Kexx_drv_lib KE02 Sample Code Guide for CodeWarrior

Board configuration, software, and development tools
Rev.0.1

Contents

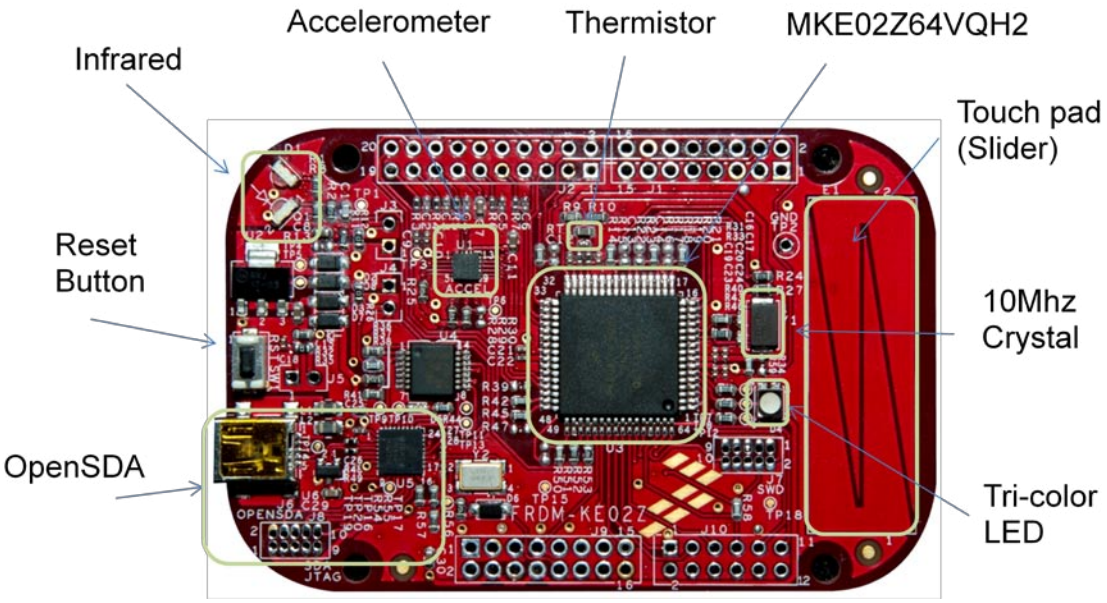
1 Purpose

This Sample Code Guide will familiarize you with the FRDM-KE02Z board and development tools. You will learn the features of the FRDM-KE02Z board, the features of the OpenSDA standard, and how to access the source code examples using CodeWarrior (CW). In addition, instructions are provided to download a precompiled binary file to your board.

2 Getting to know the board

The Freedom board (FRDM-KE02Z) features the Kinetis KE02Z64VQH2 microcontroller and comes with the following features (which are highlighted in the figure below):

- Tri-color LED
- 10Mhz crystal
- MMA8451Q Inertial Sensor
- OpenSDA connection
- Mini-B USB connector
- Touch Pad (Slider)
- IrDA(infrared)
- Thermistor



3 OpenSDA overview

OpenSDA is an open-standard serial and debug adapter. It bridges serial and debug communications between a USB host and an embedded target processor. OpenSDA features a mass storage device bootloader that offers a quick and easy mechanism for loading applications such as flash programmers, run-control debug interfaces, serial-to-USB converters, and more, onto your Tower or Freedom board. Currently, P&E Micro offers two different applications: an MSD application and a debug application.

3.1 MSD application

This OpenSDA application was developed by P&E Micro and allows the Freedom board to instantiate as a mass storage device on your computer. Once this application properly enumerates, you may program the KE02Z64 on your Freedom board with a binary or SREC file by simply "dragging and dropping" one of these files into FRDM-KE02Z drive that is installed when your Freedom board enumerated. In addition, you will also have serial communication with the KE02Z64.

3.2 Debug application

This OpenSDA application (also developed by P&E Micro) allows you to program and debug your KE02Z64 on your Freedom board just as any other debugger module would allow. With this application loaded onto your Freedom board, you will also have serial communication with the KE02Z64 available.

4 Download and install software and tools

4.1 Downloading and installing OpenSDA drivers

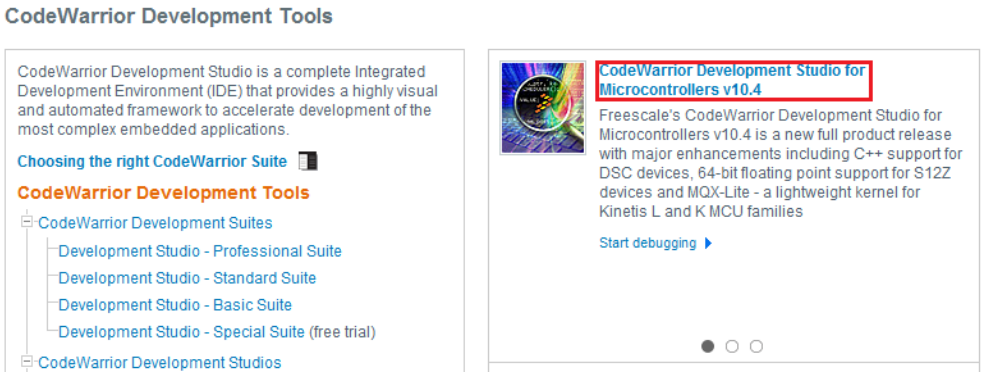
Before you begin, you will need the latest OpenSDA serial drivers installed on your development computer and on your FRDM-KE02Z. The latest OpenSDA drivers should already be installed on either of these, and your system should be able to automatically find the latest Windows CDC drivers (as they should be pre-installed on the Freedom board). If they are not, navigate to www.pemicro.com/opensda/index.cfm and follow the directions on this page to download the correct OpenSDA files. You may also refer to the OpenSDA user's guide which can be found in your Quick Start Package.

4.2 Downloading and installing Code Warrior 10.5 and tools

4.2.1 Downloading and installing Code Warrior 10.5

To download CodeWarrior 10.5, follow these instructions:

1. Navigate to the Code Warrior download page: www.freescale.com/codewarrior.



2. Click the link in the red line coming into the download page.

3. Select the desired version.

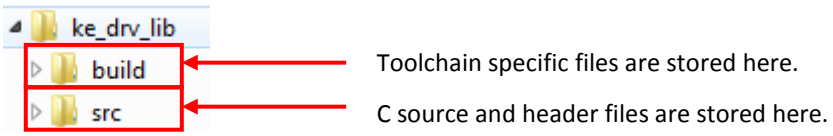
5 Freescale Sample Code

The Freescale kexx_drv_lib sample code provided for KE02Z64 is a baremetal code.

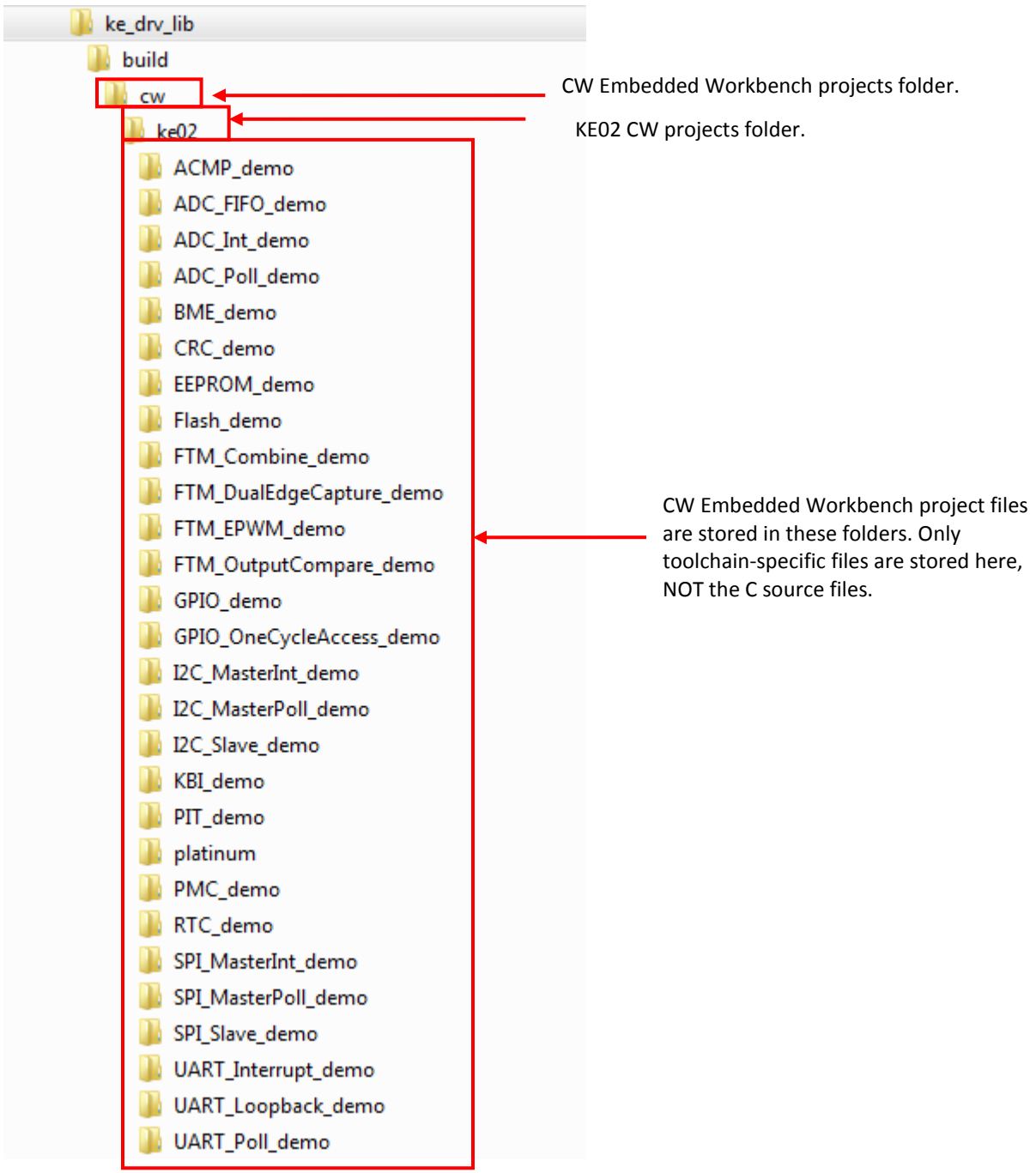
5.1 Baremetal Sample Code (kexx_drv_lib)

5.1.1 Baremetal Sample Code Folder Structure

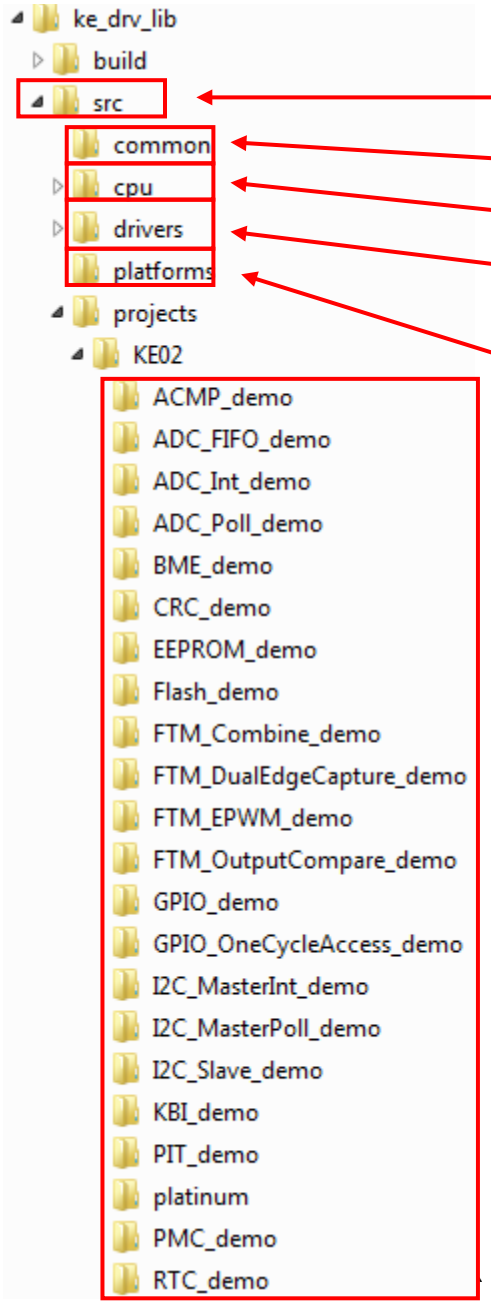
The Baremetal sample code folder contains three folders at the top level: build folder and src (source) folder.



The build folder is structured as follows:


ke_drv_lib
build
cw
ke02
ACMP_demo
ADC_FIFO_demo
ADC_Int_demo
ADC_Poll_demo
BME_demo
CRC_demo
EEPROM_demo
Flash_demo
FTM_Combine_demo
FTM_DualEdgeCapture_demo
FTM_EPWM_demo
FTM_OutputCompare_demo
GPIO_demo
GPIO_OneCycleAccess_demo
I2C_MasterInt_demo
I2C_MasterPoll_demo
I2C_Slave_demo
KBI_demo
PIT_demo
platinum
PMC_demo
RTC_demo
SPI_MasterInt_demo
SPI_MasterPoll_demo
SPI_Slave_demo
UART_Interrupt_demo
UART_Loopback_demo
UART_Poll_demo
CW Embedded Workbench projects folder.
KE02 CW projects folder.
CW Embedded Workbench project files are stored in these folders. Only toolchain-specific files are stored here, NOT the C source files.

The source folder structure is as follows:



All source files are located here.
Source files common to the project and drivers reside here (e.g., printf.c, io.c, stdlib.c, alloc.c, etc.).
CPU header files are stored here.

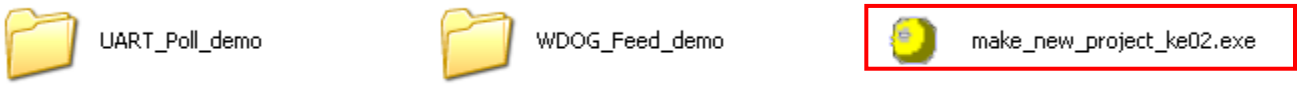
Peripheral driver source files are located here (e.g.. gpio.c, gpio.h, etc)

Platform-specific header files are stored here. These files determine start up information for the project (e.g., core frequency, terminal baud rate configuration, which UART to use, etc.).

Project source and header files are stored here. Main will be defined in one of these files for your project.

5.1.2 Using the Freescale Baremetal sample code to jumpstart your design

The kexx_drv_lib library is provided as a jump start for your design, and to provide you with code examples. We have provided a script that will copy our platinum project and rename it to your desired project name. This script is a single executable that resides in the \build\cw\ke02 folder.



Simply double-click make_new_project_ke02.exe file and a command prompt pop-up window will prompt you for a project name, copy the platinum project and rename all of the necessary files for your new project to work correctly.

6 Configure hardware

1) Using a Mini-B to A USB cable, connect your FRDM-KE02Z board to your development computer. Be sure to plug the Mini-B connection into the OpenSDA port of the FRDM-KE02Z board.
2) No special hardware configuration is necessary to run the demo applications in the code examples unless otherwise specified by the “readme.txt” file located in the project folder.

7 Terminal program configuration

The OpenSDA serial port is designed to enumerate just as any other USB to serial converter. Therefore, you will need to open a serial terminal utility (Tera Term, Hyperterm, etc.,) and configure your terminal as follows:

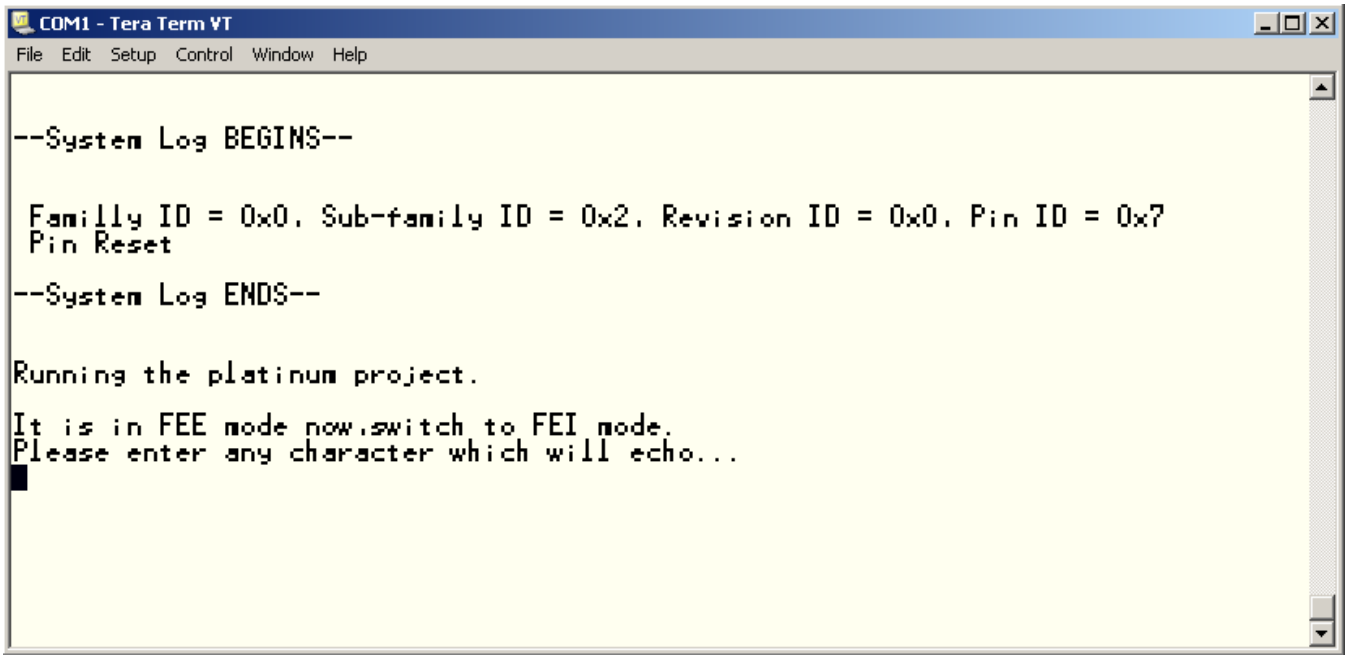
- 115200 baud
- 8 data bits
- 1 stop bit
- no parity
- no flow control

8 Loading and running the demos into CW 10.5

The following instructions describe how to build and debug the platinum demo using CW 10.5. This document is targeted for users who choose to use the OpenSDA programming and debugging capabilities and it is assumed that you have loaded the P&E Micro Debug application onto your FRDM-KE02Z. If you need assistance in loading this application onto your Tower board, see the OpenSDA user’s guide provided in your Quick Start Package.

1) Open CodeWarrior IDE.
2) Drag the .project file into CW and it will open.
3) Clean the project first and then recompile it.

4) After compilation completes, download the code to the board and start the debugger by pressing the “Debug Session” button.
5) The code will download, and the debugger screen will come up and pause at the first instruction. Hit the “Run” button to start running.
6) On the terminal you should see the following message:



7) The tri-color LED will start blinking . Enter any character which will be echoed to the terminal.

9 Explore Further

Additional software and lab guides are available on http://www.freescale.com/FRDM-KE02Z .

How to Reach Us:

Home Page:
freescale.com

Web Support:
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