Test Plan

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Unit Test

1. Test Lipo battery supplies 3.7V.
2. Test buttons are connected to the right pair of pins.
3. Test buttons can change state when pushed.
4. Test button push can be detected by the processor.
5. Test LED can be lit up by the processor output pin.
6. Test the resistance of the resistors are correct.
7. Test the 0.96’’ OLED display can light up
8. Test the buzzer, make sure it can sound.
9. Test the processor can be connected to the port of the computer.
10. Test program can be uploaded on the processor.

Verification test

1. Test the LED can light up in control of the processor.
2. Test the button pressed is recognized by the processor.
3. Test the OLED can show the required instructions.
4. Test the processor can control the 4 LEDs randomly light up one by one.
5. Test the LEDs can be turned off by pressing the button.
6. Test the processor can measure the time between LED light up and button pressed.
7. Test the OLED screen can show the Countdown. (3,2,1)
8. Test the OLED screen can show results of different modes.
9. Test the buzzer so it can sound at the correct time and control.
10. Test the button can be used to switch between functions.
11. Test the Menu can show the selections and act properly.
12. Test the Memory game performs well.

Validation tests

1. Verify that the device is portable and fits within a credit card's dimensions.
2. Confirm the device accurately measures reaction times to within ± 10 ms.
3. Validate that scores are legibly displayed on the OLED screen.
4. Ensure the user interface is intuitive and easy to operate.
5. Verify the countdown before tests is consistent and accurate.
6. Check that the device powers on/off with a single switch.
7. Ensure both the Reaction Tester and LED Memory Test Modes operate seamlessly.
8. Test the other additional functions correctly.

In this testing phase, we will first focus on verifying the basic functionalities of the device to ensure that its core components and system operate as designed. This includes testing the power supply, buttons, LEDs, OLED screen, buzzer, and processor for their fundamental performance and interactions. Once the foundational features are confirmed to be stable, we will proceed to test the overall system performance, including random LED control, reaction time measurement, memory game logic, and the user interface experience.

After the basic functionality tests demonstrate stability, we plan to evaluate the scalability of the device and explore the addition and optimization of new features. We may improve the user interface, enhance the entertainment value of the game modes, or explore more efficient power management methods. All these optimizations will be carried out while ensuring the stability of the existing functionalities.