

## A Modern, Mobile, Lighting Solution

Young kids don't sleep through the night. They are always waking up in search of a glass of water or to use the bathroom. It's not safe to wander in the dark and a light switch can be hard to find and may disrupt another's sleep. With this set of problems in mind, 56C designed the Bucky Bright.

### Parts List:

- Red Vex BuckyBall
- Skyrise Post Holder
- 3 microswitches
- 2 neodymium magnets
- (1) 2200 mah power bank
- 5v led strip
- 6 washers
- Clear PLA

The two most important elements of the design were the wireless contact charging and the light diffusion. To address the more difficult challenge of wireless charging, two systems were considered: concentric contact leads and electromagnetic charging. Electromagnetic charging was dismissed due to the energy requirements, which could make the product potentially unsafe for younger children, and the cost of implementation which was estimated to be in excess of \$30. Rather, exposed contact leads were chosen for their relative ease of fabrication, low cost (about \$0.80 each) and aesthetic appearance. Neodymium magnets were also utilized in the center of the leads to ensure a robust connection. A possible electric shock from the exposed contacts was not a concern as the 5v leads when placed in contact with skin would transmit less than 0.00005 amps. This current can't even be felt and was deemed safe.

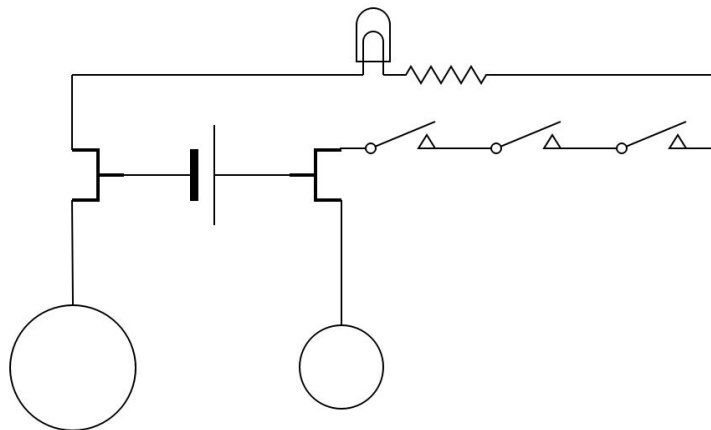
For the Bucky Bright to be effective as a night navigation tool, the light needed to be diffused easily and not be harmful to natural night vision. To accomplish this, a red Buckyball was chosen so the light cast would not compromise night vision. Further, while the LEDs were allowed to float randomly inside the shell for aesthetic purposes, they were also semi-fixed to ensure that their light was evenly distributed throughout the shell for a soft even glow.

In order for the Bucky Bright to be a viable wireless option, it required a rechargeable battery. A 2200 mah USB power bank was harvested for its battery, USB and micro USB connectors, and IC. To house and protect the 18650 battery and its IC, a core housing was designed in Fusion 360 and 3D printed in PLA. In the interest of simplicity and spatial requirements, the ports and outlets required for the charging elements were modeled and printed into the base and docking station in the same print. A small collar to protect the IC inside the Bucky Bright was also printed.

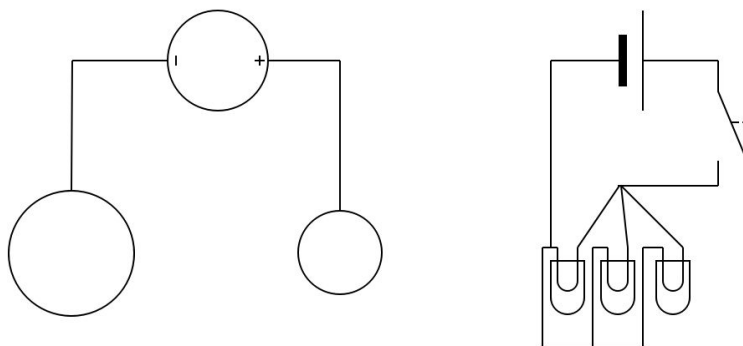
Because the docking station was printed in PLA with a 10% infill, it was extremely light. In anticipation of this, the charging dock was designed to fit into a Skyrise post holder. The holder is hollow with open supports. The holder was filled with steel bb's and sealed with hot glue both adding weight to the charging dock and providing a rubberized bottom to prevent slipping.

The internal wiring of the Bucky Bright and Docking Station is diagrammed below:

### Core and Interior Charging Elements



### Base and Battery Powered LEDs



Supplemental Photographs:



