

DESIGN OF MECH-CONTROLLER FOR ELECTROMECHANICAL DEVICES

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Abstract: This paper brings out the design of a device which aids the disabled to access control over electrical and mechanical appliances using a SIM 800 module, Arduino UNO and an interface with relay with minimum physical work. This device can toggle ON or OFF any electrical device from anywhere provided there is ample network just by a simple call. This reduces human work and has a wide range of applications in every field. There is not much complexity in this device since this uses arduino embedded programming and basic wiring which does not need much skill. This cost-effective device reduces financial burden and can be used by any common man rich or poor.

This device can be used for central locking, car locator, garage shutters, air conditioner and security gates. By upgrading the arduino used in this device cars can become much smarter and efficient.

IndexTerms – Mech Controller, SIM 800 module, Arduino UNO, smart cars.

I. INTRODUCTION

Mech-controller is a device which toggles the switch using GSM module 800. When the GSM module 800 receives incoming call, the signal is transmitted to the Arduino which decodes and toggles the device based on its position. The components used are:

Sim 800A, Arduino, Relay, Basic wirings

A. Arduino

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It is made up of 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; it should be connected to a computer with a USB cable or with a AC-to-DC adapter or battery. The chip can be replaced and start over again. "Uno" means one in Italian and this was used for the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards. [3]

B. GSM MODULE/SIM 800A

GSM Module is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to communicate with the network. They have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

1. Send / Receive or delete SMS messages in a SIM.
2. Search, read, add, phonebook entries of the SIM.
3. Make, Receive, or reject a voice call.

II. METHODOLOGY

A. WORKING

The GSM module with the Arduino interface is connected to the appliance to be controlled. A working SIM card of any network is inserted into the SIM slot of the SIM 800 module.

To turn on the appliance, the number is given a phone call using any other SIM with a reply message showing ON status of the machine, and same is repeated to turn off the machine with the OFF status in the reply message.

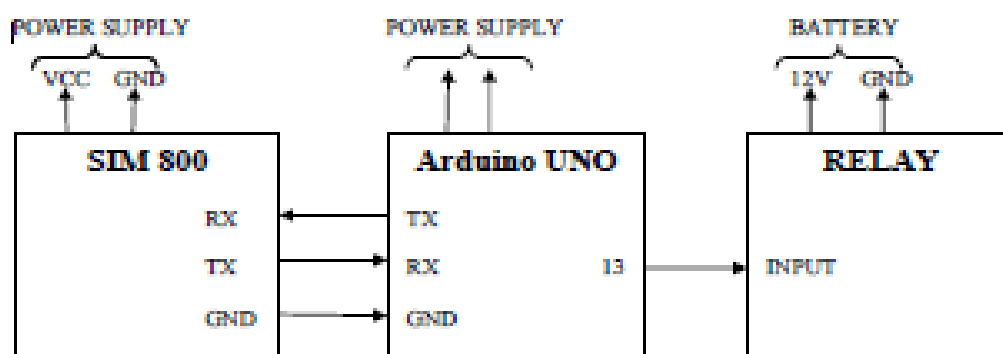


Fig1. Schematic diagram of the device

In fig 1. TX-Transmitter, RX-Receiver

The sequence of operations is:

- a) SIM 800 receives the incoming call and transmits the signal to the arduino through TX
- b) Arduino decodes the received signal and toggles the relay switch
- c) Depending on the previous state the relay changes its state to ON/OFF

B. ARDUINO PROGRAM

```
#include "SIM800.h"
#include <SoftwareSerial.h>
#include "inetGSM.h"
#include "sms.h"
#include "call.h"
CallGSM call;
MSGSMS sms;
char number[20] = "8105246409";
byte stat = 0;
int value = 0;
int pin = 1;
char value_str1[9]="MOTOR ON";
char value_str2[10]="MOTOR OFF";
int Rpin = 13;
void setup()
{
  pinMode(pin, INPUT);
  pinMode(Rpin, OUTPUT);
  Serial connection.
  Serial.begin(9600);
  Serial.println("GSM Shield testing.");
  if (gsm.begin(2400))
  Serial.println("\nstatus=READY");
  else
  Serial.println("\nstatus=IDLE");
};
loop()
{
  stat = call.CallStatusWithAuth(number, 0, 0); \
  if (stat == CALL_INCOM_VOICE_AUTH)
  {
    call.HangUp();
    delay(2000);
    value = digitalRead(Rpin);
    if (value == LOW)
    {
      digitalWrite(Rpin, HIGH);
      sms.SendSMS(number,value_str1);
    }
    else
    {
      digitalWrite (Rpin, LOW); sms.SendSMS(number,value_str2);
    }
    (number,value_str1);
  }
  delay(1000);
};
```



III. RESULTS

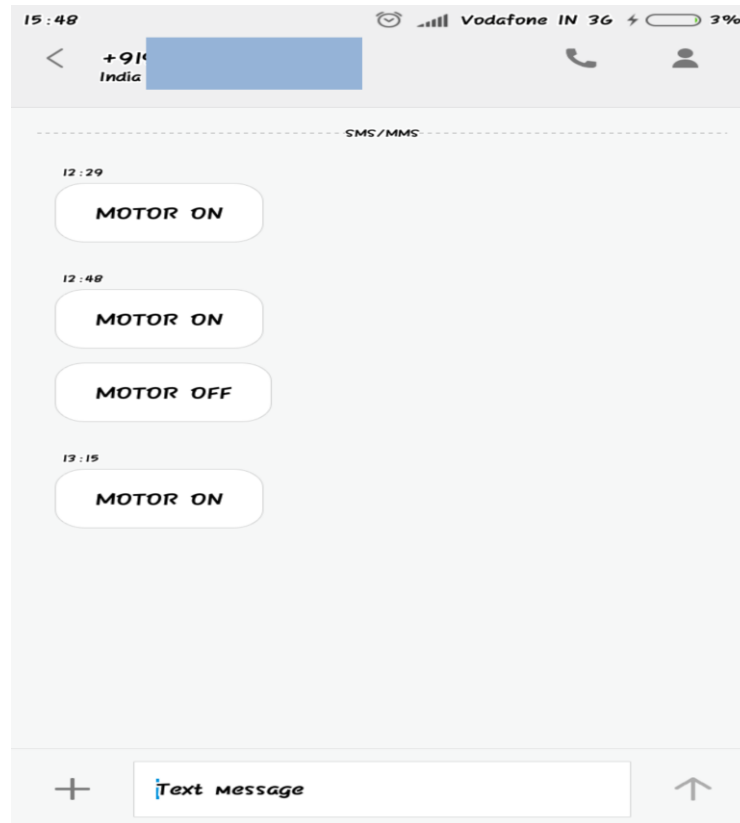


Fig.2 Device interface with GSM phone

When the relay switch toggles the device, the user receives a text message on the mobile phone informing the state of the device as shown above in Fig.2. It is hence a simple yet convenient system, which lets the user control the device comfortably and remotely.

IV. APPLICATIONS

1. Railway level Crossing- opening and closing of barricades can be done by the operator using the device.
2. Central locking of cars- lock or unlock the doors of the car from anywhere,
3. Motor pumps switching ON/OFF situated at a distance for agricultural applications.
4. Any electrical device can be switched ON/OFF from any part of the country.
5. Parking shutters- opening and closing of parking shutter when at a distance thus reducing waiting time for the driver.
6. Air conditioners- Toggle ON the air conditioners of the car to reduce the cabin temperature before entering the car, reduces the time the driver must wait for the AC to cool the cabin.
7. Security gates- Open or close the gate of the building from a distance.
8. Car locator- Locate where the car was parked by calling and actuating GPS inside the car.

V. CONCLUSION

In the automobile world, this device will be highly efficient and smart keeping up with the ever changing technology. This can also be used to aid the disabled to access control over electrical and mechanical appliances using a SIM 800 module, Arduino UNO and an interface with relay with minimum physical work. This device can toggle ON or OFF any electrical device from anywhere provided there is ample network just by a simple call. This reduces human work and has a wide range of applications in every field.

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