

# Executive Summary

## Problem Statement

Our team recently received feedback from customers in a self-responding poll reporting that they frequently leave their windows open and would like a solution to prevent water damage. The majority responded positively to our proposed product line, and among the price ranges provided, the majority favored a product that would cost no more than \$200. Developing the Window Weather Monitor 30K is appropriate in today's market to satisfy this customer demand and increase our existing product lines.

## Proposed Solution

The current market ranges up to \$300, with most products priced in the \$100 to \$200 range. Our price point is expected to be \$149. To satisfy both customer concerns and allow the company a competitive advantage, our product can offer:

- Sound-based alerts that will attract attention
- Sensors that will monitor for rain conditions and temperature
- A water-resistant enclosure to protect internal electronics
- A display that can report temperature

## Final Thoughts and Next Steps

Our product stands out among market competitors because of the portability and more sensors.

### **Market:**

The intended customers are people who need a reminder to close the windows during a weather event.

Product competition for a window weather monitor is saturated. Competitors boast products that have a motor that will automatically open and close windows and are capable of rain detection. However, what separates our product from others is the inclusion of temperature and humidity sensor modules, LED and LCD displays, power via USB, and audible noise alerts.

We could sell this for around \$149. The reason for this price is due to the materials cost, labor, research, and development. Market conditions for the competition will vary depending on the feature set that is sought after, but similar products range from \$100-\$300.

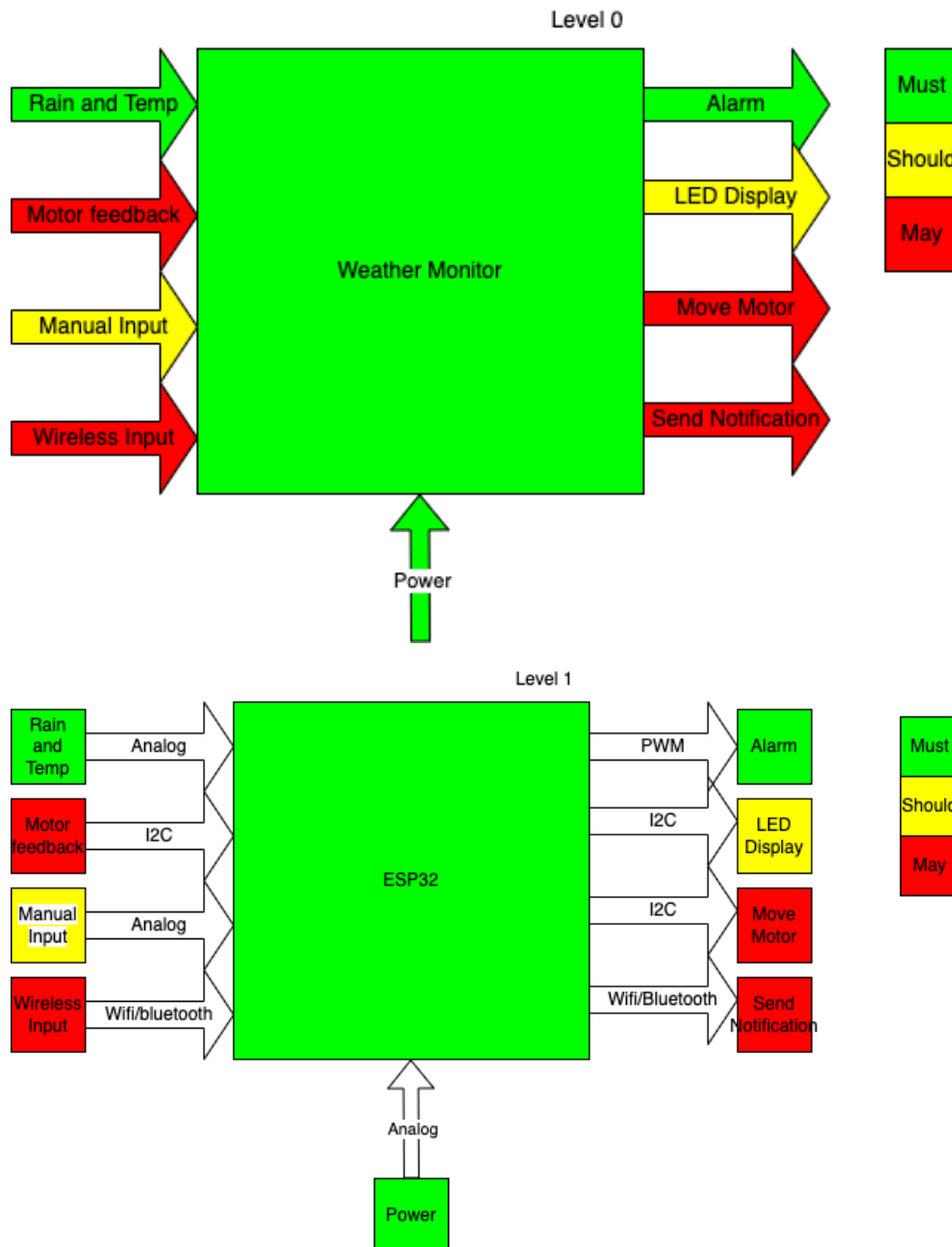
### **Requirements:**

For our product to meet the needs of our target market it must meet the following criteria. It must be able to detect when it is raining and audibly alert the user when rain is present. There must be a way to manually turn off the audible alert. There should also be a visual alert. The monitor must also be able to withstand repeated exposure to rain.

The monitor should also be able to detect and visually display the current temperature and humidity level. The monitor should allow the user to manually program a desired temperature range and audibly alert the user when the detected temperature is outside the programmed range. The monitor should have an internal power supply that may be rechargeable. The

monitor should be able to sit in an open window or be affixed to the exterior near the window. The monitor should be able to be moved from one window to another. If time and budget allow the monitor may also include some combination of the following features. The monitor may have the capability to close the window it is used in. It may also allow for remote programming and the ability to silence the alerts. It may include connectivity capabilities to monitor weather conditions from an online source and to send window closure alerts to the user's cell phone.

## Architecture:



## Design:

### Weather monitor product design specifications

- ESP32 feather microcontroller, or ATmega328P
- Input sensor: DHT11 Temperature and humidity sensor module
- Input sensor: KY-022 IR receiver module
- Input: IR remote control - XIITIA
- Input sensor: LM393 raindrop sensor
- Output: LCD1602 display
- Output: LED
- Output: KY-012 active buzzer
- Output: 1 Motor Driver Board (e.g., Adafruit 2927)
- Output: 1 Stepper Motor (e.g., Amazon B00PNEQKC0)
- Power: USB
- Arduino IDE