MAIL NOTIFICATION SYSTEM

ECE 445 SENIOR DESIGN PROJECT
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TEAM #9

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AGENDA

• OBJECTIVE
• FEATURES
• IDEA SKETCH
• BLOCK DIAGRAM
• SYSTEM OVERVIEW
• OLD DESIGN vs. NEW DESIGN
• SCHEMATICS
• REQUIREMENTS & VERIFICATIONS
• SUCCESSES
• CHALLENGES
• RECOMMENDATIONS
• QUESTIONS
OBJECTIVE

• To make our lives more convenient by providing an efficient mail notification system

• To reduce time and energy wasted by checking an empty mailbox

• To pick up expected items as soon as they arrive
FEATURES

• Instant notification on home display and email

• Easy Installation

• Durable

• Lightweight and portable
IDEA SKETCH

or

you got mail!
SYSTEM OVERVIEW

[Mailbox Unit]

[User's Email]

[Receiving Unit]

Power

Sensors

LCD

Wi-Fi Shield

Microcontroller

Communication

Microcontroller

Communication
# OLD DESIGN vs. NEW DESIGN

<table>
<thead>
<tr>
<th></th>
<th>Old Design</th>
<th>New Design</th>
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<tbody>
<tr>
<td>Sensor</td>
<td>Reflect</td>
<td>Block</td>
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<tr>
<td>Case</td>
<td>Flat</td>
<td>V-Shape</td>
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<tr>
<td>Power</td>
<td>Mechanical Switch</td>
<td>Mechanical Switch+ 555 Timer</td>
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<tr>
<td>Communication</td>
<td>nRF24E1</td>
<td>XBEE</td>
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<tr>
<td>Email</td>
<td>LABVIEW</td>
<td>Web Server</td>
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SCHEMATICS

*Legend
IR Receiver (VS1838b) has 3 pins VCC, GND, OUT. Due to symbol issue, all the IR receivers are assumed to be connected to GND.
REQUIREMENTS & VERIFICATIONS

• Continuity Test (Power, Sensors, Buttons)

• Analog to Digital Conversion

• XBEE Synchronization (Mailbox & Receiving unit)

• Proper message display on LCD unit

• Email Notification
SUCCESES

• Mail detection using IR sensors
SUCCESES

- Sensor modulation (38kHz)
SUCCESES

• 555 Timer

![Astable](image1)

![Monostable](image2)
SUCCESES

• Analog to digital conversion

```c
int anaToDigital (int ana) {
    int dig;
    int volt = analogRead(ana);
    if(volt <= 30) {
        dig = 0;
    } else {
        dig = 1;
    }
    return dig;
}
```
SUCCESES

- XBEE
  - 17 Bytes transmitted
  - Essential Data: 16\textsuperscript{th} Byte
  - Coding to extract the essential
SUCCESES

- Display (message & time)

You got mail !!!
23/04/2013 13:45
SUCCESES

• Wireless communication
SUCCESES

• Email (message & time)

Mail notification

dickson.salim2@gmail.com (dickson.salim2@gmail.com)  Add to contacts
To: dickson.salim@hotmail.com

You have mail left at your porch at 27/07/2013 13:13:01
CHALLENGES

- Detection mechanism (reflect? block?)
- Insignificant voltage drop
- Unstable LCD
- Network accessibility (School network)
- Multiple mail detection
RECOMMENDATIONS

• Sensitivity of IR sensors
  – Sensor emitting angle
  – MOSFET
• Synchronize functionality of reset button
• Mobile application
RECOMMENDATIONS

• Network security

• LCD button functions

• Low cost production
Thank You!

- Ryan Corey 😊
- Professor Carney 😊
- ECE Machine Shop (Glen Hedin!!)
- ECE Store
QUESTIONS?