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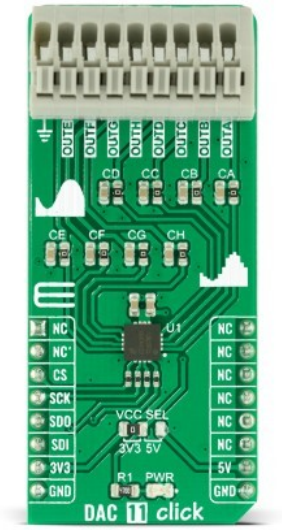
DAC 11 Click



PID: MIKROE-4767

DAC 11 Click is a compact add-on board that contains a highly accurate digital-to-analog converter. This board features the DAC128S085, a general-purpose OCTAL 12-bit analog voltage-output DAC from Texas Instruments. It uses both logic voltage levels from the mikroBUS™ socket with a maximum power consumption of 4.85mW at 5V. The on-chip output amplifiers allow rail-to-rail output swing, supporting the SPI serial interface (compatible with standard QSPI, MICROWIRE, and DSP interfaces), which operates at clock rates up to 40MHz. This Click board™ represents an excellent choice for digital gain and offset adjustment applications, programmable voltage and current sources, programmable reference, and many more.

DAC 11 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?

DAC 11 Click as its foundation uses the DAC128S085, a general-purpose 12-bit 8-channel digital-to-analog converter (DAC) from Texas Instruments. The DAC128S085 is fabricated on a CMOS process with an architecture that consists of switches and resistor strings followed by an output buffer. It ensures monotonicity, low power consumption of 4.85mW at 5V, individual channel power-down capability, and has high precision output amplifier that allows rail-to-rail output swing over a wide supply voltage range.

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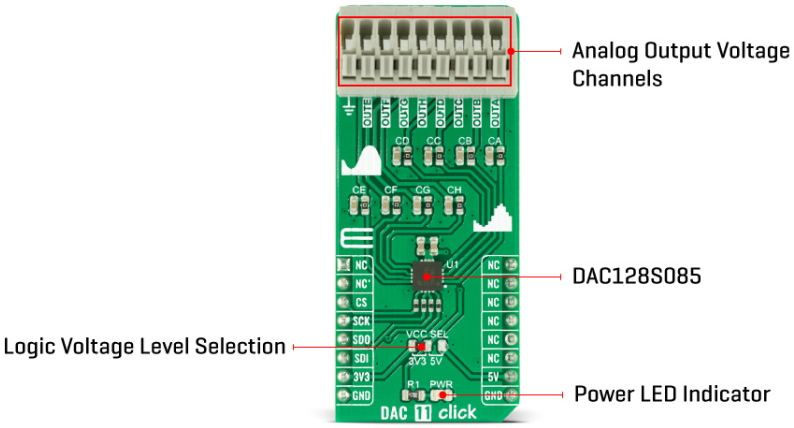

DAC architecture consists of 4096 equal valued resistors with a switch at each junction of two resistors, plus a switch to ground. The code loaded into the DAC register determines which switch is closed, connecting the right node to the amplifier. Because all eight channels of the DAC128S085 can be controlled independently, each consists of a DAC register and a 12-bit DAC. Depending on the mode of operation, data written into a DAC register causes the 12-bit DAC output to be updated, or an additional command is required to update the DAC output. Also, a Power-On reset circuit ensures that the DAC outputs power up to zero volts and remains there until there is a valid write to the device.

The DAC 11 Click communicates with MCU using the SPI serial interface compatible with standard QSPI, MICROWIRE, and DSP interfaces, with a maximum frequency of 50 MHz. Also, this Click board™ is designed to utilize the entire dynamic range of DAC128S085 by having all power supply pins (and reference voltage pins) connected together, sharing the same supply voltage. In addition, the user is given the option of further use of the RC filter at the output to roll off output noise.

This Click board™ can operate with both 3.3V and 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 SPI communication lines properly. 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	DAC
Applications	Can be used for digital gain and offset adjustment applications, programmable voltage and current sources, programmable reference, and many more
On-board modules	DAC128S085 - general-purpose 12-bit 8-channel digital-to-analog converter (DAC) from Texas Instruments
Key Features	Low power consumption, high precission, ensured monotonicity, rail-to-rail voltage output, simultaneous output updating, individual channel power-down capability, and

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	more
Interface	SPI
Feature	No 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 11 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	
	NC	2	RST	INT	15	NC	
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	**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

DAC 11 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Output Voltage Range	0	-	5	V
Resolution	12	-	-	bits
Operating Temperature Range	-40	+25	+125	°C

Software Support

We provide a library for the DAC 11 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 way), downloaded from our LibStock™ or found on Mikroe github account.

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Library Description

TThis library contains API for DAC 11 Click driver.

Key functions:

- dac11_cfg_setup - Config Object Initialization function.
- dac11_init - Initialization function.
- dac11_default_cfg - Click Default Configuration function.

Example description

This example demonstrates the use of DAC 11 Click board.

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

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.DAC11

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. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

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™

mikroSDK

Click board™ Catalog

Click Boards™

Downloads

DAC 11 click schematic

DAC 11 click 2D and 3D files

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DAC128S085 datasheet

DAC 11 click example on Libstock

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