



# Depth Sensor Node Enclosure Assembly

Learn how to assembly an Open-Storm sensor node with a depth sensor.

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## PARTS:

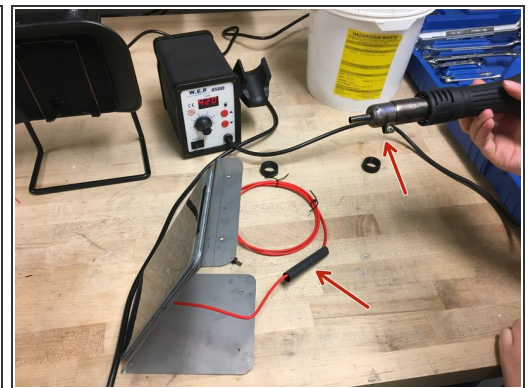
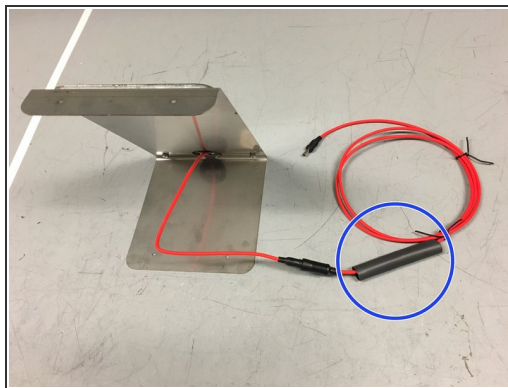
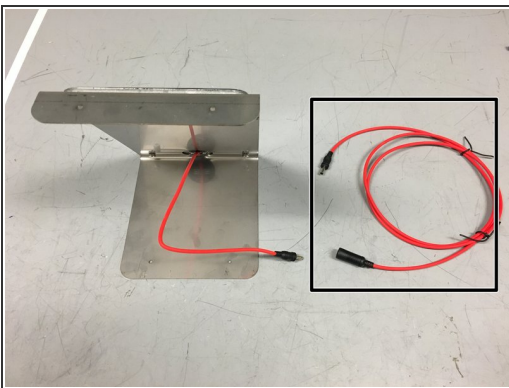
- [Enclosure](#) (1)
- [Depth Sensor](#) (1)
- [motherboard](#) (1)
- [Cellular Modem](#) (1)
- [Solar Panel](#) (1)
- [Solar Panel Frame](#) (1)
- [3.7V Lithium Ion Battery](#) (1)
- [Antena](#) (1)
- [Jumper pins](#) (2)
- [Solar Panel Nuts](#) (4)
- [Solar Panel Bolts](#) (4)
- [Waterproof Cable Gland Connector](#) (1)
- [GPS](#) (1)

## Step 1 — Outside Structure



- Obtain a solar panel with the appropriate metal plate.
- Obtain the correctly bend metal plate.
- ❗ The enclosure is the box where the sensor board, and wires are kept to protect from the environment.
- Obtain the enclosure with the predrilled holes.

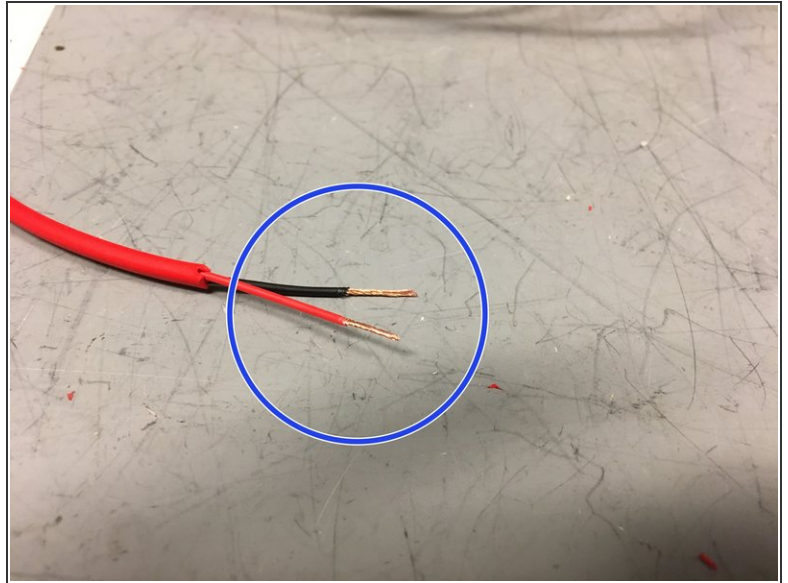
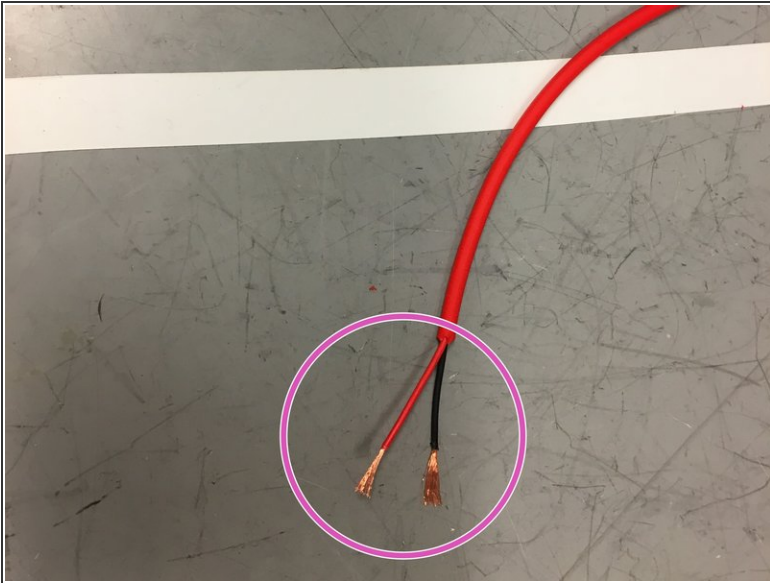
## Step 2 — Extending the Solar Panel Wire



- Obtain the solar panel extension cable
- Obtain heat-shrink tubing and place it around the cable
- Cover the connection between the solar panel wire and the extension cable with the heat-shrink tubing. Then, use a heat gun to shrink the tubing, creating a water-tight seal around the connection



### Step 3 — Preparing Solar Panel Wire



- Trim the solar panel extension wire so there is approximately 20 inches of wire from the connection point
- Strip the wires as shown in the image
- Twist the ends of the wires

## Step 4 — Attaching The Solar Panel



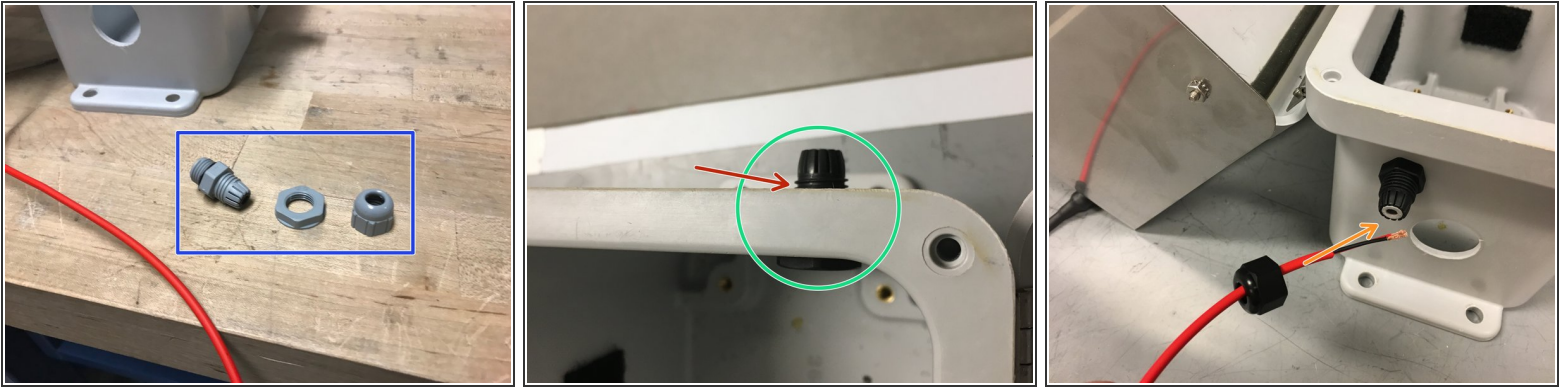
- Attach the solar panel onto the metal plate.
- Using screws and a screw driver, screw the solar panel into these holes. Now that the solar panel is attached to the metal plate, attach the metal plate onto the lid of the enclosure
  - Note: the tall side of the metal plate should be on the same side of the enclosure as the holes for the ultrasonic sensor and cable glands.
- The screws and nuts should be screwed in this matter in the holes on the sides of the box lid (meaning the nut is on the outside)

## Step 5 — Adding The Velcro



- Obtain velcro
- Add velcro with soft side inside the enclosure in the following places

## Step 6 — Solar Panel Wire

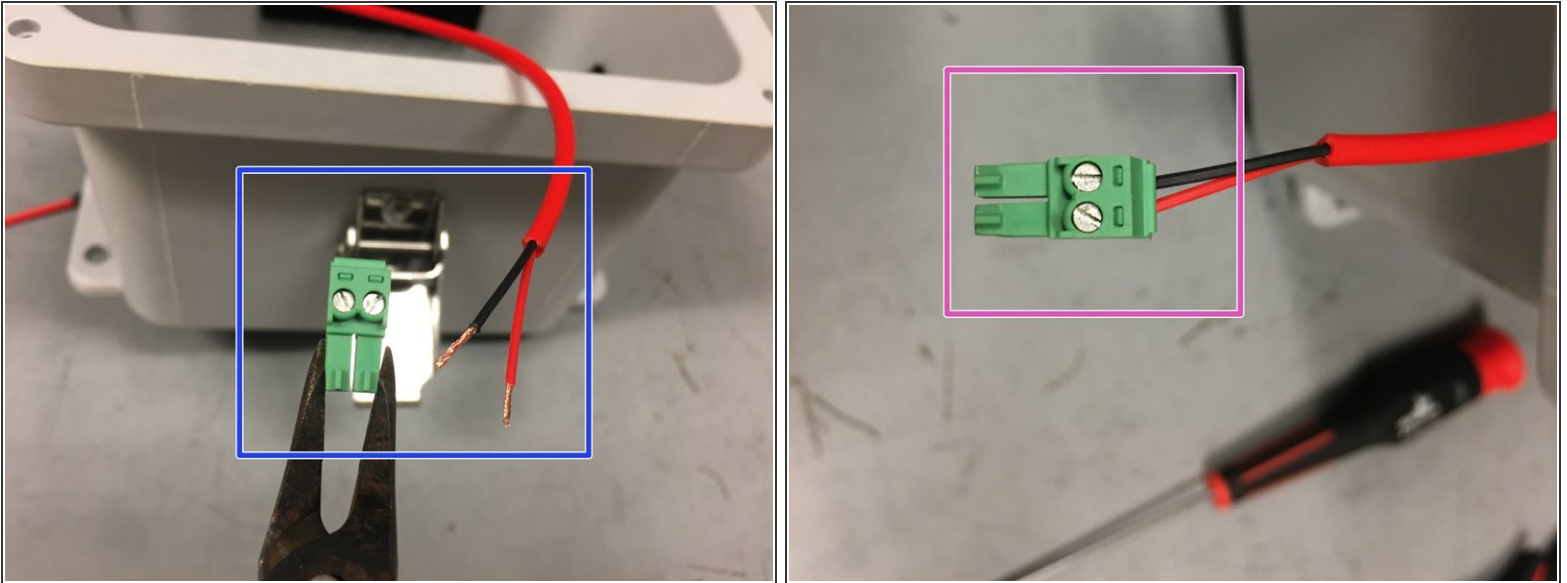


**i** Now we need to insert the red extension wire from the solar panel into the enclosure box

- Obtain a cable gland
- Screw the cable gland into the wall of the enclosure, through the small hole, as shown
- Place an o-ring between the cable gland and outer-wall of the enclosure
- Insert the solar panel extension wire into the cable gland as shown, leaving approximately 8 inches of wire inside the enclosure

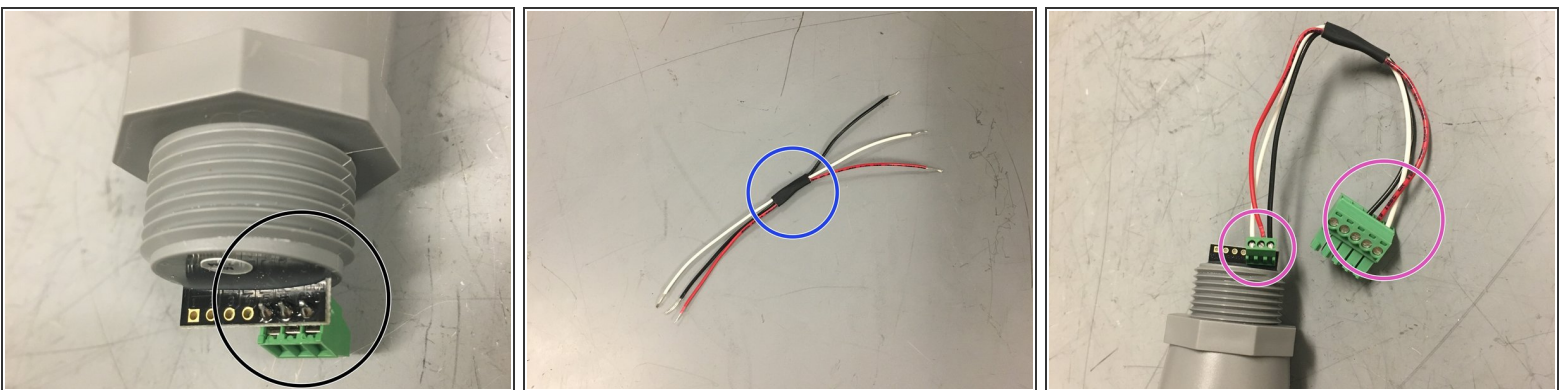


## Step 7 — Solar Panel Wire Pt. 2



- Obtain a plugable header and ensure the ends of the wires are twisted
  - Screw the wires into the plugable header as shown in the picture
- i** Note: hand tight is just right.

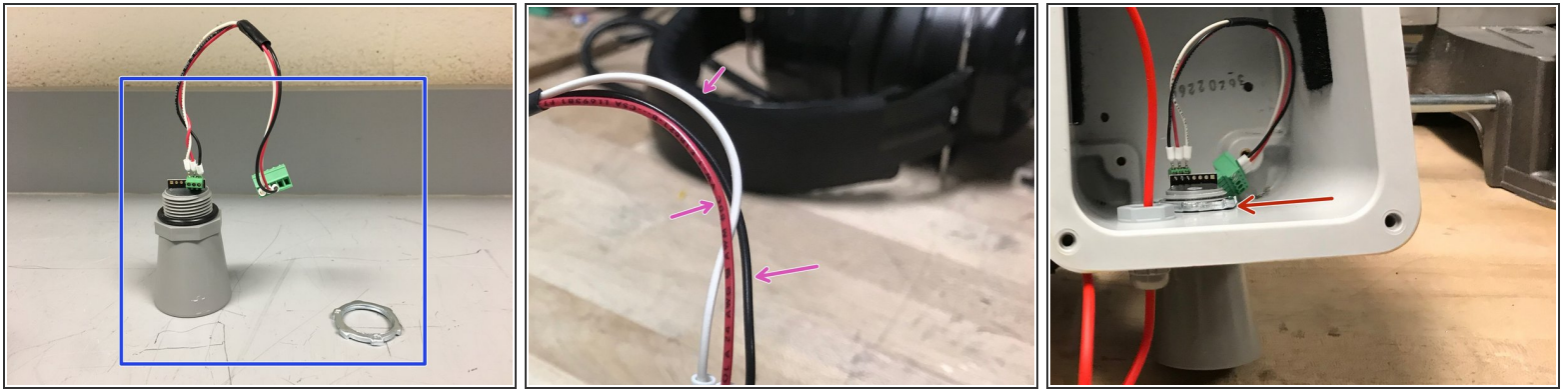
## Step 8 — Depth Sensor Assembly



- Solder a 3-prong terminal block to the ground, power, and data (#5) through-holes on the depth sensor
- For organization, bind three wires (red, white, and black) with a small piece of shrink wrap
- Connect the wires as shown in the picture (black to ground, red to power, white for data)

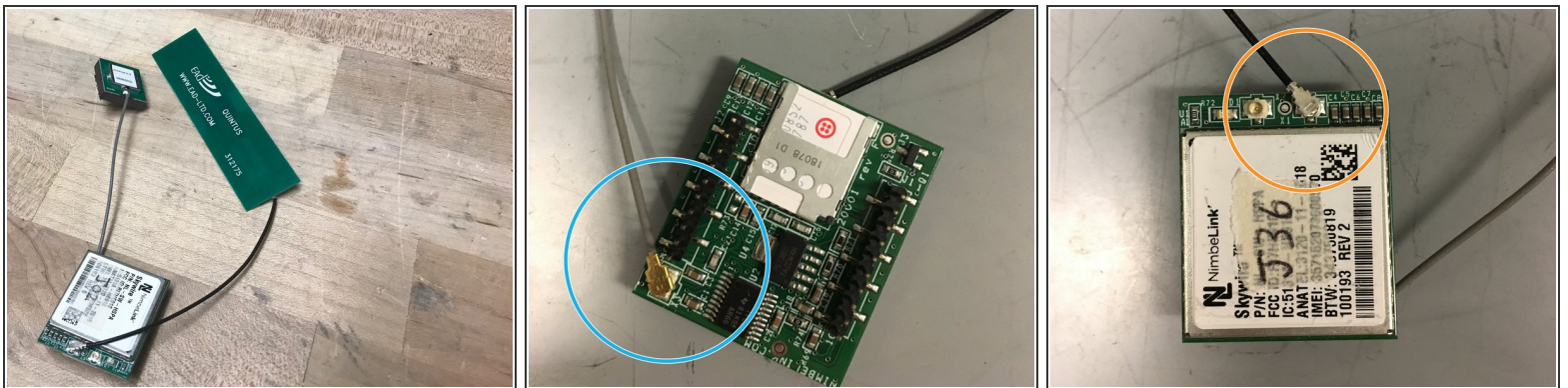


## Step 9 — Depth Sensor Installation



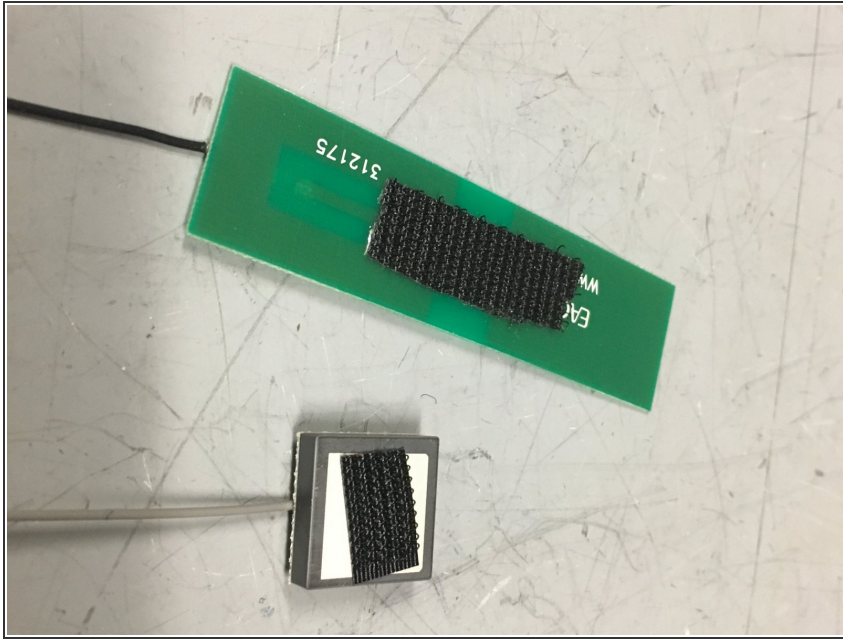
- Assemble the depth sensor by adding the o-rings, and the connective wires in the order pictured, leaving the nut ring to the side
- Note that the connective wires connect the depth sensor to the sensor node board. Remember, red wire is responsible for power, black is for ground, and white is for data
- Place the depth sensor through the larger hole, and secure it firmly by tightening the nut ring
- ⓘ Make sure the nut ring is tightened securely as it will keep the enclosure water-tight

## Step 10 — Attaching GPS and Antenna to Modem



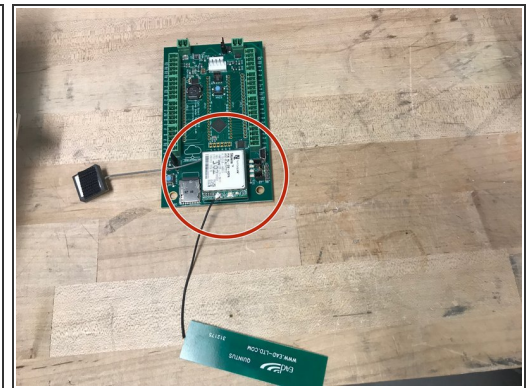
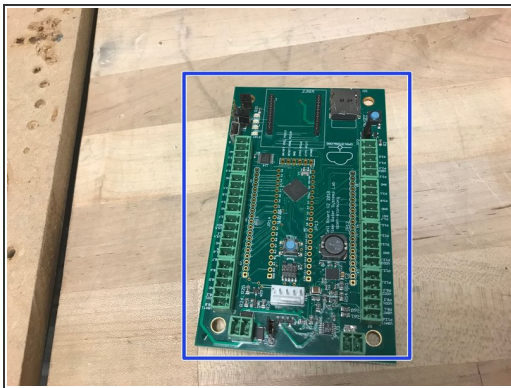
- Obtain the cell module (modem), GPS, and antenna
- Attach the GPS to the connection shown (grey wire)
- Attach the antenna to the connection shown (black wire)

## Step 11 — Adding Velcro to GPS and Antenna



- Attach rough-sided velcro on the antenna and GPS as shown in the picture.

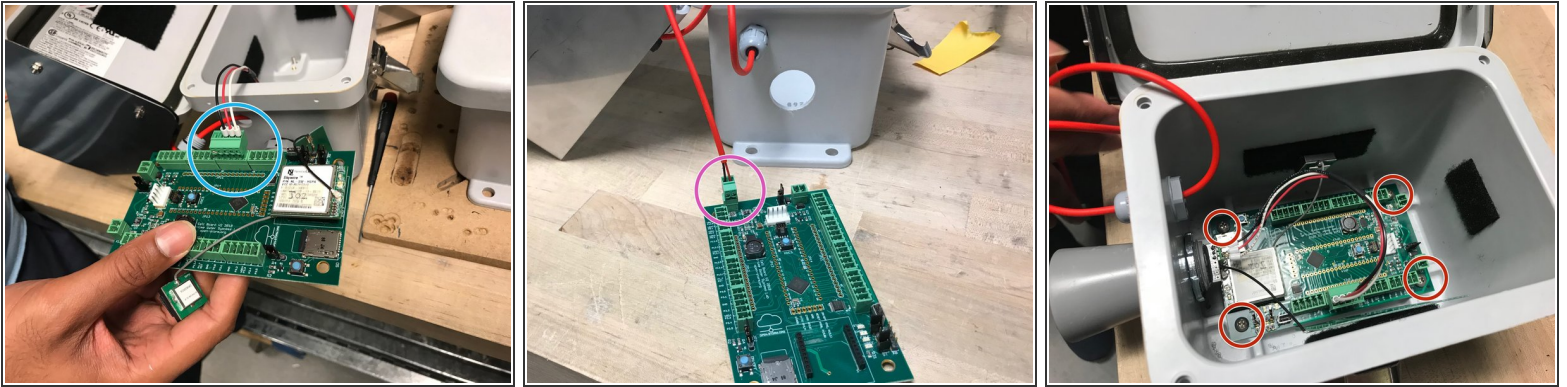
## Step 12 — Connecting Modem on Sensor Node Board



- Obtain Open-Storm board
- Obtain the modem/GPS/antenna
- Attach the cellular module onto the sensor node board in the appropriate place



## Step 13 — Connecting Sensors, Solar Panel to Node Board

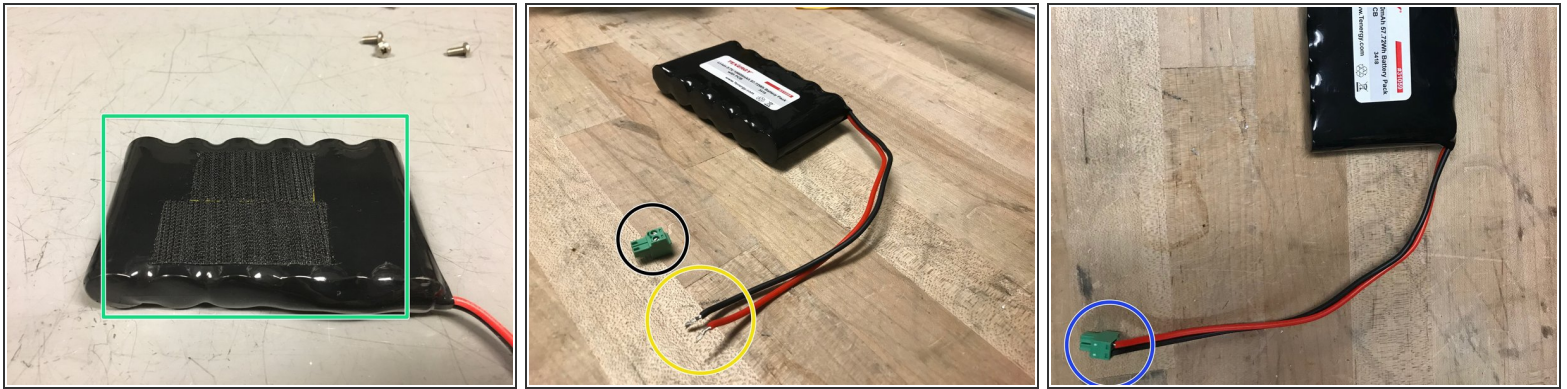


**i** Now the sensor node is attached to the modem, and the depth sensor and solar panel is attached to the box

- Connect the depth sensor wires to any green block (one that fits) on the sensor node
- Connect the solar panel wire to small green block on the sensor node as shown in the picture
- Put the sensor node board in the enclosure box, and screw it in using a screw driver

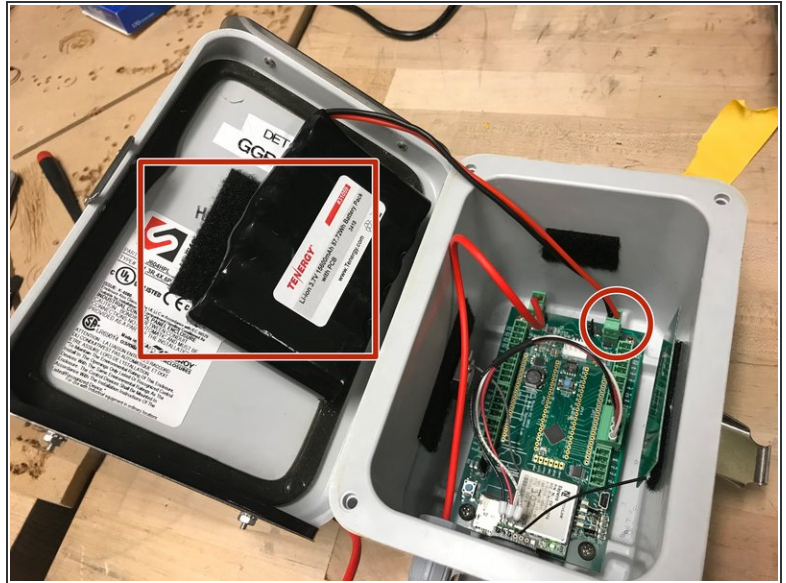
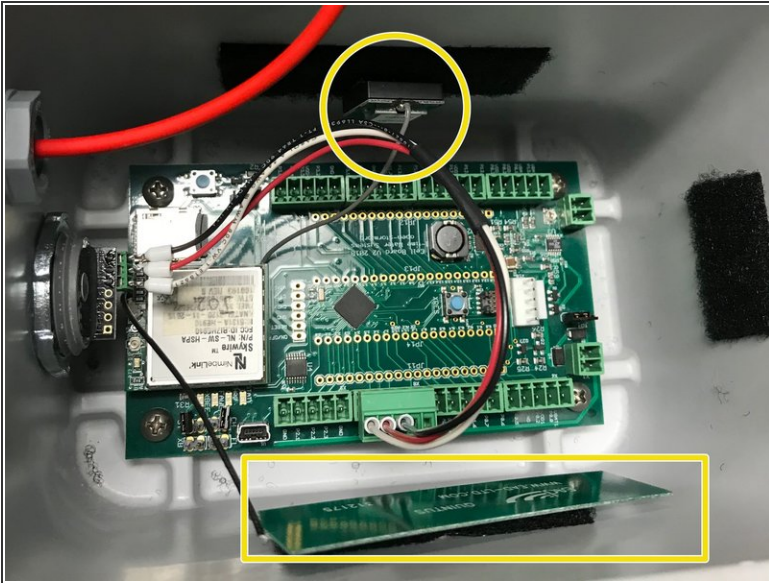


## Step 14 — Adding Velcro and Block Plug to Battery



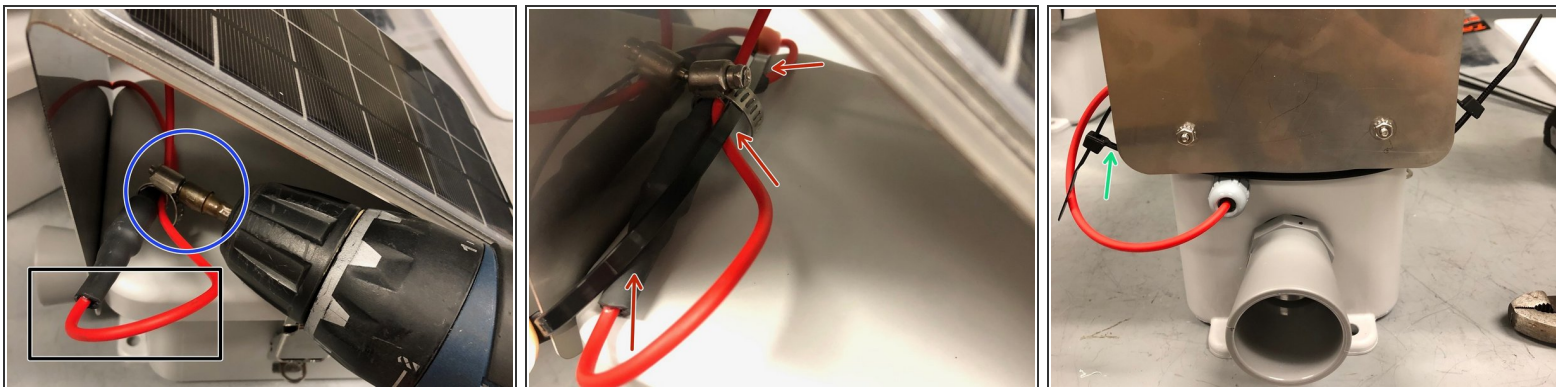
- Obtain velcro and lithium ion 3.7V battery. Attach rough side of velcro on battery
- ⚠ Be very careful not to short the battery by touching the two wires together.
- Obtain a block plug.
- Twist the wires of the battery so they fit nicely in the plugable-header block
- Screw the wires into the block plug
- ⓘ Note: hand tight is just right.

## Step 15 — Securing Antenna, GPS, and Battery



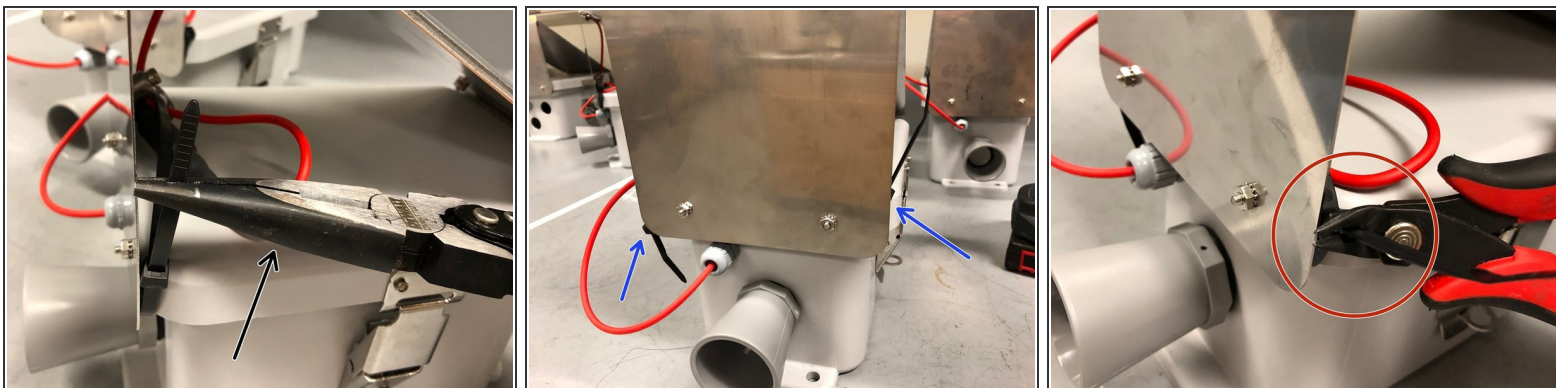
- Attach the antenna, and the GPS on the velcro to the closest wall on the inside of the enclosure
- Attach the battery to the velcro on the inside of the box lid and attach wire to the Open-Storm board

## Step 16 — Securing the Solar Panel Wire



- Fold wire over itself so that the portion above the hose clamp won't have slack when the black wire section is pressed against the inside of the panel
- Obtain a hose clamp, and secure the red part of the wire to the black section using a drill fitted with the drill bit
- Wrap a zip tie around the wire as shown.
- Use a second zip tie to connect the ends of the first one

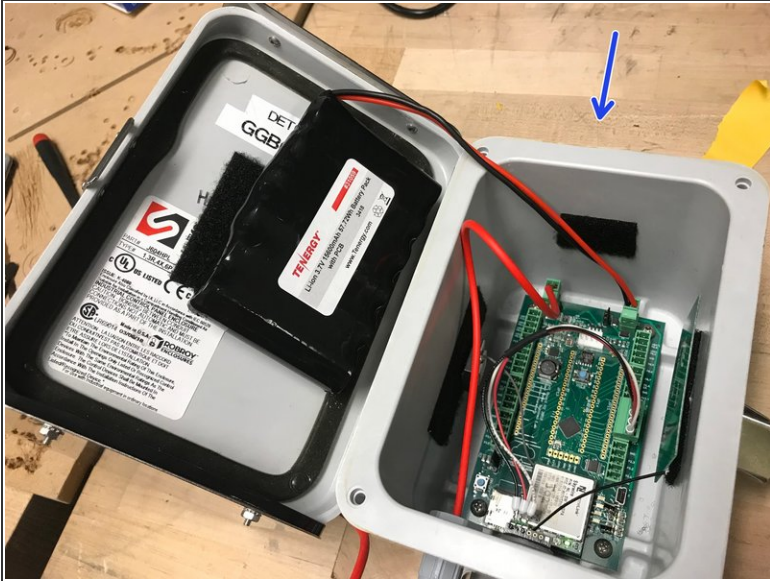
## Step 17 — Securing the Solar Panel Wire-continued



- Use a clamp to tighten the zip tie
- Position each zip tie head as shown while tightening
- Clip excess zip tie as close as possible



## Step 18 — FINISHED!



- This is what the sensor node should look like on the inside
- This is what the sensor node should look like from the outside