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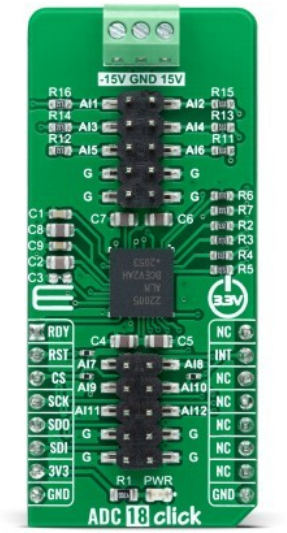
ADC 18 Click



PID: MIKROE-5132

ADC 18 Click is a compact add-on board that contains a high-performance data converter. This board features the MAX22005, an SPI-configurable twelve-channel 24-bit analog-to-digital converter (ADC) from Analog Devices. Input channels can be used as twelve single-ended, six differential, and up to eight multichannel configurable differential inputs. In total, the device supports up to 26 different configurations. The ADC is used with an integrated 5ppm/°C precision reference. Using high-voltage, zero-drift input amplifiers, standard industrial analog input voltage ranges are converted to the ADC input voltage range. This Click board™ offers high accuracy for the most demanding applications, from general-purpose remote data acquisition to industrial applications.

ADC 18 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?

ADC 18 Click as its foundation uses the MAX22005, a high-performance twelve-channel analog-to-digital converter from Analog Devices. The MAX22005 comes with an integrated 24-bit delta-sigma ADC, input multiplexer, signal conditioning, and control logic block allowing ADC to communicate with MCU through a high-speed serial interface. An integrated delta-sigma ADC is shared between all channels with an integrated 5ppm/°C precision reference. Using high-voltage, zero-drift input amplifiers, standard industrial analog input voltage ranges are converted to the ADC input voltage range.

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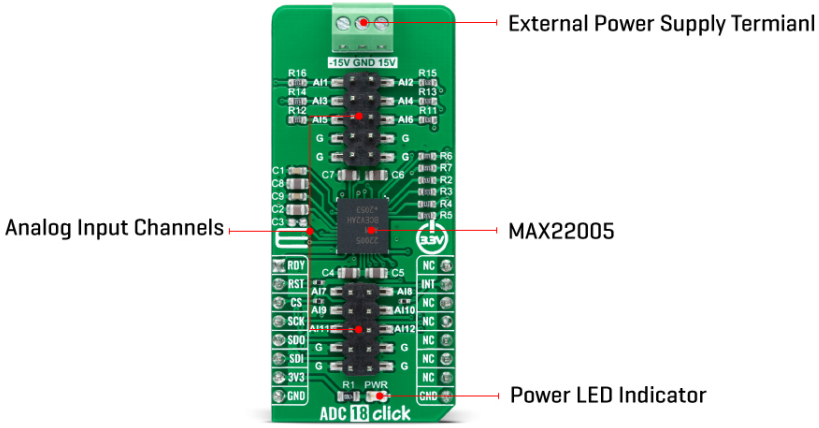

Input channels can be used as twelve single-ended, six differential, and up to eight multichannel configurable differential inputs. In total, the device supports up to 26 different configurations. The MAX22005 can also be configured as an analog-input current-mode device using an external precision resistor per channel or configurable analog-input using an external precision resistor and low-cost switch per channel. All input ports are robustly protected up to ±36V reverse polarity and ±2kV surge pulses without the need for TVS diodes and factory calibrated with a best-in-class system performance of less than 0.05% FSR Total-Unadjusted-Error (TUE) over temperature.

ADC 18 Click communicates with MCU through a standard SPI interface and operates at clock rates up to 30MHz, for all configurations and information management and acquiring conversion results. In addition, it also uses several mikroBUS™ pins. An active-low reset signal routed on the RST pin of the mikroBUS™ socket activates a hardware reset of the system, while the INT pin on the mikroBUS™ socket represents a standard interrupt feature providing a user with feedback information. It also has an additional data ready interrupt marked as RDY and routed on the AN pin of the mikroBUS™ socket, used to signal when a new ADC conversion result is available in the data register.

This Click board™ can be operated only with a 3.3V logic voltage level. It also has an analog inputs external power supply terminal where it is necessary to bring ±15V to accept ± 10V inputs, whose full-scale range is ± 12.5V. 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	ADC
Applications	Can be used for the most demanding applications, from general-purpose remote data acquisition to industrial applications
On-board modules	MAX22005 - twelve-channel analog-to-digital converter from Analog Devices
Key Features	Factory-calibrated configurable industrial-analog input, high accuracy, software configurability, 24-bit sigma-delta ADC, low

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	power consumption, high-speed serial interface, high performance, and more
Interface	SPI
ClickID	No
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V,External

Pinout diagram

This table shows how the pinout on ADC 18 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Data Ready	**RDY**	1	AN	PWM	16	NC	
Reset	**RST**	2	RST	INT	15	**INT**	Interrupt
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
J1-J2	-	Populated	Analog Input Channel Headers

ADC 18 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Input-Voltage Range	-	±15	-	V
Resolution	-	24	-	bits
Operating Temperature Range	-40	+25	+120	°C

Software Support

We provide a library for the ADC 18 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

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This library contains API for ADC 18 Click driver.

Key functions

- adc18_set_active_channel This function sets the active channel.
- adc18_start_conversion This function starts the conversion with the selected data rate.
- adc18_read_voltage This function reads RAW ADC value of previous conversion and converts it to voltage.

Example Description

This example demonstrates the use of ADC 18 Click board™ by reading the voltage from 12 analog input single-ended channels.

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.ADC18

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

ADC 18 click example on Libstockck

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ADC 18 click schematic

MAX22005 datasheet

ADC 18 click 2D and 3D files

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