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Project Preliminary Design

Objective of Preliminary Design

The objective of the Statement of Work was to identify what you are going to build. After defining the SoW, the next phase of the project is design. The objective of the design phase is to identify how you are going to build it and **what parts are necessary to build it.**

The first part of the design phase is the preliminary design. The output of the preliminary design phase is a description of how you plan to build your project. These preliminary design documents will be reviewed and discussed with each group. Once the preliminary design is agreed upon, then the group can proceed to the critical design phase, where additional detail and a full set of diagrams will be required.

The preliminary design will consist of two parts: a **document** where you will answer questions about your design and **a parts list**. For the parts list, please fill out the spreadsheet in the exact format of the template that I provide.

Preliminary Design Questions

1. What computational platform(s) do you plan to use (BBBw, Atmel, etc)? How many of each type do you plan to have in your system? Why did you choose this platform? Extremely important considerations include:

a. **BBBw** uses 100x more power than typical microcontroller

   i. BBBw since it will allow us to interface with different sensors and possibly have wifi capability

b. Do you need wifi, Bluetooth, etc?

   i. Most likely not, possibly wifi for phone connectivity

c. BBBw requires 2 minutes to boot up and must be shut down carefully…is this a problem for your end user?

   i. No, alarm systems will need boot up and shut down time anyway

2. What sensors do you plan to use? Please be specific and include links to parts (when applicable).

- PIR Motion Sensor: https://www.digikey.com/product-detail/en/parallax-inc/555-28027/555-28027-ND/1774435

3. What outputs/actuators do you plan to use? Please be specific and include links to parts (when applicable).

- Speaker for alarm if triggered https://www.digikey.com/product-detail/en/soberton-inc/SP-1605/433-1104-ND/3973691
- Text message or notification to a cell phhttps://www.digikey.com/product-detail/en/soberton-inc/SP-1605/433-1104-ND/3973691one

4. How do you plan to power each component? Do you need external power supplies? Voltage regulators b/c you are powering multiple components? Please be specific and include links to parts (when applicable).

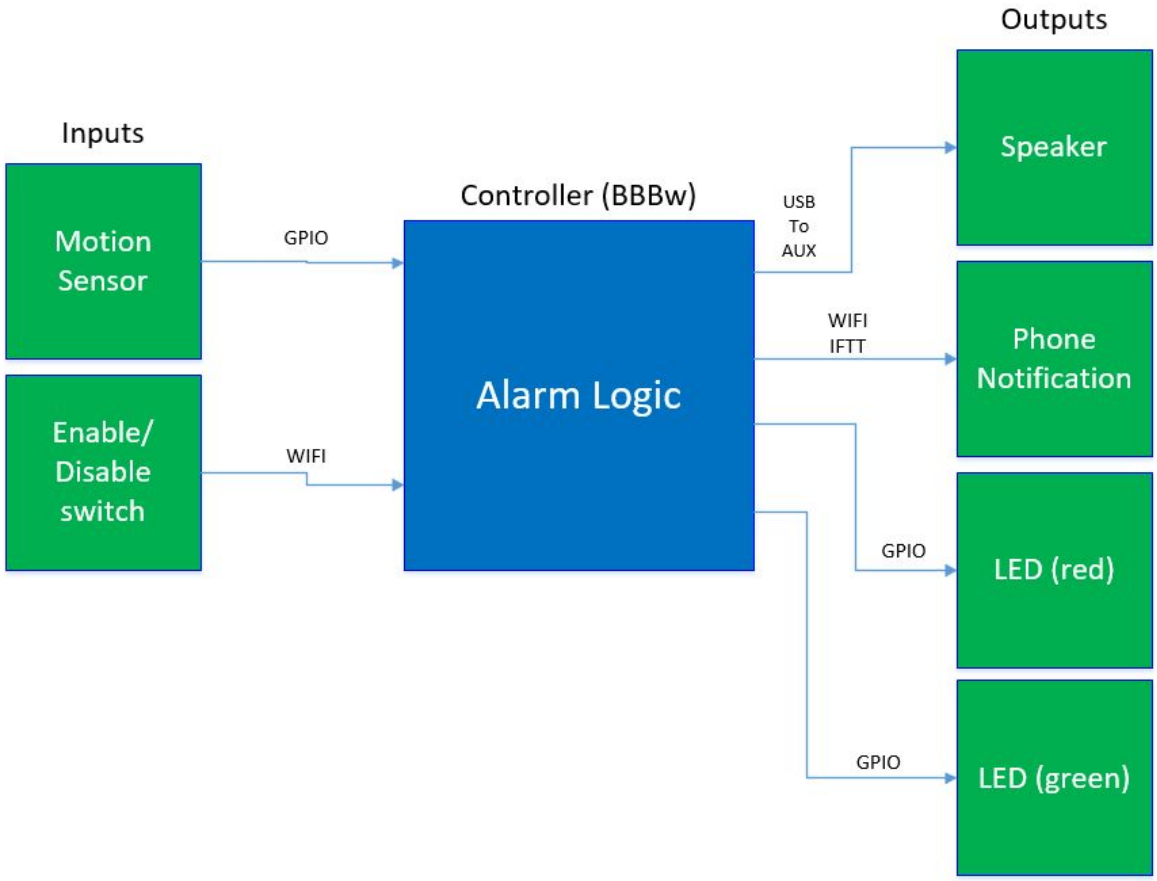
- BBBw will be powered externally not by a computer
- Motion sensor will get power from the BBBw
- Speaker will use external power and controlled by the BBBw

5. How do you plan to connect these components? This includes physical connection (Ethernet cable, Wifi, individual wires, etc), protocol (TWIM, SPI, TCP/IP, UDP, ADC, DAC, GPIO, etc), and interface (Web Sockets, ThingSpeak, TWIM interface described in sensor data sheet, etc).

- Motion sensor: GPIO with wires
- Speaker: USB connection via USB-to-AUX or just USB
- Web site: Wifi connectivity through a website

6. How do you plan to package/encase your devices? Will devices need to be weatherproof? How do you mount or install your devices? Will you need to use a 3D printer?

The device need not be weatherproof since it will be an indoor security system, specifically for apartments or dorm rooms. The device will all be in one package with the BBBw, Speaker, and Motion Sensor all together. The cell phone will obviously be separate, and linked via the WiFi. We will probably need to 3D print the casing for the device.



7. Draw a complete block diagram of your system. In addition to the standard components of block diagrams, show how each component will be powered. For each device that is connected, show the physical connection type, protocol, and interface definition on the lines that connect devices. In cases where you have multiple controllers (computational platforms), make sure to show how they are connected with each other and include all systems on a single diagram.

8. What programming language(s) do you plan to use? What drivers or ASF modules will you need?
C. Loading other libraries for playing audio with the BBBw and interfacing the cell phone with the BBBw

9. If your project will utilize a web display, what software technologies will you use to accomplish this?
No web display.

10. Please list any other details or topics that are not covered by the questions above.