Spinning Light Wand Toy Adaptation
DESIGN RATIONALE

Introduction

The toy should be activatable by connecting a standard assistive switch equipped with a 3.5 mm mono plug. This adaptation is intended for users that may have difficulty holding the toy and/or activating the small button independently.

Requirements

Goals

G01	Make the toy more accessible by adding the ability to use an assistive switch.

Functional Requirements

F01	Must have a female 3.5 mm jack connected such that when tip and sleeve contacts are closed the toy activates.

Non-functional Requirement

NF01	

Constraints

C01	Adaptation should be suitable for a volunteer maker to complete.
C02	Adaptation should require simple hand tools; screwdrivers, soldering iron

Ideation

This toy has also been switch adapted by using a battery interrupter and using tape or a strap to fix the built-in button in the on position. A custom 3d printed collar could also be used to keep the built-in button depressed. This requires no permanent modification to the toy.

Possible Alternatives

The following toys are a similar style but may have a different size or wiring.

Rhode Island Novelty Light-up Magic Ball Wand, One Piece

- https://www.amazon.ca/Rhode-Island-Novelty-Magic-Flashing/dp/B009A6PIVG
- $ 16 CAD

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ArtCreativity Light up Orbiter Spinning Wand | 7â€ LED Electronic Spin Toy for Kids with Batteries Included | Great Gift Idea for Boys Girls Toddlers | Fun Birthday Party Favor/ Carnival Prize

- https://www.amazon.ca/ArtCreativity-Spinning-Electronic-Batteries-Included/dp/B07D7GQFMZ
- $20 CAD

ArtCreativity 7.5 Inch Light Up Magic Ball Toy Wand for Kids - Flashing LED Wand for Boys and Girls - Thrilling Spinning Light Show - Batteries Included - Fun Gift or Birthday Party Favor

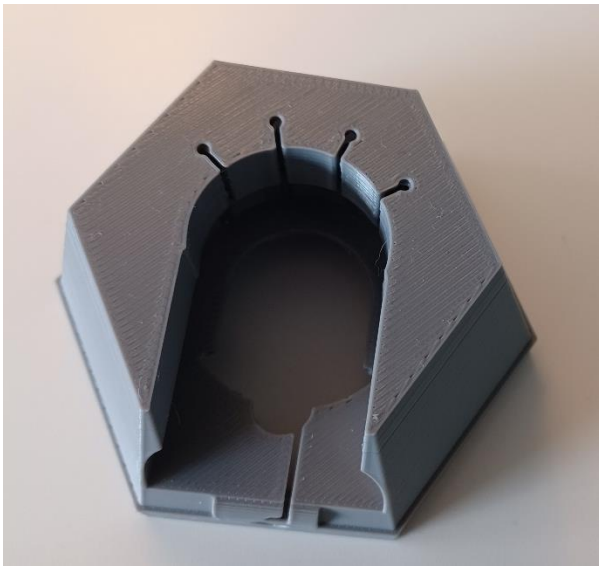
- https://www.amazon.ca/ArtCreativity-Inch-Light-Magic-Ball/dp/B07RG7DDW6
- $32 CAD

Spinning Light-Up Wand for Kids in Gift Box, Rotating LED Toy Wand for Boys and Girls, Magic Princess Sensory Toys for Autistic Children, Best Birthday Gift for Kids 3, 4, 5, 6, 7

- https://www.amazon.ca/Spinning-Light-Up-Rotating-Princess-Autistic/dp/B082VFSJZP
- $43 CAD

Prototyping

Several versions of the base were 3D printed and iterations and improvements were made accordingly. The 3D printed wand stand v1.0 was strudy but overall changes were made to decrease the print time of the device, as well as eliminate the need for supports. Some people suggested that it is rather difficult to get all of the supports off.



The Spinning Wand 3D Printed Stand v1.1 was developed as it requires no print supports, and has a quicker print time. Between iterations of this version of the wand stand, the following changes were made:

- Optimizing the hole in the base so that the battery cover could be removed in the event that the batteries need to be changed.
- Optimizing the clearance between the two 3D printed pieces so they were easy to slide together.

Testing

The adapted toy has been tested by plugging in a switch into the 3.5mm jack located in the 3D printed base.

Detailed Design – V1.1

Spinning Light Wand Toy

The spinning wand toy used for this toy adaption was purchased at Walmart for $5.

- SKU 6000201173988
- https://www.walmart.ca/en/ip/spinning-light-wand-yellowblue/6000201173987

3D Printed Base

The 3D printed base was optimized to significantly reduce the print time, as well as eliminate the need for printing with supports. The supports on the first version of the device could be very challenging to remove, so there was a need to redesign the base. This was achieved by printing the base in 2 parts. As shown below, the smaller piece slides into the base to enclose the wand base between them. The mono jack sits in the circular hole. There are two small screw holes in each piece that align hold the two halves together. The bell-shaped hole in the 3D printed base is used to open the battery compartment on the wand without having to disassemble the 3D printed base.

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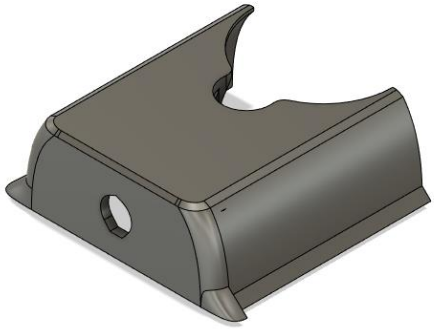

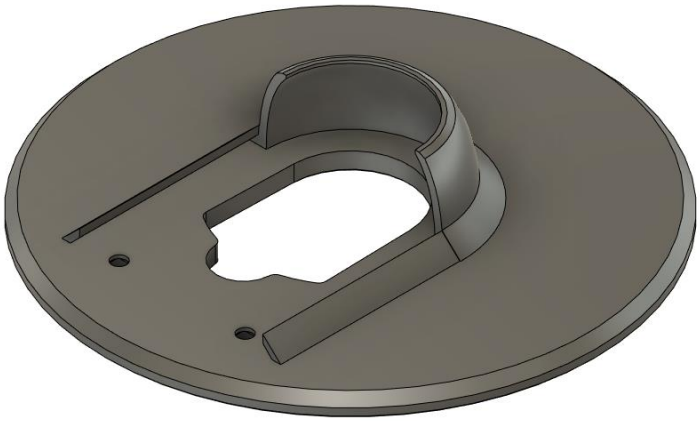

Opportunities for Improvement

- Investigate options for putting external switch jack in parallel with built-in switch so that toy can be activated using either option
- The toy still slightly vibrates even with the non-slip circles. Further improvements are required to prevent the toy from moving.