Aaron Bading

8/11/21

# T-Detector: Motion Detector Camera

## Description:

The T-Detector is a motion detector front door camera. The system contains solar panels, a lithium battery charger, 4.2V lithium battery, ESP32, ESP32-CAM, a Buzzer, LEDs and a PIR Motion-sensor.

## Operation:

The system is triggered by motion when an intruder/ guest arrives at the front door. This triggers the motion sensor and gives a signal to the ESP32-CAM board which wakes it up. Upon the board waking up, it starts a local network and streams the live camera footage to the associated webpage. In addition, the board sends a wireless signal via ESP-NOW to an inside ESP32 unit which causes a buzzer to play some sounds for notification purposes. Once the local network is started, the iPhone automatically connects to it and gives me a notification to open my browser and connect to the URL (setup with iPhone shortcut). Once connected to this URL, I can view the live camera footage and there are three buttons presented underneath the camera stream: KEEP STREAM, STOP BUZZER and GO TO SLEEP. KEEP STREAM will stop the board from going back to sleep automatically after 60 seconds. STOP BUZZER will tell the inside ESP32 to stop the buzzer from going off. GO TO SLEEP will force the ESP32-CAM board to go back to sleep until triggered again. The outside system is powered by the lithium battery which is solar charged. The inside system is powered by 5V.

## Challenges:

This project was challenging because it took a lot of setup and a good bit of research. I wanted something that was solar powered, so it was sustainable and realistic. There were several small challenges and a few big challenges. Some of the larger challenges were getting the CAM board to stream and to use ESP-NOW simultaneously, there were some power issues and also a good bit of problems when putting all the parts together. Some of the minor challenges were getting the buzzer to function properly with the ESP32, soldering up the PCB's and figuring out the external wakeups and automatic timing to turn the buzzer/cam-board off .

## Functionality:

The functionality of this project is somewhat implied. This project essentially acts as a front doorbell and gives me the option to view who is at my door without me having to even get out of my seat. This way, I can avoid unwanted conversations with unusual neighbors that just waste your time. This project can even be made better by having this be accessible anywhere. That way you'd be able to access the front door cam even if you aren't home. This would require a little more research but can be done.

Components:

ESP32, ESP32-CAM , Lithium Battery , TP4056 Lithium Battery charger, Solar panels, PIR motion sensor , Buzzer, LEDs

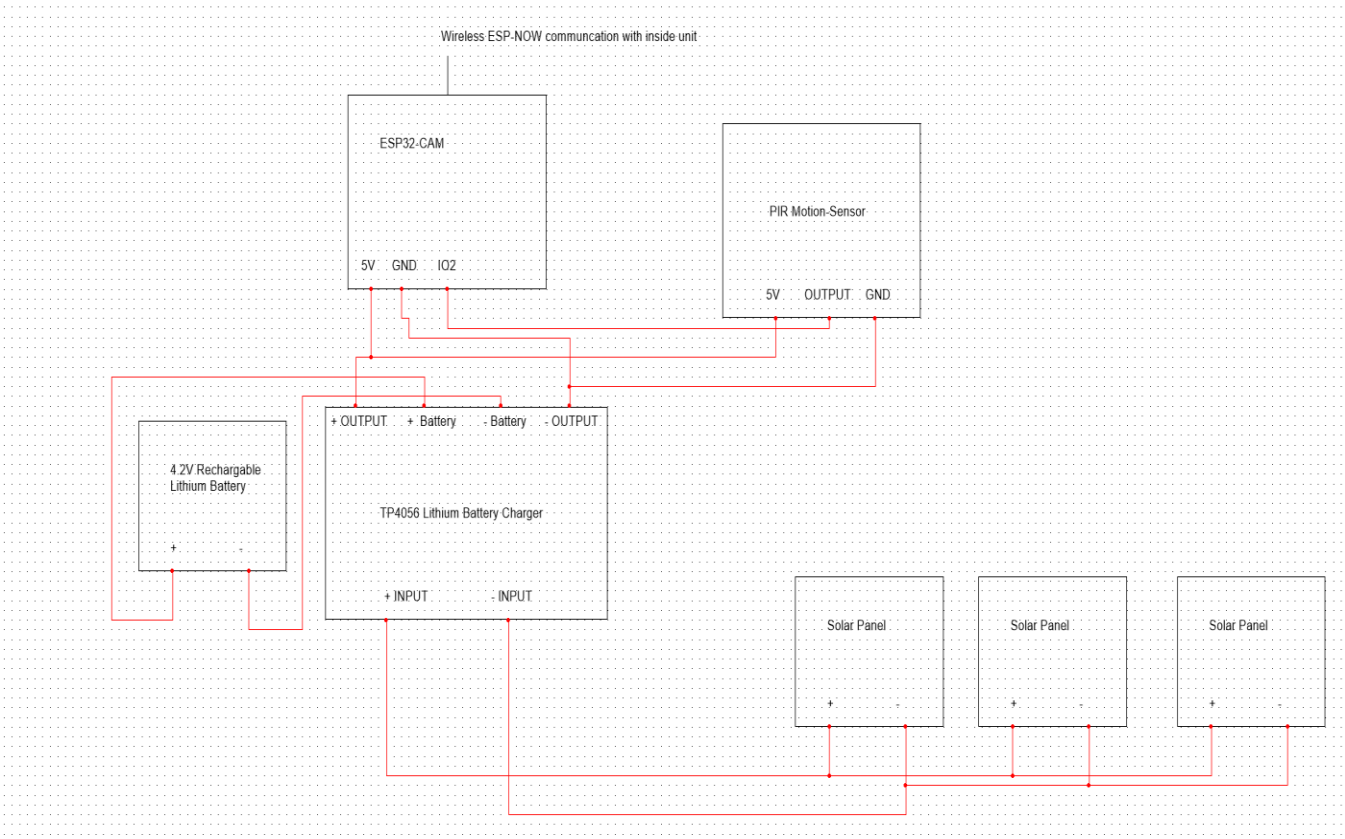


**Figure 1.** Circuit Schematic of OUTSIDE Unit

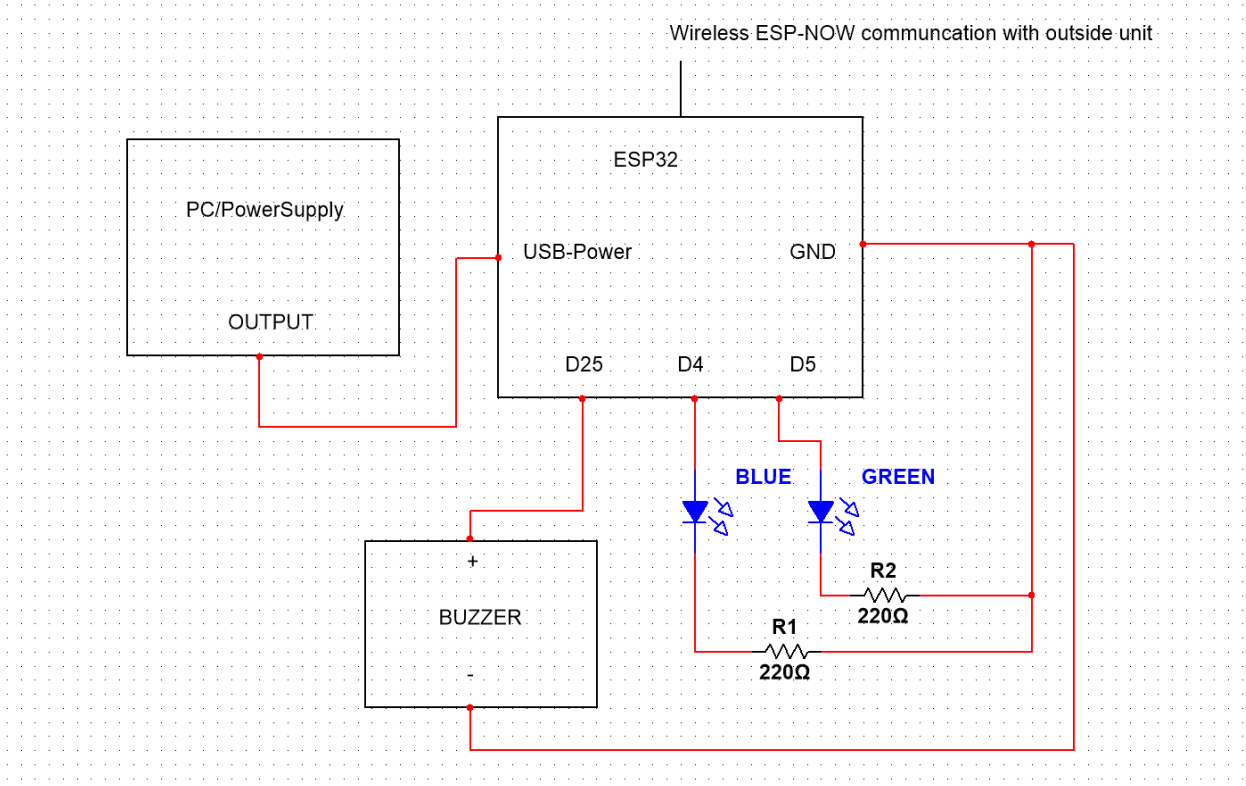


**Figure 2.** Circuit Schematic of INSIDE Unit