

DESIGN AND CONSTRUCTION OF AN AUTOMATED WATER HEATER SYSTEM WITH A CAPACITY OF 10 LITERS USING AN ARDUINO NANO-BASED SCHEDULING SYSTEM

Name : Elya Santi Pane
Student ID Number : 3103221311
Supervisor : Marzuarman, S. Si., M.T.

ABSTRACT

Water boiling is one of the most effective ways to ensure water is safe for consumption. However, manual methods often require significant time, effort, and intensive supervision. This study designed an automated water boiling system with a 10-liter capacity using an Arduino Nano that operates in two modes: automatic and manual, and is controlled via an RTC DS3231 module. The system is equipped with a MAX6675 temperature sensor, a water level sensor, an SSR relay, a 12V DC water pump, a solenoid valve, a buzzer, and a 16x2 LCD as the interface. The research methods include hardware design, software programming, and testing of each component. Test results show that the system can heat water from 29°C to 95°C in approximately 150 minutes. The average temperature reading difference between the MAX6675 sensor and a manual thermometer is $\pm 1.7^{\circ}\text{C}$ with an average error of 3.17%, while the RTC demonstrates high accuracy with a deviation of less than 1 second. With these results, the system has proven to be effective, accurate, and efficient in facilitating scheduled and automatic water boiling.

Keywords: Arduino Nano, RTC, MAX6675, Automatic Water Boiling, SSR Relay