GODIYMODULES MCU-20948-001

GODIYMODULES MCU-20948-001 6-Axis 6DOF Motion Tracking Sensor Module User Manual

Model: MCU-20948-001 | Brand: GODIYMODULES

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the GODIYMODULES MCU-20948-001 6-Axis 6DOF Motion Tracking Sensor Module. This module integrates an accelerometer and gyroscope, supporting both I2C and SPI communication protocols, and is designed for various motion tracking applications, particularly with Arduino-based systems.

2. Product Features

- Integrated 6-Axis (Accelerometer + Gyroscope) motion tracking.
- Supports both I2C and SPI digital communication interfaces.
- Low power consumption design.
- Wide operating voltage range: 1.71V to 3.6V.
- Compact module design for easy integration into projects.
- Compatible with Arduino-based development platforms.

3. Technical Specifications

Model Number	MCU-20948-001
Sensor Type	6-Axis (Accelerometer + Gyroscope)
Communication Interface	I2C, SPI
Operating Voltage (VDD)	1.71V to 3.6V
Dimensions (L x W x H)	0.6" x 0.6" x 0.01" (approx. 15.24mm x 15.24mm x 0.25mm)
Weight	0.352 ounces (approx. 10 grams)
Included Components	1PCS Sensor Module

Compatible Devices	Arduino-based systems

4. Setup and Connection

This section details the physical connections required to integrate the MCU-20948-001 sensor module into your project.

4.1 Pinout Diagram

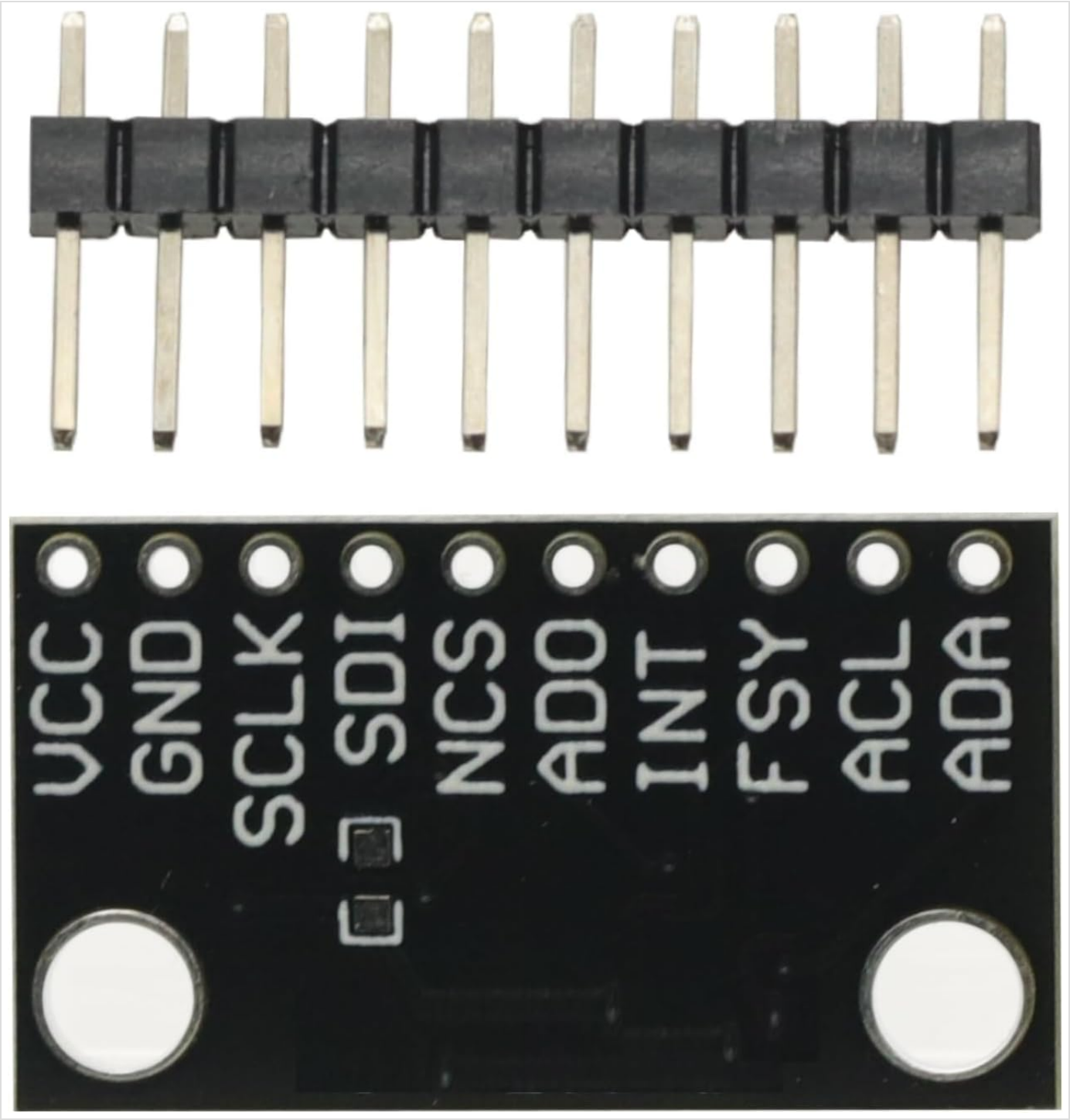


Figure 1: Pinout of the GODIYMODULES MCU-20948-001 sensor module. Key pins include VCC (power), GND (ground), SCL (clock), SDA (data), NCS (chip select), ADO (address/data out), INT (interrupt), FSY (frame sync), ACL (auxiliary clock), and ADA (auxiliary data).

The image above displays the pin configuration of the MCU-20948-001 module. Understanding these pins is essential for correct wiring.

4.2 Power Supply

- Connect the **VCC** pin to a power source within the range of**1.71V to 3.6V**.
- Connect the **GND** pin to the ground of your system.
- **Caution:** Applying a voltage higher than 3.6V, such as 5V, can permanently damage the sensor module.

4.3 Communication Interface

The module supports both I2C and SPI communication. Select the appropriate interface based on your project requirements.

4.3.1 I2C Connection

- Connect **SCL** to your microcontroller's I2C Clock pin.
- Connect **SDA** to your microcontroller's I2C Data pin.
- The default I2C address is typically 0x69 or 0x68, depending on the state of the ADO pin.

4.3.2 SPI Connection

- Connect **SCL** to your microcontroller's SPI Clock (SCK) pin.
- Connect **SDA** to your microcontroller's SPI Master Out Slave In (MOSI) pin.
- Connect **ADO** to your microcontroller's SPI Master In Slave Out (MISO) pin.
- Connect **NCS** to your microcontroller's Chip Select (CS) pin.

5. Operating Instructions

After successfully connecting the module, you can begin programming your microcontroller to read data from the sensor.

5.1 Software Libraries and Code

- For Arduino-based systems, specific libraries are required to interface with the MCU-20948-001 (ICM-20948) sensor. Search for "ICM-20948 Arduino library" in the Arduino IDE Library Manager or online.
- The register map and communication protocols for the ICM-20948 differ from older sensors like the MPU-9250. Ensure you use libraries and code specifically designed for the ICM-20948 to avoid compatibility issues.
- Refer to the documentation provided with your chosen library for example code and detailed usage instructions.

5.2 Data Acquisition

Once the library is integrated, you can initialize the sensor and read accelerometer and gyroscope data. The sensor provides raw data which may require calibration and filtering for accurate motion tracking.

- **Accelerometer:** Measures linear acceleration along X, Y, and Z axes.
- **Gyroscope:** Measures angular velocity (rotation rate) around X, Y, and Z axes.

6. Maintenance

The MCU-20948-001 sensor module is a low-maintenance device. Follow these guidelines to ensure its longevity:

- Keep the module clean and free from dust and moisture.
- Avoid exposing the module to extreme temperatures or direct sunlight.
- Handle the module with care to prevent physical damage to the components or solder joints.
- Ensure proper ventilation if enclosed in a casing to prevent overheating.

7. Troubleshooting

If you encounter issues with your MCU-20948-001 module, consider the following common problems and solutions:

- **Module Not Responding / No Data:**
  - Verify power connections (VCC and GND) and ensure the voltage is between 1.71V and 3.6V. A 5V supply will damage the module.
  - Check communication wiring (SCL, SDA for I2C; SCL, SDA, ADO, NCS for SPI) for correct connections and continuity.
  - Confirm the correct I2C address (0x68 or 0x69) is being used in your code.
  - Ensure the correct software library for the ICM-20948 is installed and properly configured. Libraries for MPU-9250 are not compatible.
- **Inaccurate Readings:**
  - Perform sensor calibration routines if available in your chosen library.
  - Ensure the module is securely mounted and not subject to vibrations or external magnetic interference (if using a magnetometer, though this module is 6-axis).
- **Magnetometer Not Working (if applicable):**
  - While this product is advertised as 6-axis, some ICM-20948 chips include a magnetometer. If your specific chip has one and it's not working, ensure the magnetometer is enabled and correctly addressed in your software. Some breakout boards might not expose all 9-axis functionality or require specific initialization.

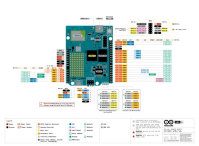
8. Safety Information

- Do not exceed the specified operating voltage (1.71V to 3.6V). Overvoltage will damage the module.
- Avoid short-circuiting the pins.
- Keep the module away from water, corrosive liquids, and extreme temperatures.
- This product contains small components and should be kept out of reach of children.
- If you are unsure about any connection or operation, consult relevant technical documentation or seek professional assistance.

9. Warranty and Support

For technical support or inquiries regarding the GODIYMODULES MCU-20948-001 sensor module, please refer to the seller's contact information or the product listing page where you purchased the item. Specific warranty details may vary by retailer.

Related Documents - MCU-20948-001

	Arduino UNO ABX00162-ABX00173 Full Pinout and Technical Specifications Detailed pinout diagram and technical specifications for the Arduino UNO board (model ABX00162-ABX00173), including MCU and MPU pin assignments, interface details, legends, and important warnings regarding logic levels.

	[FRDM-RW612 Board User Manual] This user manual provides a comprehensive guide to the NXP FRDM-RW612 board, a low-cost design and evaluation board based on the RW612 MCU. It details the board's overview, functional description, power supplies, clocks, interfaces (USB, Ethernet, I2C, SPI), memory, headers, RF front-end, MCU-Link debug probe, and operating conditions. The manual also includes information on supported debug scenarios, MCU-Link host driver installation, firmware updates, and related documentation.
	[2N IP Verso Modular IP Intercom Installation Manual] This installation manual provides comprehensive guidance for the 2N IP Verso, a modular IP intercom system. It covers product overview, components, mechanical and electrical installation, module connections, functions, technical parameters, and troubleshooting for seamless deployment in various environments.
	[Holtek HT66FB572/HT66FB574/HT66FB576 USB RGB LED Flash MCU Datasheet] Comprehensive datasheet for Holtek's HT66FB572, HT66FB574, and HT66FB576 USB RGB LED Flash MCUs. Details features, specifications, pin assignments, block diagrams, and application circuits for these high-performance RISC microcontrollers.
	[WITMOTION WT901 Inclinometer Sensor User Manual] Comprehensive user manual for the WITMOTION WT901 Inclinometer Sensor, detailing its features, applications, software, and connection methods for industrial and embedded systems.
	[MSPM0 Bootloader (BSL) Host Implementation Guide] This application note details the implementation of MSPM0 bootloader (BSL) host systems, covering both MCU-based and PC-based approaches for firmware updates via UART, I2C, and SPI.