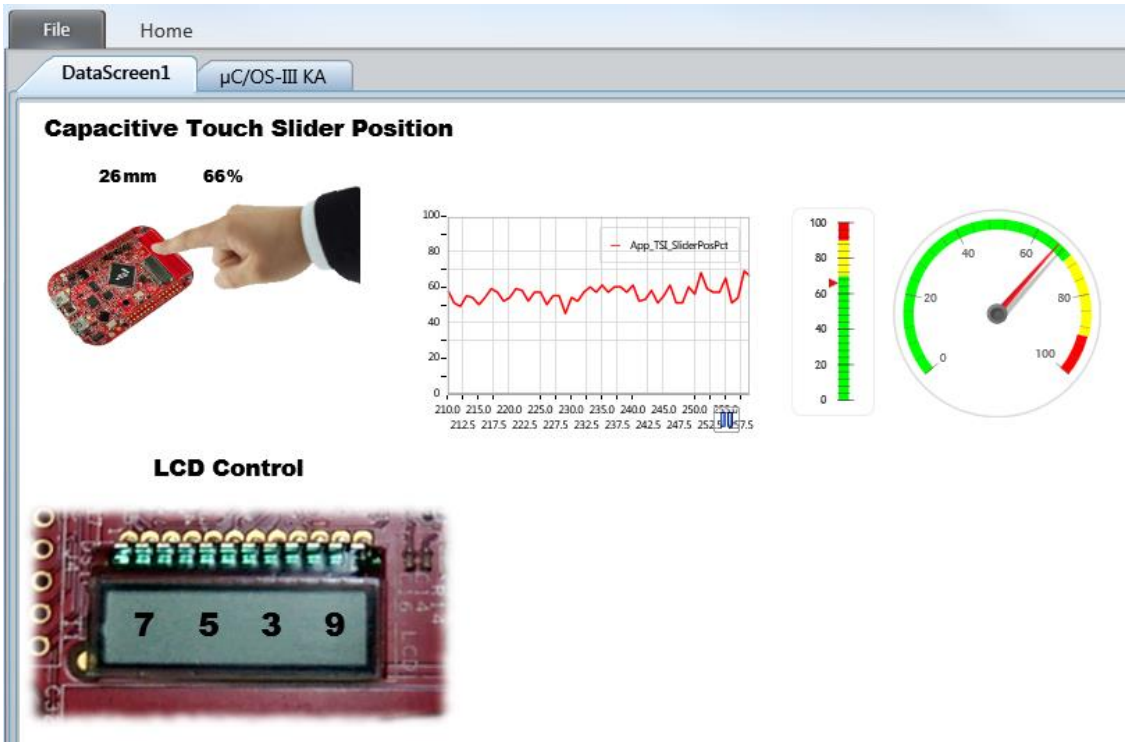
15. Open μC/Probe and then open the demo workspace by clicking ***File -> Open*** and browsing to the file ***Micrium_FRDM-KL46Z.wspx*** from the Quick Start Package that you downloaded in Step # 1.

16. You will receive an error message for a missing ELF file. The file is actually the output file from the compiling and linking process and it is part of the Quick Start Package. Simply browse to the file ***Micrium_FRDM-KL46Z_OS3.out*** to update the path.

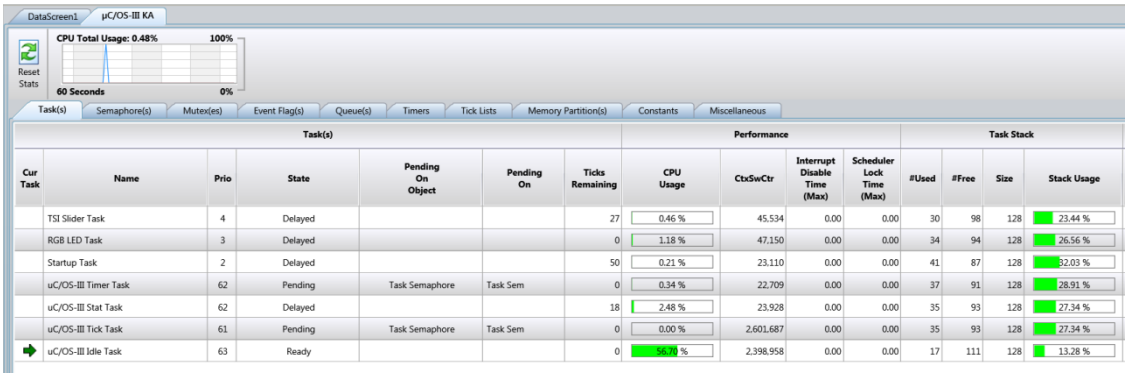
17. Open the ***μC/Probe Settings*** and select the communication interface ***CMSIS-DAP***. You should be able to select your CMSIS-DAP debugger from the drop-down box labeled ***JTAG/SW Adapter*** as shown below:



18. Finally, click the ***Run*** button in μC/Probe. Your Freedom board will come to live and you will be able to control the LCD by entering each of the four digits. Touch the capacitive slider and the touch position along the slider will be displayed in μC/Probe as shown below:



19. Click the μC/Probe tab labeled ***μC/OS-III KA*** to display the Kernel Awareness window as shown in the following image:



Task(s)							Performance				Task Stack			
Cur Task	Name	Prio	State	Pending On Object	Pending On	Ticks Remaining	CPU Usage	CtxSwCtr	Interrupt Disable Time (Max)	Scheduler Lock Time (Max)	#Used	#Free	Size	Stack Usage
	TSI Slider Task	4	Delayed			27	0.46 %	45,534	0.00	0.00	30	98	128	23.44 %
	RGB LED Task	3	Delayed			0	1.18 %	47,150	0.00	0.00	34	94	128	26.56 %
	Startup Task	2	Delayed			50	0.21 %	23,110	0.00	0.00	41	87	128	32.03 %
	uC/OS-III Timer Task	62	Pending	Task Semaphore	Task Sem	0	0.34 %	22,709	0.00	0.00	37	91	128	28.91 %
	uC/OS-III Stat Task	62	Delayed			18	2.48 %	23,928	0.00	0.00	35	93	128	27.34 %
	uC/OS-III Tick Task	61	Pending	Task Semaphore	Task Sem	0	0.00 %	2,601,687	0.00	0.00	35	93	128	27.34 %
➡	uC/OS-III Idle Task	63	Ready			0	56.70 %	2,398,958	0.00	0.00	17	111	128	13.28 %

20. Creating Dashboards for your Freedom board similar to the ones above is very easy with μC/Probe. For more information on how to use μC/Probe, download the User's Manual from:

http://micrium.com/tools/ucprobe/software-and-docs/