

Introduction

The 28BYJ-48 Stepper Motor Module is an all-in-one motion control solution that integrates a geared stepper motor with a high-performance A4988 driver on a single circuit board. This integrated architecture fundamentally simplifies implementing precise motor control by eliminating complex wiring and providing a secure mounting system. Operating at 5V, this geared stepper motor offers high-torque, precise positioning with a 1/64 gear ratio, making it an excellent component for STEM educational settings, rapid prototyping, and beginner projects with popular microcontrollers like [Arduino](#), [Raspberry Pi](#), and [ESP32](#).

All-in-One Design: Motor and Driver on a Single Board

To accelerate project development, this stepper motor's control interface has been streamlined to just four essential pins: STEP, DIR, 5V, and GND. This simplified approach allows for immediate connection to any standard microcontroller. Users can achieve precise control over the motor's step and direction without the steep learning curve associated with

traditional multi-wire stepper motor setups, getting their projects moving in minutes.

Plug-and-Play: Simplified 4-Pin Interface

To further accelerate project development, this stepper motor's control interface has been streamlined to just four essential pins: STEP, DIR, 5V, and GND. This simplified approach allows for immediate connection to any standard microcontroller, such as an Arduino or Raspberry Pi. Users can achieve precise control over the motor's step and direction without the steep learning curve associated with traditional multi-wire stepper motor setups.

Robust Mounting for Stable Operation

Engineered for stable and secure installation, the motor driver board features four M3 nuts permanently affixed to the PCB. This built-in mounting system allows the entire motor assembly to be firmly fastened to a project chassis or structural component with standard screws. This design

ensures that the 28BYJ-48 motor remains stationary during operation, which is critical for applications requiring consistent and repeatable mechanical movement.

Applications

- **STEM Education & Prototyping:** A perfect plug-and-play tool for demonstrating robotics principles in a classroom or for rapidly prototyping new mechanical ideas.
- **Desktop Robotics:** Build a mini robotic arm, XY plotter, or a small-scale CNC machine for drawing or laser engraving.
- **Camera Automation:** Create an ultra-smooth camera slider for video and time-lapse photography.
- **Smart Home & Automation:** Design an automatic pet feeder, a smart curtain opener, a drip irrigation controller, or other custom automated devices.
- **Interactive Art & Displays:** Power kinetic sculptures, automated dioramas, or other moving art installations.

Specification

- **Operating Voltage:** 5V DC
- **Physical Interface:** 4-Pin (STEP, DIR, 5V, GND)
- **Motor Type:** 28BYJ-48 Geared Stepper

- Integrated Driver: A4988
- Gear Ratio: 1:64
- Steps per Revolution (Output): 4096 (based on half-step mode; microstepping supported for smoother motion)
- Holding Torque: 0.9 kgf·cm
- Detent Torque: 0.5 kgf·cm
- Mounting: 4x Integrated M3 Nuts
- Dimensions: 42mm x 42mm

Shipping List

- 28BYJ-48 Stepper Motor Module with Driver x1
- M3x6mm Pan Head Phillips Screw x4
- 4-Pin Dupont Cable x1