MOBILE SPYING ROBOT

MUHAMMAD AZAMUDDIN BIN KHARSANI

ELECTRICAL ENGINEERING DEPARTMENT
SEBERANG PERAI POLYTECHNIC

DISEMBER 2017

MOBILE SPYING ROBOT

MUHAMMAD AZAMUDDIN
BIN KHARSANI

ELECTRICAL ENGINEERING DEPARTMENT

SEBERANG PERAI POLYTECHNIC

DISEMBER 2017

ABSTRACT

One of the ways that our military are beginning to explore new technologies in war fields come from the autonomous spying robot. In this paper a robot will be helpful for spying and object detect & shooting purpose in war fields. The main objective is to provide reliable, cost effective and accurate technique to destroy an unusual threat in the environment using image processing. Humans have evolved to better survive and have evolved their invention. In today age, a large number of robots are placed in many areas replacing manpower in severe or dangerous workplaces. Moreover, the most important thing is to take care of this technology for developing robots progresses.

A robotics vehicle using Bluetooth or arduino technology for remote operation attached with wireless camera for monitoring purpose. This project proposes an autonomous moving system which automatically finds its target from a scene, lock it and approach towards its target and hits through a shooting mechanism.

ABSTRAK

Salah satu cara yang tentera kita mula meneroka teknologi baru dalam medan perang berasal dari robot pengintipan. Dalam projek ini robot akan membantu untuk mengintip dan objek mengesan & tujuan penggambaran dalam medan perang. Tujuan utama adalah menyediakan teknik yang boleh dipercayai, kos efektif dan tepat untuk menghancurkan ancaman yang luar biasa dalam alam sekitar dengan menggunakan pemprosesan imej. Manusia telah berkembang untuk bertahan lebih baik dan telah mengembangkan ciptaan mereka. Pada hari ini, sejumlah besar robot diletakkan di banyak tempat menggantikan tenaga kerja di tempat kerja yang teruk atau berbahaya. Selain itu, perkara yang paling penting adalah menjaga teknologi ini untuk membangunkan robot yang sedang berkembang.

Kenderaan robotik menggunakan teknologi Bluetooth atau arduino untuk operasi jarak jauh yang dilampirkan dengan kamera tanpa wayar untuk tujuan pemantauan. Projek ini mencadangkan sistem bergerak autonomous yang secara automatik mendapati sasarannya dari tempat kejadian, mengesan dan mendekati sasarannya dan merakam melalui mekanisme menembak.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLE

LIST OF FIGURES

LIST OF TABLE

CHAPTER 1

INTRODUCTION

This project is introducing the robot which is used to minimize human casualties in terrorist attack. The combat robot has been designed to tackle such a cruel terror attacks. This robot is Bluetooth operated; self- powered, and has all the controls like a normal car. A wireless camera has been installed on it, so that it can monitor enemy remotely when required. This robot can silently enter into enemy area and send us all the information through its' tiny Camera eyes. A shooting gun mechanism has been mounted on the top of the robot for shooting the enemies. All this controlling of the robot is done by android application. This spy robot can be used in star hotels, shopping malls, jewelary show rooms, etc. where there can be threat from intruders or terrorists.

1.0 Problem Statements

As we all know, these days Malaysia is sick off massive terror attacks, bomb explosions at plush resorts. Since human life is always precious, these robots are the replacement of fighters against terrorist in war areas. To avoid such disasters Technological power must exceed Human power. Human life and time are priceless. We have taken an initiative to design a model of an apt robot that meets combatant needs. So to avoid terror attacks, to ensure more security at the border and high density areas it's wise to maintain a world class military technology in accordance with combatant needs.

implemented a solution for the problem of replacing a soldier with a robot soldier completely controlled with a wireless network. Tracing and attacking enemies at different areas are very much difficulty for the soldier. This robot is Bluetooth operated; self- powered, and has all the controls like a normal car. A wireless camera has been installed on it, so that it can monitor enemy remotely when required.

Objectives

The main objective behind developing this robot is for the surveillance of human activities in the war field or border regions in order to reduce infiltrations from the enemy side.

The objective of this project are:

- to replaced real soldierand perform few activities that can be aligable by an artificial robot.
- To build a robot that can auto-shoot using a wireless remote control.
- To Patrol the surroundings with sharp camera-eye.

1.1 Scope And Limitation Project

scope :

This project will allow the mobile robot can be enter any small area that human cannot enter, robot control with Bluetooth and easily can be remote and with some additional component this robot have ability to pull the trigger to shoot. specialized of this robot it can be monitor remotely by using a wireless camera.

limitation project :

The proposed system causes a lot of vague conditions. For example without using the application (Bluetooth RC Controller) on the mobile, this system will not work because it depends entirely on the application. this project can be eneter any small area as low as 1.5-2 feet. can be monitor with wireless camera for 50 meters. this robot have a distance controlling in 30 meter.

1.3 Important And Impact Of Project

The important and impact of this project are:

i. Ability to reducing the risk of their casualties and to defeat their enemies.

ii. Can make it yourself.

iii. Low cost.

1.4 Project Outline

This thesis comprises of five chapters. The first chapter briefly discusses the overviews about the project such as introduction, objectives, problem statements and scope of this project.

Chapter 2 describes about the research and information about the project. Every facts and information, which found through by any references had been selected. This literature review has been explained about the mini spy robot.

Chapter 3 will discuss about the project methodology used in this project such as hardware process, programming, and software. All these methodology should be followed for a better performance.

Chapter 4 will explain about the cost that have spent for this project that is "mobile spying robot" and how to solve problem if occur. This will include the cost of each component, materials, tools and the total expenses or each section.

Finally the conclusion has been made and recommendation for the future works. The recommendation is added to give an opinion and also an improvement on how the future works should have done.

CHAPTER 2

LITERATURE REVIEW

Remote controlled robots were developed in the 1940s and were used by trained experts. A new class of remotely controlled robots is now accessible on the Internet: the online robots. These allow users from all over the world to look over museums, tend gardens, navigate undersea, float in blimps, or handle protein crystals. The first generation of online robots came into existence in 1994. In contrast, research on the second generation of Internet robots has recently begun to focus on autonomous mobile robots that navigate in a dynamic and uncertain environment. Remote controlled robot had problem in their range limitation and also they were very expensive in term of security and use.

2.0 Introduction

This chapter informs us all about the research before the robot has been set up. To build this project, it requires the knowledge that are not readily. There are three main parts need to be investigated in this project , namely mobile robot design, sensing technology and microcontroller specification. Motor is a one of the method an electronic device achieving movement. Motors are the most important parts of mobile robotics platform. Moreover, a action cam is a device which spy or view the scene on live. The main objective of incorporation sensors technology in robotic system is to enable the robots to work in non-structured and random environment. The robot needs the microcontroller specification in order build the robot that will follow the project planning. The microcontroller performs as a brain of the system. After that, the mechanical part, electrical part and programming will be combined together to produce an antonomous system.

2.1 Full system block diagram

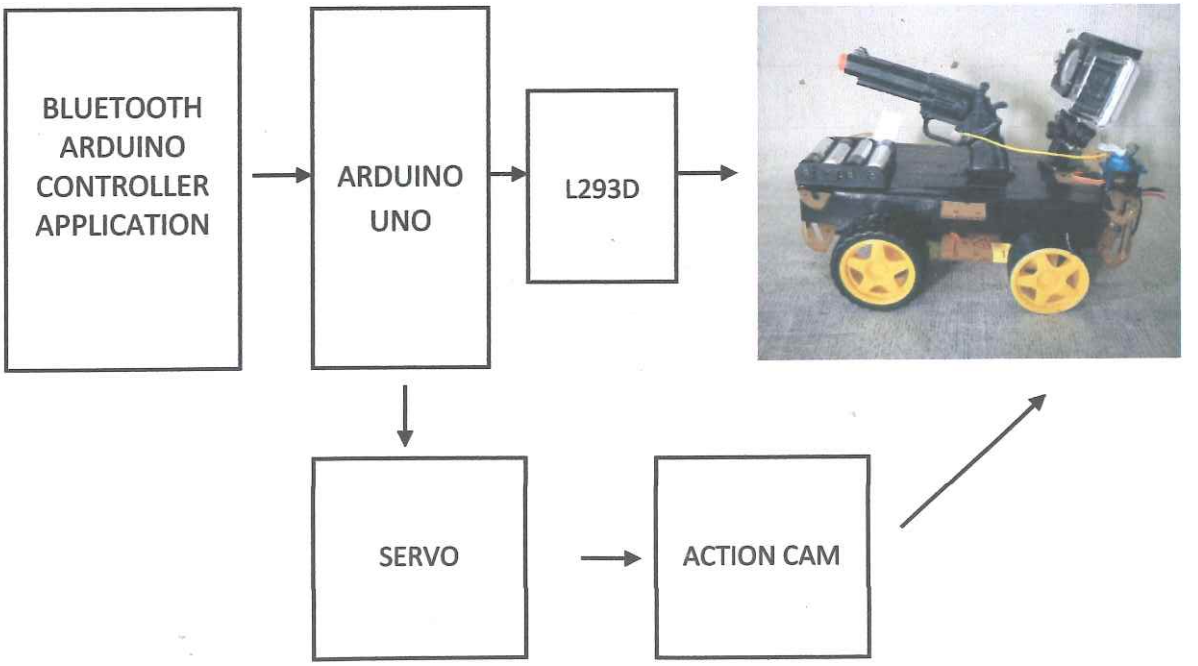

Figure 2.1: Full system block diagram

This system is controlled by Arduino uno, the relay and L293d circuit will be connected to the Arduino uno. We was write the command for communicate with Arduino uno. The Arduino uno was controlled the micro servo motor for instructions. The micro servo motor will function when the user wants to start shooting and will act as a combact robot. Arduino uno is a microcontroller, they control the entire system command using the programming language C.

2.2 Circuit Description

The circuit on this system can be devided into 3 part.

1. A brain which is Arduino uno which will control instruction the whole system.

2. Second circuit, connection of two dc motor, l293d and bluetooth module.

3. Third circuit, connection of relay circuit for 12 volt dc motor.

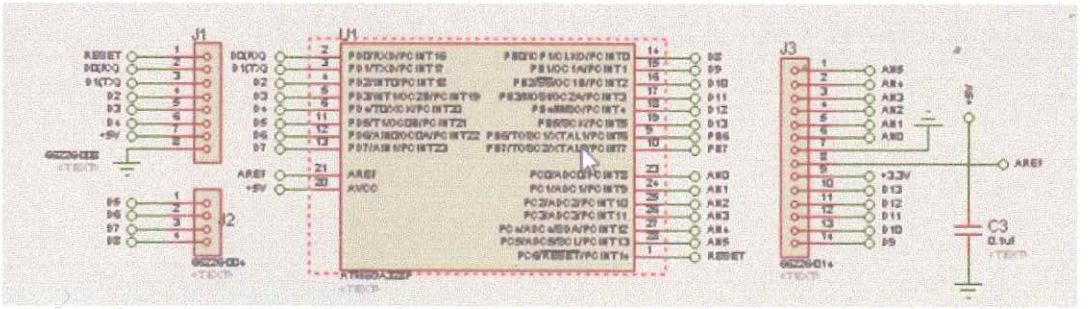

Figure 2.2(a): Arduino circuit.

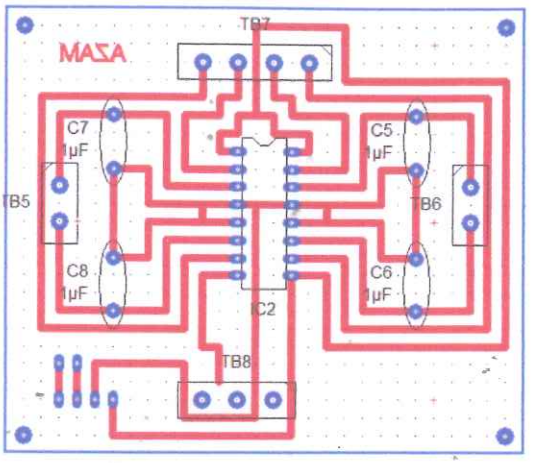

Figure 2.2(b): Two dc motor and bluetooth module with microcontroller

2.3 Software

Software to write code to ATMEGA328P-PU is Arduino 1.6.5, which has written in C language. Below is the code to for this system :

```
#include <Servo.h>

int motor1Pin3 = 3; // pin 2 on L293D IC

int motor1Pin2 = 4; // pin 7 on L293D IC

int enable1Pin = 6; // pin 1 on L293D IC

int motor2Pin4 = 8; // pin 10 on L293D IC

int motor2Pin1 = 7; // pin 15 on L293D IC

int enable2Pin = 11; // pin 9 on L293D IC

int state;

int flag=0;        //makes sure that the serial only prints once the state

int stateStop=0;

Servo myservo;

int pos = 0;

void setup() {   // sets the pins as outputs:

  pinMode(motor1Pin3, OUTPUT);

  pinMode(motor1Pin2, OUTPUT);

    pinMode(enable1Pin, OUTPUT);
```

```
  pinMode(motor2Pin4, OUTPUT);
  pinMode(motor2Pin1, OUTPUT);
  pinMode(enable2Pin, OUTPUT);
  myservo.attach(9);
Serial.begin(9600);
myservo.write(180);
delay(1000);      // sets enable1Pin and enable2Pin high so that motor can turn on:
  digitalWrite(enable1Pin, HIGH);
  digitalWrite(enable2Pin, HIGH);
  // initialize serial communication at 9600 bits per second:
 Serial.begin(9600);
}
void loop()
{
  //if some date is sent, reads it and saves in state
  if(Serial.available() > 0)
  {
    state = Serial.read();
    flag=0;
```

```
  }
  if (state == '6')
{
myservo.write(10);
delay(100);
Serial.println("kona");
}
if (state == '7')
{
myservo.write(170);
delay(100);
Serial.println("pusing");
}
  // if the state is '1' the DC motor will go forward
  if (state == '1') {
      digitalWrite(motor1Pin3, HIGH);
      digitalWrite(motor1Pin2, LOW);
      digitalWrite(motor2Pin4, LOW);
      digitalWrite(motor2Pin1, HIGH);
```

```
    if(flag == 0){
      Serial.println("Go Forward!");
      flag=1;
    }
}
    // if the state is '2' the motor will turn left
 if (state == '2') {
    digitalWrite(motor1Pin3, HIGH);
    digitalWrite(motor1Pin2,HIGH);
    digitalWrite(motor2Pin4, LOW);
    digitalWrite(motor2Pin1, LOW);
    if(flag == 0){
      Serial.println("Turn LEFT");
      flag=1;
    }
    delay(300);
    state=3;
    stateStop=1;
}
```

```
// if the state is '3' the motor will Stop
if (state == '3' || stateStop == 1) {
    digitalWrite(motor1Pin3, LOW);
    digitalWrite(motor1Pin2, LOW);
    digitalWrite(motor2Pin4, LOW);
    digitalWrite(motor2Pin1, LOW);
    if(flag == 0){
     Serial.println("STOP!");
     flag=1;
    }
    stateStop=0;
}
// if the state is '4' the motor will turn right
if (state == '4') {
    digitalWrite(motor1Pin3, LOW);
    digitalWrite(motor1Pin2, LOW);
    digitalWrite(motor2Pin4, HIGH);
    digitalWrite(motor2Pin1, HIGH);
    if(flag == 0){
```

```
      Serial.println("Turn RIGHT");
      flag=1;
    }
    delay(300);
    state=3;
    stateStop=1;
  }
 // if the state is '5' the motor will Reverse
if (state == '5') {
    digitalWrite(motor1Pin3, LOW);
    digitalWrite(motor1Pin2, HIGH);
    digitalWrite(motor2Pin4, HIGH);
    digitalWrite(motor2Pin1, LOW);
    if(flag == 0){
      Serial.println("Reverse!");
      flag=1;
    }
  }
}
```

2.4 Flowchart Of Project

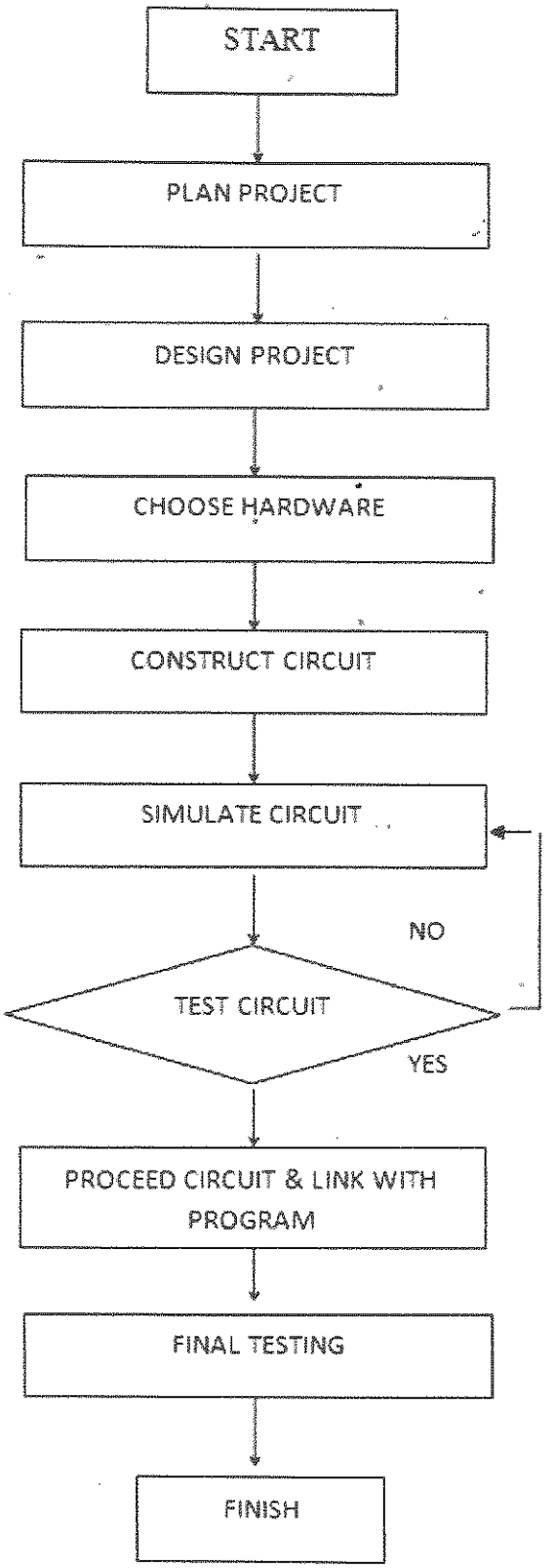

Figure 2.4: Flowchart of project

2.5 Component Of Projects

This is the proposed for mobile spy robot of material as on planned.

COMPONENT OF SPY WAR ROBOT	
DESCRIPTION	**QUANTITY**
BOARD 1	
Arduino UNO	1
IC L293D	1
4.5 Volt Dc Motor	2
Bluetooth module HC-06	1
Capacitor 0.1µf	4
Terminal Block (2 pin)	7
Terminal block (3pin)	1
9-Volt Battery	1
Diode 1N4007	1
SG90 9 g Micro Servo	1
Action Cam	1

Table 2.5: Component of Projects

a. Arduino Microcontroller UNO

Arduino Compatible can mean many things, but most of the time it means that some company has made something they sell to a customer that supports development with the Arduino IDE. The thing is that most Arduino Compatible units use the Atmel processors, but some use others too. Third party developers then make "board"- projects that you can add Arduino IDE. Be aware though that you in some cases can run into issues if you don't do your work homework, here are some of the issues you can run into. Some "compatible" boards use different architectures, so even if you can do many things with the Arduino IDE, maybe some sensor libraries are not supported. (Might have to be hacked or updated). Some "compatible" boards have different USB-circuits (if they have them at all).

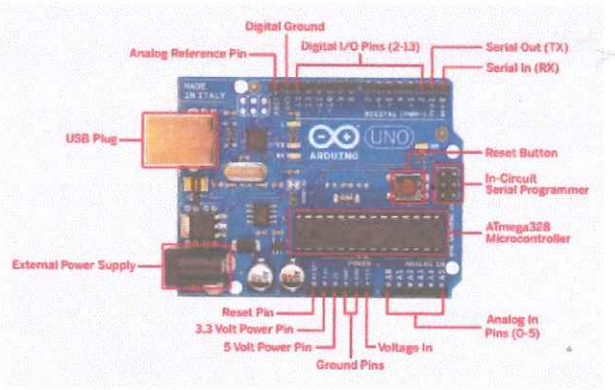

Figure 2.5(a): Arduino Microcontroller UNO Output Pin

b. IC L293D

L293D is a dual H-bridge motor driver intergrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-currentsignal. This higher current signal is used to drive the motors.

L293D contains two imbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pin 2 & 7and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively.

Enable pin 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enable. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

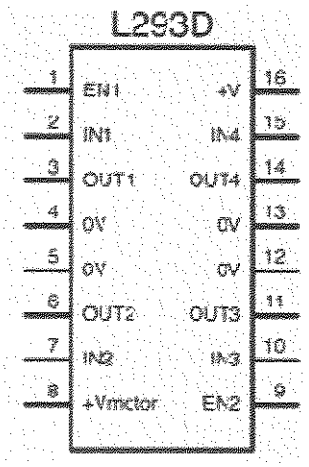

Figure 2.5(b)(i): Output pin of L293D

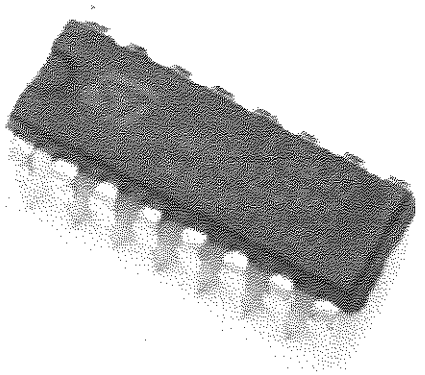

Figure 2.5(b)(ii): L293D

c. DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

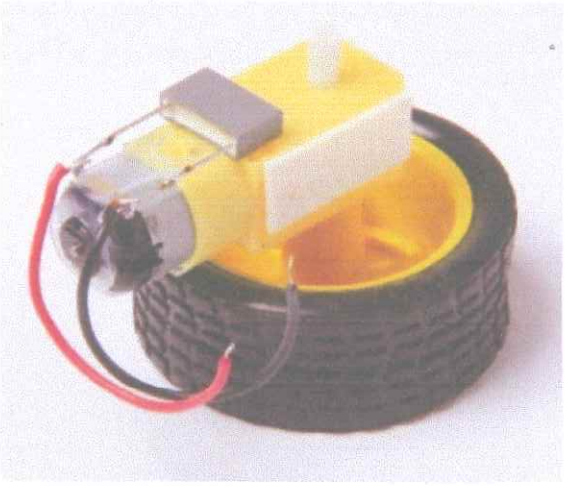

Figure 2.5(c)(i): DC Motor

d. Bluetooth module HC-06

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). Range is approximately 10 Meters (30 feet).

These modules are based on the Cambridge Silicon Radio BC417 2.4 GHz BlueTooth Radio chip. This is a complex chip which uses an external 8 Mbit flash memory.

HC-05 PinOut (Right) :

- KEY: If brought HIGH before power is applied, forces AT Command Setup Mode. LED blinks slowly (2 seconds)
- VCC: +5 Power
- GND: System / Arduino Ground
- TXD: Transmit Serial Data from HC-06 to Arduino Serial Receive. NOTE: 3.3V HIGH level: OK for Arduino
- RXD: Receive Serial Data from Arduino Serial Transmit
- STATE: Tells if connected or not

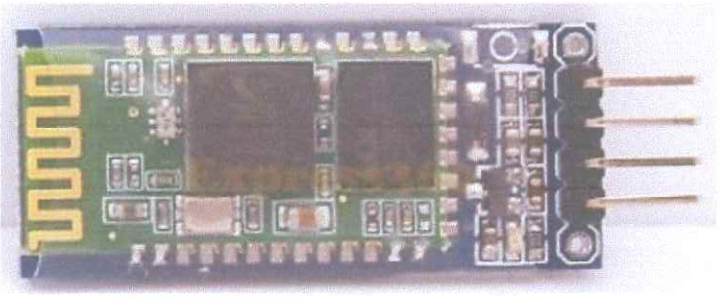

Figure 2.5(d): Bluetooth module HC-06