

## Capacitive Sensor

<http://playground.arduino.cc/Main/CapacitiveSensor>

The capacitiveSensor library turns two or more Arduino pins into a capacitive sensor, which can sense the electrical capacitance of the human body. All the sensor setup requires is a medium to high value resistor and a piece of wire and a small (to large) piece of aluminum foil on the end. At its most sensitive, the sensor will start to sense a hand or body inches away from the sensor.

Have a look also a Pencil Based Capacitive Sensor

<http://www.bareconductive.com/capacitance-sensor>

Tutorial about touch sensors features

<http://www.instructables.com/id/Touche-for-Arduino-Advanced-touch-sensing/>

[http://www.youtube.com/watch?v=ikD\\_3Vemkf0](http://www.youtube.com/watch?v=ikD_3Vemkf0)

### HARDWARE REQUIRED

Arduino Board

1 LED

1 470  $\Omega$ m Resistor

1 1M $\Omega$ m Resistor (Test the values using 5M $\Omega$  up to 50M $\Omega$  resistors)

breadboard

hook-up wire

### CIRCUIT

Resistor Choice

Here are some guidelines for resistors but be sure to experiment for a desired response. Use a 1 megohm resistor (or less maybe) for absolute touch to activate.

With a 10 megohm resistor the sensor will start to respond 4-6 inches away.

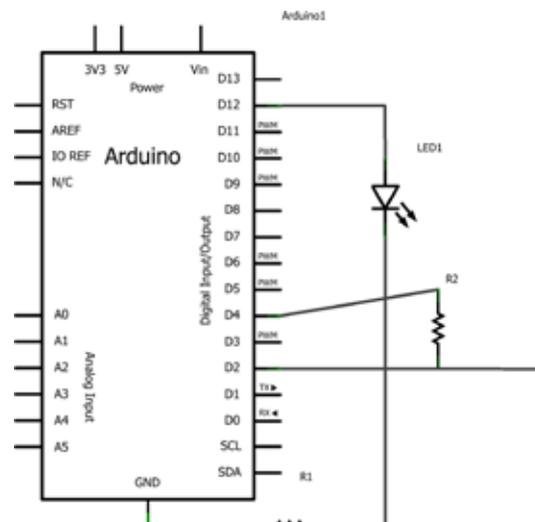
With a 40 megohm resistor the sensor will start to respond 12-24 inches away (dependent on the foil size). Common resistor sizes usually end at 10 megohm so you may have to solder four 10 megohm resistors end to end.

One tradeoff with larger resistors is that the sensor's increased sensitivity means that it is slower. Also if the sensor is exposed metal, it is possible that the send pin will never be able to force a change in the receive (sensor) pin, and the sensor will timeout.

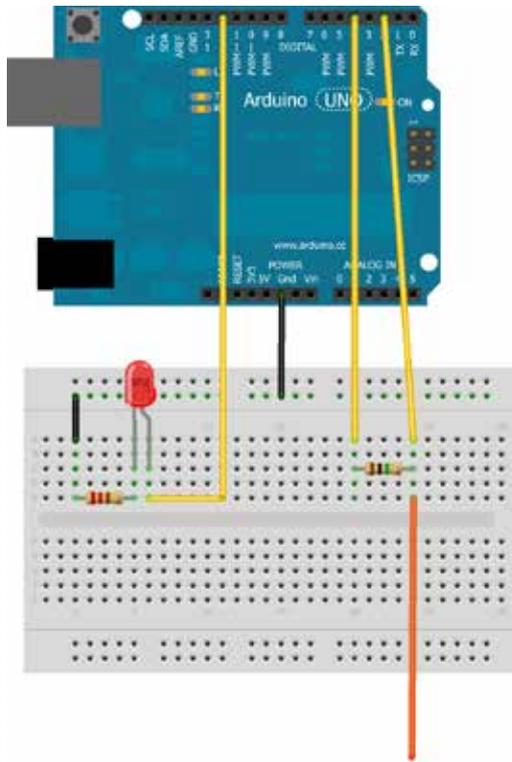
Also experiment with small capacitors (100 pF - .01 uF) to ground, on the sense pin. They improve stability of the sensor.

Note that the hardware can be set up with one sPin and several resistors and rPin's for calls to various capacitive sensors. See the example sketch.

### SCHEMATIC



IMAGE



CODE

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Arduino Starter Kit example  
Project 13 - Touch Sensor Lamp

This sketch is written to accompany Project 13  
in the  
Arduino Starter Kit

Parts required:

1 Megohm resistor  
metal foil or copper mesh  
220 ohm resistor  
LED

Software required :

CapacitiveSensor library by Paul Badger  
[http://arduino.cc/playground/Main/  
CapacitiveSensor](http://arduino.cc/playground/Main/CapacitiveSensor)

Created 18 September 2012  
by Scott Fitzgerald

<http://arduino.cc/starterKit>

This example code is part of the public domain

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```
// import the library (must be located in the
// Arduino/libraries directory)
#include <CapacitiveSensor.h>

// create an instance of the library
// pin 4 sends electrical energy
// pin 2 senses a change
CapacitiveSensor capSensor = CapacitiveSensor(4,2);

// threshold for turning the lamp on
int threshold = 1000;

// pin the LED is connected to
const int ledPin = 12;

void setup() {
  // open a serial connection
  Serial.begin(9600);
  // set the LED pin as an output
  pinMode(ledPin, OUTPUT);
}

void loop() {
  // store the value reported by the sensor in a variable
  int sensorValue = capSensor.capacitiveSensor(30);

  // print out the sensor value
  Serial.println(sensorValue);

  // if the value is greater than the threshold
  if(sensorValue > threshold) {
    // turn the LED on
    digitalWrite(ledPin, HIGH);
  }
  // if it's lower than the threshold
  else {
    // turn the LED off
    digitalWrite(ledPin, LOW);
  }

  delay(50);
}
```