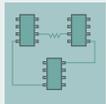


MINI BIKE LIGHT



Make an easy LED headlight from a garden hose adapter. By Trevor Shannon

I wanted to build a small, bright, and durable LED light for my bike, and I read online that plumbing parts work well as housings. So I made a 3-LED headlamp that's enclosed by a $\frac{3}{4}$ " hose faucet adapter and powered by an outboard battery pack.

1. Make the LED mount.

To hold the LEDs, I used some scrap translucent plastic. Using a drill press, I marked an outline on the plastic sheet by cutting partway through with a $1\frac{1}{4}$ " hole saw. I drilled three 5mm holes inside it for the LEDs, then finished cutting out the disk with the hole saw.

Trim the edges of the disk until it fits snugly in the rubber side of the hose adapter, stretching the rubber a bit. I used a grinder, but you can also use a file or sandpaper (Figure A, following page).

MATERIALS AND TOOLS

White 5mm LEDs, 3.6V, 20mA (3) **part #276-320 at RadioShack, or cheaper from mouser.com or other online suppliers**

15 Ω resistor I determined the resistor's value using a formula described in instructables.com/id/LEDs-for-Beginners.

3-AAA battery holder (1) with batteries (3)
Small SPST toggle switch I used a micro-mini toggle, **RadioShack #275-624, for a second, more streamlined version of the light.**

Insulated wire, electrical tape, and super glue
 $\frac{3}{4}$ " garden hose faucet adapter **clamp style**
 $\frac{1}{4}$ " hard translucent plastic **small sheet or scrap**
 $1\frac{1}{4}$ " hose clamp and 1 extra clamp
Soldering materials
Drill press with 5mm bit and $1\frac{1}{4}$ " hole saw
Grinder, file, or sandpaper



A



B



C



D



E



F

Fig. A: Drilled plastic disk for holding LEDs. Fig. B: LEDs glued into the disk and wired together with the resistor. Fig. C: Leads connected for power and switch. Fig. D: LED disk fit into the rubber end of the faucet hose adapter.

Fig. E: Switch connected to the negative LED lead and negative battery terminal. Fig. F: Rider's view of the headlamp hose-clamped above the bicycle handlebar and the switch zip-tied underneath.

2. Connect the LEDs.

Super-glue the LEDs in the disk's holes, arranged so that all their short (negative) leads point toward the center. Bend and solder together the short leads, then the long (positive) leads, avoiding any short-long contact. Solder a 15Ω resistor to the positive side (Figure B), and clip the excess length on all leads. Keep the whole affair small, with leads as short as possible, so it will all fit in the housing.

Add wires to connect to the switch and power (Figure C). Solder one to the negative leads and the other to the resistor, marking which one is which.

3. Put the light into the housing.

Fit the disk into the rubber end of the adapter, with the wires exiting the threaded hole in the back (Figure D). The rubber held my disk well without glue, but otherwise I would suggest a thin film of epoxy. I cut off just enough extra rubber to make a shim which, along with some electrical tape, holds the wires in back and keeps out water and debris.

4. Wire the circuit.

I mounted the light on top of my handlebar, the switch against the stem, and the battery pack behind the head tube. Trim the wires to the right

lengths to connect these, leaving enough slack to let you turn the handlebar. The switch connects between the negative LED lead and negative battery terminal, and the positive LED lead connects to the red, positive battery terminal (Figure E).

5. Attach the light.

I mounted my light by interlocking the hose clamp that came with the adapter with a second clamp around the handlebar. For the switch and battery pack, I used zip ties, and added more to hold the wires against the frame (Figure F). Make it all tight so that nothing falls off if you go over a big bump.

Version 2

I made a second light for my girlfriend that has a better switch setup (page 129). I mounted a micro-mini switch in the hose adapter's hole in back, and routed the wires out a hole drilled through the side. This eliminates the big switch zip-tied to the handlebar.

✚ You can see a wiring diagram at makezine.com/14/diycircuits_bikelight.

MIT student Trevor Shannon (trevorshp.com) has been making things since he was young. Occasionally, those things work.