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ADC 22 Click





PID: MIKROE-5640

ADC 22 Click is a compact add-on board with a high-performance data converter. This board features the ADS8665, a high-speed single-supply SAR ADC data acquisition system with programmable bipolar input ranges from Texas Instruments. It features a high-speed, high-precision A/D converter based on successive approximation (SAR). This 12-bit resolution ADC with an integrated analog front-end (AFE) input driver circuit can achieve speeds of up to 500ksps. This Click board™ makes the perfect solution for the development of analog input modules, mixed modules (AI, AO, DI, DO), data acquisition (DAQ), trackside signaling and control, and more.

ADC 22 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?

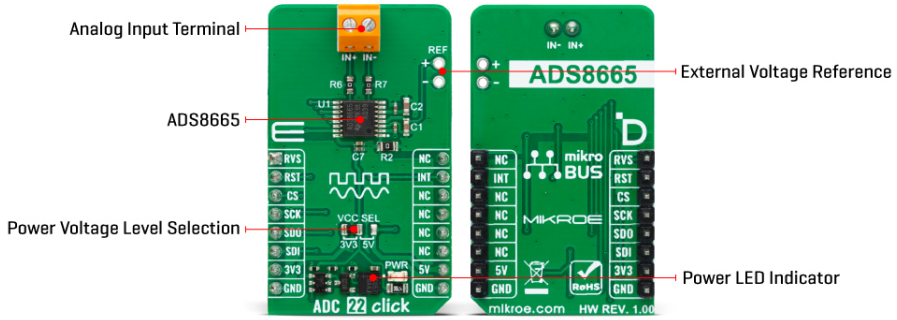
ADC 22 Click is based on the ADS8665, a 12-bit high-speed single-supply SAR ADC data acquisition system with programmable bipolar input ranges from Texas Instruments. This ADC operates on a single 5V supply used from the mikroBUS™ power rail and supports true bipolar input ranges of ±12.288V, ±6.144V, ±10.24V, ±5.12V, and ±2.56V, as well as unipolar input ranges of 0 to 12.288V, or 10.24V, 6.144V, and 5.12V. The gain and offset errors are accurately trimmed within specified values to ensure a high DC precision for each input range. The input range selection is made by software.

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The ADC features an overvoltage protection circuit of up to ±20V and an on-chip 4.096V reference with extremely low-temperature drift. In addition, ADC 22 Click is equipped with an external voltage reference REF header which allows you to apply voltages to ADS8665 ADC from 4.046 up to 4.146V. You can separate the grounds for external voltage reference usage by desoldering the NET TIE R2 resistor.

The ADC 22 Click features alarm functions that consist of an input alarm and an AVDD supply alarm. The alarm function should be enabled over the software, thus enabling both alarm functions by default. You can later separately disable one of them. Another neat feature of this Click board™ is the RVS multi-function output pin, which regarding the CS pin status, can reflect the status of the internal ADCST signal or the status of the RVS depending on the output protocol selection. The device allows the output clock on the RVS pin to be synchronous to either the external clock provided on the SCLK pin or to the device's internal clock. In all SRC modes of operation, the RVS pin provides the output clock, synchronous to the device data output. The RVS pin can be monitored for timing benefits.

ADC 22 Click uses a standard 4-Wire SPI serial interface to communicate with the host MCU supporting high serial clock frequency. It also supports an enhanced SPI interface (multiSPI) that maximizes the sampling rate even with lower-speed host controllers. The alarm interrupt is available on the INT pin, and you can reset the device over the RST pin. The RVS pin is a multi-function pin for the serial interface.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this 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 development of analog input modules, mixed modules (AI, AO, DI, DO), data acquisition (DAQ), trackside signaling and control, and more
On-board modules	ADS8665 - SAR ADC data acquisition system with programmable bipolar input ranges from

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	Texas Instruments
Key Features	High-speed, high-precision, high-performance, based on a successive approximation (SAR), up to 500ksps sampling rate, supports true bipolar and unipolar inputs in wide ranges, supports multiSPI interface backward-compatible to the standard SPI protocol, alarm function, and more
Interface	SPI
ClickID	Yes
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

This table shows how the pinout on ADC 22 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Multifunction Output	**RVS**	1	AN	PWM	16	NC	
Reset	**RST**	2	RST	INT	15	**INT**	Alarm 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
JP1	VCC SEL	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V

ADC 22 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Bipolar Input Range	±2.56	-	±12.288	V
Unipolar Input Rangee	0	-	12.288	V
Sampling Rate	-	-	500	ksps
ADC Resolution	-	12	-	bit

Software Support

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We provide a library for the ADC 22 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), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for ADC 22 Click driver.

Key functions

- adc22_get_voltage ADC 22 get voltage level function.
- adc22_get_adc_raw_data ADC 22 get ADC raw data function.
- adc22_set_range ADC 22 set range function.

Example Description

This example demonstrates the use of the ADC 22 Click board™ by reading and writing data by using SPI serial interface and reading results of AD conversion.

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.ADC22

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™

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mikroSDK

Click board™ Catalog

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Downloads

ADC 22 click example on Libstock

ADS8665 datasheet

ADC 22 click 2D and 3D files

ADC 22 click schematic

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