

LamaPLC: External FRAM memory module

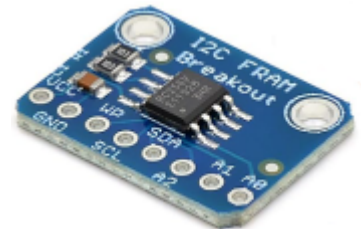
FRAM (*Ferroelectric RAM* or *F-RAM*) memory modules combine the fast write speeds and near-infinite endurance of RAM with the data persistence of traditional non-volatile storage (like Flash or EEPROM).

Key Advantages of FRAM Modules Over Flash/EEPROM

- **No Erase Cycle Required:** Unlike Flash memory, which forces you to erase an entire sector before writing, FRAM allows instant, bit-level or byte-level random writes.
- **Astronomical Endurance:** Supports up to 10^{14} (100 trillion) write cycles, which is millions of times higher than standard EEPROM or Flash.
- **Ultra-Low Power:** Consumes minimal energy during write operations because it doesn't require high-voltage charge pumps

MB85RC256 Non-Volatile FRAM Board with I²C communication

The MB85RC256 Non-Volatile FRAM Board is a high-performance memory breakout module built around Fujitsu's [MB85RC256V memory chip](#). It bridges the gap between RAM and EEPROM, offering non-volatile data persistence combined with instantaneous byte-level write speeds and extreme endurance.



MB85RC256 Technical Specifications

- **Memory Capacity:** 256 Kilobits (Kb), which translates to exactly 32 Kbytes (KB).
- **Memory Organization:** 32,768 words × 8 bits (byte-addressable from 0x0000 to 0x7FFF).
- **Operating Voltage:** 2.7V to 5.5V (fully compatible with 3.3V and 5V microcontrollers like Arduino, STM32, and ESP32).
- **Communication Interface:** Two-wire [I²C](#) Fast Mode Plus.
- **Max Clock Speed:** Up to 1.0 MHz. Read/Write Endurance: 1 Trillion (10^{12}) to 10 Trillion (10^{13}) cycles per byte.
- **Data Retention:** 95 years at +55°C, or up to 200+ years at +35°C.
- **Power Consumption:** 200 μ A maximum active operating current (at 1 MHz), and ~27 μ A standby current.

MB85RC256 Core Functional Mechanics

No Write Delay (Instantaneous Commit)

Traditional EEPROM or Flash memory requires an internal “charge pump” to burn data into the cells, forcing a 5ms to 10ms wait delay per write cycle. The MB85RC256 writes instantly at bus speed. It does not require a write-polling routine, completely eliminating data loss risk during sudden mid-write power failure.

I²C Addressing Flexibility

The device features a base binary slave address of 1010 (or 0x50). By hardwiring the address pins (A0, A1, A2) to either VCC or GND, you alter the final 3 bits of the address structure:

- All pins to GND: **I²C Address is 0x50 (Default).**
- All pins to VCC: I²C Address shifts to 0x57.

MB85RC256 Pinout

Pin Name	Function Type	Pin Description
VCC / VDD	Power Input	Input power line. Connect to 3.3V or 5V depending on system logic.
GND / VSS	Power Ground	Common system ground for power and logic return.
SDA	I ² C Logic Data	Serial Data line for bidirectional communication. Requires a pull-up resistor.
SCL	I ² C Logic Clock	Serial Clock line driven by the I ² C master device.
WP	Digital Input	Write Protect pin. Connect to VCC to lock memory against writes. Pulled down internally (write-enabled by default).
A0	Hardware Address	Sets bit 0 of the I ² C slave address suffix. Connect to VCC or GND.
A1	Hardware Address	Sets bit 1 of the I ² C slave address suffix. Connect to VCC or GND.
A2	Hardware Address	Sets bit 2 of the I ² C slave address suffix. Connect to VCC or GND.

I²C topics on lamaPLC

Page	Date	Tags
• lamaPLC Communication: 1-Wire	2026/04/23 21:51	1-wire , communication , bus , microlan , i2c , uart , usart , ds18b20
• lamaPLC Communication: I²C	2025/09/23 21:25	i2c , i c , smbus , philips , bus , communication , arduino
• lamaPLC project: Sension SCD CO² measurement module	2026/04/15 19:34	scd30 , scd40 , scd41 , iaq , ndir , sensor , i2c , arduino code
• LamaPLC: AHT10 Modul	2026/03/22 03:14	communication , i2c , temperature , humidity , sensor , aht , aht 10 , modul
• LamaPLC: AHT20 / BMP280 Modul	2026/04/23 21:52	bmp280 , aht20 , adafruit , temperature , humidity , pressure , sensor , arduino , code , i2c
• LamaPLC: APDS - Avago ALS and proximity detection sensors with I²C communication	2026/04/23 21:52	avago , apds-9900 , apds-9930 , apds-9960 , als , proximity , detection , gesture recognition , gesture , i2c , communication , sensor , arduino , code
• lamaPLC: Arduino Modul: BME680	2026/05/12 18:40	code , c , 2026 , arduino , bme680 , sensor , i2c , comunication
• lamaPLC: AS5600 Magnetic Induction Angle Measurement Sensor Module	2026/05/13 00:06	communication , i2c , as5600 , as-5600 , magnetic , induction , angle , sensor
• lamaPLC: Bi-Directional Logic Level Converter 3.3V ↔ 5V	2026/04/12 00:34	bi-directional , logic level converter , i2c , uart , spi

• LamaPLC: BMP/BME Bosch Temperature/Humidity/Pressure sensors with I ² C communication	2026/04/23 21:52	bme280, bme680, bme688, bmp180, bmp280, hw-611, hw611, bosch, temperature, humidity, pressure, sensor, arduino, i2c, communication, ai, cjmcu, volatile organic compounds, vocs, volatile sulfur compounds, vscs, iaq
• LamaPLC: CJMCU-219/INA-219 breakout board/IC with I ² C communication	2026/04/23 21:52	cjmcu-219, ina-219, ina219, breakout board, i2c, communication, sensor, voltage, current, arduino, code, cjmcu
• LamaPLC: CJMCU-3216 / AP-3216 integrated digital ambient light and proximity sensor module/IC with I ² C communication	2026/04/23 21:52	cjmcu-3216, cjmcu, ap-3216, ap3216, ambient light, proximity, sensor, arduino, code, i2c, communication
• LamaPLC: CJMCU-811 CCS811 Gas Sensor (VOCs TVOC CO ₂)	2026/04/23 21:52	cjmcu-811, ccs811, gas, sensor, vocs, tvoc, eco2, co2, arduino, air quality metal oxide, mox, i2c, micropython, rp2040-eth
• LamaPLC: D6T Omron Non-Contact Thermal Sensors with I ² C communication	2026/04/23 21:52	d6t, d6t-32l, d6t-44l, d6t-8l, d6t-1a, omron, non-contact, thermal, sensor, i2c, arduino, code
• LamaPLC: Digital-to-Analog Converter (DAC) modules	2026/07/28 21:45	communication, i2c, dac, modul, mcp4728, mcp4725, mcp47a1, gp8413
• LamaPLC: DPS Infineon Temperature/Pressure sensors with I ² C communication	2026/04/23 21:52	dps310, infineon, temperature, pressure, sensor, arduino, i2c, communication, code
• LamaPLC: Energy, power, current, and voltage	2025/05/31 23:32	i2c, i c, communication, arduino, energy, power, current, sensor, ina226
• LamaPLC: ENS ScioSense Multi-gas sensors with I ² C communication	2026/04/23 21:52	ens160, sciosense, gas-quality, i2c, communication, sensor, arduino, code, eco ₂ , tvoc, aqi, indoor air quality, iaq, co ₂ , voc
• LamaPLC: ESP32 / ESP8266	2025/11/22 00:07	esp8266, esp32, esp32-c2, esp32-c3, esp32-c5, esp32-c6, esp32-c61, esp32-h2, esp32-s2, esp32-s3, esp32-p4, espressif systems, communication, ethernet, ip, wi-fi, thread, zigbee, matter, homekit, bluetooth, mqtt, adc, spi, uart, i2c, i2s, rmt, pwm, usb, usb otg, twai
• LamaPLC: External FRAM memory module	2026/07/28 22:33	communication, i2c, module, memory, fram, 32kb, mb85rc256, mb85rc256v
• LamaPLC: Gas sensors	2023/07/01 17:29	gas, sensor, i2c, onewire, communication, mq-3, mq-4, mq-5, mq-6, mq-7, mq-8, mq-9, mq-135, gm-102b, gm-302b, gm-502b, gm-702b, alcohol, ch4, natural gas, smoke, lng, co, co2, lpg, h2, iso-butane, nox, nh3, benzene, town gas, formaldehyde, propane, humidity, temperature, voc, grv gas sens v2

• lamaPLC: GY-511 6DOF sensor module	2026/04/23 21:52	stmicroelectronics , lsm303dlhc , i2c , lsm303 , sensor , gy-511 , 6dof , pololu , module , arduino
• LamaPLC: GY-9250 MPU-9250/6500 9-axis Attitude Sensor Board	2026/04/23 21:52	ak8963 , gy-9250 , mpu-9250 , 9-axis , motion detection , magnetometer , communication , i c , i2c , spi
• LamaPLC: HDC Texas Instruments Temperature/humidity sensors with I²C communication	2026/04/23 21:52	sht21 , htu21 , si7021 , gy-21 , gy-213v , hdc1080 , gy-213v-hdc1080 , cjmcu , cjmcu-1080 , texas instruments , temperature , humidity , sensor , i2c , communication , arduino , code
• lamaPLC: HT16K33 display controller	2026/04/23 21:51	i2c , 7-segment display , display , ht16k33 , arduino
• LamaPLC: HTU TE Connectivity temperature/humidity sensors with I²C communication	2026/04/23 21:52	htu , htu31d , htu21d , htu20d , sht20 , htu20 , sht21 , htu21 , si7021 , gy-21 , gy-213v , hdc1080 , si702 , gy-20 , sht31 , htu31 , si7031 , gy-31 , te connectivity , temperature , humidity , i2c , communication , sensor , arduino , code
• lamaPLC: INA modules with Arduino libraries	2026/04/23 21:52	i2c , i c , communication , arduino , energy , power , current , monitor , sensor , ina219 , gy-219 , ina226 , gy-216 , ina228 , gy-228 , ina237 , ina238 , ina260 , ina3221 , ina
• lamaPLC: INA226 - current/voltage/power monitor with I²C communication	2026/04/23 21:52	i2c , i c , communication , arduino , energy , power , current , monitor , sensor , ina226 , ina219 , ina
• lamaPLC: LCD 1602/2004 with I²C communication	2026/02/14 18:27	communication , i2c , display , lcd , 1602 , 2004 , hd44780 , pcf8574 , pcf8574t , pcf8574at , arduino
• LamaPLC: MAX30100/MAX30102 Heart Rate Click Sensor Module	2026/04/23 21:52	max30102 , max30100 , heart rate click , sensor , communication , i2c , arduino , code
• lamaPLC: MCP23017 / MCP23S17 16-Bit I/O Expander with Serial Interface I²C / SPI	2026/04/23 21:52	communication , i2c , mcp23017 , mcp23s17 , spi , i o expander , serial , cjmcu-2317 , cjmcu
• lamaPLC: MLX90614 (GY-906) infrared non-contact thermometer	2026/05/08 00:03	communication , i2c , temperature , mlx90614 , gy-906 , modul , infrared , non-contact thermometer , dsp , pwm , smbus , hailege
• lamaPLC: PCF857x I/O Expander chip/modul with I²C communication	2026/05/15 01:03	communication , i2c , pcf857x , pcf8574 , pcf8574a , pcf8575 , i o expander , i o extension , nxp , texas instruments
• LamaPLC: Pixart PAJ7620U2 Gesture recognition sensors/module with I²C communication	2026/04/23 21:52	paj7620u2 , gy-paj7620 , pixart , gesture recognition , i2c , communication , sensor , arduino , code
• lamaPLC: Raspberries	2026/07/07 19:15	raspberry , rp2040 , rp2350 , rp2040 zero , rp2040 eth , pi pico h , pi pico w , pi pico wh , raspberry pi pico , pi pico 2 , i2c , microcontroller
• lamaPLC: RP2040_ETH_Modul: I²C scanner	2026/05/12 16:20	code , micropython , 2026 , rp2040 eth , i2c , comunication

• lamaPLC: RP2040_ETH_Modul: MLX90614 simple	2026/05/12 17:06	code, micropython, 2026, rp2040 eth, i2c, communication, mlx90614
• lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data	2026/05/12 21:06	code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication
• lamaPLC: RP2040_ETH_Modul: Read BME 680/688 sensor data and store in Modbus input registers	2026/05/12 21:04	code, micropython, 2026, rp2040 eth, bme680, i2c, sensor, communication
• LamaPLC: SC16IS750 / SC16IS752: One or two serial (UART) ports from microcontroller via I ² C or SPI communication	2026/04/23 21:52	cjmcu-750, cjmcu-752, cjmcu, nxp, sc16is750, sc16is752, uart, serial, i2c, spi, modul, converter, arduino, code sgp30, sgp40, sgp41, sensirion, gas-sensor, i2c, communication, sensor, arduino, code, eco2, voc, tvoc, indoor air quality, iaq, nox, hydrogen
• LamaPLC: SGP Sensirion TVOC/VOC sensors with I ² C communication	2026/04/15 19:41	sht20, sht21, sht25, sht30, sht31, sht35, sht40, gy21, temperature, humidity, i2c, communication, sensor, arduino, code
• LamaPLC: SHT Sensirion Temperature/humidity sensor with I ² C communication	2026/04/23 21:52	
• lamaPLC: Signal level converters	2026/02/14 23:47	pca9306, i2c, voltage, level, converter
• lamaPLC: st756x display drivers	2026/05/20 16:41	display, driver, i2c, spi, lcd, cog, oled, st7565, st7567, gm12864, gm12864-59n, gm12864-03a, gm12864-01a, gme12864-41
• lamaPLC: TCA9548A (HW617); Low-Voltage 8-Channel I ² C Switch Module	2026/02/14 23:51	tca9548a, hw617, i2c, switch, communication, expansion board, arduino
• lamaPLC: TM1637 7-segment display	2026/02/14 18:26	i2c, 7-segment display, display, tm1637, arduino
• LamaPLC: TOFnnnC STMicroelectronics Time-of-Flight (ToF) sensors with I ² C communication	2026/04/23 21:52	tof050c, vl6180, tof200c, vl53l0x, tof400c, vl53l1x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• LamaPLC: VL53Lnn STMicroelectronics time-of-flight (ToF) laser-ranging sensors with I ² C communication	2026/04/23 21:52	vl53l0x, vl53l1x, vl53l0 1xv2, gy-530, time-of-flight, tof, laser-ranging, i2c, communication, sensor, arduino, code
• LamaPLC: VL6180X STMicroelectronics Time-of-Flight (ToF) sensor with I ² C communication	2026/04/23 21:52	vl6180x, stmicroelectronics, time-of-flight, tof, i2c, communication, sensor, arduino, code
• lamaPLC: XGZP68xx: Silicon Pressure Sensors/Module	2026/05/15 15:17	communication, i2c, sensor, modul, pressure, cfsensor, xgzp68xx, xgzp6810d, xgzp6857d, xgzp6859d, xgzp6887d, xgzp6897d, xgzp6899a, piezoresistive, capacitive
• Magnetic angle sensors	2026/04/23 21:52	magnetic angle sensor, magnetic flux, sensor, spi, i2c, pwm, communication, modul, as5047p, as5600, mt6701, mt6816, mt6835, tle5012b, amr, gmr, tmr, anisotropic magnetoresistive
• SSH1106/SSD1306 OLED Display with I ² C communication	2026/02/14 18:27	i2c, oled, display, ssd1306, sh1106, ssh1106, arduino, cmos

[communication](#), [i2c](#), [module](#), [memory](#), [FRAM](#), [32KB](#), [MB85RC256](#), [MB85RC256V](#)

This page has been accessed for: Today: 5, Until now: 11

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Last update: **2026/07/28 22:55**

