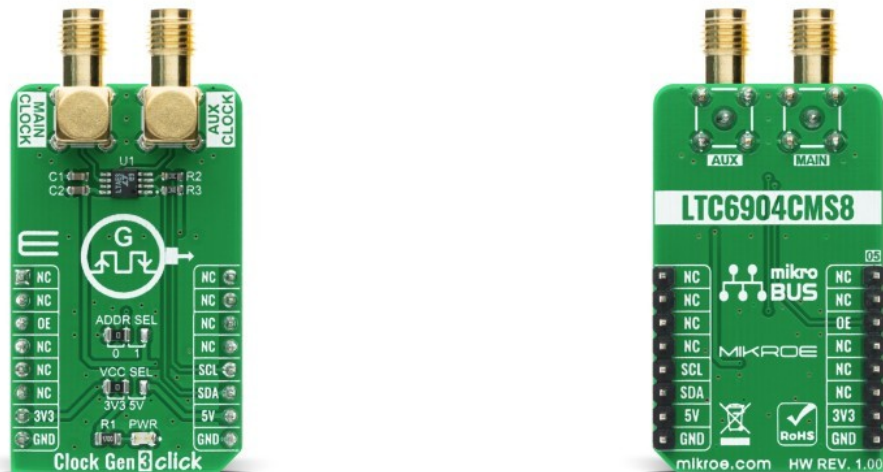


# Clock Gen 3 Click



PID: MIKROE-4171

**Clock Gen 3 Click** features a low power self-contained digital frequency source providing a precision frequency from 1kHz to 68MHz, set through a serial port. This Click board™, an I2C configurable clock generator, features the [LTC6904](#) from [Analog Devices](#) and requires no external components other than a power supply bypass capacitor, and it operates over a single wide supply voltage range of 2.7V to 5.5V. The LTC6904 features a proprietary feedback loop that linearizes the relationship between digital control settings and frequency. It has many features that make it attractive for various applications such as a microcontroller clock source, clock source for a switched capacitor filter, or general replacement for a DAC/VCO combination.

Clock Gen 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?

Clock Gen 3 Click uses the LTC6904 IC, 1kHz to 68MHz Serial Port Programmable Oscillator from Linear Technology. The LTC6904 is a low power self-contained digital frequency source providing a precision frequency from 1KHz to 68MHz, which is set by the I2C interface operating up to 3.4 Mbps. This Click board™ features on-board I2C address jumpers, pull-up resistors, a power supply bypass capacitor, and a power LED. The maximum frequency error is 1.1% or 1.6% when operating with a flexible power supply voltage range from 2.7V to 5V, which makes it suitable for 3.3V and 5V MCUs.

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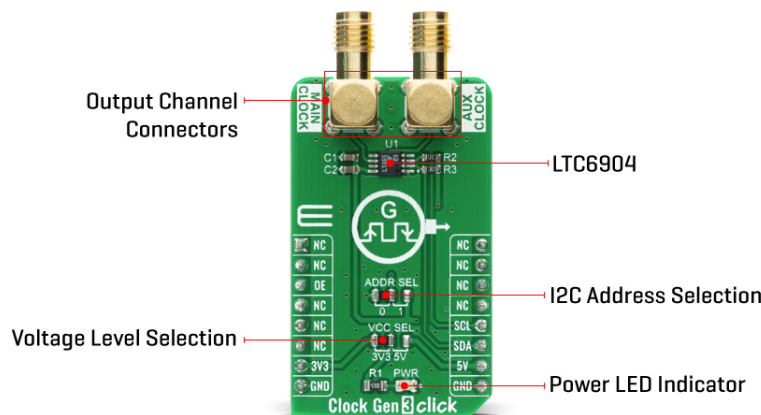
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In most frequency ranges, the output of the Clock Gen 3 Click is generated as a division of the higher internal clock frequency. This helps to minimize jitter and subharmonics at the output of the device. In the highest frequency ranges, the division ratio is reduced, which will result in a greater cycle-to-cycle jitter as well as spurs at the internal sampling frequency. Because the internal control loop runs at 1MHz to 2MHz without regard to the output frequency, output spurs separated from the set frequency by 1MHz to 2MHz may be observed. These spurs are characteristically more than 30dB below the level of the set frequency.

The LTC6904 communicates with the MCU using the standard I2C 2-wire interface. The two bus lines, SDA and SCL, must be HIGH when the bus is not in use. If the I2C interface is not driven with a standard I2C compatible device, care must be taken to ensure that the SDA line is released during the ACK cycle to prevent bus contention. The LTC6904 can respond to one of two 7-bit addresses. The first 6 bits (MSBs) have been factory programmed to 001011. The address pin, ADR (Pin 4) is programmed by the user and determines the LSB of the slave address and it can be selected by an onboard SMD jumper labeled as ADD SEL allowing selection of the slave address LSB.

This Click board™ can be supplied and interfaced with both 3.3V and 5V without the need for any external components. The onboard SMD jumper labeled as VCC SEL allows voltage selection for interfacing with both 3.3V and 5V microcontrollers. More information about the LTC6904 can be found in the attached datasheet. However, this Click board™ comes equipped with a library that contains easy to use functions and an example that may be used as a reference for development.

## Specifications

Type	Clock generator
Applications	Can be used as a microcontroller clock source, clock source for a switched capacitor filter, or general replacement for a DAC/VCO combination.
On-board modules	LTC6904
Key Features	Precision frequency generator from 1KHz to 68MHz, minimal jitter and subharmonics at the output, on-board I2C address jumpers
Interface	GPIO, I2C

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ClickID	No
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V,5V

## Pinout diagram

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

Notes	Pin	mikro™ BUS				Pin	Notes
	NC	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	NC	
Output Enable	<b>OE</b>	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
Power Supply	<b>3.3V</b>	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
JP1	VCC SEL	Right	Power Supply Voltage Selection 3V3/5V, left position 3V3, right position 5V
JP2	ADDR SEL	Left	I2C Address Selection: Left position 0, Right position 1
CN1	CN1	-	Main Clock Output SMA connector
CN2	CN2	-	Auxiliary Clock output SMA connector

## Maximum Ratings (Limiting Conditions)

Description	Min	Typ	Max	Unit
Supply Voltage	2.7	-	5.5	V
SMBus Operating Frequency	10	-	100	kHz
Output Impedance	-	50	-	Ω
Operating Temperature Range	-40	+25	+85	°C

## Software Support

We provide a library for the Clock Gen 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](#).

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## Library Description

The library contains basic functions for working with Clock Generator 3 click.

Key functions:

- void clockgen3\_set\_freq( float freq ) - Sets Frequency
- void clockgen3\_config( uint8\_t cfg ) - Configuration

## Examples description

The application is composed of three sections :

- System Initialization - Initializes I2C module and set GS pin as OUTPUT
- Application Initialization - Initializes driver init and configuration Clock Generator click
- Application Task - Adjusts different frequencies every 3000ms.

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- I2C library
- Conversions Library
- UART Library

## 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

[Clock Gen 3 click 2D and 3D files](#)

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[Clock Gen 3 click example on Libstock](#)

[LTC6904 datasheet](#)

[Clock Gen 3 click schematic](#)

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