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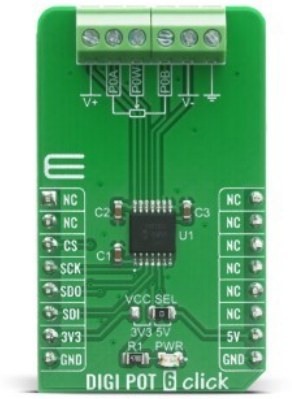
DIGI POT 6 Click



PID: MIKROE-4110

DIGI POT 6 Click is a compact add-on board used as a digitally controlled potentiometer. This board features the MCP41HV51, 8-bit dual power rails digital potentiometer with SPI serial interface and volatile memory from Microchip. The MCP41HV51 has a wide operating voltage range, analog from 10 to 36V and digital from 2.7 to 5.5V or implemented as dual-rail (±18V). Its 8-bit configuration supports 255 resistors and 256 steps and provides RAB resistance options of 100 kΩ. It also has a Write Latch function, which will inhibit the volatile wiper register from being updated with the received data. This Click board™ is suitable for precision calibration of set point thresholds, adjustable power supplies, adjustable gain amplifiers and offset trimming, and more.

DIGI POT 6 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 6 Click as its foundation uses the MCP41HV51, 8-bit dual power rails digital potentiometer with SPI serial interface and volatile memory from Microchip. It has a wide operating voltage range, analog from 10 to 36V and digital from 2.7 to 5.5V or implemented as dual-rail (±18V) for systems requiring wide signal swing or high power-supply voltages. It supports resistor configurations of 255 resistors and 256 steps and high terminal/wiper current, including the ability to sink/source up to 25mA on all terminal pins for driving larger loads.

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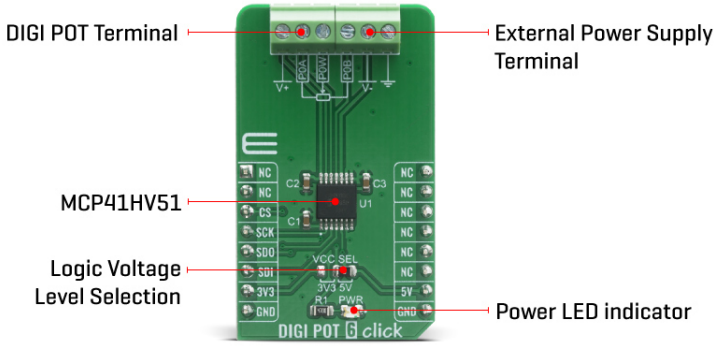

The resistor network of the MCP41HV51 has an 8-bit resolution where each resistor network allows Zero-Scale to Full-Scale connections. All these features combined with an extended temperature range make the MCP41HV51 well suited for a broad range of high-voltage and high-temperature applications, including those in the industrial, automotive, and audio markets.

DIGI POT 6 click communicates with MCU using the SPI serial interface with a maximum frequency of 10MHz and supports the two most common SPI modes, 0 and 3. This Click board™ also has three terminals labeled as P0A, P0B, and P0W, with an internal architecture that comprises various resistances and switches. The resistance between terminals A and B, RAB, commonly called the “end-to-end” resistance, provides RAB resistance options up to 100 kΩ. In contrast, the wiper terminal, P0W, is digitally programmable to access any 2n tap points on the resistor string.

This Click board™ can operate with both 3.3V and 5V logic voltage levels selected via the VCC SEL jumper. This way, it is allowed for both 3.3V and 5V capable MCUs to properly use the SPI communication lines. 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 precision calibration of set point thresholds, adjustable power supplies, adjustable gain amplifiers and offset trimming, and more.
On-board modules	MCP41HV51 - 8-bit dual power rails digital potentiometer with SPI serial interface and volatile memory from Microchip.
Key Features	Wide operating voltage range, configurable resistance options, Zero-Scale to Full-Scale wiper operation, low wiper resistance, and more.
Interface	SPI

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Feature	No 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 DIGI POT 6 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	
	NC	2	RST	INT	15	NC	
SPI Chip Select	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT	**SDO**	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
Ground	**GND**	8	GND	GND	9	**GND**	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

DIGI POT 6 Click electrical specifications

Description	Min	Typ	Max	Unit
Digital Supply Voltage	3.3	-	5	V
Analog Supply Voltage	10	-	36	V
Maximum Output Current	-	-	25	mA
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the DIGI POT 6 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.

Library Description

The library covers necessary functions that enable the usage of the DIGI POT 6 Click board™. User can read and write data to and from Volatile Wiper 0 and Volatile TCON Register or issue increment and decrement commands to Volatile Wiper 0. User can also Connect/Disconnect Resistor 0 Terminal A, Resistor 0 Terminal B, Resistor 0 Wiper and Resistor 0 Hardware

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Configuration Control.

Key functions:

- void digipot6_write_data (uint8_t reg_adr, uint8_t wr_byte) - Function is used to write single byte of data into user defined register.
- uint8_t digipot6_read_data (uint8_t reg_adr); - Function is used to read single byte of data from user defined register.
- void digipot6_set_r0hw (uint8_t state); - Function is used to force Resistor 0 into the “shutdown” configuration.

Examples description

The application is composed of three sections :

- System Initialization - Initializes SPI module and LOG structures.
- Application Initialization - Initalizes SPI and device drivers, wakes up the device and connects terminal A, terminal B and wiper to the resistor 0 network.
- Application Task - Demonstrates use of DIGI POT 6 Click board™ by setting wiper to step 0, then going through the steps, fifteen at a time and displaying data via USART terminal.

The full application code, and ready to use projects can be found on our LibStock page.

Other mikroE Libraries used in the example:

- SPI
- UART
- Conversions

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

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Click Boards™

Downloads

DIGI POT 6 click 2D and 3D files

DIGI POT 6 click example on Libstock

MCP41HVX1 datasheet

DIGI POT 6 click schematic

Mouser Electronics

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MIKROE-4110