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
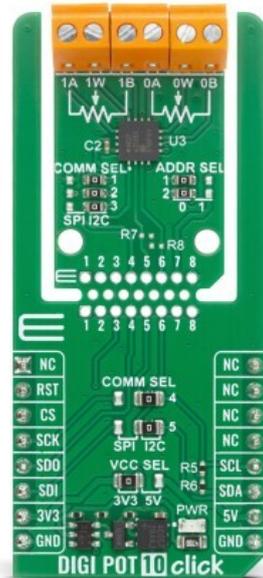www.mikroe.com

DIGI POT 10 Click

PID: MIKROE-6797

DIGI POT 10 Click is a compact add-on board that provides precise programmable resistance control for fine analog signal adjustment, system calibration, and tuning applications. It is based on the MCP42U83-103, a 10-bit dual-channel digital potentiometer from Microchip with a total resistance of 10kΩ. Each channel offers 1,024 programmable steps and includes Multiple-Time Programmable (MTP) nonvolatile memory with up to 1,000 write cycles for storing custom resistance settings. The board supports user-selectable SPI and I2C communication interfaces, a CRC mechanism for data integrity, and flexible configuration options that allow independent or synchronous wiper updates. Featuring MIKROE's innovative Click Snap format, the potentiometer section can be detached and used autonomously, expanding integration possibilities. DIGI POT 10 Click is ideal for applications requiring precision analog adjustment, calibration systems, and signal conditioning in embedded designs.

For more information about **DIGI POT 10 Click** visit the official product page.

How does it work?

DIGI POT 10 Click is based on the MCP42U83-103, a 10-bit dual-channel digital potentiometer from Microchip featuring a total resistance of 10kΩ. Each channel offers 1,023 resistor elements and 1,024 programmable steps, allowing fine-tuned adjustment from zero to full scale. The device includes a Multiple-Time Programmable (MTP) nonvolatile memory capable of 1,000 write cycles, enabling users to store and retain custom resistance configurations even after power loss. The DIGI POT 10 Click is ideal for fine analog control, system calibration, and adaptive signal tuning in embedded applications.
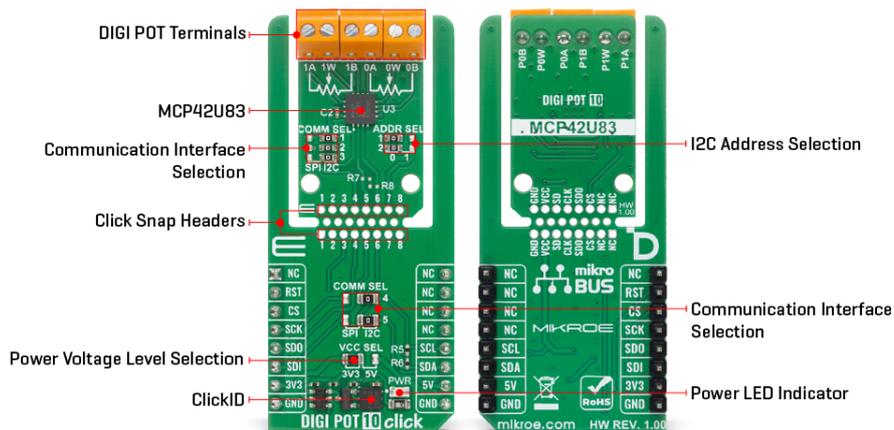
The MCP42U83-103 can operate either as a potentiometer or a rheostat, supporting flexible use across various analog signal conditioning, calibration, or trimming applications. It also integrates a Cyclic Redundancy Check (CRC) mechanism to ensure reliable communication, with the option to enable or disable CRC via software.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the MCP42U83-103 can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

The board supports user-selectable serial communication, operating over either SPI or I2C interface. The SPI interface allows 20 MHz read/write operations with daisy-chain capability for up to 128 devices, while the I2C interface provides communication speeds up to 3.4 MHz for fast data exchange. The communication interface is selected by adjusting the COMM SEL jumpers to the desired position. To enhance flexibility, particularly with the detachable Snap section of the Click Snap format, an additional COMM SEL jumpers are available. These jumpers function the same as the COMM SEL, allowing for independent communication interface selection when the Snap section is used independently. To ensure proper functionality, all COMM jumpers must be set to the same interface. For those using the I2C interface, the board also provides an ADDR SEL jumper, enabling users to configure the I2C address as needed for their specific application.

The MCP42U83-103 includes dedicated commands for software reset and internal registers for monitoring device status. It also provides configurable register bits that define how wiper updates are performed, either independently per channel or synchronously for both channels, along with a dedicated latch bit to store and trigger simultaneous output updates. Additionally, the MCP42U83-103 incorporates three general-purpose MTP memory locations that can store user-defined custom data, as well as counter registers that record the number of MTP writes made to wiper and GP data registers.

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.

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Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the official page dedicated to this feature.

Specifications

Type	Digital potentiometer
Applications	Ideal for applications requiring precision analog adjustment, calibration systems, and signal conditioning in embedded designs
On-board modules	MCP42U83-103 - 10-bit dual-channel digital potentiometer from Microchip
Key Features	10-bit dual-channel digital potentiometer, 10kΩ total resistance, 1,024 programmable steps per channel, Multiple-Time Programmable nonvolatile memory supporting up to 1,000 write cycles, user-selectable communication, SPI daisy-chain support, CRC, configurable as potentiometer or rheostat, options for independent or synchronous wiper updates, Click Snap format, and more
Interface	I2C,SPI
Feature	Click Snap,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 DIGI POT 10 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS			Pin	Notes
	NC	1	AN	PWM	16	NC	
ID SEL	**RST**	2	RST	INT	15	NC	
SPI Select / ID COMM	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	5	MISO	SCL	12	**SCL**	I2C Clock
SPI Data IN	**SDI**	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

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Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1-JP3	COMM SEL	Right	Snap-Side Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C
JP1-JP3	COMM SEL	Right	Snap-Side Communication Interface Selection SPI/I2C: Left position SPI, Right position I2C
JP4-JP5	ADDR SEL	Left	I2C Address Selection 1/0: Left position 1, Right position 0
JP8	VCC SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

DIGI POT 10 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Total Resistance	-	10	-	kΩ
Resolution	-	1024	-	taps

Software Support

DIGI POT 10 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 mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the DIGI POT 10 Click board. The application gradually changes the wiper positions of both potentiometers in opposite directions and logs their values.

Key Functions

- digipot10_cfg_setup This function initializes Click configuration structure to initial values.
- digipot10_init This function initializes all necessary pins and peripherals used for this Click board.
- digipot10_default_cfg This function executes a default configuration of DIGI POT 10 Click board.
- digipot10_set_wiper_0 This function sets the value of wiper 0 volatile register.
- digipot10_set_wiper_1 This function sets the value of wiper 1 volatile register.

Application Init

Initializes the driver, checks communication, and applies the default configuration.

Application Task

Alternately increments and decrements the wiper positions of both channels, while logging their values every second.

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™

ClickID

Downloads

DIGI POT 10 click example package

DIGI POT 10 click 2D and 3D files v100

MCP42U83 datasheet

DIGI POT 10 click schematic v100