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# BLUETOOTH BASED HOME ROBOTIZATION BY USING ATmega16 MICROCONTROLLER

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***Abstract***

*Innovation is a ceaseless procedure. To have the capacity to plan an item utilizing the present innovation that will be useful to the lives of others is an enormous commitment to the group. This paper demonstrates the arrangement and execution of a negligible exertion yet versatile and secure mobile bluetooth based home robotization framework. The outline depends on a remain solitary ATmega16 microcontroller. This framework is intended to be ease and versatile enabling assortment of gadgets to be controlled with least changes to its center. Secret key security is being utilized to just permit approved clients from getting to the apparatuses at home. It empowers us will control home pack machines. It also gives for home security. Home robotization alludes ought to decay human endeavors, in addition gone through proficiency. The individuals guideline destination for home computerization In addition security will be will support weakened In addition of age created people who will empower them once control home machines also caution them carried out crucial condition.*

***Keywords:*** *Microprocessor, Bluetooth, Robotization,Atmega16*

## 1. Introduction

### 1.1 What is Home Robotization?

Home robotization is defined as it controls each and every single electrical gadget in our home or office,. Incapacitated can give expanded personal satisfaction to people who may some way or another require parental figures or institutional care

Highlights and Benefits of Home Robotization

Highlight of Home Robotization

1. Interoperability

Its capacity to entwine different electronic gadgets so they can execute as one brought together framework. A decent case of interoperability is having the lights kill, the fans kill and sends you a content that somebody has in to your room while you are away.

2. Access from far away

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"Mechanization is tied in with having the capacity to control things in your home," says Jay McClellan, leader of Home Automation Inc. So we can Access our Home gadgets from far away ( i.e upto some meters )

3. Assortment of Interfaces

There are various diverse ways you can control the electronic frameworks in your home: by squeezing the catches of a handheld remote or divider mounted keypad, by touching bright symbols on a compact touch board

4. Can-do Attitude

Mechanization is just useful and handy on the off chance that it fits your way of life. Since everybody's way of life is extraordinary, the maker ought to give its installers the apparatuses to tweak the framework to your particular needs.

5. Expandability

Innovation will keep on evolving, presenting a totally new age of items to the commercial center. Later on, you may likewise need to include new rooms. it's essential that a home computerization framework can be effortlessly extended both vertically to fuse extra items and evenly to help extra rooms.

6. Upgradeability

Before you purchase any framework, make sure the maker (or your installer) will have the capacity to open and download programming refreshes naturally.

### 1.2. Advantages of Home Robotization

Includes Safety Through Appliance and Lighting Control : Just by selecting the Bluetooth options in our phone, we can control all appliances This further helps increment the wellbeing and security of your home.

Saves Money & Increases Convenience :By this technology we can save power, money and time. And it is more convieanent for older people

Expands Peace of Mind : In our daily routine works , we get little bit tense after the door lock whether the all gadgets will properly switch off or not, so with this technology we can check the status of our gadgets, by that we get relaxed.

## 2. Why favor Bluetooth??

It is desirable over utilize bluetooth in light of the fact that these days individuals have their cell phones with them constantly, since the cell phones have bluetooth office in them, in this manner it's smarter to utilize bluetooth instead of utilizing RF remotes or IR remotes. Have you at any point seen individuals conveying remotes???

Utilizing bluetooth has its very own significant number preferences :

1.It's safe.

2.Easy to utilize.

3.It works in short separation range(i.e. upto 10mtrs.)

4. Anybody can find free bluetooth applications on android and some more If you ask me, why I made this task?? My answer would be basic since I am far excessively languid and need, making it impossible to control things sitting at one place.

## 3. Block Diagram

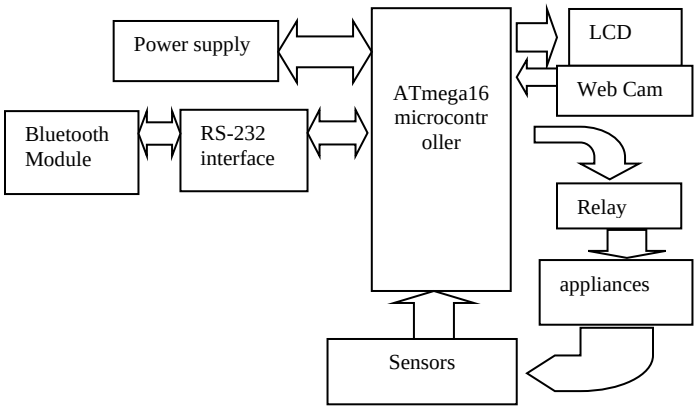


**Figure 1. Block Diagram**

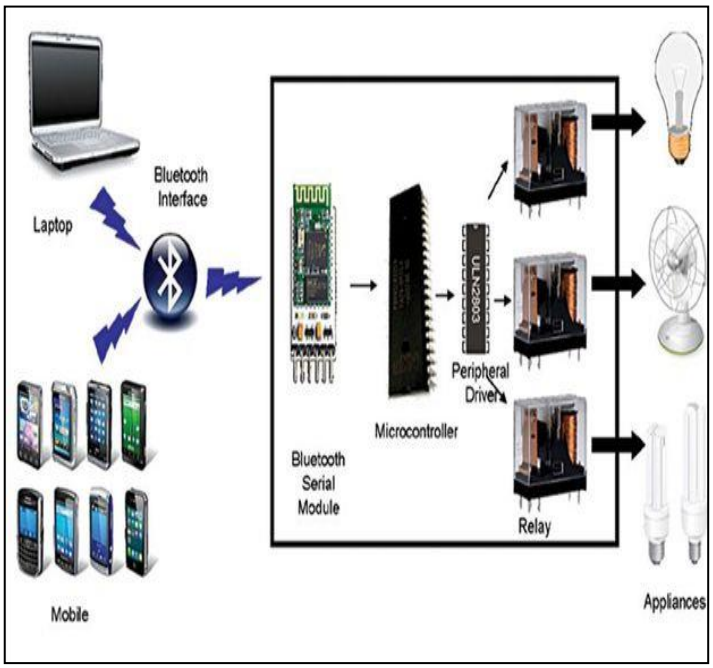


**Figure 2. Block Diagram**

Figure how cool it would be in the event that you can control your AC machines just with a Blue tooth in your cell phone. All you have to tap on your Mobile phone and you can undoubtedly switch ON/OFF your lights, fans and other home machines. AVR miniaturized scale controllers give an awesome stage to fabricate such fascinating undertakings and I have utilized ATMEGA16 micro-controllers.

### 3.1 Description of Block Diagram

The project is soldered by making the microcontroller at the centre. The sensors and communication devices are connected to the microcontroller.

i. Microcontroller: The brain of the project which controls the overall activities. All devices are connected to it by using wires. The project uses Atmega16 microcontroller.

ii. Communication devices: They serve as a bridge between the microcontroller and the user. They are crucial for this project. Without the communication with the user, we can't say that the system is working.

HC-05 Bluetooth Module: to send and receive data between the microcontroller and Bluetooth support devices via Bluetooth.

LCD : to display the temperature

Relay: to control the home appliances as on and off

iii. Sensors: The project uses sensors to control the environment. The different sensors which are used in this project are:

Temperature: used to get the current temperature of the environment

PIR motion : to detect intruders when they got in to home by sensing the motion.

Gas : to sense the carbon-monoxide level of the environment which is dangerous and can lead us to death.

## 4. Circuit Description

a, ATmega16 Microcontroller:

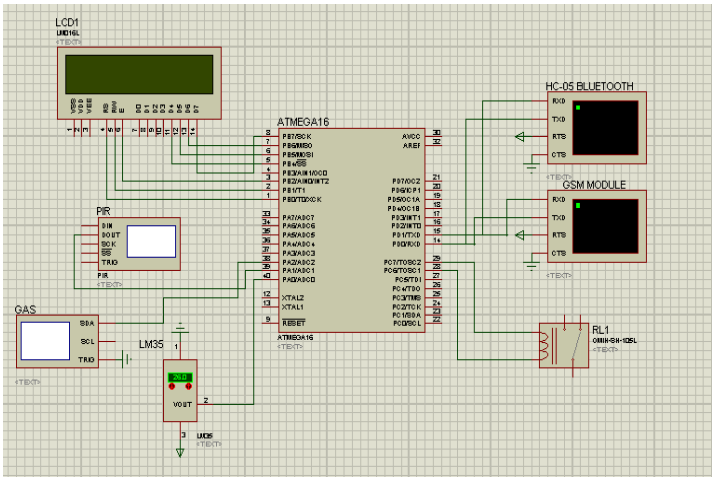


**Figure 3. Circuit Diagram**

ATmega16 is the cerebrum of the undertaking. It control the general action of the venture. It consumes Low power. It depends on improved RISC design with 131 intense guidelines. The ATmega 16, being an AVR center, can execute up to 16 million direction for each second. This is because of the way that AVR guidelines are executed on a solitary clock . ATmega16 is a 40 pin microcontroller. There are 32 I/O lines that are separated into four

8-bit ports, ATmega16 has different in-manufactured peripherals.

Ports:

Atmega16 has four ports namely PORTA, PORTB, PORTC and PORTD

All ports have Read-Modify-Write usefulness.

All pins are equipped for performing double capacities!

Registers:

Each port pin has three register bits

1. DDRx 2. PORTx 3. PINx

DDRx

DDRx = 0xff; //configuring as o/p

DDRx = 0x00; //configuring as i/p

PINx :: To Read data

When sensor is connected to a least significant bit of Port D. To read the status of the sensor, we use PIND.i.e., x=PIND; //x acquires the status of port D

```
if(x&0b00000001)
{sensor is ON}
else
{sensor is OFF}
```

b. GSM Module

In my project I use SIM900 as a communication module with the user while the user is away from his/her home. The device has many internal pins but the interface pins are the following:

Pin 1(GND) : for ground connection with microcontroller.

Pin2(Tx) : transmission pin, it sends data. It should be wired and connected to Rx pin of the microcontroller.

Pin3(Rx) : receiving pin, to receive data. It should be wired and connected to Tx pin of the microcontroller.

Pin4(Mic) : we can connect microphone here

Pin5(Speaker) : if we want to use as a phone, we can connect speaker here.

c. 16x2 LCD

Liquid crystal display used to display data from the microcontroller. I use 16x2 LCD and can display 32 characters in two lines. The 16x2 LCD has 16 pins.

 

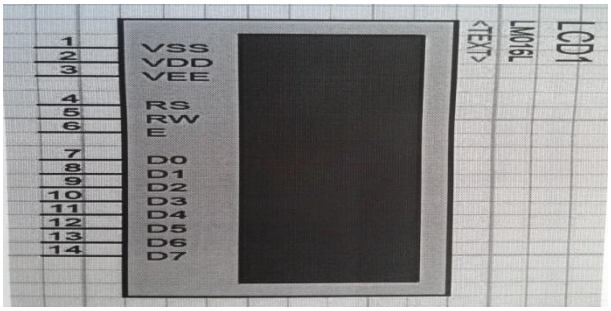


**Figure 4. 16x2 LCD Pins**

d. MQ7

MQ7 is a gas sensor which mainly detects carbon-monoxide and smoke. The sensor has 3 pins VDD, Data and GND which are connected to +5v, data pin and GND of microcontroller.

**Table 1. MQ7 pins**

| Pin No: | Symbol | Description |
|---|---|---|
| 1 | VDD | Power pin |
| 2 | DATA | Data pin, it takes the input and the microcontroller calibrates for gas or smoke |
| 3 | GND | Ground pin |

e. PIR

This sensor is used to detect any motion.. The sensor has 3 pins VCC, OUT and GND

**Table 2. PIR pins**

| Pin No: | Symbol | Description |
|---|---|---|
| 1 | VCC | Power pin |
| 2 | OUT | OUT pin, detects and send any motion |
| 3 | GND | Ground pin |

## 5. HARDWARE DESIGN

The project uses the following hardware components:

Microcontroller

GSM module

HC-05 Bluetooth Module

LCD

LM35

MQ7

PIR

Relay

The other components used are:

LED

Variable Resister

Jumping wires

Voltage regulator

Capacitor

### 5.1 Microcontroller

#### 5.1.1 Introduction

A microcontroller is a little, minimal effort PC it includes:

16 bit microprocessor(CPU) , RAM , ROM ,

Parallel or potentially serial I/O , flag

A/D and/or D/A conversion

To operate a gadget we have to run the code.

#### 5.1.2. ATmega16

Since I'm using TechieNest development board, this device uses Atmega16 as an IC. ATmega16 is produced by ATMEL Company. All necessary information about this microcontroller is stated in the datasheet which is produced by ATMEL.

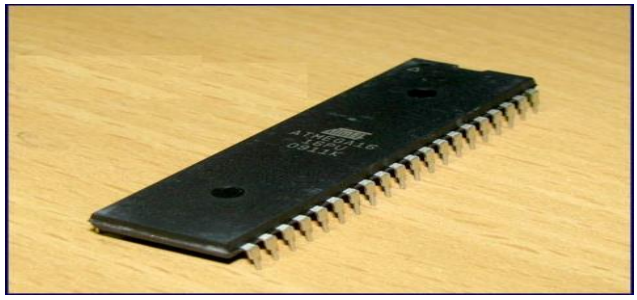

**Figure 5. ATmega16.**

## 6. Algorithm

What the framework does is it just gets the guidelines in ASCII organize from the bluetooth empowered Android cell phone utilizing the bluetooth module and pass it on to the miniaturized

 

scale controller. The miniaturized scale controller does the fundamental handling part and for that reason we require the code, please make your own.

What happens when the controller gets a specific ASCII esteem it turns ON or OFF a transfer. Furthermore, the transfer goes about as a switch for AC apparatuses. I have utilized some banner factors which check whether a specific hand-off is ON or OFF. A specific ASCII esteem is allocated for one and just a single hand-off.

At the point when an ASCII esteem is taken a break, it switches ON the transfer and if a similar esteem is passed once more, the hand-off gets turned OFF.

## 7. Future Enhancement

As a future work, this undertaking can be utilized as a kind of perspective or as a base for understanding a plan to be executed in different tasks of more noteworthy level by expanding the security component, adaptable, and even lower cost. The undertaking can be upgraded by recording video and utilizing face recognizer so that regardless the gatecrasher can be distinguished so effectively.. For instance "Increment Temperature". Adding affirmation summons to the voice acknowledgment framework could be another future upgrade.

## 8. Conclusion

In this paper I have shown possible application of Bluetooth based home computerization framework which is minimal effort, secure, universally available. By controlling the lights, fans, heaters and other home appliances remotely we can save our money, energy and time. From this system we can also get flexibility, manageability and achieving security. For elderly and disables this system plays a great role.

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