

# LSM6DSOX & LIS3MDL 9 DoF IMU Breakout Board

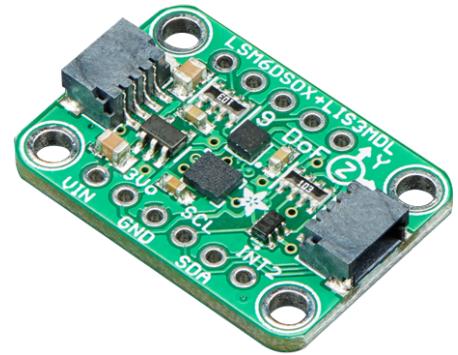
## Product Overview

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## Description

Adafruit LSM6DSOX and LIS3MDL 9 DoF IMU Breakout Board adds a direction, high-quality motion, and orientation sensing to an Arduino project. This board includes a 6-DoF IMU accelerometer, LSM6DSOX, and a gyroscope. This breakout board features two chips that sit side-by-side to provide 9 degrees of full-motion data. The 3-axis gyroscope can measure twist and spin. This sensor from ST has very low noise and gyro zero rates, compared to LSM6DS33 and MPU6050, which is excellent for orientation fusion change, which results in faster responses and drift.



The LSM6DSOX has flexible ranges and data rates.  $\pm 2/\pm 4/\pm 8/\pm 16$ g at 1.6Hz to 6.7KHz update rate for acceleration,  $\pm 125/\pm 250/\pm 500/\pm 1000/\pm 2000$ dps at 12.5Hz to 6.7KHz for the gyroscope. The device also includes activity detection, a pedometer/step counter, built-in tap detection, and a programmable finite state machine/machine learning core that can perform some basic gesture recognition. The breakout board features a LIS3MDL 3-axis magnetometer that senses from where the strongest magnetic force is coming and generally detects magnetic north. The three triple-axis sensors add up to 9 degrees of freedom by combining this data.

These sensors are placed on a compact breakout board with level-shifted inputs and voltage regulation and can be used with 3V or 5V power/logic devices. From each chip, only the I<sup>2</sup>C interface and some pins are interrupted. The breakout comes fully tested and assembled with some extra headers so the user can use it on a breadboard and four mounting holes make a secure connection. Since it has I<sup>2</sup>C, it can be connected with two wires plus power and ground. Since the SparkFun qwiic compatible STEMMA QT connectors have been included with the I<sup>2</sup>C bus, there is no need for soldering. Using the STEMMA QT adapter cable, the user can wire up to a favorite microcontroller like the STM32F405 feather to get 6-DoF data right away.

The I<sup>2</sup>C addresses can be changed on the back using the solder jumpers, to have two of these sensor boards on one bus. Libraries are written by Adafruit to help get these sensors integrated for Arduino/C++ and this library covers the accel/gyro and the magnetometer. For advanced Arduino usage ST has a fully-featured library that includes extras such as tap detection for the LSM6DSOX and for the LIS3MDL magnetometer.

## Features

- **LSM6DSOX:**

- Accelerometer:  $\pm 2/\pm 4/\pm 8/\pm 16\text{g}$  at 1.6Hz to 6.7KHz update rate
- Gyroscope:  $\pm 125/\pm 250/\pm 500/\pm 1000/\pm 2000\text{dps}$  at 12.5Hz to 6.7KHz
- Continuous and single-conversion modes
- Advanced pedometer, step detector, and step counter
- Significant motion detection and tilt detection
- Standard interrupts: free-fall, wakeup, 6D/4D orientation, click and double-click
- Programmable finite state machine: accelerometer, gyroscope, and external sensors
- Machine learning core
- I<sup>2</sup>C Address 0x6A or 0x6B

- **LIS3MDL:**

- $\pm 4/\pm 8/\pm 12/\pm 16$  gauss selectable magnetic full scales
- Continuous and single-conversion modes
- 16-bit data output
- Interrupt generator
- I<sup>2</sup>C address 0x1C or 0x1E

## Mouser Part Number

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