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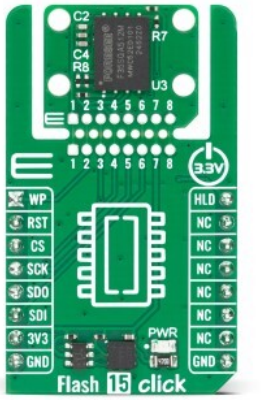
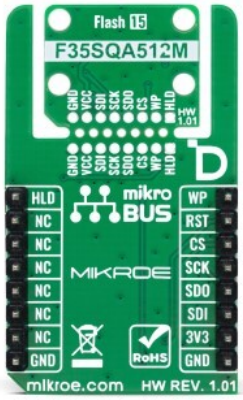
Flash 15 Click





PID: MIKROE-6955

Flash 15 Click is a compact add-on board designed for high-capacity non-volatile data storage in systems requiring fast serial flash memory expansion. This board is based on the F35SQA512M, a 512Mb Serial NAND Flash Memory from Lexar Enterprise. The F35SQA512M supports standard SPI, Dual SPI, and Quad SPI communication with clock frequencies up to 133MHz. It features a 64M + 2M byte memory cell array, 2k + 64 byte page size, 128k + 4k byte block size, JEDEC manufacturer and device identification, Unique ID, one parameter page, 62 OTP pages, and internal 1-bit ECC logic enabled by default. The board also includes Click Snap support, HOLD and Write Protect functions, and 3.3V logic-level operation. This Click board™ is suitable for data logging, firmware storage, configuration storage, image storage, industrial records, and general-purpose embedded memory expansion.

For more information about **Flash 15 Click** visit the official product page.

How does it work?

Flash 15 Click is based on the F35SQA512M, a 512Mb Serial NAND Flash Memory from Lexar Enterprise that operates from a single 3.3V supply and provides a memory solution for applications that need fast data storage. The F35SQA512M supports the standard Serial Peripheral Interface (SPI), as well as Dual and Quad SPI modes, allowing higher data throughput when supported by the host controller. The device is organized as a memory cell array of 64M + 2M bytes, with a page size of 2k + 64 bytes and a block size of 64 pages, equivalent to 128k + 4k bytes. This structure makes it suitable for page-based and block-based storage management, giving the host system a practical way to handle larger amounts of data while maintaining compatibility with serial NAND flash workflows. With SPI clock frequencies of up to 133MHz, Flash 15 Click is suitable for embedded applications such as data logging,

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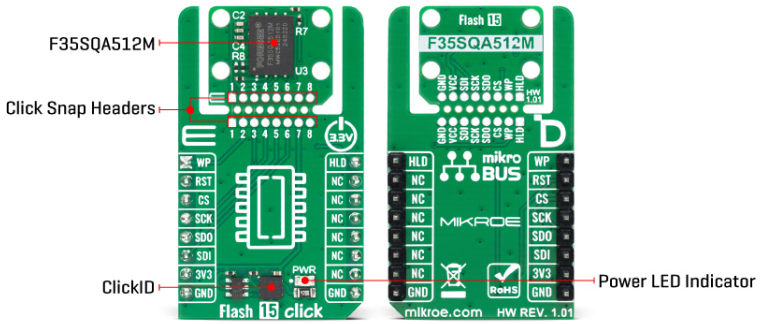

The F35SQA512M also supports JEDEC standard manufacturer and device identification, enabling device recognition during initialization and system diagnostics. In addition, it includes a Unique ID, one parameter page, and 62 OTP pages, allowing the system to store fixed or one-time programmable information when needed. An internal 1-bit ECC logic is integrated into the chip and enabled by default, helping improve data reliability by supporting error correction directly inside the memory device. This internal ECC function can also be disabled or enabled by command, giving engineers flexibility depending on whether error correction is managed internally by the flash memory or externally by the host system. The device offers an endurance rating of 100k cycles and a data retention specification of 10 years, based on 1-bit per 528-byte ECC operation.

This Click board™ is designed in a unique format supporting the newly introduced MIKROE feature called "Click Snap." Unlike the standardized version of Click boards, this feature allows the main sensor/IC/module area to become movable by breaking the PCB, opening many new possibilities for implementation. Thanks to the Snap feature, the F35SQA512M can operate autonomously by accessing its signals directly on the pins marked 1-8. Additionally, the Snap part includes a specified and fixed screw hole position, enabling users to secure the Snap board in their desired location.

Furthermore, the board features a HOLD function, marked as HLD pin of the mikroBUS™ socket. The hold function allows the suspension of serial communications without disrupting ongoing operations. The board also has a Write Protect feature, marked as WP pin of the mikroBUS™ socket, that safeguards all registers and memory from unintended write operations through both hardware and software mechanisms.

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. It also comes equipped with a library containing functions and example code that can be used as a reference for further development.

Click Snap

Click Snap is an innovative feature of our standardized Click add-on boards, designed to bring greater flexibility and optimize your prototypes. By simply snapping the PCB along predefined

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lines, you can easily detach the main sensor/IC/module area, reducing the overall size, weight, and power consumption - ideal for the final phase of prototyping. For more details about Click Snap, visit the official page dedicated to this feature.

Specifications

Type	FLASH
Applications	Ideal for data logging, firmware storage, configuration storage, image storage, industrial records, and general-purpose embedded memory expansion
On-board modules	F35SQA512M - 512Mb SPI NAND Flash Memory from Lexar Enterprise
Key Features	512Mb Serial NAND Flash Memory, single 3.3V operation, standard SPI interface, Dual SPI and Quad SPI support, 64M + 2M byte memory cell array, 2k + 64 byte page size, 64-page block size, 128k + 4k byte block organization, JEDEC standard manufacturer and device identification, Unique ID support, one parameter page, 62 OTP pages, internal 1-bit ECC logic enabled by default, command-configurable ECC enable and disable control, 100k cycle endurance, 10-year data retention, and more
Interface	QSPI,SPI
Feature	Click Snap,ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Flash 15 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS				Pin	Notes
Write Protect / IO2	**WP**	1	AN	PWM	16	**HLD**	Communication Pause / IO3
ID SEL	**RST**	2	RST	INT	15	NC	
SPI Select / ID COMM	**CS**	3	CS	RX	14	NC	
SPI Clock	**SCK**	4	SCK	TX	13	NC	
SPI Data OUT / IO1	**SDO**	5	MISO	SCL	12	NC	
SPI Data IN / IO0	**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

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Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator

Flash 15 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Memory Density	-	512	-	Mb
Endurance	-	100.000	-	cycles
Data Retention	10	-	-	years

Software Support

Flash 15 Click demo application is developed using the NECTO Studio, ensuring compatibility with mikroSDK's open-source libraries and tools. Designed for plug-and-play implementation and testing, the demo is fully compatible with all development, starter, and mikromedia boards featuring a mikroBUS™ socket.

Example Description

This example demonstrates the use of the Flash 15 Click board for basic flash memory operations. The application disables memory protection, erases a memory page, writes text data to the selected page and column, and then reads the written data back from memory.

Key Functions

- flash15_cfg_setup This function initializes Click configuration structure to initial values.
- flash15_init This function initializes all necessary pins and peripherals used for this Click board.
- flash15_memory_write This function writes a desired number of data bytes starting from the selected memory page and column.
- flash15_memory_read This function reads a desired number of data bytes starting from the selected memory page and column.
- flash15_erase_memory This function erases the memory block which contains the selected page address.

Application Init

Initializes the logger and Flash 15 Click driver, checks device communication, and disables memory protection.

Application Task

Erases the selected memory page, writes demo text messages to flash memory, and reads the stored data back for verification.

Application Output

This Click board can be interfaced and monitored in two ways:

- Application Output - Use the "Application Output" window in Debug mode for real-time data monitoring. Set it up properly by following this tutorial.
- UART Terminal - Monitor data via the UART Terminal using a USB to UART converter.

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For detailed instructions, check out this tutorial.

Additional Notes and Information

The complete application code and a ready-to-use project are available through the NECTO Studio Package Manager for direct installation in the NECTO Studio. The application code can also be found on the MIKROE GitHub account.

Resources

mikroBUS™

mikroSDK

Click board™ Catalog

Click boards™

ClickID

Downloads

Flash 15 click example package

Flash 15 click 2D and 3D files v101

Flash 15 click schematic v101

F35SQA512M datasheet