

Kexx_drv_lib KE02 Sample Code Guide for IAR

Board configuration, software, and development tools

Rev.0.1

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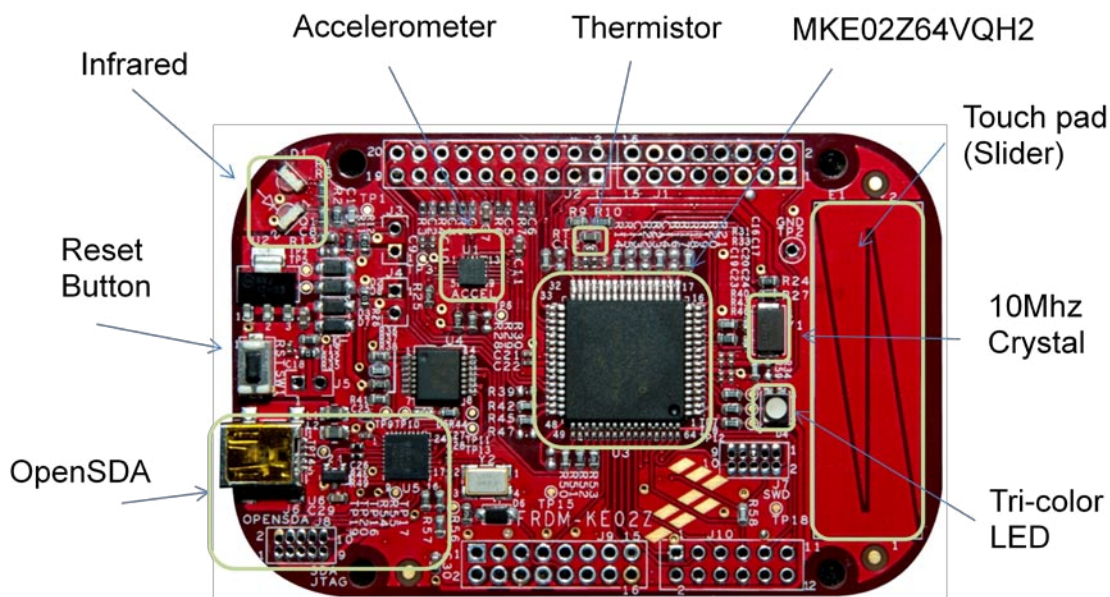
1 Purpose

This Sample Code Guide will familiarize you with 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 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-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 IAR 6.70.2

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

1. Navigate to IAR’s website: www.iar.com/freescale.

2. Next, select IAR Embedded Workbench for ARM under the Kinetis ARM Cortex-M4 Microcontrollers.

Kinetis ARM Cortex-M4 Microcontrollers

32-bit Kinetis MCUs represent the most scalable portfolio of ARM® Cortex™-M4 MCUs in the industry. The first phase of the portfolio consists of five MCU families with over 200 pin-, peripheral- and software compatible devices with outstanding performance, memory and feature scalability. Enabled by innovative 90nm Thin Film Storage (TFS) flash technology with unique FlexMemory (configurable embedded EEPROM), Kinetis features the latest low-power innovations and high performance, high precision mixed-signal capability. Kinetis MCUs are supported by a market-leading enablement bundle from Freescale and ARM 3rd party ecosystem partners.

[Overview—Development tools from IAR Systems for Kinetis Microcontrollers](#)

[IAR Embedded Workbench for ARM](#)

[IAR J-Link for ARM](#)

[IAR J-Trace for ARM](#)

[IAR visualSTATE](#)

[Integrated RTOSes](#)

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

3. Click on the “Download” button.
4. Follow IAR’s downloading and licensing instructions
5. To install software tools, follow the installer package instructions.

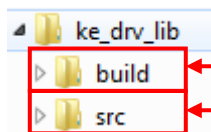
5 Freescale sample code

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

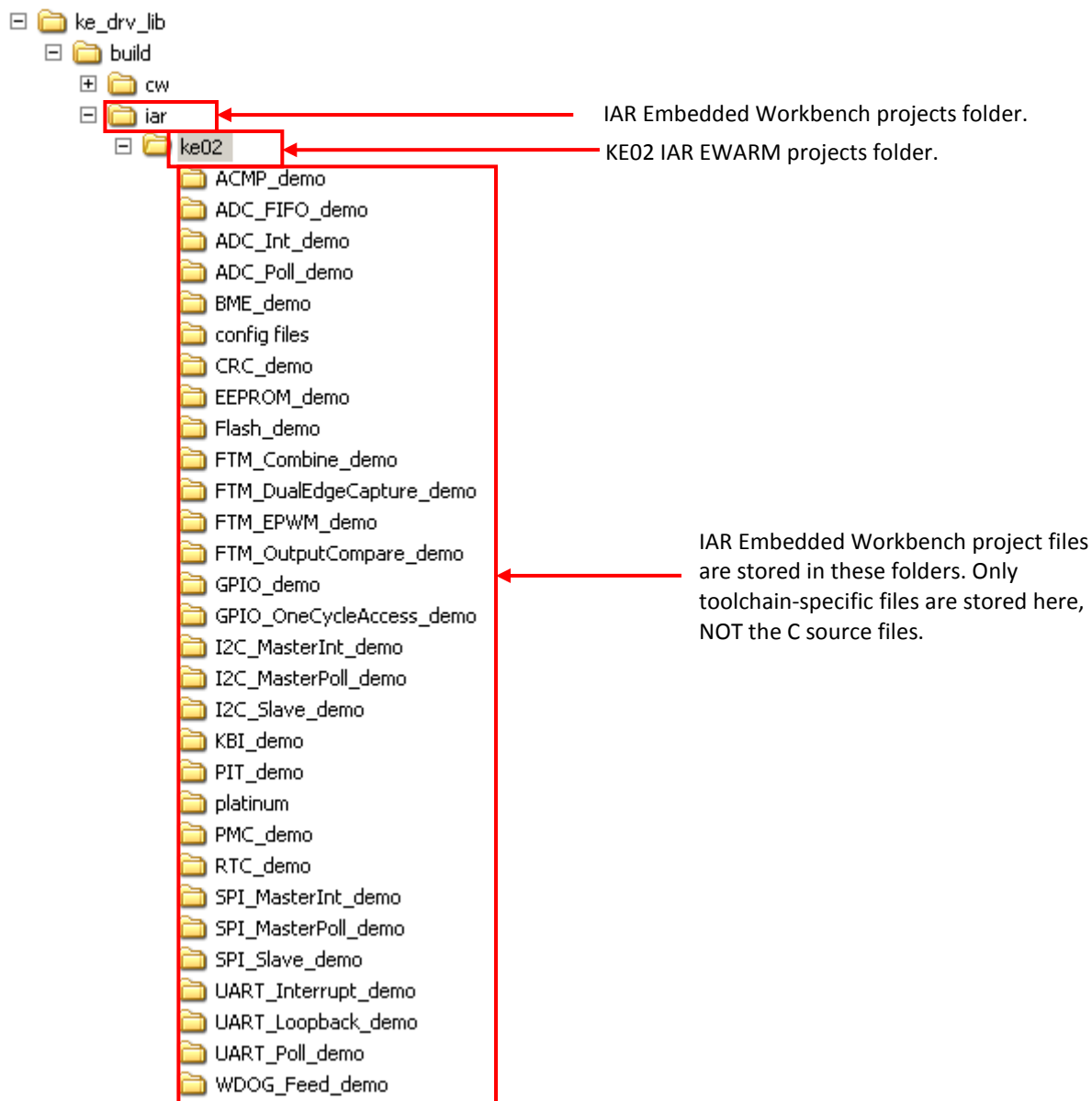
The Baremetal sample code folder contains three folders at the top level: build folder and src (source) folder.



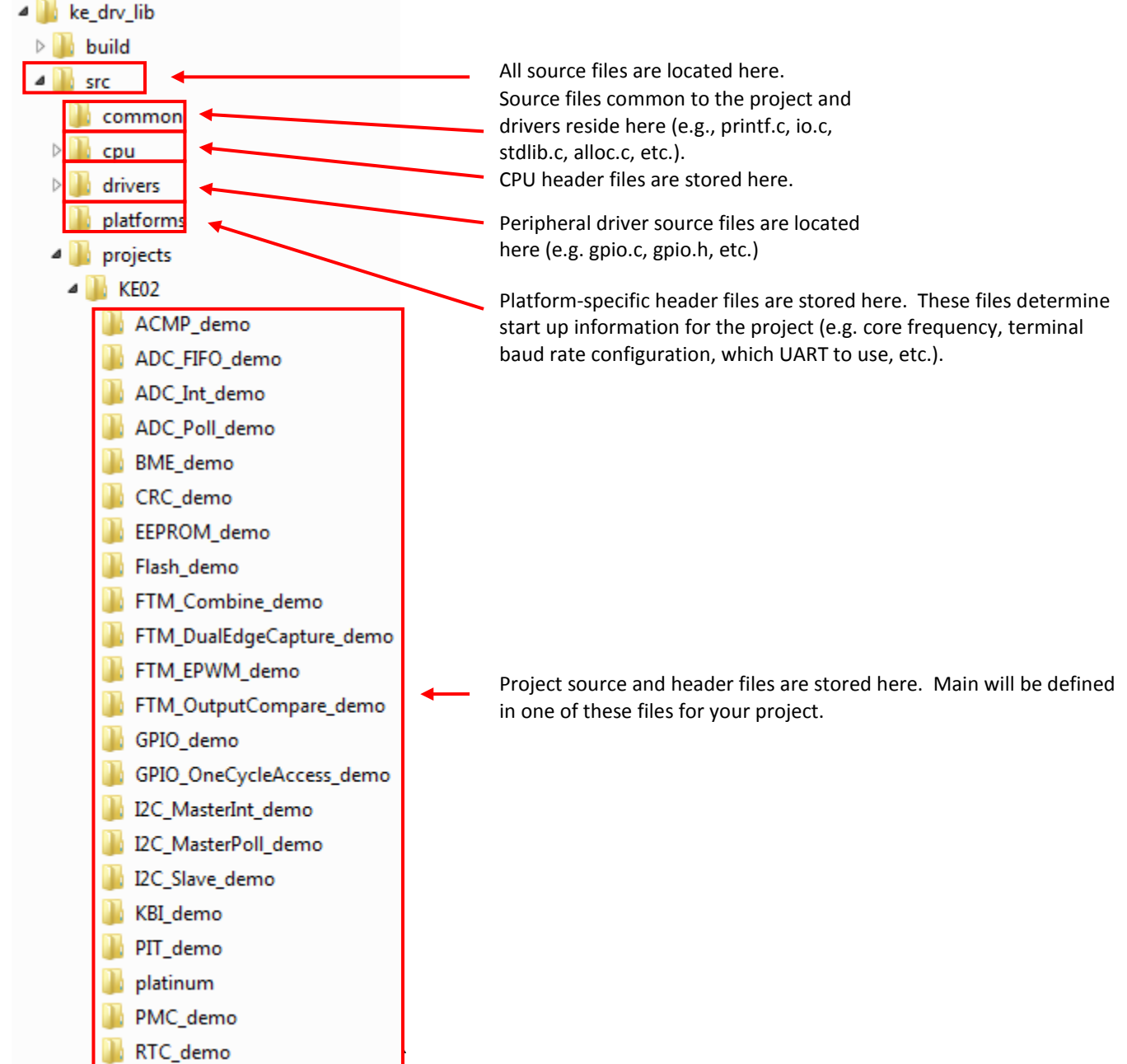
Toolchain specific files are stored here.

C source and header files are stored here.

The build folder as below,

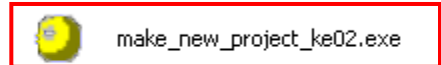
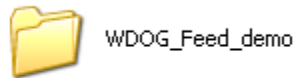
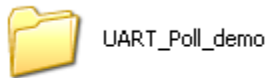


The source folder structure is as follows:



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, as well as providing you with code examples. To facilitate this, 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\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:

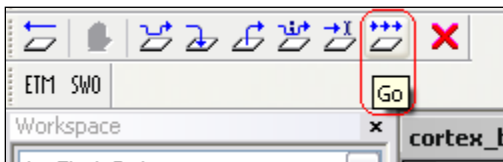
- 115200 baud
- 8 data bits
- 1 stop bit
- no parity
- no flow control

8 Loading and Running the Demos into 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-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 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\\ke02\\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, please 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:

```
COM1 - Tera Term VT
File Edit Setup Control Window Help

--System Log BEGINS--

Family ID = 0x0. Sub-family ID = 0x2. Revision ID = 0x0. Pin ID = 0x7
Pin Reset

--System Log ENDS--

Running the platinum project.
It is in FEE mode now, switch to FEI mode.
Please enter any character which will echo...
█
```

- 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 on <http://www.freescale.com/FRDM-KE02Z> .

How to Reach Us:**Home Page:**

freescale.com

Web Support:

freescale.com/support

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