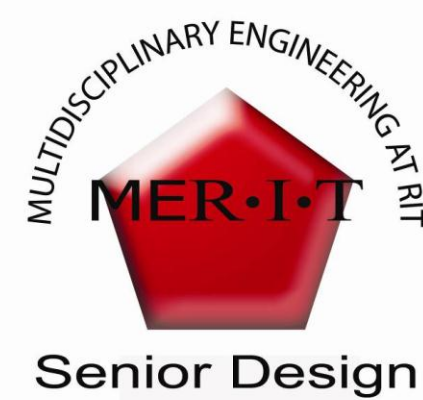


# Motorized Pediatric Stander

## Senior Design Project 13045



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## Project Overview

The goal of this project was to enable a disabled child to stand at the same level and move at the same pace as their peers, and at their own will via the mobilization of a pediatric standing device. The device has an interchangeable user interface to accommodate each user's strengths as well as a trainer interface which allows for operations to be overridden as a safety precaution. No such similar project exists on the market, and this project has never been attempted as a senior design project.

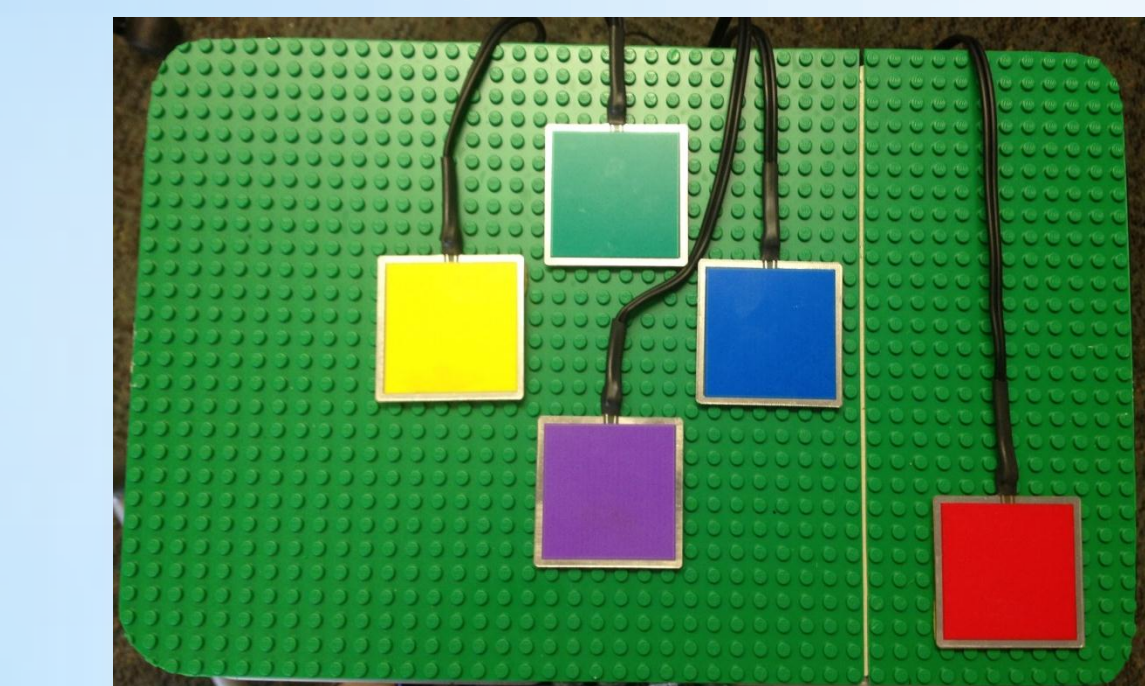
## User Interface

The stander's user interface is composed of five buttons attached to an adjustable tray with a Lego base. Four of the buttons are reserved for directional movements (forward, backward, left and right), while the fifth button is an emergency stop button. Each of the buttons are mounted onto Lego parts that connect with the base. This allows for the personalization of the user interface for the child using the stander. The adjustable tray is able to accommodate children with different arm spans as it can be moved up and down, side to side, and can rotate around one axis. This allows the therapist to customize the stander for each user.



## Customer Needs

- Mobilize existing stander
- Trainer mode with controller override
- Moves at a brisk walking pace
- Add no more than 20lbs to the existing device
- Interchangeable interface for right handed and left handed children
- Able to function in a school environment
- Must contain as much stability as the off the shelf stander
- Electrical components must be protected

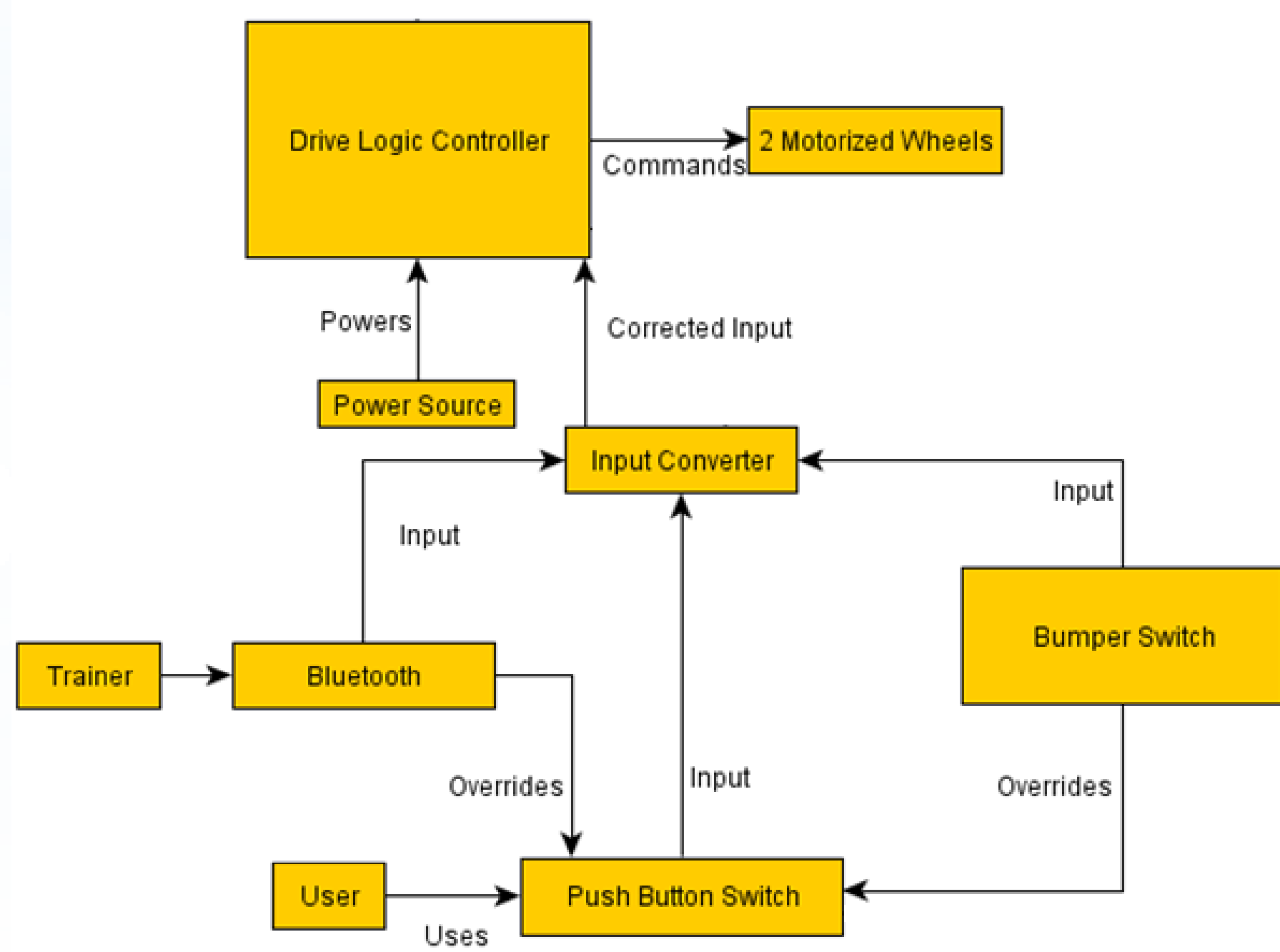


## Trainer Mode

A therapist is able to control the stander by using a Bluetooth enabled remote control. This allows the therapist to teach the child how to use the stander and to override their movements when necessary. The therapist is able to supervise the movement from a distance of **6 inches**; allowing for the child to use the stander on his/her own but also be corrected by the therapist.

The trainer's remote is comprised of the same five buttons (directional and emergency stop) as the child's, however an additional two toggle switches control override and assistive modes. In the override mode, the stander is controlled by the remote. In the assistive mode, input from the remote is combined with input from the main controls.

## System Architecture



## Sensors

The stander has a safety feature incorporated to stop the stander in case of a collision. Four bump sensors, located on the fore- and aft-most positions of the device alert the system when contact has been made and the device comes to a halt.

*Picture of sensors (front and back)*

## Recommendations

- Encompass wiring within the stander structure
- Reduce the size of the trainer remote
- Add ultrasonic sensors to prevent collisions while allowing stander movement