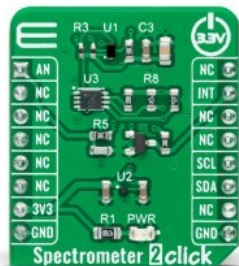


Spectrometer 2 Click



PID: MIKROE-5167

Spectrometer 2 Click is a compact add-on board that collects light waves. This board features the VD6283TX, a color sensor with advanced light flicker extraction from STMicroelectronics. The VD6283TX performs fast and accurate light measurements thanks to an individual ADC and a readout for each color channel - red, green, blue, IR, clear, and visible. It uses hybrid color filters with precise responses allowing accurate computation of the correlated color temperature (CCT) and Lux information. Its patented architecture and a high-performance photodiode design can also extract light-flickering frequencies to avoid “banding effects” or check that they are safe for the human eye. This Click board™ is suitable for screen brightness adjustment and white balance color assistance, lux and CCT measurement, or light frequency extraction for flicker correction assistance.

Spectrometer 2 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?

Spectrometer 2 Click as its foundation uses the VD6283TX, a color sensor with advanced light flicker extraction from STMicroelectronics. It performs fast and accurate light measurements thanks to an individual ADC with a resolution of 24 bits (16 bit + 8 bit for high accuracy under low light) and a readout for six color channels: red, green, blue, IR, clear, and visible. The color channels can be individually enabled to optimize power consumption, alongside 15 programmable gains for a high-dynamic range, through a serial interface. Six channels can operate with independent, parallel reading for ALS or flicker operations, one represents a dedicated fast channel for light flicker measurement, and one stands for an internal dark

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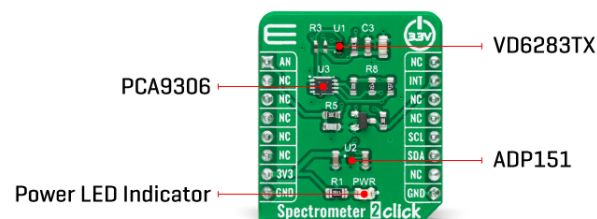


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channel.



The VD6283TX uses hybrid color filters with precise responses allowing accurate computation of the correlated color temperature (CCT) and Lux information. Its patented architecture and a high-performance photodiode design can also extract light-flickering frequencies from a minimum of 100Hz and a maximum frequency of 2kHz, including LED square signals, to avoid “banding effects” or check that they are safe for the human eye.

Spectrometer 2 Click communicates with MCU using the standard I2C 2-Wire interface with a maximum clock frequency of 1MHz, fully adjustable through software registers. The VD6283TX does not require a specific Power-Up sequence but requires a voltage of 1.8V for its interface and logic part to work correctly. Therefore, a small regulating LDO is used, the [ADP151](#), providing a 1.8V out of 3.3V mikroBUS™ power rail. Since the sensor for operation requires a power supply of 1.8V, this Click board™ also features the [PCA9306](#) voltage-level translator allowing the VD6283TX to work with 3.3V MCU properly.

The VD6283TX can stream the following data continuously: ALS color data over the I2C interface and raw flicker data over the AN pin of the mikroBUS™ socket. It also possesses an additional interrupt signal, routed on the INT pin of the mikroBUS™ socket labeled as INT, indicating when a specific interrupt event occurs.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before using MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

Specifications

Type	Optical
Applications	Can be used for screen brightness adjustment and white balance color assistance, lux and CCT measurement, or light frequency extraction for flicker correction assistance
On-board modules	VD6283TX - hybrid filter multispectral sensor with light flicker engine from STMicroelectronics

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Key Features	Advanced hybrid filters with high photocount response, parallel sensing of all six channels, innovative readout architecture to extract AC light flicker signal, from 100Hz to 2kHz frequency detection - sine or square wave, low power consumption, and more
Interface	Analog,I2C
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Spectrometer 2 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin					Pin	Notes
Raw Flicker Data	AN	1	AN	PWM	16	NC	
	NC	2	RST	INT	15	INT	Interrupt
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	SCL	I2C Clock
	NC	6	MOSI	SDA	11	SDA	I2C Data
Power Supply	3.3V	7	3.3V	5V	10	NC	
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Spectrometer 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Peak Wavelength (R/G/B/VIS/IR/C)	610/550/470/560/820/680			nm
AC Flicker Frequency Detection Range	100	-	2000	Hz
Resolution	16	-	24	bit
Operating Temperature Range	-30	+25	+85	°C

Software Support

We provide a library for the Spectrometer 2 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

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Manager(recommended way), downloaded from our [LibStock™](#) or found on [Mikroe github account](#).

Library Description

This library contains API for Spectrometer 2 Click driver.

Key functions

- spectrometer2_get_data This function reads data from 6 ALS channels (Red, Visible, Blue, Green, IR, Clear).
- spectrometer2_rgbc_to_hsl This function converts RGBC (red, green, blue, clear) to HSL (hue, saturation, lightness) color value.
- spectrometer2_get_color This function returns the color name flag from the input HSL color.

Example Description

This example demonstrates the use of Spectrometer 2 Click board™ by reading data from 6 ALS channels and converting them to HSL color and displaying those data as well as the detected color name on the USB UART.

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.Spectrometer2

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 MikroElektronika [compilers](#).

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™](#)

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Downloads

[Spectrometer 2 click example on Libstock](#)

[VD6283TX datasheet.](#)

[Spectrometer 2 click 2D and 3D files](#)

[Spectrometer 2 click schematic](#)

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