

Memorandum

Date: 10/6/17

To: Bruce Segee, Andrew Sheaff

From: Joshua Andrews **JAA**, Riley McKay **RLM**

Re: Progress Report #2

Seems like
more progress
should be
made

this seems
pretty simple
so far for a
senior
project

Summary:

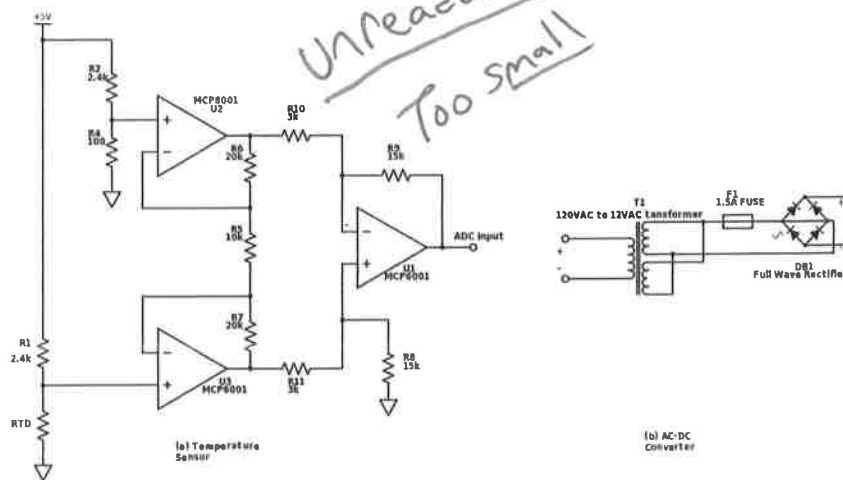
This memorandum provides an explanation of what the "Granny-Safe" does, including a description, block diagrams, and the status. In addition, schematics and code is shown.

Description:

The "Granny-Safe" is designed to use a temperature sensor to monitor and control a hot plate burner. The design will feature time and temperature settings, which will allow the user to control and view the temperature of the hot plate as well as alarm and turn the hotplate off.

Schematics/Code:

The hardware design is being captured using DigiKey's Scheme-it software and the code is being developed in the Arduino IDE interface. The temperature sensor is shown in Figure 1(a) and the AC-DC converter is shown in Figure 1(b).



Unreadable
Too small

Figure 1: Temperature sensor and AC-DC converter

To calculate the temperature, a function was written to convert the ADC value to °F. The loop code is shown in Figure 2.

```
compare = analogRead(A1);           //get the ADC value
temperature = (.4545 * compare) + 28.2; //convert value to F
lcd.print(temperature);              //print it
```

Figure 2: Main loop code

The temperature is calculated by using the temperature coefficient of the RTD (.4545) and the temperature at which the ADC value is zero.

Progress:

The “Granny-Safe” project is comprised of both hardware and software components. The hardware block diagram is shown in Figure 3(a) while the major functions of the software controlling the “Granny-Safe” is shown in Figure 3(b).

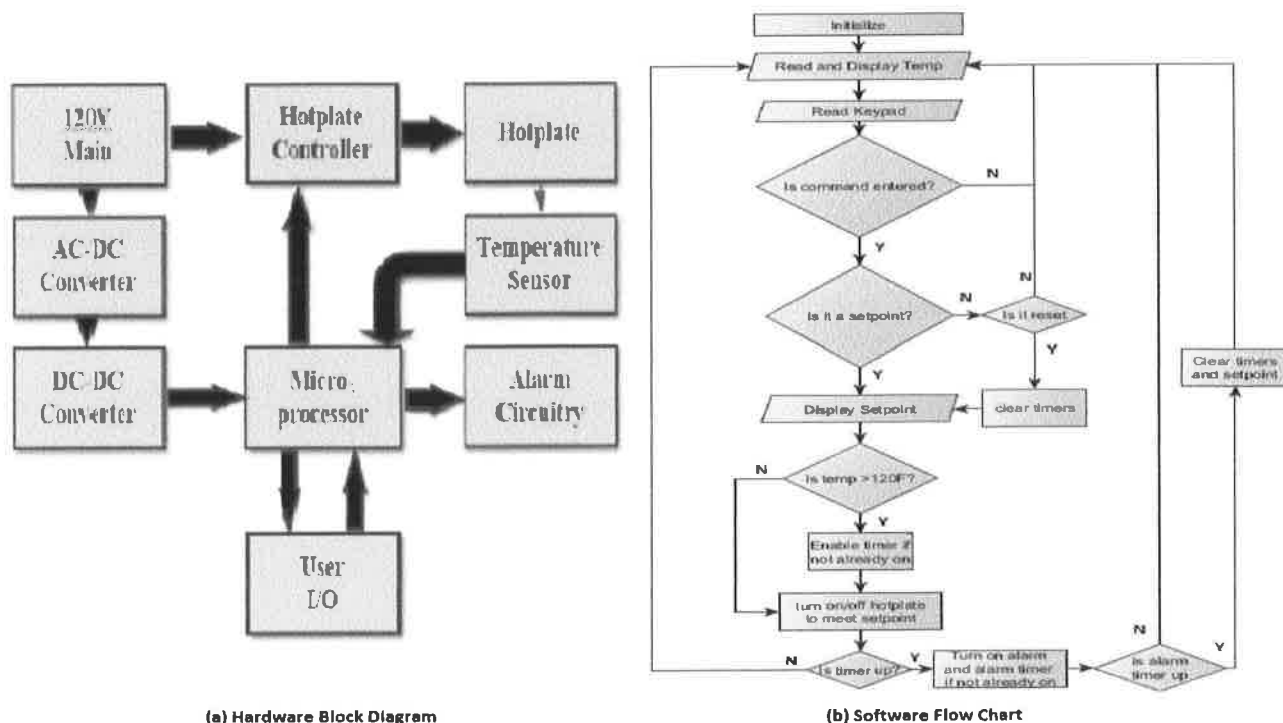


Figure 3: “Granny-Safe” hardware and software block diagrams

The ATMEGA 328P-PU has been selected as the microprocessor and code has been written to read temperature, read a keypad and print to an lcd but further design will be required to incorporate the other modules. The temperature sensor is completed but may require redesign with a new RTD. The AC-DC converter is awaiting parts and the DC-DC converter is in the design stage. The hotplate controller is also in the design stage. The design for the full user I/O and alarm circuitry will begin when all of the other modules are functioning correctly.

Qualifiers Week Progress:

The team has been working on the project consistently through the semester, meeting at least two days a week to work on the design, and now the implementation. The simulated and partially designed power circuitry has gone well and shouldn't present any problems. The software development has been going well. The hotplate controls are in the design process and should be moving forward within the week. The current rate of progress leaves time for prototyping and PCB implementation.