



# Pololu 3pi Robot

## *Quick-Start Sheet*

### Overview

The Pololu 3pi robot is a small, high-performance, autonomous robot designed to excel in line-following and maze-solving competitions. Powered by four AAA batteries (not included) and a unique power system that runs the motors at a regulated 9.25 V, 3pi is capable of speeds up to 100 cm/second while making precise turns and spins that don't vary with the battery voltage. This results in highly consistent and repeatable performance of well-tuned code even as the batteries run low. The robot comes fully assembled with two micro metal gearmotors, five reflectance sensors, an 8x2 character LCD, a buzzer, three user pushbuttons, and more, all connected to a user-programmable AVR microcontroller. The 3pi measures approximately 3.7 inches (9.5 cm) in diameter and weighs 2.9 oz (83 g) without batteries.

The 3pi is based on an Atmel ATmega168 microcontroller running at 20 MHz with 16KB of flash program memory and 1KB data memory. The use of the ATmega168 microcontroller makes the 3pi compatible with the popular Arduino development platform. Free C and C++ development tools are also available, and an extensive set of libraries make it a breeze to interface with all of the integrated hardware. Sample programs are available to show how to use the various 3pi components, as well as how to perform more complex behaviors such as line following and maze solving.

### Contacting Pololu

You can visit the Pololu web site at <http://www.pololu.com/> for the complete 3pi documentation, including the user's guide, software libraries, sample programs, application examples, datasheets, pictures, and troubleshooting tips. There is also a forum at <http://forum.pololu.com/> where you can interact with other 3pi users and exchange code and project ideas.

We would be delighted to hear from you about your project and about your experience with our product. You can contact us through our online feedback form, by email at [support@pololu.com](mailto:support@pololu.com), or through the forum mentioned above. Please tell us what we did well, what we could improve, what you would like to see in the future, or anything else you would like to say!

### Required Accessories

- **4 AAA batteries.** Any AAA cells will work, but we recommend NiMH batteries, which are rechargeable and can be purchased from Pololu or at a local store. If you use rechargeable batteries, you will also need a battery charger. Battery chargers designed to connect to external series battery packs may be used with the 3pi's battery charger port.
- **AVR ISP programmer with 6-pin connector.** The 3pi features an ATmega168 microcontroller, which requires an external programmer such as the Pololu Orangutan USB programmer or Atmel's AVRISP series. The 3pi has a standard 6-pin programming connector, so your programmer will need to have a 6-pin ISP cable for connecting to the target device. (You will also need whatever cable your programmer requires to connect to a computer. Our Orangutan USB programmer requires a USB cable that is not included with the programmer alone but that is included as part of the 3pi+programmer combo deal).
- **A desktop or laptop computer.** You will need a personal computer for developing your code and loading it onto the 3pi. The 3pi can be programmed on Windows, Mac, and Linux operating systems, but Pololu support for Macs is limited.



### Important Safety Warnings

The 3pi robot is not intended for young children! Younger users should use this product only under adult supervision. **By using this product, you agree not to hold Pololu liable for any injury or damage related to the use or to the performance of this product. This product is not designed for, and should not be used in, applications where the malfunction of the product could cause injury or damage. Please take note of these additional precautions:**

- The 3pi robot contains lead, so follow appropriate handling procedures, such as not licking the robot and washing hands after handling.
- Avoid placing the robot so that the underside of the PCB makes contact with conductive materials (e.g. do not place the 3pi in a bin filled with metal parts). This could inadvertently short out the batteries and damage your robot, even with the 3pi turned off.
- Since the PCB and its components are exposed, take standard precautions to protect your 3pi robot from ESD (electrostatic discharge), which could damage the on-board electronics. When picking up the 3pi, you should first touch a safe part of the robot such as the wheels, motors, batteries, or the edges of the PCB. If you first touch components on the PCB, you risk discharging through them. When handing the 3pi to another person, first touch their hand with your hand to equalize any charge imbalance between you so that you don't discharge through the 3pi as the exchange is made.



# Pololu 3pi Robot Simplified Schematic Diagram

