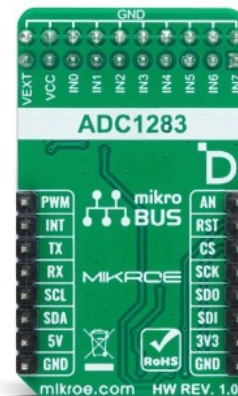


ADC 21 Click



PID: MIKROE-5531

ADC 21 Click is a compact add-on board that converts an analog voltage into a digital representation. This board features the ADC1283, a low-power, eight-channel pure CMOS 12-bit analog-to-digital converter from STMicroelectronics. The ADC1283 is specified for conversion from 50ksps to 200ksps. Its architecture is based on a successive approximation register with an internal track-and-hold cell. It features eight single-ended multiplexed inputs, where the output serial data is straight binary and SPI-compatible. This Click board™ offers high accuracy for the most demanding applications, from general-purpose remote data acquisition and instrumentation to industrial applications.

How does it work?

ADC 21 Click is based on the ADC1283, a high-performance eight-channel analog-to-digital converter from STMicroelectronics. The ADC1283 implements a successive approximation register (SAR) structure to convert analog signals into 12-bit pure binary digital outputs. The conversion circuit includes a fast settling time comparator to convey instruction into the register to store digital 0 or 1 and a redistribution DAC with logic control to have the ADC compare the track signal with a reference signal at each clock cycle.

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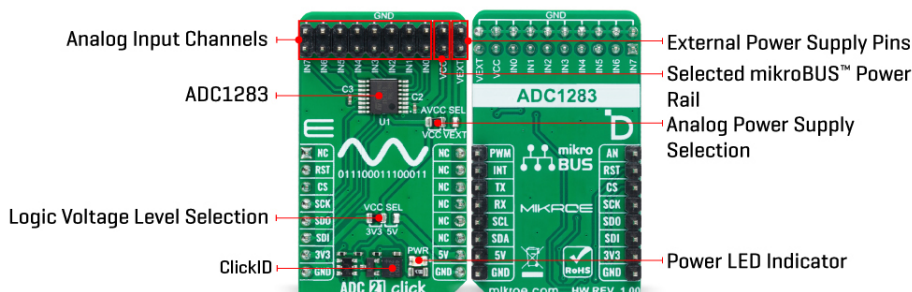
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ADC 21 Click communicates with MCU through a standard SPI interface and operates at clock rates up to 3.2MHz, for all configurations and acquiring conversion results. The AD conversion is carried out in two phases. The sampling phase conveys the input signal through the capacitance array for the first three clock cycles, and then, the evaluation phase performs the conversion into a digital 12-bit signal within 13 clock cycles. At each clock cycle of the evaluation phase, the hold signal is compared with a new value distributed by the DAC, and the result is stored in the 12-bit register, with MSB first. A complete conversion requires 16 clock cycles to generate a new 12-bit word on the SDO pin on the mikroBUS™ socket.

This Click board™ can operate with either 3.3V or 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. Additionally, there is a possibility for the ADC1283 analog power supply selection via jumper labeled AVCC SEL to supply the ADC1283 from an external power supply in the range from 2.7V to 5.5V or with mikroBUS™ power rails. 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	ADC
Applications	Can be used for the most demanding applications, from general-purpose remote data acquisition and instrumentation to industrial applications
On-board modules	ADC1283 - eight-channel analog-to-digital converter from STMicroelectronics
Key Features	Low power consumption, high accuracy, high-speed serial interface, high performance, selectable conversion rate, 12-bit SAR-based ADC, selectable analog power supply, and more
Interface	SPI
Feature	ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)

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Input Voltage	3.3V or 5V
---------------	------------

Pinout diagram

This table shows how the pinout on ADC 21 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
	NC	1	AN	PWM	16	NC	
ID SEL	RST	2	RST	INT	15	NC	
SPI Select / ID COMM	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	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	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	AVCC SEL	Left	Analog Power Supply Selection VCC/VEXT: Left position VCC, Right position VEXT
J1	-	Populated	Analog Input Channels Header

ADC 21 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Analog Power Supply Voltage	2.7	-	5.5	V
Resolution	-	12	-	bits
Data Rate	50	-	200	ksps

Software Support

We provide a library for the ADC 21 Click as well as a demo application (example), developed using MIKROE [compilers](#). The demo can run on all the main MIKROE [development boards](#).

Package can be downloaded/installed directly from NECTO Studio Package Manager (recommended), downloaded from our [LibStock™](#) or found on [MIKROE github account](#).

Library Description

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This library contains API for ADC 21 Click driver.

Key functions

- `adc21_read_raw_adc` This function reads raw ADC value from the selected channel by using SPI serial interface.
- `adc21_read_voltage` This function reads raw ADC value from the selected channel and converts it to proportional voltage level depending on the avcc selection.

Example Description

This example demonstrates the use of ADC 21 Click board™ by reading and displaying the voltage levels from 8 analog input channels.

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

Other MikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.ADC21

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 MIKROE [compilers](#).

mikroSDK

This Click board™ is supported with [mikroSDK](#) - MIKROE Software Development Kit, that needs to be downloaded from the [LibStock](#) and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the [official page](#).

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click Boards™](#)

[ClickID](#)

Downloads

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[ADC 21 click example on Libstock](#)

[ADC 21 click 2D and 3D files v100](#)

[ADC1283 datasheet](#)

[ADC 21 click schematic v100](#)

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