Home Automation Interfaced Bluetooth Control

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Abstract- *Smart home automation system has a Smart home automation system has a wide potential market in the recent scenario. Though the systems were developed, leading to high cost, efficiency and flexibility limitation, we are proposing a cost effective home automation system via Bluetooth control. This paper represents a reliable, compact, fast and low cost smart home automation system, based on Arduino (microcontroller) and Android app. Bluetooth HC-05 Sensor for long range and energy efficient wireless communication system to control the home appliances with GUI interface.*

Keywords- Bluetooth Module, Microcontroller, Relay, Voltage Regulator, Electrolyte Capacitor, Transformer.

I. INTRODUCTION

The concept of Home automation system is to automate the controls of various devices and appliances and make daily life of the people more technology driven. This technology provides more flexibility and can be created based on the client requirement and budget. An internet based home automation system focuses on controlling home electronic devices irrespective of whether someone is inside or outside of the house. The words appliance and devices have been utilized in this paper interchangeably. Automation is the current trend, where devices are being controlled automatically. The usual operation of a home automation system till now was focused on the basic tasks of turning ON/OFF different devices either remotely or in close proximity. Technological enhancement has permitted researchers and developers to use Bluetooth or Wi-Fi technology to connect different devices in a home automation system. In earlier days, Home Automation System was controlled Remotely Using telephone sets and telephone network. Initially PC along with the telephone network has been developed for the purpose of home automation system. DTMF (Dual Tone Multi Frequency) signals have been sent from a sender telephone (DTMF type) to a receiver telephone (DTMF type) through telephone line and an on-off hook detector, a ring detector and a PC has been incorporated within the system.

II. BLUETOOTH (HC-05)

The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04- External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices. The user can use it simply for a serial port replacement to establish connection between MCU and GPS, PC to your embedded project. The Bluetooth has a range of 10 to 100.The communication adapter hardware consists of a 20MHz 16bit CPU, SRAM and a Bluetooth module. In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of micro controllers the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04- External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices. The user can use it simply for a serial port replacement to establish connection between MCU and GPS, PC to your embedded project. The Bluetooth has a range of 10 to 100 Metre.

Fig -I: Bluetooth HC-05 Module

III. MICROCONTROLLER (AT89S52)

A micro controller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer embedded all on a single chip. This microcontroller had 128 bytes of RAM, 4K bytes of on-chip ROM, two timers, one serial port and four ports (each 8-bits wide) all on a single chip. At89s52 is Flash type 8051. It is a low-voltage, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable memory having 51 instructions set. The At89s52 is a low-voltage, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable memory. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel At89s52 is a powerful microcomputer, which provides a highly flexible and cost-effective solution to many embedded control applications. In addition, the At89s52 is designed with static logic for operation down to zero frequency and supports two software select-able power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning.

IV. PROBLEM FORMULATION

Today people are looking at ways and means to better their usage of appliances using the latest technologies that are available. Any new facility or hope appliance that promises to enhance their life-style is grabbed by the consumers. The more such facilities and appliances are added, it becomes inevitable to have easy and convenient methods and means to control and operate these appliances. Conventional wall switches are located in different parts of a house and thus necessitates manual operations like to switch on or off these switches to control various appliances. It gets virtually impossible to keep track of appliances that are running and also to monitor their performances.

V. EXISTING TECHNOLOGY

The newer versions of the equipment have updated inputs and outputs such as HDMI or Optical Digital connected by using RF Technologies. Sub systems don't always fully understand and we don’t know that how sub systems can be integrated into a larger centrally controlled system. And this can cause home automation problems.

VI. PROPOSED TECHNOLOGY

Home automation system makes the operations of various home appliances more convenient and saves energy. With the energy saving concept, home automation or building automation makes life very simple nowadays. It involves automatic controlling of all electrical or electronic devices in homes or even remotely through wireless communication. A simple home automation system was designed and developed using GSM technology that controls electrical devices at home from a remote location by a simple android smart phone. This is achieved by sending an SMS to receiver present at home which is in turn connected to a hardware kit. In default the Arduino is not equipped with a display to visualize measuring-data, for example from your temperature or your pressure Sensor. If you want to get the data shown you need a PC, printing the data to the console or mounting a display directly to the Arduino. So there is no simple way to WIRELESSLY visualize measuring-data. Fig.II will show how to transfer measured Sensor-data in real-time from your Arduino - Microcontroller to your Android-Smartphone via Bluetooth.

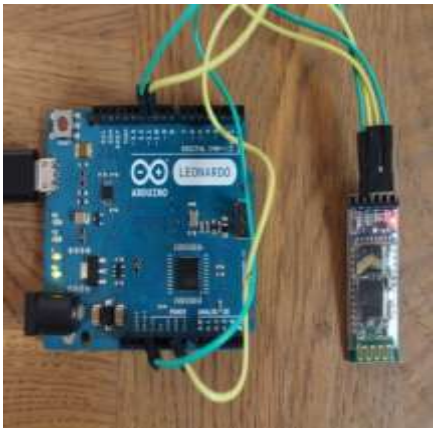

Fig -II: Bluetooth HC-05 and Arduino

VII. HARDWARE IMPLEMENTATION

It consists of Power supply, Transformer, Resistor, Led, Diodes, Capacitor, Relay, Transistor, Voltage regulator, Filter, Rectifier, Dc motor.

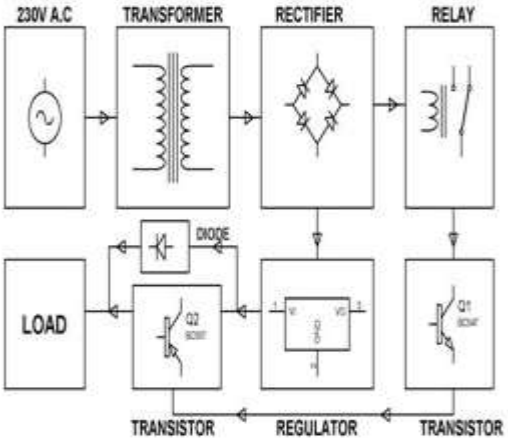

Fig -III: Block diagram

An electrolytic capacitor is a type of capacitor that uses an electrolyte to achieve a larger capacitance than other capacitor types. An electrolyte is a liquid or gel containing a high concentration of ions. Almost all electrolytic capacitors are polarized, which means that the voltage on the positive terminal is greater than the negative terminal. These have a typical capacitance between 1µF to 47mF and an operating voltage of up to a few hundred volts DC.

A relay is an electrically operated switch. Many relays use an electromagnet too mechanically Operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal, or where several circuits must be controlled by one signal.

A voltage regulator is designed to automatically maintain a constant voltage level. A voltage regulator may be a simple "feed-forward" design or may include negative feedback control loops. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages. Electronic voltage regulators are found in devices such as computer power supplies where they stabilize the DC voltages used by the processor and other elements.

VIII. RESULTS

Whenever supply is given to the circuit an indication led will ON. So that indication the system is ready to use. We pair the HC-05 module to the mobile and open the ARDUTOOTH app click on the HC-05 and click on the terminal on it shows a message “BLUETOOTH IS READY TO USE”. Whenever we send “A” message the bulb will glow and we send “C” the dc motor fan will start ,”B” the bulb will stop glowing & “D” will stop the fan.

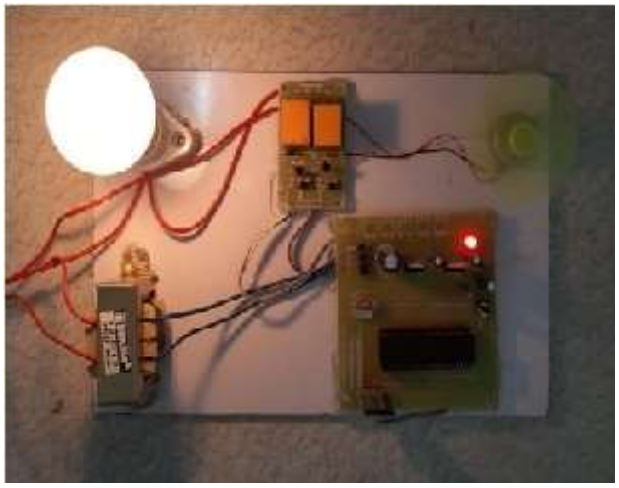

Fig -5: Output

IX. CONCLUSIONS

This project is made, that provides more flexibility in operation. Home automation is undeniably a resource which can make a home environment automated. People can control their electrical devices via these “HOME AUTOMATION” devices and setup controlling actions through mobile.

FUTURE SCOPE

This project can be further developed by integrating it with the internet to monitor your home while sitting in a remote area. By doing this, one can keep an eye on his or her home through an internet connected to the user’s mobile phone or PC or laptop. This will not only improve the security of your home in this modern day world but will also assist in conservation of energy like if you left any home appliance switched on by mistake, then you can check the status of the appliance on the graphical interface made on your mobile and can switch it off using the internet connectivity.

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