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Robovac(Cleaning Robot)

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Abstract - With the advancement of technology, robots are getting more attention of researchers to make life of mankind comfortable. IN recent years, robotic cleaners have taken major attention in robotics research due to their effectiveness in assisting humans in floor cleaning applications at homes, hotels, restaurants, offices, hospitals, workshops, warehouses and universities etc. Basically, robotic cleaners are distinguished on their cleaning expertise like floor mopping, dry vacuum cleaning etc. Some products are based on simple obstacle avoidance using infrared sensors while some utilize laser mapping technique. Each cleaning and operating mechanism of robotic floor cleaners has its own advantages and disadvantages. For example, robots utilizing laser mapping are relatively faster, less time consuming and energy efficient but costly, while obstacle avoidance-based robots are relatively time consuming and less energy efficient Due to random cleaning but less costly. This design contains a microcontroller like PIC, multiple sensors etc.

***Key Words*: ROBOVAC (Cleaning Robot)**

1. INTRODUCTION

CIRCUIT DIAGRAM DISCREAPYION:

This project includes main blocks are microcontroller, power supply, ultrasonic sensor, dc motor drive circuit.

Microcontroller:

All operations control in this project by microcontroller. In short microcontroller is heart of our project. Here we will use PIC16f690 microcontroller. PIC 16f690 is 20 pin controller operates on 5V power supply.

Power supply:

In this project power supply provide by using solar power. So that solar panel will be use. Output of solar power will be given to regulated power supply circuit which generates 5V, 12V power supply according to requirements.

Ultrasonic sensor:

Ultrasonic sensors are noting but ultrasonic transducers. That converts ultrasound waves to electrical signals or vice versa. Here ultrasonic sensors are used to measure area. Ultrasonic sensors can detect movement of target and measure the distance to them.

DC motor drive circuit: DC motor drive circuit consist of relay which ON/OFF by controller.

1.1 SYSTEM DESIGN AND DETAILS

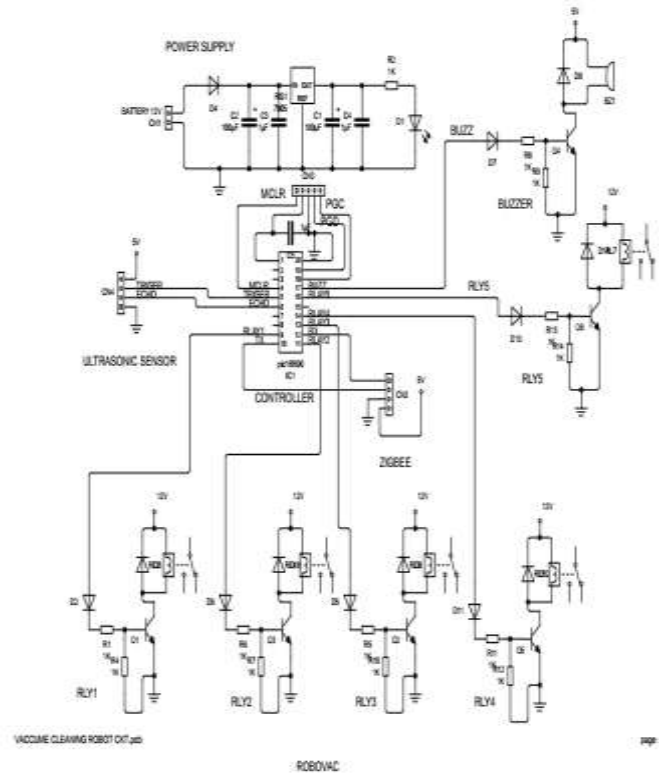

Figure. Circuit diagram ROBOVAC PCB

Components:

Bluetooth (HC - 06):

- It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications.
- It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions.
- It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air.

- It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART).
- HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration.

Figure: Bluetooth Module

Ultrasonic Sensor:

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules include ultrasonic transmitters, receiver and control circuit. The basic principle of work:

(1) Using IO trigger for at least 10us high level signal,

(2) The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.

IF the signal back, through high level, time of high output IO duration is the time from sending ultrasonic to returning.

Test distance = (high level time velocity of sound (340M/S) / 2,

Wire connecting direct as following:

5V Supply

Trigger Pulse Input

Echo Pulse Output

0V Ground

Figure: Ultrasonic Module

Power Supply:

One of the important sources of DC Supply are Batteries. But using batteries in sensitive electronic circuits is not a good idea as batteries eventually drain out and lose their potential over time. Also, the voltage provided by batteries are typically 1.2V, 3.7V, 9V and 12V. This is good for circuits whose voltage requirements are in that range. But, most of the TTL IC's work on 5V logic and hence we need a mechanism to provide a consistent 5V Supply.

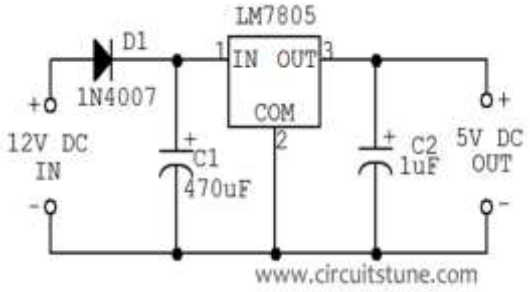

Fig. Power Supply

2. Application Software:

Pair HC-05 and smartphone:

- Search for new Bluetooth device from your phone. You will find Bluetooth device with "HC-05" name.
- In smart phone, open Bluetooth terminal application and connect to paired device HC-05.
- It is simple to communicate; we just have to type in the Bluetooth terminal application of smartphone. Characters will get sent wirelessly to Bluetooth module HC-05.
- HC-05 will automatically transmit it serially to the PC, which will appear on terminal. Same way we can send data from PC to smartphone.
- The app invented by these searches for the Bluetooth devices along with their MAC addresses.

- The user just needs to select a particular MAC Address. When a particular MAC is selected, the status shown on the screen is "Connected.

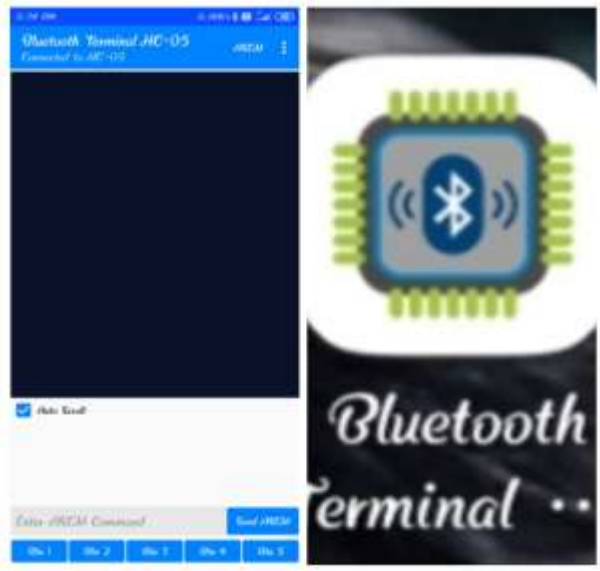

Fig. Software of Bluetooth Terminal Application

SYSTEM OPERATION

Fig: Hardware of ROBOVAC Cleaning Robot

3. CONCLUSION

In these projects to improve the best automation system Are required to advancement of technology, robots are getting more attention of researchers to make life of mankind comfortable.

REFERENCES

[1] http://www.instructables.com/id/Floor-cleaner-robot-controlled-by-Arduino

[2] http://www.scribd.com/doc/231094704/Automatic-cleaner-project#scribd

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