


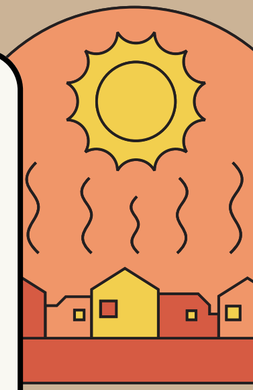
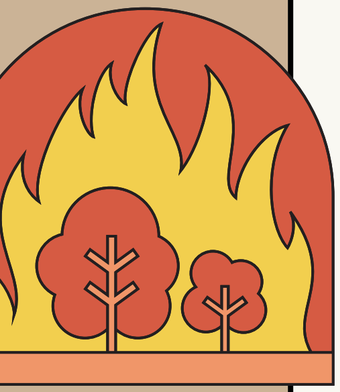
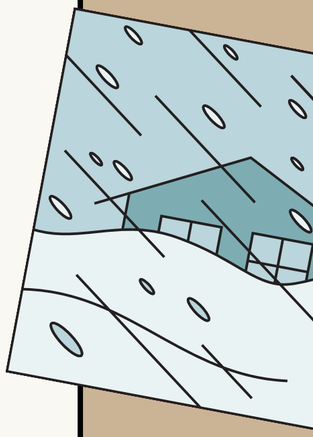
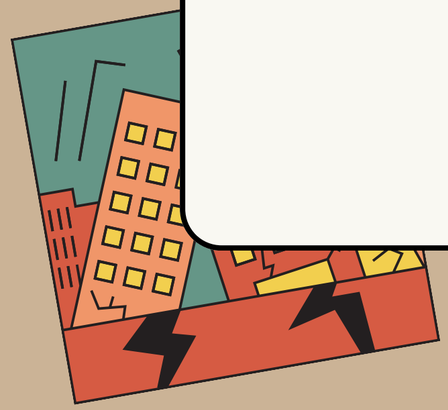

PORTABLE BATTERY-POWERED WEATHER MONITORING SYSTEM

Group 4 members:

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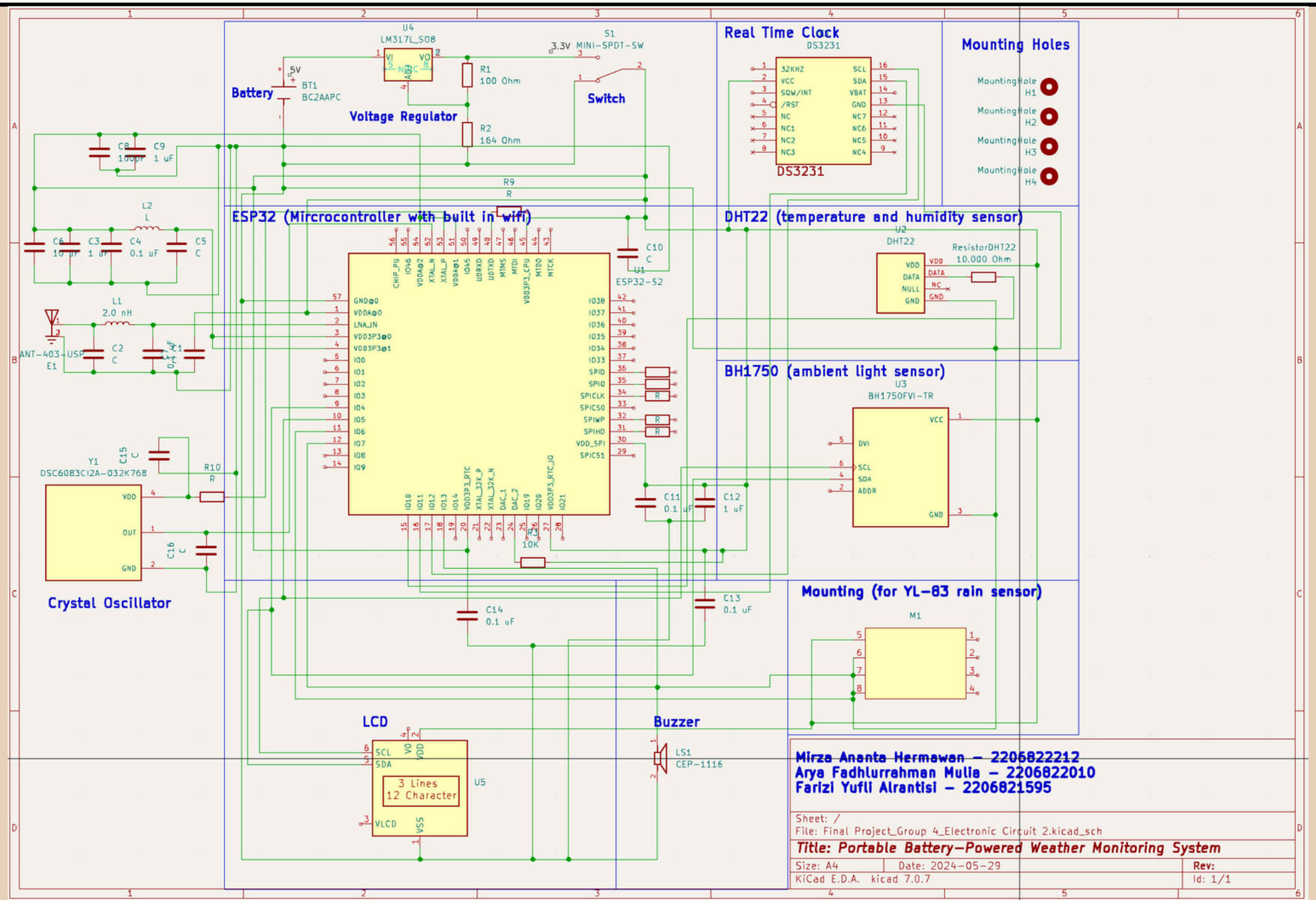
BACKGROUND DESIGN

- Purpose: Designed to provide **real-time weather** data in a portable format.

- Applications: Ideal for **agriculture** to manage crops, **urban areas** for smart city solutions, outdoor events for planning, and **educational** uses for data collection.

- Advantages: **Highly versatile and adaptable**, can be easily used in diverse settings.

SCHEMATIC EXPLANATION



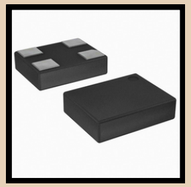
SCHEMATIC EXPLANATION

ESP32 (bare chip)

Acts as the central processing unit, superior with integrated WiFi and Bluetooth, handling multiple data streams.

DSC6083

Provides a stable clock source using MEMS technology, crucial for accurate timing.



I2C 3 Lines 12 Character LCD

Displays environmental data in real-time, simplifying user interaction via a standardized communication interface.

CEP-1116 Buzzer

Generates audible alerts when environmental thresholds are exceeded.

YL-83 (Rain Sensor)

Detects precipitation, triggering alerts and data logging.

BH1750 (Ambient Light Sensor)

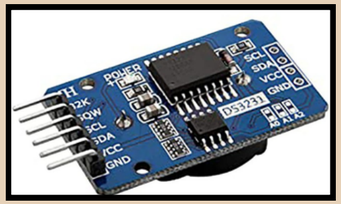
Measures ambient light, essential for both agricultural and urban applications.

DHT22

Offers precise readings crucial for monitoring environmental conditions.

RTC DS3231

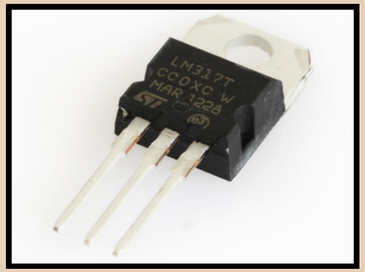
Maintains accurate timekeeping, essential for logging with time stamps.



SCHEMATIC EXPLANATION

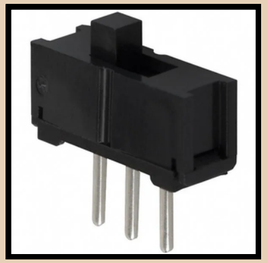
LM317L508

Ensures all components receive a stable 3.3V, critical for device stability.



MINI-SPDT-SW

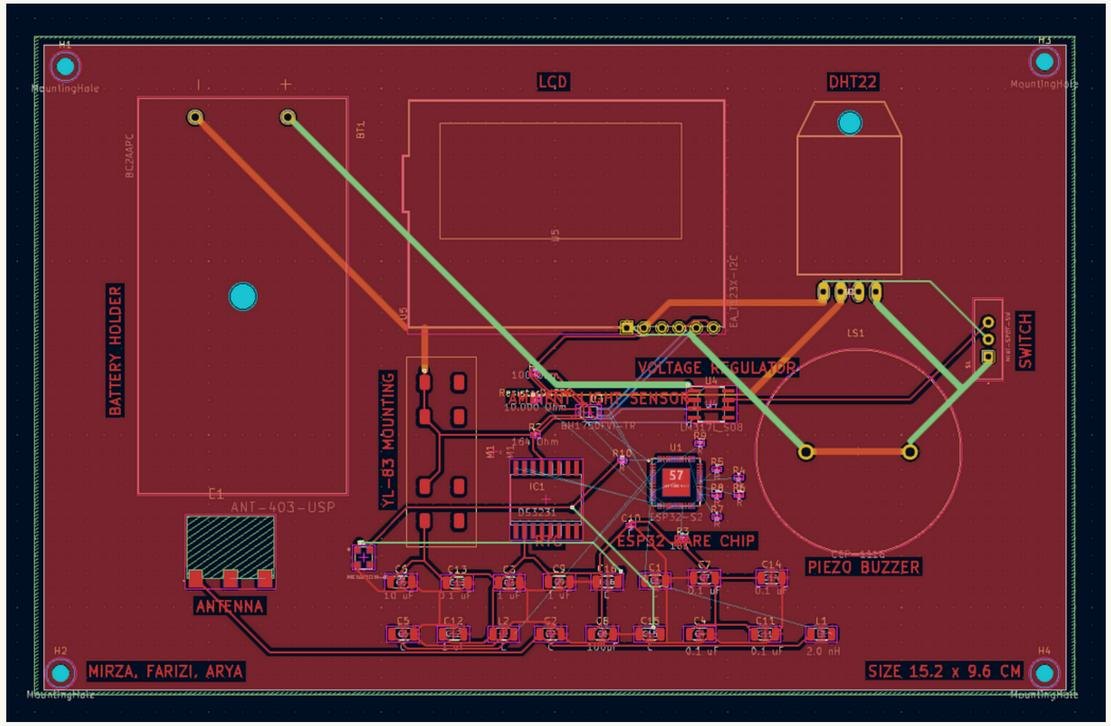
- On & Off switch



BC2AAPC

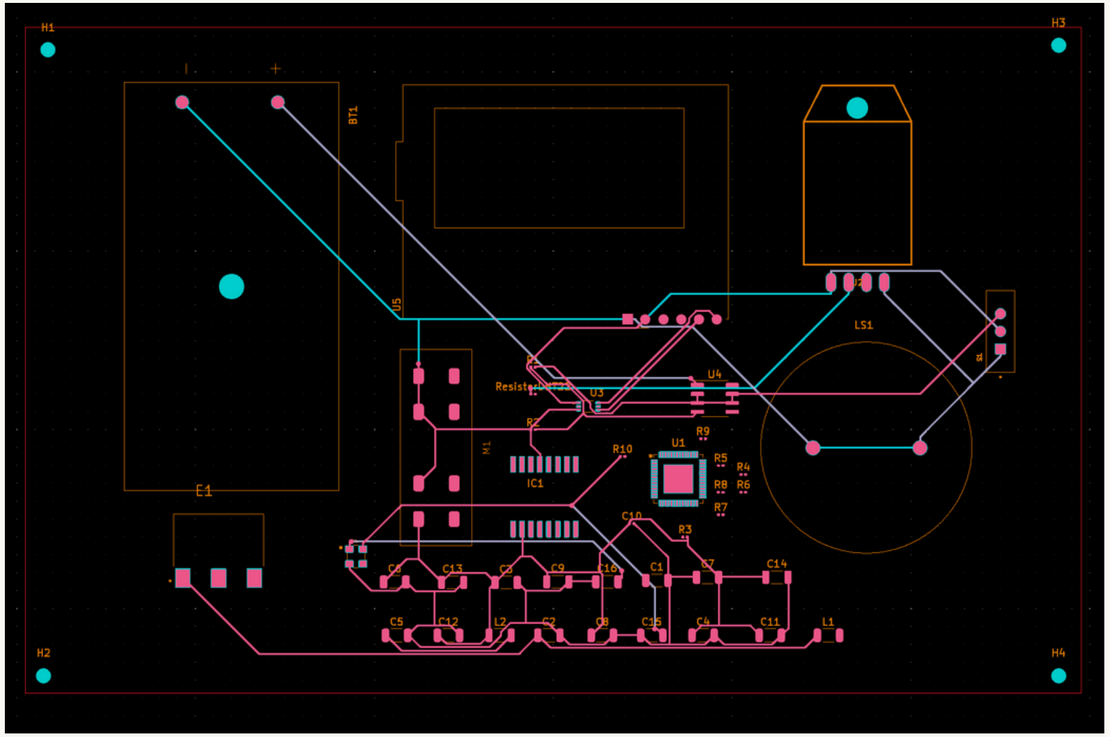
- battery holder
- support common AA battery

PCB LAYOUT

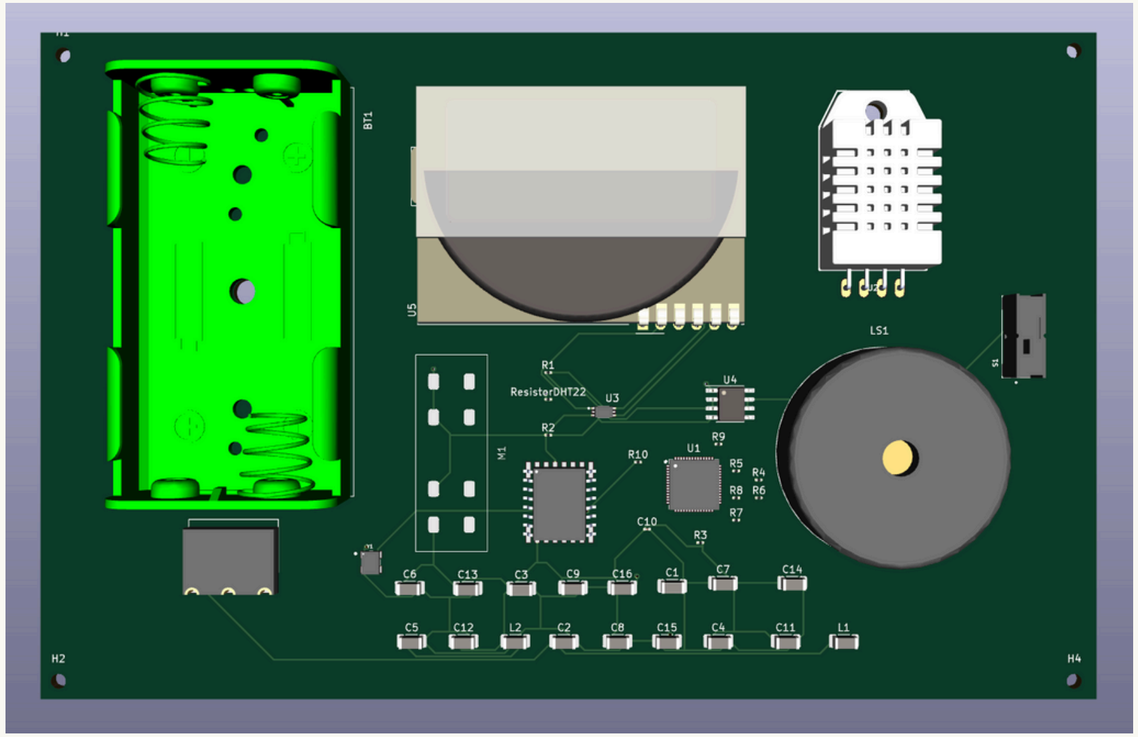


- **Central ESP32 Placement:** strategically placed in the middle to minimize connection lengths and enhance signal integrity.
- **Power Management:** voltage regulator and capacitors are positioned near the input to regulate and stabilize incoming power.
- **Sensor Placement:** optimized to reduce electrical noise and interference, ensuring accuracy.
- **Display and Interface:** placed on the edge for optimal visibility and easy accessibility.
- **Trace Routing:** Designed to ensure minimal latency and maximum data integrity, with thick traces for power.

PCB LAYOUT



Gerber



3D PCB

DESIGN CONSTRAINTS

- **ESP32 bare chip :** Integration needs numerous small, precision-placed passive components to ensure functionality.
- **Custom mount for YL-83 sensor:** Developed due to unavailable symbil and footprint of the component. Custom made allowing for tailored sensor positioning and optimal functionality without compromising PCB integrity.

CONCLUSION

- Successfully **integrate various sensors** technologies into a compact and efficient device.
- **Addressed complex PCB design challenges** and **innovative solutions** for component integration.
- Demonstrates the **project's adaptability and scalability in modern electronics design**, with applications across various fields.

REFERENCE

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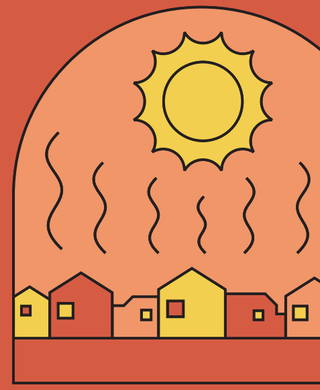
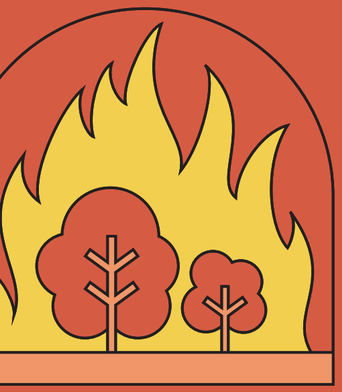

THANK YOU