Circuit 1B: Potentiometer

Potentiometers (also known as “trimpots” or “knobs”) are one of the basic inputs for electronic devices. By tracking the position of the knob with your RedBoard, you can make volume controls, speed controls, angle sensors and a ton of other useful inputs for your projects. In this circuit, you’ll use a potentiometer as an input device to control the speed at which your LED blinks.

NEW COMPONENTS

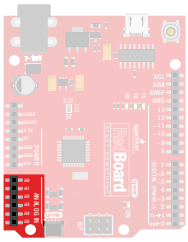
POTENTIOMETER: A potentiometer is a 3-pin variable resistor. When powered with 5V, the middle pin outputs a voltage between 0V and 5V, depending on the position of the knob on the potentiometer. Internal to the trimpot is a single resistor and a wiper, which cuts the resistor in two and moves to adjust the ratio between both halves.

NEW CONCEPTS

ANALOG VS. DIGITAL: We live in an analog world. There are an infinite number of colors to paint an object, an infinite number of tones we can hear, and an infinite number of smells we can smell. The common theme among these analog signals is their infinite possibilities.

Digital signals deal in the realm of the discrete or finite, meaning there is a limited set of values they can be. The LED from the previous circuit had only two states it could exist in, ON or OFF, when connected to a digital output.

ANALOG INPUTS: So far, we’ve only dealt with outputs. The RedBoard also has inputs. Both inputs and outputs can be analog or digital. Based on our previous definition of analog and digital, that means an analog input can sense a wide range of values versus a digital input, which can only sense two values, or states.



You may have noticed some pins labeled **Digital** and some labeled **Analog In** on your RedBoard. There are only six pins that function as analog inputs; they are labeled A0–A5.

VOLTAGE DIVIDER

VOLTAGE DIVIDERS are simple circuits that turn some voltage into a smaller voltage using two resistors. A potentiometer is a variable resistor that can be used to create an adjustable voltage divider. A wiper in the middle position means the output voltage will be half of the input. Voltage dividers will be covered in more detail in the next circuit.