NL-NAU8315

User Manual

Evaluation Board for NAU8315

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1 OVERVIEW

The NL-NAU8315 is the evaluation board for NAU8315 and its compatible ICs. This board is developed for users to quickly understand the characteristics of NAU8315. For development flexibility, this board has built-in additional expansion connectors that provide power, speaker outputs and digital interface. For development convenience, NL-NAU8315 can be connected with speakers or directly to customized system.

Nuvoton has also developed a USB control board, NU-NAUSB212C, which provides digital audio interface signals. Users can quickly set up and use NL-NAU8315 on their PCs.

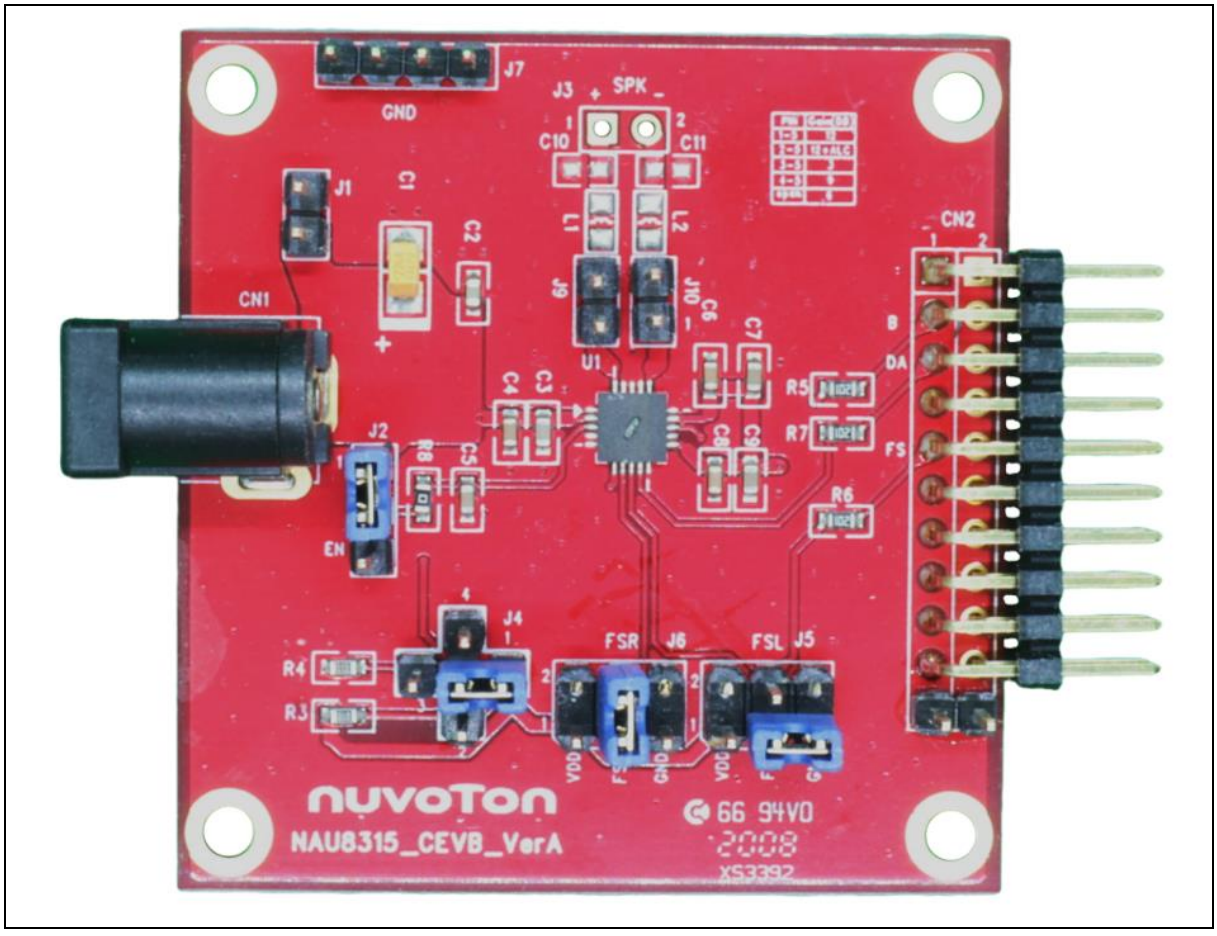


Figure 1-1 NL-NAU8315 Evaluation Board

NL-NAU8315 compatible ICs:

- NAU8315YG
- NAU83U15YG
- NAU83R15YG

2 HARDWARE CONFIGURATION

2.1 NL-NAU8315 Front View

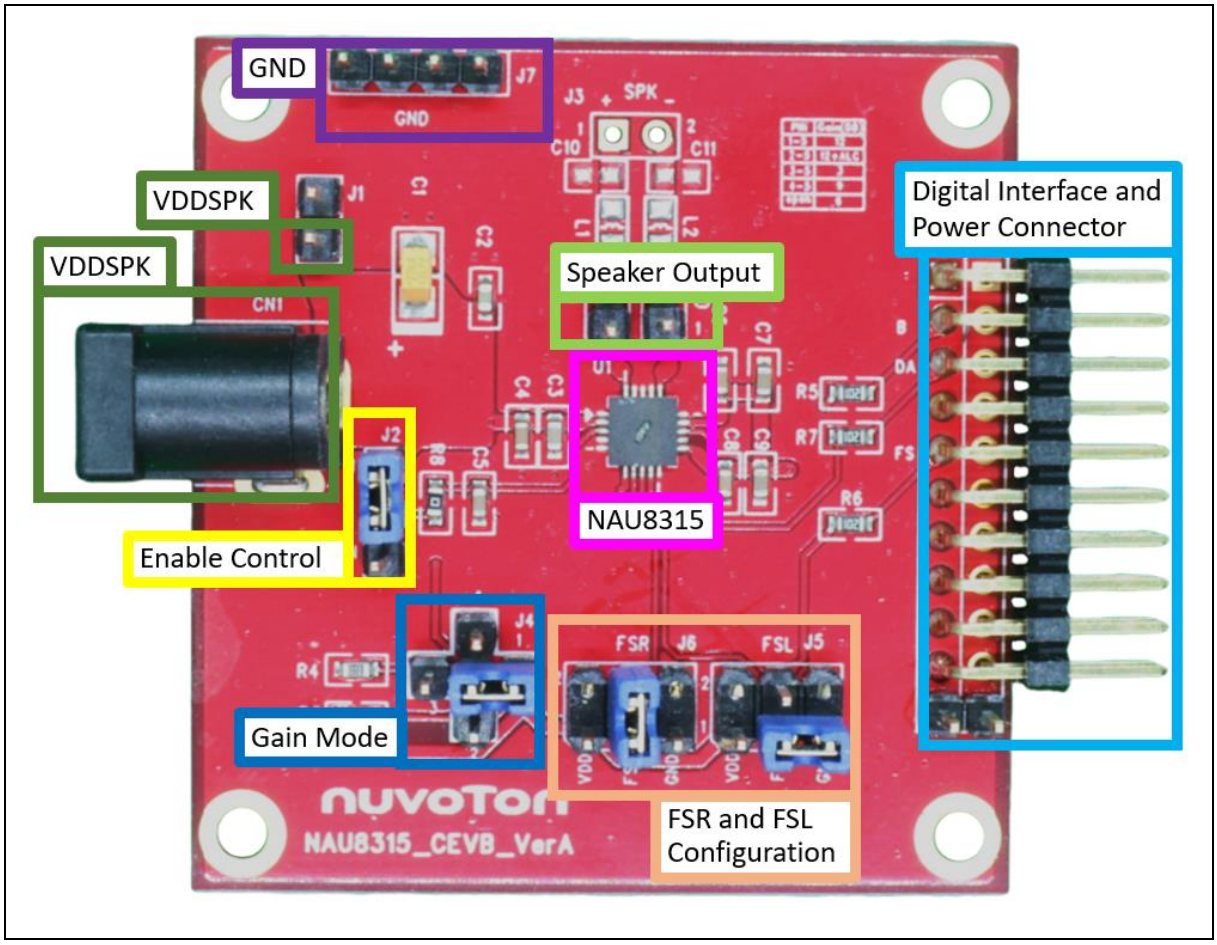


Figure 2-1 Front View of NL-NAU8315

Figure 2-1 shows the main components and connectors from the front side of NL-NAU8315 as the following list:

- Target Chip: NAU8315 (U1)
- VDDSPK 2.5MM DC Jack (CN1)
- VDDSPK Extension Connector (J1.1)
- Digital Interface and Power Extension Connector(CN2)
- Enable Control (J2)
- Output Gain Function Setting (J4)
- Channel Select (J5, J6)
- GND (J7)
- Speaker Output (J9, J10)

2.2 NL-NAU8315 Connectors

Table 2-1 describes the connectors on NL-NAU8315. Users can refer to Figure 2-1.

Header		NL-NAU8315	
		Net Name in Schematic	Description
CN2	CN2.1	NC	
	CN2.2	GND	GND
	CN2.3	BCLK	Serial Data Bit Clock Input / Output for I^2S / PCM Data
	CN2.4	GND	GND
	CN2.5	DACIN	Serial Audio Data Input for I^2S / PCM Data
	CN2.6	GND	GND
	CN2.7	NC	
	CN2.8	GND	GND
	CN2.9	FS	Frame Sync Input / Output for I^2S / PCM Data
	CN2.10	GND	GND
	CN2.11	NC	
	CN2.12	GND	GND
	CN2.13	NC	
	CN2.14	GND	GND
	CN2.15	NC	
	CN2.16	GND	GND
	CN2.17	NC	
	CN2.18	GND	GND
	CN2.19	NC	
	CN2.20	GND	GND
	CN2.21	VDDSPK	VDDSPK Power Supply
	CN2.22	GND	GND
CN1		VDDSPK	VDDSPK Power Supply

Header		NL-NAU8315	
		Net Name in Schematic	Description
J1	J1.1	VDDSPK	VDDSPK Power Supply
	J1.2	GND	GND
J7	J7.1	GND	GND
	J7.2		
	J7.3		
	J7.4		
J9	J9.1	SPK+	Speaker Positive Output
	J9.2	SPKL+_CON	SPK+ Connects to EMI components
J10	J10.1	SPK-	Speaker Negative Output
	J10.2	SPKL-_CON	SPK- Connects to EMI components

Table 2-1 NL-NAU8315 Extension Connectors

2.3 NL-NAU8315 Jumpers

Table 2-2 describes the connectors on NL-NAU8315. Users can refer to Figure 2-1.

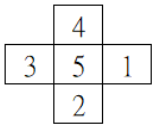
Jumper	NL-NAU8315		
	Function Description	Options	Jumper option description
J2	Enable Control	J2.1 – J2.2 (Default)	Setting the EN Pin High
		J2.3 – J2.2	Setting the EN Pin Low
J4	Gain Mode Configuration 	J4.1 – J4.5 (Default)	Gain 12db. Gain Pin Tied To VDDSPK
		J4.2 – J4.5	Gain 12db + CLIP ALC. Gain Pin Tied to VDDSPK Through 100k Ohm
		J4.3 – J4.5	Gain 3db. Gain Pin Tied to GND Through 100k Ohm
		J4.4 – J4.5	Gain 9db. Gain Pin Tied to GND
		Floating	Gain 6db. Gain Pin Floating
J5	FSR Configuration 	J5.1 – J5.3	FSR Pin Tied to VDD
		J5.4 – J5.3 (Default)	FSR Pin Tied to FS
		J5.5 – J5.3	FSR Pin Tied to GND
J6	FSL State Setting 	J6.1 – J6.3	FSL Pin Tied to VDD
		J6.4 – J6.3	FSL Pin Tied to FS
		J6.5 – J6.3 (Default)	FSL Pin Tied to GND

Table 2-2 NL-NAU8315 Jumpers

2.4 NU-NAUSB2I2C USB Control Board View

The NU-NAUSB212C provides I²C control signals and common audio digital formats. With this board, users can quickly evaluate the functions and features of the NL-NAU8315 and perform basic operations on the NL-NAU8315 in conjunction with the content of this document. For more details of NU-NAUSB212C, please refer to *NU-NAUSB212C User Manual*.

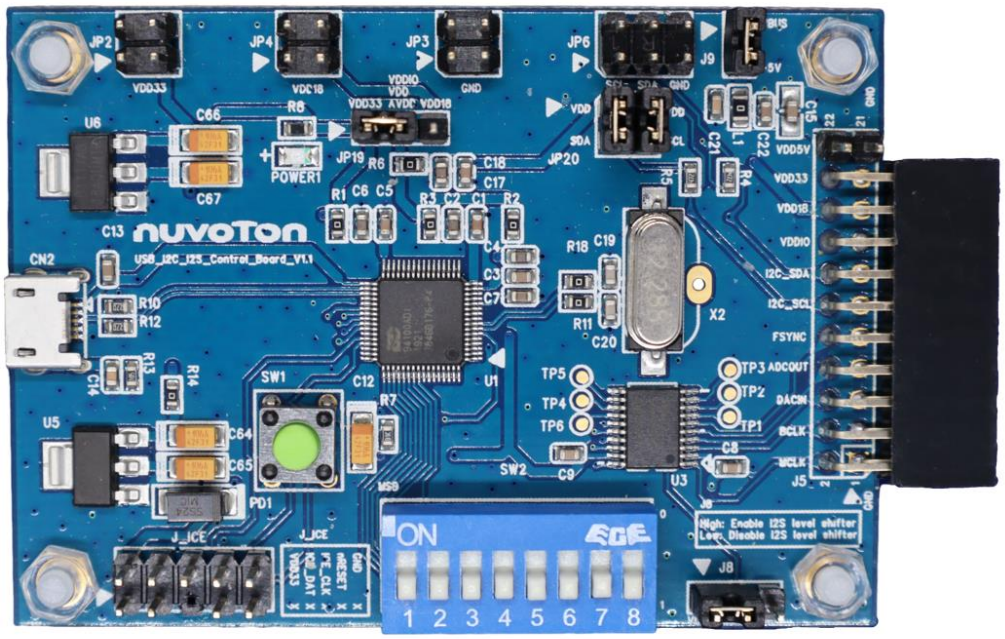


Figure 2-2 NU-NAUSB212C

2.5 Hardware Check and Connection

Before using NU-NAUSB212C, please confirm the hardware configured as follows before connecting to a Windows based PC.

1. Confirm that pin 7 of SW2 of NU-NAUSB212C is high and the rest are low level, as shown in Figure 2-3.

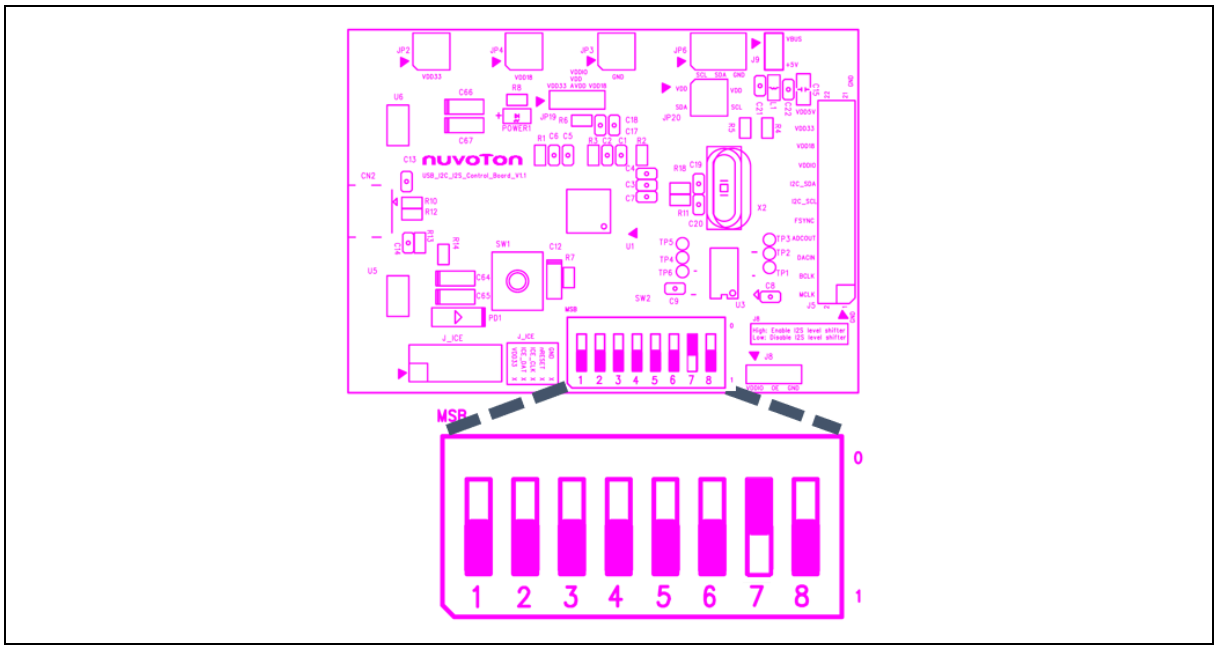


Figure 2-3 PIN Status of NU-NAUSB212C SW2

2. Connect J5 of NU-NAUSB212C to CN2 of NL-NAU8315. Figure 2-4 is the diagram after two boards are connected to each other.

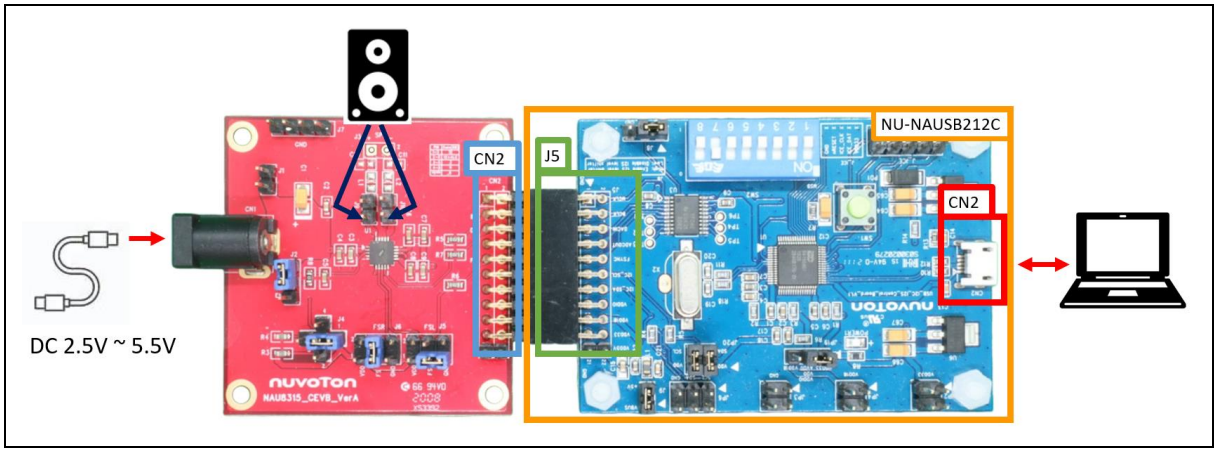


Figure 2-4 NU-NAUSB212C Connection

3. CN2 of NU-NAUSB212C uses USB Cable to connect to a PC under Windows system. (If possible, please do not connect to the PC through USB HUB). Figure 2-5 shows the audio signal path after the two boards are connected to each other.

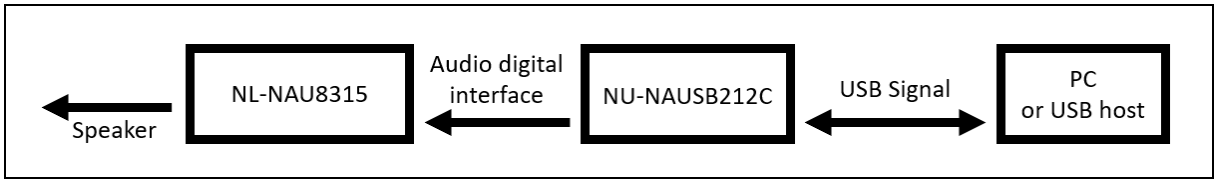


Figure 2-5 Signal Path of NU-NAUSB212C and NL-NAU8315

4. Select the audio device on the PC as "Nuvoton UAC+HID Device". For example, under Win10 system, users can click the speaker icon on the bottom-right corner of the desktop and choose the device "Nuvoton UAC+HID Device," as shown in Figure 2-6. This will select "Nuvoton UAC+HID Device" as current playback device.

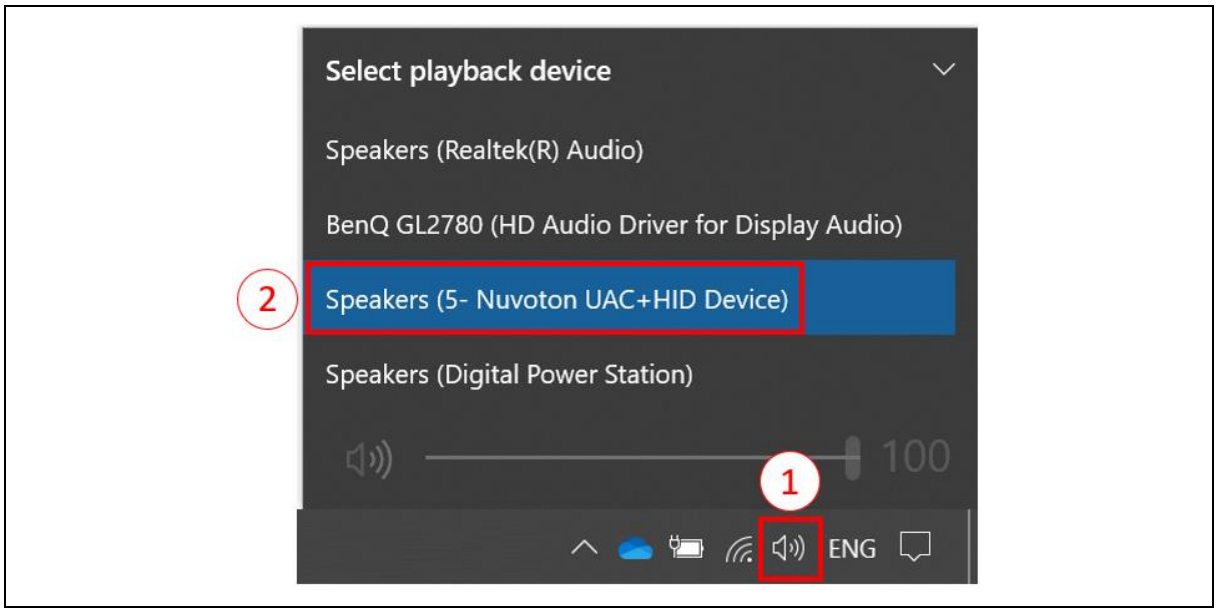


Figure 2-6 PC Audio Device Setting

5. Users can play audio files from the PC, and the sound will be output through the speakers connected with the NL-NAU8315.

2.6 Power Supply on NU-NAUSB212C to Assist Demonstration

The NU-NAUSB212C can provide basic power (5V, 3.3V, and 1.8V) when connected to PC. This document provides a method to use the NU-NAUSB212C to supply DC 5V to the NL-NAU8315, allowing the NL-NAU8315 to operate without the need for an additional power adapter, enabling a quick and convenient way to complete the demonstration.

Note: If the user intends to verify the power output of this IC, a professional power supply should be used.

Please refer to Figure 2-7 and the following instructions to complete the hardware connections.

1. Connect J9.1 and J9.2 of the NU-NAUSB212C to each other.
2. Connect JP1.22 of the NU-NAUSB212C to CN2.21 of the NL-NAU8315.

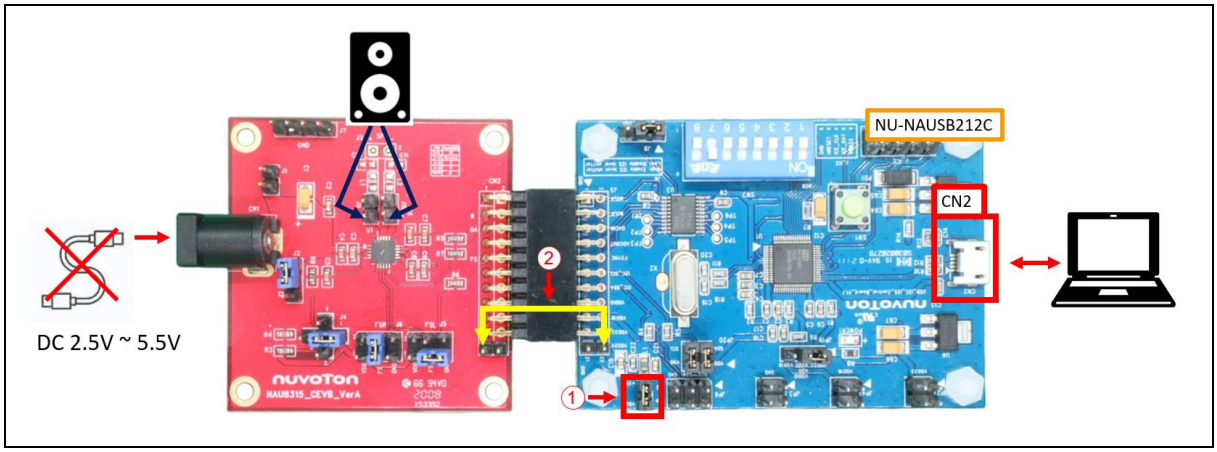


Figure 2-7 NU-NAUSB212C Supplies DC 5V Hardware Configuration

3 SOFTWARE CONFIGURATION

This document is compatible with NuvotonAudioGUI V2.04 or later.

Evaluation of NL-NAU8315 feature doesn't need to install NuvotonAudioGUI.

4 SCHEMATICS

4.1 NL-NAU8315 Schematic

Figure 4-1 shows the NL-NAU8315 circuit.

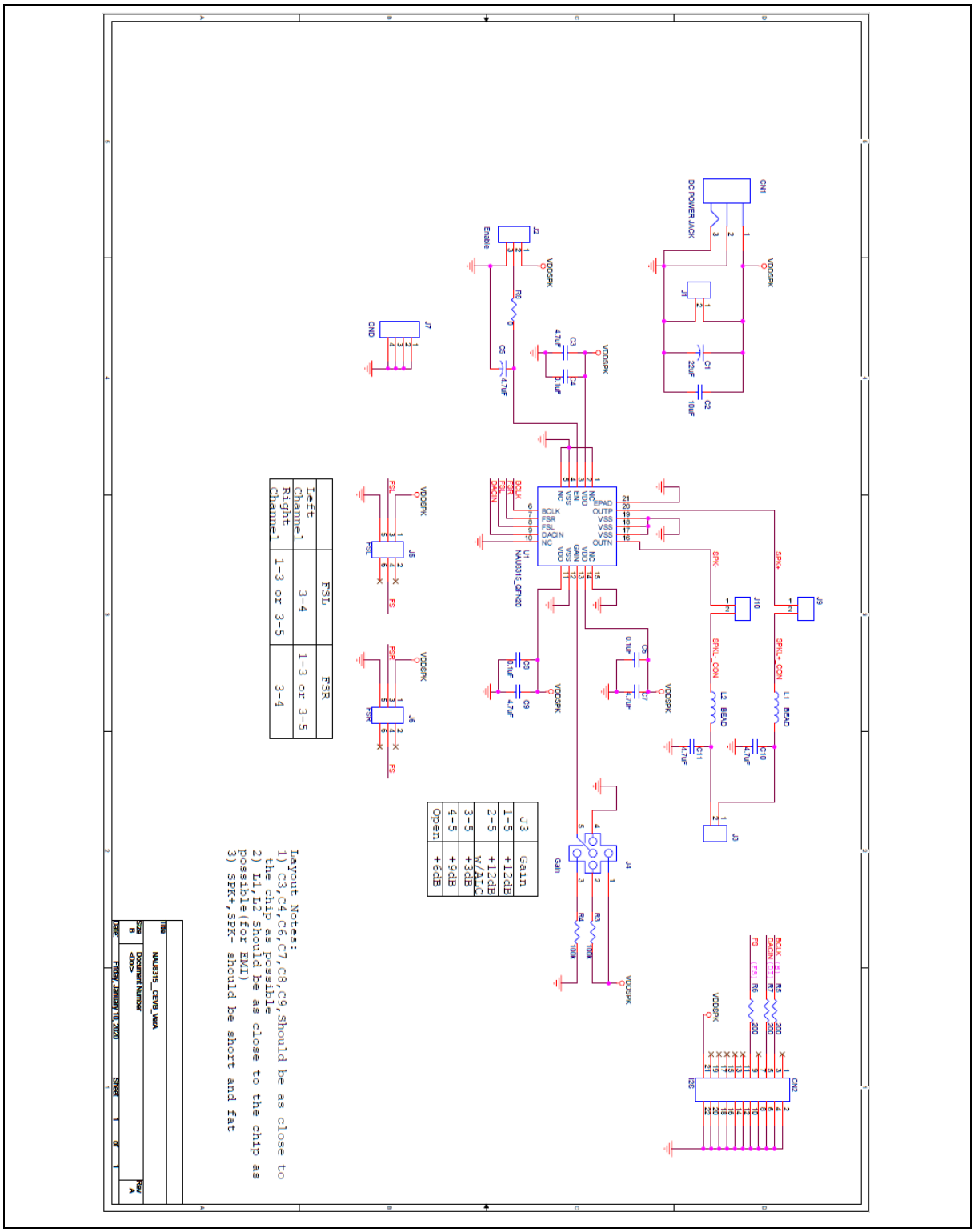


Figure 4-1 NL-NAU8315 Circuit

4.2 NL-NAU8315 PCB Layout

Figure 4-2 shows the placement of NL-NAU8315.

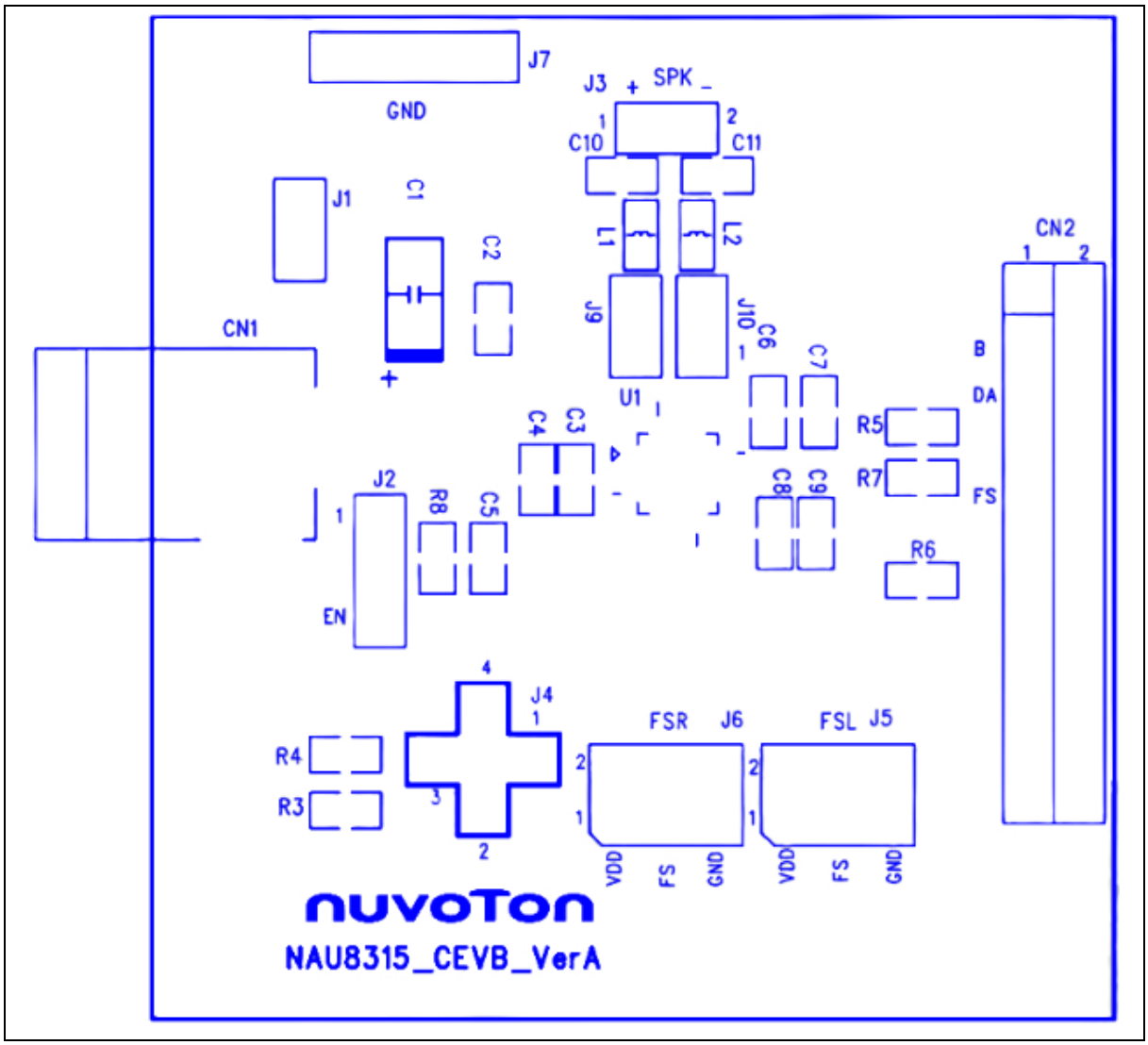


Figure 4-2 NL-NAU8315 Layout

5 REVISION HISTORY

REVISION	DATE	DESCRIPTION
1.0	Feb 18, 2025	Initial Release
1.1	Mar 17, 2025	Update 3 SOFTWARE CONFIGURATION

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