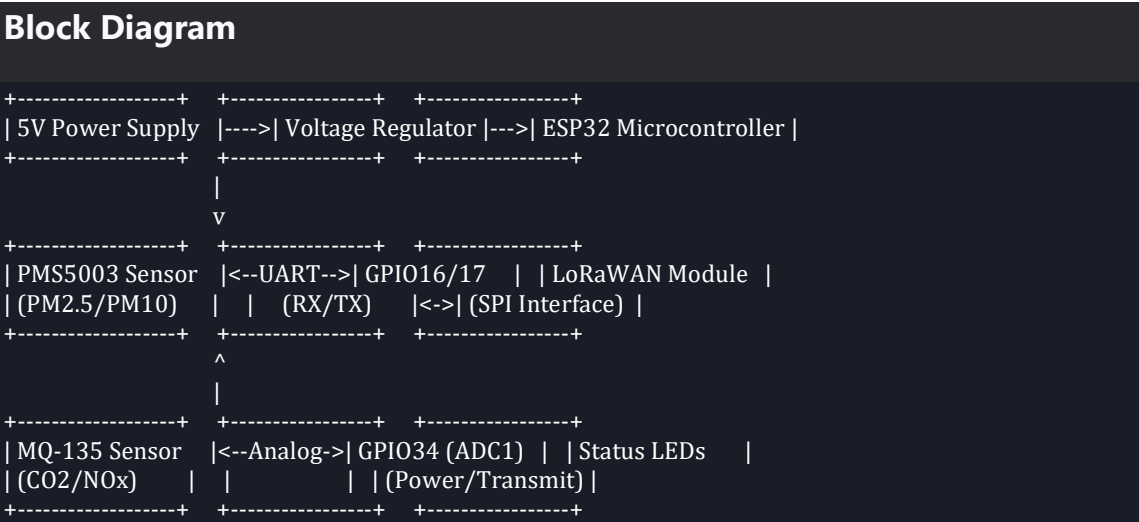


Sensor Node Schematic (sensor\_v1.pdf)  
Title: IoT Air Quality Sensor v1.0  
Author: Aditya K. Mishra  
Date: 25/03/2025



Circuit Details

1. Power Supply

- Input: 5V DC (USB/MicroUSB)
- Voltage Regulator: AMS1117-3.3V
- Decoupling Capacitors: 10μF (Input), 0.1μF (Output)

2. ESP32 Connections

PMS5003 <-> ESP32:

- VCC -> 5V
- GND -> GND
- TX -> GPIO17 (RX)
- RX -> GPIO16 (TX)

MQ-135 <-> ESP32:

- VCC -> 3.3V
- GND -> GND
- OUT -> GPIO34 (ADC1\_CH6)

LoRaWAN Module (RAK4631):

- MOSI -> GPIO23
- MISO -> GPIO19
- SCK -> GPIO18
- NSS -> GPIO5
- RST -> GPIO14

### 3. Additional Components

- Status LEDs:
  - Power: Red LED (330Ω resistor to 3.3V)
  - Data Transmit: Blue LED (GPIO2 + 330Ω resistor)
- Reset Button: GPIOEN pin to GND

## Design Notes

### 1. PCB Layout Guidelines:

- Keep analog/digital sections separated
- 20mm clearance around antenna for LoRaWAN
- Use 0603 SMD components for compact design

### 2. Power Consumption:

- Sleep Mode: 10μA
- Active Mode: 120mA (peak during transmission)

### 3. Environmental Protection:

- IP65-rated enclosure
- Nano-coating for moisture resistance