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**VOICE ENABLED DEVICE CONTROL USING ARM PROCESSOR**

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**ABSTRACT**

This paper gives an overview of how to control the domestic devices by reducing human efforts. Here we are replaced remote control to android software Home Appliance Control intending to not to use the remote just speak through an android App and it is connected to the device using Bluetooth and the devices will work on your command. Bluetooth is used to provide input to system with your voice just like clicking with your mouse, typing on your keyboard, or pressing a key on the phone keypad provides input to an application. This paper gives an overview of voice enable hardware control. In this paper we are using Bluetooth module, LPC 2148, Android mobile phone with Home Appliance Control. This idea of developing a voice enable hardware device by using the Bluetooth technology is to develop an application which demonstrates a hardware chip responding to the commands given by voice to control the different home appliances. The Bluetooth module connects to the Android mobile using Bluetooth. Initially we record some sounds previously and will then compare the coming sounds by recorded word. According to the coming sound the particular action will be taken and the particular device is turned ON or OFF accordingly.

**KEYWORDS-** Bluetooth module, ARM7 based LPC2148MC

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**INTRODUCTION**

The Wireless Home Automation System is an integrated system to facilitate elderly and disabled people with an easy-to-use home automation system that can be fully operated based on speech commands. The system is portable and constructed in a way that is easy to install, configure, run, and maintain. Automation of the most of the procedures in the day to day life has revolutionized the lives of the humans. The key of automation lies in the use of microcontrollers. Coding for performing a specific task is loaded in the ROM of microcontroller which then acts as an embedded system causing the chip to perform the task desired.

One of the applications of microcontroller is speech recognition. Have we really, really talked to our computer? Where it actually recognized what we said and then did something as a result? If we have, then we have used a technology known as speech recognition. Speech recognition will become the method of choice for controlling appliances, toys, tools and computers. At its most basic level, speech controlled appliances and tools allow the user to perform parallel tasks (i.e. hands and eyes are busy elsewhere) while working with the tool or appliance.

In this project ARM7TDMI processor is used to control eight different devices. This voice is an analog quantity so an analog to digital converter is used to convert analog voice into digital data. Because ARM processor works on the digital signals. This digital data is given to ARM processor. ARM generates data signals and it will send control signals to eight different devices.

**OBJECTIVE OF THE SYSTEM**

The objective is not to simply recognize the sound but to control the different devices using the ARM processor.

We used ARM7 processor because of its RISC architecture and low power consumption. ARM LPC2148 has on chip two ADCs out of that one has 6 channels and other has 8 channels. Means total of 14 input channels. LPC 2148 is interfaced with relay driver IC to control different devices. The four pins of stepper motor are to be connected to four pins of ARM to control the motor.

### NECESSITY OF THE SYSTEM

The principle feature of the ARM 7 microcontroller is that it is a register based load-and-store architecture with a number of operating modes. While the ARM7 is a 32 bit microcontroller, it is also capable of running a 16-bit instruction set, known as “THUMB”. This helps it achieve a greater code density and enhanced power saving. While all of the register-to-register data processing instructions are single-cycle, other instructions such as data transfer instructions, are multi-cycle. To increase the performance of these instructions, the ARM 7 has a three-stage pipeline. Due to the inherent simplicity of the design and low gate count, ARM 7 is the industry leader in low-power processing on a watts per MIP basis. Finally, to assist the developer, the ARM core has a built-in JTAG debug port and on-chip “embedded ICE” that allows programs to be downloaded and fully debugged in-system.

In order to keep the ARM 7 both simple and cost-effective, the code and data regions are accessed via a single data bus. Thus while the ARM 7 is capable of single-cycle execution of all data processing instructions, data transfer instructions may take several cycles since they will require at least two accesses onto the bus (one for the instruction one for the data). In order to improve performance, a three stage pipeline is used that allows multiple instructions to be processed simultaneously.

### BLOCK DIAGRAM

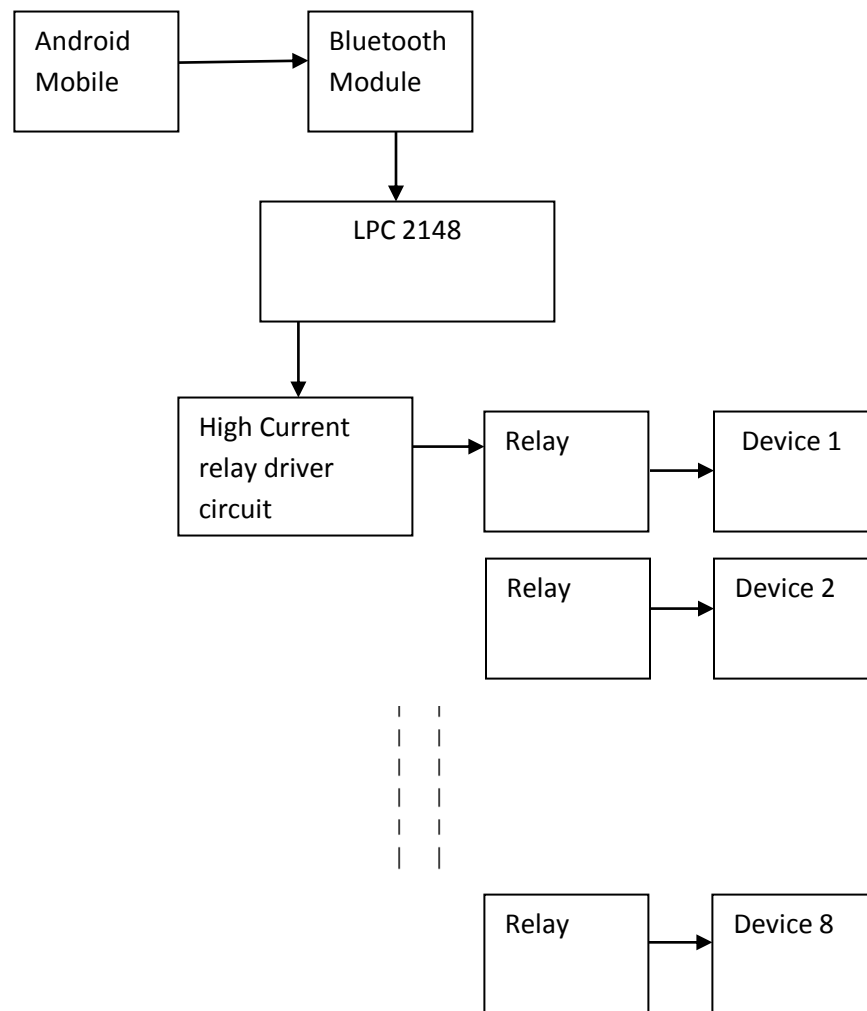


Fig 1 Block Diagram of system

- **Android Mobile-**

In this system Android mobile is used to give command to the system. We can give command to the system as particular device is ON or OFF by voice(Fan On or Fridge OFF). We can use any Android mobile for this system but that mobile is must have Home Appliances Control application. So by using this application we can give command to the system.

- **Bluetooth Module-**

We are giving voice input to the system and we are using Android mobile for giving input and we communicate to the system by using bluetooth so bluetooth module is required on the main board. By using Bluetooth of mobile we can send command by using Home Appliances Control application to the system and this command is received by using Bluetooth module on the board and appropriate action will be taken.

- **LPC 2148**

The heart of this system is LPC 2148. This processor is used to control the system. In this project ARM7TDMI processor is used to control eight different devices. This voice is analog quantity so an analog to digital convertor is used to convert analog voice into digital data. Because ARM processor is works on the digital signals. This digital data is given to ARM processor. ARM generates data signals and it will send control signals to eight different devices. The objective is not to simply recognize the sound but to control the different devices using the ARM processor.

- **Relay**

A relay is an **electrically** operated **switch**. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. In this system also we are giving input through single android mobile phone so we are using relays in this system.

- **Devices**

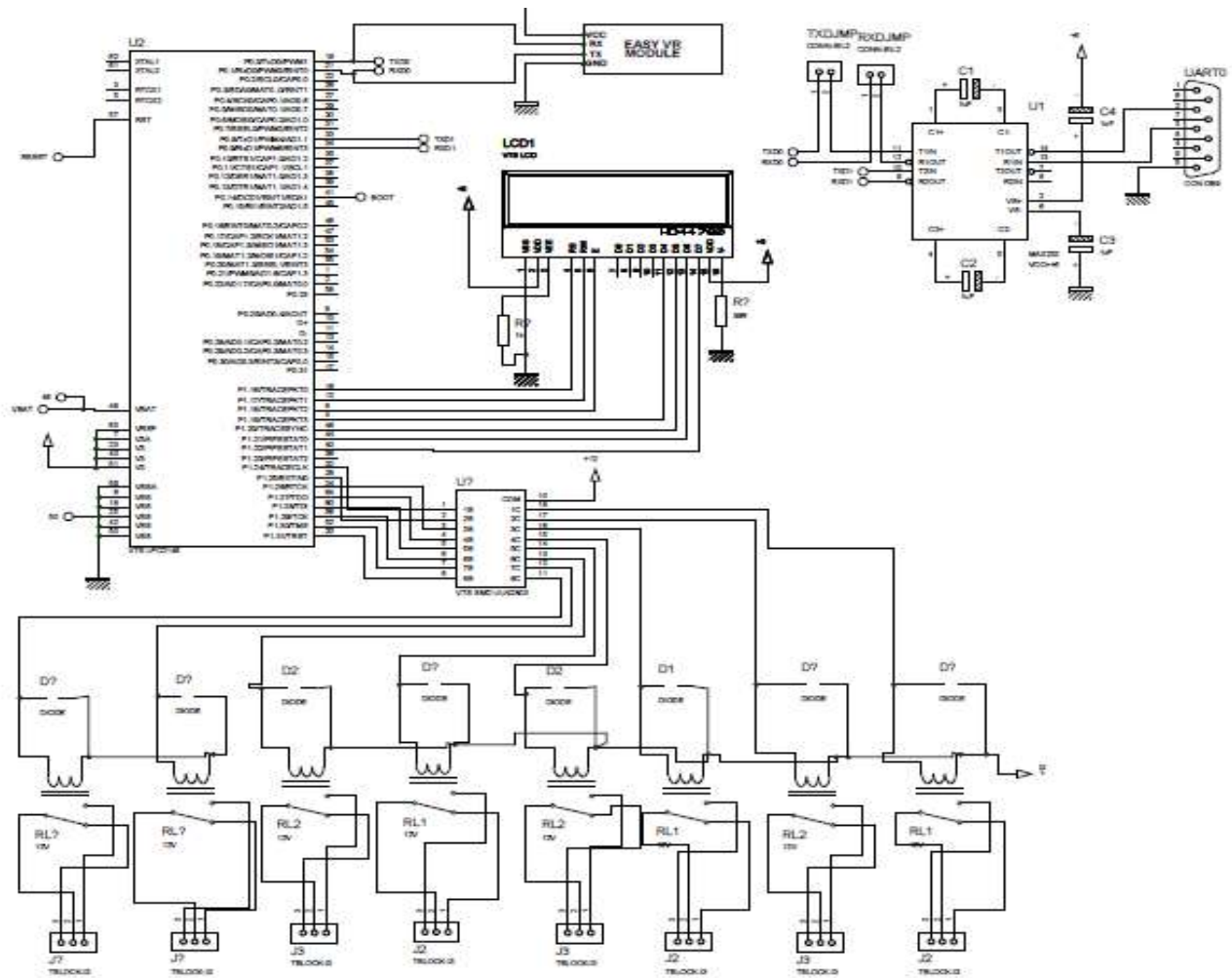
In this system we are going to control the eight different devices. So here we are interfaced eight different devices to the system.

## **THEME OF THE SYSTEM**

In this system ARM7TDMI processor is used to control eight different devices by using Android mobile phone application Home Appliances Control. The speech recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, in the sense that you train the words (or vocal utterances) you want the circuit to recognize. This board allows you to experiment with many facets of speech recognition technology. It has 8 bit data out which can be interfaced with any microcontroller for further development. Some of interfacing applications which can be made are controlling home appliances, robotics movements, Speech Assisted technologies, Speech to text translation, and many more. ARM processor is works on the digital signals. This digital data is given to ARM processor. ARM generates data signals and it will send control signals to eight different devices.

A typical wireless home automation system allows one to control house hold appliances from a centralized control unit which is wireless. These appliances usually have to be specially designed to be compatible with each other and with the control unit for most commercially available home automation systems. The project demonstrates a system that can be integrated as a single portable unit and allows one to wirelessly control eight different home appliances and turn on or off any appliance that is plugged into a wall outlet, get the status of different appliances and take decision accordingly. The overall system is controlled from a Home Appliances Control Android application which is connected with Bluetooth module. This module provides input command to the microcontroller. The remote system receives the commands through Bluetooth module and performs the request function.

CIRCUIT DIAGRAM



In this project we are going to use ARM 7 development board. This board contains all the peripherals like LCD, LED, keyboard and other input output devices. But we are using only the required components only.

CONCLUSION

In this project we are control all the eight devices successfully. This project contains Android phone with Home Appliances control Application, Bluetooth module, LPC 2148, relays and eight different devices which we are going to control by using this project.

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**REFERENCES**

- [1] D.NARESH , B.CHAKRADHAR, S.KRISHNAVENI “Bluetooth Based Home Automation and Security System Using ARM9” International Journal of Engineering Trends and Technology (IJETT) – Volume 4 Issue 9- Sep 2013 ISSN: 2231-5381,Page No 4052.
- [2] Aakash.A.Hongunti, Mayuri.Deulkar, Varsha.Sable, Prof.Dr.P.B.Mane “Voice Operated Wheelchair”International Journal of Advanced Research in Computer Science and Software Engineering Research Volume 4, Issue 4, April 2014 ISSN: 2277 128X
- [3] Dhawan S. Thakur and Aditi Sharma, “Voice Recognition Wireless Home Automation System Based On Zigbee” , IOSR Journal of Electronics and Communication Engineering (IOSR-JECE) e-ISSN: 2278-2834,p- ISSN: 2278-8735.Volume 6, Issue 1 (May. - Jun. 2013), PP 65-75.
- [4] Y.Usha Devi 1, II M.Tech, “Wireless Home Automation System Using ZigBee”, International Journal of Scientific & Engineering Research Volume 3, Issue 8, August-2012 ISSN 2229-5518.
- [5] BILMES, J., ET AL. The Vocal Joystick: A voice-based human-computer interface for individuals with motor impairments. In Proc. Human Language Tech./Epirical Methods in Natural Language Processing (Oct. 2005), pp. 995–1002.
- [6] D. K. Prabitha, Chidananda Murthy. M. V & M. Z. Kurian "Speech Recognizing Powered Wheelchair for Disabled" International Conference on Electrical Engineering and Computer Science (ICEECS-2012). May 12th , 2012, Trivendum, ISBN Number : 978-93-81693-58-2
- [7] Ms. S. D. Suryawansi, Mr. J. S. Chitode, Ms. S. S. Pethakar "Voice Operated Intelligent Wheelchair" International Journal of Advanced Research in computer Science And Software Engineering . Research Paper, Volume 3, Issue 5, May 2013 ISSN: 2277 128X Pg 487-48
- [8] M.Prathyusha, K. S. Roy ,Mahaboob Ali Shaik " Voice and Touch Screen Based Direction and Speed Control of Wheel Chair for Physically Challenged" International Journal ofpp. 1-51, Apr. 2000.
- [9] N. Sriskanthan and Tan Karand. “Bluetooth Based Home Automation System”. Journal of Microprocessors and Microsystems, Vol. 26, pp.281-289, 2002.
- [10] Muhammad IzharRamli, MohdHelmyAbdWahab, Nabihah, “TOWARDS SMART HOME: CONTROL ELECTRICAL DEVICES ONLINE” ,Nornabihah Ahmad International Conference on Science and Technology: Application in Industry and Education (2006)
- [11] Al-Ali, Member, IEEE & M. ALRousan,“Java-Based Home Automation System R.” IEEE Transactions on Consumer Electronics, Vol. 50, No. 2, MAY 2004
- [12] Pradeep.G, B.Santhi Chandra, M.Venkateswarao, “Ad-Hoc Low Powered 802.15.1 Protocol Based Automation System for Residence using Mobile Devices”, Dept.of ECE, K L University, Vijayawada, Andhra Pradesh, India IJCST Vo l. 2, SP 1, December 2011
- [13] E. Yavuz, B. Hasan, I. Serkan and K. Duygu. “Safe and Secure PIC Based Remote Control Application for Intelligent Home”. International Journal of Computer Science and Network Security, Vol. 7, No. 5, May 20
- [14] AmulJadhav, S. Anand, NileshDhangare, K.S. Wagh “Universal Mobile Application Development (UMAD) On Home Automation” MarathwadaMitraMandal’s Institute of Technology, University of Pune, India Network and Complex Systems ISSN 2224- 610X (Paper) ISSN 2225-0603 (Online) Vol 2, No.2, 2012
- [15] Rana, JitendraRajendra and Pawar, Sunil N., Zigbee Based Home Automation (April 10, 2010).
- [16] R.Piyare, M.Tazil” Bluetooth Based Home Automation System Using Cell Phone”, 2011 IEEE 15th International Symposium on Consumer Electronics

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	<p>Ms. Rajmane Sunita R ME Electronics Student, Government college of Engg, Aurangabad</p>
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