

# 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-serial driver chip. Instead, it features the Atmega8PU2 programmed as a USB-to-serial converter

## 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 Tricodex .
- 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.

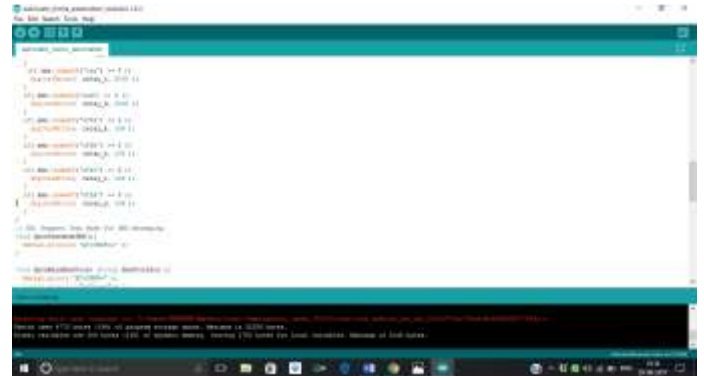
A **relay switch** can be divided into two parts: input and output. The input section has a coil which generates magnetic field when a small voltage from an electronic circuit is applied to it. This voltage is called the operating voltage. Commonly used relays are available in different configuration 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.



**Working**

To make home automation easy and effective we have used Arduino for interface with GSM and RELAY module. With reference to our code, the appliance like fan1, bulb1, blub 2, fan2. Are to connected to pins 4,5 6, 7 of Arduino with relay module interface. Relay module is used as, Arduino can operate on limited spike of voltage i.e. 3.3-5 v. and home appliances works on 220 v supply. so it convert 220 v to 5 v. As GSM module works in AT command mode, so we have it in msg receiving mode by giving "CNMT" command in coding. Now when we send a msg from mobile like ona, onb, onc, ond, it ON the respective appliances and when we send a msg like offa, offb, offc, offd it will turn OFF the respective appliance. In these way, we can control the automation of appliances from any place and at any time. This device will provide a time and electricity saving platform.



**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.

Case	Message from mobile	GSM	Oouput of appliance
1	ON	Received	ON
2	OFF	Received	OFF

**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:**

1. Wolber David, Hal Abelson, Ellen Spertus, and Liz Looney, "App Inventor: Create Your Own Android Apps", O'Reilly Media, Inc., 2011.

2. Morelli Ralph, Trishan de Lanerolle, Pauline Lake, Nina Limardo, Elizabeth Tamotsu, and Chinma Uche, "Can Android App Inventor Bring Computational Thinking to K-12", In Proc., 42nd ACM technical symposium on Computer science education (SIGCSE'11), 2011.

3. R. Llamas, R Reith, M. Shiere, "Apple Cedes Market Share in Smartphone Operating System Market as Android Surges and Windows Phone Gains, According to IDC", 7th August 2013, IDC Press Release, <http://www.idc.com/getdoc.jsp?containerId=prUS24257413>.

4. Delgado, A. R., Picking, R., & Grout, V. Remote-controlled home automation systems with different network technologies. Proceedings of the 6th International Network Conference (INC 2006), University of Plymouth, 11-14, pp. 357-366, July 2006

5. Ciubotaru-Petrescu, B., Chiciudean, D., Cioarga, R., & Stanescu, D., Wireless Solutions for Telemetry in Civil Equipment and Infrastructure Monitoring. 3rd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence (SACI) May 25-26, 2006.

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

waveguide filters For GSM applications, International Journal of Engineering and Technical Research (IJETR), ISSN: 2321-0869, Volume-2, Issue-4, April 2014.

