DIGI POT 2 Click

PID: MIKROE-2332

DIGI POT 2 Click is a compact add-on board that contains a digitally controlled potentiometer with a resistance of 100KΩ. This board features the TPL0501, a 256-taps single-channel digital potentiometer with an SPI interface from Texas Instruments. It is designed to operate as a variable resistor for analog signals with the voltage range of single-supply operation. The TPL0501 has ±20% resistance tolerance and does not contain non-volatile memory; therefore, it will not remember its last position. This Click board™ makes the perfect solution for the development of mechanical rheostat replacements, in voltage to current conversions, for gain and offset adjustment, sensor timing, calibration, and many more applications.

DIGI POT 2 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?

DIGI POT 2 Click is based on the TPL0501, a 256-taps, single-channel, digital potentiometer with an SPI interface from Texas Instruments. The TPL0501 can be used as a three-terminal potentiometer or a two-terminal rheostat. It has four screw terminals: A High terminal (H), a Low terminal (L), and two Wiper terminals (W), internally connected. The H and L terminals do not have polarity restrictions; H can be a higher voltage than L and vice-versa. The position of the wiper (W) terminal is controlled by the value in the 8-bit wiper resistance register.

There are two functional modes for the DIGI POT 2 Click. When all three terminals are used, the TPL0501 generates a voltage divider, where the voltage divider at wiper-to-H and wiper-to-L is proportional to the input voltage at H to L. It operates in rheostat mode as a variable resistor

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when only two terminals are used. The variable resistance can be anywhere between the H and L terminals depending on the polarity. The nominal resistance between H and L terminals, in this case, is 10KΩ, and the TPL0501 has 256 tap positions of the wiper.

DIGI POT 2 Click communicates with the host MCU using the 3-Wire SPI serial interface as a write-only. The SCK timing frequency maximum is 25MHz.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the PWR 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	Digital potentiometer
Applications	Can be used for the development of mechanical rheostat replacements, in voltage to current conversions, for gain and offset adjustment, sensor timing, calibration, and many more applications.
On-board modules	TPL0501 - digital potentiometer from Texas Instruments
Key Features	256 wiper positions, 100 kilo Ohms end-to-end resistance, no polarity restrictions, voltage divider mode, rheostat mode, ±20% resistance tolerance, SPI interface, low power consumption, and more
Interface	SPI
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on DIGI POT 2 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	
SPI Chip Select	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	6	MOSI	SDA	11	NC	
Power Supply	**3.3V**	7	3.3V	5V	10	**5V**	Power Supply

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).

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| Ground | **GND** | 8 | GND | GND | 9 | **GND** | Ground |

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	PWR SEL	Left	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

DIGI POT 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
End-to-end Resistance	-	-	100	KΩ
Position Resolution	-	-	256	steps

Software Support

We provide a library for the DIGI POT 2 Click as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika 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 DIGI POT 2 Click driver.

Key functions

- digipot2_set_wiper_positions The function sets 8-bit wiper positions data.

- digipot2_convert_output The function convert 10-bit ADC value to volatage reference.

Example Description

The demo application changes the resistance using DIGI POT 2 Click.

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.DigiPot2

Additional notes and informations

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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 MikroElektronika compilers.

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™

mikroBUS™

Click board™ Catalog

Click Boards™

Downloads

DIGI POT 2 click example on Libstock

DIGI POT 2 click schematic

TPL0501 datasheet

DIGI POT 2 click 2D and 3D files