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LED Driver 18 Click

PID: MIKROE-5560

LED Driver 18 Click is a compact add-on board that simplifies the control of multiple LEDs. This board features the TLC5947, a 24-channel LED driver from Texas Instruments. Each channel is individually adjustable with 4096 pulse-width modulated (PWM) steps and has a programmable current value of all channels with a maximum of 30mA of LED current per channel. This LED driver also features a built-in thermal shutdown function that turns OFF all output drivers during an over-temperature condition. This Click board™ is suitable for color mixing and backlight application for amusement products, LED status signalization, home automation projects, and many more.

LED Driver 18 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?

LED Driver 18 Click is based on the TLC5947, a 24-channel 12-bit PWM LED driver from Texas Instruments. Each channel supports many LEDs in series connected to the LED terminal, and has an individually-adjustable 4096-step PWM grayscale brightness control accessible through a serial interface port. It has a programmable current value of all 24 channels achievable through the AD5171, an I2C-configurable digital potentiometer, with a maximum of 30mA of LED current per channel. The TLC5947 also features a built-in thermal shutdown function that turns OFF all output drivers during an over-temperature condition. All channels automatically restart when the temperature returns to normal conditions.

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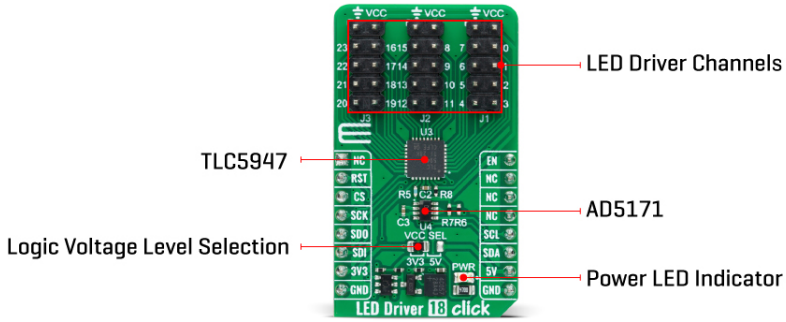

LED Driver 18 Click communicates with MCU through a register-selectable standard SPI interface that enables a high clock speed of up to 30MHz for optimum performance. In addition to the interface signals, the TLC5947 uses another signal from the mikroBUS™ socket. The enable signal routed on the EN pin of the mikroBUS™ socket provides the ability to turn OFF all constant-current outputs. When the EN pin is in a high logic state, all channels (0-23) are forced OFF, the grayscale PWM timing controller initializes, and the grayscale counter resets to 0. When the EN pin is in a low logic state is low, the grayscale PWM timing controller controls all LED channels.

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. 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	LED Drivers
Applications	Can be used for color mixing and backlight application for amusement products, LED status signalization, home automation projects, and more
On-board modules	TLC5947 - PWM LED driver from Texas Instruments
Key Features	24 LED channels, programmable current value, PWM grayscale control, thermal shutdown protection, low power consumption, high efficiency and performance, and more
Interface	I2C,SPI
ClickID	Yes
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V or 5V

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Pinout diagram

This table shows how the pinout on LED Driver 18 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	**EN**	Channels Enable
	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	**SCL**	I2C Clock
SPI Data IN	**SDI**	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	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
J1-J3	0-23	Populated	LED Driver Channel Terminals

LED Driver 18 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Output Current	-	-	30	mA
Resolution	-	12	-	bit

Software Support

We provide a library for the LED Driver 18 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 LED Driver 18 Click driver.

Key functions

- leddriver18_set_output_pwm LED Driver 18 set output channel PWM value function.
- leddriver18_write_config LED Driver 18 write config function.

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- leddriver18_set_cc_output LED Driver 18 set constant current output function.

Example Description

This library contains API for LED Driver 18 Click driver. The library initializes and defines the I2C bus drivers to write and read data for setting constant current output, as well as the default configuration for a PWM output value of the OUT 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.LEDDriver18

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

This Click board™ is supported with mikroSDK - Mikroe Software Development Kit, which needs to be downloaded from the LibStock and installed for the compiler you are using to ensure proper operation of mikroSDK compliant Click board™ demo applications.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

LED Driver 18 click example on Libstock

AD5171 datasheet

TLC5947 datasheet

LED Driver 18 click 2D and 3D files

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LED Driver 18 click schematic