

Step Down 7 Click



PID: MIKROE-5754

Step Down 7 Click is a compact add-on board that converts higher voltages into a lower voltages level. This board features the [MAX17624](#), a synchronous step-down converter with integrated MOSFETs from [Analog Devices](#). The converter, as input, uses voltages in the range from 2.9V up to 5.5V and can output step-down voltages from 1.5V to 3.3V up to 1A. It features high efficiency, and depending on the mode of operation, it works at a fixed 4MHz switching frequency. In addition, it comes with undervoltage lockout, overcurrent protection, and thermal overload protection. This Click board™ makes the perfect solution for the development of power conversion solutions in automation and control applications, industrial sensors, test and measurement equipment, portable low-power devices, and more.

How does it work?

Step Down 7 is based on the MAX17624, a synchronous step-down converter with integrated MOSFETs from Analog Devices. The converter uses soft start ramp technology, allowing a smooth output voltage increase. The output voltage is monitored through a resistor divider as feedback. On this Click board™, the resistor divider consists of a resistor, and the [MCP4661T](#), an 8-bit dual digital POT with volatile memory from Microchip. This 50K digital potentiometer has a resistor ladder with ends connected to the analog switches and terminals A and B. The 256 resistors give 257 wiper positions. The potentiometer features high-speed read/write to the wiper and increment/decrement of wiper serial protocols.

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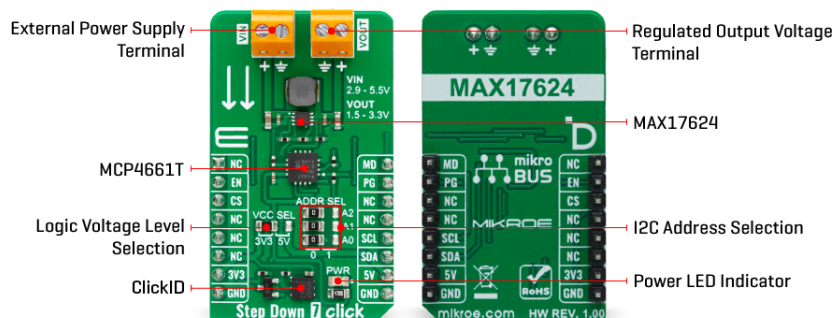
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The MAX17624 has two selectable modes of operation, the PWM and the PFM modes. The PWM mode is used in fixed-frequency operations with a fixed 4MHz switching frequency. This mode allows the device's output current to go negative and is useful in frequency-sensitive applications as it provides fixed switching frequency operations at all loads. The PWM mode gives lower efficiency at light loads compared to a PFM mode of operation. The PFM mode disables the negative output current from the device, and skips pulses at light loads for better efficiency. Another feature of the step-down converter is Power Good, which indicates the output voltage status.

Step Down 7 Click uses I/O pins to communicate with the host MCU. To change to the desired mode, you can set a logic state of the MD pin LOW for the PWM mode of operation; otherwise, the PFM mode is selected. Power Good output can be monitored over the PG pin. With the enabled EN pin, the MAX17624 will first go into soft start mode and, after 1ms, will smoothly increase the voltage. The feedback is provided over the resistor divider and the digital potentiometer, which uses a standard 2-Wire I2C interface to communicate with the host MCU, supporting frequencies of 100KHz, 400KHz, and 3.4MHz. The I2C address can be selected over the combination of the three jumpers, with all of them set to 0 by default.

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

Specifications

Type	Buck
Applications	Can be used for the development of power conversion solutions in automation and control applications, industrial sensors, test and measurement equipment, portable low-power devices, and more
On-board modules	MAX17624 - synchronous step-down converter with integrated MOSFETs from Analog Devices
Key Features	Internal soft start and pre-bias startup, overtemperature protection, overcurrent protection, 100% duty cycle operation, fixed

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	4MHz operation, PWM and PFM mode of operation, adjustable output, up to 1A of output current, digital potentiometer for feedback of the converter, and more
Interface	GPIO,I2C
Feature	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 Step Down 7 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	MD	Mode Selection
Enable	EN	2	RST	INT	15	PG	Power Good Output
ID COMM	CS	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock
	NC	6	MOSI	SDA	11	SDA	I2C Data
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
JP2-JP4	ADDR SEL	Right	I2C Address Selection 0/1: Left position 0, Right position 1

Step Down 7 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Input Voltage	2.9	-	5.5	V
Output Voltage	1.5	-	3.3	V
Output Current	-	-	1	A

Software Support

We provide a library for the Step Down 7 Click as well as a demo application (example),

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developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development boards](#).

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

Library Description

This library contains API for Step Down 7 Click driver.

Key functions

- `stepdown7_set_mode` Step Down 5 mode selection function.
- `stepdown7_get_pg_state` Step Down 5 get PG pin state function.
- `stepdown7_set_output` Step Down 7 set output voltage.

Example Description

This library contains API for the Step Down 7 Click driver. This driver provides the functions to set the output voltage treshold.

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

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.StepDown7

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 MIKROE [compilers](#).

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MIKROE 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™](#)

[ClickID](#)

Downloads

[Step Down 7 click example on Libstock](#)

[Step Down 7 click 2D and 3D files](#)

[Step Down 7 click schematic](#)

[MAX17624 datasheet](#)

[MCP4661 datasheet](#)

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