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Joystick 3 Click





PID: MIKROE-5378

Joystick 3 Click is a compact add-on board that can fulfill your directional analog input needs. This board features 2765, a high-quality mini 2-axis analog output thumbstick from Adafruit Industries. This small joystick is a 'self-centering' analog-type with a black rocker cap similar to the PSP joysticks. It comprises two 10kΩ potentiometers, one for up/down and another for left/right direction. Knowing that this joystick represents an analog type, it connects with mikroBUS™ through the SPI interface through the MCP3204 12-bit A/D converter. This Click board™ is suitable for numerous applications as a human-machine interface device (HMI), robotics, and other control interfaces.

Joystick 3 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?

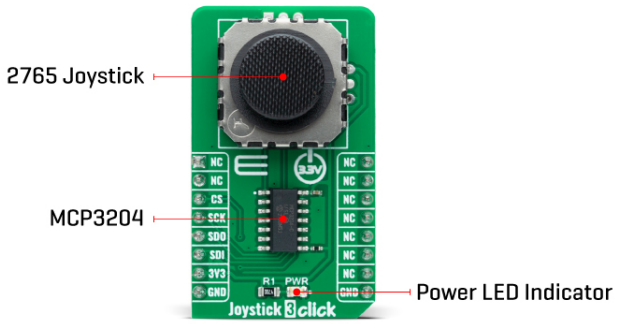
Joystick 3 Click, as its foundation, uses 2765, a high-quality mini 2-axis analog-type thumbstick from Adafruit Industries. This type of joystick has a self-centering feature that allows it to center itself the moment when you release the joystick. It also contains a comfortable cup-type black knob/cap, which gives the feel of a thumbstick, making it very similar to the ‘analog’ joysticks on PSP joysticks, suitable for numerous applications as a human-machine interface.

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It comprises two 10kΩ potentiometers, one for up/down and another for left/right direction, used as dual adjustable voltage dividers providing 2-axis analog input in a control stick form. With the joystick fully assembled and functioning, the voltage will follow the motion of the thumbstick as it is moved around.

The measurements of the potentiometer resistance change are needed to read the joystick's physical position. That's why the MCP3204, a 12-bit A/D converter from Microchip, connects the joystick with mikroBUS™ using a simple serial interface compatible with the SPI protocol to determine the value of the joystick's X and Y. As the MCP3204 has a resolution of 12 bits, the values on each analog channel (axis) can vary from 0 to 4095. So, if the stick is moved on the X axis from one end to the other, the X values will change from 0 to 4095, and a similar thing happens when moved along the Y axis. The value of the joystick staying in its center position is around 2048. Also, the MCP3204 is capable of conversion rates of up to 100ksps.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Pushbutton/Switches
Applications	Can be used for numerous applications as a human-machine interface device (HMI), robotics, and other control interfaces
On-board modules	2765 - mini 2-axis analog-type thumbstick from Adafruit Industries
Key Features	Low power consumption, high quality, high mechanical and electrical durability, self-centering feature, 2-axis, SPI interface, and more
Interface	SPI
ClickID	No
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)

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Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Joystick 3 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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Joystick 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
2765 Potentiometer Resistance	-	10	-	kΩ
ADC Resolution	-	12	-	bits
Operating Temperature Range	0	+25	+80	°C

Software Support

We provide a library for the Joystick 3 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 way), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for Joystick 3 Click driver.

Key functions

- joystick3_read_raw_adc This function reads the raw ADC for X and Y axis by using SPI serial interface.
- joystick3_get_angle This function calculates and returns joystick angle in degrees from raw ADC values for X and Y axis.

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- joystick3_get_position This function calculates and returns joystick position flag from raw ADC values for X and Y axis.

Example Description

This example demonstrates the use of the joystick 3 Click board™ by reading and displaying the raw ADC for X and Y axis, as well as the joystick angle and position calculated from those ADC readings.

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

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Joystick3

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 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™

mikroSDK

Click board™ Catalog

Click Boards™

Downloads

Joystick 3 click example on Libstock

MCP3204 datasheet

2765 datasheet

Joystick 3 click 2D and 3D files

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Joystick 3 click schematic

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