Kexx_drv_lib KE06 Sample Code Guide for IAR

Board configuration, software, and development tools
Rev.0.1

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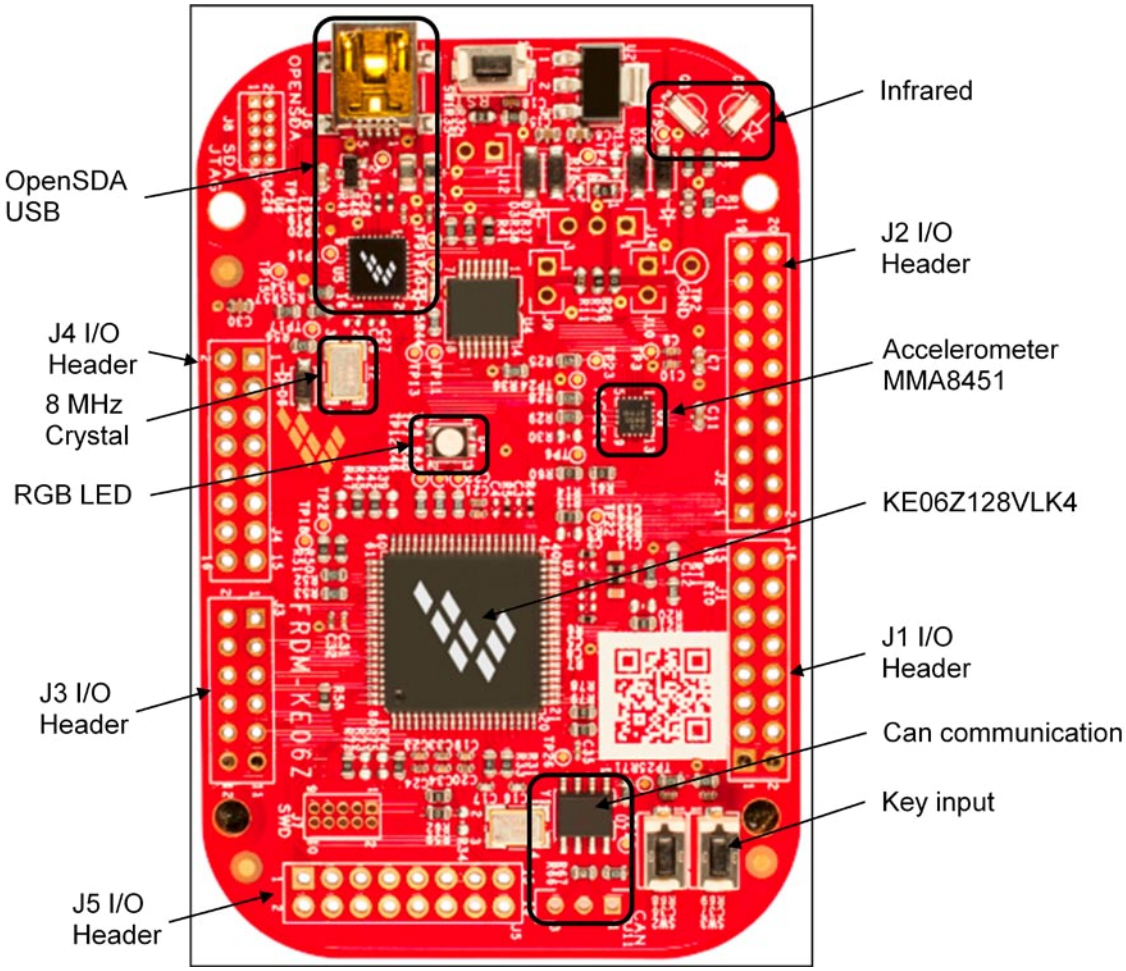
1 Purpose

This Sample Code Guide will familiarize you with kexx_drv_lib, the FRDM-KE06Z board, and development tools. You will learn the features of the FRDM-KE06Z board, the features of the OpenSDA standard, and how to access the source code examples using IAR 6.70.2. In addition, instructions are provided to download a precompiled binary file to your board.

2 Getting to know the board

The Freedom board (FRDM-KE06Z) features the Kinetis KE06Z128VLK4 microcontroller and comes with the following features (which are highlighted in the figure below):

- Tri-color LED
- 8 Mhz crystal
- MMA8451Q Inertial Sensor
- OpenSDA connection
- IrDA(infrared)
- Thermistor
- CAN communication



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 KE06Z128 on your Freedom board with a binary or SREC file by dragging and dropping one of these files into FRDM-KE06Z drive. In addition, you will also have serial communication with the KE06Z128.

3.2 Debug Application

This OpenSDA application (also developed by P&E Micro) allows you to program and debug your KE06Z128 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 KE06Z128 available.

4 Download and Install Software and Tools

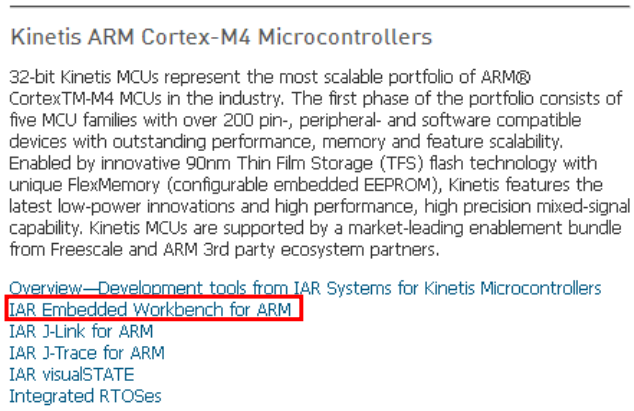
4.1 Downloading and Installing OpenSDA Drivers

Before you begin, you will need the latest OpenSDA serial drivers installed on your development computer and on your FRDM-KE06Z. The latest OpenSDA drivers should be pre-installed on the Freedom board, and your system should be able to automatically find the latest Windows CDC drivers. If it is 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 found in your Quick Start Package.

4.2 Downloading and Installing IAR 6.70.2

To download the IAR 6.70.2 (or newest), follow these instructions:

1. Open IAR's website at www.iar.com/freescale and select IAR Embedded Workbench for ARM under the Kinetis ARM Cortex-M4 Microcontrollers.



   You can also click http://www.iar.com/en/Products/IAR-Embedded-Workbench/ARM/ .

2. Click on the "Download" button.
3. Follow IAR's downloading and licensing instructions
4. To install software tools, follow the installer package instructions.

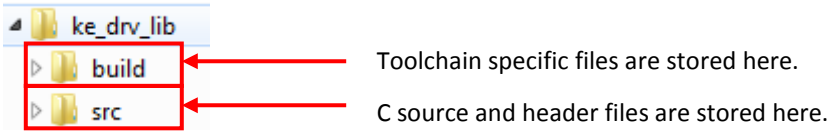
5 Freescale Sample Code

The Freescale kexx_drv_lib sample code provided for KE06Z128 is a baremetal code.

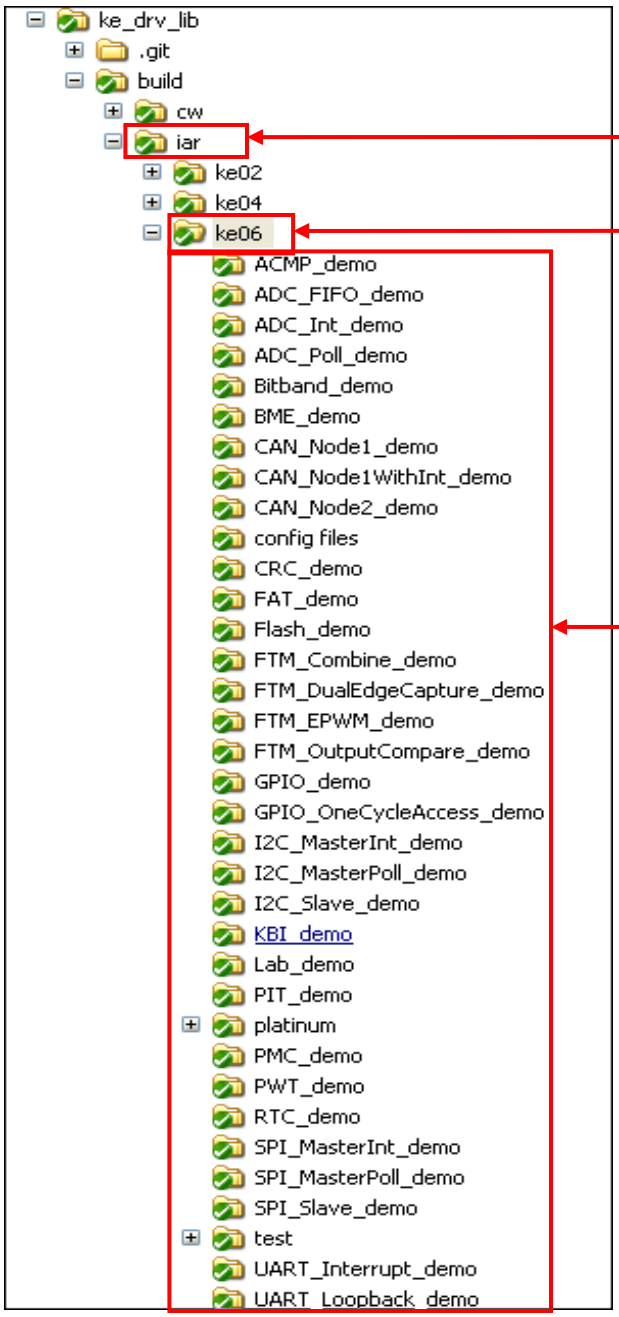
5.1 Baremetal Sample Code (kexx_drv_lib)

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.

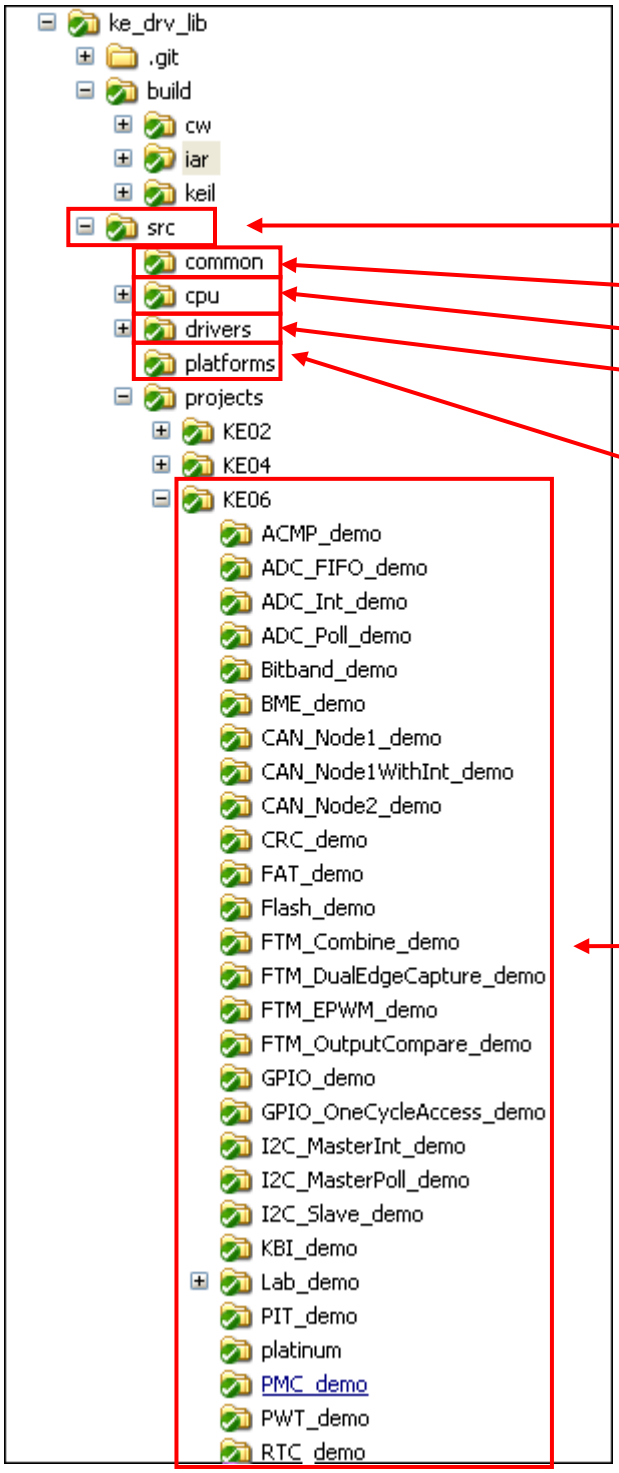


IAR Embedded Workbench projects folder.

KE06 IAR EWARM projects folder.

IAR 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.

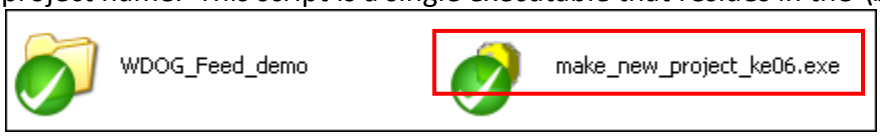
Peripheral driver source files are located here (e.g. gpio.c, gpio.h, etc.)

Platform specific header files are stored here. These files determine startup 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 to jump start for your design, and is accompanied by 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\iar\ke06 folder.



Double-click the make_new_project_ke06.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-KE06Z board to your development computer. Be sure to plug the Mini-B connection into the OpenSDA port of the FRDM-KE06Z 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:

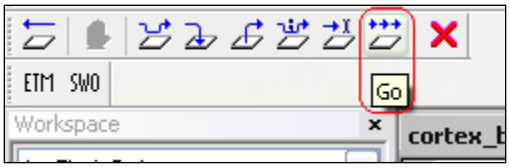
- 115200 baud
- 8 data bits
- 1 stop bit
- no parity
- no flow control

8 Loading and Running the Demos into IAR 6.70.2

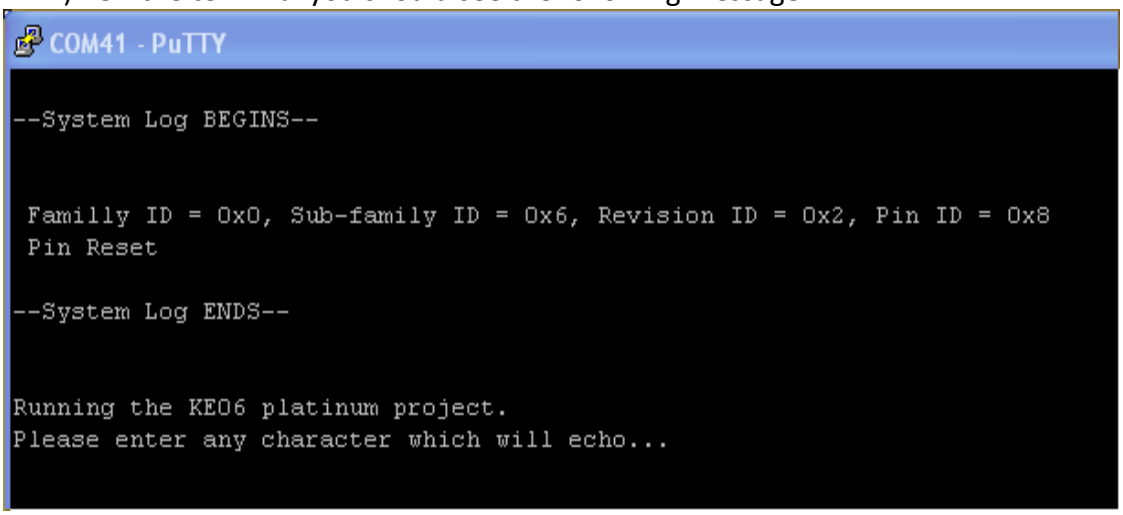
The following instructions describe how to build and debug the platinum demo using IAR 6.70.2. This document is targeted for users who choose to use the OpenSDA programming and debugging capabilities and it is assumed that you have loaded the P&E Micro Debug application onto your FRDM-KE06Z. If you need assistance in loading this application onto your tower board, refer to the OpenSDA user’s guide provided in your Quick Start Package.

1) Open IAR Embedded Workbench for ARM 6.70 (Start->All Programs->IAR Systems->IAR Embedded Workbench for ARM 6.70->IAR Embedded Workbench).

2) Open the workspace at …\build\iar\ke06\platinum\platinum.eww**.** You can either double click the *.eww icon into the IAR Workspace or by selecting File->Open->Workspace, and point IAR to the workspace path through the dialog box that pops up.
3) Compile the project by clicking the Make icon  (or right click on the project and select "Make").
4) After compilation completes, ensure that you have the OpenSDA debugger selected. You may check this by following these instructions:
    a. Right click on the platinum project in the Workspace window pane and select "Options".
    b. In the pop-up dialog box, select "Debugger" from the Category section on the left hand side of the box.
    c. In the "Setup" tab, select PE micro for the Driver.
    d. Now select "PE micro" from the Category list on the left hand side of the box.
    e. In the "Setup" tab, select OpenSDA as the "P&E Hardware interface type".
5) After compilation completes, download the code to the board and start the debugger by pressing the "Download and Debug" button 
6) The code will download, and the debugger screen will come up and pause at the first instruction. Hit the "Go" button to start running.



7) On the terminal you should see the following message:



8) 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 at http://www.freescale.com/FRDM-KE06 .

How to Reach Us:

Home Page:
freescale.com

Web Support:
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