

# BMM150 Magnetometer Module Product Brief

Compact 3-axis digital magnetometer for orientation sensing and navigation applications

Version: 1.0

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## Introduction

The **BMM150** is a compact, ultra-low-power 3-axis digital magnetometer designed for accurate orientation sensing, electronic compass applications, and inertial navigation. Its versatile I<sup>2</sup>C and SPI interfaces ensure easy integration with popular platforms such as Arduino, ESP32, and Raspberry Pi.

./images/product.jpg

## Functional Description

The BMM150 measures the magnetic field in three perpendicular axes (X, Y, Z), allowing precise heading calculation in static and dynamic environments. It compensates for soft and hard iron distortions and can be used in combination with an accelerometer and gyroscope for sensor fusion applications (e.g., 9DoF IMU).

- Measurement Range:  $\pm 1300 \mu\text{T}$  (X, Y axis),  $\pm 2500 \mu\text{T}$  (Z axis)
- Output Data Rate: Up to 30 Hz (configurable)
- Communication Interface: I<sup>2</sup>C (up to 400 kHz) or SPI (up to 10 MHz)
- Supply Voltage: 1.8V to 3.6V (typically 3.3V)

## Electrical Characteristics

- Operating Voltage: 1.8V – 3.6V
- Interface Logic Level: 3.3V
- Typical Current Consumption: 170  $\mu\text{A}$  in normal mode
- Standby Current:  $\leq 1 \mu\text{A}$
- Interface: I<sup>2</sup>C / SPI (selectable via hardware)

## Features

- 3-axis magnetic field sensing
- Low power consumption for battery-operated devices
- Fast startup time
- Integrated self-test and temperature sensor
- Fully calibrated digital output

## Applications

- Electronic compass
- Augmented reality (AR) and virtual reality (VR)
- Robotics and drones (UAV)
- Navigation systems (GNSS enhancement)
- Wearable tracking devices

## Settings

### Interface Overview

Interface	Signals / Pins	Typical Use
Power	VCC, GND	Power supply
I <sup>2</sup> C	SDA, SCL	Communication with MCU
SPI	MOSI, MISO, SCK, CSB	High-speed SPI communication

### Supported Pins

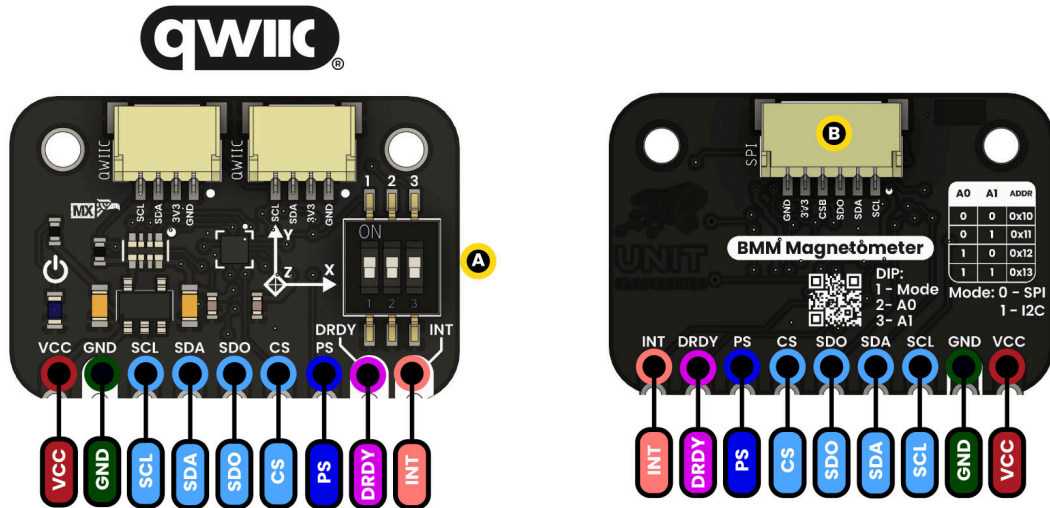
Symbol	I/O	Description
VCC	Input	Power supply (3.3V)
GND	GND	Ground reference
SDA	I/O	I <sup>2</sup> C Data / SPI MOSI
SCL	I	I <sup>2</sup> C Clock / SPI SCK
CSB	I	SPI Chip Select (Active Low)
SDO	O	SPI MISO / I <sup>2</sup> C address selector

### Pin & Connector Layout

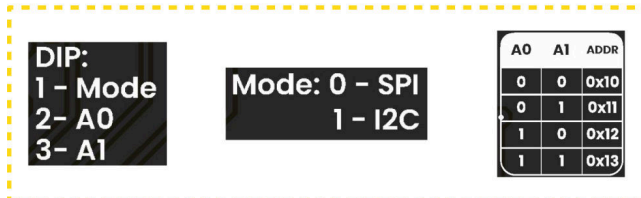
Pin	Name	Description
1	VCC	3.3V supply input
2	GND	Ground
3	SDA/MOSI	I <sup>2</sup> C data / SPI MOSI
4	SCL/SCK	I <sup>2</sup> C clock / SPI clock
5	CSB	SPI chip select (active low)
6	SDO/SA0	SPI MISO / I <sup>2</sup> C address select

## Block Diagram

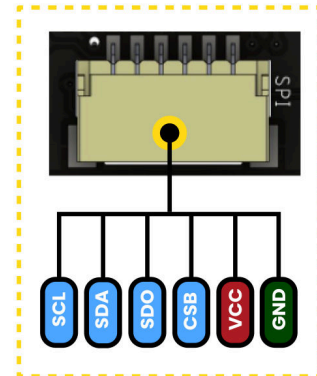
# BMM150 Magnetometer I2C



## A Dip Switch



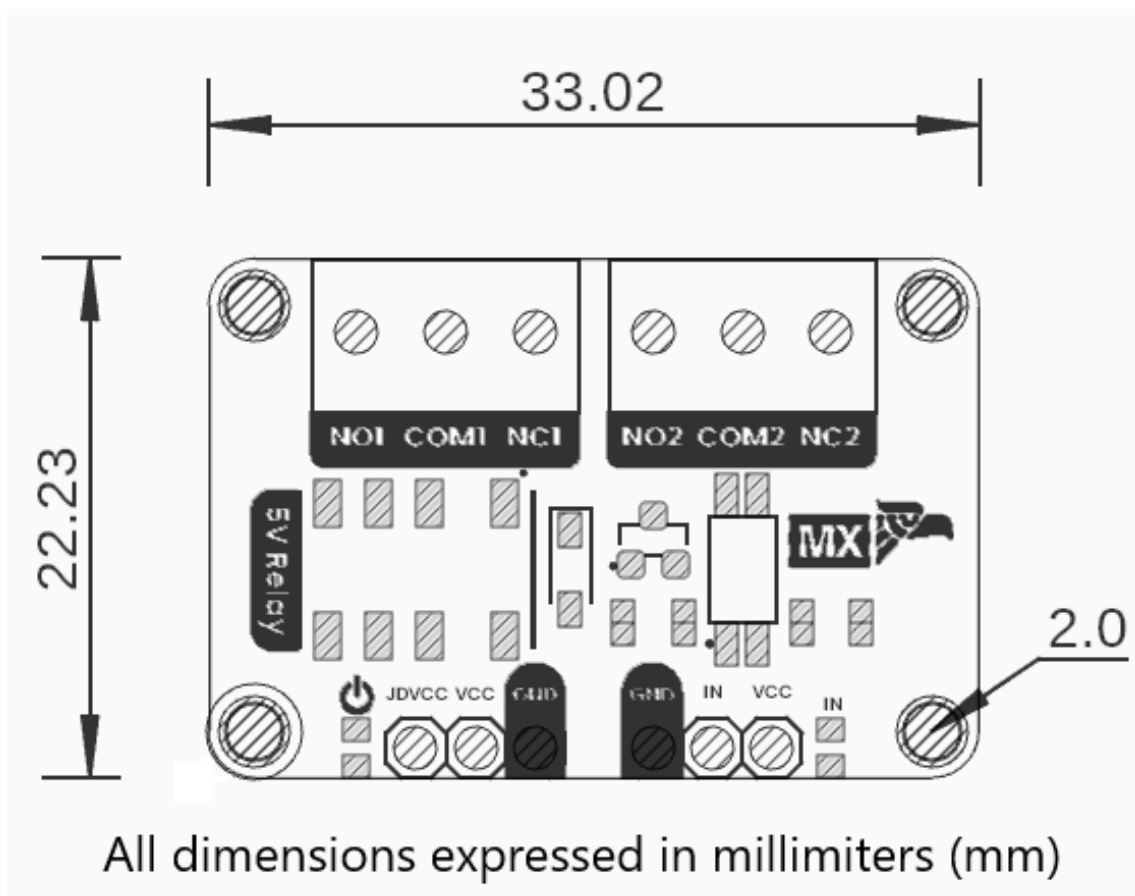
## B JST



## Description:



## Dimensions



## Usage

- Arduino UNO / Nano
- ESP32 / ESP8266
- Raspberry Pi / RP2040 boards
- STM32, CH32V, and other I<sup>2</sup>C/SPI capable MCUs

## Downloads

- Datasheet - BMM150 (Bosch)
- Example Code - Arduino
- Schematic PDF

## Purchase

- Buy from UNIT Electronics