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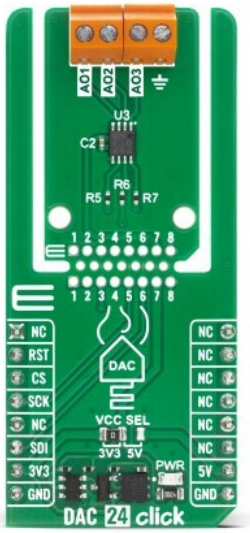
DAC 24 Click



PID: MIKROE-6944

DAC 24 Click is a compact add-on board designed for digital-to-analog signal conversion in applications requiring programmable analog voltage output, gain control, and offset adjustment. It is based on the BD79701FVM-LB, a 3-channel 8-bit R-2R type DAC from ROHM Semiconductor. It features three analog output channels, high-speed output response, a built-in initial zero hold function for defined startup behavior, and a 3-wire SPI interface with clock support up to 30MHz for fast and reliable communication with the host MCU. It also offers good conversion accuracy with low differential and integral non-linearity, while the integrated Click Snap format allows the main IC section to be separated from the base board and used autonomously through directly accessible pins. This Click is ideal for industrial equipment, battery-powered devices, programmable voltage and current sources, programmable attenuators, and other embedded systems requiring DAC functionality.

For more information about **DAC 24 Click** visit the official product page.

How does it work?

DAC 24 Click is based on the BD79701FVM-LB, a 3-channel 8-bit R-2R type D/A converter from ROHM Semiconductor that provides three analog outputs labeled AO1, AO2, and AO3, enabling flexible implementation in multi-channel control systems. This IC features a built-in initial zero hold function, which helps ensure defined startup behavior, while its high-speed output response characteristics make it suitable for systems that demand fast and stable analog signal updates. This board is suitable for industrial equipment, battery-powered devices, programmable voltage or current sources, programmable attenuators, and other embedded systems requiring DAC functionality.

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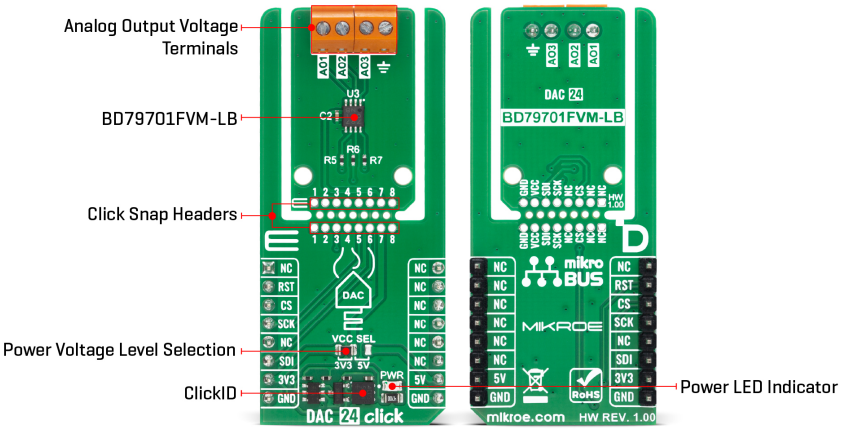

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the BD79701FVM-LB 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.

Communication with the device is achieved through a 3-wire SPI serial interface supporting clock frequencies of up to 30MHz, allowing integration with a wide range of host MCUs. The BD79701FVM-LB also offers excellent conversion accuracy, with differential non-linearity and integral non-linearity specified at ±0.5 LSB maximum, along with a maximum settling time of 4.5µs.

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.

Specifications

Type	DAC
Applications	Ideal for industrial equipment, battery-powered devices, programmable voltage and current sources, programmable attenuators, and other embedded systems requiring DAC functionality
On-board modules	BD79701FVM-LB - 3-channel 8-bit DAC from

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	ROHM Semiconductor
Key Features	3-channel 8-bit R-2R DAC, three analog output channels, built-in initial zero hold function, high-speed output response, 3-wire SPI interface, low differential non-linearity of ±0.5 LSB maximum, low integral non-linearity of ±0.5 LSB maximum, settling time of 4.5µs maximum, Click Snap feature, and more
Interface	SPI
Feature	Click Snap,ClickID
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 DAC 24 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				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	
	NC	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	Power Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V

DAC 24 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Resolution	-	8	-	bit
Differential Non-Linearity (DNL)	-0.5	-	+0.5	LSB
Integral Non-Linearity (INL)	-0.5	-	+0.5	LSB
Settling Time	-	-	4	µs

Software Support

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DAC 24 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 control of DAC output voltage using the DAC 24 Click board. The application sequentially increases the DAC output voltage on all channels in equal steps.

Key Functions

- dac24_cfg_setup This function initializes Click configuration structure to initial values.
- dac24_init This function initializes all necessary pins and peripherals used for this Click board.
- dac24_set_power_down This function sets the device in the selected power down mode.
- dac24_set_dac_value This function writes the 8-bit DAC code value to one or more channels.
- dac24_set_dac_voltage This function sets the output voltage (in millivolts) for one or more channels.

Application Init

Initializes the driver and logger.

Application Task

Gradually increases the DAC output voltage on all channels in equal steps every 2 seconds.

Application Output

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™

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ClickID

Downloads

DAC 24 click example package

DAC 24 click 2D and 3D files v100

DAC 24 click schematic v100

BD79701FVM-LB datasheet