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DAC 17 Click





PID: MIKROE-6059

DAC 17 Click is a compact add-on board that establishes precise voltage output control in various electronic applications. This board features the DAC7558, a 12-bit, octal-channel voltage output digital-to-analog (DAC) from Texas Instruments. It offers flexible internal or external power options with a voltage range from 2.7V to 5.5V. It features a rapid settling time of 5µs, rail-to-rail output amplifiers, and the ability to simultaneously or sequentially update outputs, ensuring precise and efficient performance. This Click board™ is ideal for digital gain and offset adjustment, programmable voltage and current sources, programmable attenuators, industrial process control, and more.

DAC 17 Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

DAC 17 Click is based on the DAC7558, a 12-bit, octal-channel voltage output DAC from Texas Instruments, known for its exceptional linearity and monotonicity. Its proprietary architecture mitigates undesired transients, such as code-to-code glitches and channel-to-channel crosstalk. Operating within a voltage range of 2.7V to 5.5V, the DAC7558 offers versatility. The board provides the flexibility of powering the IC internally or externally by setting the VCC SEL jumper to either the VIO or VEXT position. The VIO option enables internal powering of the Click board™, providing a choice between 3.3V or 5V. On the other hand, the VEXT option allows users to externally supply power in the range of 2.7 to 5.5V (applied to VEXT pins), offering

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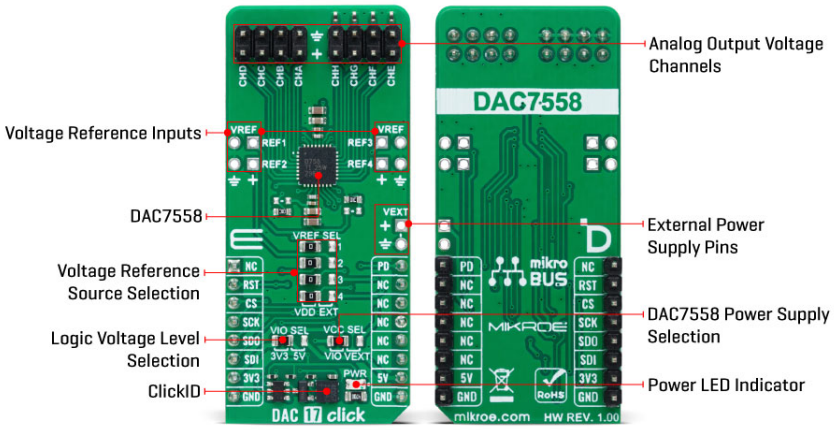
flexibility in power supply according to specific system requirements.



Featuring output amplifiers capable of driving a 2Ω, 200pF load rail-to-rail with a rapid settling time of 5µs, the DAC7558 ensures precise and efficient performance. Users can configure the output range of DAC channels (from CHA to CHH) by connecting an external voltage reference to one of the REFx terminals in a range from 0V to a value of the main IC supply, VCC. Additionally, the board offers a selection between internal and external voltage reference sources. This selection is made via the VREF SEL jumpers, allowing users to choose between internal or external voltage reference options.

The DAC7558 offers versatility in operation, with the ability to update outputs simultaneously or sequentially. Its integrated Power-on-Reset circuit guarantees that DAC outputs power up to zero volts during initialization. Furthermore, a Power-Down feature, controllable via the PD pin of the mikroBUS™ socket, reduces the device's current consumption to under 2µA, enhancing efficiency and prolonging battery life.

Communication with the host MCU is achieved through the 4-wire SPI serial interface, supporting clock rates of up to 50MHz. This interface is compatible with SPI, QSPI, Microwire™, and DSP standards, ensuring easy integration into various systems. The DAC7558 also uses an active-low reset feature via the RST pin on the mikroBUS™ socket. When the RST pin is set to a LOW logic state, all DAC channels are reset to zero scale.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VIO 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	DAC
Applications	Ideal for digital gain and offset adjustment, programmable voltage and current sources, programmable attenuators, industrial process control, and more
On-board modules	DAC7558 - octal-channel voltage output DAC from Texas Instruments

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Key Features	12-bit linearity and monotonicity, rail-to-rail voltage output, rapid settling time of 5µs, ultralow glitch and crosstalk, low power consumption, power-down feature, SPI-compatible interface, selectable power supply source, and more
Interface	SPI
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V,External

Pinout diagram

This table shows how the pinout on DAC 17 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	**PD**	Power-Down
Reset / 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	DAC7558 Power Supply Selection VIO/VEXT: Left position VIO, Right position VEXT
JP2	VIO SEL	Left	Logic Voltage Level Selection 3V3/5V: Left position 3V3, Right position 5V
JP4-JP7	VREF SEL	Left	Voltage Reference Source Selection VDD/EXT: Left position VDD, Right position EXT

DAC 17 Click electrical specifications

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Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	2.7	-	5.5	V
Resolution	-	12	-	bit

Software Support

We provide a library for the DAC 17 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

This library contains API for DAC 17 Click driver.

Key functions

- dac17_send_command This function is used to send specific command of the DAC 17 click board.
- dac17_set_dac_output This function is used to set output level of the sellected channel of the DAC 17 click board.
- dac17_set_all_dac_output This function is used to set output level of the DAC 17 click board.

Example Description

This example demonstrates the use of DAC 17 Click board by changing the voltage level on the output 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.DAC17

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

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This Click board™ is supported with mikroSDK - MIKROE 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

DAC 17 click example on Libstock

DAC 17 click 2D and 3D files v100

DAC 17 click schematic v100

DAC7558 datasheet

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