

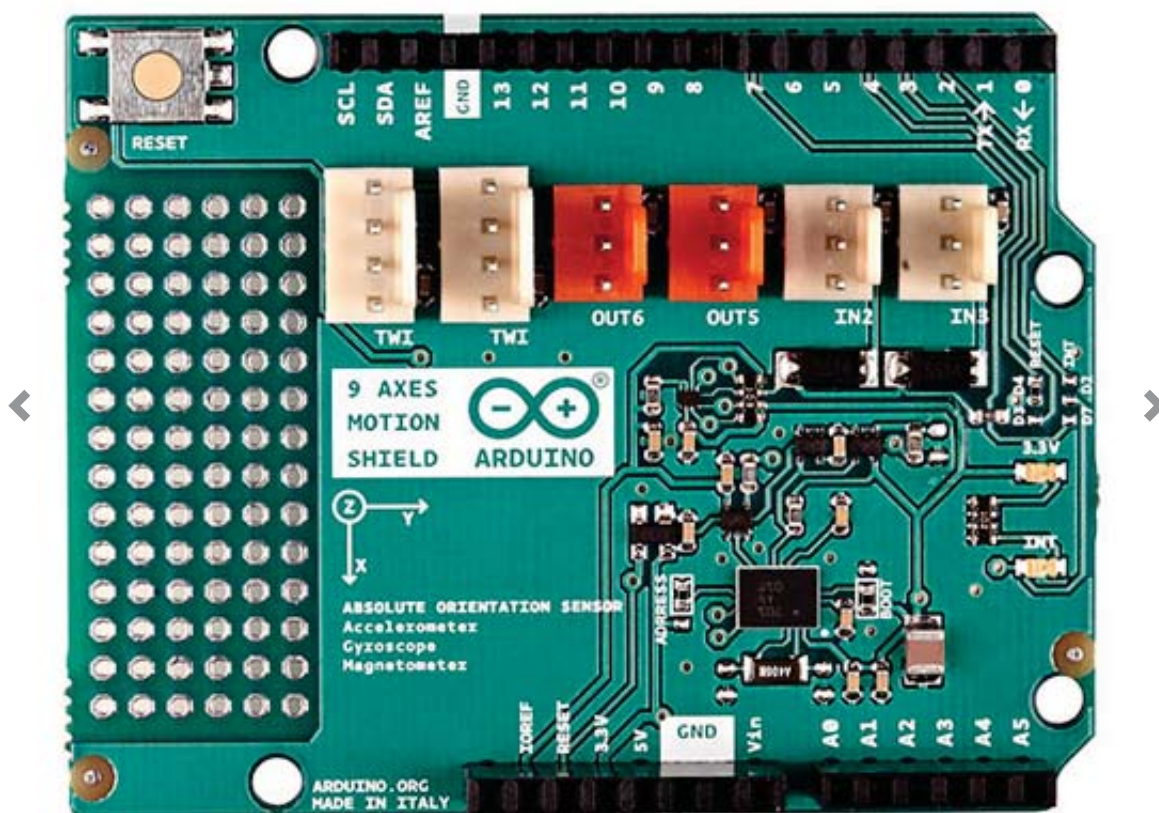
# Arduino 9 Axes Motion Shield

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## Overview

The Arduino 9 Axes Motion Shield is based on the BNO055 absolute orientation sensor (datasheet ([http://ae-bst.resource.bosch.com/media/products/dokumente/bno055/BST\\_BNO055\\_DS000\\_12~1.pdf](http://ae-bst.resource.bosch.com/media/products/dokumente/bno055/BST_BNO055_DS000_12~1.pdf))) from Bosch Sensortec GmbH.

The BNO055 is a System in Package (SiP), integrating a triaxial 14-bit accelerometer, a triaxial 16-bit gyroscope with a range of  $\pm 2000$  degrees per second, a triaxial geomagnetic sensor and a 32-bit microcontroller running the BSX3.0 FusionLib software.

The sensor features three-dimensional acceleration, yaw rate and magnetic field strength data each in 3 perpendicular axes.

It also provides the sensor fusion signals such as

- Quaternion
- Euler angles
- Rotation vector
- Linear acceleration
- Gravity vector

In addition, it incorporates an intelligent interrupt engine, which allows for triggering interrupts based on

- slow or no motion recognition
- any motion (slope) detection
- high-g-detection.

The shield is TinkerKit compatible, which means you can quickly create projects by plugging TinkerKit modules to the board.

## Summary

Operating Voltage	5V
Power Consumption	50mW

## Schematic & Reference Design

EAGLE files: [arduino\\_9AxesShield-reference-design.zip](http://download.arduino.org/products/9AXESMOTIONSHIELD/9-AxesMotion-Shield-V8_rd.zip)  
([http://download.arduino.org/products/9AXESMOTIONSHIELD/9-AxesMotion-Shield-V8\\_rd.zip](http://download.arduino.org/products/9AXESMOTIONSHIELD/9-AxesMotion-Shield-V8_rd.zip))  
Schematic: [arduino\\_9AxesShield-schematic.pdf](http://download.arduino.org/products/9AXESMOTIONSHIELD/9-AxesMotion-Shield-V8-SCH.pdf)  
(<http://download.arduino.org/products/9AXESMOTIONSHIELD/9-AxesMotion-Shield-V8-SCH.pdf>)

## Power

The Arduino 9 Axes Motion Shield has no power jack and is powered only when attached to an Arduino board.

# Input and Output

The shield features several TinkerKit input/output and communication interfaces. Connecting TinkerKit modules can simplify the creation of a project or a prototype.

The on-board connectors are :

- **2 TinkerKit Inputs:** IN2 and IN3 (in white), these connectors are routed to the Arduino A2 and A3 analog input pins.
- **2 TinkerKit Outputs:** OUT5 and OUT6 (in orange), these connectors are routed to the Arduino PWM outputs on pins 5 and 6.
- **2 TinkerKit TWI:** these connectors (4-pin in white) are routed on the Arduino TWI interface. Both connect to the same TWI interface to allow you to create a chain of TWI devices.

# Physical Characteristics

The maximum length and width of the 9 Axes Motion Shield PCB are 2.7 and 2.1 inches respectively. Four screw holes allow the board to be attached to a surface or case. Note that the distance between digital pins 7 and 8 is 160 mil (0.16"), not an even multiple of the 100 mil spacing of the other pins.

# Compatibility

The Arduino 9 Axes Motion Shield is compatible with Uno, Yùn, Leonardo, Ethernet, Mega and Due boards. When using the Arduino 9 Axes Motion Shield, be sure to solder the Interrupt bridge and Reset bridge in the correct position depending on the board used. See table:

BOARD	INTERRUPT PIN	RESET PIN
Arduino Uno	D2	D4
Arduino Leonardo	D7	D4
Arduino Yun	D7	D4
Arduino Ethernet	D2	D4
Arduino Due	D2	D4
Arduino Mega	D2	D4

For example to use 9 Axes Motion Shield with ArduinoUNO solder the Interrupt bridge on the pin D2.



## Programming

The 9 Axes Motion Shield can be programmed with the Arduino software (download (/downloads)).

## Examples

In the Arduino IDE you will find the following examples, go to File -> Examples of Arduino IDE, under NAxesMotion, there are 4 sketches for the use of 9 Axes Motion Shield:

- Accelerometer  
Example code to stream Accelerometer data
- BareMinimum  
Example code to describe the Bare Minimum
- Euler  
Example code to stream Euler data
- Motion  
Example code of a game to demonstrate the Any motion and No motion Interrupt features

## Conformity Declaration

EC

([http://download.arduino.org/products/9AXESMOTIONSHIELD/Declaration\\_CE\\_9\\_Axys\\_Shield.pdf](http://download.arduino.org/products/9AXESMOTIONSHIELD/Declaration_CE_9_Axys_Shield.pdf))

RoHS

([http://download.arduino.org/products/9AXESMOTIONSHIELD/Declaration\\_RoHS\\_9\\_Axys\\_Shield.pdf](http://download.arduino.org/products/9AXESMOTIONSHIELD/Declaration_RoHS_9_Axys_Shield.pdf))