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
www.mikroe.com

ReRAM 2 Click

PID: MIKROE-4895

ReRAM 2 Click is a compact add-on board containing highly reliable resistive random-access memory. This board features the MB85AS8MT, an 8Mbit memory organized as 1,048,576 words of 8 bits from Fujitsu Semiconductor. The MB85AS8MT uses the resistance-variable memory process and silicon-gate CMOS process technologies to form nonvolatile memory cells. This SPI configurable ReRAM can withstand many write cycles (1x106 rewrite operations), has a data retention period greater than ten years, and can read and write to random addresses with very negligible delay. This Click board™ is ideal as a nonvolatile storage media or temporary RAM expansion for storing variables in any embedded application that requires rapid writes and unlimited endurance.

ReRAM 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?

ReRAM 2 Click as its foundation uses the MB85AS8MT, a highly reliable 8Mbit resistive random-access memory (ReRAM) organized as 1,048,576 words of 8 bits from Fujitsu Semiconductor. It uses the resistance-variable memory process and silicon-gate CMOS process technologies to form nonvolatile memory cells. The MB85AS8MT specifies 1.000.000 endurance cycles with data retention of a minimum of 10 years, which gives the MB85AS8MT the capability to handle unlimited reads/writes to the memory.

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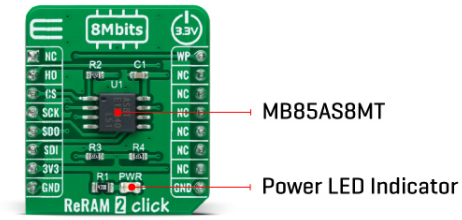

One prominent feature of the MB85AS8MT is an extremely small average current, despite its large density, for reading operations of 0.15mA at an operating frequency of 5MHz, which is only 5% of large density EEPROM devices. This feature enables minimal power consumption when in applications with frequent data-read operations. Besides higher write endurance, it has faster write speeds than EEPROM and flash memory, while its electric specifications, such as commands and timings, are compatible with EEPROM products.

The ReRAM 2 Click communicates with MCU through a standard SPI interface that enables high clock speeds up to 10MHz, supporting the two most common SPI modes, SPI Mode 0 and 3. An additional feature of this Click board™ represents the configurable Write Protection function labeled as WP routed on the PWM pin of the mikroBUS™ socket. The WP pin protects the entire memory and all registers from write operations and must be set to a low logic state to inhibit all the write operations. All memory and register writes are prohibited when this pin is low, and the address counter is not incremented. Besides, the ReRAM 2 Click also has an additional HOLD pin, routed to the RST pin of the mikroBUS™ socket labeled as HO, to interrupt a serial operation without aborting it.

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	ReRAM
Applications	Can be used as a nonvolatile storage media or temporary RAM expansion for storing variables in any embedded application that requires rapid writes and unlimited endurance
On-board modules	MB85AS8MT - highly reliable resistive random-access memory (ReRAM) from Fujitsu Semiconductor
Key Features	8 Mbits (1,048,576 words x 8 bits), 256 bytes buffer size, high endurance and data retention, fast serial interface, sophisticated write protection scheme, and more

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Interface	SPI
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V
Category	Click Boards

Pinout diagram

This table shows how the pinout on ReRAM 2 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	**WP**	Write Protection
SPI Suspension	**HO**	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	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

ReRAM 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Memory Size	-	-	8	Mbit
Write Endurance	10^6	-	-	Write Cycles
Data Retention	10	-	-	Years
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the ReRAM 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 Manager(recommended way), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

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This library contains API for ReRAM 2 Click driver.

Key functions

- reram2_read_device_id ReRAM 2 read device ID function.
- reram2_write_memory ReRAM 2 write memory function.
- reram2_read_memory ReRAM 2 read memory function.

Example Description

This library contains API for ReRAM 2 Click driver.

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.ReRAM2

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™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

ReRAM 2 click example on Libstock

ReRAM 2 click schematic

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ReRAM 2 click 2D and 3D files

MB85AS8MT datasheet