

# Kexx\_drv\_lib KE02 Sample Code Guide for CodeWarrior

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Board configuration, software, and development tools

Rev.0.1

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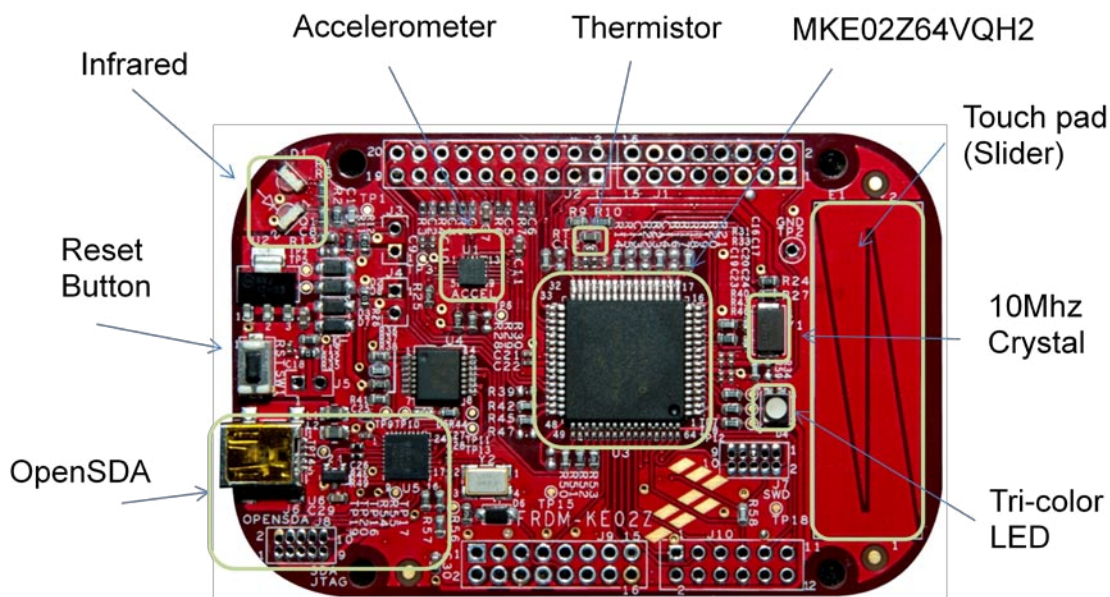
## 1 Purpose

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

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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

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### 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](http://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](http://www.freescale.com/codewarrior).

## CodeWarrior Development Tools

CodeWarrior Development Studio is a complete Integrated Development Environment (IDE) that provides a highly visual and automated framework to accelerate development of the most complex embedded applications.

[Choosing the right CodeWarrior Suite](#)

### CodeWarrior Development Tools

- CodeWarrior Development Suites
  - Development Studio - Professional Suite
  - Development Studio - Standard Suite
  - Development Studio - Basic Suite
  - Development Studio - Special Suite (free trial)
- CodeWarrior Development Studios



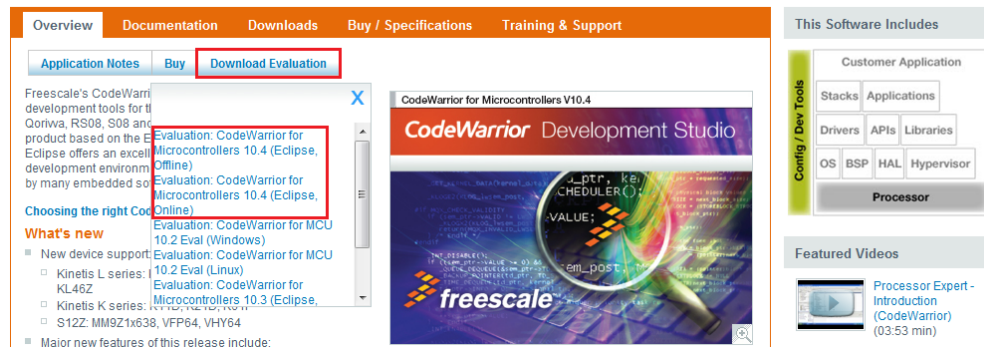
### CodeWarrior Development Studio for Microcontrollers v10.4

Freescale's CodeWarrior Development Studio for Microcontrollers v10.4 is a new full product release with major enhancements including C++ support for DSC devices, 64-bit floating point support for S12Z devices and MQX-Lite - a lightweight kernel for Kinetis L and K MCU families

[Start debugging](#)

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

CodeWarrior for MCUs (Eclipse IDE) - ColdFire, 56800/E DSC, Kinetis, Qorivva 56xx, RS08/S08, S12Z ☆



- Select the desired version.

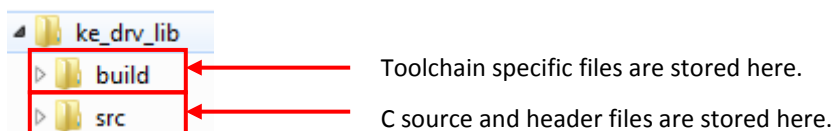
## 5 Freescale Sample Code

The Freescale kexx\_drv\_lib sample code provided for KE02Z64 is a baremetal code.

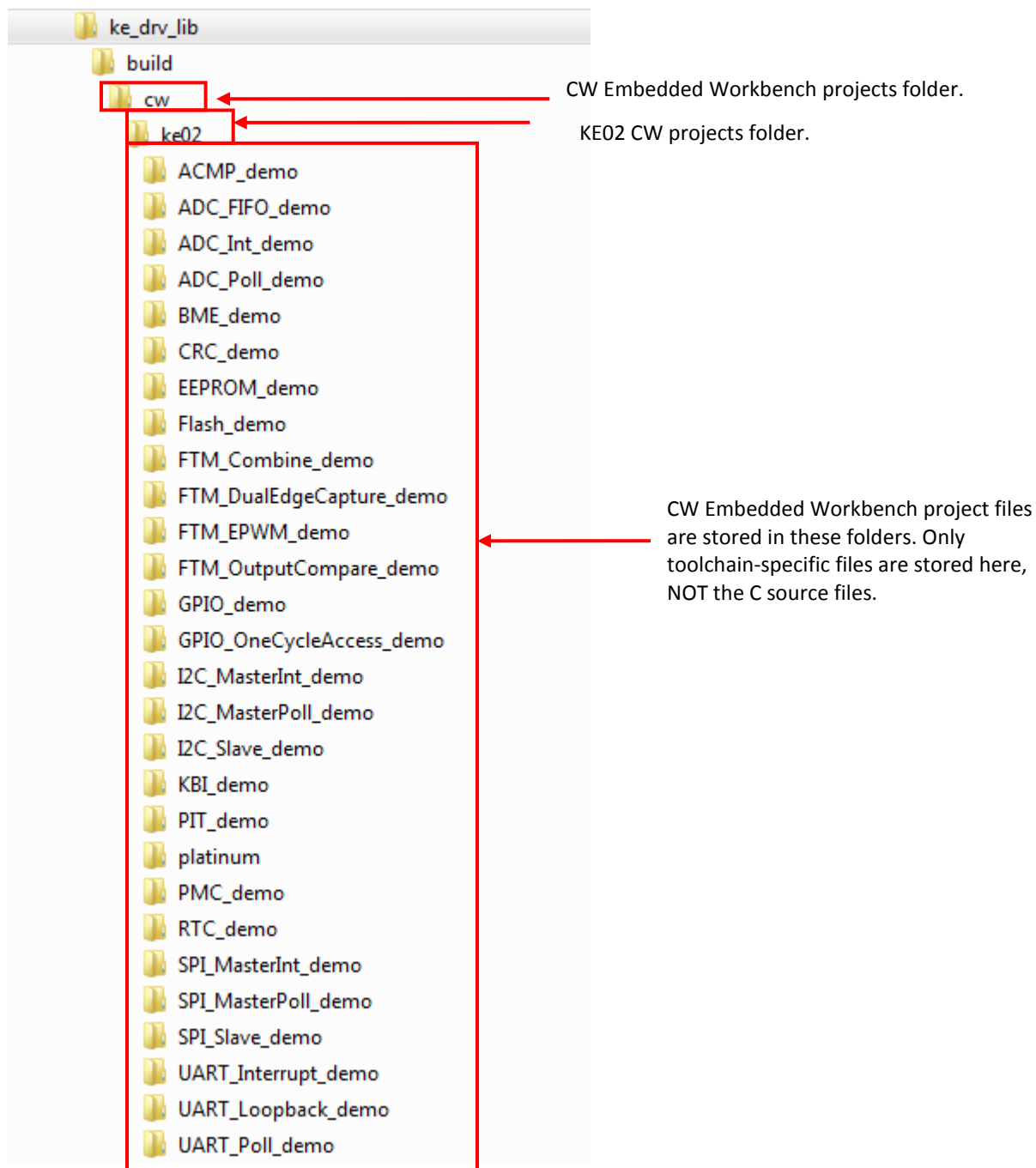
### 5.1 Baremetal Sample Code (kexx\_drv\_lib)

#### 5.1.1 Baremetal Sample Code Folder Structure

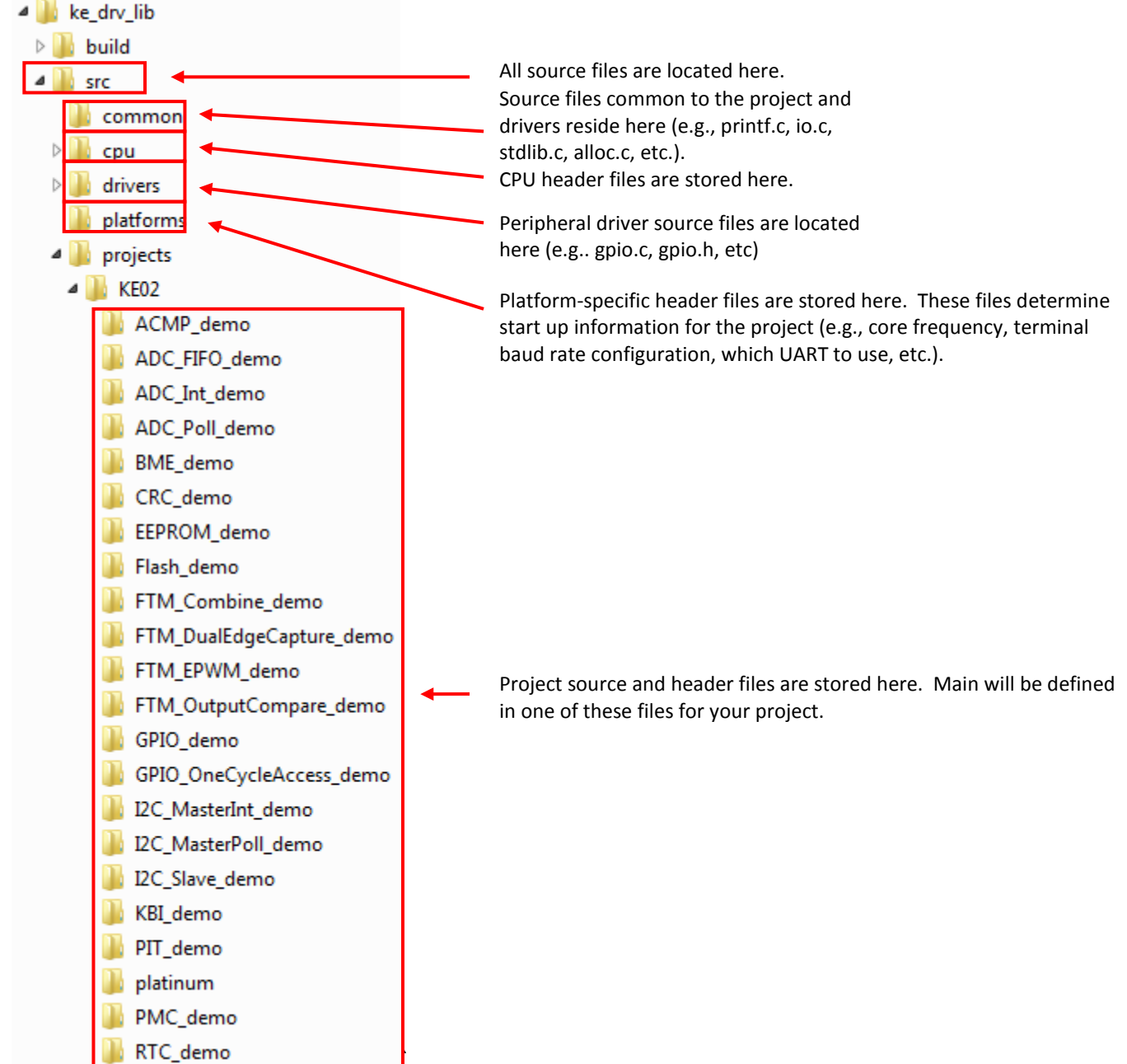
The Baremetal sample code folder contains three folders at the top level: build folder and src (source) folder.



The build folder is structured as follows:



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, 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.



UART\_Poll\_demo



WDOG\_Feed\_demo



make\_new\_project\_ke02.exe

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

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- 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

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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

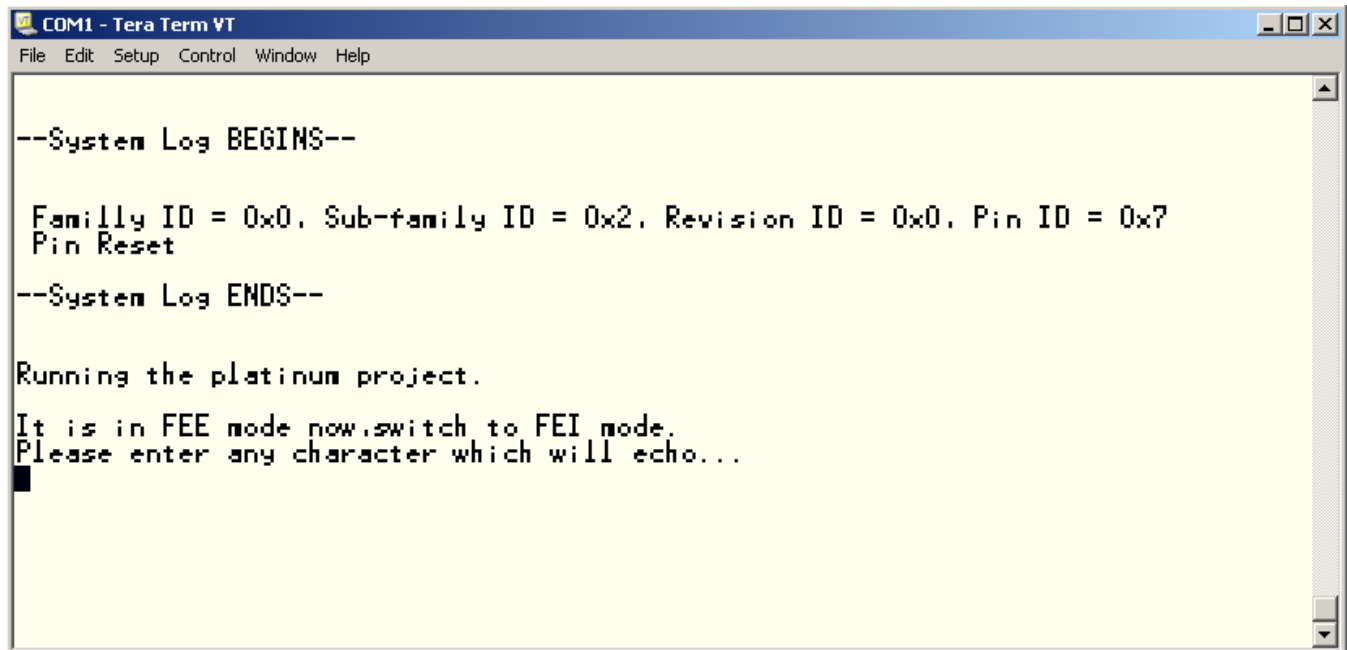
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The following instructions describe how to build and debug the platinum demo using CW 10.5. This document is targeted for users who choose to use the OpenSDA programming and debugging capabilities and it is assumed that you have loaded the P&E Micro 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:



```
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...
█
```

- 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> .

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