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One touch appliance control

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Abstract

The main objective of this project is to develop a home automation system using an Arduino board with Bluetooth being remotely controlled by any Android OS smartphone. As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control systems, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation systems provide a most modern solution with smartphones. In order to achieve this, a Bluetooth module is interfaced to the Arduino board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF commands to the receiver where loads are connected. By touching the specified location on the GUI, the loads can be turned ON/OFF remotely through this technology.

Components Required

1)ARDUINO UNO
2)1 CHANNEL RELAY(5v)
3)BLUETOOTH MODULE HC05
4)POWER SUPPLY
5)LOAD(BULB 220V)
6)CONNECTING WIREs
7)SMARTPHONE(BLUETOOTH ENABLED)

Description

ARDUINO UNO

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself (DIY) kits.

Features of the Arduino UNO:
Microcontroller: ATmega328

Operating Voltage: 5V
Input Voltage (recommended): 7-12V
Input Voltage (limits): 6-20V
Digital I/O Pins: 14 (of which 6 provide PWM output)
Analog Input Pins: 6
DC Current per I/O Pin: 40 mA
DC Current for 3.3V Pin: 50 mA
Flash Memory: 32 KB of which 0.5 KB used by bootloader
SRAM: 2 KB (ATmega328)
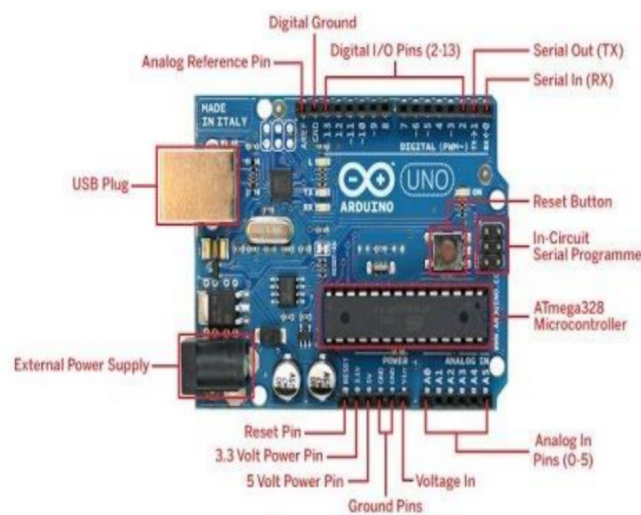EEPROM: 1 KB (ATmega328)
Clock Speed: 16 MHz

Fig-1 Arduino Uno

BLUETOOTH MODULE(HC-05 Bluetooth Module)

HC-05 Specification:

Bluetooth protocol: Bluetooth Specification v2.0+EDR
Frequency: 2.4GHz ISM band
Modulation: GFSK(Gaussian Frequency Shift Keying)
Emission power: ≤4dBm, Class 2
Sensitivity: ≤-84dBm at 0.1% BER
Speed: Asynchronous: 2.1Mbps(Max) / 160 kbps, Synchronous: 1Mbps/1Mbps
Security: Authentication and encryption
Profiles: Bluetooth serial port
Power supply: +3.3VDC 50mA
Working temperature: -20 ~ +75Centigrade
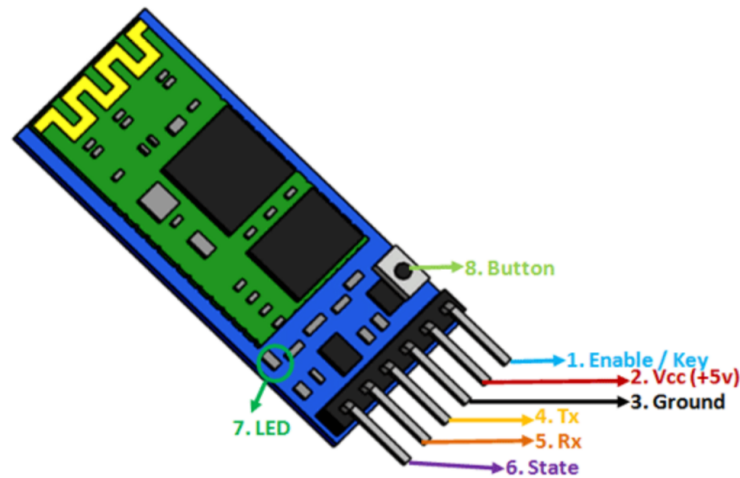Dimension: 26.9mm x 13mm x 2.2 mm

Fig-2 BT module HC-05
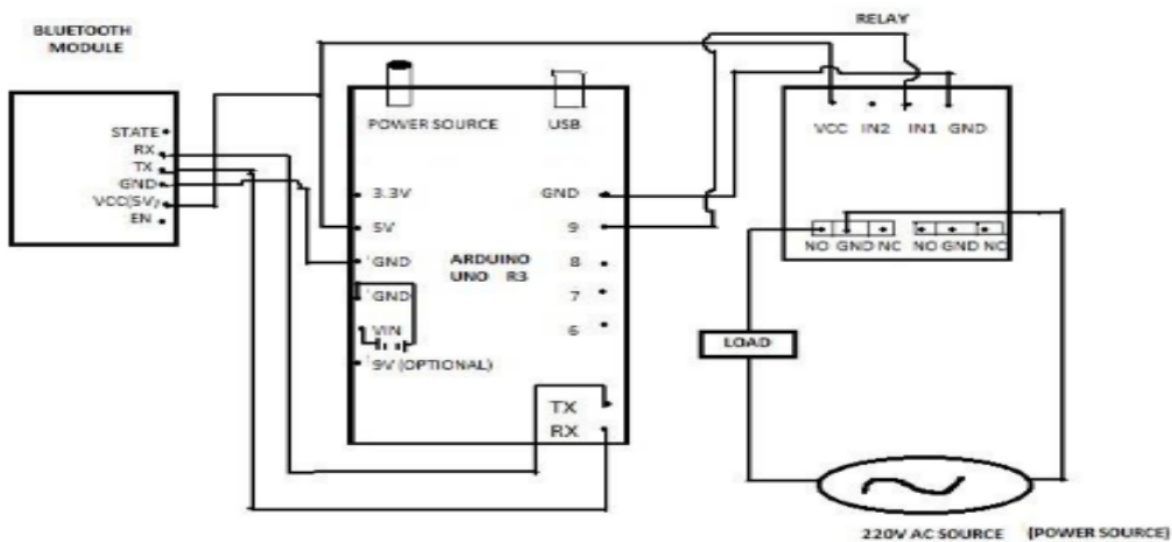
Circuit Diagram

Fig-3 Assembled Circuit.

Code

```
void setup() {
Serial.begin(9600);
pinMode(8, OUTPUT); // put your setup code here, to run once:
pinMode(13,OUTPUT);
```

```
}
void loop() {
// put your main code here, to run repeatedly:
if(Serial.available()>0)
{
char data= Serial.read(); // reading the data received from the bluetooth module
switch(data)
{
case 'a': digitalWrite(8, HIGH);break; // when a is pressed on the app on your smartphone
case 'd': digitalWrite(8, LOW);break; // when d is pressed on the app on your smartphone
case 'b': digitalWrite(13,HIGH);break;
case 'c': digitalWrite(13,LOW);break;
default : break;
}
Serial.println(data);
}
delay(50);
}
```

Applications

Home Is Where the Smart Is

Evm Machine-to-machine communication, and you understand you're not the most tech-savvy consumer, it's impossible that you've missed the abundance of home automation products filling the shelves and ads of every home improvement store. Suddenly an ordinary errand for light bulbs will leave you wondering if your lamp could send you a message alerting you that the light bulb needs to be replaced. Furthermore, if your lamp is talking to you, could your refrigerator and sprinkler system be too? Experts say: Yes, the possibilities are endless. If that's the case, where do you begin?Any day-to-day, repeatable process is automatable with smart home applications. The greater the control and flexibility of these processes, the more energy and cost savings the resident experiences, which are factors anyone who pays utilities strives to moderate. The smart home revolution is likely to be more of an evolution, with the incorporation of one or two home systems at a time, gradually automating our households through smart mobile devices. However, with these elements of efficiency comes the question of ease of use. Will it bring you enjoyment or exasperation? With so many brands and models already available in an ever-growing market, how do you know which is best for you?

Lighting Control: Leaving the Dark Ages and Stepping Into the Light

Smart lighting allows you to control wall switches, blinds, and lamps, but how intuitive is a lighting control system? It turns out, quite; its capabilities are extensive. You're able to schedule the times lights should turn on and off, decide which specific rooms should be illuminated at

certain times, select the level of light which should be emitted, and choose how particular lights react through motion sensitivity, as seen with Belkin's WeMo Switch + Motion, which is both affordable and easy to use with its plug-and-play simplicity.

HVAC Regulation: No Longer Burned by Your Heating Bill

As fuel costs rise and the availability and sustainability of our resources becomes a greater concern, heating/cooling our homes efficiently is less of a budgetary bonus and more of a necessity. Over the past year, smart thermostats and automated home heating systems have become more readily available and easily incorporated into any home. Heating and cooling our homes consumes an average of 50% of energy costs yearly, making daily HVAC regulation progressively rewarding. Maintaining a substantial lead among the nearly non-existent competition, the Nest Learning Thermostat, learns your heating and cooling preferences over time, eliminating the need for programming and is accessible from your smartphone app. With automated HVAC you are able to reduce the heat when a room is unoccupied, and increase or decrease it at specific times based on your schedule and occupancy.

Conclusion

The system as the name indicates, 'Home automation' makes the system more flexible and provides an attractive user interface compared to other home automation systems. In this system

We integrate mobile devices into home automation systems. A novel architecture for a home automation system is proposed using relatively new communication technologies. The

The system consists of mainly three components: a BLUETOOTH module, Arduino microcontroller and relay circuits. WIFI is used as the communication channel between android phone and the Arduino microcontroller. We hide the complexity of the notions involved in the home automation system by including them into a simple, but comprehensive set of related concepts. This simplification is needed to fit as much of the functionality on the limited space offered by a mobile device's display. This paper proposes a low cost, secure, ubiquitously accessible, auto-configurable, remotely controlled solution. The approach discussed in the paper is novel and has achieved the target to control home appliances remotely using the WiFi technology to connect system parts, satisfying user needs and requirements. WiFi technology capable solution has proved to be controlled remotely, provide home security and is cost-effective as compared to the previously existing systems. Hence we can conclude that the required goals and objectives of the home automation system have been achieved. The system design and architecture were discussed, and the prototype presents the basic level of home appliance control and remote monitoring has been implemented. Finally, the proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems.