

ECE 403 Senior Project TOC

1 Introduction

2 Breakdown

- 2.1 Power Supply
- 2.2 Microprocessor
- 2.3 Temperature Sensor
- 2.4 User I/O
- 2.5 Hot Plate Controller
- 2.6 Alarm Circuitry

3 Details

3.1 Hardware

- 3.1.1 Power Supply
 - 3.1.1.1 Bridge Rectifier
 - 3.1.1.2 Buck Converter
- 3.1.2 Microprocessor
- 3.1.3 Temperature Sensor
 - 3.1.3.1 Wheatstone Bridge
 - 3.1.3.2 Instrumentation Amplifier
- 3.1.4 User I/O
 - 3.1.4.1 LEDs
 - 3.1.4.2 LCD
 - 3.1.4.3 Keypad
- 3.1.5 Hot plate Controller
 - 3.1.5.1 Zero-Sensing
 - 3.1.5.2 Triac
- 3.1.6 Alarm Circuitry

3.2 Software

- 3.2.1 PID Controller
- 3.2.2 Temperature conversion
- 3.2.3 Alarm conditions

4 Results

- 4.1 Power Supply
- 4.2 Temperature Sensor
- 4.3 Temperature Control
- 4.3 Triac Current Conditions

5 Conclusion

Appendices

A Project Contract

B Schematics

B.1 Complete Schematic

B.2 Power Supply

B.3 Temperature Sensor

B.4 Controller

C Parts List

D Datasheets

D.1 AtMega

D.2 BT137 Triac

D.3 Adafruit RTD

D.4 MOC3051 optoisolator

D.5 LM2576 simple switcher