

Sound MCU: S1C31D41

Demonstration Software Guide

"3. SOUNDREC_DEMO (Sound Recording and Playback Demo)"



Rev1.00

- Purpose : This document describes “SOUNDREC_DEMO” software.

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1. Evaluation Board

1.1. Jumper Settings

Set the jumpers on the evaluation board

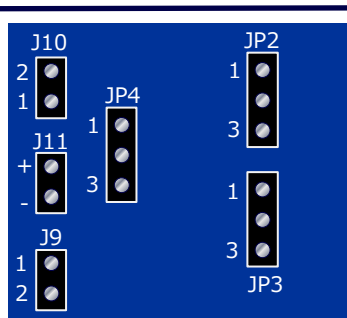
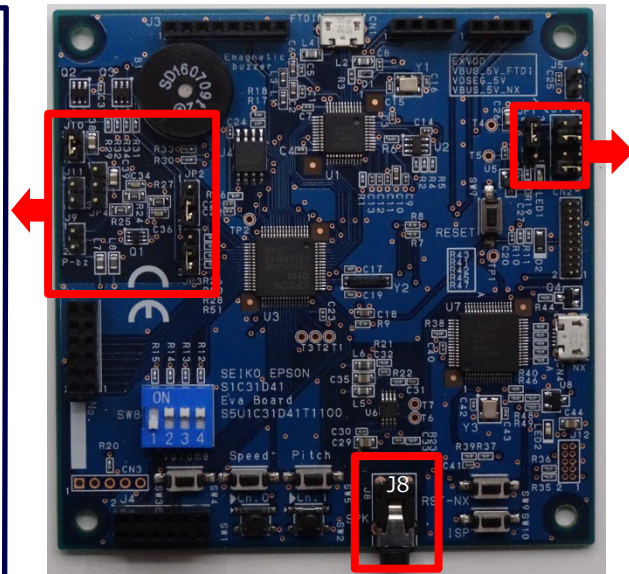
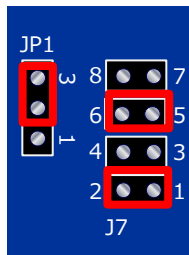


Table1.1 Output Mode Setting

| Output Mode | JP2 | JP3 | JP4 | J10 | J8 | J9 | J11 |
|-------------|-----|-----|----------|----------|--------------------|----|-----|
| Speaker | - | - | 1-2 open | 1-2 open | Speaker connection | - | - |

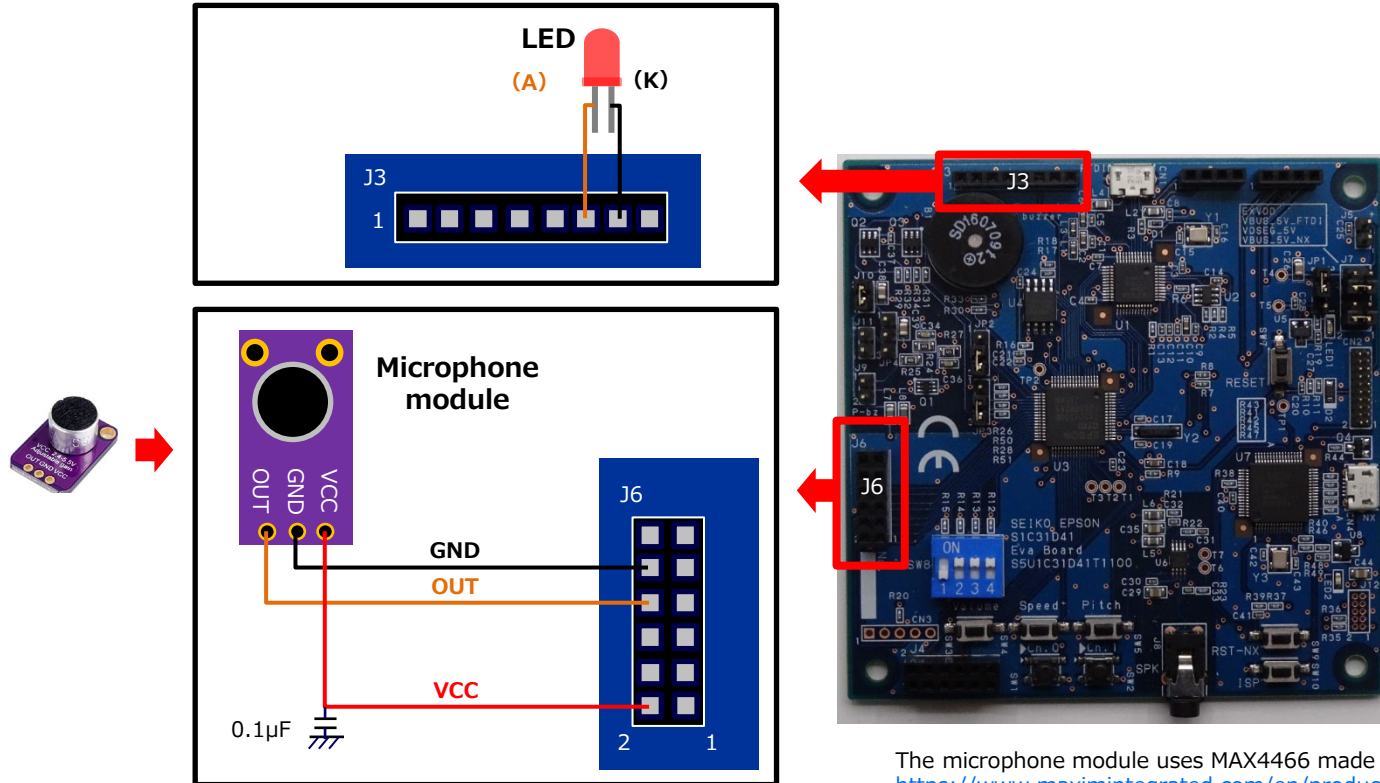


| Table 1.2 Power Supply Setting | | |
|--------------------------------|--|-----------|
| Power | J7 | JP1 |
| USB 5V supply | 1-2 short 3-4 open 5-6 short 7-8 open | 2-3 short |



1.2. Microphone Module Connection

Obtain the microphone module and LED separately and connect them to the J3 and J6 connector on the evaluation board.

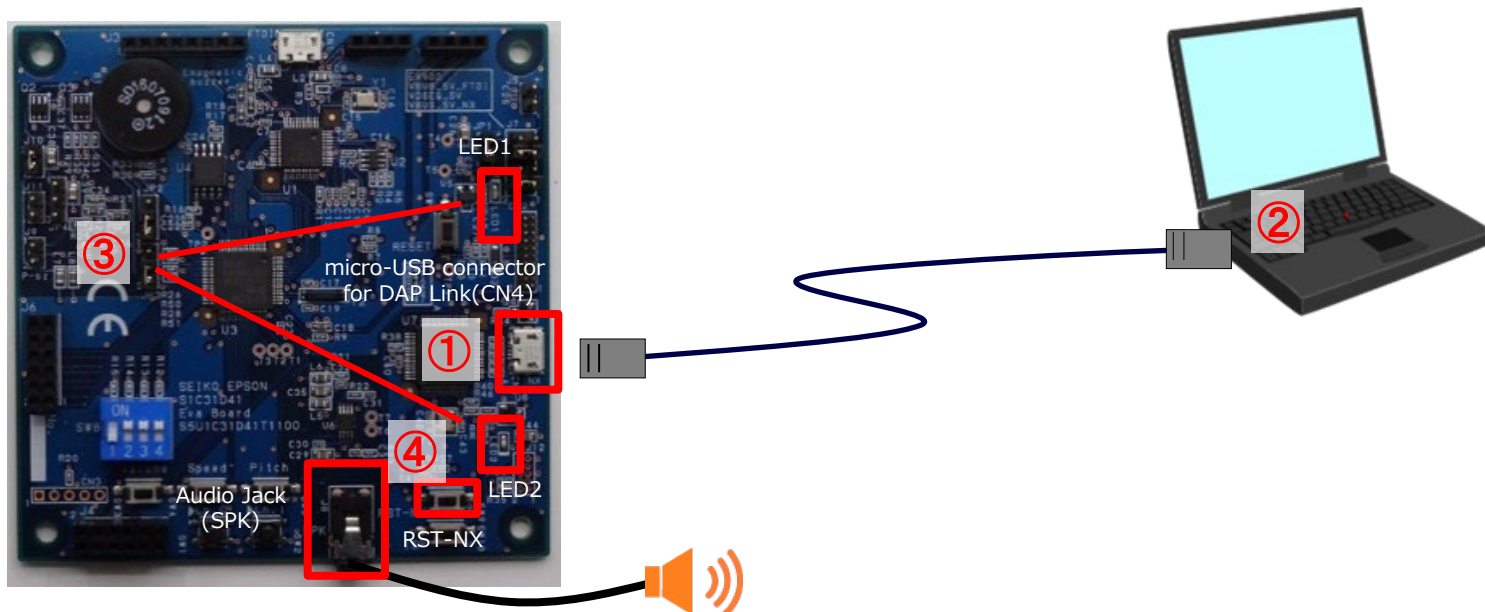


The microphone module uses MAX4466 made by Analog Devices.
<https://www.maximintegrated.com/en/products/analog/audio/MAX4466.html>

1.3. PC Connection

Follow the steps below to connect the PC to the evaluation board.

- ① Connect the micro USB cable to “CN4” connector on the evaluation board.
- ② Connect the micro USB cable to the USB port of the PC with IDE installed.
- ③ Make sure LED1 and LED2 on the evaluation board are lit.
- ④ Push “RST-NX” button.



2. Demonstration Software

2.1. Build and Download

Build [SOUNDREC_DEMO](#) project in S1C31D41 peripheral sample software package and download the software to the evaluation board.

1. Double click the “SOUNDREC_DEMO” workspace file to launch the IDE.
2. Build this project and download the built software to S1C31D41 on the evaluation board.

* For details on software build and download, refer to the following documents.

- S1C31 Family Peripheral Circuit Sample Software Manual

```
[s1c31d5xd41sp_verx_xx]
- [Licenses] : License group
- [Drivers] : Driver group
  - [board] : Drivers related to the evaluation board
    - [S5U1C31D41T1]
      - [ARM]
      - [IAR]
      - board.c/.h : Evaluation board setting program
      - settings.h : Definition file for setting the function of the evaluation board
    - ...
  - [CMSIS] : CMSIS Drivers
    - [Device]
      - [S1C31D41]
        - [Include]
          - S1C31D41.h : CMSIS peripheral circuit access layer header file
          - ...
        - [Source]
          - [ARM]
          - [IAR]
          - startup_S1C31D41.s : CMSIS startup program
          - system_S1C31D41.c : CMSIS peripheral circuit access layer program
        - [Driver]
        - [SVD]
      - [sePeripheralLibrary] : Peripheral circuit library
        - se_clg.c/.h
        - se_i2c.c/.h
        - ...
    - [Middleware] : Middleware group
      - [seHWProcLibrary] : HW Processor library
      - [seEepromLibrary] : EEPROM emulation library
      - [seFlashLibrary] : Self-programming library
  - [Projects] : Sample software group
    - [Demonstration] : Various demonstration software
      - [SOUNDREC_DEMO] : Sound Recording and Playback Demo Project
        - [ARM] : MDK-ARM Project
          - soundrec_demo_D41.uvmpw : Workspace file
        - [IAR] : IAR EWARM Project
          - SOUNDREC_DEMO_D41.eww : Workspace file
        - main.c
        - ...
      - ...
    - [Applications] : Application software group
    - [Examples] : Peripheral example software group
  - README.txt
```


2.2. Operation Flow

SOUNDREC_DEMO records the sound input from the externally connected microphone module and play the recorded sound using the 12bit A/D Converter and the SOUNDPLAY function of HW Processor.

1. Set System Clock as OSC3 16MHz for SOUNDPLAY.
2. Initializes the AD Converter and the T16 Timer used as a trigger for AD conversion.
3. Initialize QSPI for access to external QSPI-Flash.
4. Initialize the ports that control peripheral components(DIP switch, Push switch, LED).
5. Push and hold SW1 to start the recording.
 - 5.1. Confirm that SW1 is pushed and erase the storage area of QSPI-Flash.
 - 5.2. After the erasure is completed, LED1 lights up and AD conversion starts.
 - 5.3. ADC interrupt is generated at a cycle of 15625Hz, store the 16-bit sound data into RAM.
 - 5.4. Write to the storage area of QSPI-Flash after 256 bytes of data are accumulated.
 - 5.5. Stop the recording process when the long push of SW10 is released or when 4 seconds of data are accumulated.
(Recording up to 4 seconds)
6. Push SW2 to start the playback.
 - 6.1. Confirm that SW2 is pushed and enable memory-mapped access mode of QSPI-Flash.
 - 6.2. Execute the seSoundPlayInit function(*1) to initialize the SOUNDPLAY function of HWP.
 - 6.3. Execute the seSoundPlaySetPCM function(*1) to set the address and size of the sound data stored in QSPI-Flash.
 - 6.4. Executes the seSoundPlayCommand function(*1) to start playing the sound.
 - 6.5. After the sound has finished playing, execute the seSoundPlayFinish function(*1) to exit HWP.
 - 6.6. Disables memory-mapped access mode for QSPI-Flash.

*1: For details of HWP library function specification (seSoundPlay functions), please see the following document.

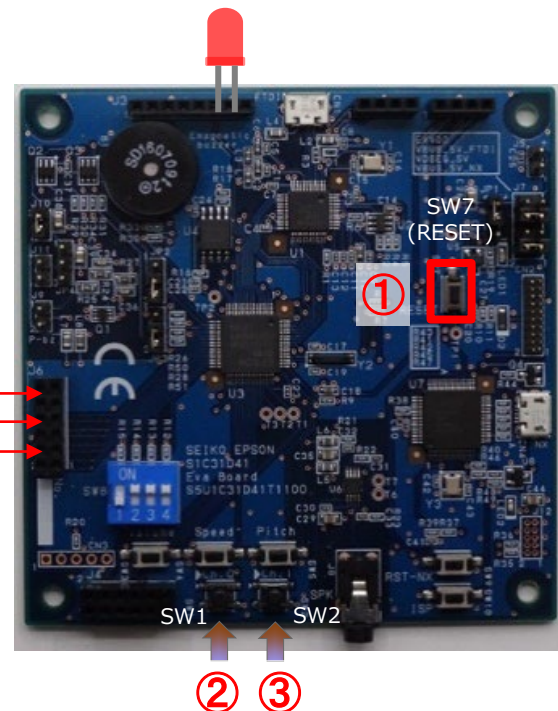
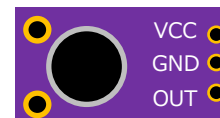
• S1C31D41 Demonstration Software Guide "2. SOUNDPLAY(Sound Playback Example)" (2_S1C31D41_SoundPlay_e_revxx.xx.pptx)

2.3. Demonstration Operation

SOUNDREC_DEMO allows you to record and play back the sound by operating the push switch.
The operation of this demo is as follows.

- ① Push SW7 (RESET) to reset the evaluation board.
- ② **Push and hold SW1 to start the recording.**
 - When the storage area of QSPI-Flash can be erased and recorded, the LED of the external connection lights up.
 - Recording continues as long as SW1 is pushed.
 - Recording stops when SW1 is released.

* However, the maximum recording time is 4 seconds (data size 128KB), and recording stops automatically if it exceeds 4 seconds.
- ③ **Push SW2 to start playing the recorded sound.** Push SW2 during playback to stop playback.



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