

Circuit 5A: Motor Basics

In this circuit, you will learn the basic concepts behind motor control. Motors require a lot of current, so you can't drive them directly from a digital pin on the RedBoard. Instead, you'll use what is known as a motor controller or motor driver board to power and spin the motor accordingly.



MOTOR DRIVER



GEAR MOTOR



SWITCH



16 HOOKUP WIRES

**YOU
NEED**

NEW COMPONENTS

SWITCHES are components that control the open-ness or closed-ness of an electric circuit. Just like the momentary buttons used in earlier circuits, this type of switch can only exist in one of two states: open or closed. However, a switch is different in that it will stay in the position it was last in until it is switched again.



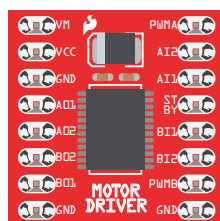
THE MOTORS in your Inventor's Kit have two main parts: a small DC motor that spins quickly and a plastic gearbox that gears down the output from the hobby motor so that it is slower but stronger, allowing it to move your robot. The motors



have a clever design allowing you to attach things that you want to spin fast (like a small fan or flag) to the hobby motor, and things that you want to be strong (like a wheel) to the plastic axle sticking out the

side of the motor. The included wheels just so happen to fit on the plastic axles.

TB6612FNG MOTOR DRIVER: If you switch the direction of current through a motor by swapping the positive and negative leads, the motor will spin in the opposite direction. Motor controllers



contain a set of switches (called an H-bridge) that lets you easily control the direction of one or more motors. The

TB6612FNG Motor Driver takes commands for each motor over three wires (two wires control direction, and one controls speed), and then uses these signals to control the current through two wires attached to your motor.

NEW CONCEPTS

VOLTAGE IN (VIN): This circuit utilizes the VIN pin found with the other RedBoard power pins. The VIN pin outputs a voltage that varies based on whatever voltage the RedBoard is powered with. If the RedBoard is powered through the USB port, then the