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A Prototype for Cell Phone Signal Isolator for GSM Network with Preschedule Time Duration Using Arduino

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Abstract— *The prototype developed here is mainly intended to prevent the usage of mobile phones in place inside the range, thus providing an effective and reliable device for blocking mobile communication in required restricted surroundings. The module was tested against GSM network and was proven success with average range of 10-15 meters, which is sufficient to block all cell phones in as classroom. GSM mobile jammer is controlled through microcontroller (Arduino Uno)*

Keywords— *GSM Jammer, ATmega328, Arduino Uno, Pulse Jamming, Prescheduled Jamming.*

I. INTRODUCTION

A jammer is any device that deliberately blocks, jam or interferes with authorized wireless communications [1]. In many countries, jammers are illegal and their use can result in large fines. A mobile phone jammer is an instrument used to prevent cellular phones from receiving signal from based station. The jammer can be used practically at any location where the use of mobile phone is restricted. The two main techniques are noise techniques and repeater techniques. The three types of noise jamming are spot, sweep, and barrage [2]. In this work pulse jamming technique is used. The jammer is a classic single transistor oscillator operating in the VHF region. Powerful VHF oscillations from the circuit will interfere with the FM signals to nullify it. Jammers can broadcast on any frequency this jammer can jam GSM and CDMA frequency. However the work was restricted for GSM network only. This prototype could be very useful at locations such as schools , exam centers ,temples, hospitals etc.

II. MOTIVATION

Evolution of cell phone was for human connectivity with the world from anywhere. But after a period of time it seems that their use raised problems, such as their potential use to invade privacy or contribute to academic cheating. Use of cell phone in silent places such as temple, church, conference meeting, classroom, exam hall, hospitals, etc in unwilling. This may lead to disturb people from their work, sometimes it may arise serious problems. As it was demand of situation and became essential to establish a cell phone free environment at some important places, many devices such a Faraday cages [3], radio jammer come forward for this job. But use of such complex and insufficient devices was tedious and inconvenient while treating with today cell phones. Along with jamming device it may also be desired to control jamming with fixed timings. Thus a controlling unit to control switching of jammer is also important as user point of view. This motivated us investigating for such system establishment for a prescheduled cell phone jammer using microcontroller.

III.HARDWARE DESCRIPTION

The block diagram description of the prototype is depicted in figure.01. The components of the prototype are: Arduino Uno a microcontroller board based on the ATmega328, RTC (Real Time Clock- DS1307) used to interface with microcontroller for proper scheduling, Control switches are used for setting time durations, LCD Display (16*2 character), relay, ULN2003 a monolithic high voltage and high current Darlington transistor arrays and antenna. Figure.02 shows the circuit diagram of prescheduled mobile jammer. For setting the mobile jammer time that is set time and date to be displayed on LCD (16x2), we used RTC DS 1307 IC. Three control switches are used to increment, decrement and set the curser on LCD display. A portable mobile jammer is used in this work in which antenna connectors of output power and working instruction LED on top point connects with antenna which are identified by GSM as the indication, accordingly turning on power point indicator light . A power switch press button turns on the jammer and the indicator moves to power point indicator. Jammer has three SMA connectors we use one for GSM. It uses external Omni directional antenna.

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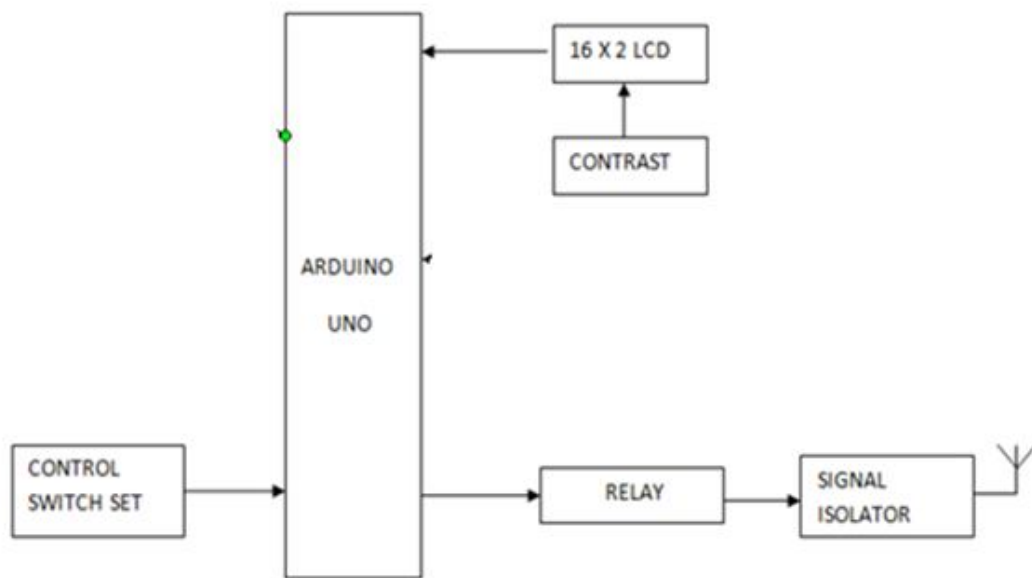


Figure.01 Block Diagram of the Prototype Developed

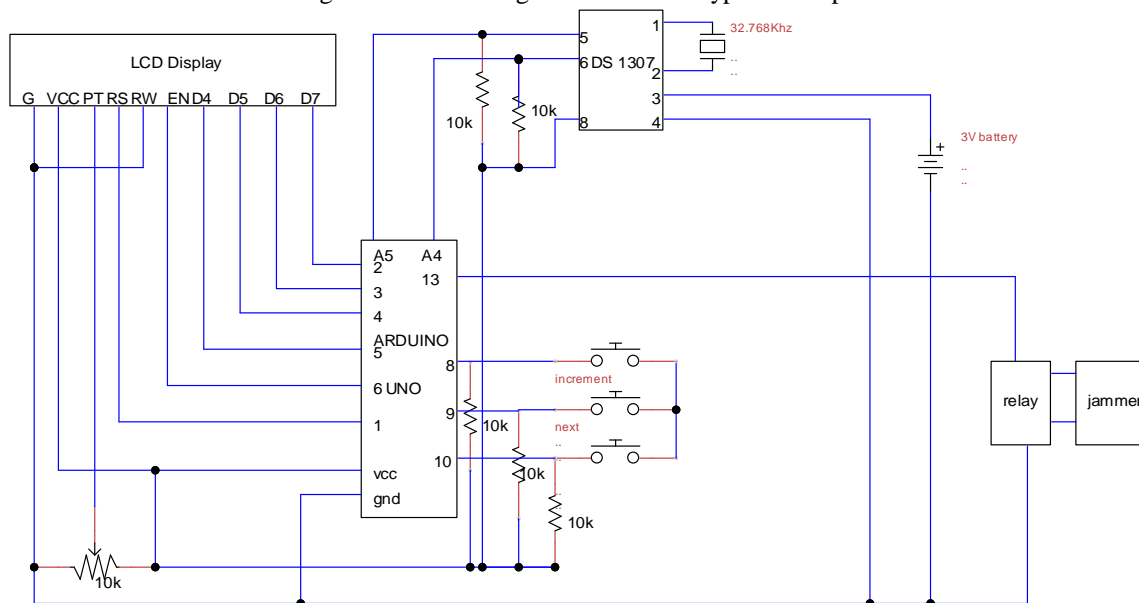


Figure.02 Circuit Diagram of Prescheduled Cellphone Jammer

IV. SOFTWARE DESCRIPTION

The Arduino Uno software has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega8U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The 8U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, an *.inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer. A Software serial library allows for serial communication on any of the Uno's digital pins. The Arduino software includes a Wire library to simplify use of the I2C bus. In this work we are using the arduino version IDE 1.0.6. The library used by us are `#include<wire.h>`, `<EEPROM.h>`, `<RTCLib.h>`, `<Liquid Crystal.h>`.

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The flowchart of the process is summarized in figure.03

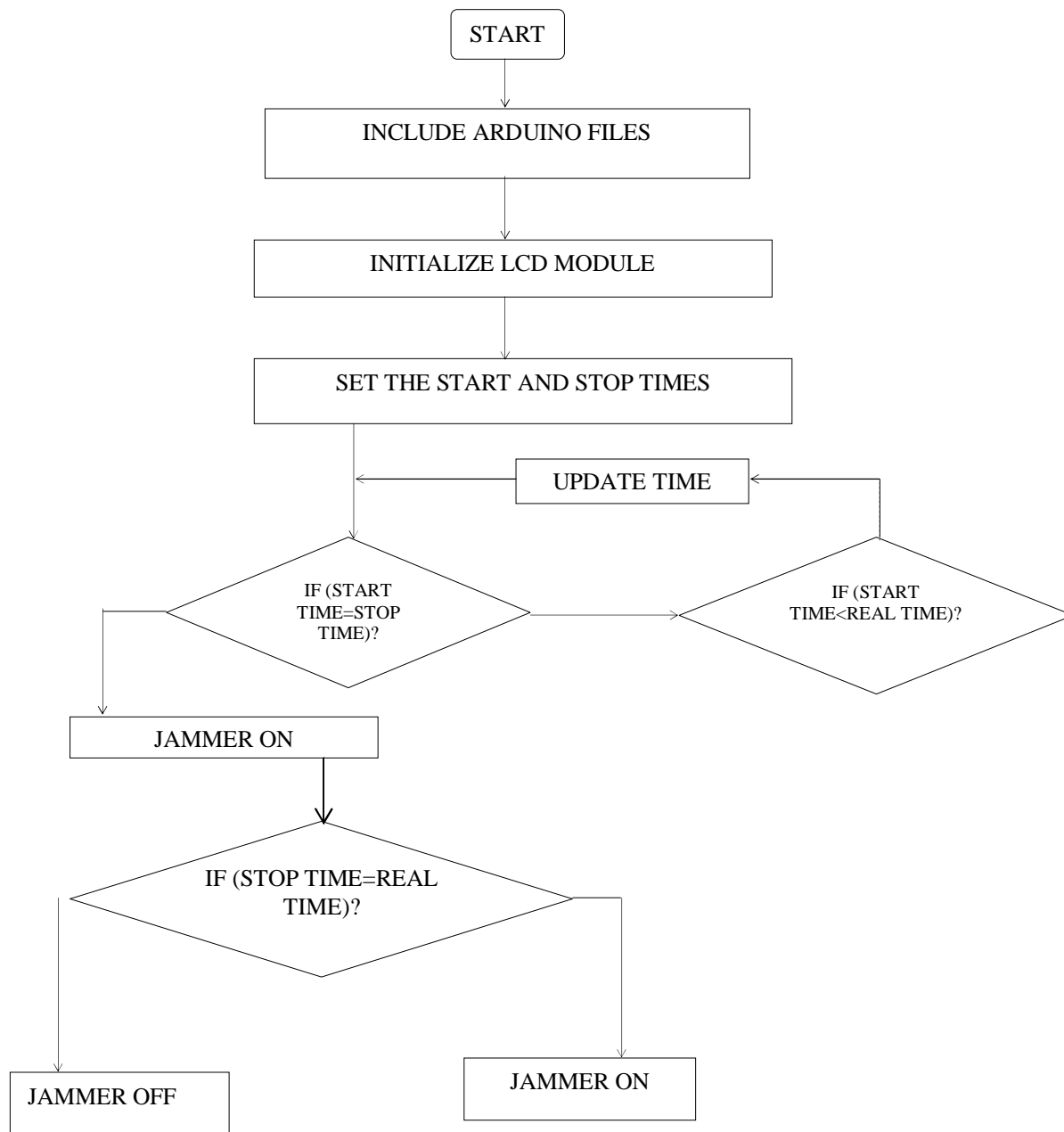


Figure 03. Process Flowchart of prototype

A. Algorithm

Following are the steps followed for this prototype:

Define all the files of the arduino include

Initialized the LCD module pins

Set the switches are used to time INC, DEC

Set the matter of the LCD is print

Set the delay (2000-in this case)

Set the time, date etc. display on the LCD print

Set the time to jammer ON or OFF

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Set the 1st jammer ON time
Set delay (2000-in this case)
Set the jammer OFF time
Display the time, date or jammer ON or OFF on the LCD

B. Arduino Sketch

Following is the sketch used for this prototype where some of the comments are also included for ready reference:

```
#include <Wire.h>
#include<EEPROM.h>
#include <RTClib.h>
#include <LiquidCrystal.h>

LiquidCrystal lcd(7, 6, 5, 4, 3, 2);
RTC_DS1307 RTC;
int temp,inc,hours1,minut,add=11;
int next=10;
int INC=9;
int set_mad=8;

#define buzzer 13

int HOUR,MINUT,SECOND;

void setup()
{
  Wire.begin();
  RTC.begin();
  lcd.begin(16,2);
  pinMode(INC, INPUT);
  pinMode(next, INPUT);
  pinMode(set_mad, INPUT);
  pinMode(buzzer, OUTPUT);

  lcd.setCursor(0,0);
  lcd.print("Medicin reminder");
  lcd.setCursor(0,1);
  lcd.print(" Using Arduino ");
  delay(2000);
  lcd.setCursor(0,0);
  lcd.print("By vaibhav ");
  lcd.setCursor(0,1);
  lcd.print("adinath infotech");
  delay(2000);

  if(!RTC.isrunning())
  {
    RTC.adjust(DateTime(__DATE__,__TIME__));
  }
}

void loop()
{
  int temp=0,val=1,temp4;
  DateTime now = RTC.now();
  if(digitalRead(set_mad) == 0) //set medicine time
  {
    lcd.setCursor(0,0);
    lcd.print(" Set Medicine ");
    lcd.setCursor(0,1);
    lcd.print(" Reminder time ");
    delay(2000);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Enter Time 1");
    default();
    time(1);
    delay(1000);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Enter Time 2");
    default();
    delay(1000);
    time(2);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Enter Time 3");
    default();
    time(3);
    lcd.setCursor(0,0);
    lcd.print("Medicin reminder");
    lcd.setCursor(0,1);
    lcd.print(" time has set ");
    delay(2000);
  }
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Time:");
  lcd.setCursor(6,0);
  lcd.print(HOUR=now.hour(),DEC);
  lcd.print(":");
  lcd.print(MINUT=now.minute(),DEC);
```

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```
lcd.print(":");
lcd.print(SECOND=now.second(),DEC);
lcd.setCursor(0,1);
lcd.print("Date: ");
lcd.print(now.day(),DEC);
lcd.print("/");
lcd.print(now.month(),DEC);
lcd.print("/");
lcd.print(now.year(),DEC);
match();
delay(200);
}

void default()
{
  lcd.setCursor(0,1);
  lcd.print(HOUR);
  lcd.print(":");
  lcd.print(MINUT);
  lcd.print(":");
  lcd.print(SECOND);
}

/*Function to set alarm time and feed time into Internal
eprom*/

void time(int x)
{
  int temp=1,minuts=0,hours=0,seconds=0;
  while(temp==1)
  {
    if(digitalRead(INC)==0)
    {
      HOUR++;
      if(HOUR==24)
      {
        HOUR=0;
      }
      while(digitalRead(INC)==0);
    }
  }
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Enter Time ");
  lcd.print(x);
  lcd.setCursor(0,1);
  lcd.print(HOUR);
  lcd.print(":");
  lcd.print(MINUT);
  lcd.print(":");

  lcd.print(SECOND);
  delay(100);
  if(digitalRead(next)==0)
  {
    hours1=HOUR;
    EEPROM.write(add++,hours1);
    temp=2;
    while(digitalRead(next)==0);
  }
}

while(temp==2)
{
  if(digitalRead(INC)==0)
  {
    MINUT++;
    if(MINUT==60)
    {MINUT=0;}
    while(digitalRead(INC)==0);
  }
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("Enter Time ");
  lcd.print(x);
  lcd.setCursor(0,1);
  lcd.print(HOUR);
  lcd.print(":");
  lcd.print(MINUT);
  lcd.print(":");
  lcd.print(SECOND);
  delay(100);
  if(digitalRead(next)==0)
  {
    minut=MINUT;
    EEPROM.write(add++,minut);
    temp=0;
    while(digitalRead(next)==0);
  }
}

delay(1000);
}

/* Function to chack medication time */

void match()
{
  int tem[17];
  for(int i=11;i<17;i++)
  {
```


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```
tem[i]=EEPROM.read(i);  
}  
if(HOUR == tem[11] && MINUT == tem[12])  
{  
  beep();  
  beep();  
  beep();  
  beep();  
  lcd.setCursor(0,0);  
  lcd.print(" Take Group One ");  
  lcd.setCursor(0,1);  
  lcd.print(" Medicine ");  
  beep();  
  beep();  
  beep();  
  beep();  
}  
  
if(HOUR == tem[13] && MINUT == tem[14])  
{  
  beep();  
  beep();  
  beep();  
  beep();  
  lcd.setCursor(0,0);  
  lcd.print(" Take Group Two ");  
  lcd.setCursor(0,1);  
  lcd.print(" Medicine ");  
  beep();  
  beep();  
}  
  
beep();  
beep();  
beep();  
beep();  
if(HOUR == tem[15] && MINUT == tem[16] )  
{  
  beep();  
  beep();  
  beep();  
  beep();  
  lcd.setCursor(0,0);  
  lcd.print("Take Group Three ");  
  lcd.setCursor(0,1);  
  lcd.print(" Medicine ");  
  beep();  
  beep();  
  beep();  
  beep();  
}  
  
/* function to buzzer indication */  
  
void beep()  
{  
  digitalWrite(buzzer,HIGH);  
  delay(500);  
  digitalWrite(buzzer, LOW);  
  delay(500);  
}
```

V. RESULT & DISCUSSION

The jamming system developed in here is capable of jamming GSM networks. It can further be extended for CDMA, 3G and 4G. Currently we are controlling timings of mobile jammer [11] controlling unit manually, but entire mobile jammer (Model: AI-0115 used in this case) controlling unit may be controlled by Short Message Service (SMS). The range of jammer is 10 to 15 meter. For radius of few km there are more dedicated units such as TRJ-89 jammer which can block cellular communication for a 5 mile (8 km) radius. For a low range application we can use pocket models having radius up to a dozen feet. In future mobile jammer portability can be enhancing to make device more portable. Figure.04 depicts snapshot of the prototype developed in working condition. All the GSM networks were jammed when the device was turned ON.

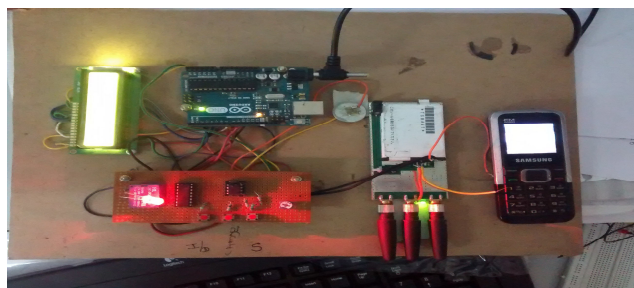


Figure.04.Snapshot of Prototype

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VI. CONCLUSIONS

While testing a jammer we observed that jamming range depends on surroundings and signal strength in that surrounding. In low network areas, the jamming range increases to 20 meters also. In general, the jamming attack was protected by network signal power, and having jammer with high power there is guarantee of jamming quickly.

From above all observation, it can be concluded that the cell phone jammer worked efficiently in most of the areas where there is need to jam the signal for maintaining silence and peace for the people. Also there is need of more powerful jamming devices for large space. However our jammer is effective in short space requirements. This work is intended to provide an open base for developing the prototype in the form of hardware, software, range of antenna etc.

VII. ACKNOWLEDGMENT

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