

Introduction:

This document describes the design, simulation, and construction of the “Granny-Safe” project. The Granny-Safe is a smart stove top that allows precision temperature control of a hot plate burner, while incorporating safety features like an audio and visual alarm when the hotplate has been left on for ten minutes, and an automatic shutoff. The Granny-Safe addresses the problem of hot plate dangers as well as accurate temperature control.

Project specifications are listed somewhere. The project had to meet the specifications in order to be successful. The contract requires a DC to DC voltage converter capable of $5V \pm 5\%$ and supplying at least 500mA, with less than 100mV of ripple. The Granny-Safe must maintain hot plate temperature within $\pm 10^\circ\text{F}$ of set temperature between 150°F and 400°F , without the use of relays to control the 120V AC at a minimum of 5A. Lastly, the alarm timer is activated when the hotplate temperature exceeds 120°F , and will sound if the reset button is not pressed within ten minutes.

In order to demonstrate that the Granny-Safe met specifications, A variety of methods were employed. Oscilloscopes from Barrows Hall were used to prove the power supply specifications, and a multimeter was used to prove the amperage supplied to the hotplate coil. An Adafruit temperature probe was used to confirm the temperature of the coil.

After the introduction of the project, the Granny-Safe will be examined thoroughly in the sections below. Section 2 contains a high-level project overview, Section 3 contains an in-depth explanation on design choices. Section 4 details the results of the project, and Section 5 concludes the report.