



Technical notes on using Analog Devices products and development tools

For further information contact your local Field Applications Engineer.

SDP-K1 MBED Keil Studio User Guide for ADBMS6830

Contributed by Pramod Pundyavana Krishna
Revision - September 08, 2023

Introduction

The document describes the instruction to setup ADBMS6830 demo board with SDP-K1 evaluation board (also known as EVAL-SDP-CK1Z) on ARM Mbed Keil Studio Platform.

The SDP-K1 controller board is a part of the evaluation system for many Analog Devices components and reference circuits. The SDP-K1 is a part of the system demonstration platform (SDP), which consists of a series of controller boards, interposer boards, and daughter boards. SDP controller boards provide a means of communicating with the PC from the system under evaluation. [More information about SDP-K1 can be found here.](#)

[Mbed](#) is used by Analog Devices to develop and distribute drivers for Analog ICs. Mbed developed by ARM, gives a free open source operating system with connectivity, security, storage, device management and machine learning. It allows to build product with free development tools, code examples and support for various microcontroller development boards. [Keil Studio](#) is an easy platform to use because being an online cloud IDE, there is no downloading or installation of software required.

Getting Started with Keil Studio

Each product with Keil Studio support comes with :

1. Library files or drivers for the product.
2. A top level example program that provides a text based menu driven interface that demonstrates the library functions

Mbed Keil Studio Setup

1. Go to Mbed web page <https://os.mbed.com/> and click Log in/sign Up button. Create an Mbed account or log in. Please note the username you are using. Open the online compiler by clicking the Keil Studio Cloud button on the top right.

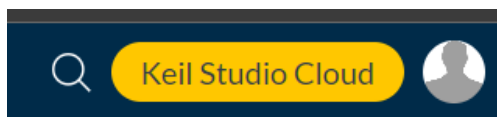


Figure 1. Keil Studio Cloud

2. In Keil Studio Cloud, Create a New - MBED Project from the the File options. Let the Example Project option be "empty Mbed OS project" and name the project, for instance, EVAL-ADBMS6830.

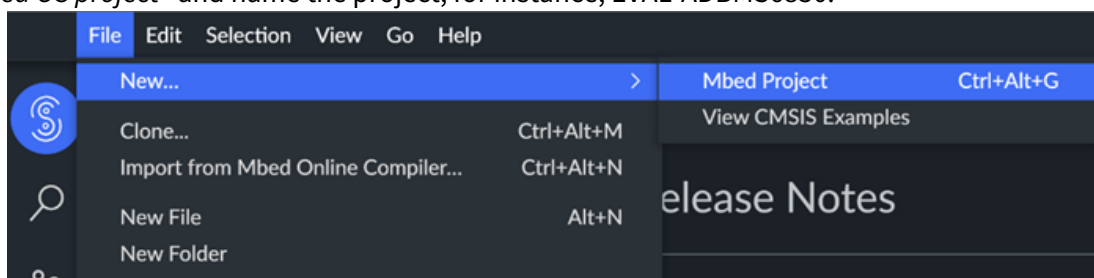
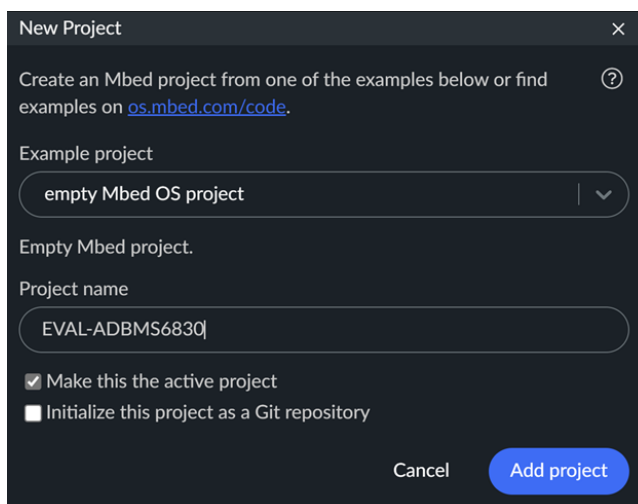


Figure 2. New Mbed Project



3. This will create a project like shown below, with a main file.

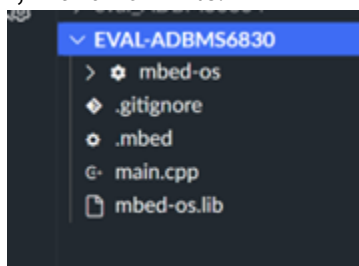
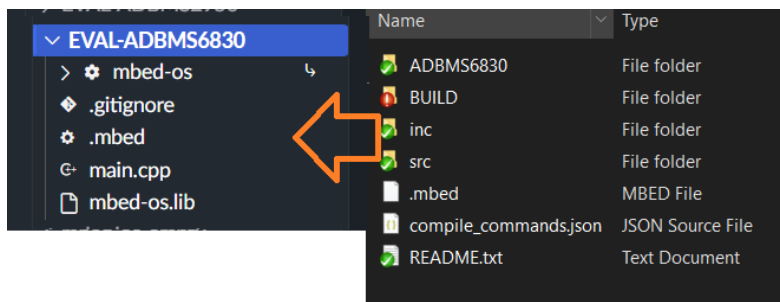
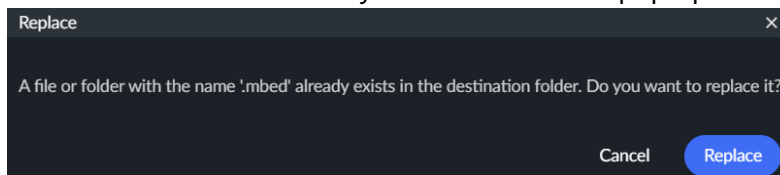


Figure 3. New Keil project

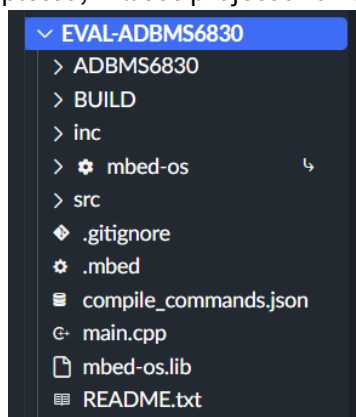
4. Drag drop the Keil Studio Cloud folders from this software release, into the project level in the Keil Studio.



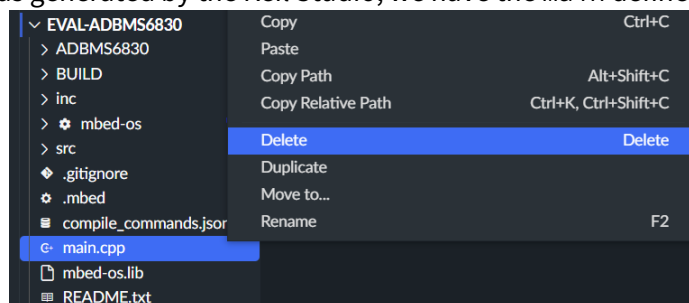
5. It will ask to confirm to overwrite files and folders. Say REPLACE for all the pop-up.



5. Once the files and folders uploading completed, will see project and files structure like this



7. Delete the *main.cpp* that was generated by the Keil Studio, we have the main defined in the src folder.



3. Right Click and *Set Active Project*, (when there are already multiple projects) if this project EVAL-ADBMS6830 is not *Active* one.

Hardware setup

A System setup with SDP-K1, DC2972B and 2 ADBMS6830 demo boards will look like as follow

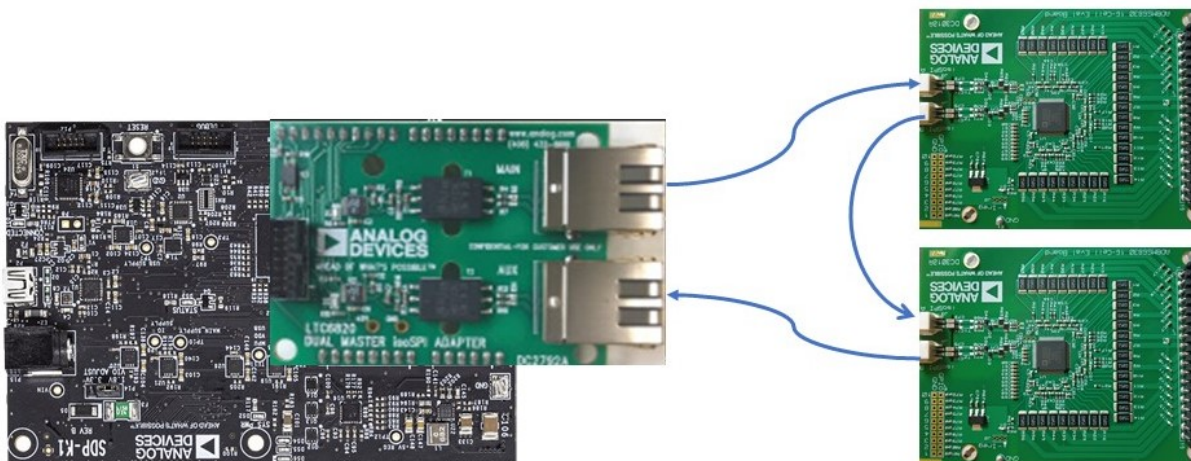


Figure 4. Hardware Setup with SDP-K1, dual 6820 isoSPI board and 2 ADBMS6830 boards

- Set VIO jumper P14 on SDP-K to 3.3V
- The GPIOs of SDP-K1 are on 3.3V level thus supply to DC2972B board should also be of same logic level. To accommodate this supply IOREF (HDR P3 pin 3) of SDP-K1 to supply pin (HDR J6 pin 5) of DC2972B. Do not short 5V with IOREF.
- If USB is connected external supply is not required for SDP-K1.

Compile & Running ADBMS6830 Sample code

- I. Refer to the Hardware Setup section, and Connect the SDP-K1 board to the PC by USB. The `SYS_PWR` LED will come on, indicating the board has power. After a few seconds of activity, the PC will recognize the SDP-K1 as a standard USB drive.

Status LED

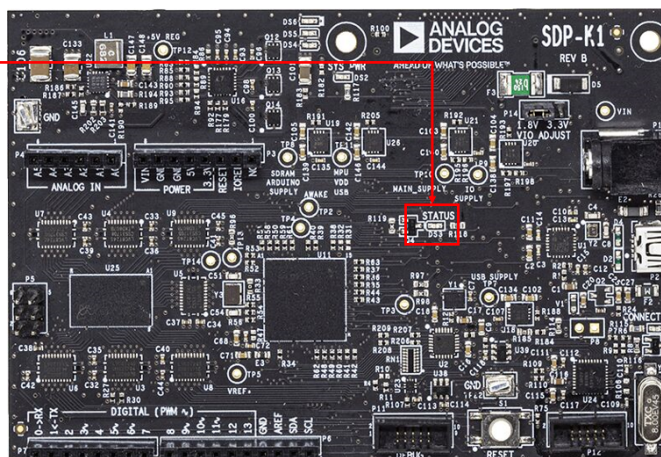


Figure 5. Board Status LED

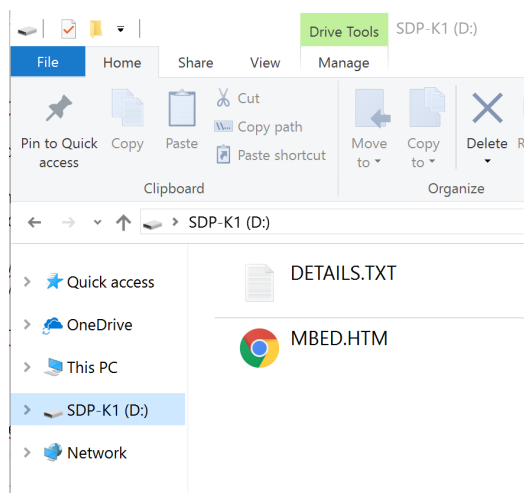
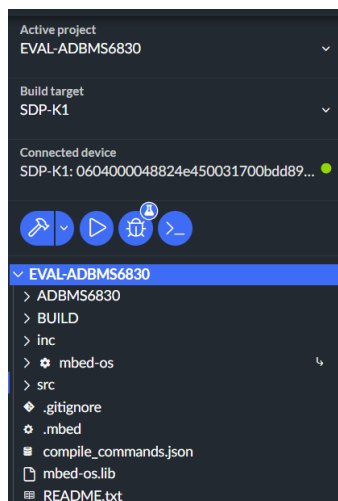
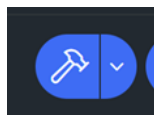


Figure 6. SDP-K1 as a Windows drive

2. In the Keil Studio, Set the *Build Target* as SDP-K1, and usually, *connected device* should appear as SDP-K1. If it does not appear, please check the Windows *Device Manager*, where in you might find unrecognized WebUSBdevice. In that case, device driver for this will have to be selected manually. Pick the driver from the *Update Drivers* option, *Manufacturer* is WinUSB Device and *Model* is also WinUSB Device



3. Build the Project. After successful compilation, download the binary file "*program_name*".bin (EVAL-ADBMS6830.SDP_K1.bin).



4. Copy - paste or drag and drop the bin file into the SDP-K1 drive (just like you would with a normal USB disk). The *Status LED* will flash as the PC writes the file to the Micro controller disk. The file is now consumed.
5. Use your favorite Terminal program, like [Putty](#), [Tera Term](#).
5. Open the Terminal software and select Serial connection type. Enter the serial port number and set the baud rate to 115200 8N1. (NOTE: You can find the serial port from the Windows *Device Manager*. This appears as "*mbed Serial Port(COM xx)*")
7. In the terminal, Select *Auto* in the *Receive mode* for *New line* and *CR* for *Transmit*. For e.g., in *Tera Term Setup -> Terminal ...*

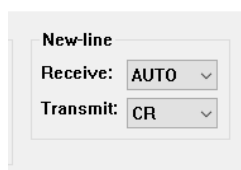


Figure 7. Tera Term terminal setup

3. The Serial monitor will print the list of ADBMS commands options. The Micro controller is now running the program. If you reset the Micro controller, or power-cycle the board, the program will simply restart.
3. Enter '0' for menu display then follow below command list to run the code.

```

COM4:115200bps - Tera Term VT
File Edit Setup Control Window Help
List of ADBMS6830 Command:
Write and Read Configuration: 1
Read Configuration: 2
Start Cell Voltage Conversion: 3
Read Cell Voltages: 4
Start S-Voltage Conversion: 5
Read S-Voltages: 6
Start Avg Cell Voltage Conversion: 7
Read Avg Cell Voltages: 8
Start F-Cell Voltage Conversion: 9
Read F-Cell Voltages: 10
Start Aux Voltage Conversion: 11
Read Aux Voltages: 12
Start RAux Voltage Conversion: 13
Read RAux Voltages: 14
Read Status Registers: 15
Loop Measurements: 16
Clear Cell registers: 17
Clear Aux registers: 18
Clear Spin registers: 19
Clear Fcell registers: 20

Print '0' for menu
Please enter command:

```

Figure 8. ADBMS6830 Menu

). Enter 1 for write and read configuration, similarly, enter all other commands to run this code.

```

COM4:115200bps - Tera Term VT
File Edit Setup Control Window Help
Start Cell Voltage Conversion: 3
Read Cell Voltages: 4
Start S-Voltage Conversion: 5
Read S-Voltages: 6
Start Avg Cell Voltage Conversion: 7
Read Avg Cell Voltages: 8
Start F-Cell Voltage Conversion: 9
Read F-Cell Voltages: 10
Start Aux Voltage Conversion: 11
Read Aux Voltages: 12
Start RAux Voltage Conversion: 13
Read RAux Voltages: 14
Read Status Registers: 15
Loop Measurements: 16
Clear Cell registers: 17
Clear Aux registers: 18
Clear Spin registers: 19
Clear Fcell registers: 20

Print '0' for menu
Please enter command:

Enter cmd:1
IC1:
Write Config A:
0x80, 0x0, 0x0, 0xFF, 0x3, 0x0

Write Config B:
0x71, 0x52, 0x46, 0x0, 0x0, 0x0

IC1:
Read Config A:
REFON:0x1, CTH:0x7
FLAG_D[0]:0x1, FLAG_D[1]:0x1, FLAG_D[2]:0x1, FLAG_D[3]:0x1, FLAG_D[4]:0x1, FLAG_D[5]:0x1, FLAG_D[6]:0x1, FLAG_D[7]:0x1
OWA[2:0]:0x7, OWRNG:0x1, SOAKON:0x1, GPO:0x3FF, FC:0x7, COMM_BK:0x1, MUTE_ST:0x1, SNAP:0x1

Read Config B:
VUV:0xFFFF, VOV:0xFFFF, DCTO:0x3F, DTRNG:0x1, DTMEN:0x1, DCC:0xFFFF

CCount:63, PECErrors:1

```

Figure 9. Write and Read Configuration Example

Related Resources

SDP-K1 Product page: <https://www.analog.com/en/design-center/evaluation-hardware-and-software/evaluation-boards-kits/sdp-k1.html>

DC2792B Product page: <https://www.analog.com/en/design-center/evaluation-hardware-and-software/evaluation-boards-kits/dc2792b.html>

SDP-K1 Platform details: https://os.mbed.com/platforms/SDP_K1/

Mbed Creating your own program: <https://os.mbed.com/handbook/Creating-a-program>

Mbed: User Guide for SDP-K1: <https://wiki.analog.com/resources/tools-software/mbed>

Mbed Serial Communication Overview: <https://os.mbed.com/docs/mbed-os/v6.16/program-setup/serial-communication.html>

Further MBED OS reference in the link <https://os.mbed.com/docs/mbed-os/v6.16/introduction/index.html>

Document History

Revision	Description
<i>Rev. Preliminary 0.1 - August 2022</i> <i>by Pramod Pundyavana Krishna</i>	Initial Document
<i>Rev. Preliminary 0.2 - 08 Sept 2022</i> <i>by Pramod Pundyavana Krishna</i>	Fix to correct the Keil Studio file & folders imports, for the release v1.0.1