3 Capacitive Foil Sensors

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

Tutorial about touch sensors features

HARDWARE REQUIRED

Arduino Board
3 10MΩhm Resistor (Test the values using 5MΩ up to 50MΩ resistors)
3 Pieces of Foil (Connect the foils to wires)
breadboard
hook-up wires

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
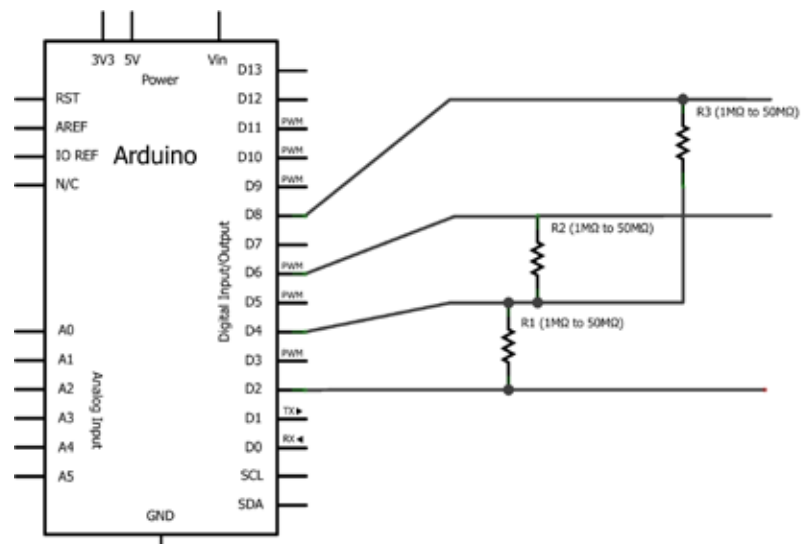
IMAGE
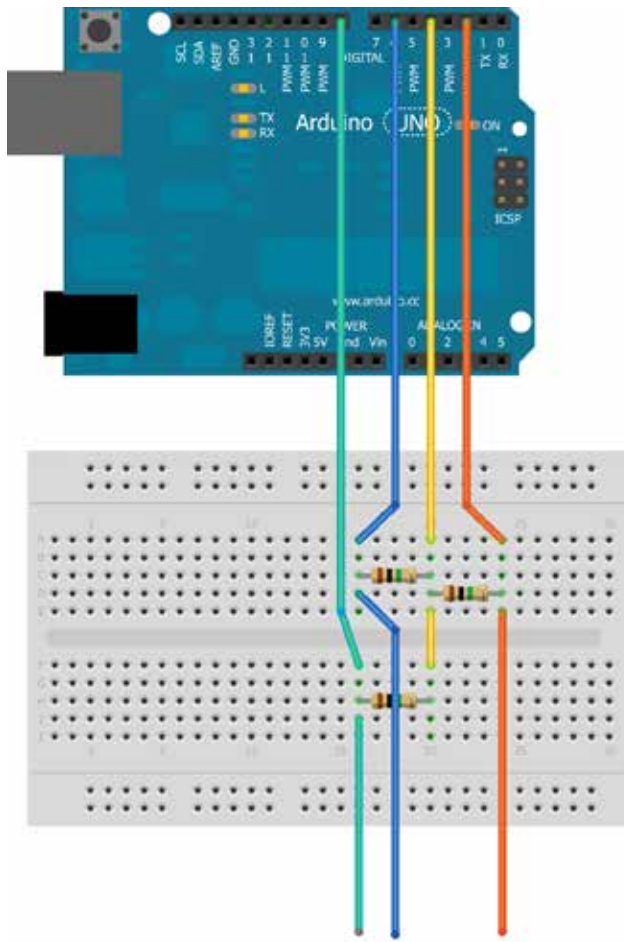
CODE

```cpp
#include <CapacitiveSensor.h>

// 10M resistor between pins 4 & 2, pin 2 is sensor pin, add a wire and or foil if
desired
CapacitiveSensor   cs_4_2 = CapacitiveSensor(4,2);
 // 10M resistor between pins 4 & 6, pin 6 is sensor pin, add a wire and or foil
CapacitiveSensor   cs_4_6 = CapacitiveSensor(4,6);
 // 10M resistor between pins 4 & 8, pin 8 is sensor pin, add a wire and or foil
CapacitiveSensor   cs_4_8 = CapacitiveSensor(4,8);

void setup()
{
   // turn off autocalibrate on channel 1 - just as an example
   cs_4_2.set_CS_AutocaL_Millis(0xFFFFFFFF);
   Serial.begin(9600);
}

void loop()
{
   long start = millis();
   long total1 =  cs_4_2.capacitiveSensor(30);
   long total2 =  cs_4_6.capacitiveSensor(30);
   long total3 =  cs_4_8.capacitiveSensor(30);

   Serial.print(millis() - start);      // check on performance in milliseconds
   Serial.print("\t");                  // tab character for debug window spacing

   Serial.print(total1);                // print sensor output 1
   Serial.print("\t");
   Serial.print(total2);                // print sensor output 2
   Serial.print("\t");
   Serial.println(total3);              // print sensor output 3

   delay(50);                           // arbitrary delay to limit data to serial port
}
```

/*
 * CapitiveSense Library Demo
Sketch
 * Paul Badger 2008
 * Uses a high value resistor e.g.
10M between send pin and receive
pin
 * Resistor effects sensitivity, ex-
periment with values, 50K - 50M.
Larger resistor values yield larger
sensor values.
 * Receive pin is the sensor pin - try
different amounts of foil/metal on
this pin
 */