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2x2 Key click

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PID: MIKROE-2152

Weight: 24 g

2x2 Key click has a 4 button keypad.

The click allows multiple key presses and has a debounce circuit composed of 74HC32 quad 2-input OR gate from NXP and the SN74HC14 Hex Schmitt-Trigger Inverter from Texas Instruments. 2x2 Key click is designed to use either 3.3V or 5V power supply. The buttons can be independently read.

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Debounce circuit

In electronics, two metal components tend to bounce or create multiple signals when they are in contact with each other — like when you push a button — before they get to a stable state. You want a single contact to be recorded, but the microcontroller records this as if you pressed the button many times.

So debouncing is, as the name states, the removal of bounces or spikes of low and high voltages. Graphically speaking, you want a clean line, not spikes. A debounce circuit makes sure that there are no voltage changes on the output. Thanks to it, one button press is recorded as such.

Interrupt service routine

All four Schmitt-trigger outputs are connected to input pins of the logic OR gate 74HC32, whose output is directly connected to the INT pin on mikroBUS. This pin is used to signalize an interrupt to the MCU any time a button is pressed.

In this way, the MCU software can be implemented as a simple polling

routine, without any delays programmed in the code (like it would be necessary if there wasn't a hardware debouncing circuit present).

Thanks to the INT pin you can easily program a common interrupt service routine, in order to detect when a button is pressed (the state of the button changes from low to high logic level).

Specifications

Type	Joystick
Applications	Human machine interface applications
On-board modules	74HC32 quad 2-input OR gate from NXP and the SN74HC14 Hex Schmitt-Trigger Inverter from Texas Instruments
Key Features	74HC32 quad 2-input OR gate, SN74HC14 Hex Schmitt-Trigger Inverte
Key Benefits	4 black PCB buttons onboard
Interface	GPIO
Input Voltage	3.3V or 5V
Compatibility	mikroBUS
Click board size	M (42.9 x 25.4 mm)

Additional information

- J2 is the interrupt enable pin (by default it is in the enable status).

- J1 is the power selection pin.

Pinout diagram

This table shows how the pinout on 2x2 Key click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
When button T1 is pressed the pin is active	T1-OUT	1	AN	PWM	16	T4-OUT	When button T4 is pressed the pin is active
When button T2 is pressed the pin is active	T2-OUT	2	RST	INT	15	TINT	Interrupt pin that notifies the MCU that a button is pressed
When button T3 is pressed the pin is	T3-OUT	3	CS	TX	14	NC	

		active								
		NC	4	SCK	RX	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

Programming

The demo initialises the TFT display and sets pins to operate in input direction. The main fucntion of the demo uses the polling method to check if inputs are on an active level. The TFT display shows the button state according to detect level.

```
1  void main()
2  {
3      system_init();
4
5      Draw_Taster(X1, Y1, RELEASED, "T1");
6      Draw_Taster(X2, Y1, RELEASED, "T2");
7      Draw_Taster(X1, Y2, RELEASED, "T3");
8      Draw_Taster(X2, Y2, RELEASED, "T4");
9
10     while(1)
11     {
12         if(Taster_Pressed(TAST1, &t1_state))
13             Draw_Taster(X1, Y1, PRESSED, "T1");
14
15         if(Taster_Released(TAST1, &t1_state))
16             Draw_Taster(X1, Y1, RELEASED, "T1");
17
18         if(Taster_Pressed(TAST2, &t2_state))
19             Draw_Taster(X2, Y1, PRESSED, "T2");
20
21         if(Taster_Released(TAST2, &t2_state))
22             Draw_Taster(X2, Y1, RELEASED, "T2");
23
24         if(Taster_Pressed(TAST3, &t3_state))
25             Draw_Taster(X1, Y2, PRESSED, "T3");
26
27         if(Taster_Released(TAST3, &t3_state))
28             Draw_Taster(X1, Y2, RELEASED, "T3");
29
30         if(Taster_Pressed(TAST4, &t4_state))
31             Draw_Taster(X2, Y2, PRESSED, "T4");
32
33         if(Taster_Released(TAST4, &t4_state))
34             Draw_Taster(X2, Y2, RELEASED, "T4");
35
36         t1_state = TAST1;
37         t2_state = TAST2;
38         t3_state = TAST3;
39         t4_state = TAST4;
40
41         Delay_ms(POLLING_PERIOD);
42     }
43 }
```

Downloads

📄 mikroBUS™ Standard specification ↗

🗄 LibStock: 2x2 Key click Examples ↗

📄 SN74HC14 datasheet

📄 74HC32 datasheet

📄 2x2 Key click schematic

📄 Click Boards™ Catalog

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