

Practicum Product Design Specification (PDS) Outline Of

Card-Size Reaction Tester

Group 10

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- **Short Descriptive Name**
Card-Size Reaction Tester
- **Executive Summary with Concept of Operations**

The Portable Card Reaction Tester is designed for users to measure their reaction time in various situations. The device is designed to have four buttons and a screen, after starting it will start a countdown and then light up one of the buttons. The player should click the button as fast as they can and then the screen will show your reaction speed.

This device has wide applicability across multiple user groups, including athletes, eSports players, drivers, and ordinary users who are interested in gauging their reflexes. Its portable design, about the size of a credit card, makes it easy to carry, allowing users to test their reaction speed anytime and anywhere.

The device works by having the user press one of its 4 test buttons, initiating the reaction test. After a short countdown, an LED will randomly light up. The user must press the corresponding button as quickly as possible. This process repeats several times, and the average reaction speed is displayed on the OLED screen. The system is powered by an ESP32C3 microcontroller, and all components are enclosed in a 3D-printed shell.

- **Brief “Market” Analysis**

Intended Users

1. Athletes (for training)
2. eSports players (to measure reflexes)
3. F1-Drivers (to test reaction times for safety)
4. General users (for personal interest and entertainment)

Competition

Other handheld devices that measure reaction time are usually larger or part of more expensive sports equipment. Our device is uniquely portable, credit-card-sized, and cost-effective for broader use in both professional and casual settings.

Price

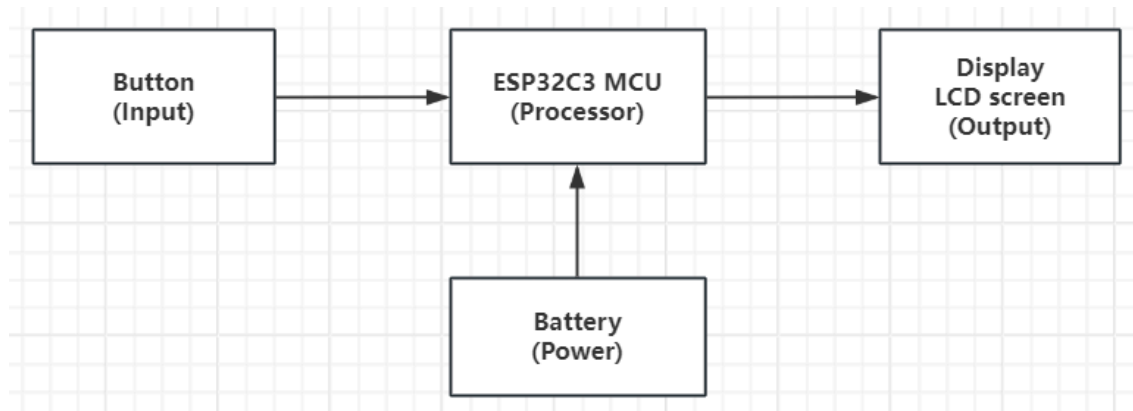
Estimated price range: \$30-\$50. This is based on the cost of the components (microcontroller, sensors, LEDs, OLED display) and the 3D printed casing. The main processor we are going to use is only 5\$. The price is competitive, especially compared to larger and more complex reaction testing systems.

- **Requirements**

1. **Must** be portable.
2. **Must** measure reaction times accurately.
3. **Must** have a screen to display the score.
4. **Should** be user-friendly.
5. **Should** do a countdown before testing.
6. **Should** have a switch to control on or off.
7. **May** have a nice designed case.
8. **May** use low power.
9. **May** have different modes.

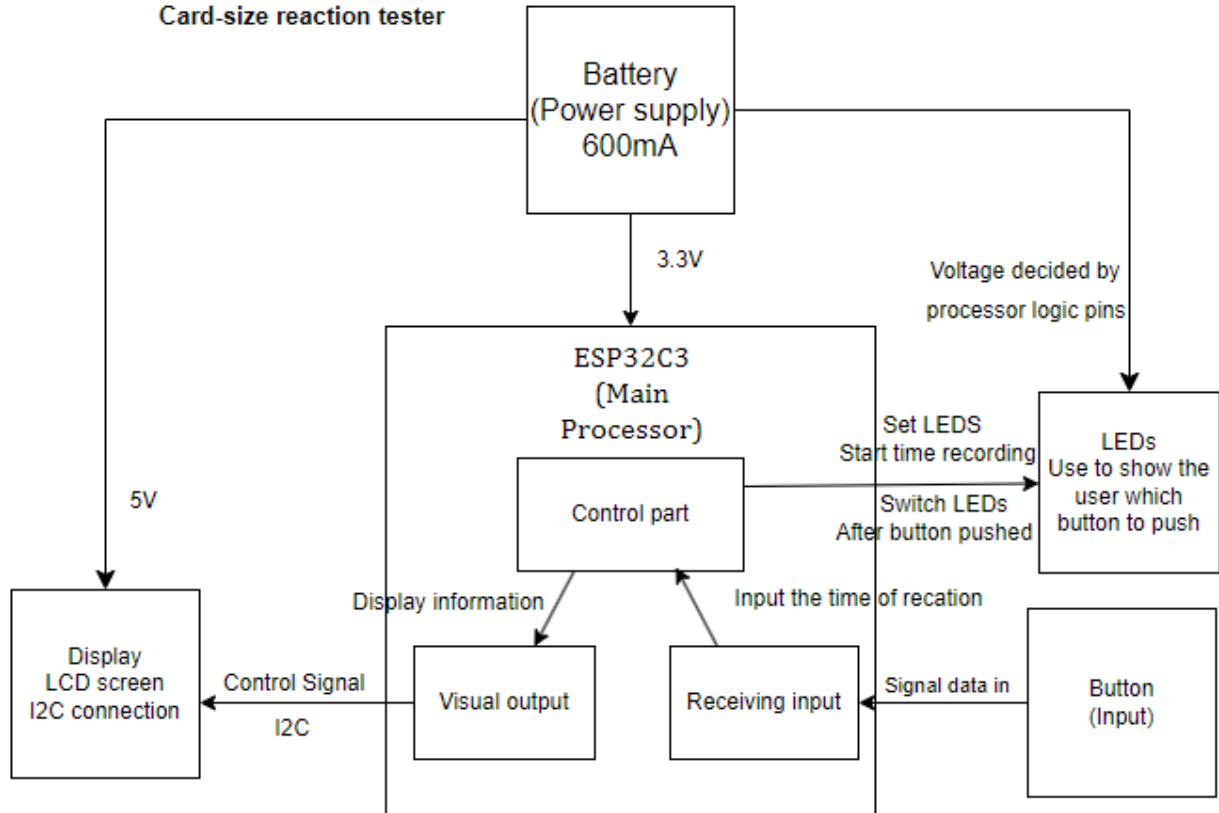
- **System Architecture**

Level 0 block diagram



Level1 block diagram

ECE 411- Team 10
Card-size reaction tester



- **Design Specifications**

- **Sensors: Button, Pressure Sensors**
- **Processor: ESP32C3**
- **Display: 1.28" IPS LCD Module**
- **Power: Battery**
- **Development environment: Arduino, VS Code**
- **Case : 3D printed**
- **Purpose : Effective and compact design**