0-CLock / LED Ring Clock

1. Introduction:

This project presents the development of an IoT-based clock system employing an Arduino Nano microcontroller and WS2812 LEDs for time indication. The clock ensures accurate timekeeping through a DS3231 RTC module and incorporates user-friendly controls with push buttons for time adjustment. Various modes have been implemented to enhance functionality, providing users with options for customization and interaction. Through meticulous hardware setup, programming, and testing, the project delivers a functional and visually appealing IoT-based clock system suitable for diverse applications.

2. Materials Required:

- Arduino Nano microcontroller.
- DS3231 RTC module for precise timekeeping.
- 60 WS2812 LEDs for indicating seconds, minutes, and hours.
- Two push buttons for adjusting minutes and hours.

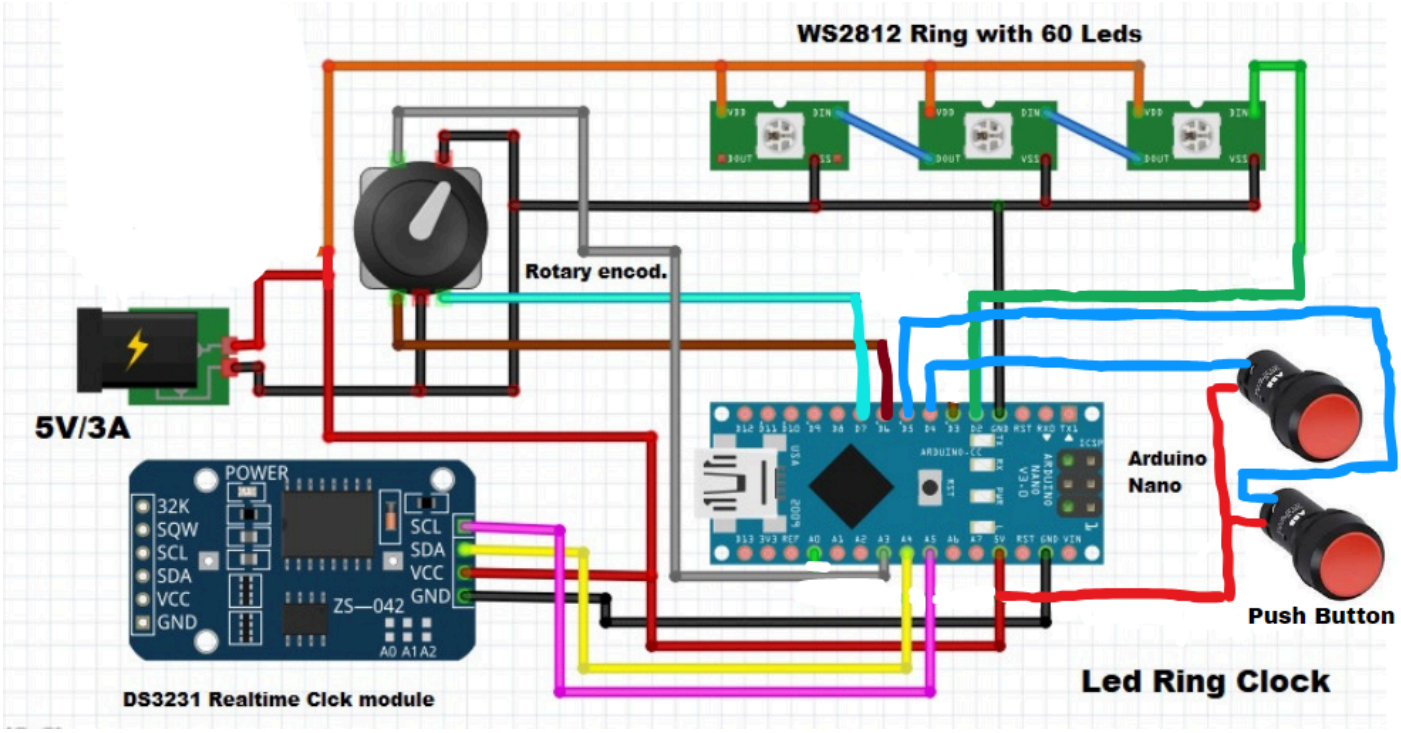
- Rotary encoder for changing modes.
- Breadboard, jumper wires, hook up wires, soldering iron and other necessary components.

3. Procedure:

- **Setting Up Hardware:**
  - Solder Arduino Nano with its pin legs.
  - Wire the DS3231 RTC module to the Arduino Nano for timekeeping using jumper wires.
  - Connect the WS2812 LEDs to the Arduino Nano for indicating time.
  - Wire the push buttons and rotary encoder to the Arduino Nano for user input using hook up wires.
  - Ciruit diagram is given below.

- **Programming:**
  - Write code to interface with the DS3231 RTC module for time retrieval.
  - Program the WS2812 LEDs to display seconds, minutes, and hours using different colors.
  - Implement functions to adjust time using push buttons.
  - Develop code for switching between different modes using rotary encoder.
  - Code: https://github.com/AnshVP/O-Clock/blob/main/o_clock.ino

4. Circuit Diagram:



5. Circuit Diagram:

3 Modes