

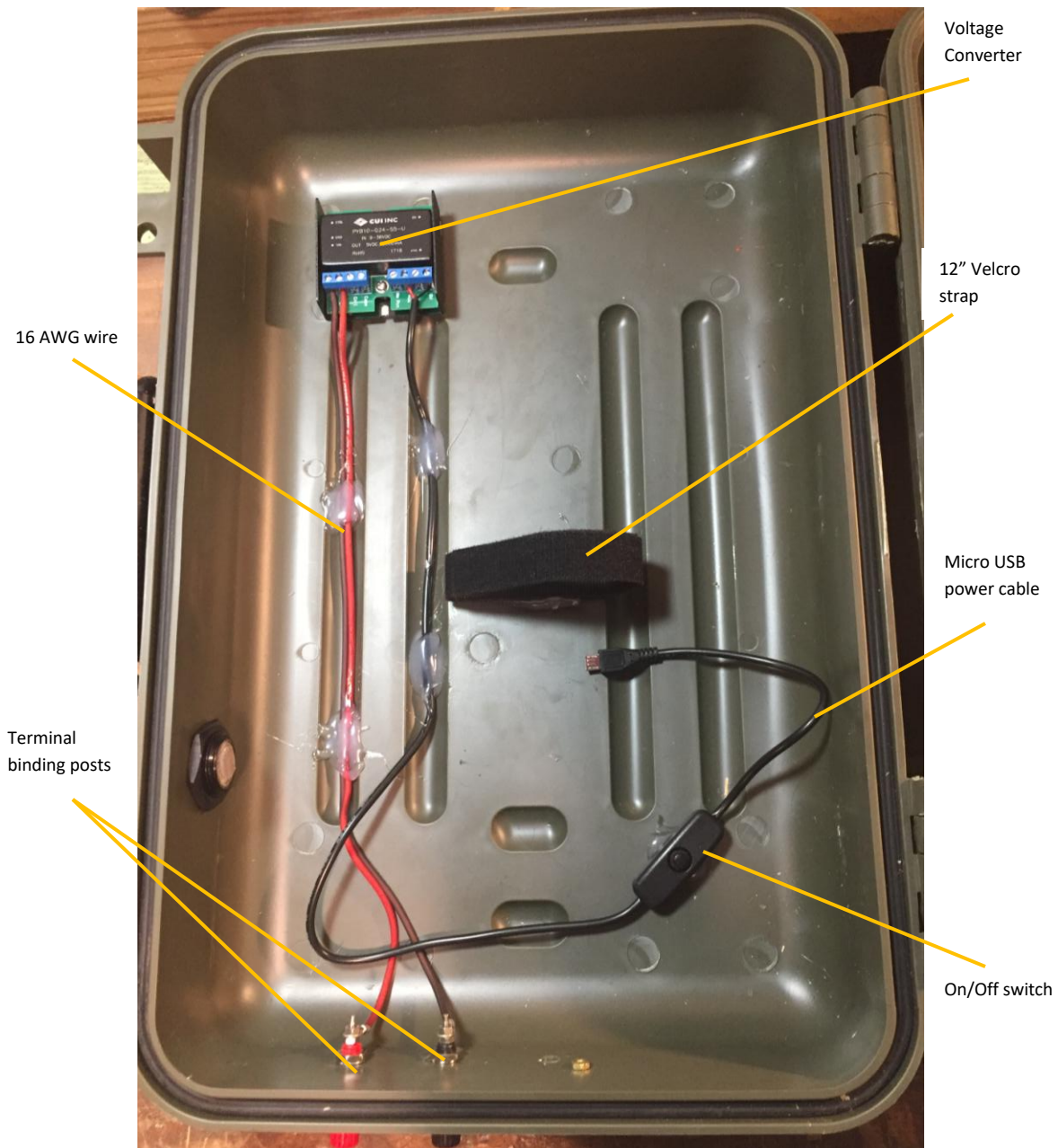
Raspberry Pi 3 for Sensorgnome – Electrical

Materials

- Black & red terminal binding posts (1 red, 1 black)
- Rubber o-ring (7/32" ID, 11/32" OD, 1/16" cross section) (2)
- 16 AWG stranded hook-up wire (14")
- DC/DC voltage converter (1)
- Stick-on Velcro (sized to match voltage converter)
- Micro USB power cable with on/off switch (1, cut to 22")
- One-Wrap Velcro roll (cut to 12")

Tools

- Ring terminal wire connectors (2)
- Soldering iron with chisel tip
- Solder wire
- Rosin flux
- Hot glue gun and hot glue
- Small needle-nose pliers or hemostats
- Small flathead screwdriver
- Wire stripping tool
- Sandpaper
- Compressed air



The electrical system of your Sensorgnome allows the receiver to connect to a power source, convert voltage to 5 volts (safe for RPi), and supply power to the RPi unit.

- 1) Peel off backing of sticky Velcro and affix to the bottom of DC/DC voltage converter (Figure 1). Affix match piece of Velcro to front-left corner of the Sensorgnome case, opposite two drilled 5/8" holes (Figure 2).

Preparing and tinning wires

- 2) Plug in soldering iron fitted with chisel tip and cut hook-up wire and power cable to proper lengths. The power cable should be measured from the micro USB port (Figure 3). Strip the casing off both ends of the 16 AWG hook-up wire (Figure 4). To strip the cut end of the power cable, first strip off the black outer casing to access the red and black wires inside (Figure 5).

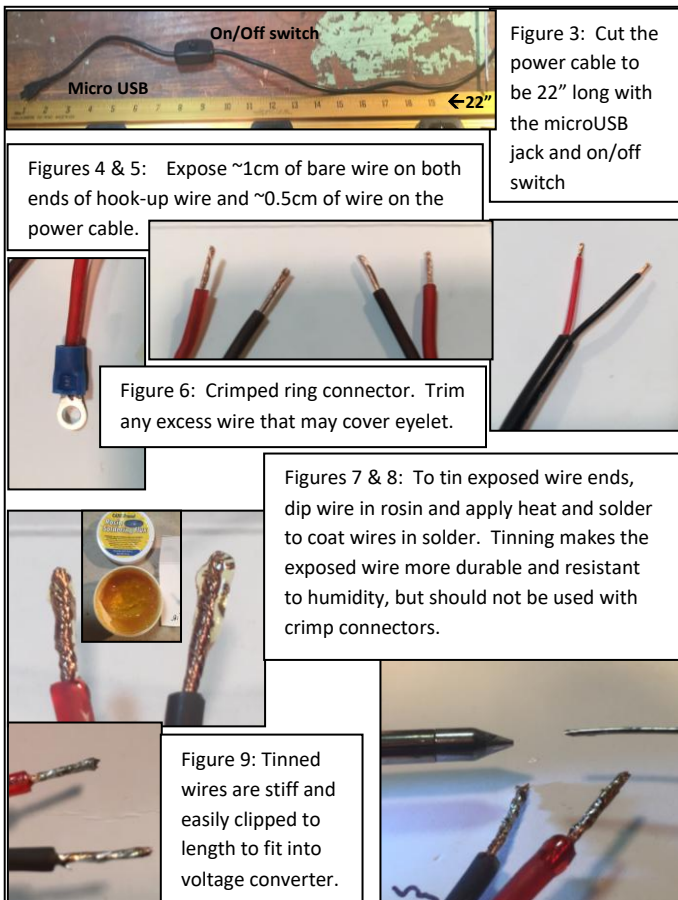


Figure 1: Affix Velcro to back of voltage converter and interior of case.

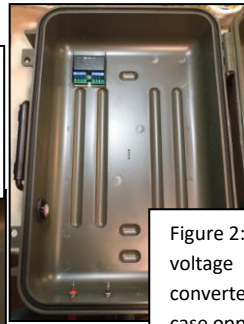


Figure 2: Place voltage converter in case opposite power posts.

- 3) Attach a ring terminal connector to each wire at one end of the hook-up wire and trim any excess (Figure 6).

- 4) Tin the exposed ends of each wire to create a strong, durable connection. Dip the exposed copper wire into the rosin flux (Figure 7). Melt a small drop of solder onto the tip of the iron and then touch the iron tip and solder droplet to the wire end. The flux will evaporate and the solder will flow to cover the wire (Figure 8). Use gravity to direct the solder to flow over the exposed wires and continue to apply heat until the exposed copper wires are completely covered in solder (Figure 9). Tin both wires coming from the power cable and the other end of the hook-up wire.

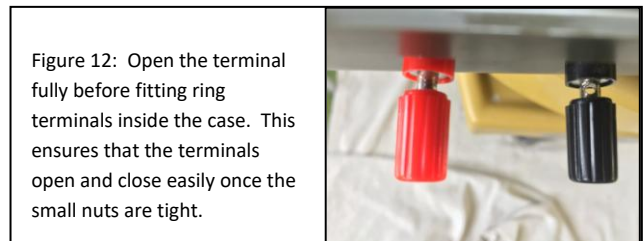


Figure 12: Open the terminal fully before fitting ring terminals inside the case. This ensures that the terminals open and close easily once the small nuts are tight.

- 5) To fit the hook-up wire to the terminal post, first open the terminal by completely unscrewing the plastic outer post (Figure 12). Remove outermost small nut from post, and tighten the inner nut with pliers. Fit the ring terminal, replace small nut and tighten (Figure 13). Feel with your finger that the ring terminal is secure and doesn't spin.



Figures 13: Tighten the inner nut against the post, then place eyelet, and secure with outer nut.

- 6) Connect tinned ends of hook-up wire to voltage converter by fitting wire into the slot and tightening the corresponding flathead screw. Connect red to “Vin” and black to “GND” (Figure 14). You may need to trim the exposed tinned wire in order to fit completely in the slot (Figure 15). Tug slightly on wires to test that the wires are secure.

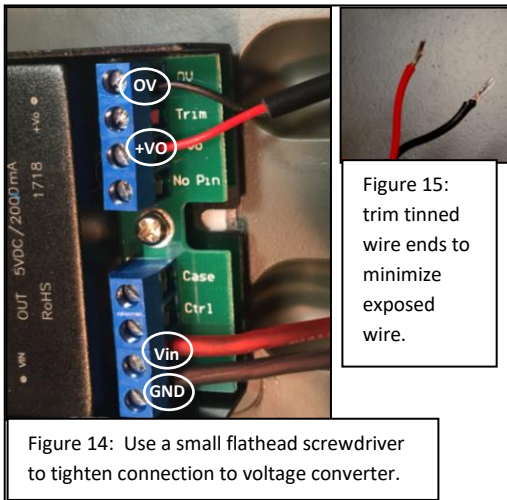


Figure 14: Use a small flathead screwdriver to tighten connection to voltage converter.

Figure 15: trim tinned wire ends to minimize exposed wire.

- 7) Connect power cable to voltage converter in the same process as above. Connect red to “+VO” and black to “0V” (Figure 14).

- 8) Secure the hook-up wire and power cables to the inside of the case using hot glue. Using the sandpaper to scuff the locations where you put glue can help longevity. Glue each wire in two locations and route any excess wire to the front-right corner of the case to keep it out of the way (Figure 16). Glue the switch on the power cable in an easily accessible location on the right or

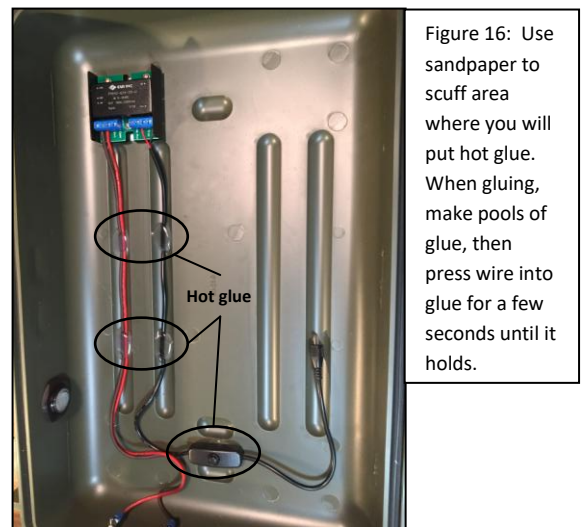


Figure 16: Use sandpaper to scuff area where you will put hot glue. When gluing, make pools of glue, then press wire into glue for a few seconds until it holds.

rear-right portion of the case interior (Figure 16). Be sure that the cable can reach the RPi computer in the center of the case.

- 9) Hot glue a strap for the RPi computer in the center of the case. Cut Velcro roll to length and test fit your enclosed Raspberry Pi (RPi) computer by putting GPS “tail” through the 1/4” hole and screwing on SMA dust cap (Figure 5). You want to make sure that the Velcro strap doesn’t cover the wifi button. Use sandpaper to rough up interior of case and hot glue Velcro strip inside case bottom (Figure 6).

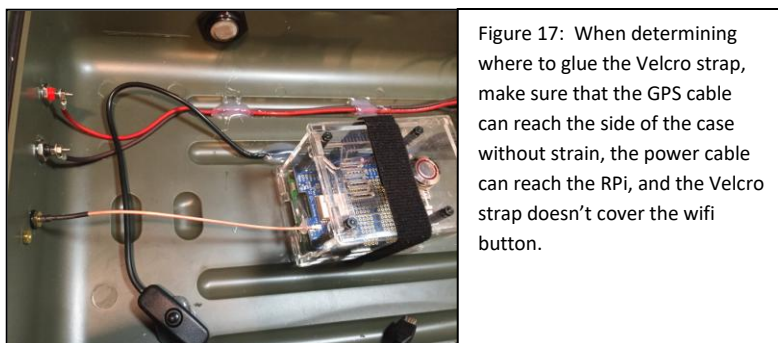


Figure 17: When determining where to glue the Velcro strap, make sure that the GPS cable can reach the side of the case without strain, the power cable can reach the RPi, and the Velcro strap doesn’t cover the wifi button.

Figure 18: Once you determine where the Velcro strap will go, rough the location with sandpaper, make a line of glue, and press the strap in place it holds.

