MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
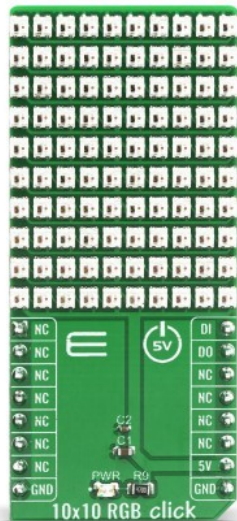Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
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10x10 RGB Click

PID: MIKROE-4115

10x10 RGB Click is a matrix of 100 "intelligent" RGB elements, forming a 10x10 display screen. These LED elements feature internal logic, which allows them to communicate directly with the MCU. These intelligent LEDs are meant to be cascaded: the elements communicate by a single line with the host MCU and they feature a signal reshaping section, so the data gets to the adjacent element with no losses or distortion.

10x10 RGB 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?

The WS2812C is an intelligent control LED light source, its exterior adopts the latest MOLDING packaging technology, the control circuit and RGB chips are integrated in a package of 2020 component. Its internal includes intelligent digital port data latch and signal reshaping amplification drive circuit. Also include a precision internal oscillator and a voltage programmable constant current control part, effectively ensuring the pixel point light color height consistent.

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WS2812

Power LED indicator

10x10 RGB click
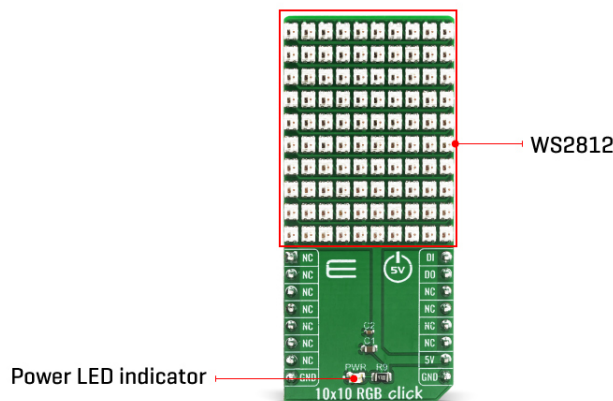
The data transfer protocol use single NZR communication mode. After the pixel power-on reset, the DIN port receive data from controller, the first pixel collect initial 24bit data then sent to the internal data latch, the other data which reshaping by the internal signal reshaping amplification circuit sent to the next cascade pixel through the DO port. After transmission for each pixel, the signal to reduce 24bit. pixel adopt auto reshaping transmit technology, making the pixel cascade number is not limited the signal transmission, only depend on the speed of signal transmission.

RESET time >280μs , it won't cause wrong reset while interruption, it supports the lower frequency and inexpensive MCU.

Refresh Frequency updates to 2KHz, Low Frame Frequency and No Flicker appear in HD Video Camera, it improve excellent display effect.

LED with low driving voltage, environmental protection and energy saving, high brightness, large scattering angle, good consistency, low power, long life and other advantages. The control chip integrated in LED above becoming more simple circuit, small volume, convenient installation. 10x10 RGB Click can be used in many applications, like full-color module, full color soft lights a lamp strip, LED decorative lighting, indoor/outdoor LED irregular screen, game machine and amusement equipment etc.

The INT pin of the mikroBUS™, which is labeled as DO on this Click board™, allows cascading of multiple 10x10 RGB click devices. It simply routes the data line back to the mikroBUS™, allowing it to be re-used for the next 10x10 RGB click, and so on. The length of the whole chain is limited only by the communication speed, required to scan through all the LED devices, in order to maintain a reasonable refresh speed.

This Click Board™ is designed to be operated only with 5V logic level. A proper logic voltage level conversion should be performed before the Click board™ is used with MCUs with logic levels of 3V3.

Specifications

Type	LED Matrix
Applications	Full-color module, Full color soft lights a lamp strip, LED decorative lighting, indoor/outdoor LED irregular screen, game machine and

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	amusement equipment etc.
On-board modules	WS2812C - intelligent control LEDs
Key Features	256 brightness display, completed 16777216 color full color display and scan frequency is of 2KHz, send data speed of 800Kbps, 5mA operating current per channel
Interface	GPIO
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	5V

Pinout diagram

This table shows how the pinout on 10x10 RGB Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS		Pin	Notes
	NC	1	AN	PWM	16	**DI**	Data Input
	NC	2	RST	INT	15	**DO**	Data Output
	NC	3	CS	RX	14	NC	
	NC	4	SCK	TX	13	NC	
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
	NC	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-JP4	COM SEL	Right	

Software Support

We provide a library for the 10x10 RGB Click on our [LibStock](#)page, as well as a demo application (example), developed using MikroElektronika [compilers](#). The demo can run on all the main MikroElektronika [development boards](#).

Library Description

Library contains function for show Image, Byte and String and one demo (rainbow).

Key functions:

- void c10x10rgb_setup(void (*logic_one)(void), void (*logic_zero)(void)) - Setup function

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- void c10x10rgb_demo_rainbow (uint8_t brightness, uint16_t wait_ms) - Demo rainbow
- void c10x10rgb_display_string (c10x10rgb_byte_t *data_obj, uint8_t len, uint16_t speed_ms) - Function for shows string

Examples description

The application is composed of three sections :

- System Initialization - Initializes all necessary GPIO pins
- Application Initialization - Initializes driver inti and setup module
- Application Task - Shows one byte, then scrolls the string, image and rainbow demo.

The full application code, and ready to use projects can be found on our LibStock page.

Other mikroE Libraries used in the example:

- GPIO

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

WS2812C datasheet

10x10 RGB click schematic

10x10 RGB click example on Libstock