**Timer Cube**

A creative and physical approach to time management using an ESP32, MPU6050 accelerometer, and a capacitive touch sensor. This Pomodoro Timer supports intuitive mode switching by rotating the cube, manual mode selection via touch, and visual feedback through LEDs with a breathing effect.

## Features

1. Start/Pause Timer
2. Pomodoro Timer – 2 min
3. Short Break – 30 sec
4. Long Break – 1 min
5. Reset Timer

## Features Summary

* **MPU6050-Based Mode Switching**  
  Rotate the cube to change modes based on orientation.
* **Touch Sensor Interaction**  
  Tap to pause/resume or acknowledge. Long press to reset. Works even when MPU is not connected.
* **LED Feedback**
* Breathing effect when the timer is running
* Solid light when paused or completed
* All LEDs off when idle
* **Buzzer Alerts**

Audio feedback for state transitions and when the timer is done.

* **Fallback Support**

If the MPU6050 fails, the timer still works using only the touch sensor.

## Requirements

### Hardware Components:

1. ESP32 – x1
2. 6DOF Accelerometer Gyroscope GY-521 MPU-6050 – x1
3. LED Indicator – x3
4. Resistors – x3
5. Buzzer – x1
6. TP4056 Lithium Battery Charger (Type-C) – x1
7. DC to DC Booster – x1
8. Battery Case – x1
9. Li-ion Battery – x1
10. ON/OFF Switch – x1
11. Vero Board
12. Wires

### Software:

* Arduino IDE
* Libraries:
  + MPU6050 by Jeff Rowberg
  + Wire (I2C communication)

## Pin Configuration

|  |  |
| --- | --- |
| **Component** | **GPIO Pin** |
| Touch Sensor | 4 |
| Buzzer | 5 |
| LED – Pomodoro | 18 |
| LED – Short Break | 19 |
| LED – Long Break | 23 |
| MPU6050 SDA | 21 |
| MPU6050 SCL | 22 |

## Touch Controls

|  |  |
| --- | --- |
| **Action** | **Description** |
| Short Tap (running) | Pause/Resume the timer |
| Short Tap (after done) | Acknowledge timer completion |
| Long Press | Reset the timer |
| Short Tap (no MPU) | Cycle through modes manually |