

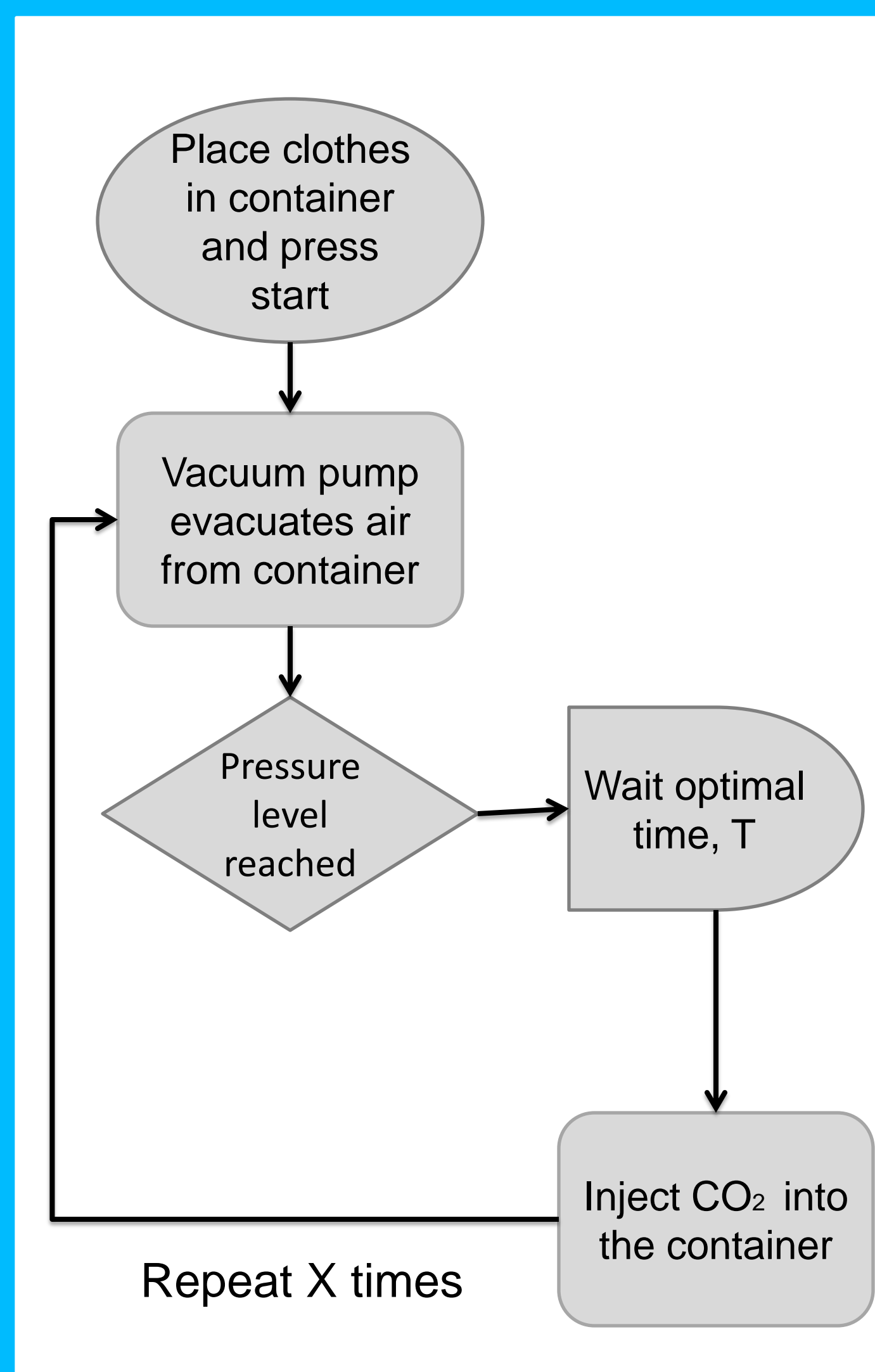
Background

Millions of city dwellers do not own a washing machine and instead have to deal with the hassle of hauling their laundry to a laundromat. To spare them from some of that work, we have developed FreshBox; a product that freshens clothes by removing odor without the use of water.

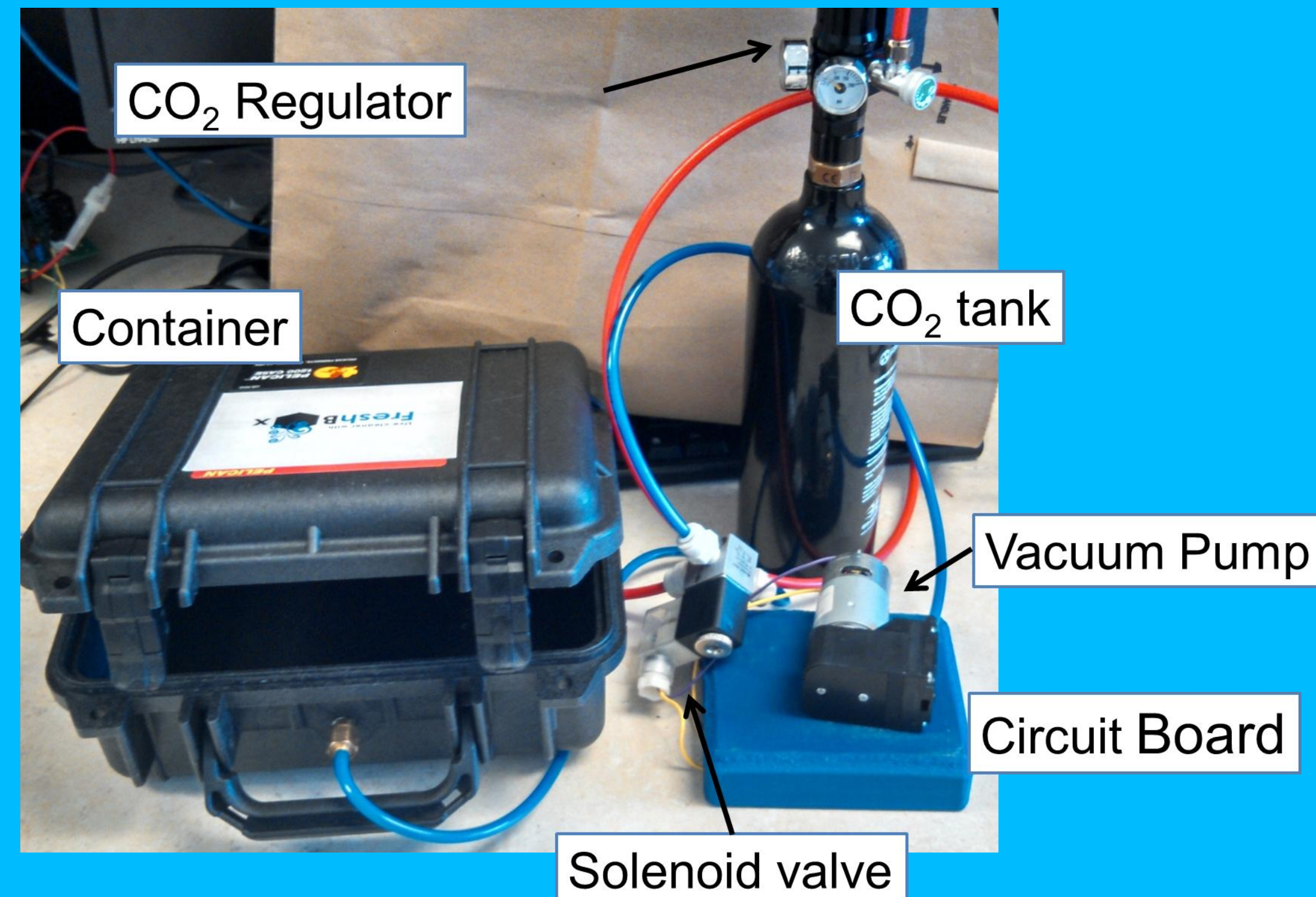
How it works

With a low enough pressure odor molecules vaporize away and CO₂ is also added in the process to help make clothes smell fresh. To make it work, FreshBox consists of a pressure sealed container to place clothes in and is capable of controlling the pressure and CO₂ concentration within the container.

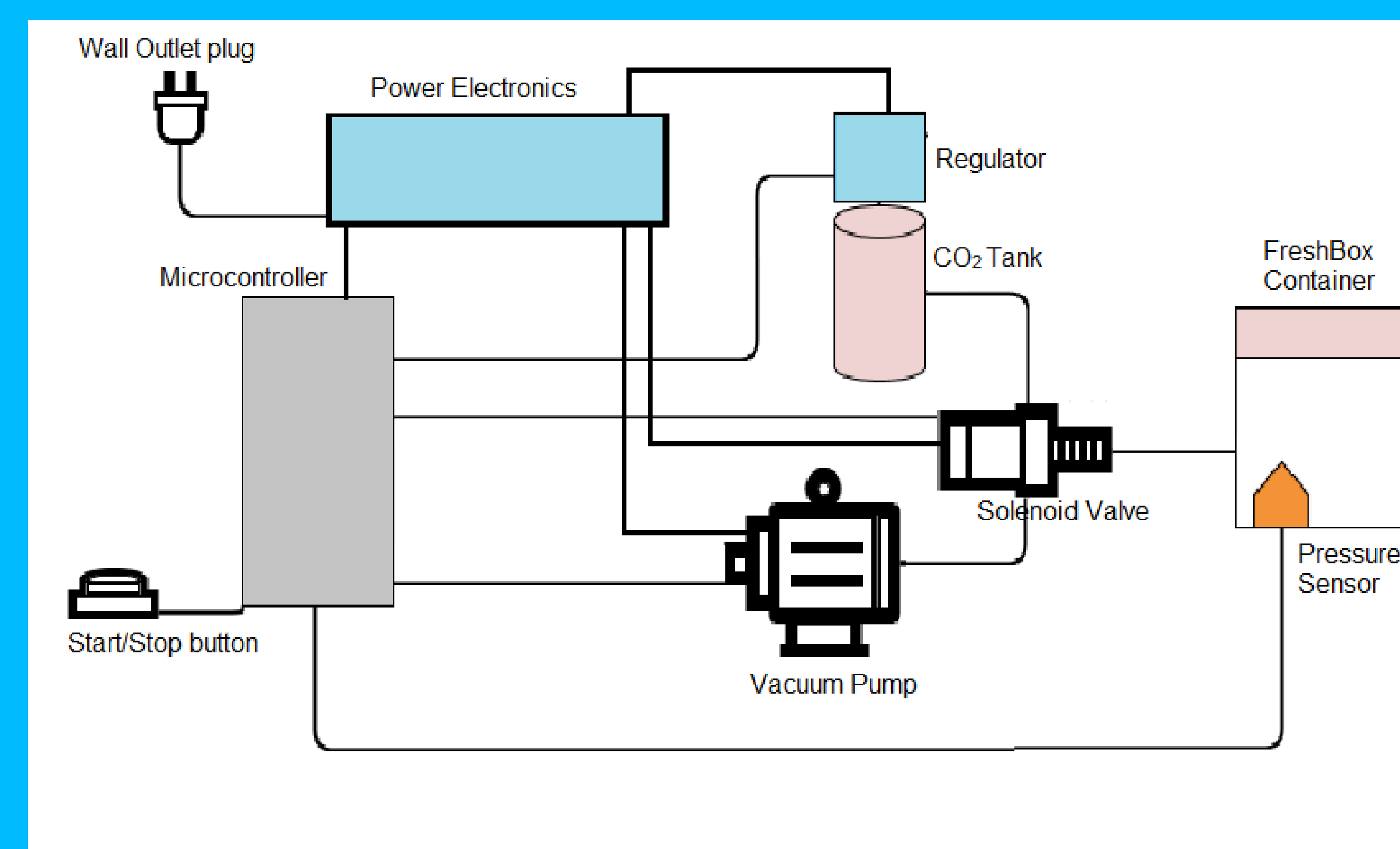
Process



The end result of this process is clothes that smell fresh and that are ready to wear again. The hold time for low pressure, T , and number of cycles, X , are both numbers that can be optimized for speed and effectiveness.

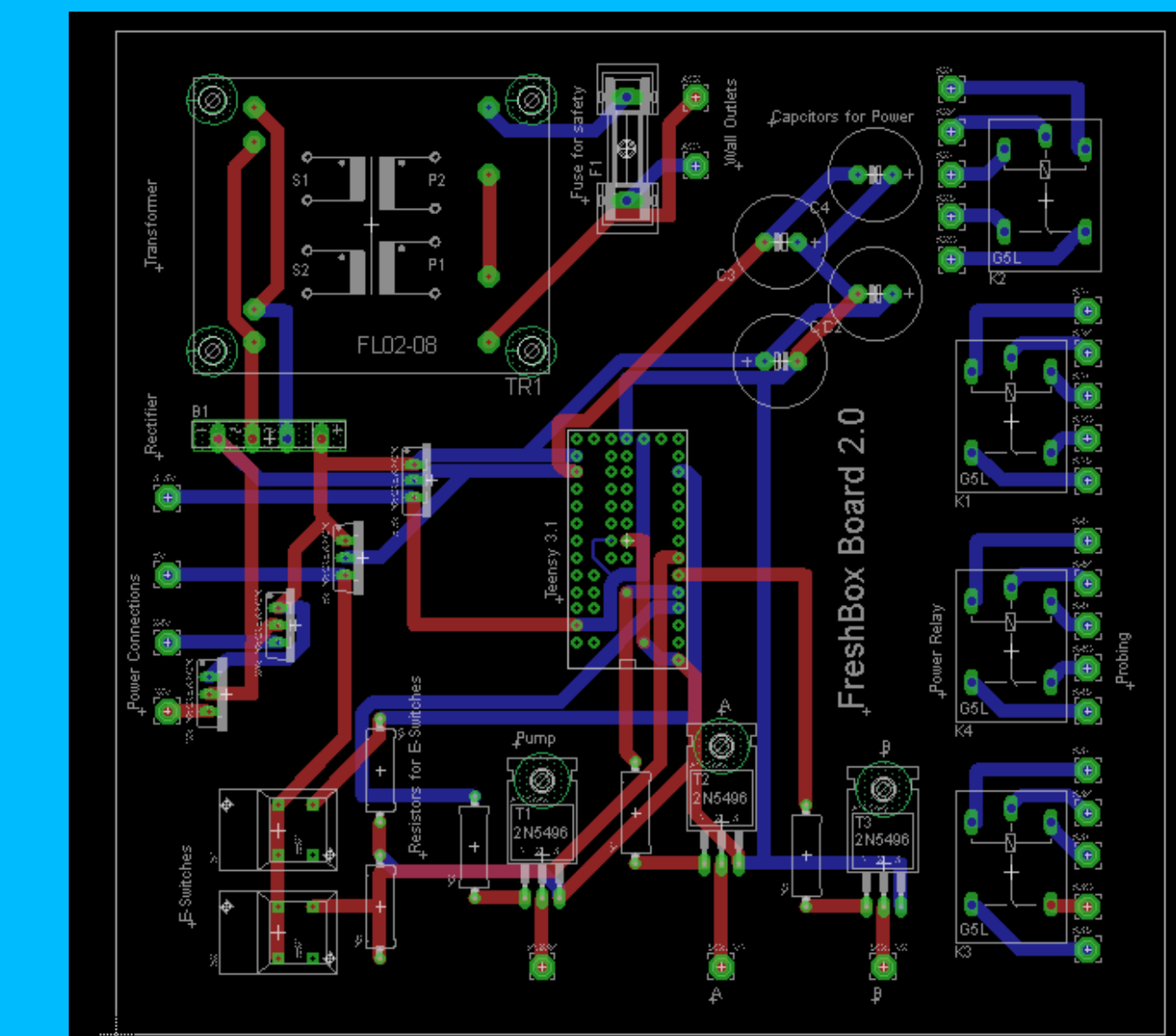


System Schematic

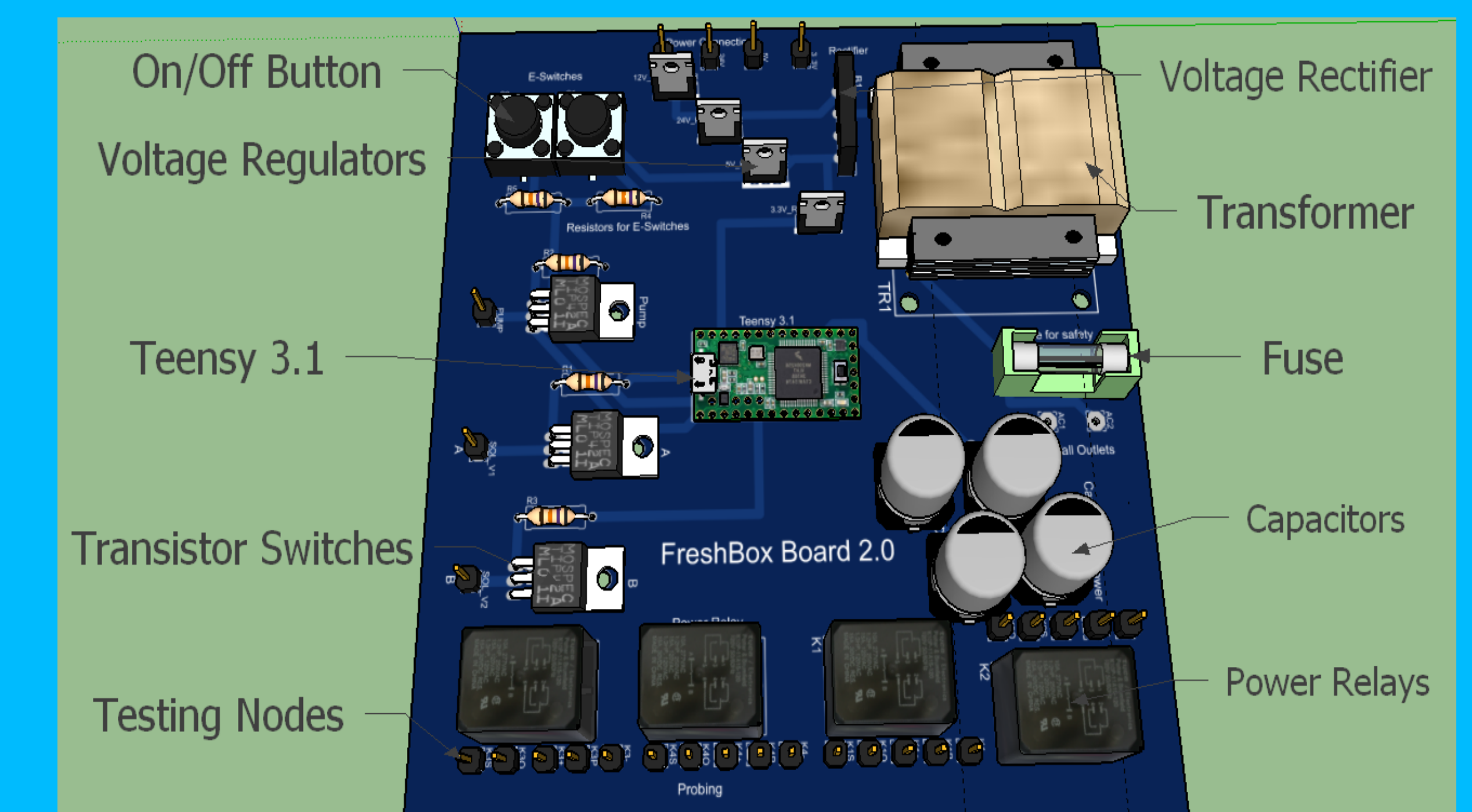


This schematic shows the main components used to make FreshBox work. Our product plugs into the wall and the power electronics connect to all the electronics with the required voltage. The microcontroller connects to the regulator, vacuum pump, and valve in order to signal them when to turn on or switch. The regulator helps lower the pressure to the solenoid valve for extra safety. The pressure sensor offers feedback to the controller so that the entire process can be monitored.

PCB Layout



The PCB includes the hardware required to be powered directly from a wall outlet and has all the switches required for external components.



Hardware

Power Supply

- Step-down transformer, rectifier bridge, and linear regulators used to provide 12V, 5V, and 3V supplies with a total power of 30W.

Microcontroller

- Teensy 3.1 is used for controlling the process by turning on and off the vacuum pump and valves in the correct steps.

Solenoid Valves

- Used to regulate the outflow of air caused by the vacuum pump and the inflow of CO₂ from the tank into the container.