

# Bluetooth and Arduino Based Smart Home Automation System

Srikanth.B

Dept of ECE,Sri Sivani Institute of Technology, Chilakapalem Jn,AP,India.

N.P.V.Bhaskar Reddy

Assistant Professor, Dept of ECE,Sri Sivani Institute of Technology, Chilakapalem Jn,AP,India.

**Abstract – Bluetooth and Arduino based smart home automation system is a study and design the real home automation system by using the Arduino ATMEGA328 processor. There has been a significant development in the area of an individual's routine tasks and those can be automated. Now-a-days, we can find most of the people clinging to their mobile phones and smart devices throughout the day. Some daily household tasks can be accomplished by the use of the mobile phone. The temperature and fire alerts are also detected through sensors by using the Android based mobile phones.**

**Home Automation System (HAS) has been designed for mobile phones having Arduino platform to automate an 8 bit Bluetooth interfaced microcontroller which controls a number of home appliances like lights, fans, bulbs and many more using on/off relay. This paper presents the automated approach of controlling the devices in a household through temperature and fire detecting sensors that could ease the tasks of using the traditional method of the switch. And the Bluetooth is also used here to automate the system. The embedded c language is used for programming the code. The HAS system for Arduino users is a step towards the ease of the tasks by controlling more different appliances in any home environment.**

**Index Terms – Arduino ATMEGA328 processor, Bluetooth HC-05, Home Automation, Temperature Sensor, code, Light Sensor.**

## 1. INTRODUCTION

The project mainly deals with the Arduino based modern home automation system. The proposed system using Bluetooth and Sensors for communication so that we can control and detect the surrounding alerts. Now, a day's Environment monitoring and device control allows new level of comfort in homes and it can also manage the energy consumption efficiently which in turns promotes the saving. Remote controlling of the devices offers many advantages to senior citizens and people with disabilities which helps them in being more autonomous and increasing quality of life. In addition to remote control, monitoring temperature, flood and carbon monoxide in homes is also a major concern. There is a severe need to monitor temperature, fire or gases as they can be costly and deadly. A monitored low temperature sensor warns about freezing temperatures inside house. Also if the boiler, washer or pipes leaks in the home, it can cause considerable damage. In the

proposed system Arduino based microcontroller and wireless sensors are used to control the various devices and to monitor the information regarding the surroundings of our home automation using Bluetooth and android based mobile phones.

## 2. SMART HOME AUTOMATION USING ARDUINO

The automatic switching on and off of the light is controlled by the Light Dependent Resistor (LDR) which determines the day light intensity. Also to incorporate security in our design, a motion detector is integrated using Passive Infrared Sensor (PIR) to detect movement in the home when the security system is turned on. A relay switch is used to send control signals from the microcontroller to the electronic device used to achieve the switching on and off action. A web portal is designed with a one factor authentication system (username and password) to check authenticity of the home user.

- Overview of the smart home
- Bluetooth
- Home automation system

### 2.1. Design and implementation

A low cost and efficient smart home system is presented in our design. This system has two main modules: the hardware interface module and the software communication module. At the heart of this system is the Arduino Mega 2560 microcontroller which is also capable of functioning as a micro web server and the interface for all the hardware modules. All communication and controls in this system pass through the microcontroller

### 2.2. Bluetooth HC-05

HC serial Bluetooth products consist of Bluetooth serial interface module and Bluetooth adapter, such as:

- (1) Bluetooth serial interface module
- (2) Bluetooth adapter

### 2.3. LM358

LM358 is also one of the types of operational amplifier. LM358 consists of two independent, high-gain, frequency-

compensated operational amplifiers designed to operate from a single supply over a wide range of voltages.

### 3. ARDUINO PROCESSOR

Arduino is an open source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's an open-source physical computing platform based on a microcontroller board, and a development environment for writing software for the board. In simple words, Arduino is a small microcontroller board with a USB plug to connect to your computer and a number of connection sockets that can be wired up to external electronics, such as motors, relays, light sensors, laser diodes, loudspeakers, microphones, etc., They can either be powered through the USB connection from the computer or from a 9V battery. They can be controlled from the computer or programmed by the computer and then disconnected and allowed to work independently.

### 4. RESULTS

The below are the results obtained by Bluetooth and Arduino based smart home automation system by using the Bluetooth appliances. By appliance 1 is ON, it detects the temperature accordingly. Similarly by giving different appliances it results automatically. The fire alert system is also detected when the system detects fire nearby. The results shows by giving different inputs, the LED light automatically ON/OFF. Thus the smart home automation system plays an important role to alert the home appliances.

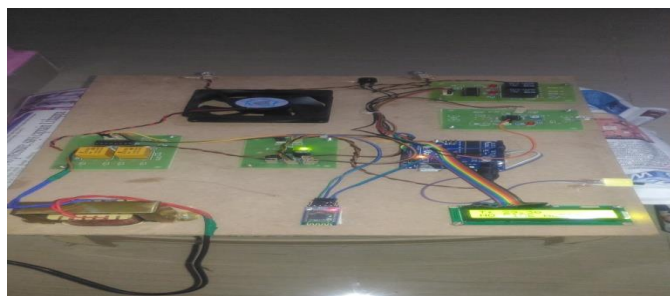


Figure 1 Smart Home Automation Using Arduino

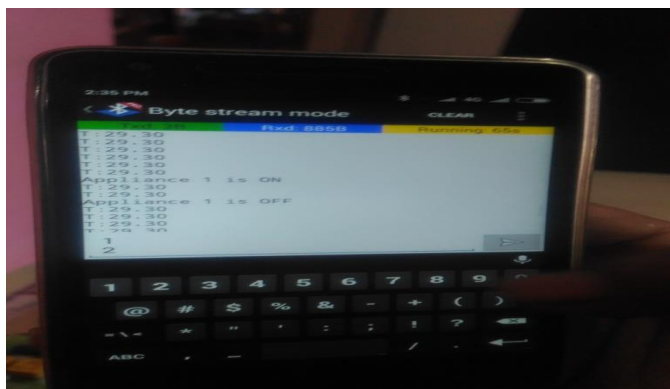


Figure 2 Bluetooth Operating Byte Stream Mode



Figure 3 Output Of Appliance 1 is ON

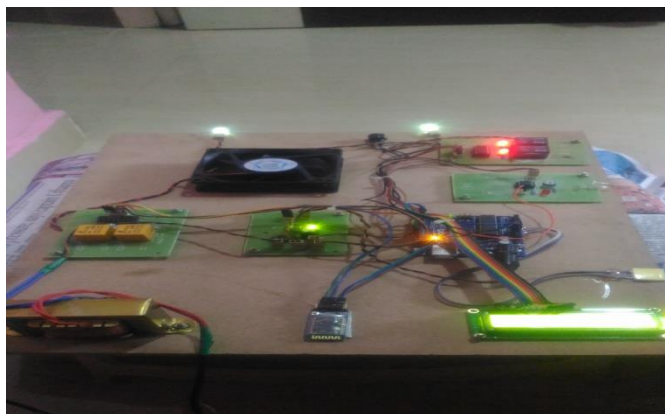


Figure 4 Output Of Appliance 4 IS ON

### 5. CONCLUSION

A novel architecture for low cost and flexible home control and monitoring system using Bluetooth and Arduino based Smart phone is proposed and implemented. The proposed architecture utilizes a Bluetooth communication as an interoperable application layer for communicating between the remote user and the home devices. Any Android based Smart phone with built in support for Wi-Fi can be used to access and control the devices at home. The system automatically alerts the user to perform the particular tasks.

### REFERENCES

- [1] Ajah, G, David, N, Abioye, A, Web Based Security System, Sch. J. Eng. Tech, 1(3):112-116, 2013.
- [2] Mahmood, S M, Abdulsattar, M, Firas, A Y; Home Automation Management with WLAN (802.11g) and RF Remote Control, Raf. J. of Comp. & Math's, 6(1), 2009.
- [3] Aru O E ,Ihekweaba G, Opara F K, Design Exploration of a Microcontroller Based RF Remote Control 13amps Wall Socket,IOSR-JCE, 11(1), 56-60, 2013.
- [4] David, N, Design of an Internet Based Security System, NIJOTECH, 29(2) 118-129, 2010.IJSER International Journal of Scientific & Engineering Research, Volume 6, Issue 6, June-2015 803 ISSN 2229-5518IJSER © 2015.
- [5] Diaan, M F, Mahmood, B M, Data Acquisition of Greenhouse Using Arduino, Journal of Babylon University/Pure and Applied Sciences/ No.(7)/ Vol.(22), 1908-1916, 2014.

- [6] Robotics D, "DHT11 Humidity & Temperature Sensor", 2010, [www.micro4you.com/files/sensor/DHT11.pdf](http://www.micro4you.com/files/sensor/DHT11.pdf)
- [7] Anandan, R, Karthik, B, Kumar, K, WIRELESS HOME AND INDUSTRIAL AUTOMATION SECURITY SYSTEM USING GSM, JGRCS, Volume 4, No. 4, 126-132, 2013. R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.
- [8] Asif, O, Hossain, B, Hasan M, Rahman, T, Chowdhury, M, Fire-Detectors Review and Design of an Automated, Quick Responsive Fire-Alarm, 2014.
- [9] Violino, B, The 'Internet of things' will mean really, really big data, InfoWorld, 2013.
- [10] R Das, G Tuna, "Machine-to-machine communications for smart homes", International Journal of Computer Networks and Applications (IJCNA), 2(4), PP: 196-202, 2015.

Authors



Srikanth.B  
Dept of ECE,Sri Sivani Institute of Technology,  
Chilakapalem Jn,AP,India.



N.P.V.Bhaskar Reddy  
Assistant Professor, Dept of ECE,Sri Sivani Institute  
of Technhology, Chilakapalem Jn,AP,India.