UNIT BNO055 + BMP280 Module Product Brief

Integrated 9-DOF IMU and Barometric Sensor Module for Orientation and Environmental Sensing

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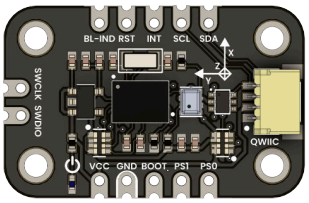
Introduction

The UNIT BNO055 + BMP280 Module integrates a 9-axis absolute orientation sensor and a precision barometric pressure and temperature sensor into a compact, ready-to-use form factor.



- BNO055: Combines accelerometer, gyroscope, and magnetometer with on-board sensor fusion delivering quaternions, Euler angles, and gravity vectors. - BMP280: High-resolution barometric pressure sensor with temperature measurement, ideal for altitude estimation and environmental monitoring.

This combination is ideal for robotics, drones, VR/AR, and IoT systems requiring orientation and environmental awareness.

Functional Description

The module provides full 9-DOF sensing with absolute orientation through the BNO055, which includes sensor fusion in hardware, eliminating the need for complex calculations on the host MCU. It supports I²C or UART interfaces for flexible integration.

The BMP280 complements the system by offering accurate barometric pressure and temperature measurements, useful for altimetry and environmental logging. Communication is possible through I²C, UART, or SWD.

The board includes clearly labeled pins and a QWIIC-compatible JST-SH connector for rapid prototyping.

Electrical Characteristics

- Operating voltage: 3.3 V (typical)
- Logic compatibility: 3.3 V
- BNO055 interfaces: I2C, UART (selectable via PS0/PS1)
- BMP280 interfaces: I2C, UART, SWD
- BNO055 sensor ranges:
- Accelerometer: +/-2g, +/-4g, +/-8g, +/-16g
- Gyroscope: +/-125 deg/s to +/-2000 deg/s
- Magnetometer: +/-1.3 to +/-8.1 gauss
- BMP280 pressure range: 300 to 1100 hPa
- BMP280 temperature accuracy: +/-1 degC
- SWD programming interface via SWCLK/SWDIO

Features

- BNO055 on-chip sensor fusion with Euler/quaternion output
- BMP280 pressure and temperature sensing
- Dual sensor integration in compact board
- Selectable UART/I2C interfaces
- SWD debug header
- QWIIC-compatible JST-SH connector
- Breadboard-friendly form factor

Applications

- Portable weather stations
- Altimeter and variometer systems
- Human posture tracking
- Inertial navigation systems

- VR/AR orientation sensing
- Flight controllers for drones and robotics
- Motion gesture interfaces
- IoT environmental data logging

Settings

Interface Overview

Interface	Signals / Pins	Typical Use
I2C	SDA, SCL	Communication with microcontroller
UART	TX, RX (via SDA, SCL)	Alternative communication protocol
SWD	SWDIO, SWCLK	Programming/debugging BMP280
GPIO	PS0, PS1	Protocol selection for BNO055
Interrupt	INT	Orientation or motion event signaling

Supported Pins

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)
PS1	I	BNO055 protocol select (bit 1)
SWDIO	I/O	BMP280 SWD data
SWCLK	I	BMP280 SWD clock
INT	O	Motion/interrupt signal (BNO055)

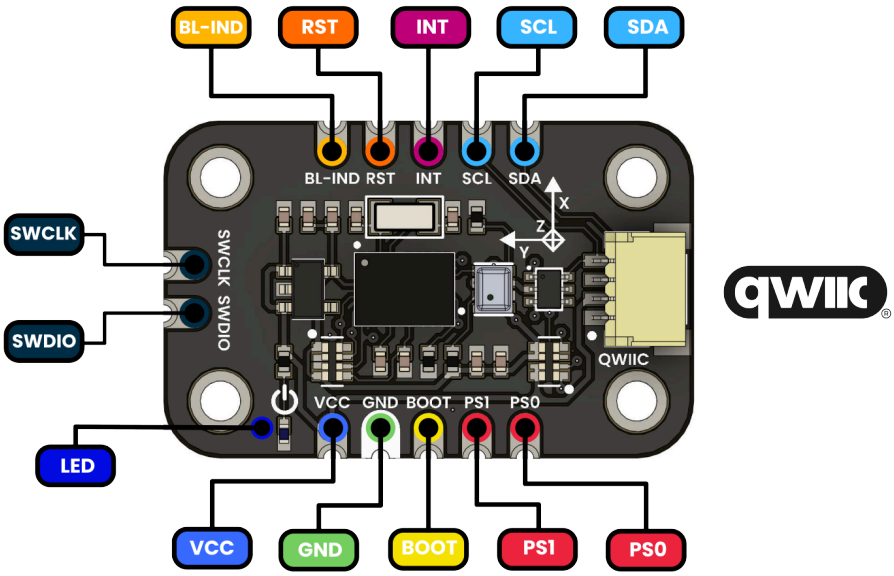
Pin & Connector Layout

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
PS1	Protocol select bit 1
SWDIO	SWD data (BMP280)
SWCLK	SWD clock (BMP280)
INT	BNO055 interrupt output

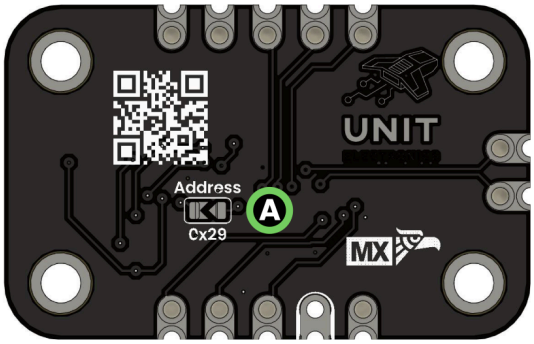
Block Diagram

BNO055 BMP280 Module

Top view



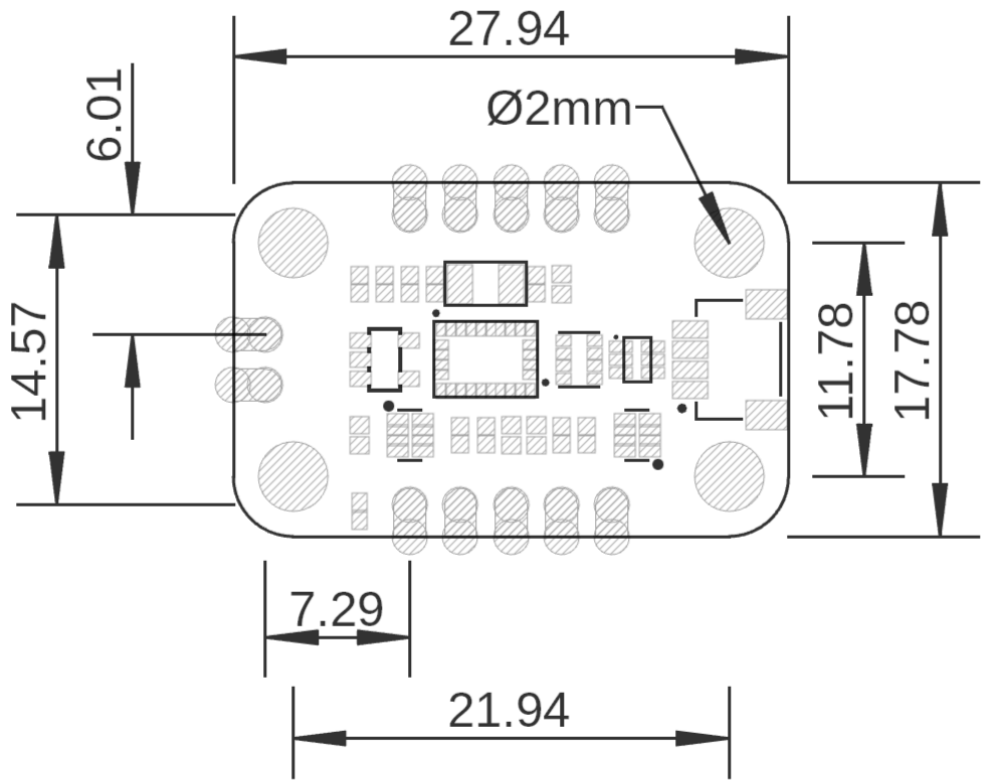
Bottom view



Description:

- Supply voltage
- GND
- Boot Mode
- Protocol select
- Configurable address
- Boot loader indicator
- I2C
- Interrupt
- Reset
- SWD

Dimensions



Mechanical dimensions in millimeters

Usage

- Arduino (Nano, Mega, Due)
- ESP32, ESP8266
- Raspberry Pi (via I2C)
- STM32 and ARM Cortex-M
- CH552 and other UART/I2C-compatible MCUs
- Unity or Processing (3D visualization)

Downloads

- Schematic PDF

Purchase

- Buy from UNIT Electronics