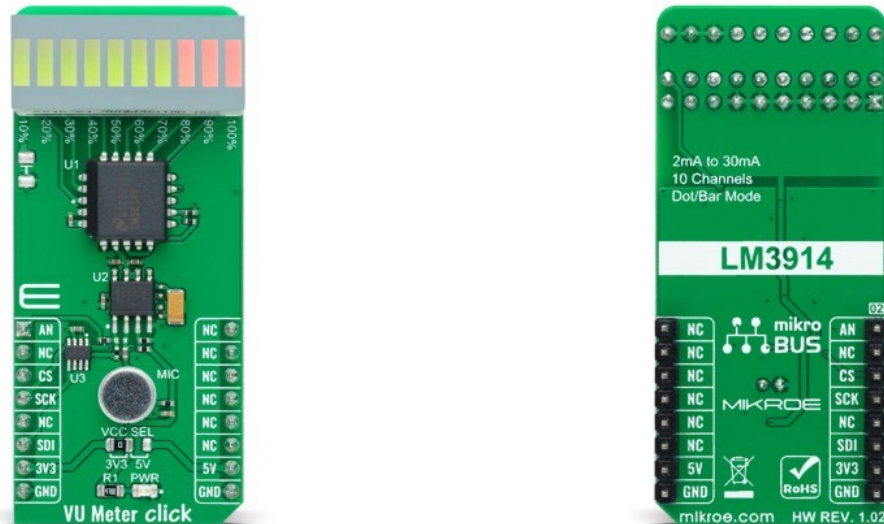


VU Meter Click



PID: MIKROE-5111

VU Meter Click is a compact add-on board representing a volume unit meter that displays the intensity of an audio signal. This board features the LM3914, a monolithic integrated circuit that senses analog voltage levels and drives a 10-segment bar graph display from Texas Instruments. This Click board™ is manufactured with a sound detecting device (microphone), Op-Amp, and the LM3914, which gleams the bar graph display according to the sound's quality. The LM3914 is an analog-controlled driver meaning it can control (turn ON or OFF) a display by an analog input voltage and eliminates the need for additional programming. This Click board™ is commonly used in visual alarms and other metering or monitoring applications.

VU Meter 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?

VU Meter Click as its foundation uses the LM3914, a monolithic integrated circuit that senses analog voltage levels and drives a 10-segment bar graph display from Texas Instruments, making this solution a compact volume unit meter. This is an analog-controlled driver meaning it can control display by an analog input voltage and eliminates the need for additional programming. A volume unit meter represents a device that displays the intensity of an audio signal; more specifically, it is used to visualize analog signals. That's why VU Meter Click is suitable as a volume measurement gadget.

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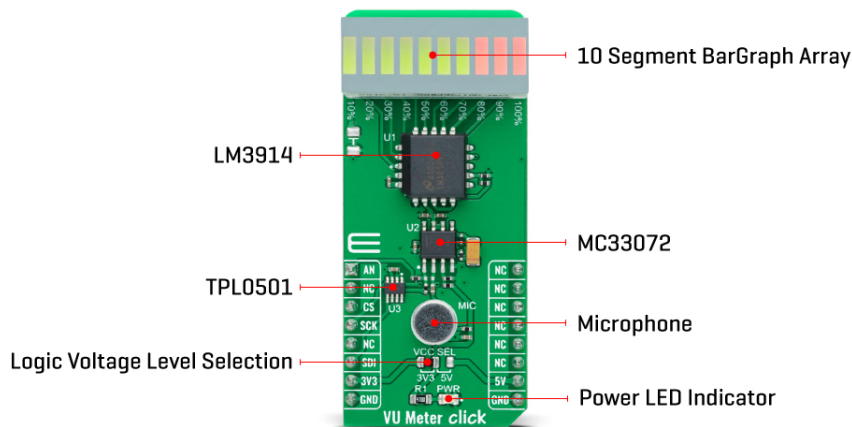
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The LM3914 is configured to work in bar mode where all parts of the bar graph display below a certain point turn on. This board is manufactured with an onboard sound detecting device (microphone), the [MC33072](#) Op-Amp, and the LM3914, which gleams the bar graph display according to the sound's quality. In the beginning, the microphone captures the sound and transforms it into voltages linear to sound amplitude. The capacitor then stops the DC component of the transmission, allowing the AC input from the microphone to enter the MC33072 Op-Amp.

One part of the MC33072 represents a variable gain inverting amplifier using the [TPL0501](#), an SPI-configurable digital potentiometer from Texas Instruments, while the second part represents a signal buffer. After filtration and amplification, these filtered and amplified signals are finally provided to LM3914. Considering that this driver is analog controlled, this Click board™ also provides the ability to monitor the analog signal by the MCU via the AN pin of the mikroBUS™ socket.

The LM3914 operates in a voltmeter format and lights the XGURUGX10D, a ten-segment bar graph array, according to the strength of the given signal. The onboard bar graph display segments are bright and uniformly colored, providing pleasant and clean visual feedback. Each segment is composed of green and red-colored LEDs, making it possible to have various essential states marked in a different color. It can use green, red, and a combination of these two, resulting in having amber-colored segments.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to use the communication lines properly. However, the Click board™ comes equipped with a library that contains easy-to-use functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Microphone
Applications	Can be used in visual alarms and other metering or monitoring applications
On-board modules	LM3914 - monolithic integrated circuit that senses analog voltage levels and drives a 10-segment bar graph display from Texas

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	Instruments
Key Features	Analog controlled driver, bar operation mode, programmable output current, low power consumption, and more
Interface	Analog, SPI
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin					Pin	Notes
Analog Signal	AN	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
SPI Chip Select	CS	3	CS	RX	14	NC	
SPI Clock	SCK	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
SPI Data IN	SDI	6	MOSI	SDA	11	NC	
Power Supply	3.3V	7	3.3V	5V	10	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

VU Meter Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Maximum Output Current	2	10	30	mA
Operating Temperature Range	0	+25	+70	°C

Software Support

We provide a library for the VU Meter 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

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Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Library Description

This library contains API for VU Meter Click driver.

Key functions

- `vumeter_read_an_pin_voltage` This function reads results of AD conversion of the AN pin and converts them to proportional voltage level.
- `vumeter_set_gain_level` This function sets the input signal gain level (the microphone sensitivity).
- `vumeter_calculate_vu_level` This function calculates VU level from the analog voltage input.

Example Description

This example demonstrates the use of VU Meter Click board™.

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.VUMeter

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. UART terminal is available in all MikroElektronika [compilers](#).

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](#)

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[Click board™ Catalog](#)

[Click boards™](#)

Downloads

[TPL0501 datasheet](#)

[LM3914 datasheet](#)

[MC33072 datasheet](#)

[VU Meter click 2D and 3D files](#)

[VU Meter click schematic](#)

[VU Meter click example on Libstock](#)

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