Adafruit LSM6DSOX + LIS3MDL FeatherWing – Precision 9-DoF IMU

PRODUCT ID: 4565

Upgrade any Feather board with precision motion sensing with the ST 9-DoF IMU, an all-in-one sensing 'Wing. It sports two fantastic sensors from ST to provide 9 degrees of full-motion data.

The board includes an LSM6DSOX, a 6-DoF IMU accelerometer + gyro. The 3-axis accelerometer can tell you which direction is down towards the Earth (by measuring gravity) or how fast the board is accelerating in 3D space. The 3-axis gyroscope can measure spin and twist. This new sensor from ST has very low gyro zero rate and noise, compared to the MPU6050 or even LSM6DS33 so it's excellent for orientation fusion usage: you'll get less drift and faster responses.

The LSM6DSOX has flexible data rates and ranges. For the accelerometer: ±2/±4/±8/±16 g at 1.6 Hz to 6.7KHz update rate. For the gyroscope: ±125/±250/±500/±1000/±2000 dps at 12.5 Hz to 6.7 KHz. There are also some nice extras, such as built-in tap detection, activity detection, pedometer/step counter, and a programmable finite state machine / machine learning core that can perform some basic gesture recognition.

It also includes a LIS3MDL 3-axis magnetometer that can sense where the strongest magnetic force is coming from, generally used to detect magnetic north. The three triple-axis sensors add up to 9 degrees of freedom, by combining this data you can orient the board. Check out our guide on how to do that!

Both sensors are connected over the shared I2C bus, so you can use it with any and all Feathers! We also break out the interrupt pins and address-selection jumpers in case you want multiple Feathers or have I2C address conflicts. We've got both Arduino (C/C++) and CircuitPython libraries available so you can use it with any Feather board and get data readings in under 5 minutes. Four mounting holes make for a secure connection.

Additionally, since it speaks I2C you can easily connect it up with two wires (plus power and ground!). We've even included a SparkFun qwiic compatible STEMMA QT connector for the I2C bus so you don't even need to solder to connect more of your favorite ST sensors like the LPS25! Simply connect a plug-and-play cable to more sensor data, OLED displays, or other I2C devices connected ASAP.

We also wrote libraries to help you get these sensors integrated with your Arduino/C++. This library covers the accel/gyro and this library is for the magnetometer. For advanced Arduino usage, ST has their own fully-featured library that includes extras such as FIFO management and tap detection for the LSM6DSOX and also for the LIS3MDL magnetometer.

Comes fully tested and assembled with a bit of standard 0.1" header.
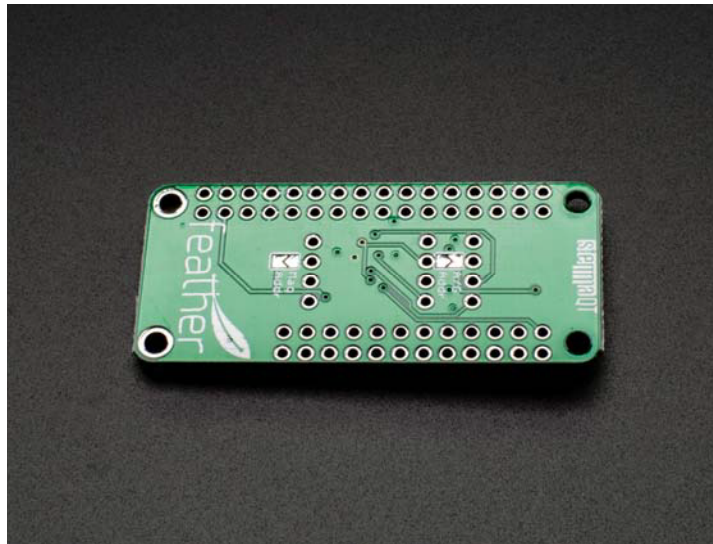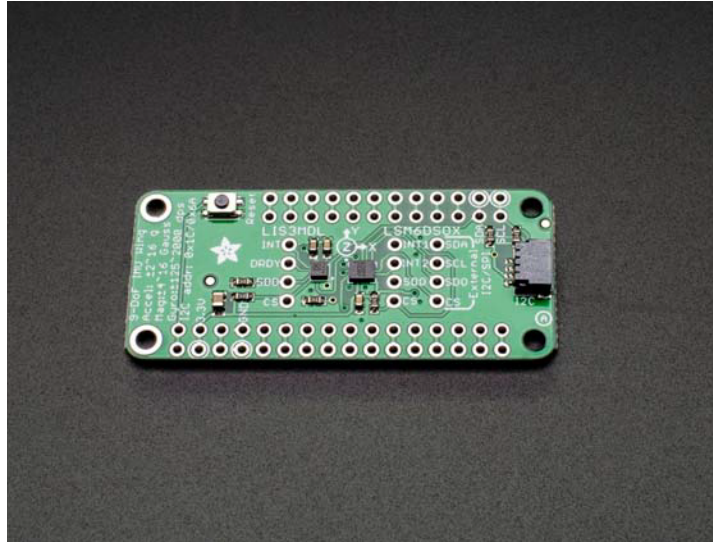
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TECHNICAL DETAILS

LSM6DSOX Specifications:

- Accelerometer ±2/±4/±8/±16 g at 1.6 Hz to 6.7KHz update rate
- Gyroscope: ±125/±250/±500/±1000/±2000 dps at 12.5 Hz to 6.7 KHz
- Continuous and single-conversion modes
- Advanced pedometer, step detector and step counter
- Significant Motion Detection, 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
- I2C Address 0x6A or 0x6B

LIS3MDL Specifications:

- ±4/±8/±12/±16 gauss selectable magnetic full scales
- Continuous and single-conversion modes
- 16-bit data output
- Interrupt generator
- I2C Address 0x1C or 0x1E

https://www.adafruit.com/product/4565/6-4-20