Infrared Laser Security

by

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A SENIOR THESIS PROPOSAL

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The accompanying Senior Thesis Proposal, "Infrared Laser Security," is submitted in accordance with the requirements of CEEN 4980, Senior Thesis Proposal. As stated in the proposal, the project will be done for and funded by J. Matt Casson, Eric Gitt, and Les Kimmel.

Respectfully yours,

J. Matt Casson
Eric Gitt
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I. BACKGROUND

In our nation today, security has become a topic of major concern. With the threat of terrorism and the talk of war, being able to secure an area has become a high priority. With this possible threat coming at anytime and anywhere, it is impossible to supply the manpower needed to perform this kind of security. Using technology, we must be able to secure any needed space and while preventing access is always preferred, the knowledge of a breach has become a must.

II. THESIS OVERVIEW

This project will involve a laser security system that will initially be designed for use in an entry/exit but could easily be extended to fit other locations. The system will detect the passing of someone or something through the doorway. Statistics for activity will be recorded and transmitted over the Internet to a secure remote site for storage and manipulation.

III. GENERAL DESCRIPTION

Using infrared lasers and infrared sensors, we will monitor a doorway using a protective laser pattern, which can simulate the entrance to some space needing protection. Using a wireless transceiver, we will transmit the state of these sensors to a secure location, preventing the manipulation of the monitoring equipment at the site needing protection. Using an 8051 microcontroller to interpret the received sensor states, we will then use a USART to send the current security state to a computer, which will upload this state to a web page that can be monitored by any computer with Internet capabilities. The following flow diagram illustrates the process that will be used to accomplish the security system.

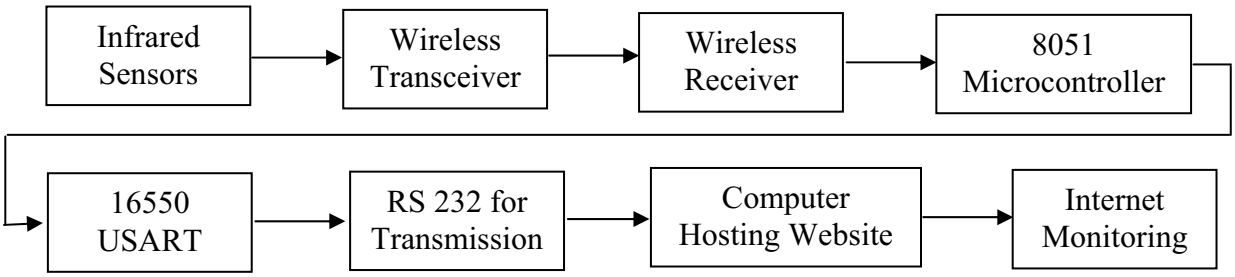

Figure 1 Flow Diagram

IV. COMPONENTS LIST

Component	Quantity	Estimated Cost
I/O Devices		
UART 16550	1	$6.00
Processor		
Microcontroller	1	$6.00
Major Components		
Tranceiver	1	$150.00
Laser Diode	1	$30.00
Photo Detector	1	$20.00
Misc. Circuits		
Alarm (Buzzer)	1	$5.00
PCB Boards	TBD	$5.00-15.00 per
DC Power Supply	1	$10.00
Wires	TBD	$0.05/ft
Misc. Resistors & Caps		$0.10 each

Figure 2 Components List

V. TIME SCHEDULE

The following diagram illustrates the time schedule we have laid out for the different phases of the project.

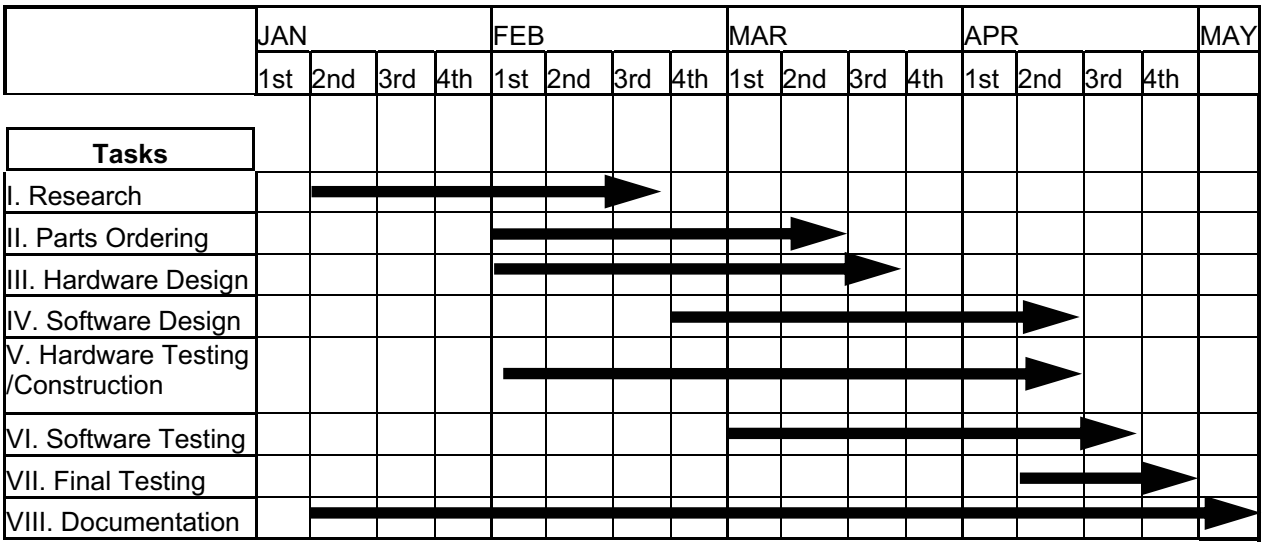

Figure 3 Time Schedule

VI. ACCEPTANCE TESTING

1. System will detect a break in infrared laser beam.
2. Upon infrared laser break, an alarm will sound.
3. Infrared laser break will be wirelessly transmitted to a microcontroller, which will simultaneously light an LED upon infrared laser break.
4. System status will be transmitted to the Internet.
5. Webpage will display the system status.

VII. TEAM MEMBERS (IF ANY)

J. Matt Casson
Eric Gitt
Les Kimmel

VIII. ASSIGNMNET OF EACH MEMBER (IN CASE OF A TEAM)

J. Matt Casson

- Programming the 8051 microcontroller and UART
- Internet interfacing with the microcontroller
- Laser Security Pattern Design
- Assembly and Testing
- Aid in and understand ALL phases of the project
- Complete at least one third of the written report and presentation

Eric Gitt

- Transceiver / Receiver operations
- Internet Visual Effects (HTML)
- Laser Security Pattern Design
- Assembly and Testing
- Aid in and understand ALL phases of the project
- Complete at least one third of the written report and presentation

Les Kimmel

- Infrared Laser and Sensor operations
- System alarm functionality
- Laser Security Pattern Design
- Internet interfacing with the microcontroller
- Assembly and Testing
- Aid in and understand ALL phases of the project
- Complete at least one third of the written report and presentation

IX. SUMMARY

The final product will model a practical laser based intrusion system. The model will use a laser pattern to effectively secure its protected area. Once the area has been breached, the alarm system will sound. The system will then wirelessly transmit the detection of a break to a microcontroller. This microcontroller will signal the intrusion by powering an LED. A workstation will be interfaced to the microcontroller, enabling Internet transmission of the system's status.