

Time-saving embedded tools

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PID: MIKROE-4178

SRAM 2 Click is based on <u>ANV32A62A</u> SRAM memory from <u>Anvo-Systems Dresden</u>. It's a 64Kb serial SRAM with a non-volatile SONOS storage element included with each memory cell, organized as 8k words of 8 bits each. Communication is done by a I²C with up to 4 cascadable devices that can share the common bus. The serial nvSRAM provides the access and cycle times, easy to use and unlimited read and write endurance of a SRAM. This Click board[™] can be easily used to store drive profiles, configurations and similar data, which are typically stored in a FLASH.

SRAM 2 Click board[™] 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?

SRAM 2 Click is using nvSRAM which is ordinary SRAMs with the ability for self-sufficient, automatic backup of SRAM-data in an internal FLASH, All Read/Write operations are addressing the SRAM array only. From a user point of view, nvSRAM appears as ordinary SRAM. SRAM are fast, energy efficient and does not wear-out while R/W operations. This explains the superior speed and the unlimited R/W endurance of nvSRAM. Data transfers automatically to the non-volatile storage cells when power loss is detected or in any brown out situation (PowerStore). As long as power will be supplied within operating conditions all data stay volatile in the SRAM cells.

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ISO 27001: 2013 certification of informational security management system. ISO 14001: 2015 certification of environmental management system. OHSAS 18001: 2008 certification of occupational health and safety management system.





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SRAM 2 Click is using a standard two-wire interface (I²C) and is functional similar to serial EEPROMs or FRAM . The addressing requires a 13 bit address out of the 2-byte address of the two-wire protocol. The jumpers ADDR SEL are device address inputs to select 1 of up to 4 devices of the same type on the same I²C bus. To select one device the hard wired addresses on the 2 pins have to match with the related bits in the slave address.

This SRAM also features PowerStore operation which is a unique feature of the SONOS technology that is enabled by default on the ANV32A62A. During normal operation, the device will draw current from VCC for circuit operation and to charge a capacitor connected to the VCAP pin. This stored charge will be used by the chip to perform a single STORE operation in case of power down. If the voltage on the VCC pin drops below VSWITCH, the part will automatically disconnect the VCAP pin from VCC. A STORE operation will be initiated with power provided by the VCAP capacitor.

If a write operation is in progress all data of complete written pages are valid. Only the last incomplete written byte will be ignored. With the following Power Store execution these data become non-volatile. To reduce needless non-volatile stores, Power Store operation will be ignored unless at least one write operation has taken place since the most recent STORE cycle. The PowerStore Operation is valid for the complete memory array.

SRAM 2 click is powered via the mikroBUS[™] 3.3V rail. However, it offers a logic voltage selection, via the VCC SEL jumper. Since the ANV32A62A memmory cannot operate with signals up to 5V, a level shifting IC is used to allow both 3.3V and 5V MCUs to be interfaced with this Click board[™]. The VCC SEL jumper routes either 3.3V or 5V to the voltage reference pin of the PCA9306, a dual bidirectional level shifting IC.

Specifications

Туре	SRAM
Applications	Workstations, Routers, Peripheral equipment, and other lpw-power applicatins
On-board modules	HSFPAR003A
Key Features	Unlimited READ and WRITE Cycles, 100-Year Non-volatile Data Retention, Hardware Write- Protect
Interface	120

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Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin	● ● mikro™ ● ● ● BUS				Pin	Notes
	NC	1	AN	PWM	16	WP	Write Protect
	NC	2	RST	INT	15	NC	
	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	5V	Power Supply
Ground	GND	8	GND	GND	9	GND	Ground

Onboard settings and indicators

Label	Name	Default	Description
PWR	LD1	-	Power LED Indicator
VCC SEL	JP1	Left	Logic level voltage selection: left position 3V3, right position 5V
ADDR1	JP2	Left	Slave address selection: Left position 0, right position 1.
ADDR2	ЈРЗ	Left	Slave address selection: Left position 0, right position 1.

Software Support

We provide a library for the SRAM 2 Click on our <u>LibStock</u> page, as well as a demo application (example), developed using MikroElektronika <u>compilers</u>. The demo can run on all the main MikroElektronika <u>development boards</u>.

Library Description

Library provides control over reading and writing data via I2C module. You can use 2 specific functions for reading and writing to memory.

Key functions:

• void sram2_write_protect(uint8_t state) - Write protect data selection

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- void sram2_write_memory(uint16_t addr, uint8_t wr_data) Generic write data function
- uint8_t sram2_read_memory(uint16_t addr) Generic read data function

Examples description

The application is composed of three sections :

- System Initialization Initializes I2C module
- Application Initialization Initializes driver init
- · Application Task Writes and then reads data from memory

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

Other mikroE Libraries used in the example:

- I2C Library
- UART Library

Additional notes and informations

Depending on the development board you are using, you may need <u>USB UART click</u>, <u>USB UART</u> <u>2 click</u> or <u>RS232 click</u> to connect to your PC, for development systems with no UART to USB interface available on the board. The terminal available in all MikroElektronika <u>compilers</u>, or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board^m is supported with <u>mikroSDK</u> - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board^m demo applications, mikroSDK should be downloaded from the <u>LibStock</u> and installed for the compiler you are using.

For more information about mikroSDK, visit the <u>official page</u>. **Resources**

<u>mikroBUS</u>™

mikroSDK

Click board[™] Catalog

Click Boards[™]

Downloads

SRAM 2 click 2D and 3D files

ANV32A62A datasheet

SRAM 2 click example on Libstock

SRAM 2 click schematic

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