Microcontrollers are used to automate and control complex electronic devices, in order to help them perform complex functions. Pellet smokers are one such device that use microcontrollers to control aspects of smoking such as maintaining constant temperature and smoke in the cook chamber of the smoker. The microcontroller currently controlling the consumer line of Myron Mixon Pellet Smokers has limited functionality and low temperature accuracy. The new microcontroller will control the same number of peripheral devices with the same functionality, with additional functionalities such as real-time tracking of temperature data, wireless connectivity capabilities, and improved temperature feedback loops for improved efficiency. Peripherals include elements commonly found in pellet smokers such as a heating element to ignite pellets, a fan to control airflow, and an auger to feed pellets.

To complement the wireless capabilities of our controller, we will be developing a mobile application for Android that will allow for complete control of the smoker via direct WiFi connection. We will also be adding a visual display to improve user experience and facilitate interaction between user and smoker.

A Raspberry Pi 3 Model B will act as the primary controller for the entire system, which will be powered by a 5v signal converted from AC to DC. A driver circuit will act as a module that connects the digital output from the Raspberry Pi to control the AC power to peripheral devices. The driving circuit will use similar components to those found in the existing microcontroller, and will be based upon a TRIAC, a three terminal semiconductor device used for controlling alternating current. The Raspberry Pi will also act as a WiFi access point allowing a smartphone (specifically an Android device) to connect and directly control the pellet smoker wirelessly. This can be done by modifying the internal libraries of the pi and using a USB range extender. The mobile application will be developed alongside our controller and along with allowing users to control the smoker, will provide the user with data relating to temperature of the cook chamber and temperature of the meat.