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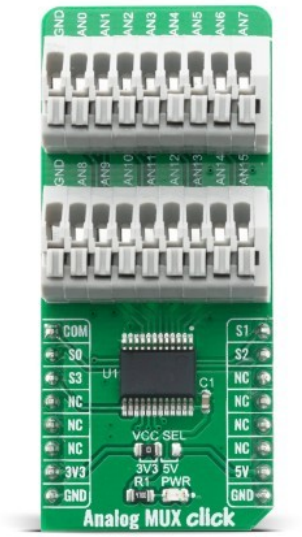
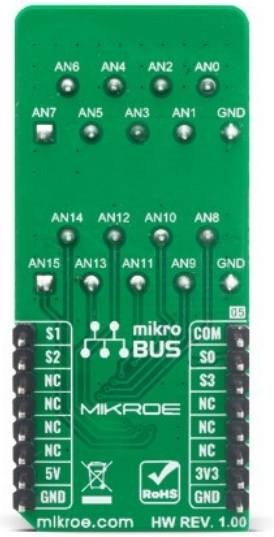
Analog MUX Click





PID: MIKROE-4111

Analog MUX Click is a Click board™ that switches one of the sixteen inputs to one output. It employs the CD74HC4067, a High-Speed CMOS Logic 16-Channel Analog Multiplexer/Demultiplexer, produced by Texas Instruments. It offers rail-to-rail operation, allowing the input signal to swing up (and down) to the voltage of the power supply, with no distortion. Features such as the low on-resistance and low input current leakage, fast and balanced propagation delay and transition times and break-before-make switching action make this circuit a perfect solution for various switching applications, analog and digital signals.

Analog MUX 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?

Analog MUX click is equipped with the CD74HC4067, a high-speed CMOS logic 16-channel analog multiplexer/demultiplexer, produced by Texas Instruments. It supports 3.3V and 5V power supplies, as well as rail to rail operation, which allows it to be used in a very wide range of different applications. Four control pins are used to switch one of sixteen inputs to a single output. Control pins labeled as S0, S1, S2, and S3 are routed to the mikroBUS™ and can be operated by both 3.3V and 5V MCUs. These pins are routed to RST, PWM, INT, and CS pins of the mikroBUS™ respectively, while the common output pin from the multiplexer is routed to the AN pin on the mikroBUS™.

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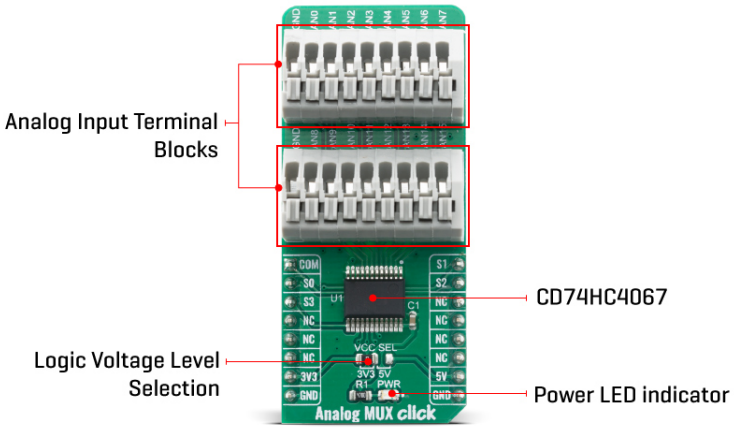

The CD74HC4067 IC is digitally controlled analog switch that utilize silicon-gate CMOS technology to achieve operating speeds similar to LSTTL, with the low power consumption of standard CMOS integrated circuits. The mentioned analog multiplexer/demultiplexer control analog voltages that may vary across the voltage supply range.

The ultra-low leakage current ensures that there is no signal interference from the inputs that are not selected by the S0, S1, S2, and S3 pins. A low crosstalk also ensures that the signal on one channel remains clean of interferences caused by other channels. To prevent any two inputs to be switched at the output at the same time, a break-before-make switching action is utilized. This ensures a reliable operation of the IC and the Click board™ itself. Analog MUX click is bidirectional switch as well, thus allowing any analog input to be used as an output and vice-versa. The switches have low “on” resistance and low “off” leakages.

All of the input channels can be easily connected to the two 9 pole spring action block terminals, without having to use any additional tools, such as screwdrivers.

More information about the CD74HC4067 can be found in the attached datasheet. However, the Click board™ comes equipped with a library that contains easy to use functions and a usage example that may be used as a reference for the development.

Analog MUX Click offers a selection between 3.3V and 5V operation, with the onboard SMD jumper, labeled as PWR SEL. This allows both 3.3V and 5V MCUs to be interfaced with this Click board™.

Specifications

Type	Measurements,Port expander
Applications	Automatization and process control, programmable logic controllers, digital multimeters, battery monitoring, and other applications that require analog signal switching.
On-board modules	CD74HC4067, a high-speed CMOS logic 16-channel analog multiplexer/demultiplexer, produced by Texas Instruments.
Key Features	low on-resistance and low input current

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	leakage, fast and balanced propagation delay and transition times, break-before-make switching action
Interface	GPIO
ClickID	No
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on Analog MUX Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Common output pin	**COM**	1	AN	PWM	16	**S1**	Control pin 1
Control pin 0	**SO**	2	RST	INT	15	**S2**	Control pin 2
Control pin 3	**S3**	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
JP1	VCC SEL	Left	Power Supply Voltage Selection 3V3/5V, left position 3v3, right position 5v
TB1, TB2	-	-	Input 9 pole spring action terminals

Analog MUX Click electrical specifications

Description	Min	Typ	Max	Unit
VCC	2	3.3	6	V
“ON” Resistance		70		Ω
Input Rise and Fall Time		500		ns

Software Support

We provide a library for the Analog MUX 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

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This library allows user to perform a control of the Analog MUX Click board. Also user can check the indication status from the charger to get charging state. Fault condition also can be checked. For more details check documentation.

Key functions:

- float analogmux_get_voltage (float adc_value); - Function used for get voltage
- void analogmux_set_channel (uint8_t set_channel); - Function used for set channel
- void analogmux_set_adc_vref (uint16_t vref_mV); - Function used for set vref in millivolts

Examples description

The application is composed of three sections :

- System Initialization - Initializes ADC module
- Application Initialization - Initializes driver and adc, and set vref and channel.
- Application Task - (code snippet) - Measures adc_value and voltage every 2 sec on set channel.

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

Other mikroE Libraries used in the example:

- ADC

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

Analog Mux click 2D and 3D files

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[CD74HC4067 datasheet]

[Analog Mux click example on Libstock]

[Analog Mux click schematic]

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