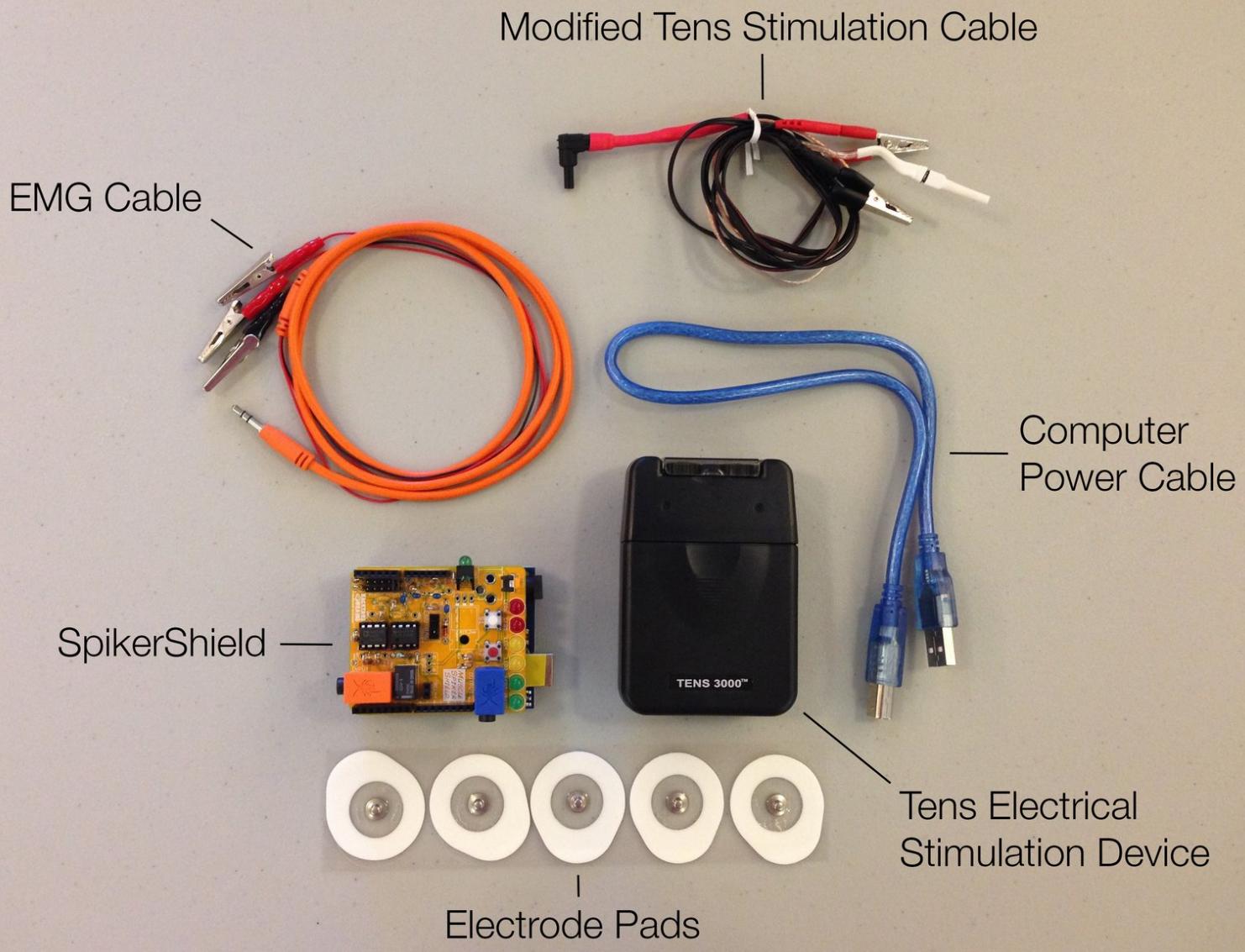




# Backyard Brain's Human-Human Interface Assembly

Written By: Bethany Smith

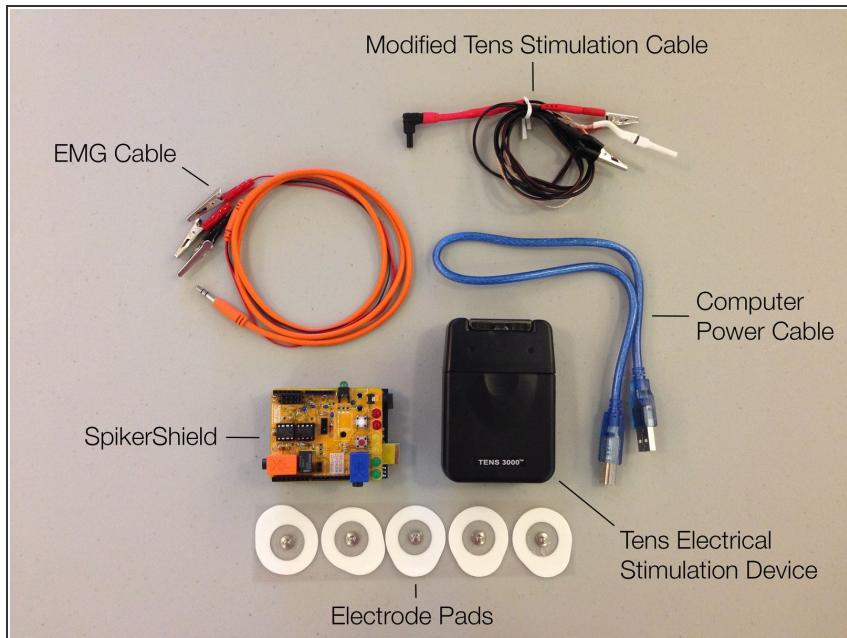




## PARTS:

- SpikerShield (1)
- EMG Cable (1)
- Electrode Pads (5)
- Tens Electrical Stimulation Device (1)
- Computer Battery (1)
- External Speaker (Optional) (1)
- Computer Power Cable (1)
- Modified Tens Stimulation Cable (1)

## Step 1 — Assembly



- Begin by assembling all necessary materials. We will use the battery power source rather than the computer cable, but wait to connect the battery.
- Plug the orange cable plug into the orange jack on the SpikerShield.

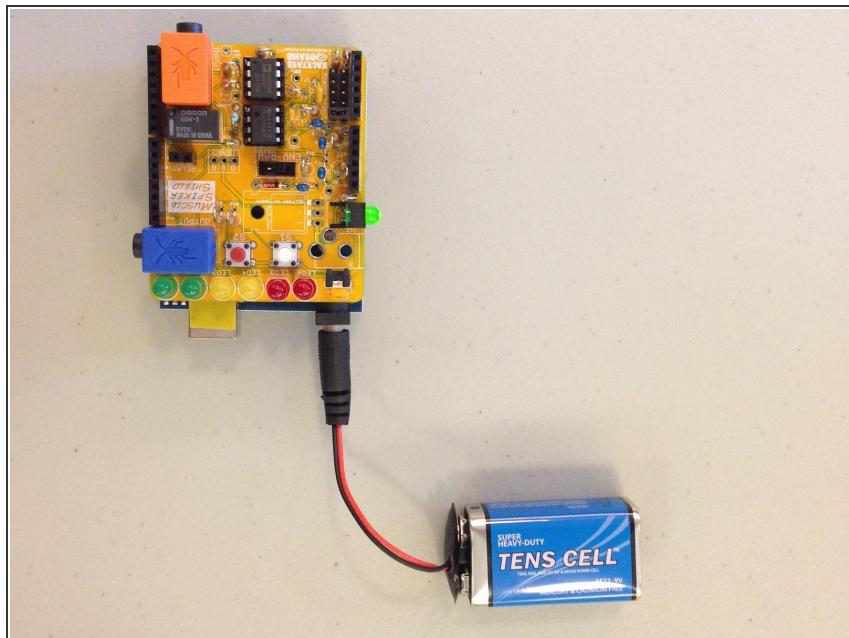
## Step 2



- Place two electrode pads on the forearm of the controller and one on the back of the controller's hand.
- Attach the orange EMG cable to the electrode pads by clipping the red and black alligator clips to the pads on the controller's forearm and the second red alligator clip to the electrode pad on the back of the controller's hand.

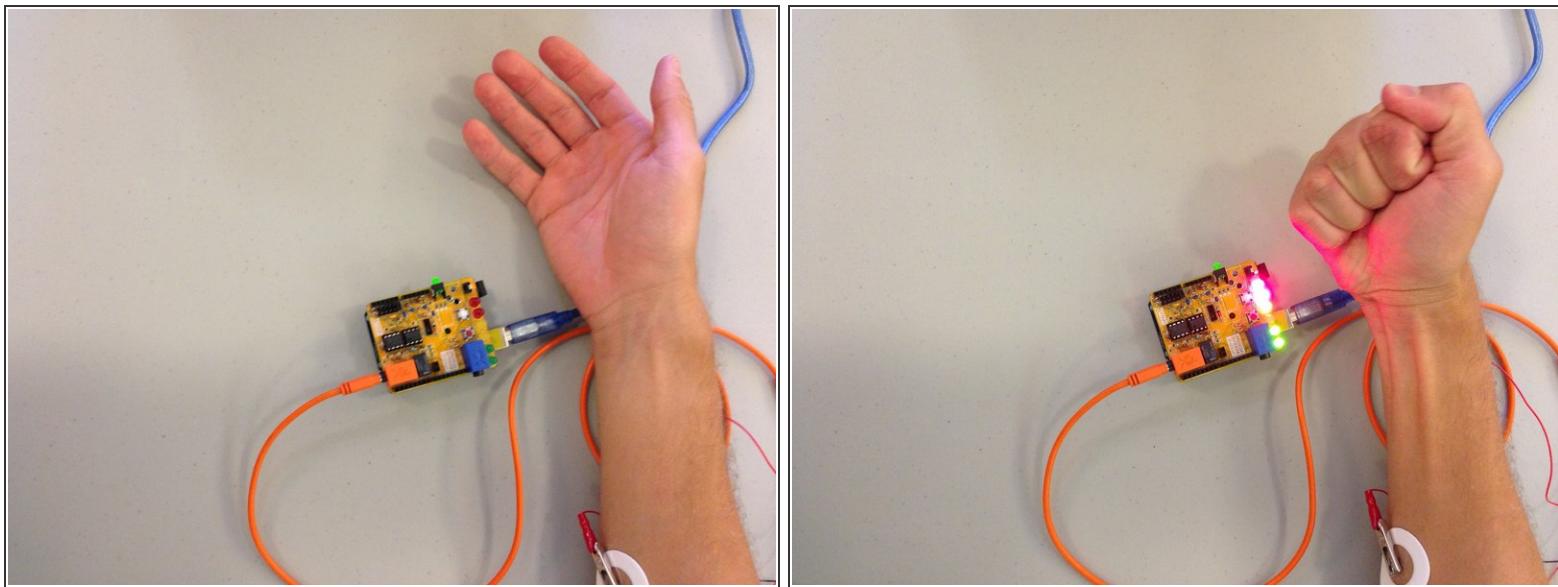
**(i)** The red lead electrode pad on the back of the controller's hand acts as the ground.

## Step 3



- Attach the green cable to the green jack on the SpikerShield but be sure to use the end of the cable marked "SpikerShield." Attach the other end to the tablet computer microphone jack and turn on the screen.
- *i* Attach the 9v battery to the black power cable and attach to the black power input on the Spiker Shield.
- *i* You should see background electrical activity on the tablet screen.

## Step 4



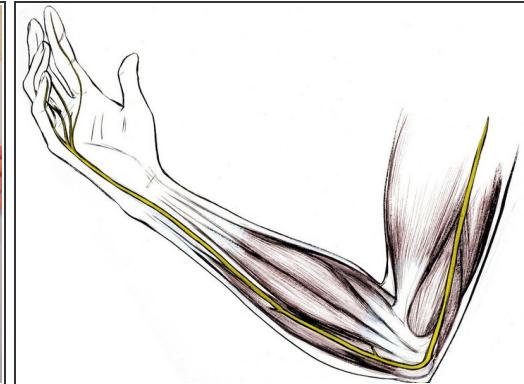
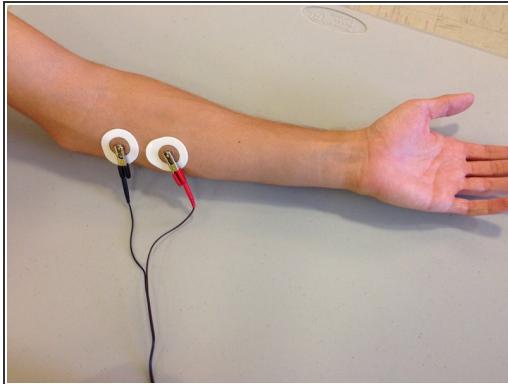
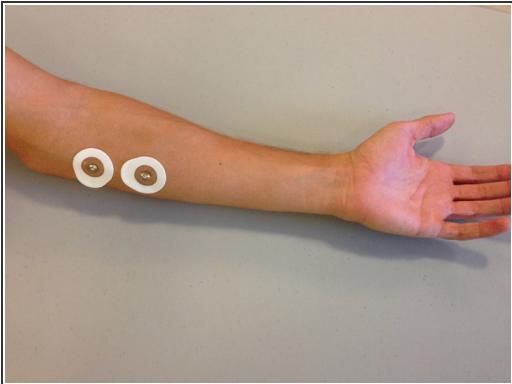
- Test the setup to make sure it is working.
- Have the controller flex his/her forearm. This should make the LEDs on the SpikerShield light up as far as the red lights.
  - ⓘ If the LEDs do not light up, either double check the setup or turn up the gain on the SpikerBox by turning the orange potentiometer screw counterclockwise.
  - ⓘ You should see muscle action potentials on the tablet screen each time the controller flexes the wrist.

## Step 5



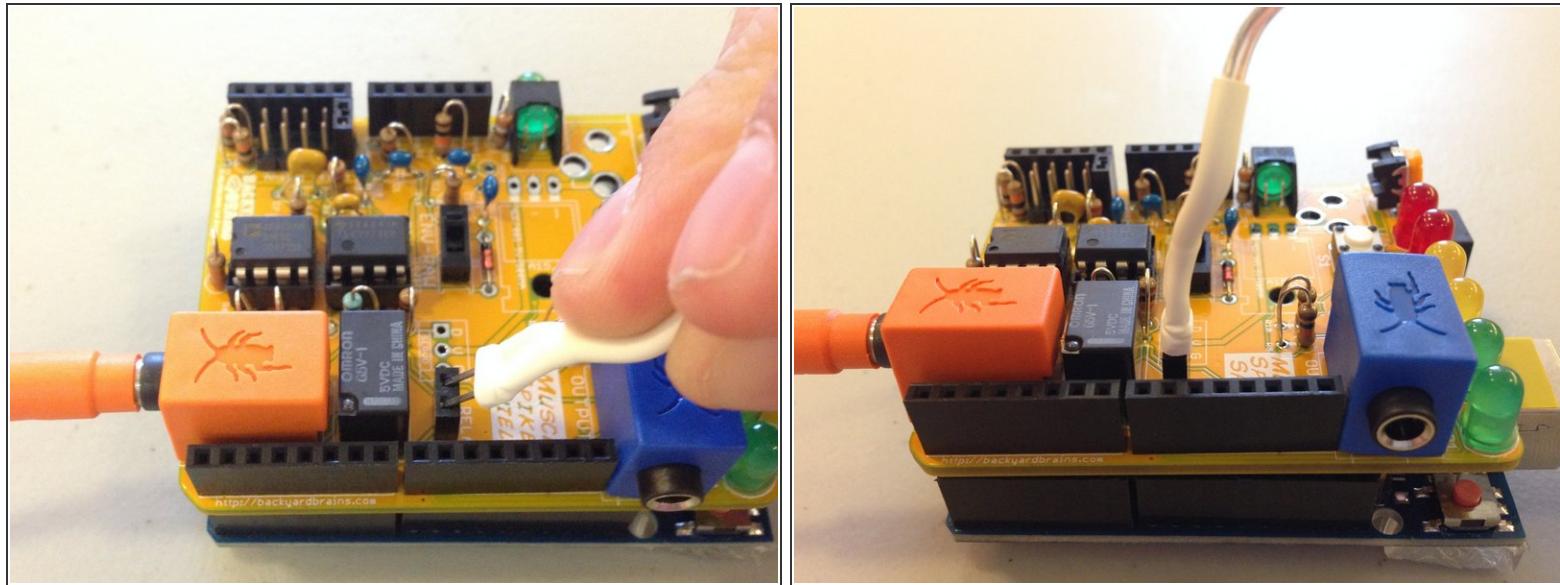
- Remove the battery from the Spiker Shield.
- Make sure that both dials on the TENS unit are turned off
- Attach the remaining wire to one of the jacks on the TENS unit and lay the alligator clips out to attach to the controlled volunteer.

## Step 6



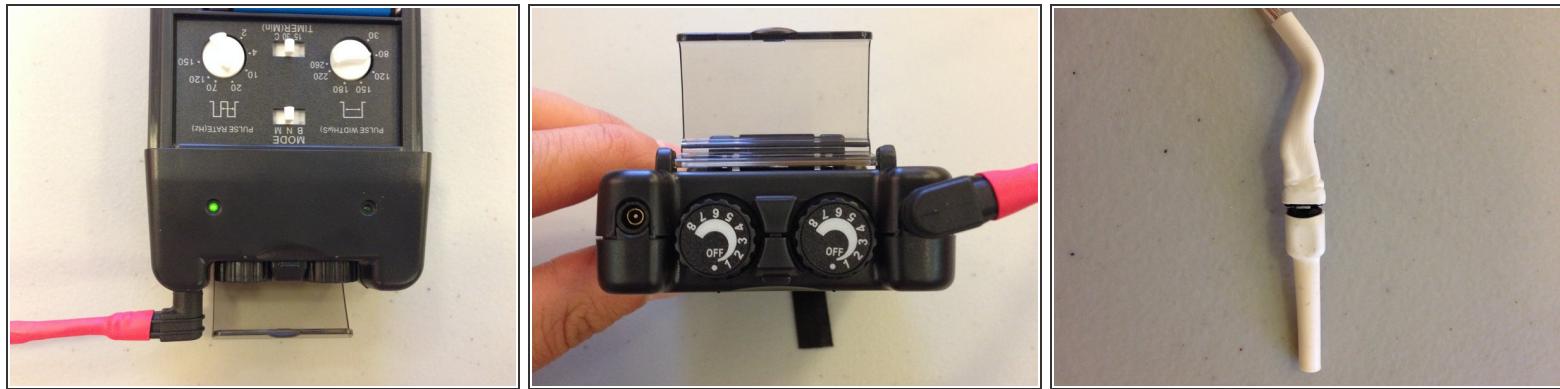
- Place two electrode pads on the muscle bellies of the forearm of the controlled volunteer as illustrated.
- Attach the TENS Device to the controlled volunteer by clipping the red and black alligator clips to the electrode pads on the forearm of the controlled human. The sequence of colors does not matter.

## Step 7



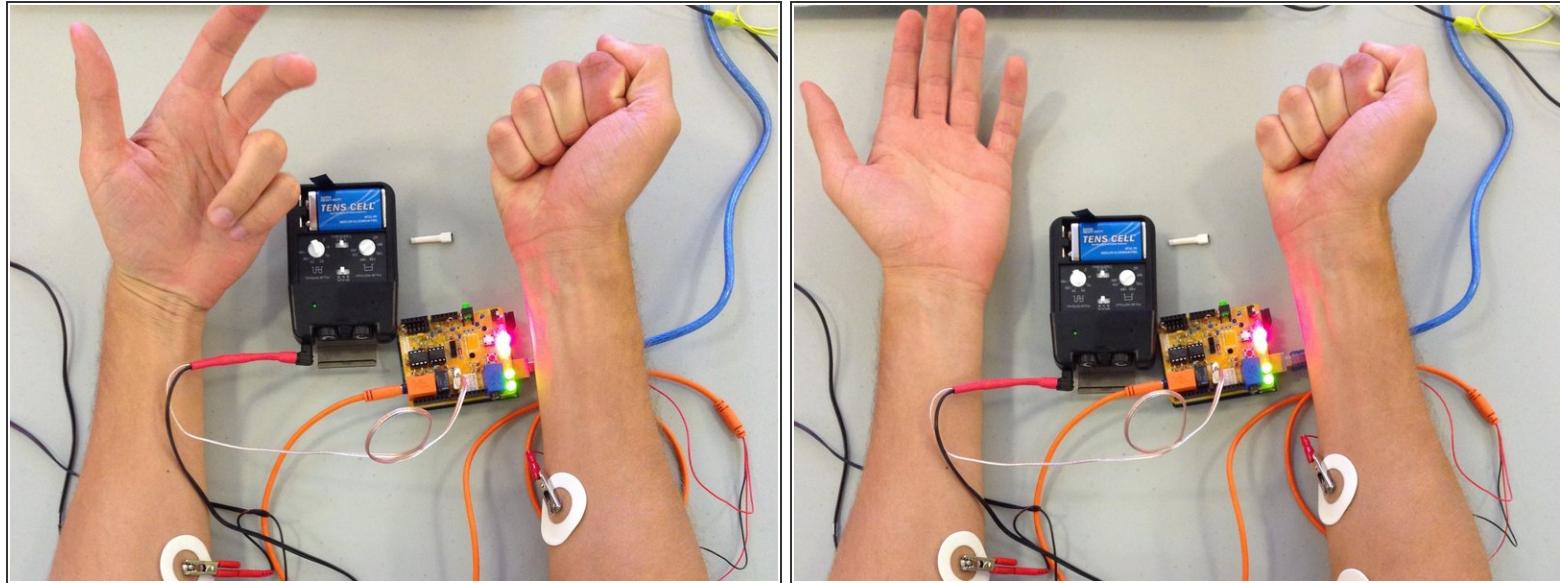
- Remove the cap from the white plug of the Tens Cable.
- First make sure that the battery is unplugged and both dials on the TENS unit are turned off. Insert the plug into the SpikerShield between the orange and blue boxes.

## Step 8



- Plug the battery back into the SpikerShield, first making sure the TENS unit is turned off. Now turn on the TENS unit carefully, turning the dial to no higher than "2" at first. Slowly turn up the settings on the TENS Device, one number at a time, to the needs of the controlled volunteer.
- *(i)* As the controller flexes his/her wrist, the controlled volunteer should feel a twitch in his/her forearm. It may be slightly uncomfortable but should not be painful. This usually occurs at about 3 on the power dial.

## Step 9



- Have the controller clench his/her fist and flex the wrist while the controlled volunteer rests his/her forearm on the table and carefully adjust the settings on the TENS device if there is no response from the controlled volunteer. At a TENS setting of about 4 the controlled volunteers wrist should flex like that of the controller.
- To turn off, first turn off the TENS unit, then remove the battery and then the other wires.

If you wish to use an external speaker, the headphone jack is the blue box on the SpikerShield.

Now you are ready to take over your partner's free will. Be kind!