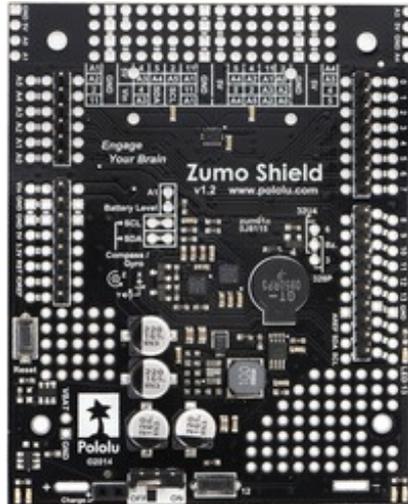**Pololu**
Robotics & Electronics

Zumo Shield for Arduino, v1.2

Zumo Shield for Arduino, v1.2,
with included through-hole
components installed.

Overview

The Zumo Shield is designed specifically to be a convenient interface between a Zumo chassis and an Arduino Uno or Leonardo. The shield mounts directly to the chassis, connecting to its battery terminals and motors, and the Arduino plugs into the shield's male header pins, face down. The shield provides all the electronics necessary to power the motors and includes some additional fun components for making a more interesting robot, such as a buzzer for making sounds, and a 3-axis accelerometer, compass, and gyroscope for sensing impacts and tracking orientation. The only differences between this v1.2 shield and the previous version are the addition of a 3-axis gyro and an upgrade of the accelerometer/magnetometer module.

With the Zumo Shield and an Arduino, the Zumo chassis becomes a low-profile, Arduino-controlled tracked robot that is less than 10 cm on each side (small enough to qualify for Mini-Sumo competitions). It works with a variety of micro metal gearmotors to allow for a customizable combination of torque and speed, and a stainless steel sumo blade is available for applications that involve pushing around other objects. Arduino libraries and sample sketches are available for quickly getting a Zumo robot up and running.


Assembled Zumo robot with a Zumo
Shield, Arduino Uno, and Zumo blade.
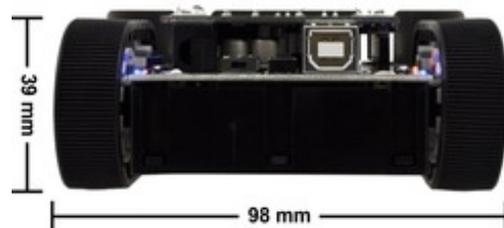
Zumo robot assembled with a Zumo Shield
and Arduino Uno, back view.

This shield is also available as part of our Zumo Robot kit for Arduino, which bundles it with a Zumo chassis and Zumo blade, and in our Zumo Robot for Arduino, which is preassembled with 75:1 HP

micro metal gearmotors and a Zumo reflectance sensor array.
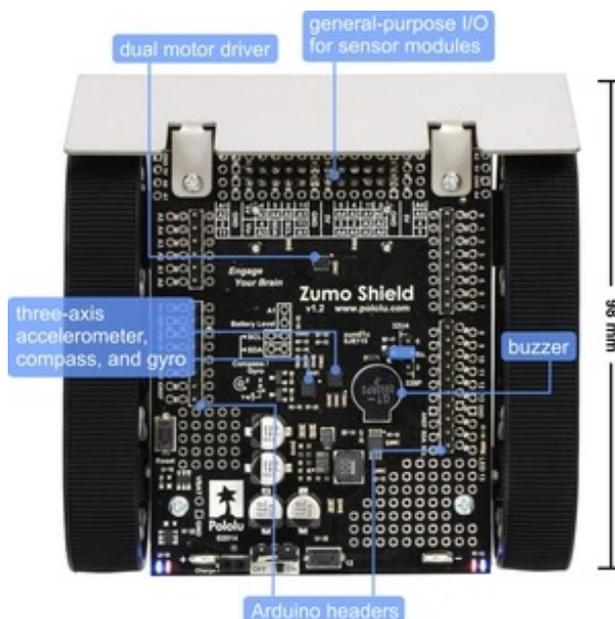
Features

- **Integrated DRV8835 dual motor drivers capable of delivering enough current for two high-power (HP) micro metal gearmotors. See the Zumo chassis product page for specific motor suggestions.**

- **Piezo buzzer for playing simple sounds and music. The buzzer is controlled by one of the Arduino's PWM outputs, so the tones can be generated in the background without taking up a lot of processing power.**

- **Integrated LSM303D 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 for rough orientation measuring in many environments. This part is an upgrade over the LSM303DLHC accelerometer/magnetometer IC included on previous versions of the Zumo shield for Arduino.**

- **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 MinIMU-9 v3 IMU module that can optionally be used to make a 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 (it is easy to add a Zumo reflectance sensor array or up to five QTR sensors for edge detection or line following).**

- **Compatible with the Arduino Uno R3 and Arduino Leonardo, and 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 with assembly instructions.**

Included Components

The Zumo Shield ships with all of the components required for shield assembly, as shown in the main product picture. Note that soldering is required; please see the user's guide for detailed assembly instructions. This shield does not include motors or the Zumo chassis itself, though it is available as part of a Zumo Robot kit for Arduino that includes everything you need to build your Zumo robot except motors, an Arduino, and batteries. If you just want a robot that is already put together, we also sell a fully assembled Zumo Robot for Arduino – just add batteries and an Arduino and it is ready to go.


Zumo chassis being assembled with two
micro metal gearmotors.

Required Accessories (not included)

To use this shield you will need a few additional parts:

- **A Zumo chassis kit. This shield is also available as part of a Zumo robot kit bundled with the Zumo chassis kit and a Zumo blade and part of a preassembled Zumo Robot.**

- **Two micro metal gearmotors. These gearmotors are available in several power options and a wide variety of gear ratios, allowing for a customizable combination of torque and speed. The Zumo Shield can deliver enough power for all of the micro metal gearmotors we carry, including the high-power (HP) versions. Note that some gear ratios are better suited for the Zumo than others; please see the Zumo chassis kit product page for specific motor suggestions.**

- **Four AA batteries. The Zumo chassis works with both alkaline and NiMH batteries, though we recommend rechargeable NiMH cells.**

- **An Arduino. The Zumo Shield works with both the Uno and the Leonardo. 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. (Other Arduino-compatible controllers might work with the Zumo robot, but support for them will be limited and they might require modification; for example, one customer got his Zumo robot working with the Freescale FRDM-KL25Z board.)**

Optional Accessories
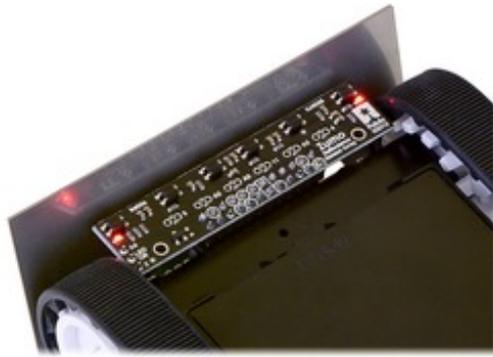
Zumo reflectance sensor array on a Zumo
robot, bottom view.

- **Zumo reflectance sensor array. This sensor bar mounts along the front edge of the Zumo shield and allows the Zumo to detect features on the ground in front of it, such as lines for following or edges for avoiding (such as the rim of a sumo ring or the edge of a table). It is designed specifically for use with the Zumo shield.**

- **Zumo blade for pushing objects and other robots around (the blade is included if you get the Zumo robot kit).**

- **iMAX-B6AC battery charger for charging the Zumo's battery's through the Zumo Shield's 2-pin charge port. Note that you only need a battery charger if you plan on powering the Zumo with rechargeable cells, and that charger should be capable of charging 4 NiMH cells in series. Alternatively, since the Zumo just uses ordinary AA batteris, you can use AA chargers (into which you stick the individual cells) available at most general electronics stores.**

- **Optical rangefinders for obstacle/opponent detection.**

- **Connectors (headers, jumper wires, etc) for adding more sensors.**

[Documentation on producer website.](#)