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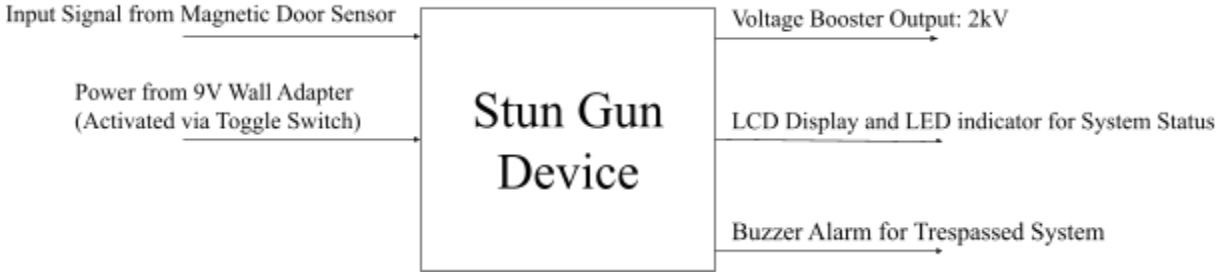
ECE 411 Group 8

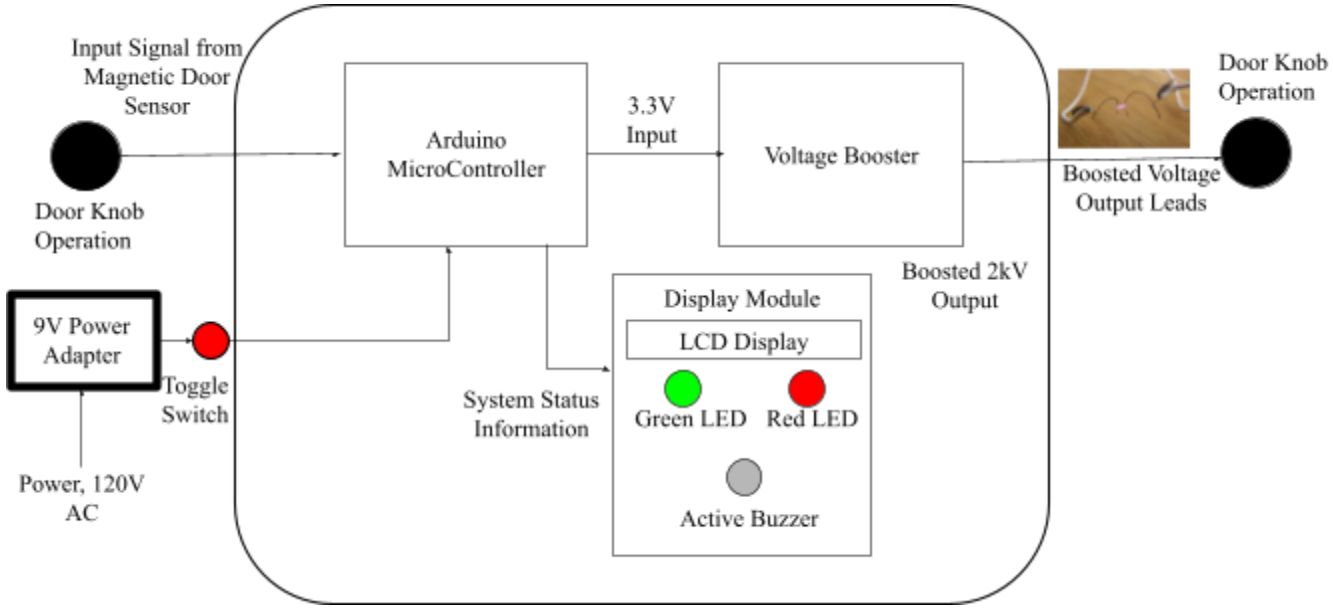
Stun Gun
Functional Decomposition

Top- Level (Level 0) Block Diagram

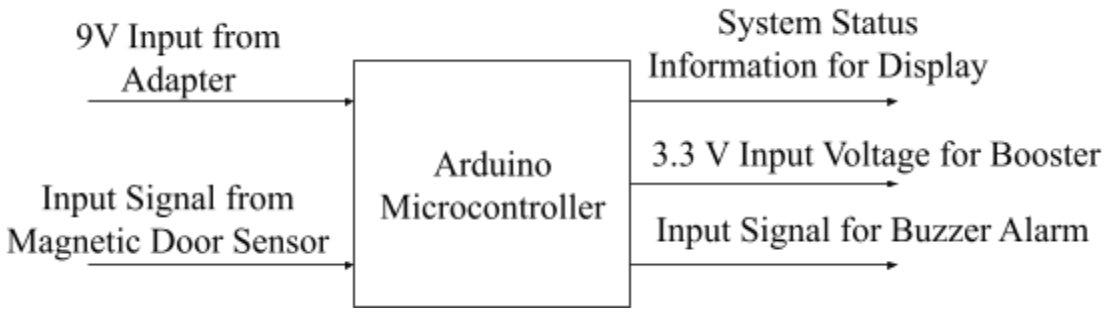


Module	Stun Gun Device
Inputs	• Input Signal from Magnetic Door Sensor • Power from 9V Wall Adapter • Toggle Switch to Activate overall System
Outputs	• Voltage Booster Output: 2kV (Output current: 0.5~1mA; external parallel capacitor can increase the output current) • LCD and LED displaying system status • Buzzer Alarm
Functionality	3.3 V input from Arduino after input signal received from magnetic door sensor as door knob is operated. Voltage boosted through the module up to ~ 2kV to create arc and shock through the hand on door knob. LCD display showing system status as armed or disarmed or trespassed. Green or red LEDs showing system status. Buzzer alarm when trespass detected.

Stun Gun Device Level 1 Block Diagram

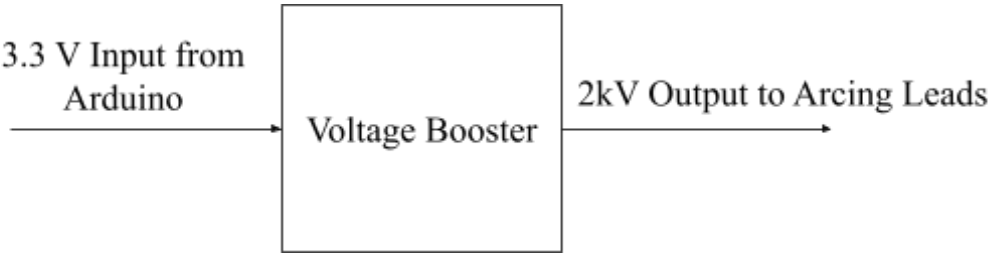


Arduino Microcontroller Level 1 Block Diagram



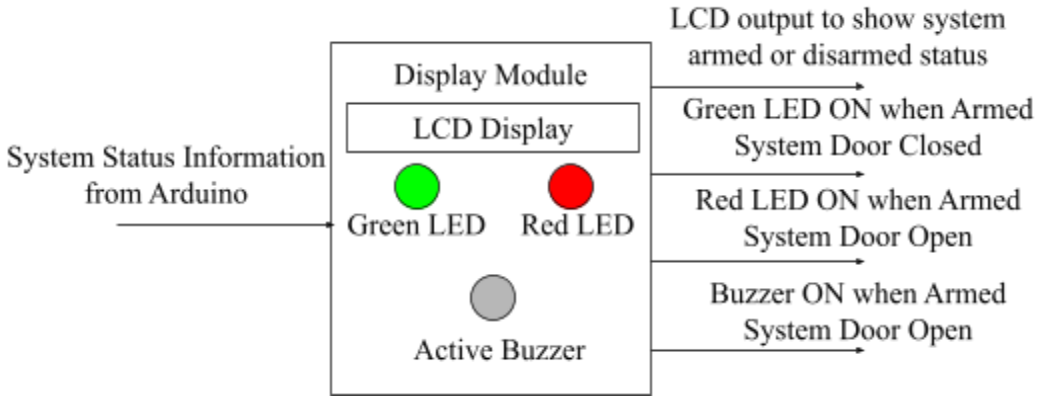
Module	Arduino Microcontroller
Inputs	• 9V Input from Adapter • Input from Magnetic Door Sensor
Outputs	• 3.3V Input for Voltage Booster • System status information for Display Module • Input Signal for Buzzer Alarm
Functionality	Arduino Powers on via 9V input from Adapter. Door knob operation sends input signal from Magnetic Door Sensor. Sensor HIGH input sends 3.3 V to input of the Voltage Booster Module. Sensor HIGH input triggers Red LED, changes LCD display to show trespassed system, and activates Buzzer.

Voltage Booster Level 1 Block Diagram



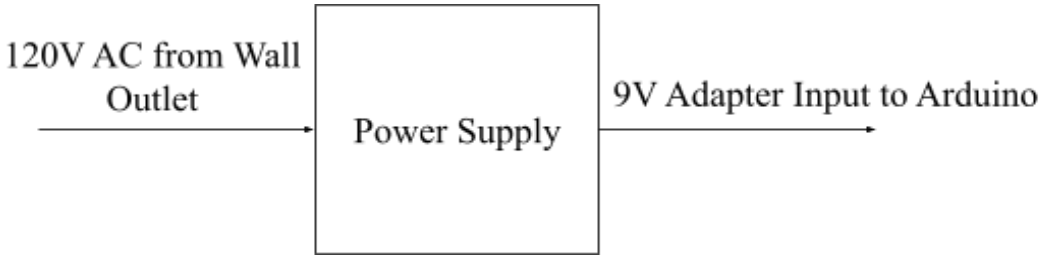
Module	Voltage Booster
Inputs	• 3.3V Input from Arduino
Outputs	• 2000V Output through Arcing Leads connected to door knob.
Functionality	Voltage booster module has active and passive components along with a transformer that boosts the input voltage from 3V-4.2V to 1500V-2000V. The output creates arcing between the two leads and touching the leads sends shock to the user's hand.

Display Module Level 1 Block Diagram



Module	Display Module
Inputs	• Input from Arduino
Outputs	• System status displays on LCD • LEDs indicates door close/open • Signal for Buzzer Alarm
Functionality	System status input from the Arduino activates Red LED when sensor input HIGH, which also modifies the LCD display to show the trespassed system and turns on Buzzer.

Power Supply Level 1 Block Diagram



Module	Power Supply
Inputs	• 120V AC from wall outlet
Outputs	• 9V Adapter Input to Arduino
Functionality	Wall outlet to 9V adapter for arduino. Toggle switch in between to help create Armed or Disarmed states for the system. No power to the system is disarmed. Once the toggle switch is flipped, system is armed and ready for input signal from Magnetic Door Sensor.