

Desk Light

Group: Zero2Embedded

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Outline

- 1 Introduction
- 2 Project Objectives
- 3 System Overview
- 4 Components and Technology
- 5 System Design
- 6 System Implementation
- 7 Demo

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Introduction

- Desk lights are essential devices for studying
- Maintaining focus and managing time is crucial
- Common lighting devices only provide basic illumination
- Lack of integrated timer or Pomodoro time management features

Solution: Build a desk light based on ESP32-C3 to support time management and enhance learning efficiency

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Project Objectives

The group focuses on achieving the following objectives:

- Control on/off light with 3 different color modes
- Display time and countdown timer using Pomodoro via OLED screen
- Display and control through web/app interface

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System Overview

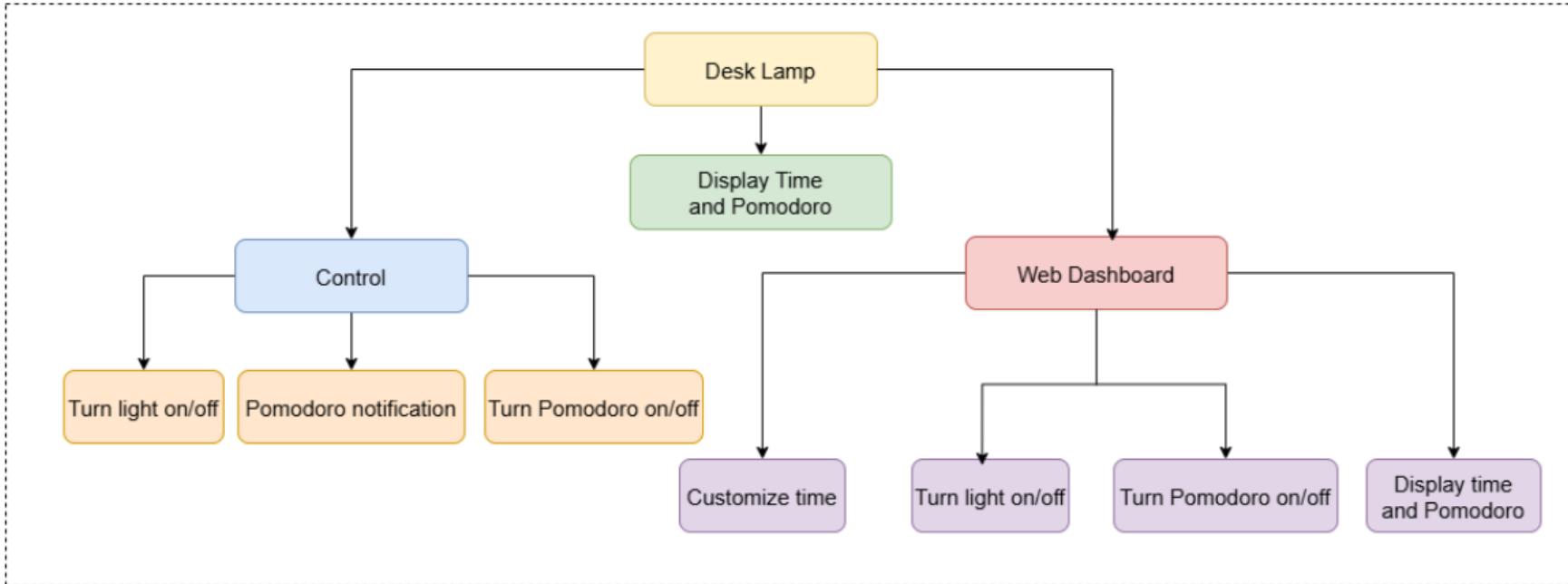
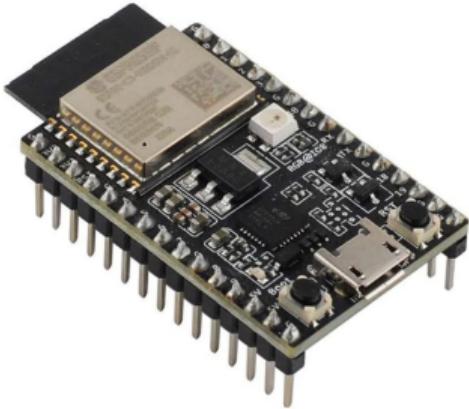


Figure 1: Functional block diagram

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Components Used



ESP32-C3 Microcontroller



OLED Display



RTC Module

Components Used



Touch Sensor



Buzzer



WS2812B LED Strip

Technology Used

Technology:

- ESP-IDF for developing source code for ESP32-C3
- Flutter for developing web and mobile applications



ESP-IDF



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Hardware Connection Diagram

The system consists of 3 main blocks:

- **Flutter Application:** User interface
- **ESP32-C3:** Command processing
- **Peripherals:** RTC, OLED, sensors, LED strip

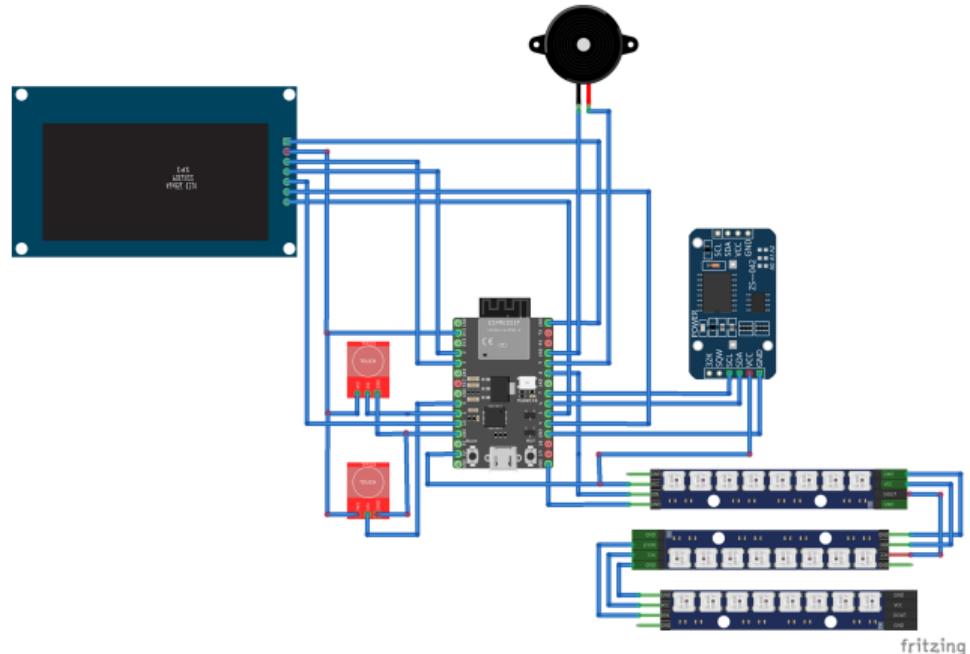


Figure 2: Connection diagram

Operation State Flowchart

The system consists of 3 main tasks:

- **Switch Task**
- **Display Task**
- **Pomodoro Task**

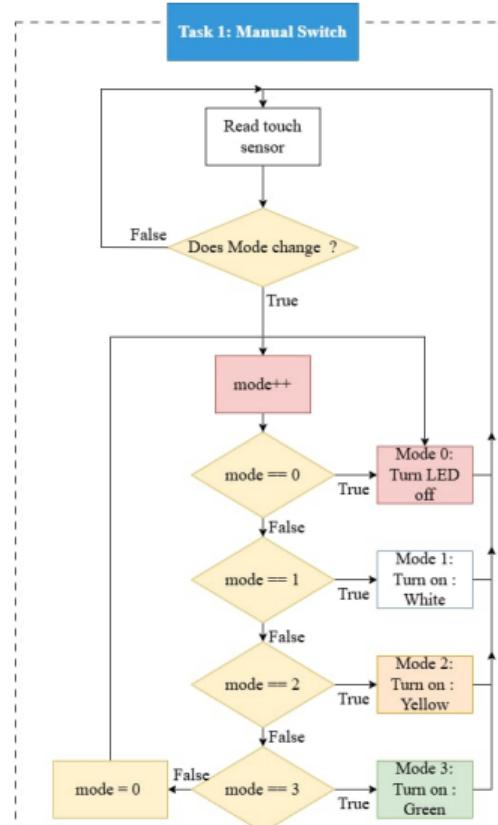


Figure 3.1: Switch Task

Operation State Flowchart

The system consists of 3 main tasks:

- **Switch Task**
- **Display Task**
- **Pomodoro Task**

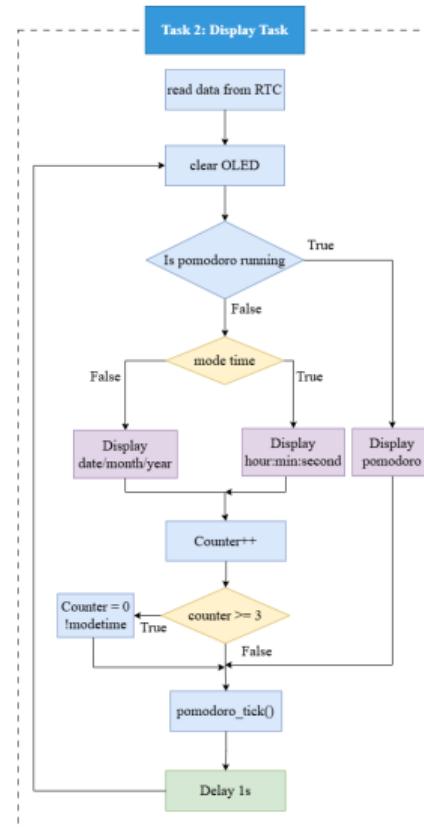


Figure 3.2: Display Task

Operation State Flowchart

The system consists of 3 main tasks:

- **Switch Task**
- **Display Task**
- **Pomodoro Task**

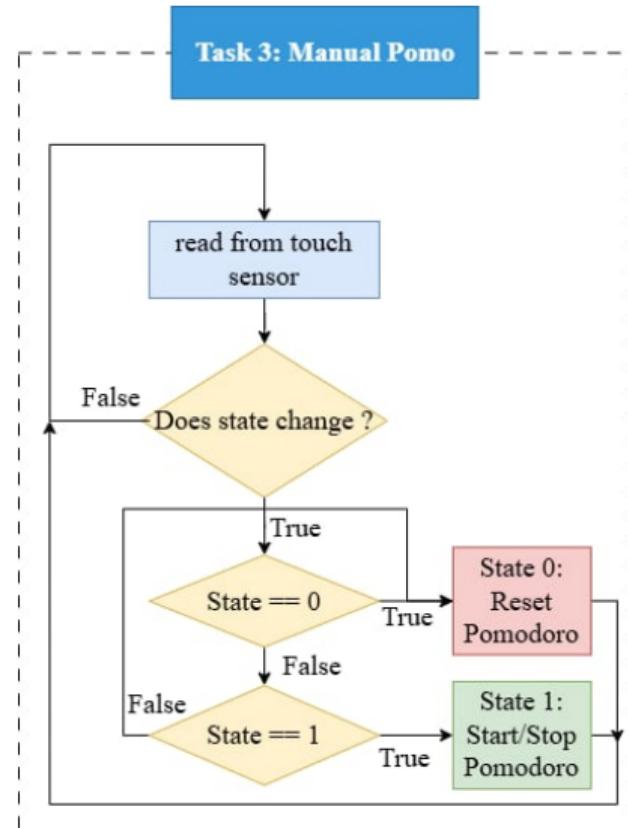
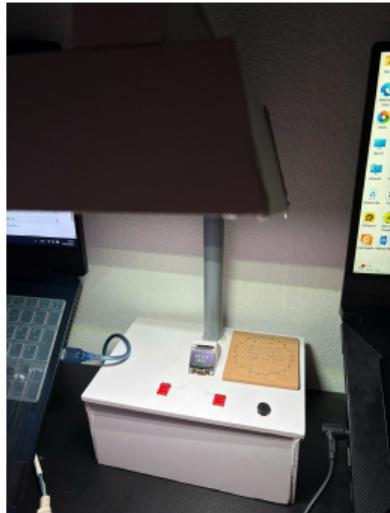


Figure 3.3: Pomodoro Task

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System Model



White Color



Yellow Color



Blue Color

Actual system model

Software Implementation

Flutter Application:

- Remote light control
- View time and Pomodoro
- Web and Android mobile support
- WiFi connectivity

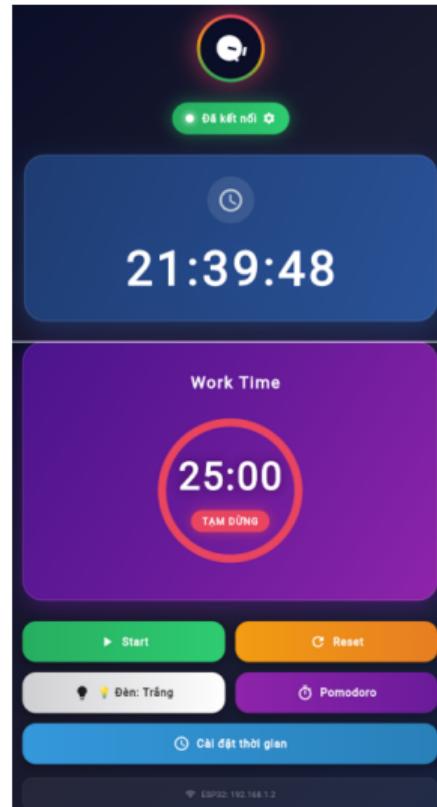


Figure 4: Web dashboard

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Demo Time

Teamworking

Name	Task
Tran Viet Thang	Implement Wifi connection and web, hardware communication
Tran Anh Toan	Implement a light function
Trinh Minh Viet	Implement a time display function
Tran Le Long Vu	Design hardware, implement Pomodoro function

Thank you!