

Switch Adapted Water Gun

DESIGN RATIONALE

Introduction

We were brought the idea of adding a switch adapted water gun to the MMC library by the IWK. People with limited hand function might not be able to hold a water gun or do the pumping required to operate most water guns. They also might have difficulty pulling the trigger on a water gun as they often require a medium-high activation force. The Switch Adapted Water Gun can be used with just the push of a 3.5mm switch.

Research

Commercial Alternatives:

[Water Gun with Lights Switch Adapted](#) - \$58.10

[Switch-adapted Water Gun Soaker](#) - \$45.00

DIY Alternatives:

[Adaptions 4 Kidz: Switch Adapted Water Gun Fun](#)

Requirements

Goals

G01	Switch adapt the water gun
G02	Design a 3D printed stand for the water gun
G03	

Functional Requirements

F01	That the water gun can be adapted to work with a 3.5mm switch.
F02	
F03	

Non-functional Requirement

NF01	That the adaption is easy enough so other volunteer makers can do it themselves.
NF02	
NF03	

Switch Adapted Water Gun

DESIGN RATIONALE

Constraints

C01	
C02	
C03	

Ideation

The water gun planned to be used in this project is shown below. It is a battery-operated water gun that requires no pumping to squirt water. It was purchased from [Amazon](#). The idea is to add a jack in parallel with the existing switch in the water gun.



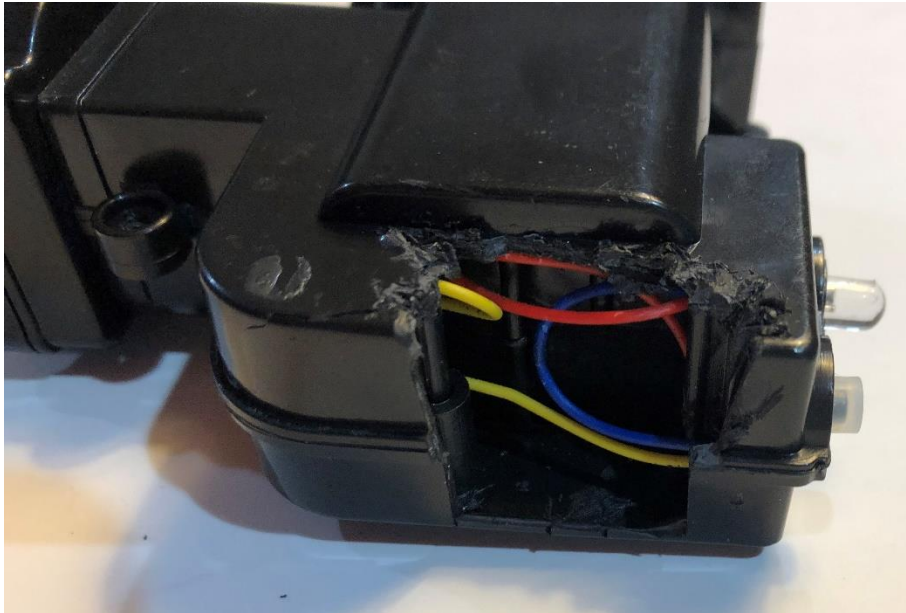
Conceptual Design

Concept 1 – Adding the Assistive Switch in Parallel

The original concept for the water gun adaptation was to be able to add an assistive switch in parallel with the existing switch. This allows for either the original trigger or the assistive switch to work to operate the toy. However, upon further investigation it was determined that it was quite difficult to get access to the original switch. As shown below, a drill was used to cut through the plastic to get access to the switch wires. Once a few holes were drilled, flush cutters were used to snap the remainder of the plastic away. Even with this new opening, I was still not able to access the original switch to solder in parallel. If one wanted the switch in parallel, it could be done by cutting into the yellow and blue wires and soldering in the assistive switch. Note, there is not much room to work with as wires are small and there is not much slack to work with. It can be done but it is not recommended to do it this way for a group build as it was time consuming to drill into this piece and there is a risk of damaging the wires when drilling through.

Switch Adapted Water Gun

DESIGN RATIONALE



Concept 2 – Adding the Assistive Switch in Series

The next route taken was to add the assistive switch in series with the original switch. This means that the original switch would have to be held in the “on” position all the time in order for the assistive switch to work. This would most easily be done with a battery interrupter.

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DESIGN RATIONALE

Detailed Design



This is the switch adapted water gun. It was adapted using a battery interrupter. As shown above, a zip tie is used to hold the trigger in the “on” position at all times. This is required to operate the assistive switch because the switch is in series.

Testing

The water gun was testing by plugging in a 3.5mm switch.

Opportunities for Improvement

- Find an easier way to cut into the battery compartment so that the switch could be more easily put in parallel rather than in series to eliminate the need for a battery interrupter.