Introduction

This project uses Arduino Uno board, temperature sensor, LCD, servo motor and buttons to implement an intelligent incubator control system. The system contains three main functions: high temperature alarm and adjustment, low temperature adjustment and manual inspection.

The temperature sensor converts the analog signal of the internal temperature of the incubator into a digital signal every second and transmits the corresponding Celsius value to the microcontroller and displays it on the LCD. When the internal temperature of the incubator exceeds the set threshold, the LCD displays a "high temperature alarm", and at the same time, the servo motor is set to rotate 45 degrees through the PWM wave controlled by the timer to help dissipate heat. If the temperature is lower than the threshold, the LCD displays "temperature is too low", and the servo motor returns the incubation tray to the initial position (0 degrees) to maintain a stable incubation environment. When the user presses the button to start the interrupt program, the LCD displays "inspection mode", and the servo motor rotates the incubation plate to 90 degrees, making it easier for the user to observe and check the incubation status.

In addition, serial communication can be achieved between the microcontroller and the PC. The user can see the temperature inside the incubator from the PC and can use the PC to send instructions to the microcontroller to adjust the angle of the incubation tray.
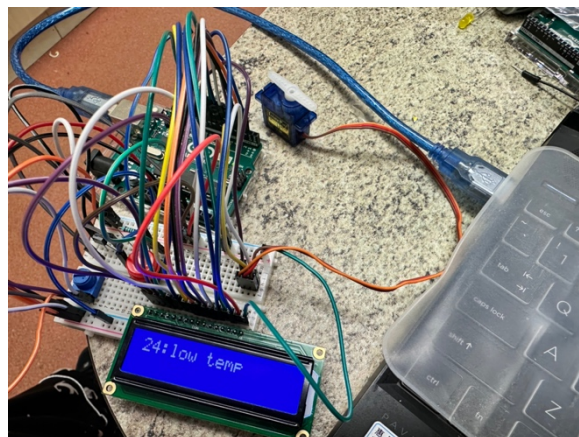
Outcome

Figure 1: Low temperature adjustment, servo motor does not rotate

Figure 2: **High temperature alarm**, servo motor rotate 45 degrees

Figure 3: The PC provides real-time feedback of the current temperature through serial communication.

Figure 4: Interrupt

Figure 5: PC controls the motor to open

Figure 6: PC controls the motor to close