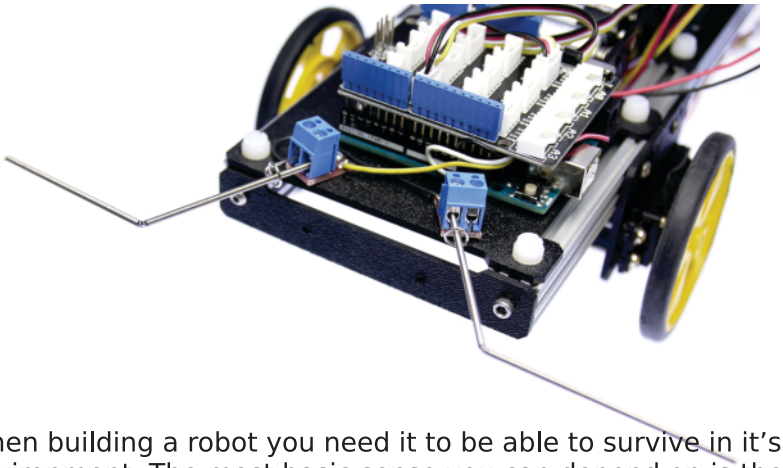
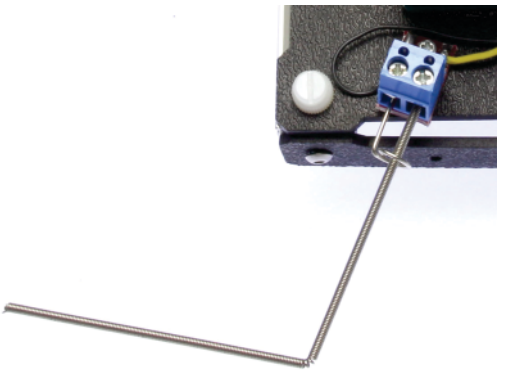
The Solarbotics Tact-1 Tactile Sensor Mount Kit

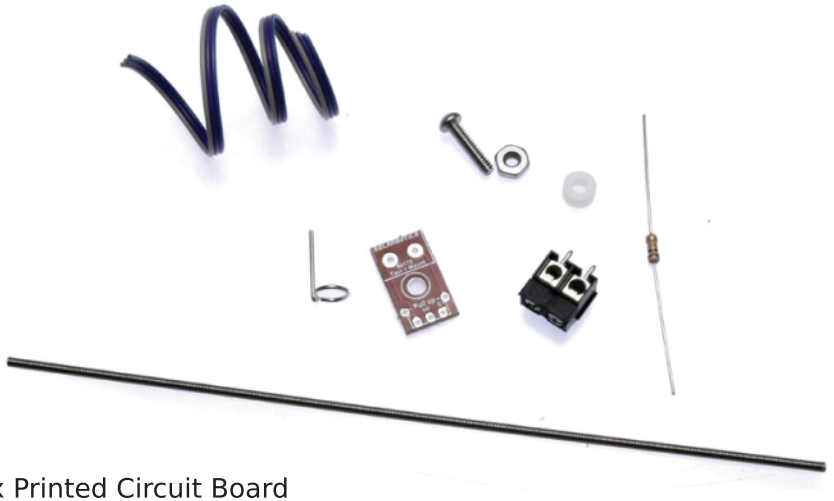


When building a robot you need it to be able to survive in it's environment. The most basic sense you can depend on is the *touch* or *bump* sensor.
The Solarbotics Tact-1 is a proven, touch sensor you can bolt onto your robot's body to detect the most basic of robot interactions: Crashing into stuff (and it won't hurt the sensor!)



Features:
Strong Ø1.86mm (0.073") nickel-plated spring
15cm (5.9") sensor reach
Omni-directional sensitivity
Built-in pull-up resistor for digital signal processing
Convenient Ground / Vcc / Signal pinout

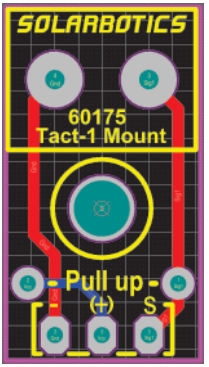
PARTS LIST



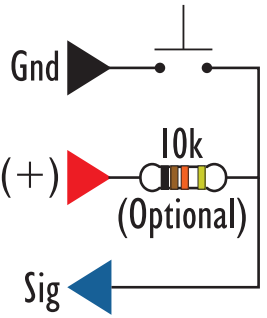
1 x Printed Circuit Board
1 x TBLK2 Terminal Block
1 x Wire Ring
1 x 15cm (5.9”) TACT1 Sensor Spring
1 x 10k Resistor (Blk / Brn / Org)
1 x #4 Plastic standoff
1 x #4 1/2” Bolt
1 x #4 nut
1 x 20cm 3-conductor wire

Required Tools:
Soldering equipment
#2 Philips or flat head screwdriver

Physical Circuit Layout



Schematic



INTRODUCTION

The wire-sensor-in-a-loop is a simple idea. Put a metal wire through a circle. If the wire bends enough to touch the circle, send a signal.

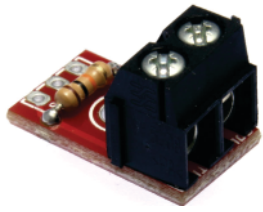
This idea works at many different sizes, from the tiny Photopopper-style Tact-2 “pin-in-coil” variations to much larger, vertically-hanging seismometric earth-motion sensor. This version is great for medium scale robots that detect objects by bashing into them, and then reacting appropriately without fear of damage to the sensor.

We’ve used variations of this sensor in many ways, like with our Tact-2 and Tact-3 sensor where instead of a loop on the outside, it’s a pin on the inside of a coil. Bend the coil until it touches the pin, and send a signal.

This kit makes it quite painless to assemble and tune a sturdy and simple touch sensor that you can bolt to a robot, and get reliable results.

ASSEMBLY

1. Start by folding the 10k resistor leads down, and soldering it in the position labeled “Pull-up”. Trim off the excess from the underside.

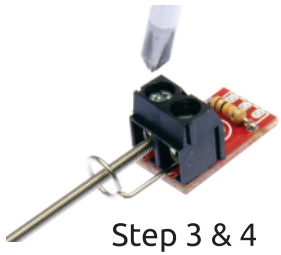


Step 1 & 2

Many microcontrollers have built-in “pull-up resistor” options that can be enabled so you do not need this external resistor. Still, installing this resistor assures you will get a good signal.

2. Solder the TBLK2 terminal block to the printed circuit board (”PCB”), making sure the holes on the side are pointed outwards. Installing this part backwards will definitely make using the sensor more difficult!

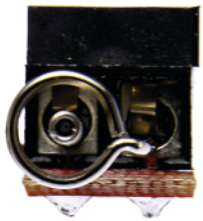
3. Use your screwdriver to open up one of the TBLK holes, so you can insert the TACT-1 spring wire into it. It doesn’t matter which one. Tighten it down as snugly as you can.



Step 3 & 4

4. Place the wire ring over the end of the TACT-1 and feed it down so the free end can be inserted into the other hole. Snug it down as well.

5. Visually align the wire ring so it is centered around the TACT-1 spring by bending it gently, so it has a equal space all the way around it. It should be almost perfect to start with.



Step 5

Assenbly, Cont'd:

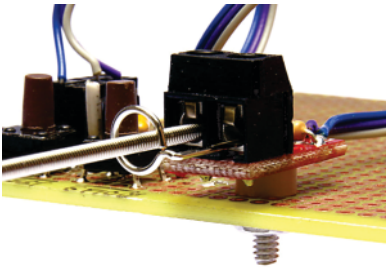
Step 6

6. Add the 3-conductor wire to the pads on the back of the PCB. The darkest color (usually black) connects to the "-" pad.

Connecting a Vcc power lead to the "(+) is optional, but necessary if you want to use the 10k pull-up resistor you installed in step 1. If you do use it, be sure to limit the current with a >1k resistor on this wire to avoid accidental short circuits!

Connect the last wire to the "S" lead. This is the signal line you will monitor for a positive pulse if your sensor touches an obstacle.

Installation, Tuning, and Use:



"Standoff" installation

Use the included #4 hardware to attach the sensor to the surface of your device. If you are attaching it to a metal surface, we've included a plastic spacer to lift the wire solder pads off the surface so it does not short out.

Connect your sensor to a battery/LED combination, or your favourite microcontroller. Whack the sensor around, and get a feel for how it responds. Like any mechanical switch-type sensor, there will be some switch noise in the signal, so be prepared to use standard "debouncing" techniques to give you a cleaner signal.

You may experience some "damping" issues, where your robot may move at a frequency that matches the sensors, causing them to "swing in tune" and cause false-triggers. It's simple to fix - either mount some 1/8" heat-shrink or electrical tape to the end of the sensor to add mass (lowering it's natural frequency), or if it isn't inconvenient to your robot, use some wire snips to trim the sensors down (raising the frequency).

Interfacing the sensor with your electronics is trivial. Treat them like a single-pole, single-throw (SPST) switch, which is what they are in fact. You will find no end of example code and circuit diagrams to get you on the way. We recommend some excellent (if not almost overkill) quality code by Albert van Dalen and by Elliot Williams. Here's our own sample code to using the TACT-1 with Arduino.

Mechanical Modifications:

Although the spring is quite tough, you can still give it a really solid and firm tweak with a pair of pliers to give it a permanent bend. We'll often use this ability to make a nice perimeter-surrounding sensor, and anchor the free end to the robot frame.