

MAKER LAB PROJECT

**Sound to light Door
Bell Alert System for
Deaf Individuals**



OUR TEAM

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PROBLEM

Deaf individuals cannot hear doorbells at home

Need a visual signal instead of sound



INITIAL APPROACH (ESP32)

First Prototype: ESP32 + LED Strip

Used ESP32 for faster processing

Sound sensor + frequency attempts

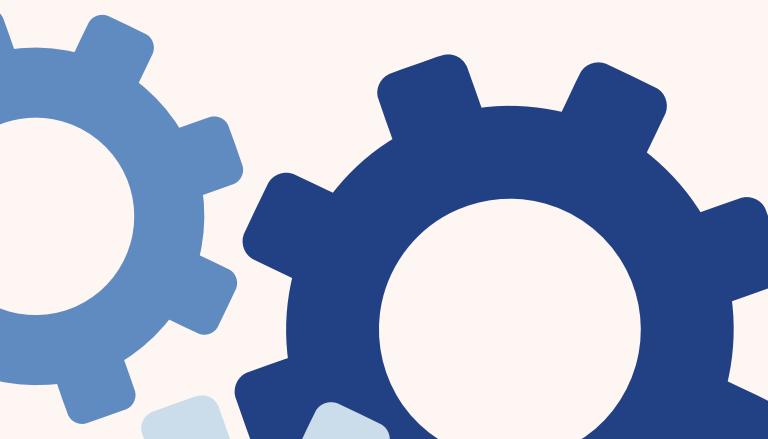
Detected all noises, not only doorbell



NEXT APPROACH

Use MAX9814
ESP32

High Sensitivity



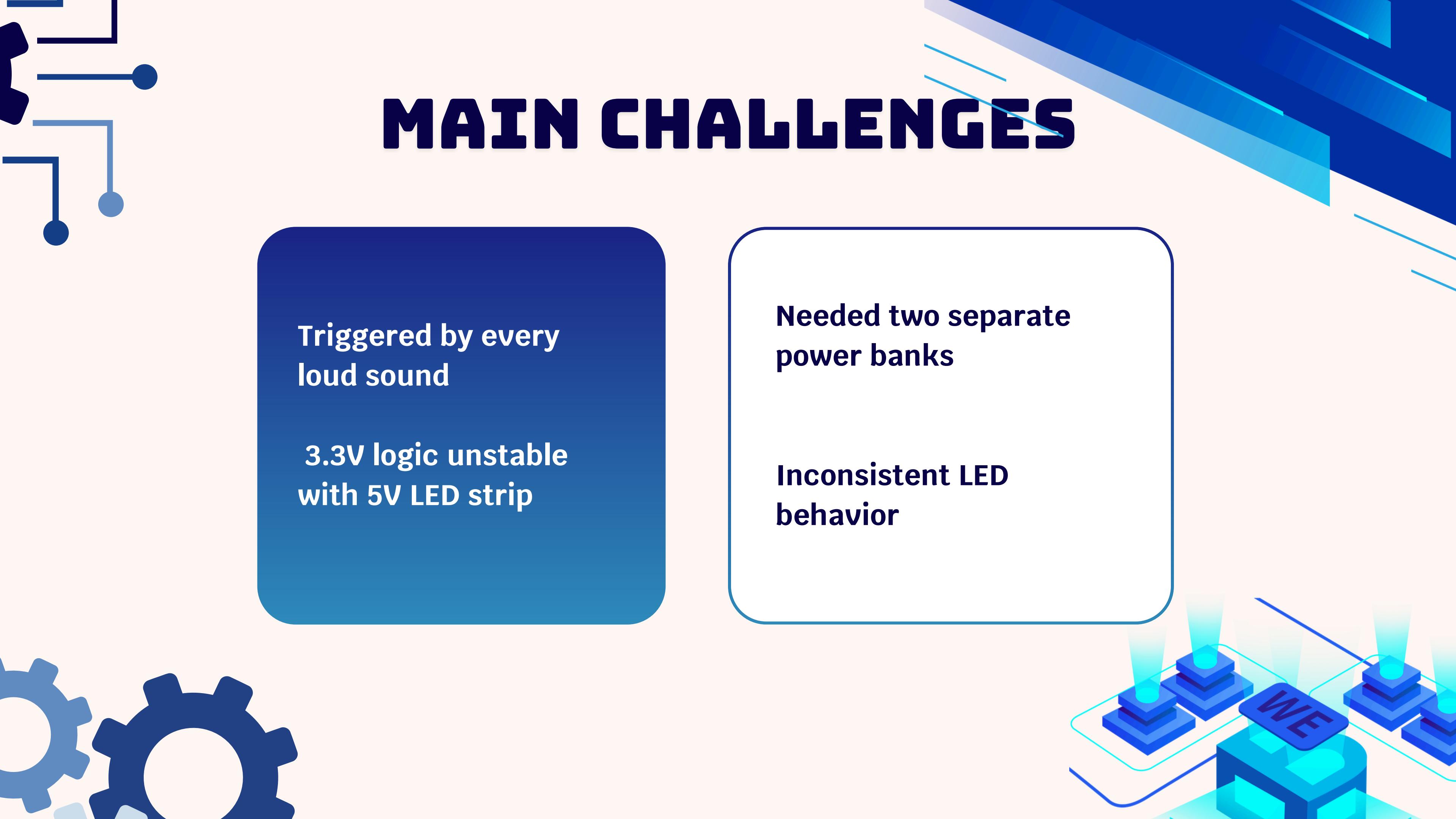
MAIN CHALLENGES

Triggered by every
loud sound

3.3V logic unstable
with 5V LED strip

Needed two separate
power banks

Inconsistent LED
behavior

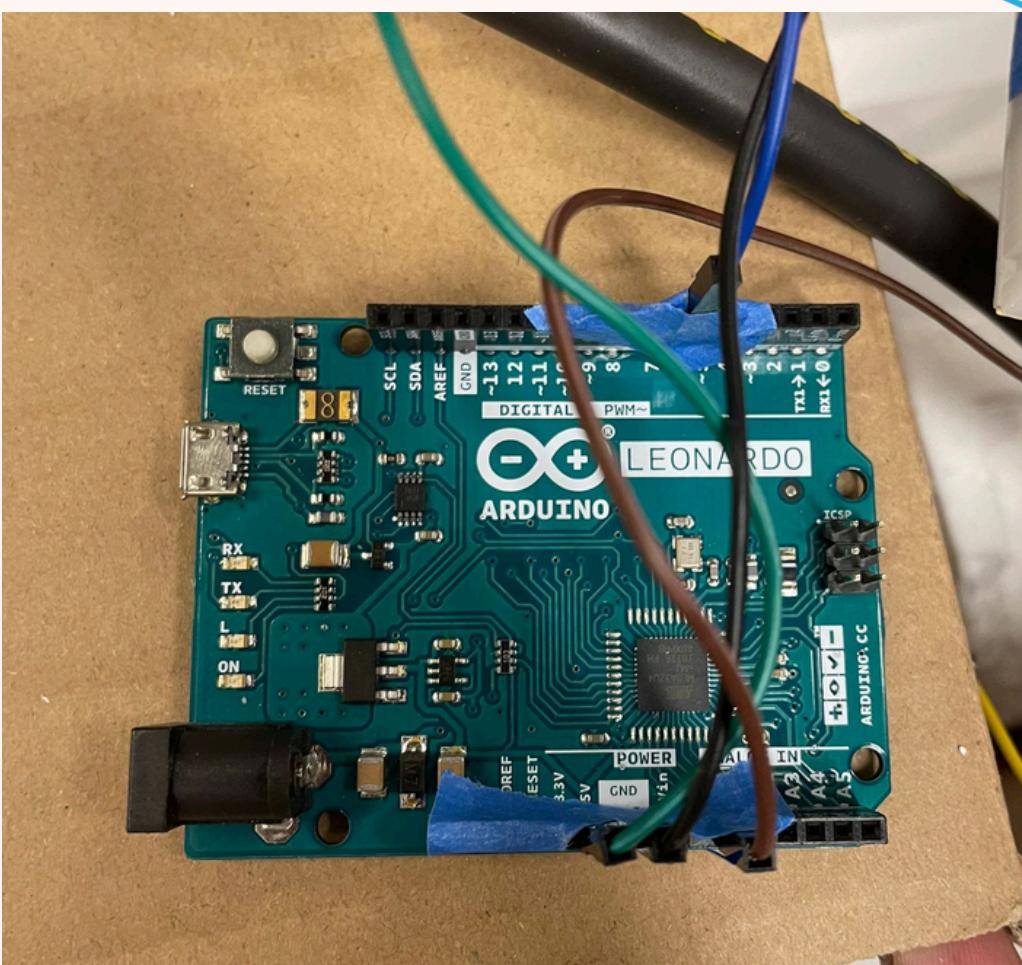


SWITCH TO ARDUINO LEONARDO

Native 5V output → compatible with LED strip

Single USB power source

More stable hardware behavior



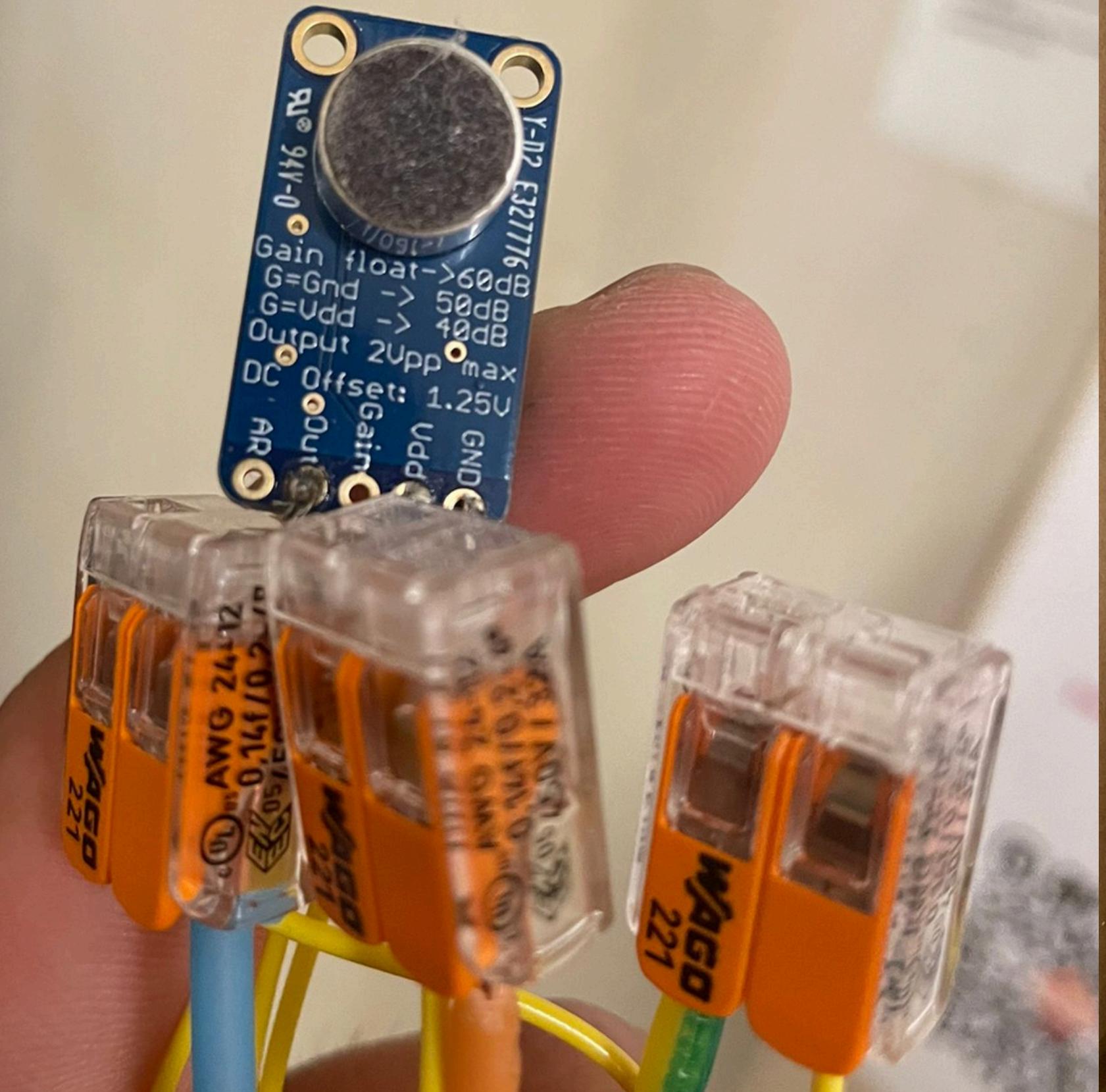
FINAL HARDWARE SETUP

Arduino Leonardo

WS2812 LED Strip (5v)

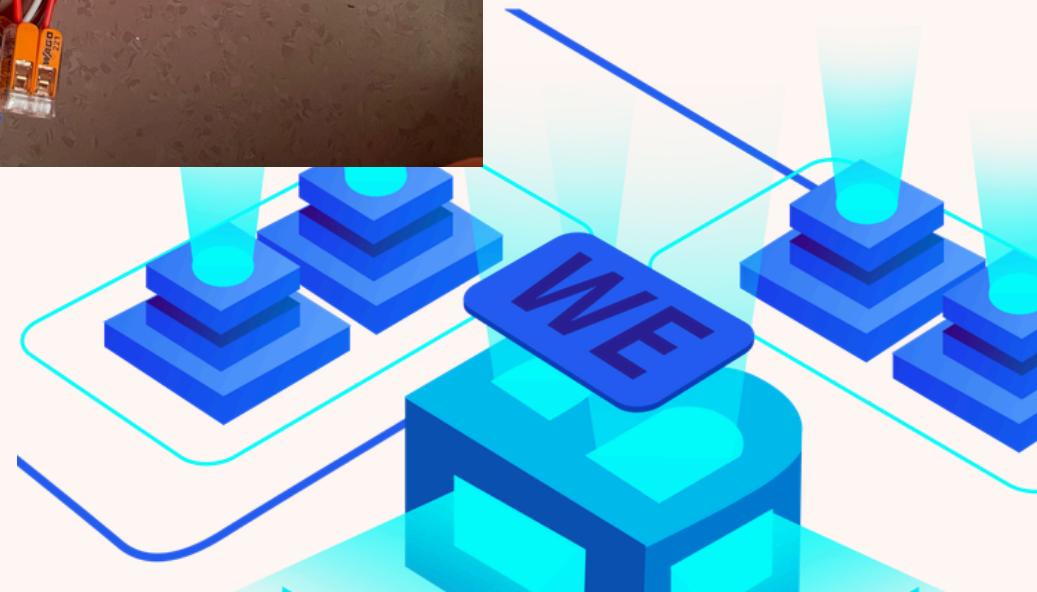
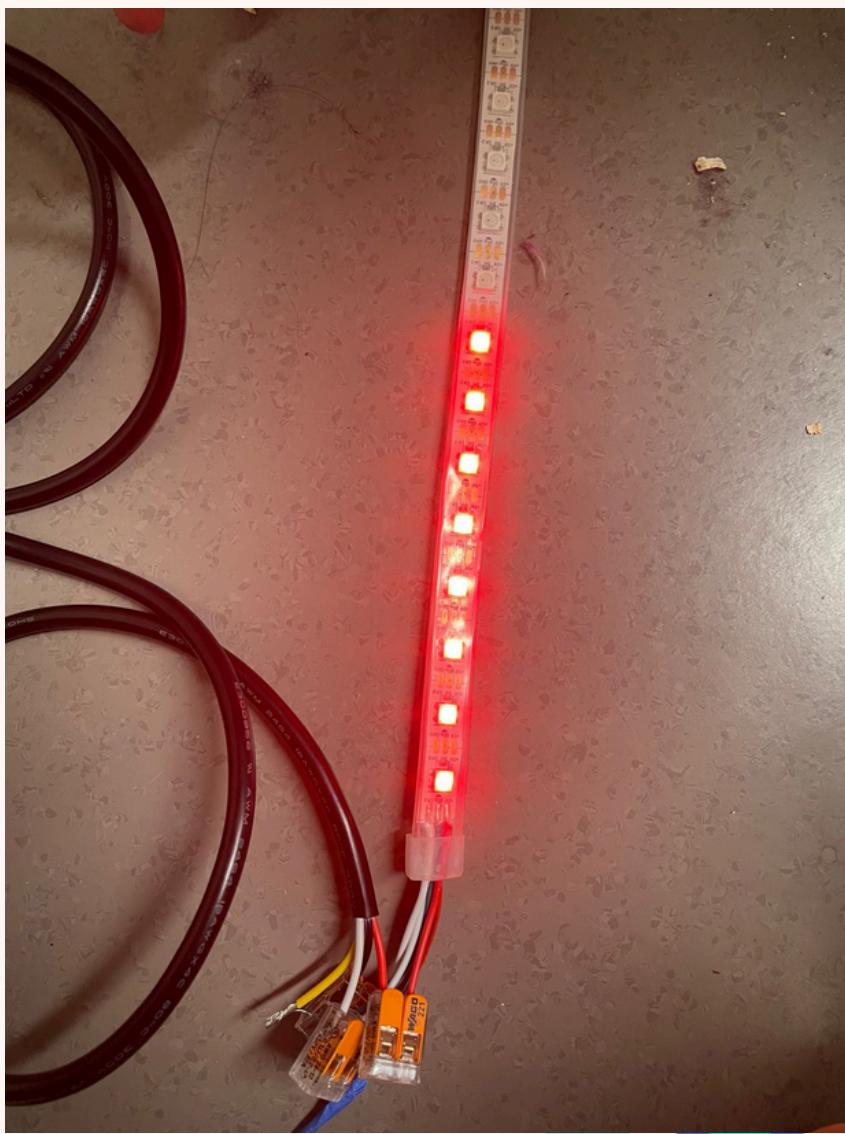
MAX9814 Microphone Module





DETECTION STRATEGY

- Measure sound amplitude
- Set high threshold
- Ignore normal room speech
- Detect only close doorbell sound



CURRENT LIMITATIONS

- Detects certain level of sound, not exact frequency
 - Requires sensor placement near source
 - Frequency tuning still challenging



FUTURE IMPROVEMENTS

- Tune for specific frequency (e.g., 800–1000 Hz)
- Detect multiple household sounds
- Custom light patterns per sound
- Consumer-level assistive device

BROADER APPLICATIONS

- Pressure cooker whistle detection
- Baby crying alert
- Pet sound detection
- Personalized sound visualization system

**THANK
YOU**