

MKW40Z Bluetooth® Low Energy Quick Start Guide

1 Introduction

This document is a brief presentation of the Freescale Bluetooth® Low Energy Software for the KW40Z wireless microcontroller platforms version 1.1.3. This software package is an add-on for the Kinetis Software Development Kit (KSDK). This document covers installation of the software packages, hardware setup, build and usage of the provided demo applications.

2 Installation

This section covers the steps for a successful installation of the required software packages: connectivity and Kinetis SDK.

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The first step is to download the “KW40Z_Connectivity_Software_1.0.0.exe” installer.

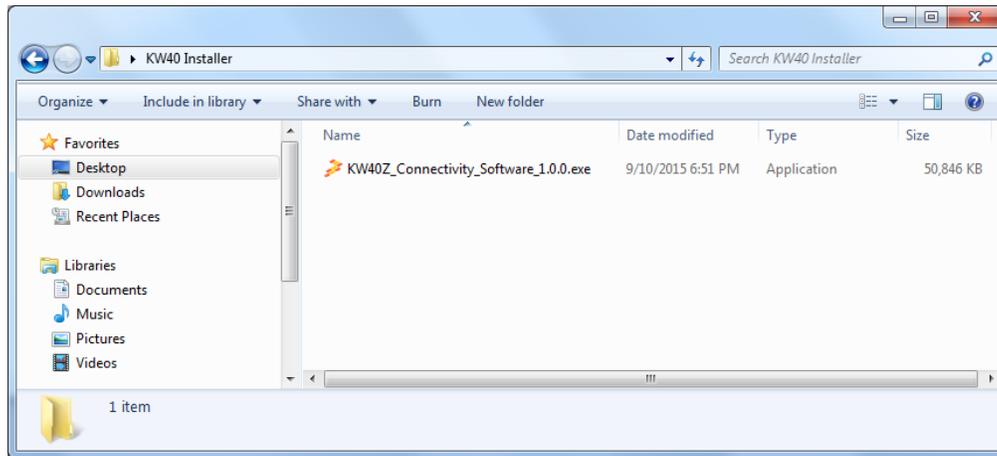


Figure 1: The KW40Z Connectivity Software Installer

On the main screen, press the *Next* button.



Figure 2: KW40Z Installer main screen

On the *License Agreement* screen press the *I agree* button to accept the license agreement.



Figure 3: License agreement screen

On the next screen click *Browse* to select another destination folder for the KW40Z Connectivity Software installation or click the *Next* button to continue.

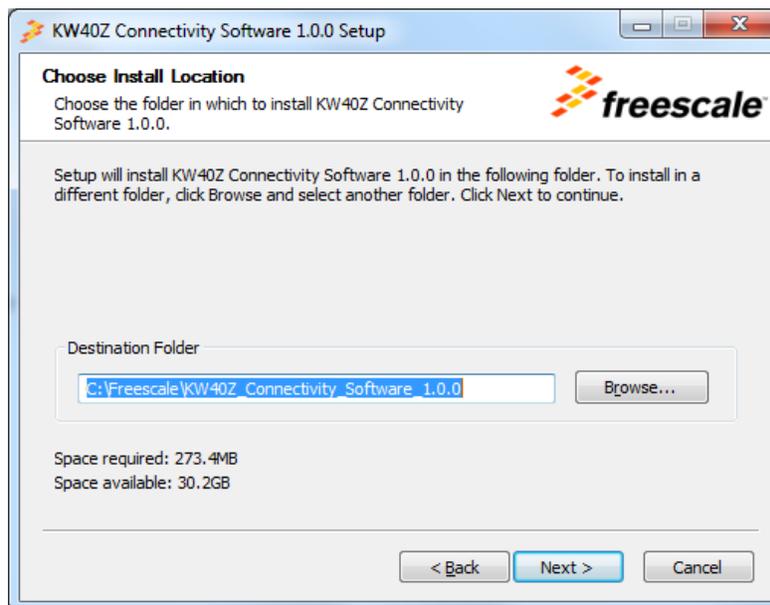


Figure 4: Destination folder selection screen

On the following screen uncheck the first two options and press the *Next* button.

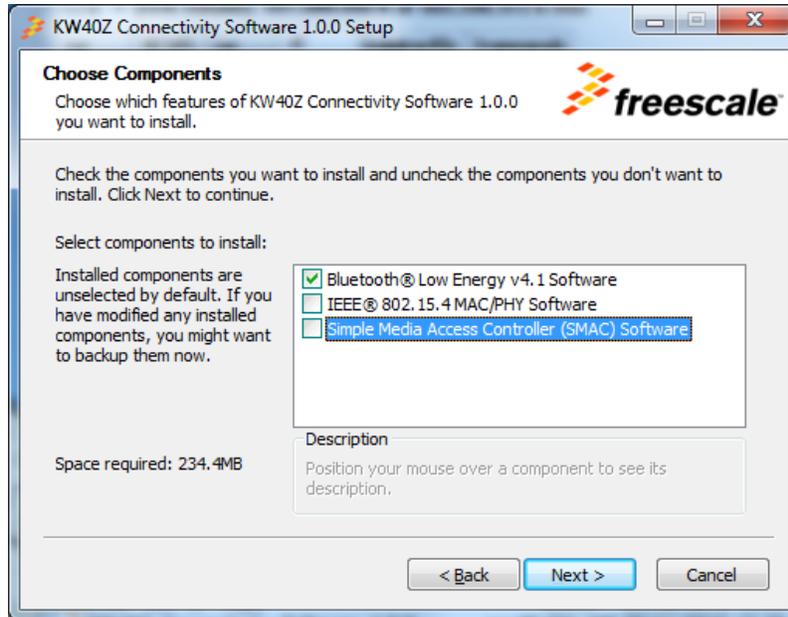


Figure 5: Component selection screen

Select a *Start Menu* folder and press the *Install* button.



Figure 6: KW40Z installer Start Menu Folder selection screen

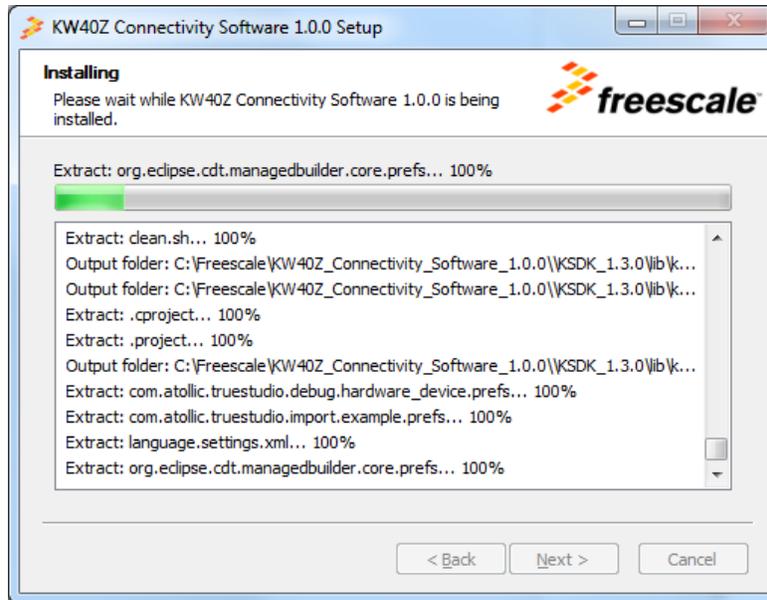


Figure 7: KW40Z installation process

Click *Finish* to close the installer.



Figure 8: KW40Z Connectivity Software installation complete

The installer automatically creates or updates the `KSDK_1_3_0_PATH` environment variable required by the KW40Z BLE projects. Once the above steps are performed, you can start using the Bluetooth[®] Low Energy Demo Applications.

3 Building the Binaries

This section details the required steps for obtaining the binary files for usage with the boards.

NOTE

In order to be able to build any of these packages you need a copy of the IAR Embedded Workbench for ARM[®] version 7.40.2 or higher. This connectivity software package does not include support for any other toolchains.

The packages must be built with the debug configuration in order to enable debugging information.

Building the KSDK Libraries

This release supports all development platforms based on the KW40Z wireless microcontroller. The RTOS support includes the FreeRTOS kernel, and a bare metal scheduler. The KSDK platform libraries are RTOS dependent, so appropriate libraries must be built for the selected RTOS.

For any connectivity application, the following Kinetis SDK libraries must be built with the IAR Embedded Workbench for ARM[®] in order to enable the complete board support and RTOS kernel support:

- FreeRTOS or bare metal Platform drivers library

The location of the KSDK platform projects is described using the following placeholders for text:

- <ksdk_path> : represents the root path of the KSDK installation folder
- <device> : represents the board MCU: KW40Z4
- <board> : represents the board: frdmkw40z

Using the placeholders, these are the required Kinetis SDK v1.3.0 projects locations:

- <ksdk_path>\lib\ksdk_freertos_lib\iar\<device>\ksdk_freertos_lib.eww
- <ksdk_path>\lib\ksdk_platform_lib\iar\<device>\ksdk_platform_lib.eww

NOTE

The IAR projects for KSDK libraries are included in the IAR workspaces corresponding to the BLE demonstration applications and it is recommended to access them this way.

Building and Flashing the Freescale BLE Software Demo Applications

The package contains various demo applications that can be used to get a first feel for the software.

In this section you will be guided through building the Heart Rate Sensor demo application, using the following placeholders for text.

For brevity we shall introduce the following placeholders for text:

- <connectivity_path> : represents the root path for the Freescale BLE software package

- <board> : represents the target board for the demo app, for example “frdmkw40z”
- <demo_app> : represents the demo app name
- <RTOS> : represents the Real Time Operating System (FreeRTOS) or bare-metal scheduler

The demo applications general folder structure is the following:

<connectivity_path>\examples\bluetooth<demo_app>\<board>\<RTOS>\build\iar

FreescalE BLE Software Demo Application Build Example

Selected app: Heart Rate Sensor

Board: frdmkw40z

RTOS: bare-metal scheduler

Resulting location:

<connectivity_path>\examples\bluetooth\heart_rate_sensor\frdmkw40z\bare-metal\build\iar\

Step 1:

Navigate to the resulting location.

Step 2:

Open the highlighted IAR workspace file (*.eww file format):

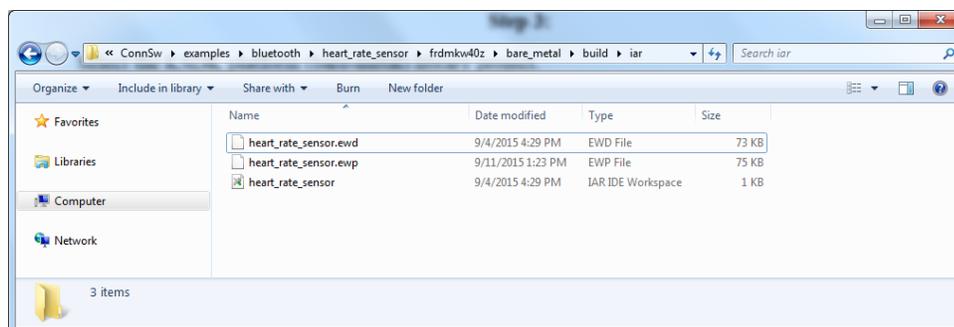


Figure 9: Heart Rate Sensor Demo Application - Project Location

Step 3:

Select the KSDK platform (bare-metal) library project.

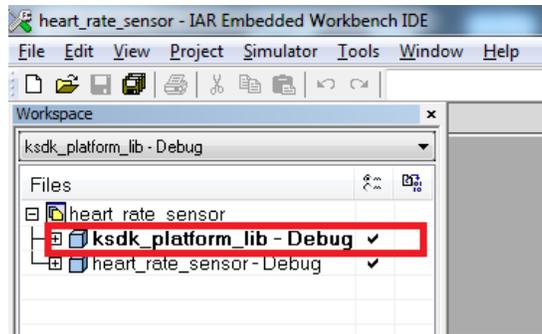


Figure 10: IAR project for KSDK platform (bare-metal) library

Step 4:

Build the KSDK platform library project.

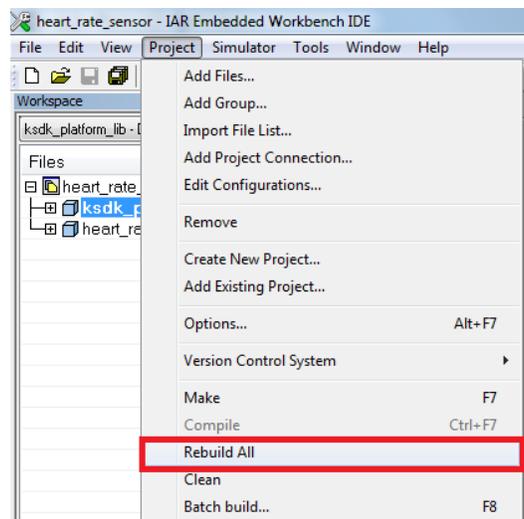


Figure 11: KSDK platform library build

Step 5:

Select the Heart Rate Sensor project.

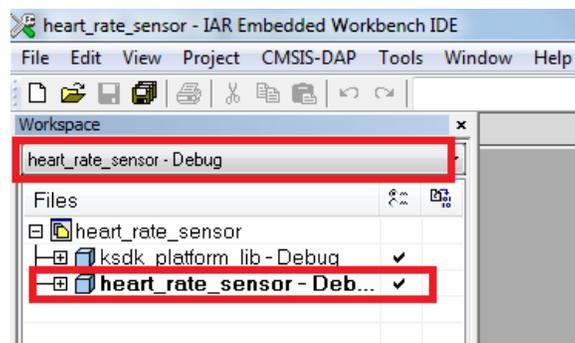


Figure 12: IAR project for Heart Rate Sensor with bare-metal scheduler

Step 6:

Build the Heart Rate Sensor project.

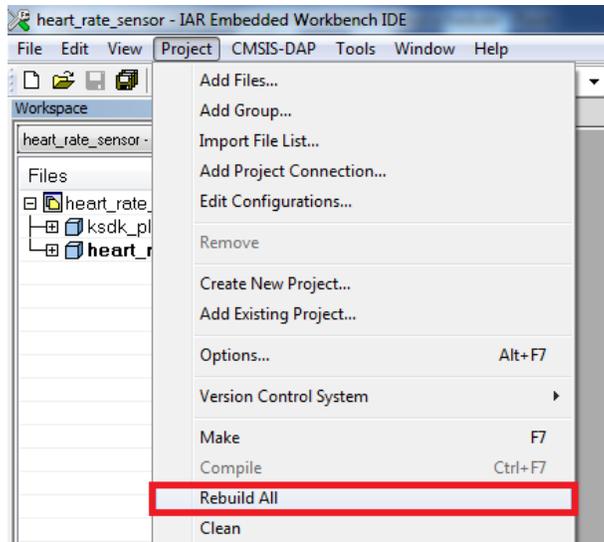


Figure 13: Heart Rate build

Step 7:

Make the appropriate debugger settings in the project options window:

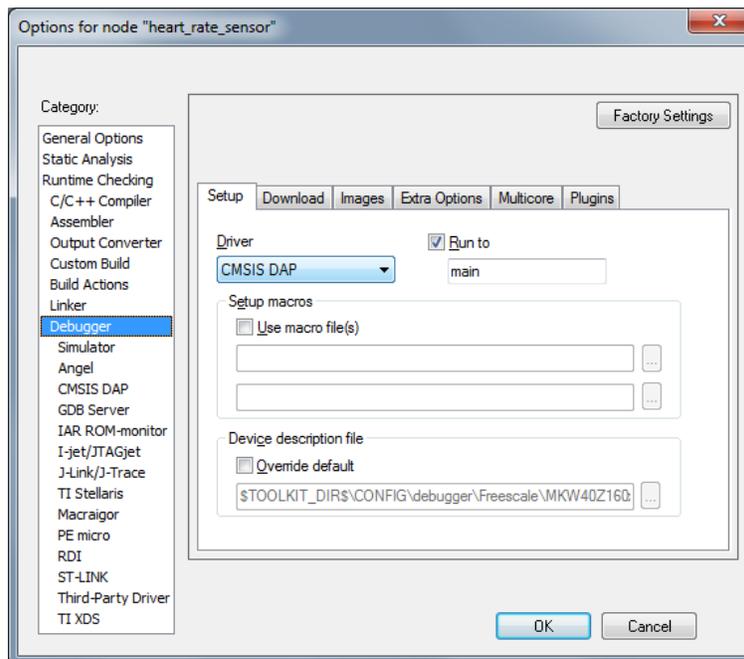


Figure 14: Debugger Settings

Step 8:

Click the “Download and Debug” button to flash the executable onto the board.

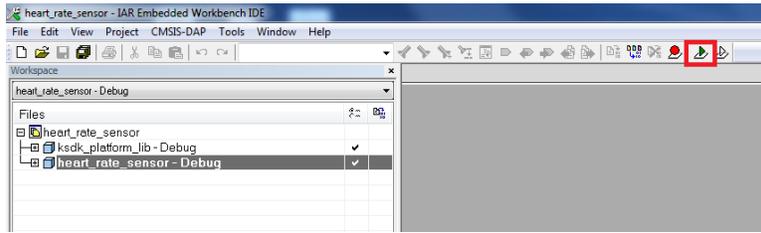


Figure 15: Heart Rate Sensor Download and Debug

NOTE

The projects are configured with “CMSIS-DAP” firmware as the default debug configuration. Please make sure that your board’s OpenSDA chip contains a CMSIS-DAP firmware or that the debugger selection corresponds to the physical interface used to connect to the boards. See the section below for more information.

4 Hardware Configurations

This section describes how to set up the Freescale Freedom FRDM-KW40 platform for the Bluetooth® Low Energy applications.

Freescale Freedom FRDM-KW40 Platform Introduction

4.1.1 Freescale Freedom FRDM-KW40 Platform Features

The target platform is the FRDM-KW40 board based on the KW40 wireless, dual mode SoC, which incorporates an ARM® Cortex®-M0+ core configured to operate at 32 MHz frequency. It has 160 KB of Flash and 20 KB of RAM. For detailed information about the board, see the appropriate board user's guide.

The board features a composite USB device called OpenSDA which serves as debugger interface and as a USB-to-serial converter via a virtual COM port application. Several firmware images can be programmed on the OpenSDA device, such as these:

- developer.mbed.org/handbook/CMSIS-DAP
- segger.com/opensda.html
- www.pemicro.com/opensda/

4.1.2 Freescale Freedom FRDM-KW40 Platform Overview

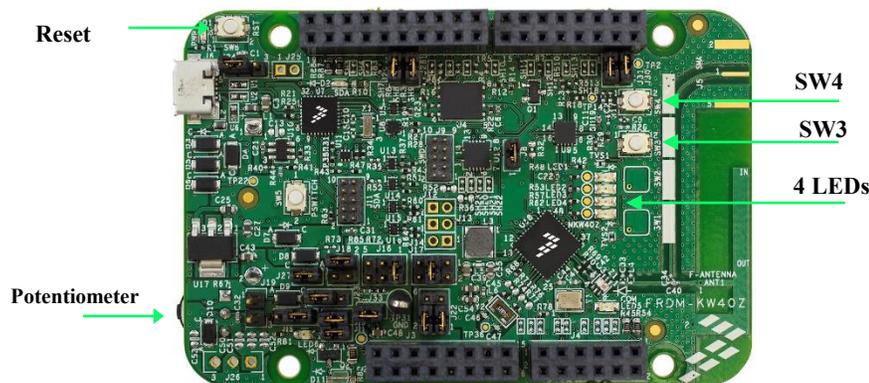


Figure 16: Freescale Freedom FRDM-KW40 platform

5 Revision history

This table summarizes revisions to this document.

Revision History		
Revision number	Date	Substantial changes
0	09/2015	Initial release

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