LASER SECURITY ALARM CONTROLLED BY MESSAGING APPLICATION

A Project done by Ramanan B R

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Abstract

The Laser Security Alarm System is an advanced security solution designed to detect unauthorised intrusions in a protected area. Utilising laser technology, this system creates a network of invisible beams that, when interrupted, trigger an alarm, alerting security personnel or property owners. The system employs laser emitters and receivers strategically positioned to form a protective grid, ensuring comprehensive coverage.

The Laser Security Alarm System represents a robust and versatile solution for safeguarding a wide range of environments, including residential properties, industrial facilities, and critical infrastructure. Its seamless integration, configurability, and rapid response capabilities make it a reliable choice for enhancing overall security measures.

Introduction

In an era where security concerns are paramount, advanced technologies play a crucial role in safeguarding properties and assets. The Laser Security Alarm System represents a cutting-edge solution designed to provide reliable intrusion detection and alert mechanisms. By leveraging the principles of laser technology, this security system establishes an invisible protective grid that, when breached, triggers immediate alarms, fortifying the defence against unauthorised access.

The Laser Security Alarm System stands at the forefront of modern security solutions, providing an effective and adaptable means of fortifying perimeters against unauthorised access. Its integration of laser technology, configurability, and real-time monitoring capabilities make it a formidable asset in the defence against intrusions.

In contemporary security strategies, the Laser Security Alarm System emerges as an advanced and discreet solution, capitalising on the principles of laser technology to fortify perimeters and safeguard against unauthorised access. This system establishes an imperceptible protective grid, leveraging infrared laser emitters and receivers to create an effective and invisible defence mechanism.

The Laser Security Alarm System, with its innovative use of laser technology, configurability, and real-time monitoring capabilities, stands as a powerful asset in the modern security landscape, ensuring robust protection against intrusions.

Working Principle

1. Emitter and LDR Setup: The laser light source emits a continuous beam towards the Light Dependent Resistor (LDR). The LDR is positioned to receive the laser beam.

2. LDR Sensing: In normal conditions, the LDR has low resistance because it receives the laser light.

3. Transistor Control: The BC-547 transistor is used to amplify the small current passing through the LDR when it's exposed to the laser beam. This amplification is used to trigger the alarm components.

4. Alarm Activation: When an intruder obstructs the laser beam, the LDR's resistance increases rapidly, causing a significant change in current flow through the transistor.

5. Buzzer Activation: This change in current activates the buzzer . and the buzzer produces an audible alarm, alerting that the laser beam has been disrupted.

6. Security Alert: This setup acts as a security alert system, providing both visual(If LED is used) and audible indications when someone crosses the laser beam path.

7. Power Source: The entire system is powered by a 3.7V battery, making it portable and independent of external power sources.

Circuit Diagram

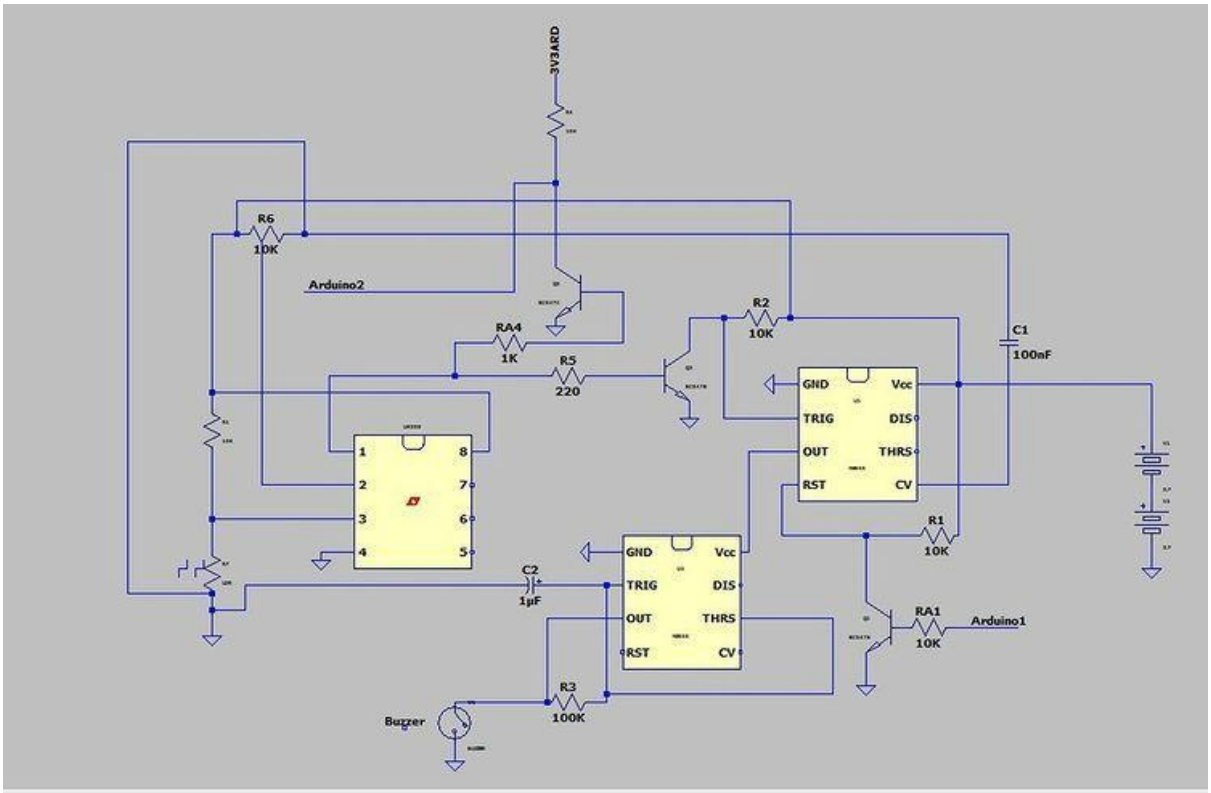


Figure 1 - PCB circuit

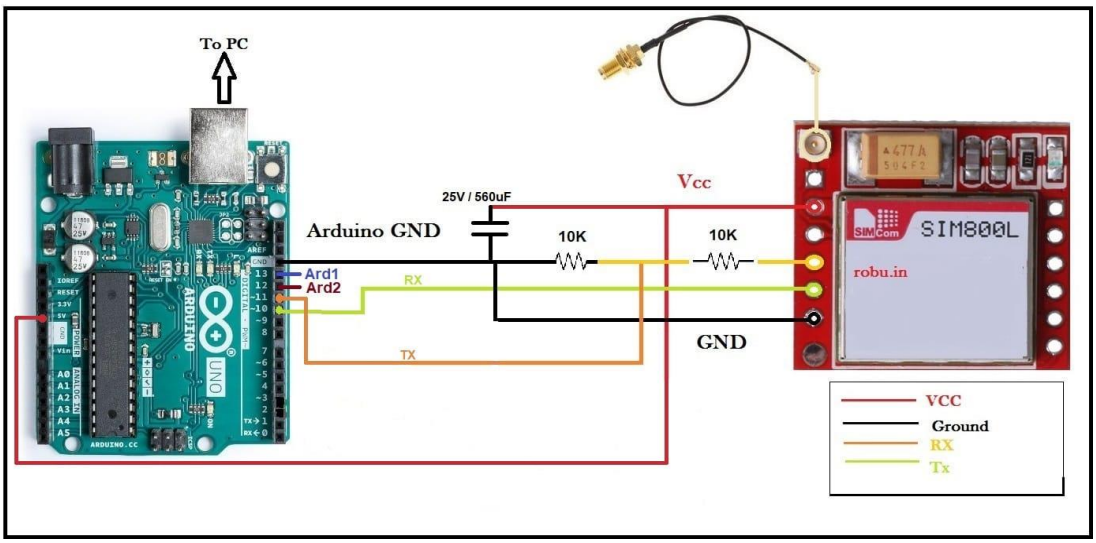


Figure 2 - Arduino Circuit

Block Diagram :

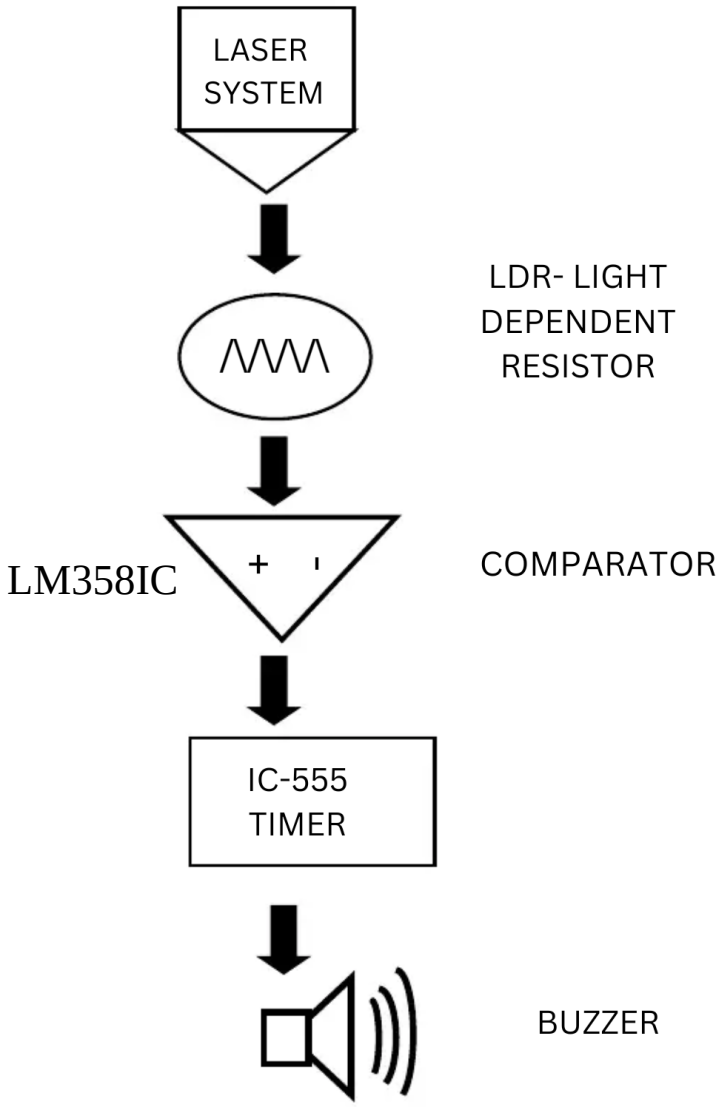


Figure 3 - Block Diagram

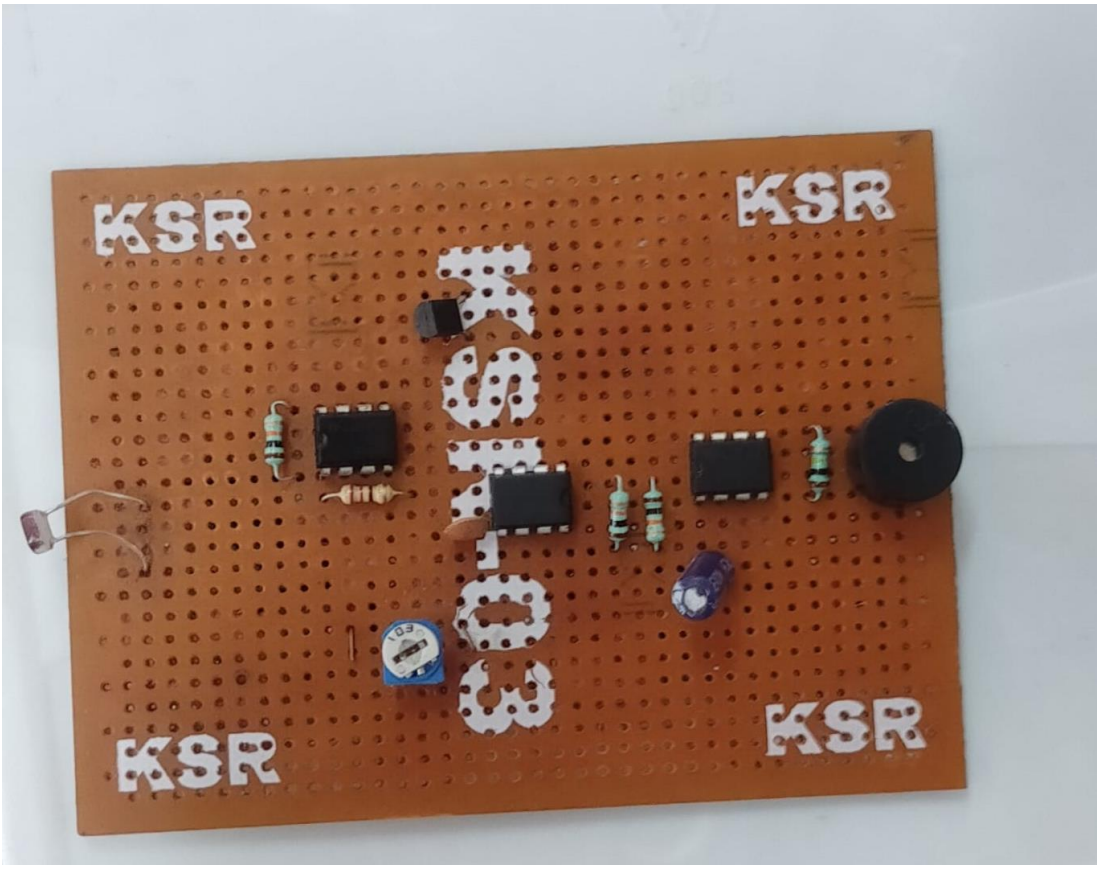
COMPONENTS AND ITS DESCRIPTION:

SL.NO.	NAME OF THE COMPONENT	SPECIFICATIO S	QUANTITY
1	Op – Amp IC	LM358	1
2	Timer IC	IC 555	1
3	LDR	--	1
4	Resistors	10 KΩ	3
		220Ω	1
5	Small Buzzer	--	1
6	Potentiometer	10 KΩ	1
7	NPN Transistor	BC547	1
8	Capacitor	100 nF	1
9	Push Button	--	1
10	Laser Pointer	--	1
11	9V Battery	--	1
12	Connecting Wires	--	--
13	Breadboard	--	1

Experimental Setup:

The main laser setup is done in zero PCB. It can work independently as laser alarm. It uses two 3.7V Li-Ion batteries, a LDR, a BC547 NPN transistor, two NE555 timer IC, a buzzer, a potentiometer, few resistors of various resistance, few capacitors with various capacitance and a reset switch. The LDR acts as the main sensor here to activate the buzzer, with its ability to change its resistance with the amount of light falling on it. The potentiometer is used to adjust the sensitivity. The lm358 is used as a comparator whereas the ne555 are used for alternative on off sound of buzzer. The BC547 npn transistor acts as a switch.

Once the laser is blocked from the LDR, the buzzer turns on, until the reset button is pressed.

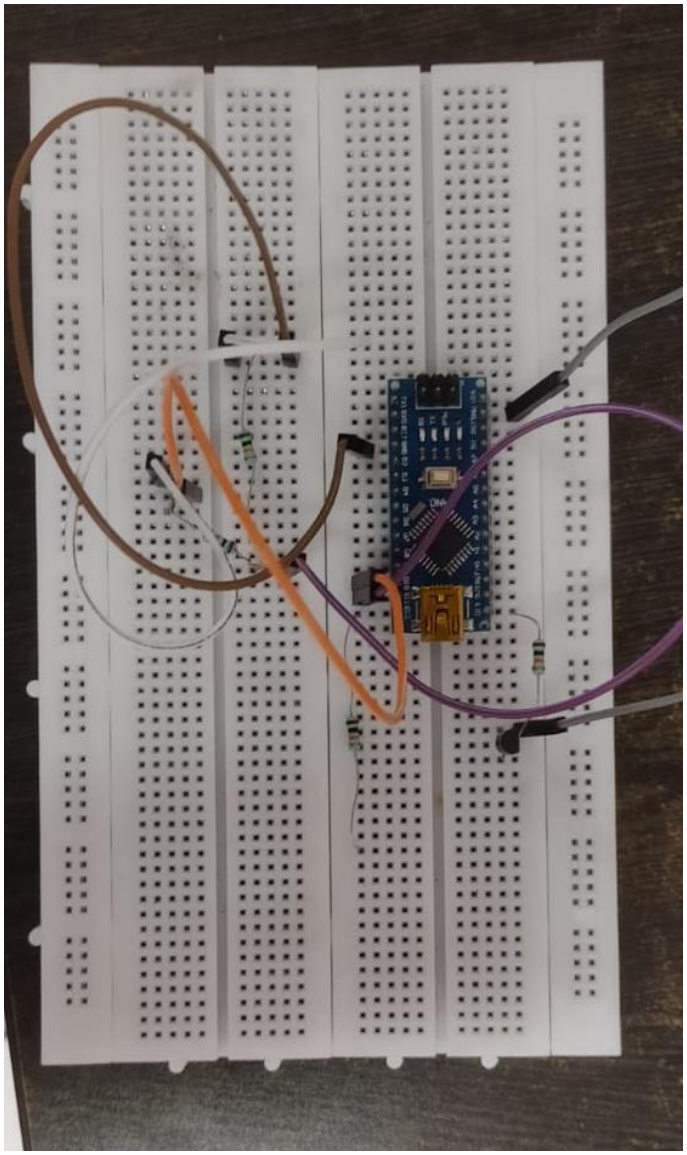


For the messaging application

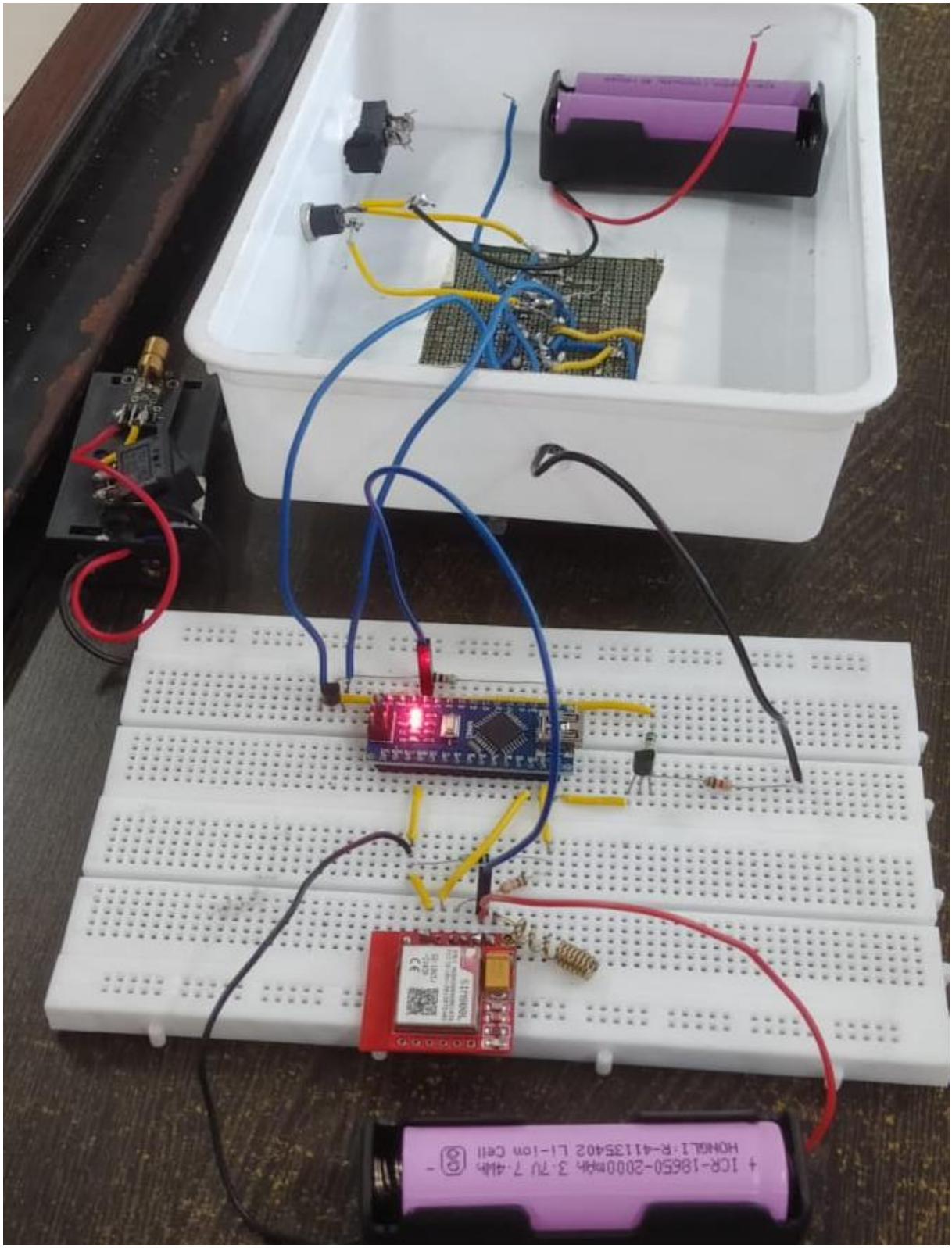
The Arduino along with the GSM module is Used to Send and receive messages to communicate with our Alarm. An Alarm app is completely build from scratch for this purpose,

The Arduino is connected to the main alarm with a breadboard and some jumper wires.

The app is built with a fingerprint system which allows authorised person to cross across the laser.



The complete circuit



Program Code:

This is the code used for Arduino:

```
#include <SoftwareSerial.h>
#define Ard1 13
#define Ard2 12
SoftwareSerial sim(10, 11);//RX & TX pinout between parenthesis. If it doesn't work change the pins to: RX #10 & TX #11
int _timeout, state=0;
char order;
short OK=-1;
String _buffer;
String number = "--------------"; // change with your number
String activation_password = "---";//change with your activation password
String deactivation_password = "---";//change with your deactivation password
void setup() {
  delay(7000); //delay for 7 seconds to make sure the modules get the signal
  Serial.begin(9600);
  pinMode(Ard1, OUTPUT);
pinMode(Ard2, INPUT);
digitalWrite(Ard1,1);
  _buffer.reserve(50);
  Serial.println("System Started...");
  sim.begin(9600);
  delay(1000);
  Serial.println("Ready");//Wait for this message to start testing
```

```
SendMessage("Hey! it's the alarm. Type On to activate");
  RecieveMessage();
}
void loop() {
  String RSMS;
  switch(state){
    case 0:
while(sim.available()> 0){
  order=sim.read();
  RSMS.concat(order);
OK=RSMS.indexOf("On");
}
  if(OK != -1){
    SendMessage("Type the activation password below:");
    state=1;
     OK=-1;
 RecieveMessage();
  }
  Break;
```