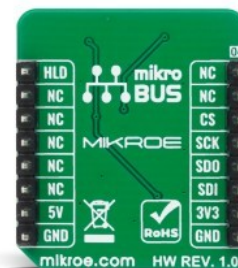


## SRAM 3 Click



PID: MIKROE-4293

**SRAM 3 Click** is a compact add-on board that contains a serial non-volatile SRAM with a high storage capacity. This board features the [ANV32AA1WDK66](#), a 1Mb serial SRAM with a non-volatile SONOS storage element included with each memory cell organized as 128k words of 8 bits each from [Anvo-System Dresden](#). The serial SRAM provides fast access & cycle times, high data accuracy, ease of use, and unlimited read & write accessed by a high-speed SPI compatible bus. This Click board™ is suitable to store drive profiles, configurations, and similar data, or for applications such as medical devices, industrial automation (for example, motor control and robotics), smart metering systems, and many others.

SRAM 3 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?

SRAM 3 Click is based on the ANV32AA1WDK66, a serial non-volatile SRAM with double memory architecture and SPI serial interface organized as 128k words of 8 bits each from Anvo-System Dresden. This memory has a silicon-oxide-nitride-oxide-silicon (SONOS) flash storage element included with each memory cell. In the case of an unforeseeable operating voltage drop below a defined value, the SONOS technology enables non-volatile storage of all data in less than 15ms. An integrated Power Down functionality of the SRAM 3 Click with a standby current of less than 1µA ensures its low power consumption, with recovery time from Power-Down Mode of typically of 60µs.

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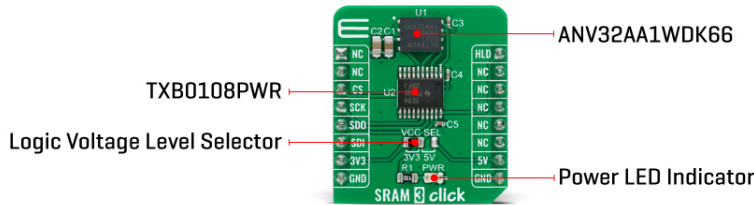
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This ANV32AA1WDK66 possesses unique safety features, such as Checksum Protected Memory Accesses (Secure READ and Secure WRITE instructions) and Time Monitoring that ensures a high degree of reliability of this Click board™. Corrupt data cannot overwrite existing memory content, and even valid data would not overwrite on a corrupted address. The SRAM 3 Click also provides some distinctive advantages of SRAMs, such as fast access times and unlimited write/read endurance.

SRAM 3 Click incorporates an additional IC, labeled as the [TXB0108PWR](#), an 8-bit bidirectional voltage level translator from [Texas Instruments](#). This allows the Click board™ to be used with a much extensive range of MCUs. At the same time, the TXB0108PWR protects the ANV32AA1WDK66 from the Electrostatic Discharges (ESD) up to ±15 kV, making SRAM 3 Click a very reliable embedded storage solution.

The ANV32AA1WDK66 communicates with MCU using the standard SPI serial interface that supports modes 0 and 3 with a maximum frequency of 66 MHz. It also possesses additional HOLD function routed at the PWM pin of the mikroBUS™ socket labeled as HLD. This pin is used in conjunction with the CS pin to select the device. When the device is selected, and a serial sequence is underway, an HLD pin can be used to pause the serial communication with the master device without resetting the serial sequence.

This Click Board™ is designed to be operated with both 3.3V and 5V logic levels that can be selected via VCC SEL jumper. This allows for both 3.3V and 5V capable MCUs to use the SPI communication lines properly. However, the Click board™ comes equipped with a library that contains easy to use functions and an example code that can be used as a reference for further development.

## Specifications

|                  |   |
|------------------|---|
| Type             | SRAM  |
| Applications     | Can be used to store drive profiles, configurations, and similar data, or for applications such as medical devices, industrial automation (for example, motor control and robotics), smart metering systems, and many others. |
| On-board modules | SRAM 3 Click is based on the  |

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|                  |   |
|------------------|---|
|                  | ANV32AA1WDK66, a serial non-volatile SRAM with double memory architecture and SPI serial interface organized as 128k words of 8 bits each from Anvo-System Dresden.                         |
| Key Features     | Low power consumption, high storage capacity, fast access & cycle times, high data accuracy, ease of use, and unlimited read & write accessed by a high-speed SPI compatible bus, and more. |
| Interface        | SPI   |
| 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 3 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

| Notes           | Pin         |  |      |     |    | Pin        | Notes        |
|-----------------|-------------|---|------|-----|----|------------|--------------|
|                 | NC          | 1   | AN   | PWM | 16 | <b>HLD</b> | HOLD         |
|                 | NC          | 2   | RST  | INT | 15 | NC         |              |
| SPI Chip Select | <b>CS</b>   | 3   | CS   | RX  | 14 | NC         |              |
| SPI Clock       | <b>SCK</b>  | 4   | SCK  | TX  | 13 | NC         |              |
| SPI Data OUT    | <b>SDO</b>  | 5   | MISO | SCL | 12 | NC         |              |
| SPI Data IN     | <b>SDI</b>  | 6   | MOSI | SDA | 11 | NC         |              |
| Power Supply    | <b>3.3V</b> | 7   | 3.3V | 5V  | 10 | <b>5V</b>  | Power Supply |
| Ground          | <b>GND</b>  | 8   | GND  | GND | 9  | <b>GND</b> | Ground       |

## Onboard settings and indicators

| Label | Name    | Default | Description   |
|-------|---------|---------|---|
| LD1   | PWR     | -       | Power LED Indicator   |
| JP1   | VCC SEL | Left    | Power Supply Voltage Selection 3V3/5V, left position 3v3, right position 5v |

## SRAM 3 Click electrical specifications

| Description                  | Min | Typ | Max | Unit |
|------------------------------|-----|-----|-----|------|
| Supply Voltage               | 2.7 | 3.3 | 3.6 | V    |
| Average VCC Current at 66MHz | -   | -   | 5   | mA   |
| Operating Temperature Range  | 0   | 25  | 70  | °C   |

## Software Support

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We provide a library for the SRAM 3 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 provides functions for communicating with device via SPI module, functions for reading and writing to memory as well as some protective functions to prevent data corruption.

Key functions:

- void sram3\_read( uint32\_t mem\_adr, uint8\_t \*read\_buf, uint8\_t buf\_size ) - Function for reading data from memmory
- uint8\_t sram3\_secure\_read( uint32\_t mem\_adr, uint8\_t \*read\_buf ) - Function for reading data from memmory with crc checksum for data validation
- void sram3\_write( uint32\_t mem\_adr, uint8\_t \*write\_buf, uint8\_t buf\_size ) - Function for writing data to memmory
- void sram3\_secure\_write( uint32\_t mem\_adr, uint8\_t \*write\_buf ) - Function for writing data to memmory with crc checksum for data validation

## Examples description

The application is composed of three sections :

- System Initialization - Initialization of SPI module
- Application Initialization - Configures SPI module
- Application Task - Writes "MikroE" to memory location 0x00 and reads from it

The full application code, and ready to use projects can be found on our [LibStock](#) page.

Other mikroE Libraries used in the example:

- SPI
- UART

## 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™](#)

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[mikroSDK](#)

[Click board™ Catalog](#)

[Click boards™](#)

## Downloads

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

[ANV32AA1WDK66 datasheet](#)

[SRAM 3 click example on Libstock](#)

[SRAM 3 click schematic](#)

[TXB0108 datasheet](#)

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