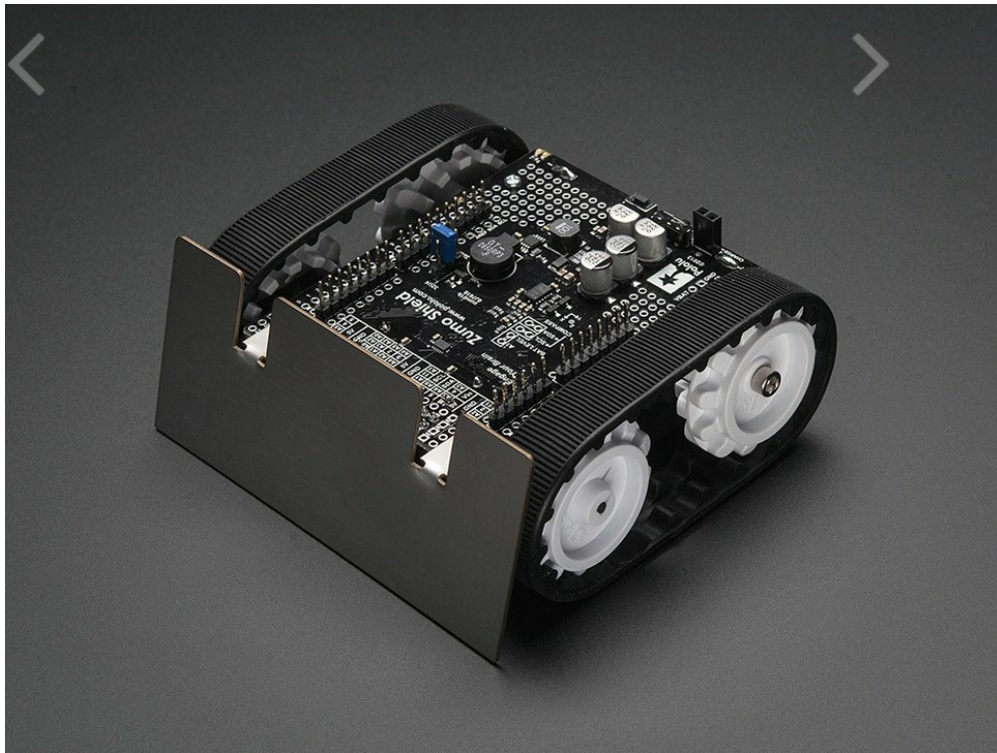




Zumo Robot for Arduino - v1.2

PRODUCT ID: 1639

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[DESCRIPTION](#)

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DESCRIPTION

The Pololu Zumo robot is an Arduino-controllable tracked robot platform that is less than 10 cm × 10 cm—small enough to qualify for Mini Sumo. It includes two micro metal gearmotors coupled to a pair of silicone tracks, a stainless steel bulldozer-style blade, an array of six infrared reflectance sensors for line following or edge detection, a 3-axis accelerometer / 3-axis magnetometer / 3-axis gyroscope, and a buzzer for simple sounds and music. Just add 4 AA batteries and an Arduino (or compatible controller) and you are ready to push! No soldering or assembly is required.

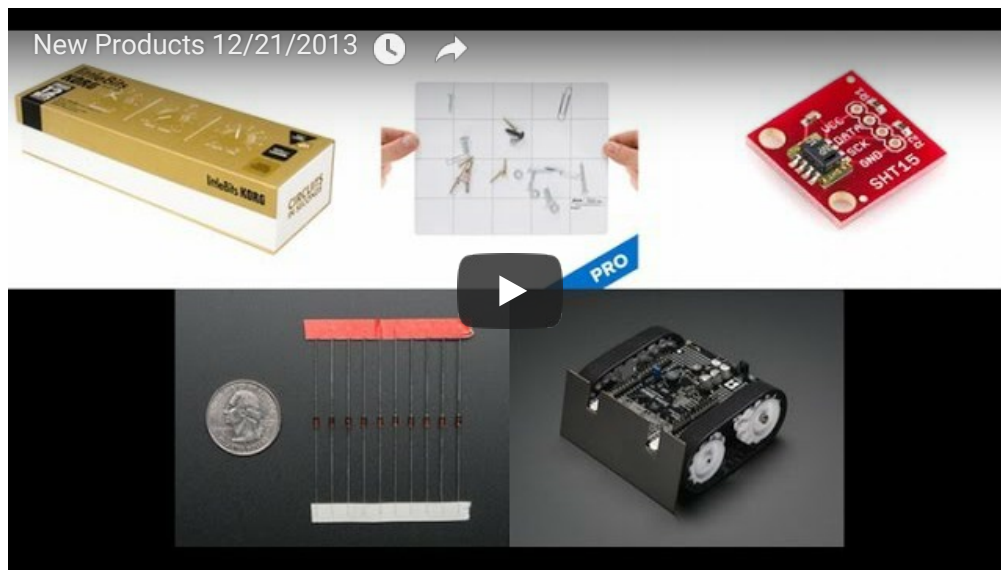
Overview

The Zumo robot is a low-profile tracked robot platform intended for use with an Arduino (or compatible device) as its main controller. It measures less than 10 cm on each side and weighs approximately 300 g with an Arduino Uno and batteries (165 g without, as shipped), so it is both small enough and light enough to qualify for Mini-Sumo competitions. It uses two [75:1 HP micro metal gearmotors](#) to drive the treads, providing plenty of torque and a top speed of approximately 2 feet per second (60 cm/s), which makes it much more agile than competing robots like the Solarbotics Sumovore and Parallax SumoBot while still offering plenty of control. The Zumo robot includes a 0.036"-thick laser-cut stainless steel sumo blade mounted to the front of the chassis for pushing around objects like other robots, and a [reflectance sensor array](#) mounted along the front edge of the Zumo (behind the sumo blade) allows the Zumo to detect features on the ground in front of it, such as lines for following or edges for avoiding.

The Zumo control board is essentially a shield for the [Arduino Uno](#) or [Leonardo](#), both of which can be plugged directly into the shield's male header pins, face down. (It is not compatible with the Arduino Mega or Due, but it can be used with older Arduinos that have the same form factor as the Uno, such as the Duemilanove.) The shield includes dual motor drivers, a buzzer for playing simple sounds and music, a user pushbutton, and a 3-axis accelerometer, gyro and compass. It also boosts the battery voltage to power the Arduino and breaks out the Arduino I/O lines, reset button, and user LED for convenient access and to accommodate additional sensors.

The [Zumo Arduino libraries](#) make it easy to interface with all of the integrated hardware, and provide a number of [sample programs](#) that show how to use the Zumo's reflectance array, pushbutton, buzzer, and motors. Pololu has also written a basic [LSM303 Arduino library](#) and [L3G Arduino library](#) that make it easier interface with the built-in [LSM303D](#) 3-axis accelerometer and magnetometer and [L3GD20H](#) 3-axis gyro.

The robot ships as shown in the main product picture; no assembly or soldering is required. An appropriate [Arduino](#) (or compatible controller) and four AA batteries are required but not included.



Zumo Robot for Arduino ([10:12](#))

TECHNICAL DETAILS

Revision History:

- As of Oct 13, 2014 - we now ship v1.2 of the Zumo bot, which adds a 3-axis gyroscope and upgrades the integrated accelerometer/magnetometer (so it now has a full IMU)

Features

- Integrated [75:1 HP micro metal gearmotors](#) that offer a good blend of speed (up to 2 feet per second), power, and control.
- Mounted array of six [IR reflectance sensors](#) that allows the Zumo to detect contrasts in reflectivity directly beneath its blade, which can be used for following lines or detecting edges (e.g. the white outer area of a sumo ring or the edge of a table).
- Integrated DRV8835 dual motor drivers capable of delivering enough current for the

- Piezo buzzer for playing simple sounds and music. The buzzer is controlled by one of the Arduino's PWM outputs, so tones can be generated in the background without taking up a lot of processing power.
- Integrated LSM303DLHC 3-axis accelerometer and 3-axis magnetometer that can be used to detect impacts. The compass gets a lot of interference from the motors, batteries, PCB, and its surroundings, so it is not generally useful for precision navigation, but we have found that, with proper calibration, it can be used as a rough indication of orientation in many environments.
- Integrated [L3GD20H](#) 3-axis gyroscope that can be used to track rotation. This is new on the v1.2 version of the Zumo shield; previous versions did not include a gyro. With this sensor and the LSM303D mentioned above, the shield effectively has a built-in [MiniIMU-9 v3](#) IMU module that can optionally be used to make an attitude and heading reference system (AHRS) so that your robot can its orientation.
- Optional user pushbutton on pin 12.
- 7.5 V boost regulator for powering the Arduino from the Zumo's 4 AA batteries.
- Convenient access to Arduino I/O lines, the pin 13 user LED, and the Arduino reset line via the shield.
- General-purpose prototyping areas and an expansion area at the front for connecting additional sensors.
- Compatible with the Arduino Uno R3 and Arduino Leonardo. Can also be used with older Arduinos that have the same form factor, like the Duemilanove.
- [Arduino libraries](#) and sample code make getting started easy.
- Detailed [user's guide](#).
- Dimensions: 98mm / 3.8" x 98mm / 3.8" x 39mm / 1.5"
- Weight: 163g

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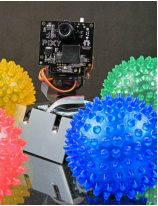
How to program a Zumo Robot with Simulink

Make the Zumo Robot move along a trajectory using Simulink



Line Following Zumo Robot Using Simulink

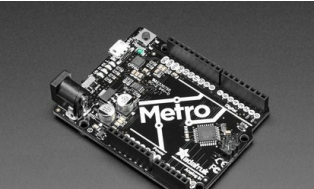
Program your Zumo Robot to follow lines using PID control



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