



# Water Bottle Filling Station

By Team Auto H<sub>2</sub>O

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SAN DIEGO STATE  
UNIVERSITY

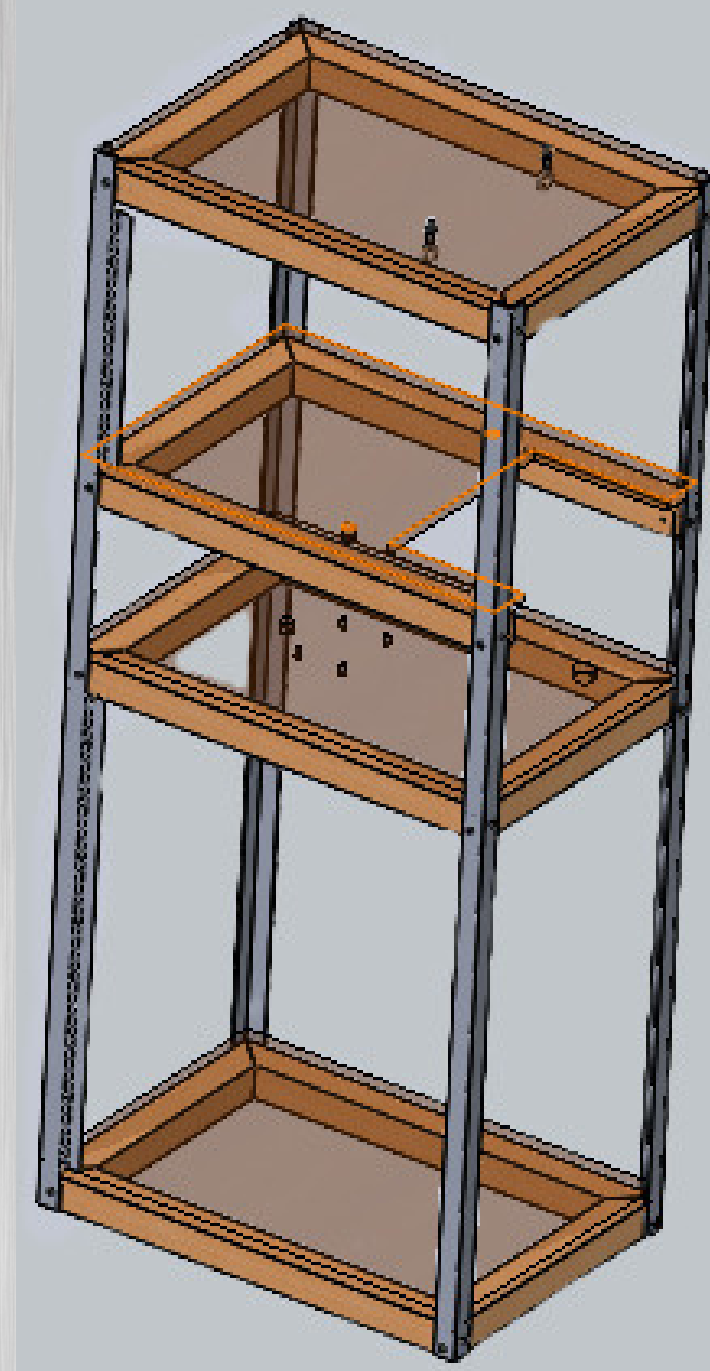
## Problem Statement

Deliver a portable, automatic water bottle filling station using an acoustic method.

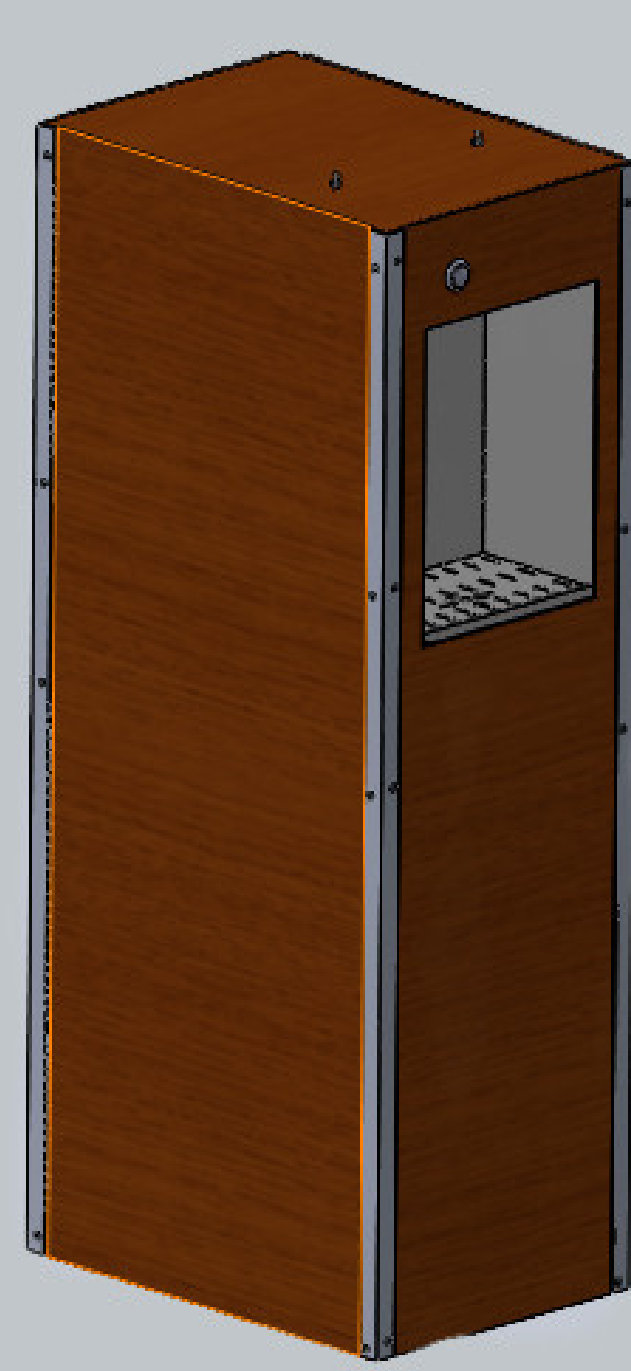
## Project Overview

Drinking water is a valuable resource. Reusable water bottles are refilled often and user error can lead to water spillage and waste. This refill station would require the user to place a bottle in the fill zone. The water starts to flow once the bottle triggers the infrared sensor. A microphone detects a predetermined rate of change in the cavity resonance frequencies. Next, a microcontroller shuts off the flow of water. This portable ADA compliant design makes it easier for users and reduces water wasted.

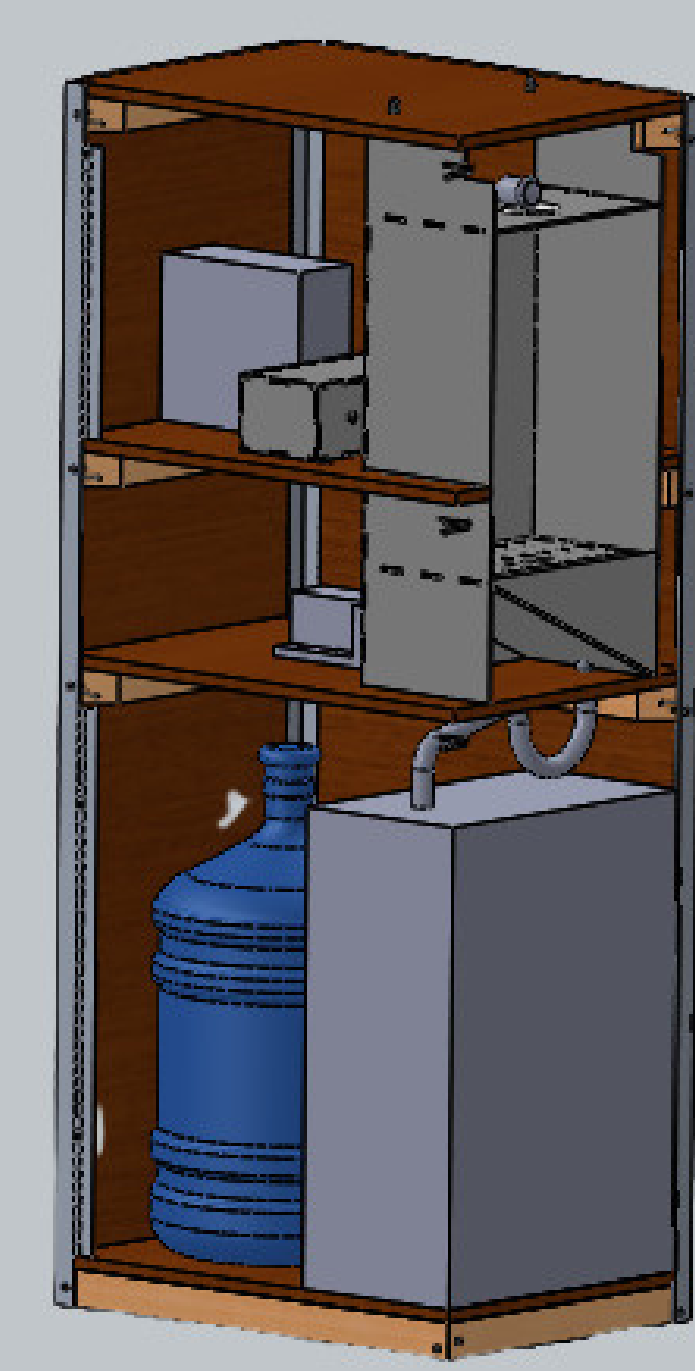
## Final Product



Framing  
Transparent  
View



Full  
Assembly  
View

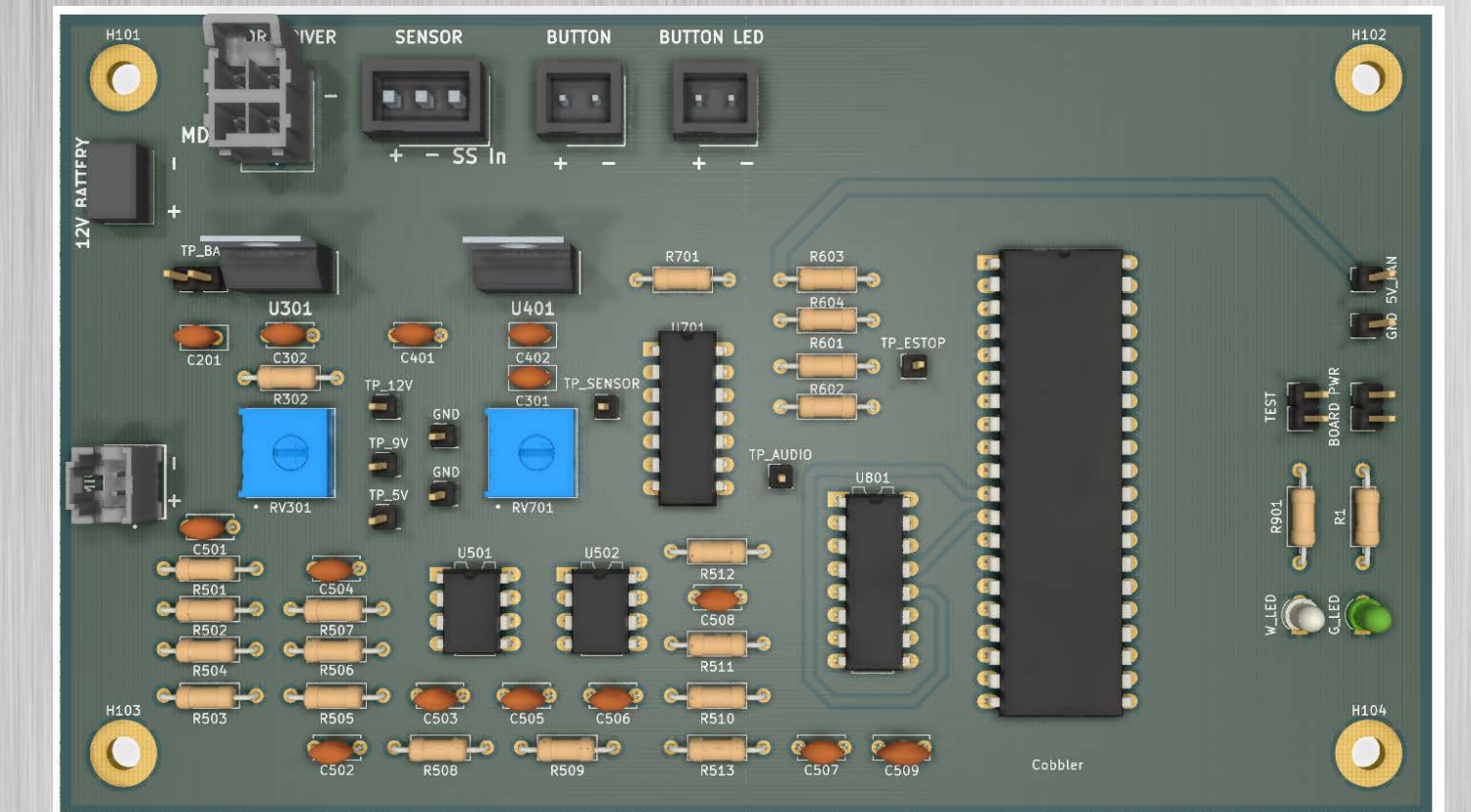


Full  
Assembly  
Internal  
View

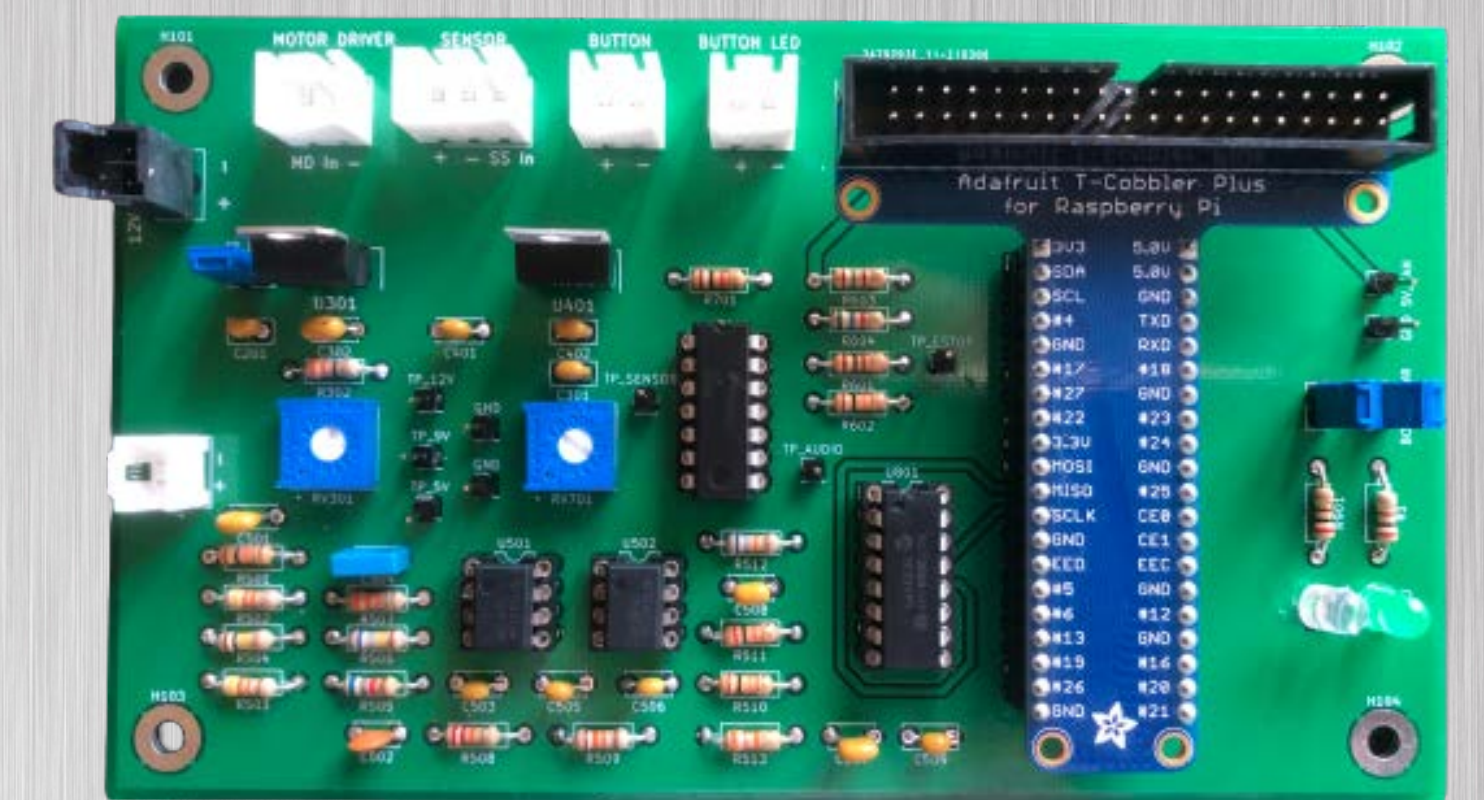


Exterior  
Branded  
View

## PCB Design



KiCad Rendering of PCB



Final Soldered PCB

## Requirements

- Uses acoustic signal processing with microprocessor
- Accommodate acoustic interferences
- Automatic start and stop for water bottle filling
- Constrained automation for reusable, non single use water bottles only
- Bottle volume constraint 20 oz - 40 oz
- Portable assembly
- Dispenses potable water from internal water supply
- Safety (electrical, slip, spillage)
- Splash resistant electrical components
- 12V DC
- Self funded

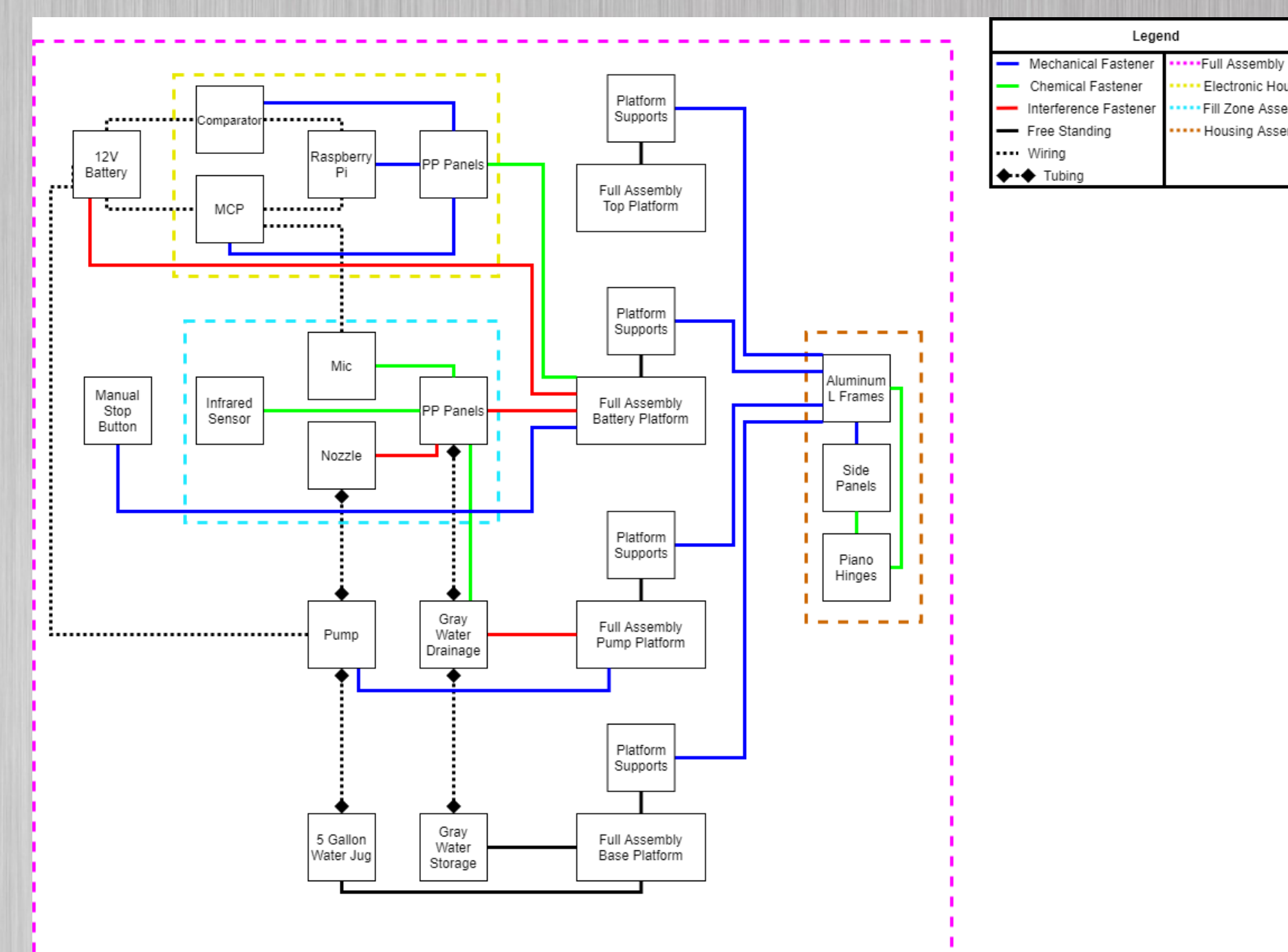
## Device Dimensions

- |                    |                      |
|--------------------|----------------------|
| Overall Dimensions | Fill Zone Dimensions |
| • Width 14.25 in   | • Width 9.75 in      |
| • Depth: 20.25 in  | • Depth: 8.75 in     |
| • Height: 48.00 in | • Height: 13.63 in   |
- ADA compliance
- Operable parts are between 15 and 48 inches.

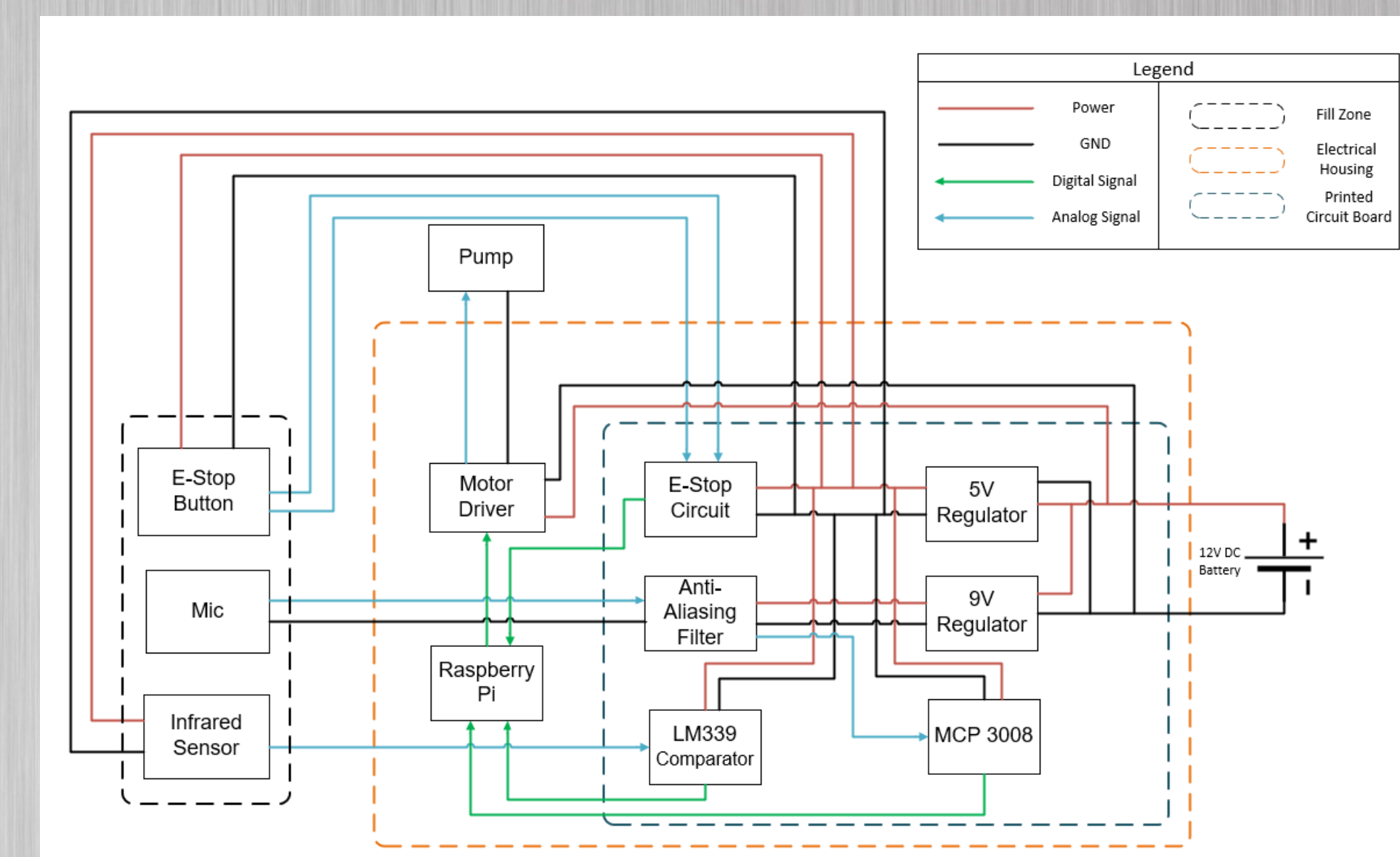
## Compatible Bottles

- Reusable
- Volume: 20-40 oz
- Material: Glass, Plastic, Metal
- Standard Geometry: Bottle with Neck

## System Level Diagram



## Subsystem Level Diagram Electronic Housing Wiring Diagram



## Team Members



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Spring 2021

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Sponsor:

SDSU Electrical & Computer Engineering, Professor Barry L. Dorr, P.E.

High res image:

Project description (Up to 525 characters with spaces)

Automatic Acoustic Water Bottle Filling Station

Drinking water is a valuable resource. Reusable water bottles are refilled often and user error can lead to water spillage and waste. This refill station would require the user to place a bottle in the fill zone. The water starts to flow once the bottle triggers the infrared sensor. A microphone detects a predetermined rate of change in the cavity resonance frequencies. Next, a microcontroller shuts off the flow of water. This portable ADA compliant design makes it easier for users and reduces water wasted.

Zoom link:

Topic: Auto H2O - SDSU Virtual Engineering Design Day

Time: May 5, 2021 01:00 PM Pacific Time (US and Canada) for 3.5 hours

Join Zoom Meeting

<https://SDSU.zoom.us/j/88590793734>