BabySitter Hardware Document

Version 1

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Abstract

Outlines the design and configuration of a monitoring system using a Raspberry Pi 4. The system uses multiple sensors and components to provide comprehensive monitoring for a baby while they are in their crib. Using visual, audio and environmental data.

Raspberry Pi Camera Module 3 NoIR will provide video streaming of the baby's crib.The 3.5mm Headphone Jack Microphone picks up sounds from the baby like crying to provide notifications to the end user. The DHT22 Temperature/Humidity Sensor is used to monitor the temperature of the room and alert the user if it is not in the recommended range. Mini Oval Speaker with Short Wires - 8 Ohm 1 Watt and Adafruit Mono 2.5W Class D Audio Amplifier - PAM8302 will be used to provide the user a way to talk to the baby through the application while not in the room.

Parts Lists:

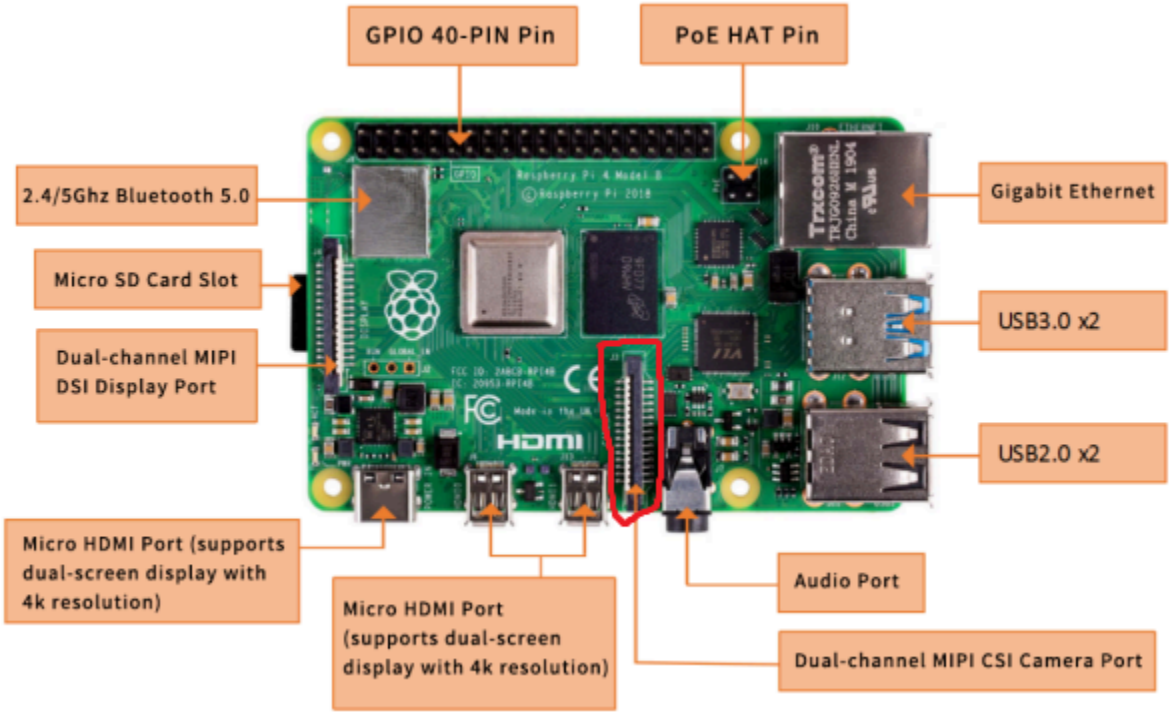
- Raspberry Pi 4
- Raspberry Pi Camera Module 3 NoIR
- 3.5mm Headphone Jack Microphone
- DHT22 Temperature/Humidity Sensor
- Mini Oval Speaker with Short Wires - 8 Ohm 1 Watt
- Adafruit Mono 2.5W Class D Audio Amplifier - PAM8302

Raspberry Pi 4:

The Raspberry Pi 4 serves as the central hub for the system, managing connections between all sensors and peripherals, processing input data, and transmitting information to the cloud server.

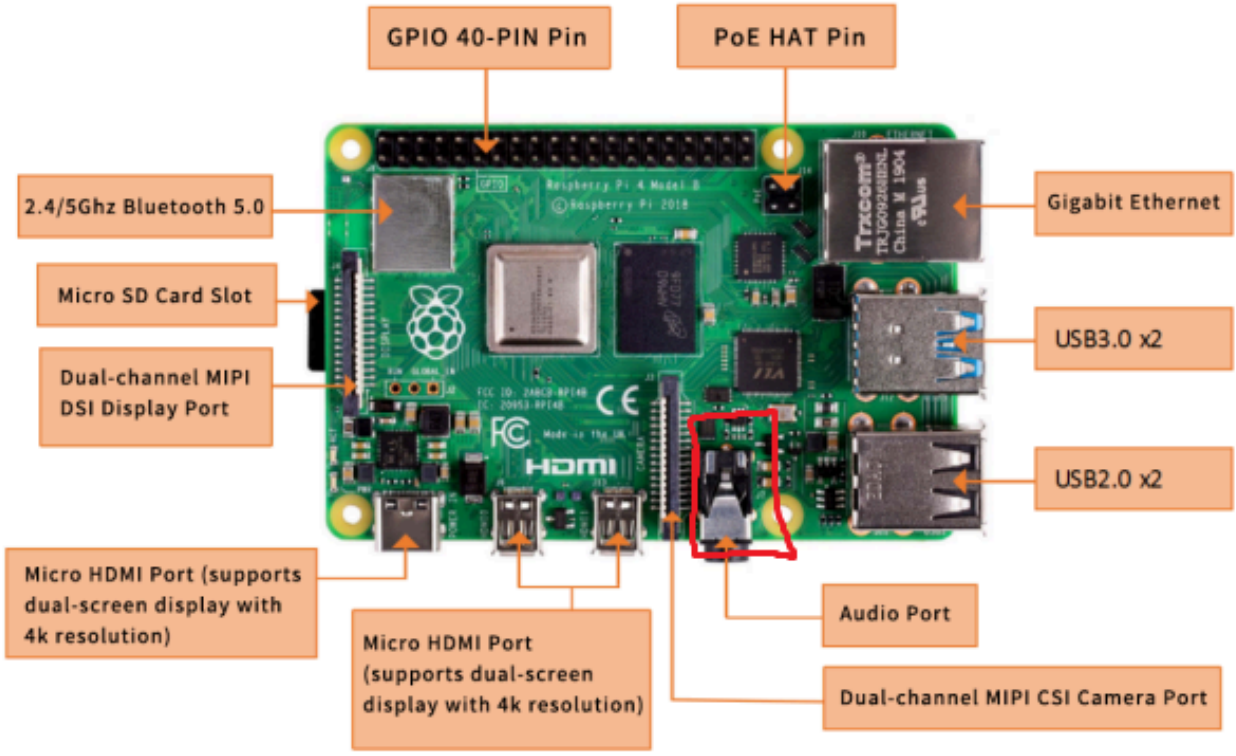
Camera Setup:

- Connect Raspberry Pi Camera Module 3 NoIR to the **CSI port** on the Raspberry Pi 4.

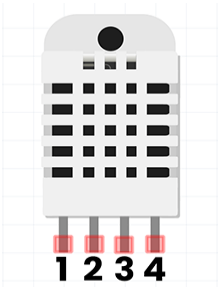


Microphone Setup:

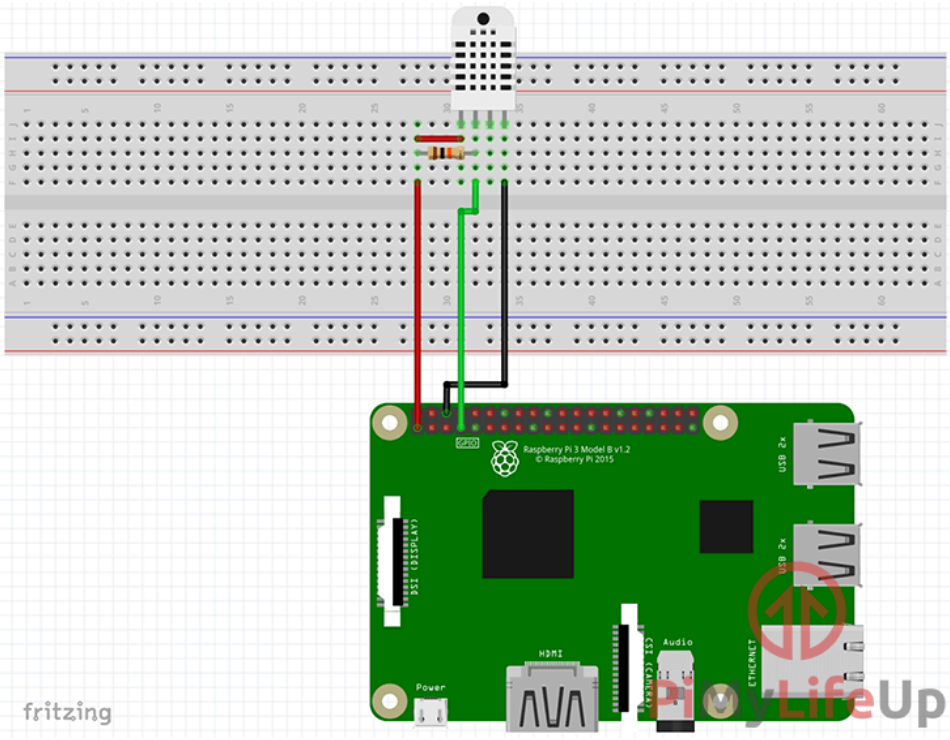
- Plug the Microphone into the audio port on the Pi 4 as seen in the below image.



DHT22 Temperature/Humidity Sensor setup:

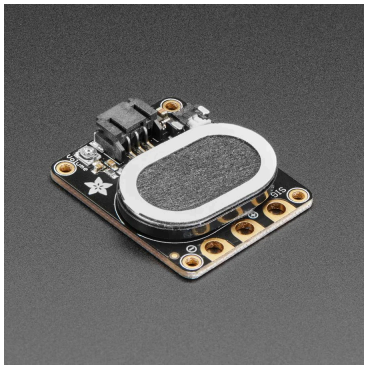
	**Pin 1** is VCC, Power Supply **Pin 2** is DATA **Pin 3** is NULL **Pin 4** is Ground

- **Pin 1**: Connect to the 5V power rail on the breadboard, which is linked to the Raspberry Pi 4
- **Pin 2:** Connect to a GPIO pin on the breadboard
- **Pin 4**: Connect to the Ground on the breadboard
- **Resistor** between Pin 1 and Pin 2



Speaker Setup:

- Connect the Amplifier (Adafruit Mono 2.5W Class D Audio Amplifier - PAM8302) to the Raspberry Pi
- Connect the VIN pin on the amplifier to a 3.3V pin on the Raspberry Pi.
- Connect the GND pin on the amplifier to a GND pin on the Raspberry Pi.
- Connect the A+ pin to a GPIO pin on the Raspberry Pi.
- Connect the A- pin to the GND pin on the Raspberry Pi.
- Connect the Speaker(Mini Oval Speaker with Short Wires - 8 Ohm 1 Watt) to the amplifier



Cloud Server (AWS):

The system uses **Amazon Web Services (AWS)** for remote monitoring and control.

- **Key Pair Authentication**: Uses **.pem files** to secure **SSH access**.
- **Security Groups**: Act as virtual firewalls, controlling **inbound** and **outbound traffic**.
- **PubNub**: Used for communication between the baby monitor and the web server.
- **Secure channels** with authentication tokens for authorized access only.

Bibliography:

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Links for Images:

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https://pimylifeup.com/wp-content/uploads/2019/05/Raspberry-Pi-Humidity-Sensor-DHT22-Wiring-Schematic.png