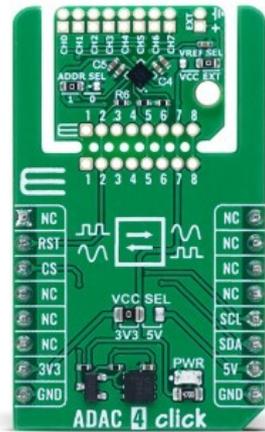


ADAC 4 Click



PID: MIKROE-6722

ADAC 4 Click is a compact add-on board designed to provide configurable analog and digital I/O functionality through eight flexible channels, suitable for various control and monitoring tasks in embedded applications. It is based on the [TPAFE0808](#), an 8-channel configurable ADC/DAC with I2C communication support from [3PEAK](#). Each channel can independently function as an ADC input, DAC output, or general-purpose I/O, while integrated 12-bit ADC and DAC units offer selectable voltage ranges of 0-VREF (2.5V) or 0-2×VREF (5V). The board also includes a ±3°C accurate temperature sensor, internal or external reference voltage selection via VREF SEL, and a unique "Click Snap" design enabling detachment and standalone operation of the sensor module. Communication is achieved through a 400kHz I2C interface with adjustable I2C address. This Click board™ is ideal for general-purpose analog/digital I/O expansion, multi-channel signal control, and system monitoring applications.

For more information about **ADAC 4 Click** visit the official [product page](#).

How does it work?

ADAC 4 Click is based on the TPAFE0808, an 8-channel configurable ADC/DAC with I2C communication support from 3PEAK designed to simplify the development of multi-channel analog and digital control systems. Each of the eight channels (CH0-CH7) on the TPAFE0808 can independently function as an ADC input, DAC output, or general-purpose I/O, making the board highly versatile for various control and monitoring applications. Internally, the IC features an integrated 12-bit ADC with an input range selectable between 0-VREF (2.5V) and 0-2×VREF (5V), routed through an 8-channel analog multiplexer that allows sequential or selective sampling. Additionally, a matching 12-bit DAC is provided for each channel, with output voltage

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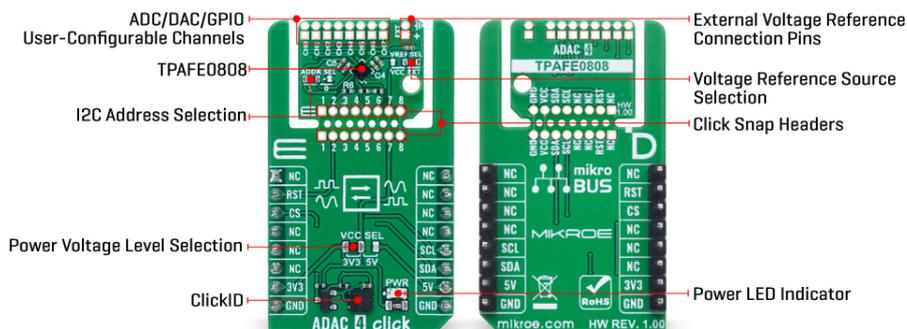


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ranges configurable to match the same reference-based schemes. The board also includes an internal temperature sensor capable of reading the die temperature with $\pm 3^{\circ}\text{C}$ accuracy, offering an additional layer of thermal monitoring for embedded systems.



To accommodate different reference voltage requirements, the TPAFE0808 integrated on the ADAC 4 Click includes an internal 2.5V reference and also supports the use of an external reference voltage. When using an external reference, selection is performed via the VREF SEL jumper, which allows the user to choose between sourcing the reference from the mikroBUS™ power rail (VCC) or from an external voltage applied to the unpopulated EXT pin. The VREF SEL jumper is only relevant when the internal reference is disabled.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening up many new possibilities for implementation. Thanks to the Snap feature, the TPAFE0808 can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

This Click board™ uses an I2C interface with clock speeds of up to 400kHz, ensuring fast communication with the host MCU. The I2C address of the TPAFE0808 can be easily configured via onboard jumper marked ADDR SEL in the Snap area, allowing multiple devices to coexist on the same bus. In addition to the interface pins, the ADAC 4 Click also uses the RST pin for resetting the TPAFE0808.

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.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the [official page](#) dedicated to this feature.

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Specifications

Type	ADC-DAC
Applications	Ideal for general-purpose analog/digital I/O expansion, multi-channel signal control, and system monitoring applications
On-board modules	TPAFE0808 - 8-channel configurable ADC/DAC with I2C interface from 3PEAK
Key Features	Eight configurable channels (ADC inputs, DAC outputs, or general-purpose I/Os), integrated 12-bit ADC and DAC with selectable input/output voltage ranges, internal $\pm 3^{\circ}\text{C}$ accurate temperature sensor, internal 2.5V reference with support for external reference, 400kHz I2C communication interface with configurable address, Click Snap feature, and more
Interface	I2C
Feature	Click Snap, ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V, External

Pinout diagram

This table shows how the pinout on ADAC 4 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	
Reset	RST	2	RST	INT	15	NC	
ID COMM	CS	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock
	NC	6	MOSI	SDA	11	SDA	I2C Data
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 Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP2	ADDR SEL	Right	I2C Address Selection 1/0: Left position 1,

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JP3	VREF SEL	Right	Right position 0 Voltage Reference Source Selection VCC/EXT: Left position VCC, Right position EXT
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ADAC 4 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Reference Voltage	-	2.5	-	V
ADC Resolution	-	12	-	bit
ADC Input Voltage Range	-	-	2.5/5	V
DAC Resolution	-	12	-	bit
DAC Output Voltage Range	-	-	2.5/5	V
Temperature Sensor Accuracy	-	±3	-	°C

Software Support

[ADAC 4 Click](#) demo application is developed using the [NECTO Studio](#), ensuring compatibility with [mikroSDK](#)'s open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a [mikroBUS™](#) socket.

Example Description

This example demonstrates the use of the ADAC 4 Click board which features an 8-channel, 12-bit DAC and ADC. The application configures each DAC channel with incremental values and measures the corresponding output voltage using the integrated ADC, as well as logs the device die temperature.

Key Functions

- `adac4_cfg_setup` This function initializes Click configuration structure to initial values.
- `adac4_init` This function initializes all necessary pins and peripherals used for this Click board.
- `adac4_default_cfg` This function executes a default configuration of ADAC 4 Click board.
- `adac4_write_dac` This function writes a value to the specified DAC channel.
- `adac4_read_adc_voltage` This function reads an ADC voltage value from the specified channel.
- `adac4_read_die_temp` This function reads and calculates internal die temperature.

Application Init

Initializes the logger and the Click board driver, and applies the default configuration.

Application Task

Iterates through all 8 DAC/ADC channels, sets an output voltage, reads back the corresponding ADC voltage, and logs both values. Also reads and logs the die temperature.

Application Output

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This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following [this tutorial](#).
- UART Terminal - Monitor data via the UART Terminal using a [USB to UART converter](#). For detailed instructions, check out [this tutorial](#).

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the [NECTO Studio](#). The application code can also be found on the MIKROE [GitHub](#) account.

Resources

[mikroBUS™](#)

[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

[ClickID](#)

Downloads

[ADAC 4 click example package](#)

[ADAC 4 click 2D and 3D files v100](#)

[TPAFE0808 datasheet](#)

[ADAC 4 click schematic v100](#)

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