



How to: DIY Bucket Moth Trap



The following document outlines how to build an LED bucket moth trap. The trap uses a portable, rechargeable battery pack to power a strip of UV LED lights. The instructions and materials outlined below will result in a trap system that powers a 1m strip of UV LED lights for approximately 8 hours per charge of the battery pack. The end of the document outlines where we purchased components and their specifications, plus adaptations you might want to make.

NEYEDC extends huge thanks to David Hood for his help and guidance in wiring the traps.

Materials

For the bucket/trap system

20L (or larger if desired) white bucket, with lid

Mounting board or architrave, approx. 30cm length or enough to cross bucket lid

PVC downpipe, approx. 68mm diameter, ~30cm length or slightly shorter

Egg boxes (approx. 2 large trays per trap)

Cable tie

Self-adhesive Velcro (2 small strips)

Funnel (minimum 18cm diameter)

For the electrical components

UV LED light strip, approx. 1m (5050 SMD, 12V, 60 LED/m), either silicone covered or self-adhesive-backed waterproof strip – 2 pin connection

Power cable (2.1mm DC power socket, unterminated, ~1.8m) cut into one shorter section close to the unterminated end and one long section (approx. 1/3 and 2/3)

Convertor (5V to 12V, output 2A)

Light sensitive switch

Battery pack (at least 20000MaH)

Crimps (male and female, set of 2 pairs)

Block connectors (up to 3)

N.B If you are using an LED strip without wires already attached (i.e., from the middle of a roll of LED lights, you will require one 2-pin LED strip light connector to attach the LED to the power cable – otherwise you can use block connectors only for this build)

Tools

Scissors

Superglue

Drill

Saw (if cutting mounting board/pipe)

Tape measure

Pen/pencil

Waterproof tape/electrical tape

Compass

Crimping tool

Wire stripper

Stanley knife or another sharp blade

Soldering tool (optional)

Setting up the bucket and light mount

- 1) If needed, cut your mounting bar down to size. This will lie across the funnel and act as the anchor for the tube which holds the LED strip. This should lie across the lid of your bucket and be a few cm smaller in length than the lid's diameter.
- 2) Cut down the downpipe, if needed, to approx. 25-30cm height. Drill two small holes on opposite sides of the downpipe at its base, about 1cm up from the bottom of the pipe.



- 3) Mark the middle of your mounting bar to determine where your downpipe will be placed. Make two marks just to either side of where the downpipe will sit, and drill two holes here into the mounting bar. These will correspond with the holes on either side of the base of the downpipe.



- 4) Using a cable tie, attach your downpipe to your mounting bar using the two sets of holes drilled in the previous steps. Tightly pull closed the cable tie under the mounting bar and cut the excess cable tie (otherwise it will go into your funnel). Your downpipe will now be attached to your mounting bar in a 'T' shape.



- 5) Next, use a compass to mark out a template for the hole in the bucket lid where the funnel will sit. You can either mark using a pencil and compass directly onto the bucket lid (making sure the circle is in the centre) or make a template first to trace around. Once marked, cut the lid using a Stanley knife or similar blade. Push the funnel into the lid – it should fit snugly with the open end of the funnel flush with the top of the lid. You may need to cut your funnel depending on how narrow it goes towards its end. Ideally, you need a gap of about 4cm in diameter at the end of the funnel.

With your mounting bar created and the funnel set in the bucket, stick the Velcro strips (attached together) right at the end of the mounting bar at each end. Then, peel off the remaining adhesive and stick the mounting bar across the funnel.



- 6) The next stage requires one hole to be drilled in the mounting bar, and one slightly larger hole directly below in the bucket lid. This will allow for the electronics to pass from the end of the LED strip and into the bucket. Stick the mounting bar over the bucket lid using the Velcro as per the previous step. There should be space between the edge of the funnel and the end of the mounting bar. Make a mark at this point (make sure not to drill into the Velcro) and drill through the mounting board and in the same spot directly below, through the bucket lid. Make the hole in the bucket slightly larger.

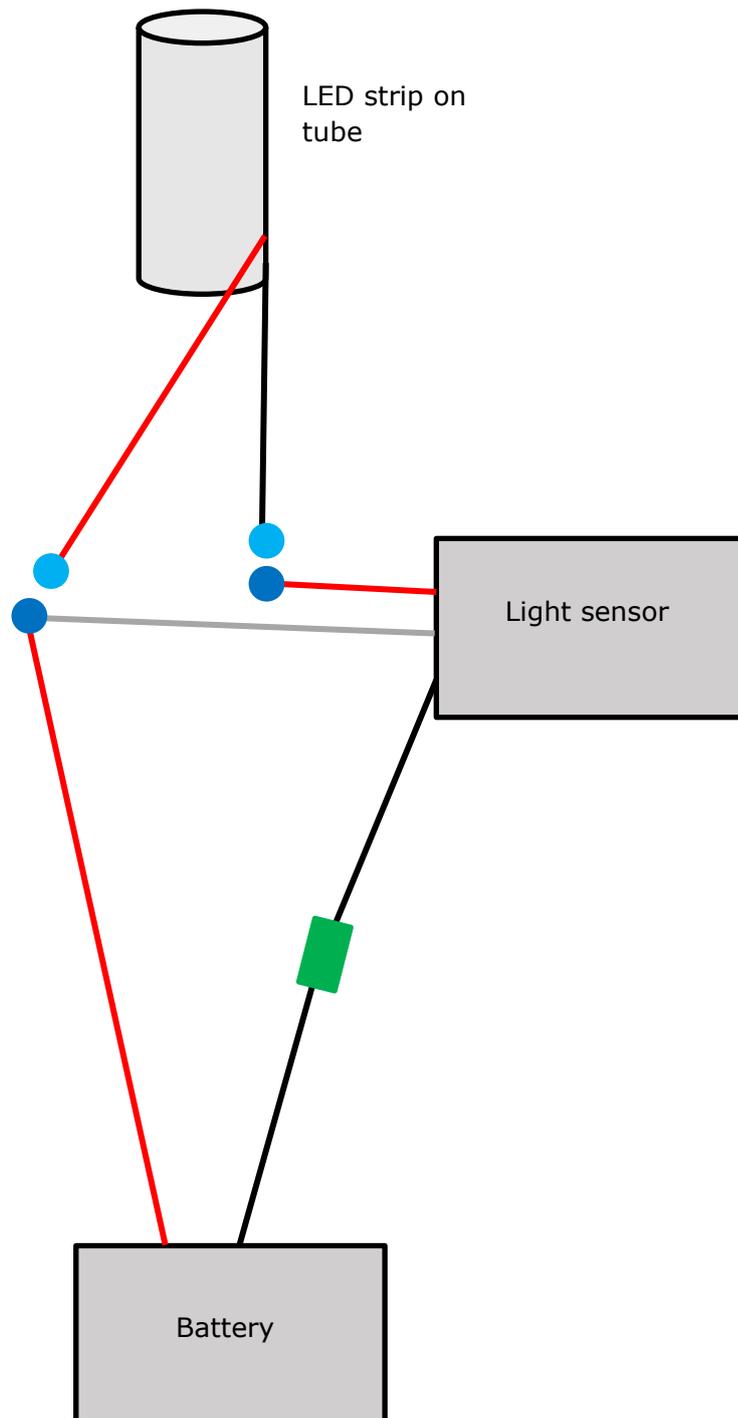


Setting up the electrics

The electric components of the trap need to be wired as such (red wires are +, black -). The grey line is the additional white cable from the light sensor.

The light blue circles are crimps (spade/male end), and the dark blue circles are the other part of the crimp (female end).

The green rectangle is a block connector.

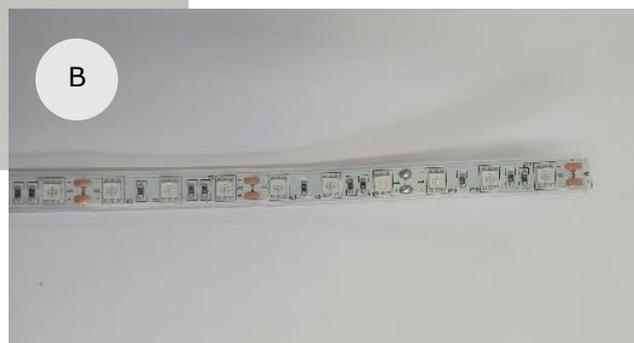
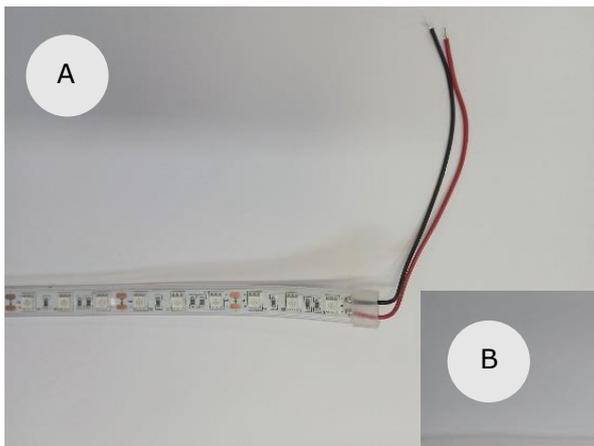


Making the connections

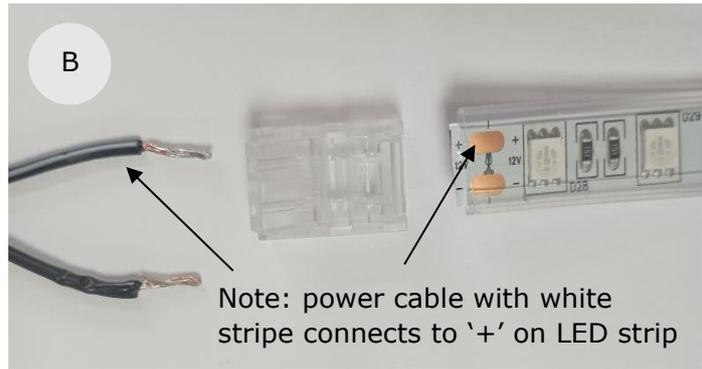
- 1) Thread the shorter section of the power cable, with the wires stripped down, through the hole in mounting board. Attach crimps (spade ends) to the two wires of the power cable that go below the mounting board. Splitting the cable into two sections like this means that when finished, you'll be able to detach the LED tube and mounting bar from the trap entirely to make it easier to transport, store, and empty.



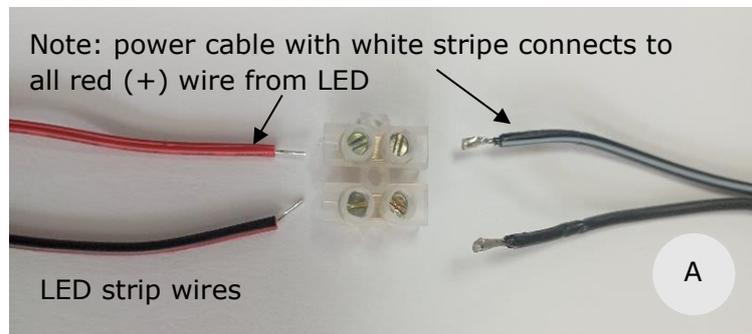
- 2) Cut your LED strip to a 1m size. You might have an LED strip with the wires attached (A) or a strip where it is cut from the middle of a larger strip LED where there are no wires (B).



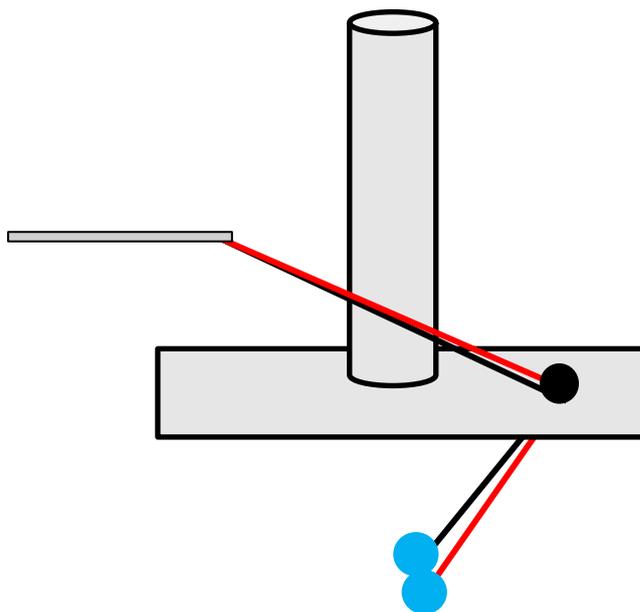
- 3) If you have a strip like in B, use an LED strip connector to connect your LED strip to the two ends of the power cable above the mounting bar. Note that it is important that the + wire connects to the + part of the LED strip and vice versa with the negative. If you have an LED strip with a silicone coating, this might need to be cut back to expose the metal strips where the clip should be closed on.



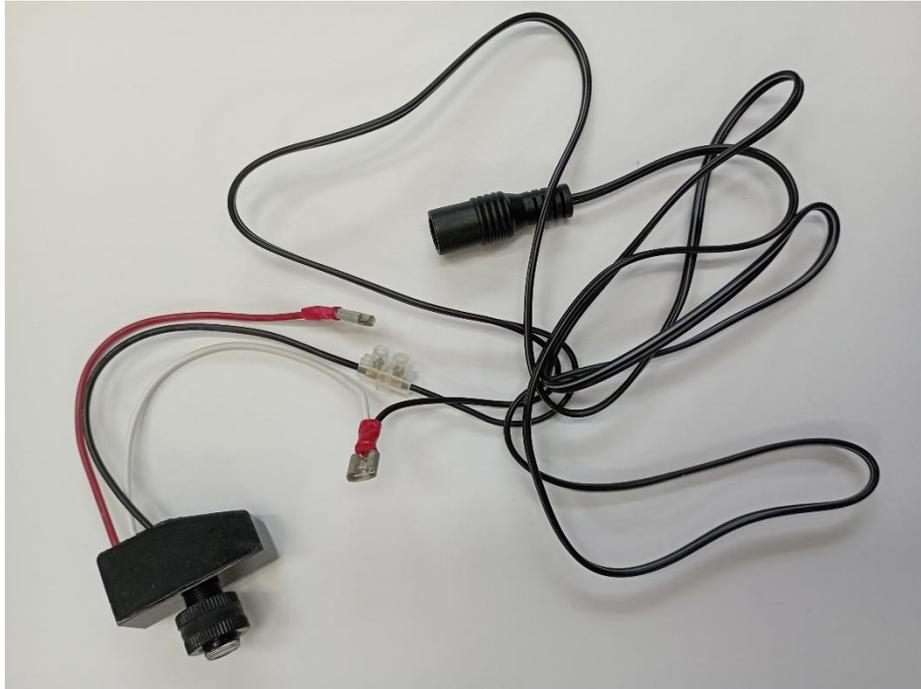
- 4) If you have a strip like in A, the cables are already attached to the LED strip, but they still need connecting to the power cable like in (3). To do this, use two block connectors.



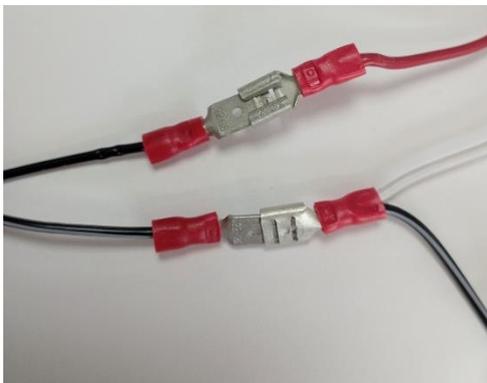
- 5) Now that the LED strip is connected to the power cable, the section of the wiring below is complete. Next, the LED strip needs to be glued around the downpipe. Lie the LED strip flat if it is non-adhesive and apply gorilla superglue or similar to the strip before winding it, spaced equally, around the downpipe.



- 6) Wire the remaining power cable and light-sensitive switch as follows. The single red wire coming from the light sensitive switch needs a female crimp end to meet the fully black wire coming from the LED. The black wire coming from the light switch and the fully black wire coming from the jack-end of the power cable need to be connected via a connector block. Finally, the white wire from the light switch and black wire with the white stripe from the jack-end of the power cable need to be crimped together into a female crimp. To improve the connections, you may wish to solder the wire ends before crimping.



- 7) With the trap now wired, it can be tested by connecting the two crimps coming down through the mounting board and bucket lid to the two crimps you just created above. Then, connect the end of the power cable to the convertor, before connecting the USB on the convertor to the battery pack.



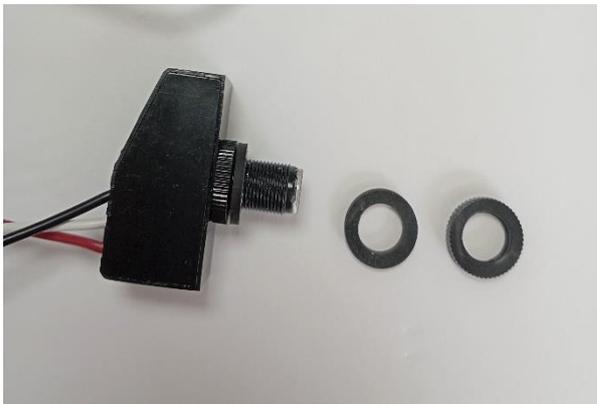
Your LED strip should light up! To test your light-sensitive switch, make sure the switch is pointed towards the light. Your LED strip should turn off once the sensor detects daylight.

The light sensitive switch can be an effective way to save battery on the pack, as it will turn the LED light off when it gets light in the morning. Be aware, though, that most battery packs have a function where they will turn off if they are not drawing a current. In this case, if you place the trap before dusk, you risk the light not coming on once darkness falls, as the LED strip won't be drawing a current and the battery pack will turn off, as it doesn't detect itself powering anything.

You can combat this by either purchasing a battery pack which has no standby function – though these are difficult to find - installing a resistor into the system to keep a constant draw of power from the battery pack (this will drain the battery more quickly) or simply placing your trap when the sun has already set enough so that the LED light is already switched on.

Finishing touches

- 1) Find where the light switch will sit most conveniently on the outside of the trap and drill a hole in the side of the bucket big enough for the outside portion of the sensor to sit through. Unscrew the two rings off the light switch, place through the hole, and screw the rings back on.



- 2) Cut up the egg boxes into smaller pieces and place randomly inside the bucket.



Sourcing components

Listed here are some of the materials needed to make this trap, including links to the exact components used. Feel free to source these from different places but be aware if these have different specifications than those indicated, the results may differ.

Component/material	Sources
UV LED light strip	eBay or Amazon – we used this one with IP67 waterproofing
Power cable	Online through an electronics retailer – or on eBay or Amazon
Convertor (5V to 12V, 2A output)	Online or from an electronics retailer
Light sensitive switch	eBay
Battery pack	Any basic portable phone/device charger with a suitable output (at least 20000Mah) we used this one
LED light connector (if your LED strip has no wires)	Online

Caveats

This is a basic portable LED trap, built to be beginner-friendly and lower-cost than purchasing a portable trap. Some things to bear in mind are:

- The trap is not completely waterproof
- The power bank listed here (20000Mah) will power the trap for approximately 8 hours per full charge
- A silicone covering on the LED strips contributes to waterproofing but may have a small impact on UV output of the strip

