MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

BUZZ 3 Click





PID: MIKROE-4390

Buzz 3 Click is a compact add-on board that contains a sounder driver that produces higher volume with a lower current. This board features the PAM8904, a piezo-sounder driver with an integrated Multi-Mode charge pump boost converter from Diodes Incorporated. With its wide input signal range of 20Hz to 300kHz, the PAM8904 can drive a sounder load of up to 15nF, providing a 9V output. It enables the selection of three different piezo sound pressure levels, keeps current consumption low, and extends battery life by employing built-in automatic shutdown and wake-up functions. This Click board™ is suitable for a variety of battery-powered applications, including medical systems, alarm clocks, home appliances, and security devices.

Buzz 3 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.

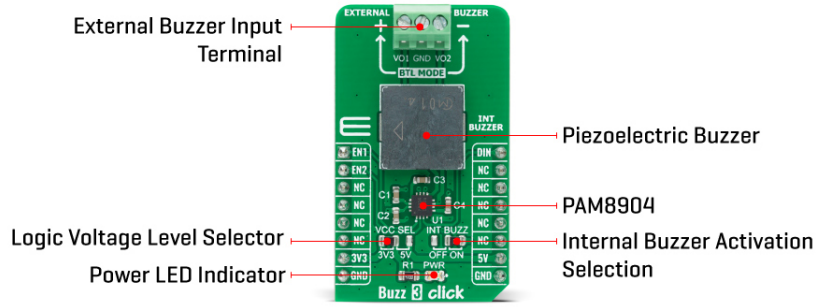
How does it work?

Buzz 3 Click is based on the PAM8904, a piezo-sounder driver with an integrated Multi-Mode charge pump boost converter from Diodes Incorporated. The PAM8904 is a switching driver with a multi-mode charge pump for piezo-sounder. Operating at a fixed frequency of 1MHz, the PAM8904 can drive a sounder load of up to 15nF, providing a 9V output with a minimal component footprint. For adjusting the piezoelectric sounder sound volume, the charge pump can operate in either of a 1x, 2x, or 3x mode. It features thermal shutdown, over-current, and voltage protection, under-voltage lock-out, and provides a small inrush current, low EMI, and high efficiency.

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISOQAR REGISTERED
UKAS MANAGEMENT SYSTEMS
ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.
TÜV SÜD ISO 9001
ISO 9001: 2015 certification of quality management system (QMS).

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com



The sounder driver helps to keep current consumption low and battery life long by employing built-in automatic shutdown and wake-up functions. For example, active current consumption is just 300µA in 1x mode, with an input voltage of 3V, input frequency of 4kHz, and driving a 15nF piezo. In shutdown mode, the quiescent current is less than 1µA.

The Charge Pump Mode pins, EN1 and EN2, are used to set the charge pump into mode 1xVDD, 2xVDD, 3xVDD, or they can be used to put the PAM8904 into a forced low-current Shutdown Mode. When one or both of the EN pins are pulled high, the device enters the Normal Operation Mode. Once the PAM8904 senses a valid signal on the DIN pin, the charge pump will start and provide the desired voltage on the VOUT pin, and the output drive lines labeled as VO1 and VO2 will become active after a period of between 270µs and 350µs depending on the selected Mode. If a valid signal on the DIN line disappears, the PAM8904 will detect that disappearance and then wait 42ms to ensure its disappearance. If even after this period there is no valid signal on the DIN line, the PAM8904 switches to low-current Standby Mode.

Buzz 3 Click establishes communication with MCU using several GPIO pins routed on the RST, AN, and PWM pins of the mikroBUS™ socket labeled as EN1, EN2, and DIN. There is also a jumper setting available labeled as INT BUZZ used to choose between single-ended and differential load configurations as well as between driving either the onboard piezo-sounder or an externally connected piezo-sounder.

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

Specifications

Type	Speakers
Applications	Can be used for a variety of battery-powered applications, including medical systems, alarm clocks, home appliances, and security devices.
On-board modules	Buzz 3 Click is based on the PAM8904, a piezo-sounder driver with an integrated Multi-Mode charge pump boost converter from Diodes

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.
ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.
ISO 9001: 2015 certification of quality management system (QMS).

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

	Incorporated.
Key Features	Low power consumption, high flexibility, built-in automatic shutdown and wake-up features, higher sound pressure level sound output, integrated charge-pump boost converter, and more.
Interface	GPIO,PWM
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Buzz 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
Charge Pump Mode Pin 1	**EN1**	1	AN	PWM	16	**DIN**	PWM Signal
Charge Pump Mode Pin 2	**EN2**	2	RST	INT	15	NC	
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	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	Power Supply Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	INT BUZZ	Right	Internal Buzzer Activation Selection: Left position OFF, Right position ON
PZ1	INT BUZZER	-	Piezoelectric Buzzer

BUZZ 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.3	-	3.6	V
Maximum Output Voltage	-	-	15	V

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.

ISO 9001: 2015 certification of quality management system (QMS).

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

Input Signal Frequency Range	0.02	4	300	kHz
Operating Temperature Range	-40	-	+85	°C

Software Support

We provide a library for the Buzz 3 Click on our LibStock page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Library Description

The library covers all the necessary functions to control Buzz 3 Click board™. Library performs a standard GPIO interface communication.

Key functions:

- BUZZ3_RETVAL_T buzz3_set_gain_operating_mode (uint8_t op_mode) - Set gain operating mode function.

Examples description

The application is composed of three sections :

- System Initialization - Initializes GPIO, set AN and RST pin as outputs, begins to write a log.
- Application Initialization - Initialization driver enables - GPIO and configures the appropriate MCU pin for sound generation, also write log.
- Application Task - (code snippet) This is an example that demonstrates the use of the Buzz 3 Click board™. This example plays the Imperial March using the sound library. Results are being sent to the Usart Terminal where you can track their changes.

Additional Functions :

- buzz3_sound_init( ) - Configures the appropriate MCU pin for sound generation.
- buzz3_melody( ) - Demo melody - plays Imperial March using Sound library.

The full application code, and ready to use projects can be found on our LibStock page.

Other mikroE Libraries used in the example:

- Sound
- UART

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

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISOQAR REGISTERED
UKAS MANAGEMENT SYSTEMS
ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.
TÜV SÜD ISO 9001
ISO 9001: 2015 certification of quality management system (QMS).

MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

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

Buzz 3 click 2D and 3D files

PAM8904 datasheet

Buzz 3 click schematic

Buzz 3 click example on Libstock

Mikroe produces entire development toolchains for all major microcontroller architectures.
Committed to excellency, we are dedicated to helping engineers bring the project development up to speed and achieve outstanding results.

ISOQAR REGISTERED
UKAS MANAGEMENT SYSTEMS

ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.

TÜV SÜD ISO 9001

ISO 9001: 2015 certification of quality management system (QMS).