UNIT BNO055 Module Product Brief

9-DOF Absolute Orientation Sensor Module with Selectable UART/I²C Interface

Version: 1.0   Modified: 2025-06-23 16:46

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 I²C communication.

This version includes a built-in DIP switch for selecting between I²C 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.
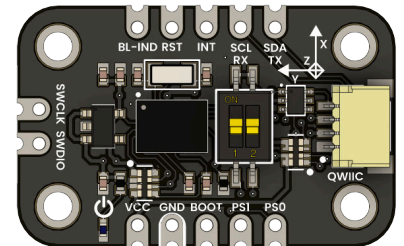
Functional Description

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 I²C 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: I²C or UART (selectable via PS0/PS1 DIP switch)
- Accelerometer ranges: ±2g, ±4g, ±8g, ±16g
- Gyroscope ranges: ±125 to ±2000 deg/s
- Magnetometer range: ±1.3 to ±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 (I²C/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

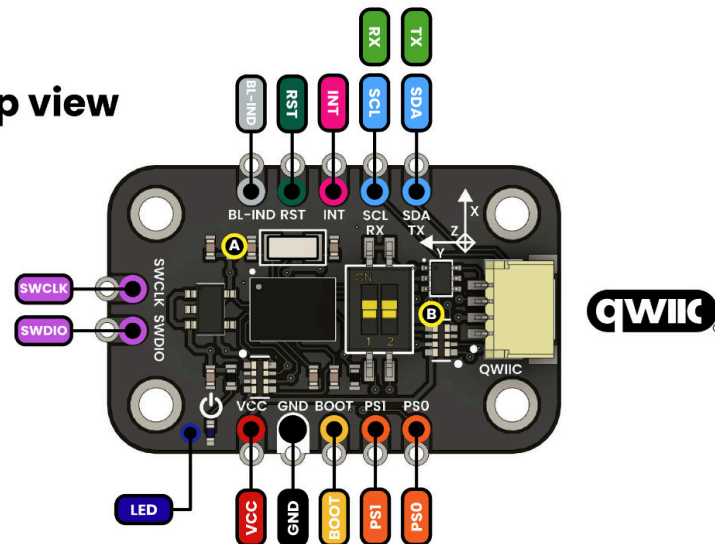| Symbol	I/O	Description
SDA	I/O	I2C data / UART TX (shared)
SCL	I/O	I2C clock / UART RX (shared)
PS0	I	BNO055 protocol select (bit 0, via DIP)
PS1	I	BNO055 protocol select (bit 1, via DIP)
INT	O	Motion/interrupt signal output

Pin & Connector Layout

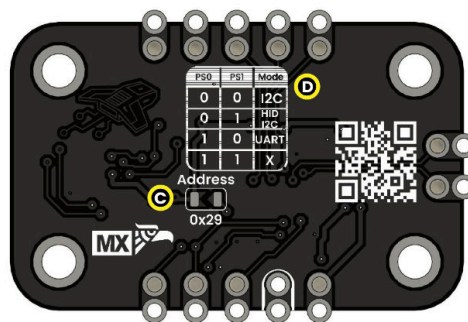| PIN	Description
VCC	Power supply input (3.3 V)
GND	Ground
SDA	I2C data / UART TX (configurable)
SCL	I2C clock / UART RX (configurable)
PS0	Protocol select bit 0 (via DIP)
PS1	Protocol select bit 1 (via DIP)
INT	BNO055 interrupt output

Block Diagram

BNO055 Module

Top view

Bottom view

Description:

🟥 Supply voltage	🟦 I2C	Ⓐ Button
⬛ GND	🟥 Interrupt	Ⓑ Dip switch
🟧 Boot Mode	🟩 Reset	Ⓒ Configurable address
🟧 Strap bit	🟩 UART	Ⓓ Addres selection table
⬜ Boot LED	🟪 Serial Wire Debug	

Dimensions
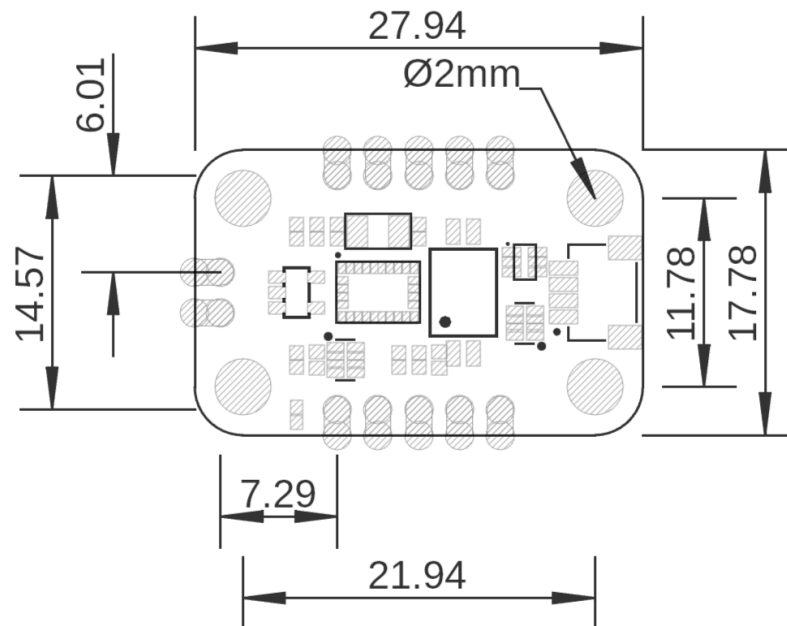
Mechanical dimensions in millimeters

Usage

- Arduino (Nano, Mega, Due)
- ESP32, ESP8266
- Raspberry Pi (via I²C)
- Unity or Processing (3D visualization)

Downloads

- Schematic PDF

Purchase

- Buy from UNIT Electronics