**ETEE 3255 Lab VII**

Project Burglar Alarm

**Minimum Requirements:**

This project will simulate a residential burglar alarm system. There will be several types of sensors, door sensors, window sensors, and IR Motion detectors. This system will have a control keypad and LCD Display or an RS232 serial communication terminal (The AVR controller will communicate to the user through a standard terminal program such as Hyper Terminal running on a laptop). The following sensors will be used:

Door / Window Sensors: Magnetic switches, Normally closed, will open when the door or window is opened.

IR Motion Sensors: Infrared motion detectors. Detect motion.

- or -

IR Beam Detector: Infrared beam that detects when an intruder “breaks” the link between transmitter and receiver

**Minimum sensors by type:**

Type Quantity

Door 2

Garage Doors 2

Windows 6

IR Motion / Beam 4

**User Interface:**

LCD & Keypad

4 x 20 character LCD display

Hexadecimal (16 buttons) Keypad

Use a menu driven system where the user will select menu choices using the keypad as well as enter numeric data such as date, time, zone numbers, etc.

RS 232 Serial Communication Terminal

Windows HyperTerminal (or similar terminal program)

Laptop (connected to AVR ATMEGA128 through serial port)

Use a menu driven system where the user will select menu choices using serial communication terminal on a laptop. User will enter numeric data such as date, time, zone numbers, etc. based on the menu prompts.

**Basic Operation:**

User will set up system by entering the current time and date and the 5 digit disarm code. For this project the sensors will be hard-coded into the application program to minimize the complexity of the setup menus. After setup the alarm will start monitoring the sensors and will display the status of the sensors on the display using the following format (or a similar format, check with instructor for approval):



The display will alternate between the sensor status screen and the main system status screen with a format similar to that shown below.



For the LCD / Keypad option there will be four pushbuttons on the keypad labeled “Set Up”, “Arm”, “Disarm”, and “Status”. They will have the following functionality:

Set Up

Take user to the set up menu to enter all of the required setup information.

Arm

Arms the system. Once all sensors are indicating “secure” (all doors and windows closed and no motion detectors tripped), the user will select the “Arm” button, then will have 45 seconds to exit and secure the house. The system will then be in “Alarm” mode and if any door, window or motion sensor is tripped and the correct disarm code is not entered within 45 seconds, it will sound an audible alarm signal (buzzer) and indicate a status of “DEFCON 5” (or some similar scary sounding military jargon) on the display.

Disarm

Disarms the system. After the user enters the home when the alarm system is armed, he will have 45 seconds to push this button and enter the correct 5 digit code to disarm the system.

Status

Returns the screen back to the Status Screen from any other menu.

For the Serial communication user interface, the basic format above will be used with the exception that the main menu screen will look similar to the example below:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* \*

\* System Status \*

\* \*

\* 10/20/09 12:30am \*

\* \*

\* Alarm Mode: Armed \*

\* System Status: Secure \*

\* \*

\* Main Menu: \*

\* 1) Set Up \*

\* 2) Arm \*

\* 3) Disarm \*

\* 4) Status \*

\* \*

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The system sensor screen for the serial communication user interface can look similar to the example below:

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* \*

\* Sensor Status \*

\* \*

\* 10/20/09 12:30am \*

\* Doors: 1 2 3 4 \*

\* A - - - \*

\* \*

\* Windows: 1 2 3 4 5 6 \*

\* - - A - A - \*

\* \*

\* Motion: 1 2 3 4 \*

\* - A - - \*

\* \*

\* (A):Alarm (-):Secure \*

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**Other Requirements:**

The pushbuttons on the system may need to be debounced if using the Keypad / LCD option. indicate in your proposal the basic method you will use to debounce the switches (can be hardware or software debouncing).

**Extra Credit:**

The Keypad / LCD option will be worth up to ten percent extra credit (10% of the total project points available) if utilized due to the added complexity of the integration and the extra embedded programming required.