

# UNIT BNO055 Module Product Brief

9-DOF Absolute Orientation Sensor Module with Selectable UART/I<sup>2</sup>C Interface

Version: 1.0

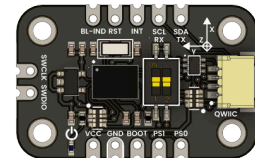
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## Introduction

The UNIT BNO055 Module integrates a 9-axis absolute orientation sensor into a compact, ready-to-use form factor. It combines an accelerometer, gyroscope, and magnetometer with an onboard microcontroller running sensor fusion algorithms, delivering orientation data such as quaternions, Euler angles, and gravity vectors directly via serial or I<sup>2</sup>C communication.

This version includes a built-in DIP switch for selecting between \*\*I<sup>2</sup>C and UART interfaces\*\* by configuring the BNO055's 'PS0' and 'PS1' pins without the need for jumpers or solder bridges.

The module is ideal for robotics, drones, VR/AR, and IoT systems requiring accurate orientation tracking with minimal software overhead.



## Functional Description

The BNO055 sensor provides complete 9-DOF sensing with onboard sensor fusion, freeing the host microcontroller from complex processing tasks. The communication protocol can be toggled between I<sup>2</sup>C and UART using an onboard DIP switch connected to 'PS0' and 'PS1'.

The board includes labeled pins and a QWIIC-compatible JST-SH connector for quick connection to development platforms. An interrupt output (INT) can be used to signal motion or orientation events to the host MCU.

## Electrical Characteristics

- Operating voltage: 3.3 V (typical)
- Logic compatibility: 3.3 V
- Interfaces: I<sup>2</sup>C or UART (selectable via PS0/PS1 DIP switch)
- Accelerometer ranges:  $\pm 2g$ ,  $\pm 4g$ ,  $\pm 8g$ ,  $\pm 16g$
- Gyroscope ranges:  $\pm 125$  to  $\pm 2000$  deg/s
- Magnetometer range:  $\pm 1.3$  to  $\pm 8.1$  gauss
- Output data: Euler angles, quaternions, linear acceleration, gravity vector
- Interrupt output: configurable for orientation or motion events

## Features

- BNO055 with onboard sensor fusion
- DIP-switch interface selection (I<sup>2</sup>C/UART)
- Breadboard-friendly pin headers
- QWIIC-compatible connector
- Interrupt pin for event signaling
- Compact, labeled module for easy integration

## Applications

- Robotics orientation and balancing
- Wearable motion tracking
- VR/AR head tracking
- Gesture interfaces
- Autonomous navigation systems
- Motion-activated devices

## Settings

### Interface Overview

Interface	Signals / Pins	Typical Use
I2C	SDA, SCL	Default communication with microcontroller
UART	TX, RX (via SDA, SCL)	Alternative communication protocol
GPIO	PS0, PS1	Protocol selection (via onboard DIP switch)
Interrupt	INT	Orientation or motion event signaling

### DIP Switch Configuration

Symbol	I/O	Description
SDA	I/O	I2C data / UART TX (shared)
SCL	I/O	I2C clock / UART RX (shared)
PS0	I	BNO055 protocol select (bit 0, via DIP)
PS1	I	BNO055 protocol select (bit 1, via DIP)
INT	O	Motion/interrupt signal output

### Pin & Connector Layout

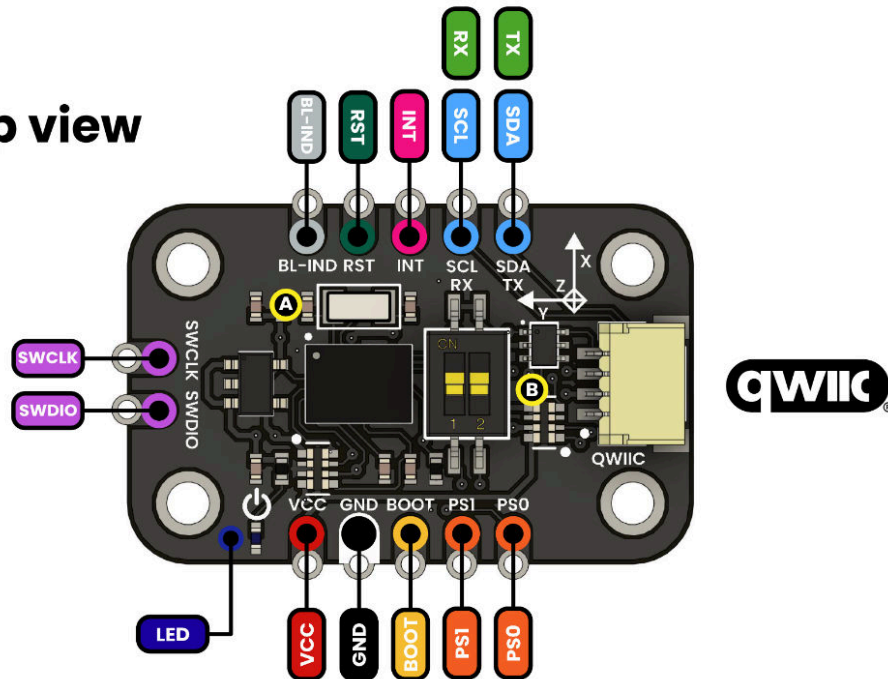
PIN	Description
VCC	Power supply input (3.3 V)
GND	Ground
SDA	I2C data / UART TX (configurable)
SCL	I2C clock / UART RX (configurable)
PS0	Protocol select bit 0 (via DIP)
PS1	Protocol select bit 1 (via DIP)
INT	BNO055 interrupt output



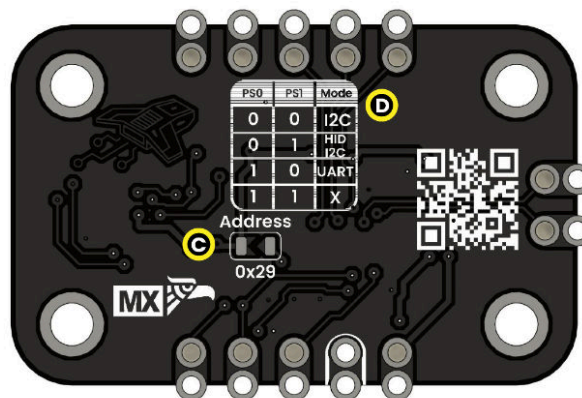
## Block Diagram

# BNO055 Module

Top view



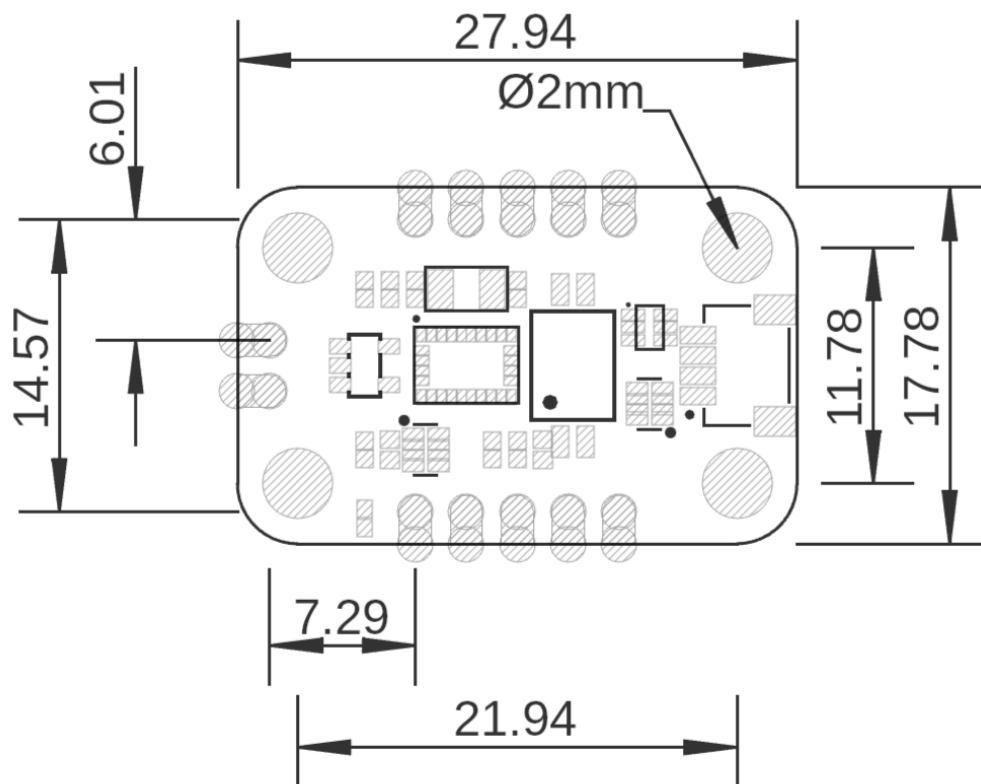
Bottom view



## Description:

- |   |   |   |
|---|---|---|
| <span style="color: red;">■</span> Supply voltage | <span style="color: blue;">■</span> I2C                 | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">A</span> Button                  |
| <span style="color: black;">■</span> GND          | <span style="color: pink;">■</span> Interrupt           | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">B</span> Dip switch              |
| <span style="color: orange;">■</span> Boot Mode   | <span style="color: green;">■</span> Reset              | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">C</span> Configurable address    |
| <span style="color: brown;">■</span> Strap bit    | <span style="color: lightgreen;">■</span> UART          | <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">D</span> Address selection table |
| <span style="color: grey;">■</span> Boot LED      | <span style="color: purple;">■</span> Serial Wire Debug |   |

## Dimensions



## Mechanical dimensions in millimeters

### Usage

- Arduino (Nano, Mega, Due)
- ESP32, ESP8266
- Raspberry Pi (via I<sup>2</sup>C)
- Unity or Processing (3D visualization)

### Downloads

- Schematic PDF

### Purchase

- Buy from UNIT Electronics