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Automation in Wireless Control System: A Small Review Study of Automation of Water Motor using ZigBee

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Abstract: The paper shows an attempt of a small review study of integrating features of the hardware components implemented in the application of water motor in the plotform of ZigBee technique. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the study has been successfully implemented. The implemented process and results have been successfully designed and tested. Study in the paper reveals the automatic operation of motor to control the water levels in a tank, using the wireless medium as well as a controlling medium. PIC(Peripheral Interface Controller) microcontroller is used as a controlling equipment and ZigBee modules are used in the wireless transmission of the messages. Module of microcontroller and a Zigbee module is a significant technique of detecting required level of the operating device.
Keywords: *Microcontroller, ZigBee, Automation Control*

I. INTRODUCTION

An embedded system is a compositional method of both software and hardware to perform a any technical task. The very common devices implemented in embedded products are Microprocessors and Microcontrollers. In some cases, it is required to control the AC motor from remote places. The objective in the study is to control the AC motor automatically using Zigbee modules. This deals with the design and development of hardware and software for Wireless AC motor speed control system. ZigBee is a wireless technology at global standard designed for the unique needs of low-cost, low-power wireless M2M networks[2]. The ZigBee standard operates on the IEEE 802.15.4 physical radio specification and operates in unlicensed bands including 2.4 GHz, 900 MHz and 868 MHz's. ZigBee devices have the ability to form a mesh network between nodes. Meshing is a type of daisy chaining from one device to another [3,4]. This technique allows the short range of an individual node to be expanded and multiplied, covering much larger area. ZigBee is an established set of specifications for wireless personal area networking (WPAN), i.e., digital radio connections between computers and related devices. This kind of network eliminates use of physical data buses like USB and Ethernet cables. The devices could include telephones, hand-held digital assistants, sensors and controls located within a few meters of each other [5]. ZigBee is one of the global standards of communication protocol formulated by the relevant task force under the IEEE 802.15 working group [6]. The fourth in the series, WPAN Low Rate/ZigBee is the newest and provides specifications for devices that have low data rates, consume very low power and are thus characterized by long battery life. Other standards like Blue tooth and IrDA address high data rate applications such as voice, video and LAN communications [7].

II. METHODOLOGY AND APPROACH OF ZigBee

The study in the present paper uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.
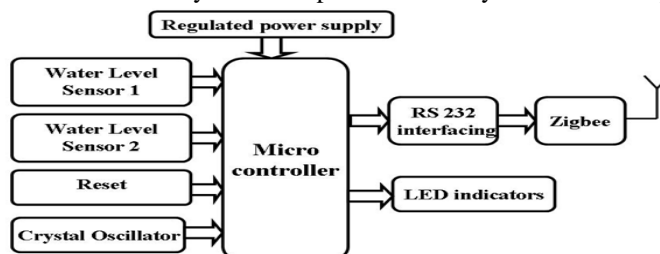

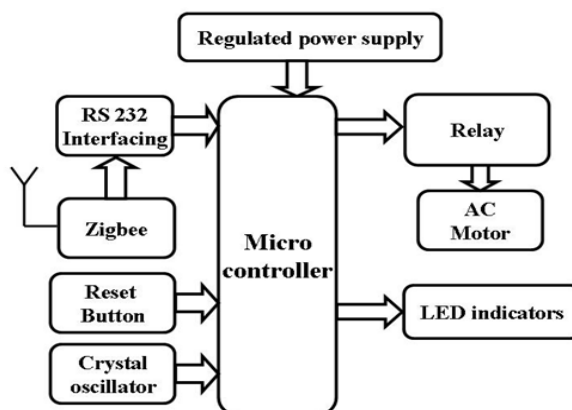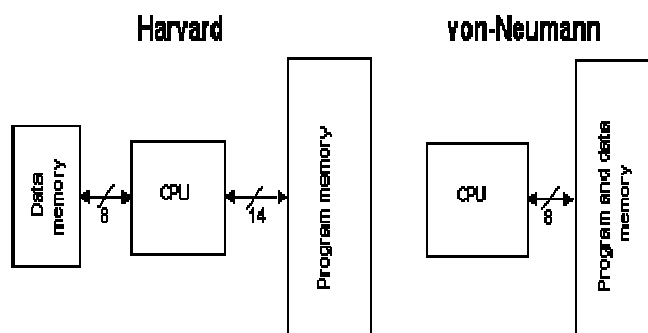Fig.1. Schematic diagram for Transmitter

Fig.1. Schematic diagram for Reciever

A. Central Processing Unit

It has a role of connective element between other blocks in the microcontroller. It coordinates the work of other blocks and executes the user program.

Fig.3. Cordination between Harvard and von-Neumann

The target networks encompass a wide range of devices with low data rates in the Industrial, Scientific and Medical (ISM) radio bands, with building-automation controls like intruder/fire alarms, thermostats and remote (wireless) switches, video/audio remote controls likely to be the most popular applications [8]. So far sensor and control devices have been marketed as proprietary items for want of a standard. With acceptance and implementation of ZigBee, interoperability will be enabled in multi-purpose, self-organizing mesh networks [9,10].
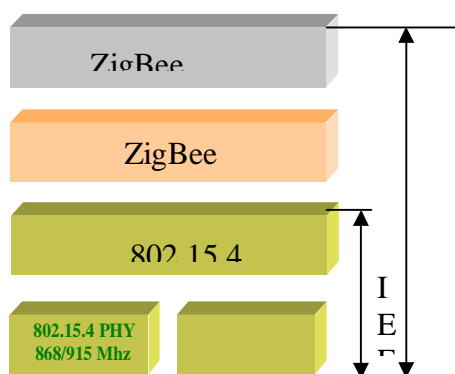
Fig.4. Layers in ZigBee Technology

III. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the study in the paper has been successfully implemented. Thus the results have been successfully designed and tested. The conceptual objective to review in the paper is mainly intended to control the movement of AC motor using wireless Zigbee technology. The study involves Zigbee technology. The micro controller is programmed in such a way that if the data from Zigbee transmitter is received by the receiver and according to the instructions given the AC motor can be controlled.The work in the paper can also be extended by using Wi-Fi wireless technology which is used to increase the distance of communication. The system can also extend using GSM modem using which the speed can be controlled just by SMS messages.

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