

# Wirelessly Charged Nursery Light

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## INTRODUCTION

### PROBLEM

- There is no multi-tasked nursery light and carrying tray for helping newborns in the middle of the night.

### SOLUTION

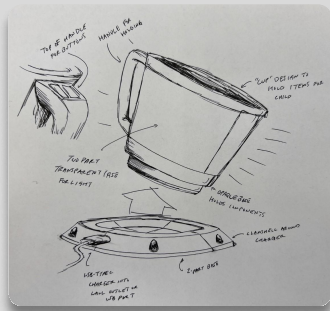
- Build one.

### INTENDED USERS & USES

- Parents of young children that need tending to in the middle of the night, to softly illuminate the nursery and aid in any nightly duties.

## DESIGN APPROACH

- Ergonomic, simple design.
- Easily disassembled for Arduino access.
- “Mug” design allows for easy handling, button access, and item transport.



## DESIGN REQUIREMENTS

### FUNCTIONAL REQUIREMENTS

- Design must be battery powered and charged wirelessly.
- Design must be able to alternate between at least two brightness levels by tapping on it (*constraint*).
- Light must automatically dim and shut off after ten minutes (*constraint*).
- At all times when the light is turned on/off it must do so smoothly as to not wake the baby.

### RESOURCE REQUIREMENTS

- Project must utilize an Arduino and remain programmable.
- Project must use a Lithium Polymer battery.

### AESTHETIC REQUIREMENTS

- Design must be soft and easily approachable for children.
- Design must emit amber or other warm-levels of light.
- Design is not required to be commercialized or mass-manufactured.

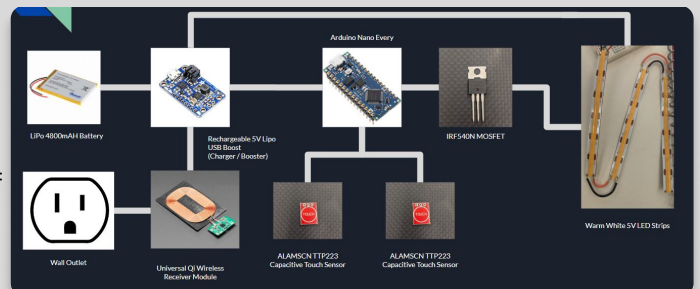
### PERFORMANCE REQUIREMENTS

- Battery life lasts longer than three days during standard use (*constraint*).

## TECHNICAL DETAILS

### MAIN COMPONENTS

- Battery: The LiPo battery needed 4.8 Ahr to allow for three days of use
- Battery Controller: Regulates incoming and outgoing currents and handles wireless charging
- Micro-controller - Arduino Nano Every: Controls the current through the LEDs using a MOSFET
- Wireless Charging Unit: Handles magnetic charging of LiPo battery.
- Touch Capacitive Buttons: Takes inputs from the user
- LED Light Strips: Adjustable LED lights
- Product Housing: 3D printing housing with opaque outside plastic for light passthrough



## TESTING

### UNIT TESTING

- Touch sensor
- Light strip
- Wireless charger
- Arduino Nano Every

### INTERFACE TESTING

- Arduino -> Touch sensor interface
- Arduino -> Light strip interface
- Wireless charger -> Lithium-polymer battery interface

### SYSTEM TESTING

- We individually tested these three areas before combination to ensure full functionality of our project:
  - Circuit Design
  - Software Design
  - Physical Design

