Infineon Audiohub Nano Analog

User Manual

About this document

Scope and purpose

The user manual provides information about using and evaluating Infineon analog XENSIV™ MEMS microphones with the help of the **Audiohub Nano Analog** evaluation board. It familiarizes you with the evaluation board and guides you through the initial set-up and measurement.

Intended audience

Design, verification, test and software engineers can use this document to get an understanding of the functionality and connections of the **Audiohub Nano** evaluation board.

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1 Introduction

This document serves as a manual for the evaluation of up to two Infineon analog XENSIV™ MEMS microphones using the Audiohub Nano evaluation board. The evaluation board provides a USB audio interface to stream audio data from microphones with any audio recording and editing software.

1.1 Prerequisites

1.1.1 Hardware

- Infineon Audiohub Nano Analog evaluation board
- Infineon analog XENSIV™ MEMS microphone flex kit
- Micro-USB cable

1.1.2 Software

- Audio editing software that supports 48 kHz and 24-bit recording
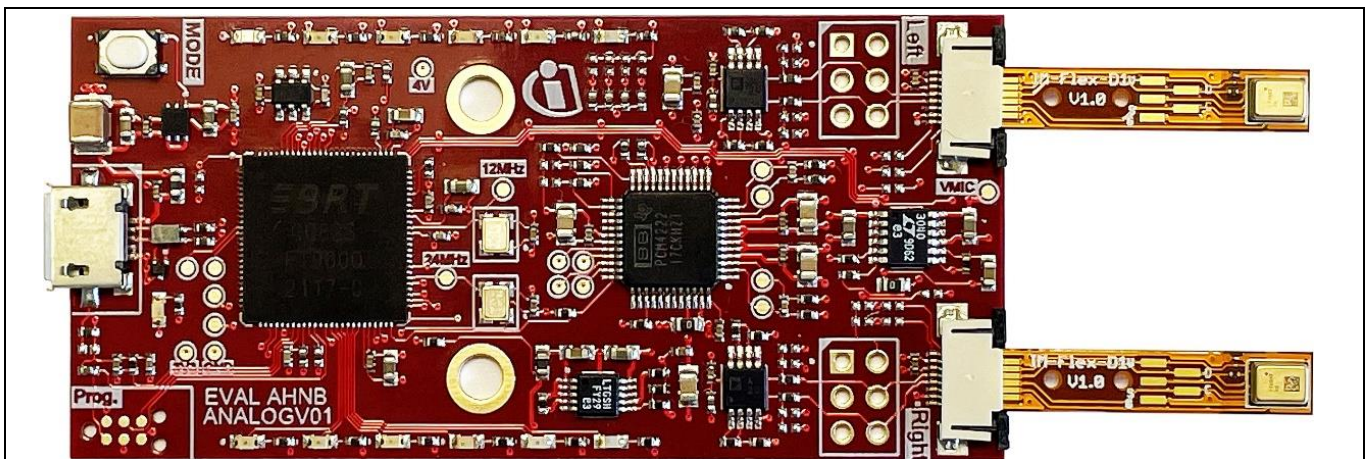- FT9xx programming utility for firmware update (optional)

Figure 1 Audiohub Nano Analog with left and right flex connectors for analog XENSIV™ MEMS Microphones

2 Features

2.1 Summary of features

- Audio interface for analog XENSIV™ MEMS microphones
- Audio streaming over USB interface
- 48 kHz sampling rate
- 24-bit audio data (stereo)
- Dynamic range 120dB
- Two different power modes (high power and low power mode, see section 4.4)
- Four different gain configurations indicated by onboard LEDs (see section 4.4)
- Volume unit meter indication by onboard LEDs (see section 4.3)
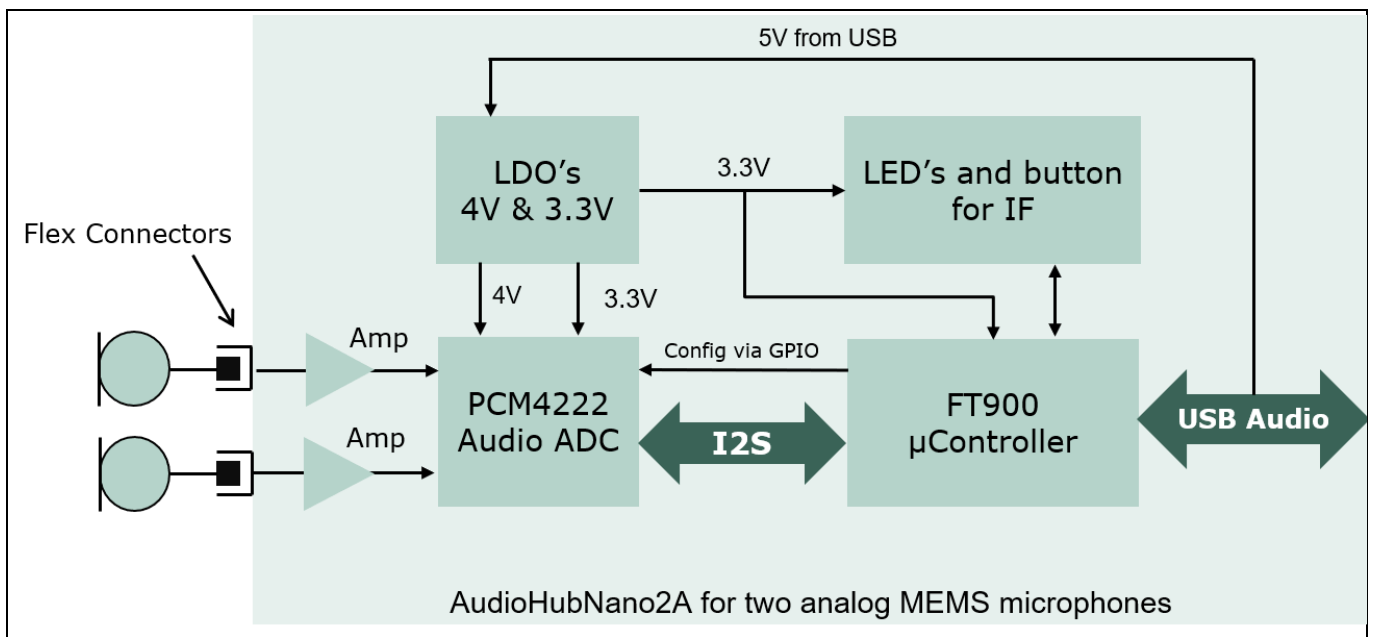- Powered through Micro-USB

2.2 Block diagram

Figure 2   Audiohub Nano Analog block diagram

3　　　　Initial set-up

To get started insert the analog XENSIV™ MEMS Microphones from your flex kit to the flex connectors (left and right), as shown in Figure 1.

3.1　　　USB communication

The evaluation board is powered via the Micro-USB port. Connect the board to a host computer via USB. For streaming the audio data from the board select the *AudioHubNano2A* as your audio input device. Any audio recording or editing software (e.g. Audacity) can be used to record and evaluate the microphones, see Figure 3.

3.2　　　Audacity software set-up

Audacity is a free and open-source audio editor and recording application. Select the audio source as Audiohub Nano in the recording software, as shown in Figure 3. The recording channel can be selected as either mono or stereo.
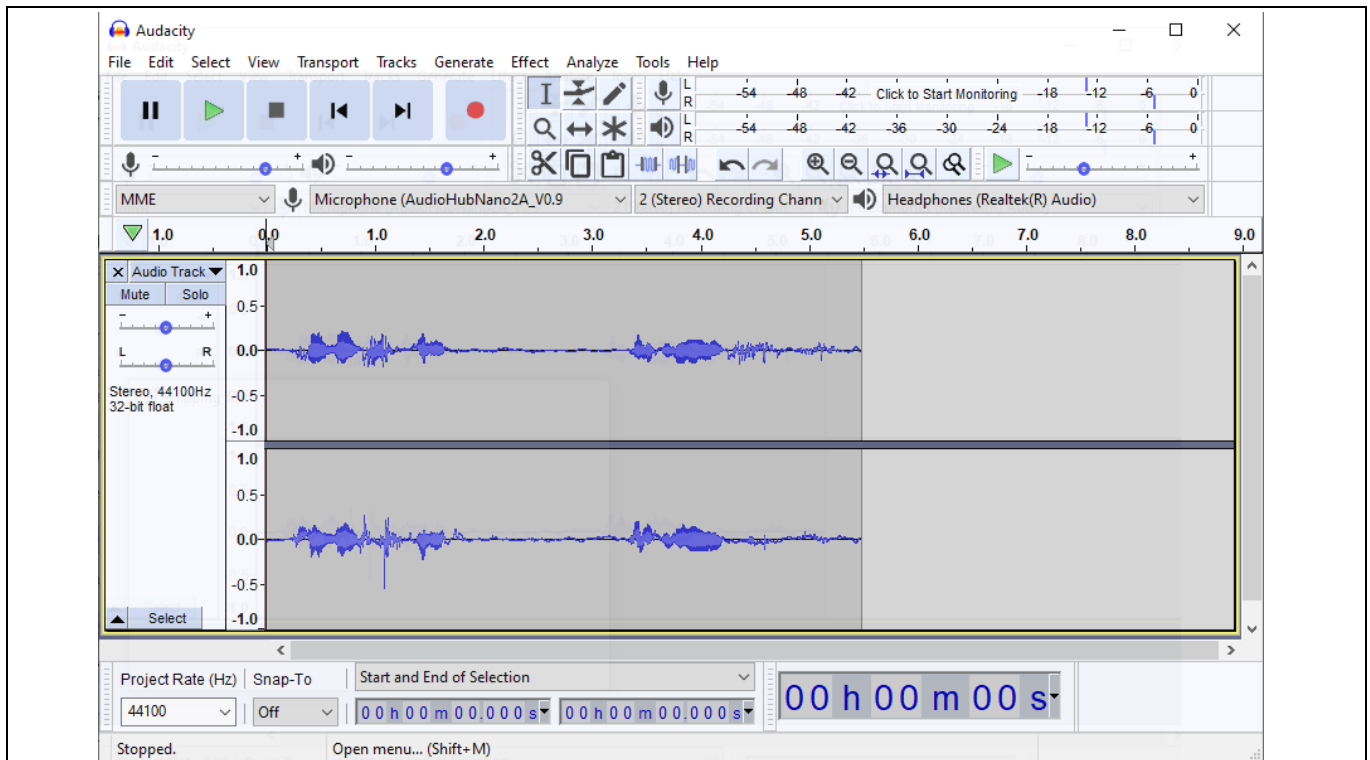

Figure 3　　　Recording from Audiohub Nano Analog in Audacity

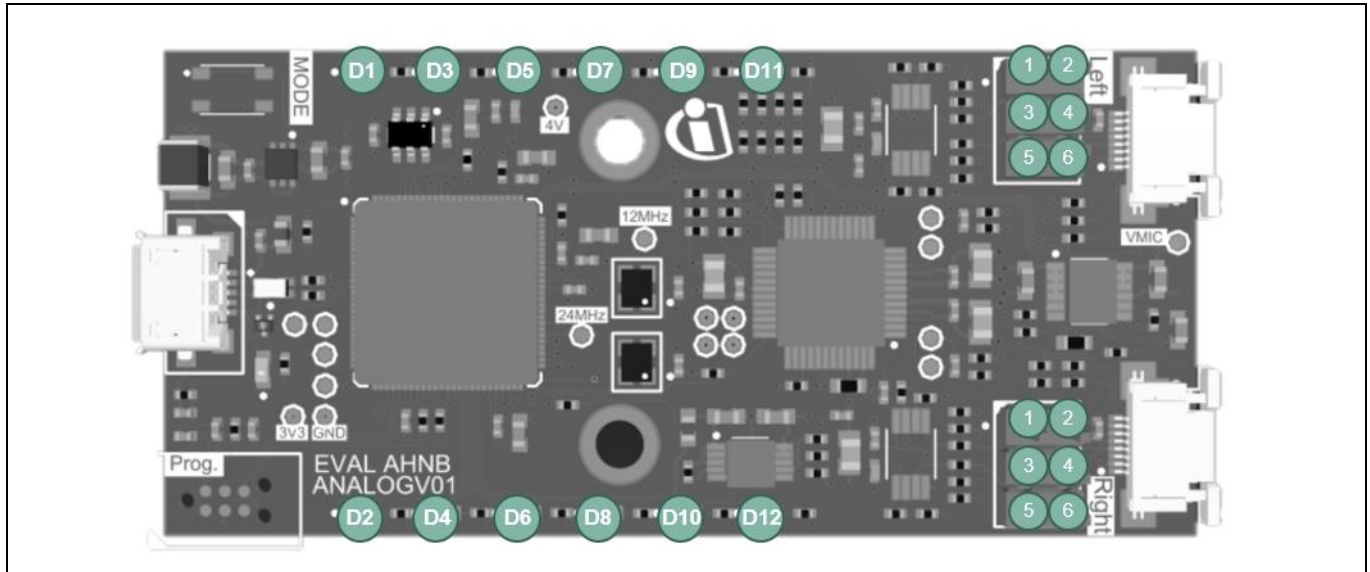2022-07-28

4 Evaluation board information

Figure 4 **AudioHub Nano Analog Layout**

4.1 Connectors

A list of the connecters provided by on the Audiohub Nano evaluation board can be found in Table 1. Furthermore, Table 2 gives an overview of the respective pins.

Table 1 **Connector list**

Reference designator	Description
LEFT	Flex connector and pinheader for left channel microphone connection
RIGHT	Flex connector and pinheader for right channel microphone connection
PROG	Programming connector
USB	Micro-USB connector for power and audio streaming

Table 2 **Connector X3 detailed pinout**

Pin number	Name	Description
2	VMIC	Microphone VDD
4	IN+	Positive analog output of microphone
6	IN-	Negative analog output of microphone
1, 3, 5	MGND	Microphone ground

The pinout of the pinheaders can be found on the back of the circuit board.

The inputs IN+ and IN- are using a DC offset, provided by the MEMS microphones. Please note, without this DC offset the Audiohub Nano Analog does not work correctly.

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4.2   Test points

Table 3 lists all the available test points for debugging on the Audiohub Nano evaluation board.

Table 3   Test point description

Test point	Description
12MHz	12 MHz from oscillator Q1
25MHz	24.576 MHz clock of oscillator Q1 for I^{2}S interface
3V3	3.3 V digital power rail
4V	4.0 V analog power rail
VMIC	Microphone power supply
GND	Digital ground

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4.3 Volume Unit (VU) meter display with onboard LEDs

The onboard LEDs turn on based on the measured sound pressure levels (dB SPL). The LEDs work as a volume unit (VU) meter when streaming the audio data. The threshold for the LED turn-on is based on the sound pressure level during the audio streaming, as shown in Table 4. In case only one microphone is connected both LED bars will indicate the volume of the mono audio stream.

Table 4   VU meter setting based on sound pressure level

LED reference	dB SPL	dBFS	LED color
D1, D2	50	-80	green
D3, D4	65	-65	green
D5, D6	80	-50	green
D7, D8	94	-36	yellow
D9, D10	110	-20	orange
D11, D12	125	-5	red

4.4 Operating mode and gain configuration with mode switch

The mode switch push button S1 can be used to switch through various configurations in a sequence. The settings are defined for configuring the power modes:

- *normal mode* and
- *low power mode*.

The mode switch button also enables different pre-defined gain configurations on the audio data stream. The gain settings can be configured when the evaluation board is in idle mode and not recording the audio stream.

On power-on, the evaluation board is set to normal mode with 0 dB gain by default. This configuration is indicated by LED D3.

Table 5 describes the different gain configurations and power modes that can be changed with the mode switch push button.

Table 5   Operating mode and gain configuration LED reference

LED reference	Operating mode	Gain configuration (dB)
D3	Normal power mode VDD of microphone at 2.75 V	0
D5		12
D7		18
D9		24
D4	Low power mode VDD of microphone at 1.60 V	0
D6		12
D8		18
D10		24

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Revision history

Document version	Date of release	Description of changes
V1_0	2022-07-20	Initial release
V1_1	2022-07-28	Included layout

2022-07-28

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