

# Energy Efficient Smart Home Automation System

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**Abstract:** *The high energy needed by home appliances (like white goods, audio/video devices and communication equipments) and air-con systems (heating and cooling), makes our homes one among the foremost essential areas for the impact of energy consumption on natural surroundings. AIM for the planning of a system which will minimize energy waste in home environments with efficiency managing devices operation modes. In our design we tend to use a wireless sensing element network to observe physical parameters (like light-weight and temperature) additionally because the presence of users reception and in every of its rooms. In order to optimize energy consumption and value while guaranteeing the specified comfort level. When users change their habits as a result of unpredictable events, the system is able to notice wrong predictions analyzing in real time info from sensors and to switch system behaviour consequently. Parameters that might stop the introduction of home automation systems for energy saving into the mass market.*

**Keywords:** smart home, smart home appliances, smart home technology

## 1. Introduction

Generally, when we go out of the house we switch off the light or the electrical equipments to avoid accidents such as short circuit, firing etc. but sometimes we forget to switch them off, we have to come back home to do so. This is wastage of time and creates lots of chaos and tension. So to avoid any such kind of situation the latest technology coming up worldwide is the smart home technology. Smart home is one in which all electrical equipment around the home technologically smart or intelligent or automated with highly advanced automatic system for security in other system. Smart home is useful for everyone and can also be used in everyday life at home. Smart home is consisting of three parts- network, controlling device and home automation.

Network can be wire or wireless. It is used for connecting the automation to controlling devices. Controlling devices can be used for managing the system. Home automation is the devices which control the physical environment. It can be used in kitchen, home or offices etc. These three parts will be discussed in detail in the "Smart Home Technology" section.

## 2. Literature Survey

In recent year, there are many implementation is going for the smart home system for residential building to make it more efficient day by day.

Many researches are implementing to optimize the efficiency of the smart home automation system; through simulation we can also implement the smart home technology. But now a day's mostly VB (visual basic) and PLCC is being used. Practically we can implement the smart home by many researchers to optimize the better result and to improve the technology for the less consumption of electricity.

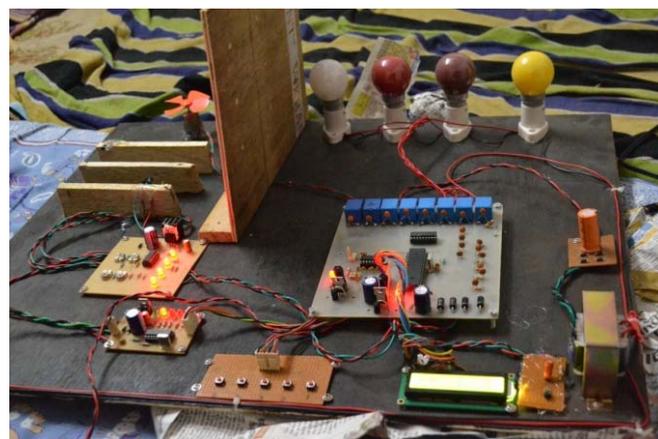
## 3. Materials and Methodology

Through VBB and optimization of smart home has been done. We observed the variation in temperature, and the speed of fan is also vary according to the temperature as

they programmed in c language. And the loads which are connected through relays which are used to switch on and switch off the loads through sending tones via mobile phone and through serial connection we can also control the whole system by connection through PCs with server through client PCs. RS232 IC is used their which is act as the transmitter and receiver as well as. This is also called the USART (universal synchronous asynchronous receiver and transmitter) and through switches we can control it manually. We use the 16F877A PIC microchip to feed the c language program in it. It will work only with the output voltage of +5V. We feed the coding in PIC microchip to run the system according to the feed coding.

## 4. Hardware Implementation and Working

The hardware implementation of the proposed thesis work is shown in fig below:



**Figure 1:** Hardware Implementation of Model Project

## 5. Working of Model Project

Firstly we have to provide the 220v supply to the model project, after that step down transformer is used to step down the power from 220V to 5V to the circuit. It works smartly if anyone enters through the door than IR sensors which are placed in door to count the person, if person enter in the room then the starts working, it means it won't work if there is no person inside the home then automatically the loads of the home is turns off. There are

three control methods through which we can control it through three methods:

- Manually control
- DTMF Control
- Computer control

## 6. Result

For obtaining the result from working model project, we connect the C.R.O probes across the working project.

Firstly for obtaining the DTMF crystal by connecting the C.R.O with the ULN2803 IC pin no. 8, which gives the output waveform for the DTMF crystal, from channel 1 in C.R.O.

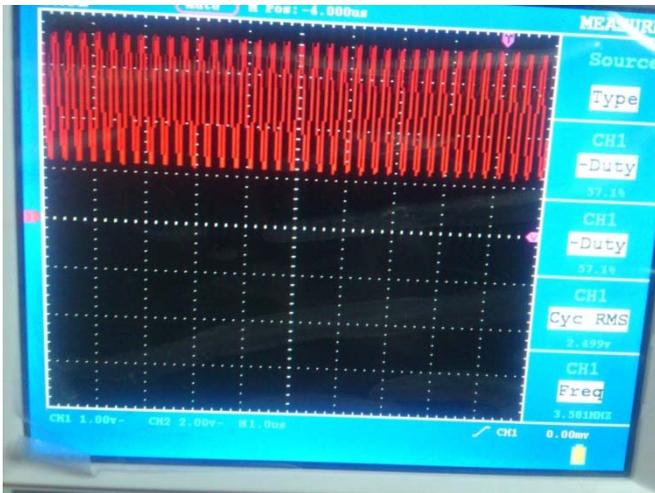


Figure 2: Waveform for the DTMF crystal frequency

Table 1: DTMF Crystal

SOURCE	CHANNEL 1	CHANNEL 1	CHANNEL 1	CHANNEL 1
TYPE	DUTY	DUTY	CYC. RMS	FREQUENCY
OUTPUT	57.10	57.10	2.499 V	3.581 MHz

DTMF is showing the waveform when we are sending tones through cell phone. That time LCD is displaying the current and voltage waveform and C.R.O is showing the Cyc. RMS value 11.0 mV and frequency is 263.8 KHz.

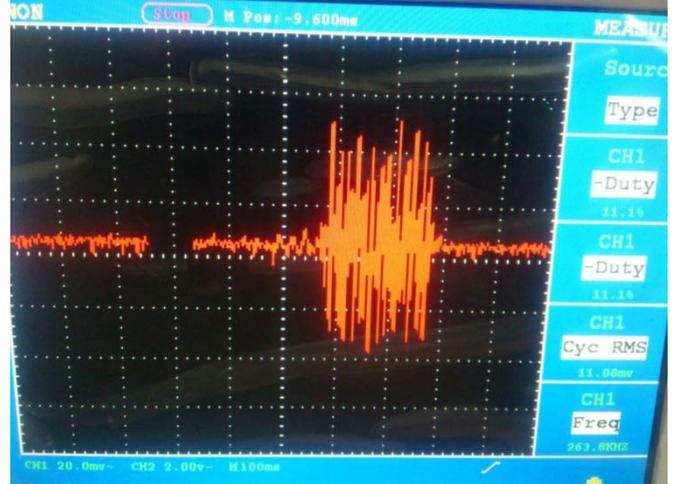


Figure 3: Receiving the DTMF waveform

Table 2: DTMF output

SOURCE	CHANNEL 1	CHANNEL 1	CHANNEL 1	CHANNEL 1
TYPE	DUTY	DUTY	CYC. RMS	FREQUENCY
OUTPUT	11.10	11.10	11.0 mV	263.8 KHz

And the received character T which is obtained after performing the serial connection with the help of computer and the received RS232 data received character t which is shown in figure. RS232 data for character T the output frequency is 2.402 KHz and the output voltage is 21.4 V. It is between the two channels channel 1 and channel 2 which is in the diagram yellow graph is for the channel 1 and red one for the channel 2, and we have successfully received the character T.

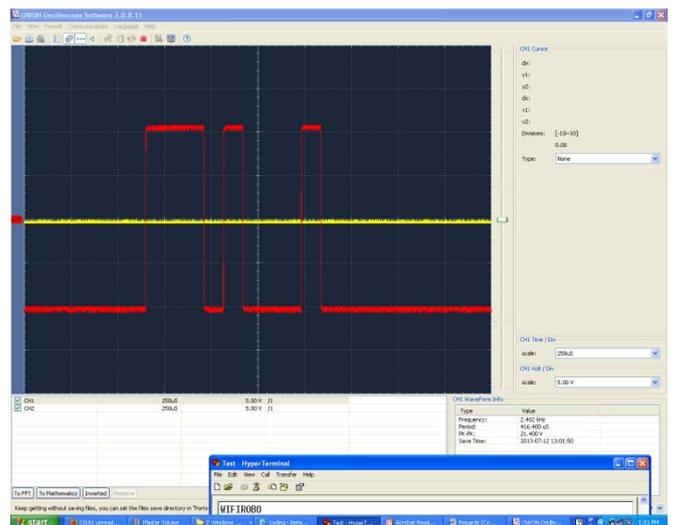


Figure 4: RS232 data received character T

The received graph after performing the task in visual basic program and in C language also the received character for the project is showing in figure. The received character T which is converted into TTL. And the output frequency for the received character TTL is 2.399 KHz and the output voltage is 5.40 V.

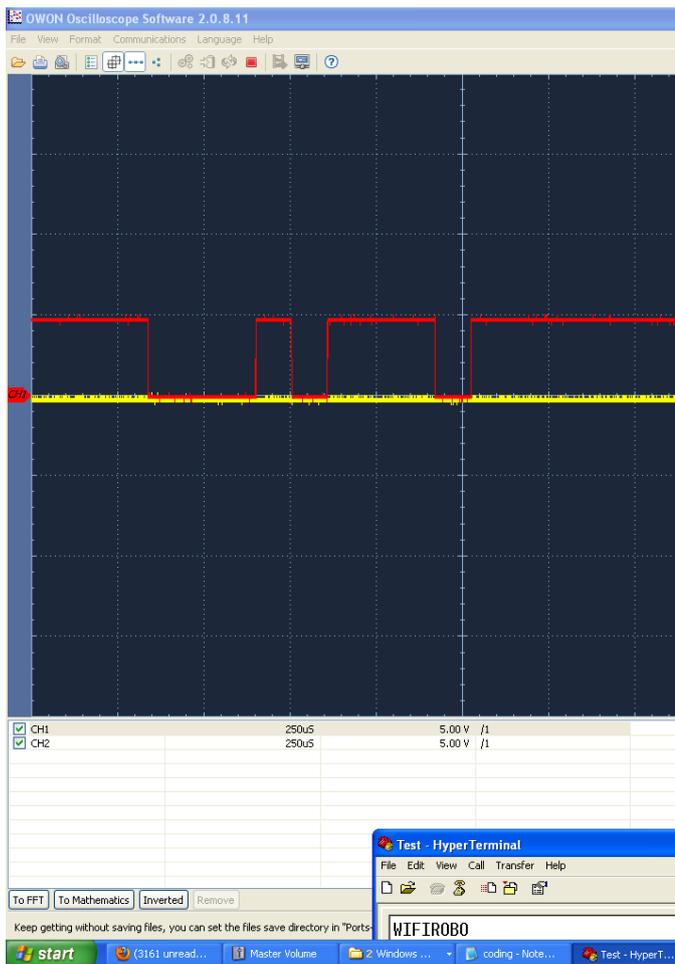


Figure 5: Received character T converted to TTL

## 7. Conclusion

This paper is based on the meaning of smart phones and all the details of smart home elements projects and challenges. main objectives is to give a survey on smart phone research. Many new technologies are exploring more and more and day by day. Smart is the good and beneficial who is very much easy with their professional life and also for those who are about security and comfort but they want to save their electrical energy that is wasted by many people in regular span of time. With the introduction of smart home people are living and will obviously live more comfortable life. All the time home can be save from automation so that we will have much more time work on the other things or pursuits.

## References

- [1] C. Douligeris, Intelligent Home Systems, IEEE Communications Magazine, Vol. 31, Issue 10, October 1993.
- [2] 61 R. J. C. Nunes and J. C. M. Delgado, An Internet Application for Home Automation, 10th Mediterranean Electro technical Conference, MeleCon 2000, Vol. I
- [3] R. Shepherd, "Bluetooth wireless tehnology in the home," Journal of Electronics and Communication Engineering, vol. 13, no. 5, pp VII. Oct. 2001.

- [4] N. Sriskanthan, F. Tan, and A. Karande, "Bluetooth based home automation system." Microprocessors and Microsystems, 2002.
- [5] F. Baader, D. Calvanese, D. L. McGuinness, D. Nardi, and P. F. Patel-Schneider (Eds.), The Description Logic Handbook: Theory, Implementation, and Applications, Cambridge University Press, 2003
- [6] P. Jazayeri, A. Schellenberg, W.D. Rosenhart, J. Doudna, S. Widergren D. Lawrence, J. Mickey, S. Jones, A Survey of Load Control Programs for Price and System Stability, IEEE Transactions on Power Systems, Vol. 20, No. 3, 2005.
- [7] W. Kastner, G. Neugschwandtner, S. Soucek, H. M. Newman, Communication Systems for Building Automation and Control, Proc. of the IEEE 93(6), 2005.
- [8] G.RAGHAVENDRAN,," SMS BASED WIRELSS HOME APPLIANCE CONTROL SYSTEM, 2011 International Conference on Life Science and Technology IPCBEE vol.3 (2011) © (2011) IACSIT Press, Singapore
- [9] Dhiren Tejani, Ali Mohammed A. H. Al-Kuwari, Energy Conservation in Smart Home, 5th IEEE International Conference on Digital Ecosystems and Technologies, Daejeon, Korea, May 2011.
- [10] Y.-J. Mon, C.-M. Lin and I. J. Rudas, Wireless Sensor Network (WSN) Control for Indoor Temperature Monitoring, Acta Polytechnica Hungarica, Vol. 9, No. 6, 2012
- [11] Adamu Murtala Zungeru 1\*, Ufaruna Victoria Edu 2, Ambafi James Garba,"Design and Implementation of a Short Message ServiceBased Remote Controller" Computer Engineering and Intelligent Systems ISSN 2222-1719 (Paper) ISSN 2222-2863 (Online) Vol 3, No.4, 2012
- [12] Carl J. Debono and Kurt Abela,"Implementation of a Home Automation System through a Central FPGA Controller" Electrotechnical Conference (MELECON), 2012 16th IEEE Mediterranean, Dec. 2012
- [13] Chetana Sarode, Prof.Mr.H.S.Thakar ,," Intelligent Home Monitoring System", International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 3, Issue 1, January -February 2013

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