ARDUINO BASED HOME AUTOMATION

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ABSTRACT: Communication is part of our day-to-day life. Every now and then, we go on finding a better platform to communicate with others which will make our work faster and effective. The main purpose of these work is to provide a new and easy platform to control our home or industrial based appliances from anywhere in the world with undue delay by using GSM module (sim 300) and Arduino. By interfacing these device with electrical appliances like bulb, fan etc. We can easily switch the status of device. In this process, real time data is assessed like text messaging to control the status.

KEY WORDS: GSM MODULE, ARDUINO UNO.

1. INTRODUCTION

The home automation increases the quality of the control of the home equipment. Main purpose of home automation is "SAVE ELECTRICITY". In daily routine life sufficient use of electricity is very important. Everyone can control the home equipment or office equipment automatically. Home automation system saves time, man workforce, money even electricity. Secured, flexible, reliable, user friendly and affordable this are the specification of home automation system. Detail information of components, methods, sensors of all systems are discussed in this paper. In all over the world, wireless technology is famous. Nowadays, Automation is not hard but advanced technique in home automation is required. Automation systems can control home equipment such as TVs, Fan, Tube lights. Android smartphones is done very important role in most of the systems. In some project GSM technology and Bluetooth technology is used. Among them, in GSM technology home equipment can control by text messages and in Bluetooth technology home equipment can control using android apps application. GSM has transfer speed up to 9.6 kbps with voice call service and SMS service. Author has used power supply or DC volt power battery in some project. User can control many devices using home automation system. (ATMEGA328) Arduino Board, (AT89S52), FPGA Controller, ARM7, ARM9, PIC16F877 (40 pin IC) etc. acts as a controller in most of the home automation system.

The communication will transfer or receive the data by using GSM module for making it wireless communication. In this project, we are using Atmega328P-PU (ARDUINO ) microcontroller for Implementing this technique at home, industries.

Components required

1. Arduino UNO
2. GSM Module (SIM 300)
3. Relay module

1. ARDUINO

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-seria}
**GSM MODULE**

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily.

The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. In GPRS mode you can also connect to any remote FTP server and upload files for data logging. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications.

Supports features like Voice, SMS, Data / Fax, GPRS and integrated TCP/IP stack.

**Specifications :**

- Data / Fax, SMS, GPRS
- Integrated TCP / IP stack Features
- Quad Band GSM / GPRS 850 / 900 / 1800 / 1900 MHz
- GPRS multi - slot class 10 / 8 GPRS Mobile station class B Compliant to GSM Phase 2 / 2 + Class 4 ( / 900 MHz) Class 1 ( / 1900 MHz)
- Control via AT commands (GSM 07.07 , 07.05 and enhanced AT commands)
- Operation Temperature (-20 deg C to +55 deg C) Specifications for Voice Tricodec.
- Half rate (HR) Full rate (FR) Enhanced Full rate (EFR) Hands-free operation(Echo suppression) Specifications for Fax
- Group 3
- Class 1 Specifications for data GPRS class 10: max 85.6 kbps (downlink)
- PBCCH support Coding schemes CS 1, 2, 3, 4 CSD up to 14.4 kbps USSD Non transparent mode PPP - Stack

**RELAY MODULE**

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate. They are often used to interface an electronic circuit (working at a low voltage) to an electrical circuit which works at very high voltage. For example, a relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. Thus a small sensor circuit can drive, say, a fan or an electric bulb.

A relay switch can be divided into two parts: input and output. The input section has a coil which generates magnetic field when a small voltage from an electronic circuit is applied to it. This voltage is called the operating voltage. Commonly used relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc. The output section consists of contactors which connect or disconnect mechanically. In a basic relay, there are three contactors: normally open (NO),
normally closed (NC) and common (COM). At no input state, the COM is connected to NC. When the operating voltage is applied the relay, coil gets energized and the COM changes contact to NO. Different relay configurations are available like SPST, SPDT, DPDT etc. which have different number of changeover contacts. By using proper combination of contactors, the electrical circuit can be switched on and off. Get inner details about structure of a relay switch.

ADVANTAGE

1. Electricity saving device.
2. Time saving device.
3. Can be control from anywhere.

RESULT

The experimental model was made according to the circuit and the results was as expected.

When we send a message to ON a particular appliance, it gets ON when message is received by ARDUINO and when we send a message to get OFF, it gets OFF.

<table>
<thead>
<tr>
<th>Case</th>
<th>Message from mobile</th>
<th>GSM</th>
<th>Output of appliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ON</td>
<td>Received</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td>OFF</td>
<td>Received</td>
<td>OFF</td>
</tr>
</tbody>
</table>

CONCLUSION

The paper proposed a new concept of home automation. The main advantage is that it’s a low cost and electricity saving device which will reduce the human effort and more easy to deal with it even an illiterate can operate it easily. It is a new way to on and off the home appliances.
REFERENCE:


6. Murthy, M. V. R., Mobile based primary health care system for rural India. W3C workshop on Role of Mobile Technologies in Fostering Social Development, Jun 2008