Project: LED Sniffer Prototype
Document: Test Plan
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LED Sniffer Test Plan

Unit tests

1. Power/Pico: Test that applying 5 V powers the Pico and starts the sniffer firmware in a known idle state.

2. Switch: Test that pressing the switch is detected exactly once per press by the firmware.

3. On-board LED: Test that firmware can turn the on-board LED on, off, and show a distinct “special mode” pattern.

4. NeoPixel: Test that firmware can set the NeoPixel to at least three distinct colors and a distinct “learn/trigger” color.

5. Speaker: Test that the speaker plays a short beep on command and is silent when no beep is commanded.

Verification tests

1. Test that pressing the switch from idle enters learn mode and changes the LED/NeoPixel indication.

2. Test that pressing the switch again exits learn mode and returns the LED/NeoPixel to the idle indication.

3. Test that, after learning a target color, the presence of that learned color on the input makes the LED/NeoPixel indicate “trigger” and plays a beep.

4. Test that input with a different color never causes a trigger indication or beep.

5. Test that the system returns to idle after the beep and can repeat the learn → trigger cycle several times without hanging.

Validation tests

1. Test that the system reaches an idle, ready state within 5 s of applying 5 V power.

2. Test that a user can enter learn mode, learn a color, and cause a trigger using only the single switch and visual feedback (no computer).

3. Test that, over many trials (e.g., 10 learned-color trials and 10 different-color trials), the system beeps on at least 9/10 learned-color trials and on 0/10 different-color trials.

4. Test that the system can run for at least 30 minutes from 5 V without excessive current draw or overheating.