

## Servo 2 Click



PID: MIKROE-6533

**Servo 2 Click** is a compact add-on board designed for precise control of multiple standard servo motors. It is based on the [TLC59401](#), a 16-channel constant-current sink LED driver from [Texas Instruments](#) with integrated PWM control. Each channel supports 12-bit resolution for fine-grained pulse width modulation, with up to 4096 steps of adjustment, and can deliver up to 120mA of current, defined by an external resistor. Communication is achieved via a high-speed 4-wire SPI interface, and the board supports both 3.3V and 5V logic levels. The connected load is powered through a single VEXT terminal supporting up to 17V, while additional safety features include open-load detection and thermal error flags. This Click board™ is ideal for applications such as robotics, motorized actuators, and automation systems, while also supporting secondary use in LED display control.

For more information about **Servo 2 Click** visit the official [product page](#).

### How does it work?

Servo 2 Click is based on the TLC59401, a 16-channel LED driver from Texas Instruments designed to control multiple outputs using a high-precision constant-current sink architecture. Each of the 16 channels features an individually programmable 12-bit grayscale PWM control, allowing for 4096 levels of pulse width adjustment per output. This level of control is accessible via a serial interface, ensuring flexible and accurate operation across all channels. The maximum output current for each channel is defined by a single external resistor, which simplifies configuration. On the Servo 2 Click, this resistor is set to 330Ω (R7), resulting in a maximum current of approximately 120mA per channel. This makes the board well-suited not only for precise servo motor control but also for driving high-current LEDs in secondary applications, including monochrome, multicolor, and full-color LED displays, signboards, and back-

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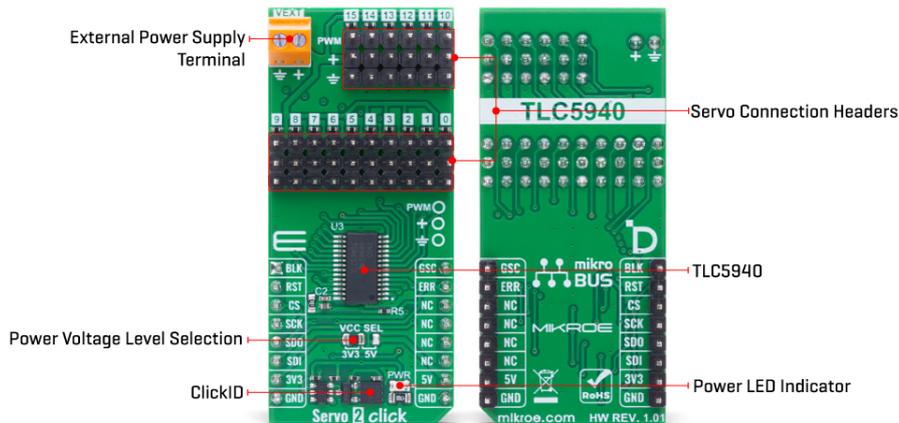


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lighting systems where accurate brightness control and current regulation are essential.



This Click board™ establishes communication with the host MCU via a 4-wire SPI interface with a maximum clock frequency of 30MHz, ensuring reliable and high-speed data transfer. Beyond the SPI pins, the board includes additional control and status lines that enhance its functionality. The BLK pin is used to blank all outputs simultaneously - when set HIGH, all output channels are disabled and the internal grayscale counter is reset. When driven LOW, the outputs resume operation under the control of the internal PWM grayscale engine. The design also supports the parallel configuration of multiple output channels to increase total current-driving capability.

The supply voltage for the connected loads is provided through the VEXT terminal, which distributes the same voltage to all output channels. This voltage can go up to a maximum of 17V, making the board compatible with a wide range of connected devices, including servo motors and LEDs. Additionally, the ERR pin provides essential fault indication through two integrated monitoring features: LED open detection (LOD), which flags disconnected or broken LEDs, and the thermal error flag (TEF), which signals an over-temperature condition.

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	Servo
Applications	Ideal for applications such as robotics, motorized actuators, and automation systems, while also supporting secondary use in LED display control
On-board modules	TLC59401 - 16-channel constant-current sink LED driver from Texas Instruments
Key Features	12-bit PWM control, SPI interface up to 30MHz, individual channel current up to 120mA, external current setting resistor, VEXT supply up to 17V, parallel output configuration

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	support, servo motor and LED control capability, BLK pin for output blanking, ERR pin for fault detection (LOD and TEF), and more
Interface	PWM,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 Servo 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Output Channel Control	<b>BLK</b>	1	AN	PWM	16	<b>GSC</b>	Grayscale PWM control
ID SEL	<b>RST</b>	2	RST	INT	15	<b>ERR</b>	Error Detection
SPI Select / ID COMM	<b>CS</b>	3	CS	RX	14	NC	
SPI Clock	<b>SCK</b>	4	SCK	TX	13	NC	
SPI Data OUT	<b>SDO</b>	5	MISO	SCL	12	NC	
SPI Data IN	<b>SDI</b>	6	MOSI	SDA	11	NC	
Power Supply	<b>3.3V</b>	7	3.3V	5V	10	<b>5V</b>	Power Supply
Ground	<b>GND</b>	8	GND	GND	9	<b>GND</b>	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

## Servo 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
External Power Supply	-	-	17	V
Output Current per Channel	-	-	120	mA
PWM Resolution	-	12	-	bit

## Software Support

[Servo 2 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.

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## Example Description

This example demonstrates the use of the Servo 2 Click board for controlling the angle of servo motors. The board is capable of driving multiple servos, and the example illustrates how to change the angle of all connected servos simultaneously within a defined range.

### Key Functions

- servo2\_cfg\_setup Config Object Initialization function.
- servo2\_init Initialization function.
- servo2\_set\_angle This function sets the servo angle for a specific channel or all channels.
- servo2\_update\_output This function updates the PWM output values for all channels by writing them to the device.
- servo2\_set\_channel\_pwm This function sets the PWM output for a specific channel or all channels.

### Application Init

Initializes the logger module and configures the Servo 2 Click board. The PWM communication is established, and the device is prepared for controlling the servos.

### Application Task

Gradually changes the angle of all connected servo motors from a minimum to a maximum value, and then back to the minimum, creating a sweeping motion. The current angle is logged during each update.

## 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™](#)

[ClickID](#)

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## Downloads

[Servo 2 click example package](#)

[Servo 2 click 2D and 3D files v101](#)

[TLC59401 datasheet](#)

[Servo 2 click schematic v101](#)

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