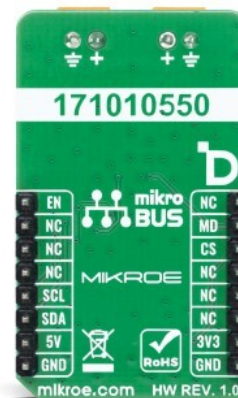
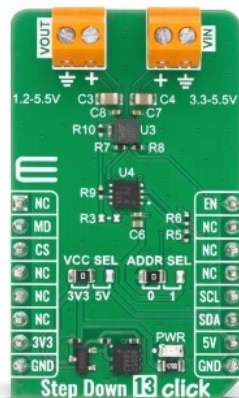


Step Down 13 Click



PID: MIKROE-6846

Step Down 13 Click is a compact add-on board designed to provide digitally configurable DC-DC step-down power conversion for modern embedded and low-power electronic systems. This board is based on the [171010550](#), a VDM MagI³C power module from [Würth Elektronik](#), a highly integrated MicroModule that combines a switching regulator IC, integrated MOSFETs, control circuitry, compensation network, and a shielded inductor in a single package. Featuring a constant on-time control architecture for fast transient response and stable operation, an integrated [MAX5419](#) digital potentiometer for I2C-based output voltage adjustment, a selectable mode pin for optimizing efficiency or output ripple at light load, and built-in thermal, overcurrent, short-circuit, and undervoltage protection, this board offers a reliable and flexible power solution. It is well suited for portable instruments, battery-powered equipment, DSP and FPGA auxiliary supplies, and embedded applications requiring high-efficiency and precisely controlled voltage regulation.

For more information about **Step Down 13 Click** visit the official [product page](#).

How does it work?

Step Down 13 Click is based on the 171010550, a VDM MagI³C power module from Würth Elektronik, which combines a switching regulator IC, integrated MOSFETs, control circuitry, compensation network, and a shielded inductor into a single MicroModule package. The regulation architecture is based on a constant on-time control loop, providing fast transient response and stable operation across a wide range of load conditions. To support flexible and precise output voltage configuration, the module integrates a MAX5419 digital potentiometer that communicates with the host microcontroller through an I2C interface, allowing the output voltage to be adjusted in software without manual intervention. This board offers a reliable

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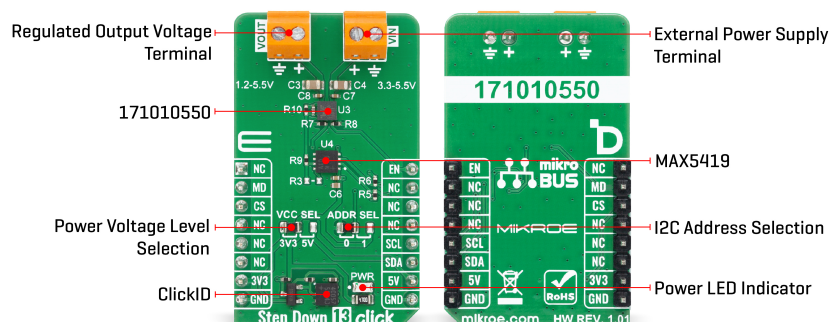


ISO 27001: 2013 certification of informational security management system.
ISO 14001: 2015 certification of environmental management system.
OHSAS 18001: 2008 certification of occupational health and safety management system.



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

point-of-load power solution for portable instruments, battery-powered equipment, and a wide range of embedded applications that demand compact high efficiency and precise voltage control.



Step Down 13 Click operates from an input voltage range of 3.3V to 5.5V and delivers a programmable output voltage from 1.2V up to 5.45V, making it well suited for powering sensitive logic rails, auxiliary voltages for DSPs and FPGAs, and replacing inefficient linear regulators in space- and power-constrained designs. The selectable MD mode pin enables users to choose between maximum efficiency or reduced output voltage ripple at light load, optimizing performance based on the specific application requirements. An EN control pin provides straightforward device enable and shutdown functionality, allowing the power stage to be managed dynamically by the system, while an onboard ADDR SEL jumper simplifies I2C address configuration for multi-device bus environments. To ensure robust and dependable operation, the 171010550 module incorporates comprehensive protection features, including thermal shutdown for safeguarding against overheating, as well as overcurrent, short-circuit, and undervoltage protection mechanisms to prevent electrical stress and system-level failures.

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. Also, this 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	Ideal for portable instruments, battery-powered equipment, DSP and FPGA auxiliary supplies, and embedded applications requiring high-efficiency and precisely controlled voltage regulation
On-board modules	171010550 - MagI ³ C power module from Würth Elektronik
Key Features	Digitally configurable DC-DC step-down power conversion, constant on-time control architecture for fast transient response and stable operation, I2C-controlled output voltage

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	adjustment, selectable mode pin for efficiency or low-ripple operation at light load, device enable and shutdown control, I2C address configuration, and more
Interface	I2C
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V, External

Pinout diagram

This table shows how the pinout on Step Down 13 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	EN	Device Enable
Mode Selection	MD	2	RST	INT	15	NC	
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	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	ADDR SEL	Left	I2C Address Selection 0/1: Left position 0, Right position 1

Step Down 13 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	3.3	-	5	V
Output Voltage	1.2	-	5.45	V

Software Support

[Step Down 13 Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and

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mikromedia boards featuring a [mikroBUS™](#) socket.

Example Description

This example demonstrates how to initialize the Step Down 13 Click board and how to control its output voltage by adjusting the potentiometer value over I2C.

Key Functions

- `stepdown13_cfg_setup` This function initializes Click configuration structure to initial values.
- `stepdown13_init` This function initializes all necessary pins and peripherals used for this Click board.
- `stepdown13_set_cot_mode` This function selects the constant on-time (COT) operating mode by setting the MODE pin.
- `stepdown13_enable_output` This function enables the device output by setting the EN pin.
- `stepdown13_set_vout` This function calculates the required wiper position of the internal digital potentiometer based on the desired output voltage and programs the VREG control register accordingly.

Application Init

Initializes the logger and Step Down 13 Click driver and enables the device in COT mode.

Application Task

Gradually increases and decreases the output voltage across the supported range and logs the current VOUT value. The VIN must always be higher than the VOUT set.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

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[ClickID](#)

Downloads

[Step Down 13 click example package](#)

[Step Down 13 click 2D and 3D files v101](#)

[Step Down 13 click schematic v101](#)

[171010550 datasheet](#)

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