

## Volume 2 Click



PID: MIKROE-4560

**Volume 2 Click** is a compact add-on board that provides the user with complete digital volume control. This board features the NJU72341, a 2-channel I2C configurable electronic volume IC with external mute control from NJRC. It controls two independent low distortion audio channels with a vast volume control range from 0 to 95dB with 1dB step offering zero-cross detection to protect pop noise. It operates with a simple I2C serial interface that accepts 8-bit data offering low distortion and noise. This Click board™ is suitable for stereo and multi-channel audio systems and represents a perfect solution for remote audio volume control applications.

Volume 2 Click is supported by a [mikroSDK](#) compliant library, which includes functions that simplify software development. This [Click board™](#) comes as a fully tested product, ready to be used on a system equipped with the [mikroBUS™](#) socket.

### How does it work?

Volume 2 Click as its foundation uses the NJU72341, a 2-channel I2C configurable electronic volume IC with an external mute control from NJRC. The NJU72341 operates as an audio signal processor with many characteristics useful in an audio application, such as low noise typical of 2.0µVrms and low distortion of 0.002%. It controls two independent audio channels with a vast volume control range from 0 to 95dB with 1dB step offering zero-cross detection to protect pop noise. That's why this Click board™ is suitable for stereo and multi-channel audio systems.

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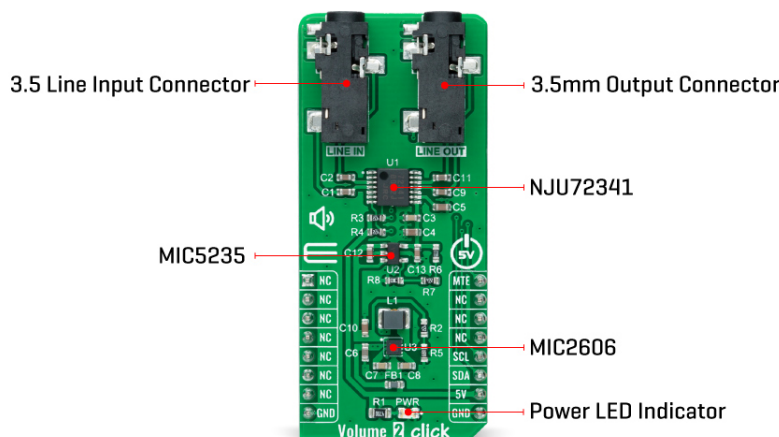
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The NJU72341 has to receive a specific supply voltage to operate appropriately, in this case, 12V. Unlike the [Volume Click](#), which has symmetrical power supply, in this case, we have only one positive power supply. Bringing just a positive power supply, the noise generated by that power supply will transmit to the output, representing a side effect. For this purpose, Volume 2 Click employs a boost converter unit made by combining [MIC5235](#) and [MIC2606](#), both from Microchip. MIC5235 provides 13V out of 5V from the mikroBUS™ power rail, which then the MIC2606, with a feature of massive noise suppression, lowers it to 12V and then supplies NJU72341 reducing the noise generated at its output.

Volume 2 Click communicates with MCU using standard I2C 2-Wire interface, with a clock frequency up to 100kHz in the Standard and 400kHz in the Fast Mode. Also, the user has the option of external mute control configurable through the PWM pin of the mikroBUS™ socket labeled as MTE.

This Click board™ operates only with a 5V logic voltage level. The board must perform appropriate logic voltage level conversion before use with MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

## Specifications

Type	Signal Processing
Applications	Can be used for stereo and multi-channel audio systems and represents a perfect solution for remote audio volume control applications
On-board modules	NJU72341 - 2-channel I2C configurable electronic volume IC with an external mute control from NJRC
Key Features	External mute control, low noise, low distortion, I2C configurable, zero cross detection, vast volume control range, and more.
Interface	I2C
Feature	No ClickID

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Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	5V

## Pinout diagram

This table shows how the pinout on Volume 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	<b>MTE</b>	MUTE Control
	NC	2	RST	INT	15	NC	
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	<b>SCL</b>	I2C Clock
	NC	6	MOSI	SDA	11	<b>SDA</b>	I2C Data
	NC	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	Ground

## Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

## Volume 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	5	-	V
Volume Control Range	0	-	95	dB
Step Size	-	1	-	db
Programmable Gain	4	6	8	db
Total Harmonic Distortion	-	0.002	0.01	%
Operating Temperature Range	-40	+25	+85	deg

## Software Support

We provide a library for the Volume 2 Click as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our LibStock™ or found on [mikroE github account](#).

## Library Description

This library contains API for Volume 2 Click driver.

Key functions:

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- volume2\_cfg\_setup - Config Object Initialization function.
- volume2\_init - Initialization function.
- volume2\_default\_cfg - Click Default Configuration function.

## Examples description

This example shows how Volume 2 Click board™ can be used for controlling the audio channels. Thanks to this, a simple audio effect is created by switching volume from right to left and vice versa.

The demo application is composed of two sections :

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended way), downloaded from our [LibStock™](#) or found on [mikroE github account](#).

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Volume2

## Additional notes and informations

Depending on the development board you are using, you may need [USB UART click](#), [USB UART 2 click](#) or [RS232 click](#) to connect to your PC, for development systems with no UART to USB interface available on the board. The terminal available in all MikroElektronika [compilers](#), or any other terminal application of your choice, can be used to read the message.

## mikroSDK

This Click board™ is supported with [mikroSDK](#) - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the [LibStock](#) and installed for the compiler you are using.

For more information about mikroSDK, visit the [official page](#).

## Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

## Downloads

[Volume 2 click 2D and 3D files](#)

[NJU72341 datasheet](#)

[MIC5235 datasheet](#)

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[MIC2606 datasheet](#)

[Volume 2 click schematic](#)

[Volume 2 click example on Libstock](#)

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