EEL 4914 SENIOR DESIGN 1 GROUP 10

Eco-Sec

The Economical Home Security Solution

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1. Project Narrative

The motivation for this product is to develop a more economical solution to the problem of home security systems. Most home security systems available on the market today cost several hundred dollars as well as many requiring additional fee to have the security installed or a monthly surcharge for a security firm to “monitor” your home system. Upon successful completion of this senior design product will result in a home security system with similar features to those available. This system shall also be easy to install requiring no outside installation service and fee as well as requiring not outside monthly service saving the user the monthly surcharge fee.

In order to successfully entice possibly users to employ this security system it must incorporate several features in order to make it comparable if not superior to most systems available on the market.

a) The security system will include a camera to provide surveillance of the rooms being monitored by the system. The security camera used by the system should be adequate enough to provide coverage of an average size room using only one security camera.
b) The system will include a method to backup the video recorded by each camera for later viewing. This backup should allow the captured video to be played on any standard computer.

c) The security system will be able to track intrusions into the house by being able to determine if a window, door, or garage door was opened while the security system was active.

d) The security system will be able to detect if an intruder has broken a window.

e) The security system shall include an infrared sensor with each camera to watch for intruders by detecting the movement of the heat source generated by an intruder's body heat.

f) The security system shall be to send a text message to the home owner in the case an intrusion has been detected. This will allow the home owner to decide to call the police or not incase the intrusion was expected.

g) The system shall be made more economical by using solar power to generate most of the power used by the system. An important issue in selecting the correct size solar cell with be balancing the cost versus the size of the panel. Larger panels are harder to install and more expensive than smaller panels but provide a better power efficiency rating. Ideally on a day with ideal weather conditions the solar power cells should be able to provide all the power the system should need.

h) A backup battery source will be used to supplement the solar power system. This is to guarantee operation of the system during times without sunlight. The battery will be able to provide enough charge and power to run the system. If the backup battery gets to low it will begin to recharge using an AC power source.

i) The system shall use a touch panel display to system status and settings as well as allow the home owner to enter the code required to turn the system on or off. The touch screen setting options should allow the user to switch which phone number the system contacts, as well as other features important to the operation of the system.

j) The security system shall be easy to install using simple step by step directions.

k) The security system will be low cost in order to be more economically friendly.

2. Specification and Requirements

The operation and characteristics of the security system being designed will fulfill the following system specification requirements:

a) The security camera used by the system shall be cable of providing a video covering a 90 degree angle of view allowing for one camera to be capable of covering an entire room. The camera should also be able to capture a video of objects at least 40 feet away.

b) The security system shall contain a hard drive capable of storing at least 10 hours of video from the security camera

c) The security system shall contain locking mechanisms that will trigger an alert 5 seconds after it detects a window or door being opened. This time delay is to allow the home owner to turn the security system off if they are coming home while still being short enough to help prevent intrusions.

d) The security system will use a vibration detector to trigger an alert within 1 second of an intruder breaking a window.

e) The system shall include an infrared detector with an area view of 90 degrees that can detect heat sources from 40 feet away.

f) The solar cells used by the system will provide minimally 2W of power during ideal weather conditions. Each solar cell will also have an efficiency of at least 17%.

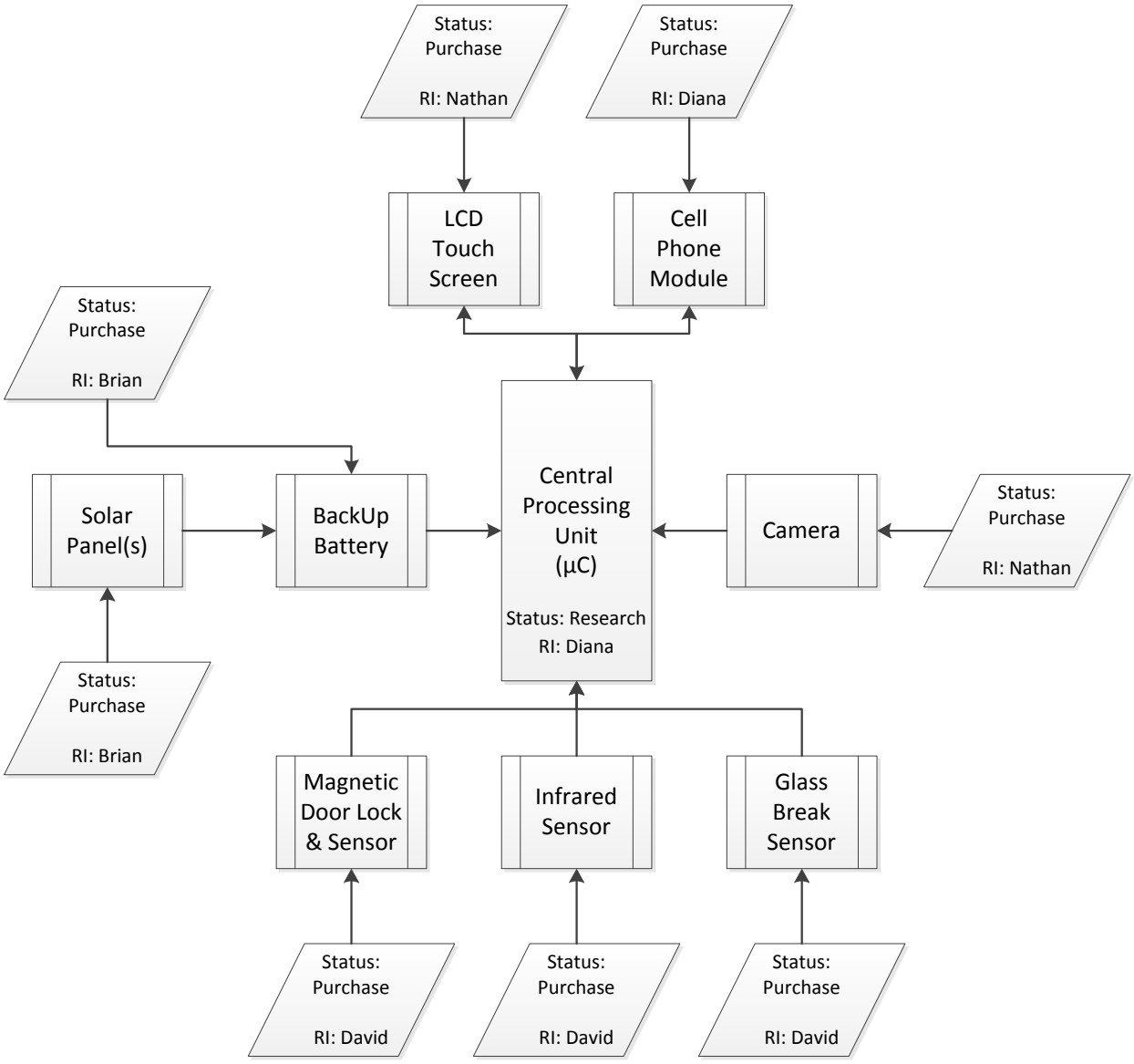
g) The system shall include a backup battery that is capable of providing enough power for 48 complete hours of system operation. When the system reaches 25% remaining of total

battery it will switch to AC power. The battery will used a DC converter to change the incoming 120V 60 Hz AC signal into the correct DC signal for the battery charger.

h) The touch screen panel used by the system shall use a screen at least 5” (diagonally) in size. The touch screen panel should be able to correctly interface with the rest of the system.

i) The entire complete system will cost $400 or less to produce.

3. Block Diagram



4. Budget and Financing

The project will be self financed with the costs split between all the group members.

Because the entire system is designed to cost $400 or less the total cost of all parts needed for

the system should not exceed this amount. In addition the budget shall assume an extra 100 dollars to be used to buy any additional parts required for testing the system or for replacing parts broken during testing of the system. The following is a more in-depth break down of some the expected financial costs associated with this project:

a) Solar Panels: Approximately $100
b) Security Camera: Approximately $50
c) Touch Screen Display: Approximately $75
d) Security Camera Video Hard Drive: Approximately $40

5. Project Milestone

The following is a very tentative schedule for the milestones related to this senior design project. Note that these time estimates are a conservative guess at this point and are likely to change as the project develops.

Research – 5 Weeks

Initial Documentation – 1 Week

Procurement of Parts – 2 Weeks

Construction – 4 Weeks

Testing – 3 Weeks

Final Documentation – 1 Week