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Tilt 3 Click

PID: MIKROE-4779

Tilt 3 Click is a compact add-on board used for measuring the tilt in multiple axes in relation to an absolute level plane. This board features the DSBA1P, a tilt sensor switch that breaks the circuit when tilted to an angle from ±30° to ±60° from NKK Switches. The DSBA1P is a non-contact switch with an embedded photo-interrupter that ensures high reliability, with a 1 million operation minimum. It is also very durable, sealed in the DSB construction for protection from environmental elements. This Click board™ is suitable for many applications where orientation or inclination detection is a crucial factor.

Tilt 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?

Tilt 3 Click as its foundation uses the DSBA1P, a PCB mount tilt switch sensor with ammonia-resistant terminals from NKK Switches. This switch is a non-contact switch with an embedded photo interrupter, which rather than contacts, ensures high reliability. It has sealed DSB construction for protection from environmental elements, including hydrogen sulfide, sulfur dioxide, and nitrogen hydroxide. These switch series are well suited to meet product safety concerns due to normally-closed (ON) status and can be used for many applications where orientation or inclination detection is crucial.

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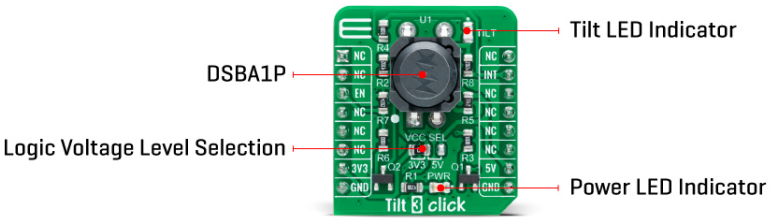

This tilt sensor works by detecting changes in angle from a pre-set “zero” state. They are set with a maximum and minimum threshold in which the application will work (from ±30° to ±60°) or be safe to operate based on the specific application’s needs. If the tilt or inclination exceeds these threshold values in either direction, a relay will be engaged, and the switch closed.

Tilt 3 Click communicates with MCU using two GPIO pins. The Enable pin, labeled as EN and routed to the CS pin of the mikroBUS™ socket, optimizes power consumption and is used for power ON/OFF purposes (driver operation permission). It also has an additional LED for exceeded angle threshold indication. In that case, such a condition is indicated by a red LED marked as TILT, which is also connected to the interrupt INT pin through which the user can receive the information, which, in addition to a LED, indicates unsafe or non-working conditions.

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 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	Motion
Applications	Can be used for many applications where orientation or inclination detection is a crucial factor
On-board modules	DSBA1P - PCB mount tilt switch sensor with ammonia-resistant terminals from NKK Switches
Key Features	Low power consumption, operation angle from ±30° to ±60°, 1 million operation minimum, very durable, sealed in the DSB construction for protection from environmental elements, possesses exceeded angle threshold indication, and more
Interface	GPIO

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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 Tilt 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	**INT**	Interrupt
Enable	**EN**	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	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
LD2	TILT	-	Tilt LED Indicator
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

Tilt 3 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Operating Angle Range	±30	-	±60	deg
Return Angle	-	10	-	deg
Mechanical/Electrical Life Cycle	1.000.000	-	-	operations
Operating Temperature Range	-25	+25	+85	°C

Software Support

We provide a library for the Tilt 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.

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Library Description

This library contains API for Tilt 3 Click driver.

Key functions:

- tilt3_cfg_setup - Config Object Initialization function.
- tilt3_init - Initialization function.

Examples description

This example demonstrates the use of Tilt 3 Click board™.

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.Tilt3

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

Click boards™

Downloads

Tilt 3 click schematic

Tilt 3 click 2D and 3D files

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DSBA1P datasheet

Tilt 3 click example on Libstock

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