Team Name: _____ Date: _____ Class: _____

# Assembling the Sensor Handout

Let's get started constructing the Sharp GP2Y0A02YK0F "radar" system:




**1. Sharp GP2Y0A02YK0F sensor**

**2. four AA battery holder with cover & switch**

**3. three AA alkaline batteries**

**4. wire-connectors**

**5. 18 AWG 2" shield wire**

**6. alligator clips**

**7. #40 x ¾" machine screw**

**8. #40 x ¾" (SAE) hex nut**

**9. electrical tape**

**10. class-shared wire stripper**

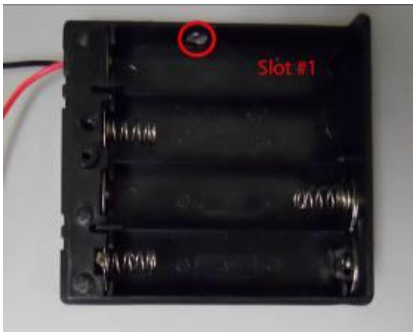
**11. precision screwdriver set**

**Also: class-shared drill with a 9/64 drill bit**

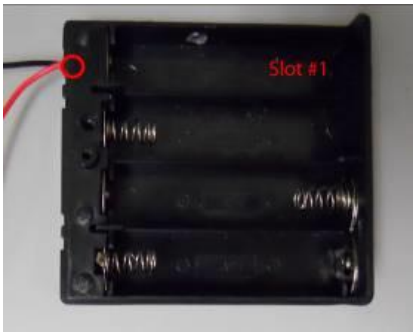
**Also: class-shared Phillips screwdriver**

1. **Pre-Mark and Drill**
   a. Open the four AA battery holder using a Philips screwdriver.
   b. Pre-mark the holder lid on the outside with two holes using a 9/64 drill bit about 37 mm apart. The holes should be directly above battery slot #1.
   c. Verify that the battery holder does not contain batteries.
   d. Identify the lower part of the four AA battery holder (not the lid).
   e. Mark and drill into the side of slot #1 of the battery holder.
      - Pre-mark the outside lower part of the holder in the middle. Drill the hole using the same bit.
   f. Mark and drill inside your holder (adjacent to the positive terminal of slot#1). This allows the holder's VCC and ground wires to enter into slot #1.
      - Pre-mark the edge of the holder above VCC and ground wire opening with a 4 mm diameter. Drill the hole.

1b




1e




1f

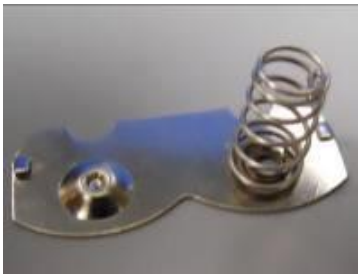
2. **Sensor Stabilization**
   a. Align the drilled holes on the holder lid with the sensor earlobe holes.
   b. Run a #40 x 3/4" machine screw through each hole.
   c. Secure the sensor by using a hex nut on each screw inside the battery holder.

2b

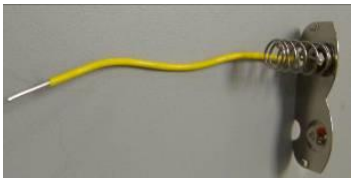
2c

3. **Serial and Parallel Holder Configuration**
   a. Correctly insert AA batteries into slots 2-4 (labeled as S2-S4).
   b. Pop out the ground (negative) terminal in slot #1.
   c. Make sure the shield wire is at least 2 inches long and stripped at each end.
      - Using two-inches of 18 AWG shield wire, connect it around the ground terminal.
   d. Slide the ground terminal into slot #1 and slide the other end of the shield wire under the positive terminal. Use a multimeter to verify that you made a proper configuration.


3a



3b



3c


3d

4. **Sensor Connections**
   a. Run the ground (black) and VCC (red) wires coming out of the sensor unit through the hole on the battery holder lid (made in 1e).
   b. Run the exiting ground (black) and VCC (red) wires from the lower part of the battery holder back inside to slot #1 (using hole made in 1f).
   c. Group the ground (black) wire from the sensor and the holder along with an **additional ground (black) wire** inside the battery holder. Connect all three wires with a wire-connector. **Run the third wire added out through the hole in the lower part of the battery holder (made in 1e).**
   d. Group VCC wires from the sensor unit and the battery holder. Connect them using a wire-connector.
   e. Neatly place all connected components inside slot #1 of battery holder and close the battery holder.

4a

4c

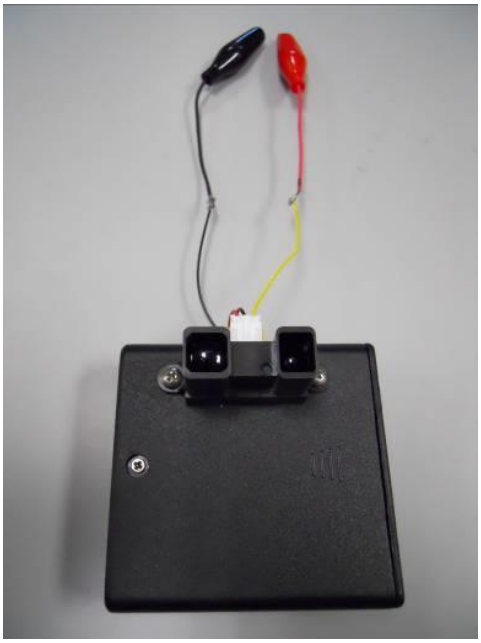
4d

4e

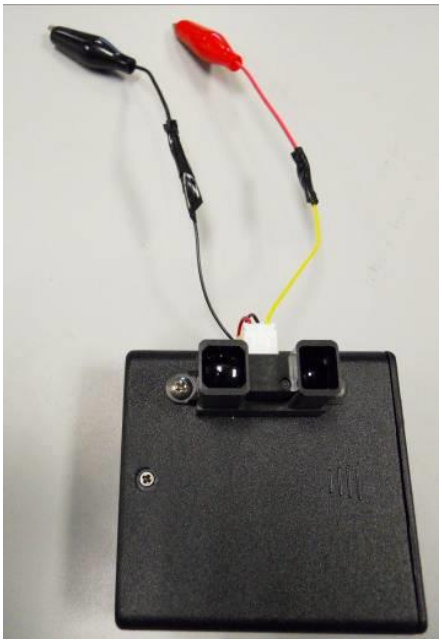
## 5. Alligator Clips

a. Connect alligator clips to corresponding sensor output wire (yellow) and battery holder ground (black). Use a red alligator clip for the yellow wire and a black alligator clip for the black wire.

b. Use a bit of electrical tape to secure good connections.



5a



5b