

DRONE INTERNSHIP

Submitted in partial fulfillment of the requirements for the

Professional Training –I of

Bachelor of Engineering Degree in

Electrical and Electronics Engineering

By

BHARATHI.S (39140009)



DEPARTEMENT OF ELECTRICAL AND ELECTRONICS

SCHOOL OF ELECTRICAL AND ELECTRONICS

**SATHYABAMA INSTITUTE OF SCIENCE
AND TECHNOLOGY**

JEPPIAAR NAGAR, RAJIV GANDHI SALAI,

CHENNAI – 600119, TAMILNADU.

SEPTEMBER - 2021



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

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Ref: SHD/2021/07/29/A1

29 July 2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. BHARATHI S**, Register Number **39140009** is a Bonafide student of our Institution pursuing **BACHELOR OF ENGINEERING** in **ELECTRICAL AND ELECTRONICS ENGINEERING** during the academic year **2021-2022**. She will be completing the course in the year **2023**.

This certificate is issued for the purpose of Applying **INTERNSHIP**.

DEAN (STUDENT AFFAIRS)

Dr. G. SUNDARI, M.E., Ph.D.,
DEAN (STUDENT AFFAIRS)

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The satisfaction and elation that accompany the successful completion of any task would be incomplete without the mention of the people who have made it possible. It is our great privilege to express our gratitude and respect to all those who have guided me during the course of my Professional Training.

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I would like to express our gratitude to our Registrar **Dr. S. S. Rao, MBA, Ph.D.** and Controller of Examinations **Dr. Igni Sabasti Prabu M.E., Ph.D.**, for their valuable support offered to complete my professional training successfully.

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Also, I thank the **Almighty** and my **Parents** for supporting me in the completion of the professional.



Ref: BTOIPs21/SEP2021/733

TO WHOMSOEVER IT MAY CONCERN

25 September 2021



This is to certify that **Ms. Bharathi S (19S149033)** of **Electrical and Electronics Engineering** Department from Sathyabama Institute of Science and Technology has attended and successfully completed **15 days Drone Internship** from 11 September to 25 September 2021 via Online Medium through our Platform.

We wish her all the best in future endeavors.

Regards,



S. Karan

Head Technical Services

ABSTRACT

The term "drone" usually refers to any unpiloted aircraft. Sometimes referred to as "unmanned Aerial Vehicles "(UAVs), these crafts can carry out an impressive range of tasks, ranging from military operations to package delivery. This program started with the study in Fabrication of Non-Powered patent applied glider model and the knack of building model using locally available low-cost materials. The session continued with the fabrication of Quad-copter non-powered model. The third session is working with Fire sensor for Disaster Management applications, here we will be Interfacing IR based flame sensor with microcontroller that can detect fire with Auto-Alert Notifier system. Flame sensor module has photodiode to detect the light and op-amp to control the sensitivity. It is used to detect fire and provide HIGH signal upon the detection. The next session was working with DC pump motor for agriculture application, here we will be interfacing HC-05 bluetooth module to its dedicated port, DC pump Motor with microcontroller and will be controlling DC pump motor using an Android Mobile application. The bluetooth module HC-05 has range upto <10 m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. Here comes session five, Working with Infrared pulse sensor for Health Care Management application. Here we will be interfacing Infrared pulse sensor with microcontroller which could be connected to drone for health care emergency applications and visualize the output in the serial plotter. The session six is working with DHT11 sensor for Weather Monitoring application, here we will be interfacing DHT11 sensor with microcontroller that can detect temperature and humidity which could be connected to drone to monitor weather and will visualize the output in the serial monitor. Here comes the final session of working with Esp 8266 Wi-Fi module and integrating DHT 11 sensor Parameters to IoT platform for weather Monitoring application, here we will be interfacing Esp 8266 Wi-Fi module to its dedicated port, and DHT 11 sensor with Microcontroller and will be monitoring Temperature and Humidity data in the IoT platform. The ESP8266 Wi-Fi module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. Drones can be as large as an aircraft or as small as the palm of your hand.

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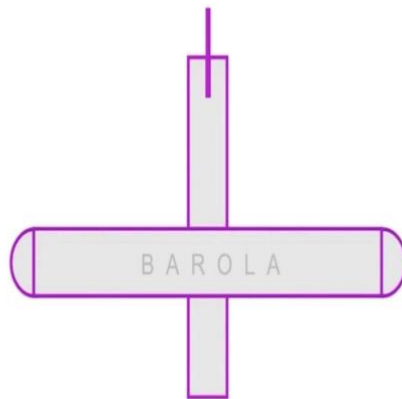
Name of the Material for Building Non- Powered Glider Model: Sun-Pack Sheet (3mm)

Technical Specifications:

Colour	White Sun-pack Sheet
Material	PP(Polypropylene)
Thickness	3mm
Usage	Model Building



How to use:



Areas of usage:

Military Applications

Search & Rescue operations

Weather Monitoring

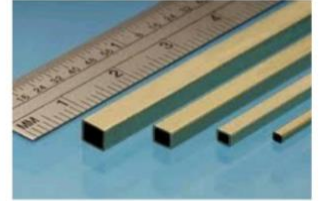
Surveillance

Civilian Applications like Disaster management, Health care and agriculture Applications.

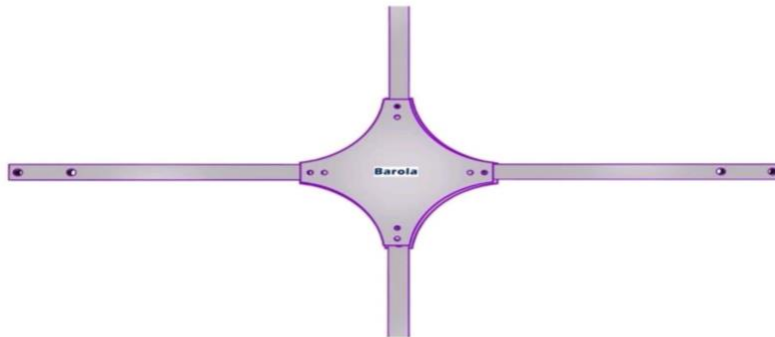
Name of the Material for Building Non- Powered Quadcopter Model: 10mm Square Aluminium Tube(s)

Technical Specifications:

Unit Length	30 Cm Per Quadcopter Arm
Shape	Square
Thickness (mm)	10 mm



How to use:



Areas of usage:

Military Applications

Search & Rescue operations

Weather Monitoring

Surveillance

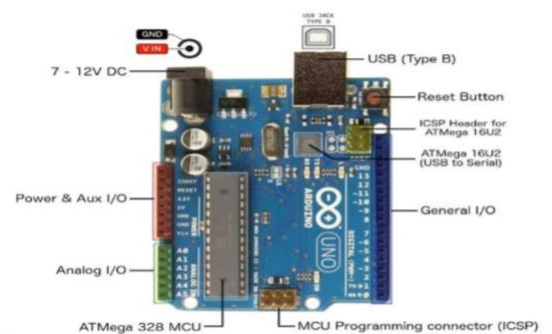
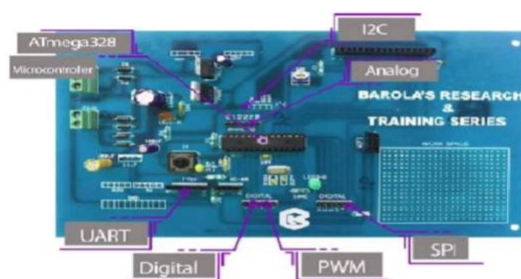
Civilian Applications like Disaster management, Health care and agriculture Applications

Name of the Controller: Atmega Training Microcontroller

Technical Specifications:

- Microcontroller: ATmega328/P
- Operating Voltage: 5 Volts
- Input Voltage: 13 to 20 Volts
- Digital I/O Pins: 14 (of which 6 can provide PWM output)
- UART: 1
- I2C: 1
- SPPI: 1
- Analog Input Pins: 6
- DC Current per I/O Pin: 20 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB of which 0.5 KB used by bootloader
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz

How to use Barola's Microcontroller and Arduino Uno Microcontroller:



Areas of usage:

You can perform 100+ Experiments using Barola's Microcontroller in Various Domains like:

- Agriculture
- Automation & Machineries
- Automobile
- Bluetooth connectivity solution integrated with Android App
- Disaster Management
- Drones
- Energy Management
- Gps & Gsm based solutions
- Health Care
- Internet of Things
- Robotics
- Rfid
- Rf based Solutions
- LiFi Based Solutions
- Wearable Technology
- Zigbee

Name of the sensor: Fire Sensor (IR Sensor)

Technical specifications:

- This tiny Flame sensor infrared receiver module ignition source detection module is Microcontroller compatible can use to detect flame or wavelength of the light source within 760nm1100nm
- It produces the one channel output signal at the D0 terminal for further processing like an alarm system or any switching system. The sensitivity is adjustable with the help of potentiometer given on the board.
- Built in a potentiometer for sensitivity control.
- Onboard signal output indication, output effective signal is high, at the same time the indicator lights up, the output signal can directly connect to microcontroller IO.
- generally used for fire detection purposes.
- Output Channel: 1
- Operating Voltage (VDC): 3.3 to 5 V
- Weight(gm): 3

Name of the Module: 5v Buzzer

Some people prefer to get active buzzers since they can use them with steady DC power but also be able to produce some variety of tones by applying an oscillating signal. Some consider them to be more versatile than the passive buzzer, which is the type that requires an oscillating signal to create any tone.

One advantage to an active buzzer is that you can still produce a sound from the buzzer connected to a microcontroller, such as Barola's Atmega Microcontroller, by just driving a standard high output on the connected pin. The benefits of this are that you don't need to use processing power, hardware timers, or additional code to produce sound.

Rated Voltage: 5 V

Operating Voltage: 4~8 V

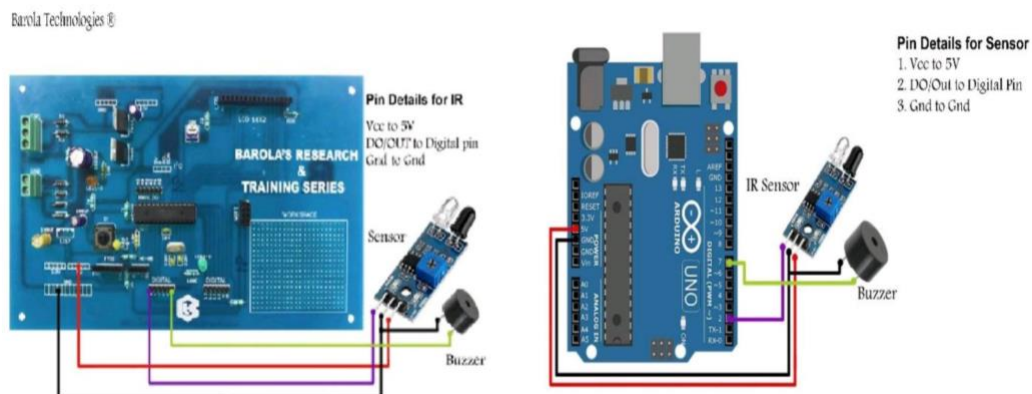
Max Rated Current: ≤ 32 mA

Min. Sound Output at 10cm: 85 dB

Resonant Frequency: 2300 ± 300 Hz

Operating Temperature: -20°C to 45°C

How to use (Pin Diagram): Comparison of Pin Diagram Between Microcontroller and Arduino Uno Microcontroller



Embedded C Language is a case sensitive Language

```
#define fire 6
#define buz 7

int fr;

void setup()
{
    pinMode(fire, INPUT);
    pinMode (buz, OUTPUT);
}

void loop()
{
    fr = digitalRead(fire);

    if (fr == 0)
    {
        digitalWrite (buz, HIGH);
    }

    else

    {
        digitalWrite (buz, LOW);
    }

    delay(200);
}
```

Areas of Usage:

Fire Detection

Obstacle Detection

Automatic door open, lights management and object counting Applications

Name of the Motor: Dc Spraying Pump Motor

Technical specifications:

- DC Voltage: 3-5V
- Flow rate:80-120L/H
- Outside diameter of water outlet: 7.5mm / 0.3"
- Inside diameter of water outlet: 4.7mm / 0.18"
- Material: engineering plastic
- Driving mode: brushless dc design, magnetic driving
- Continuous working life of 500 hours

Name of the Module: HC05 Bluetooth

Technical specifications:

It is a class-2 Bluetooth module with Serial Port Profile, which can configure as either Master or slave. a Drop-in replacement for wired serial connections, transparent usage.

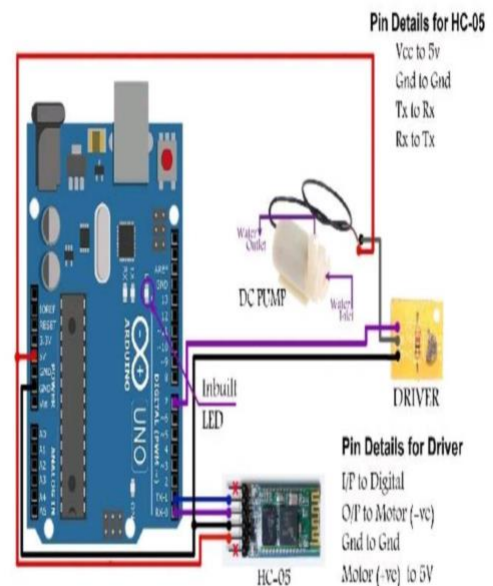
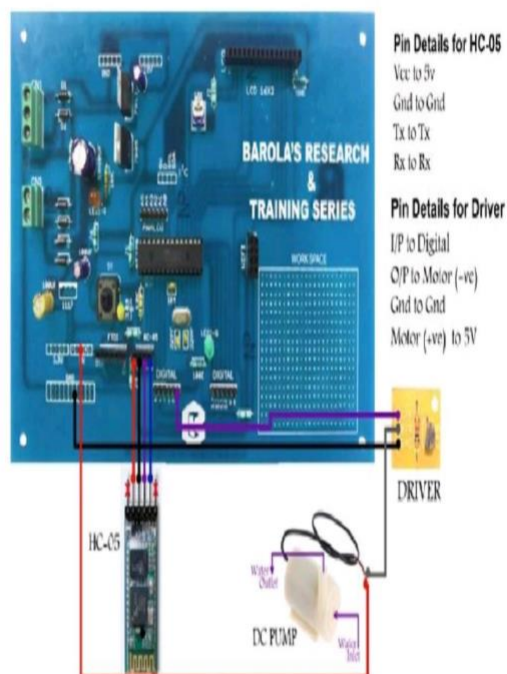
- Serial Bluetooth module for microcontrollers
- Operating Voltage: 4V to 6V (Typically +5V)
- Operating Current: 30mA
- Range: <100m
- Works with Serial communication (USART) and TTL compatible
- Follows IEEE 802.15.1 standardized protocol
- Uses Frequency-Hopping Spread spectrum (FHSS)
- Can operate in Master, Slave or Master/Slave mode
- Can be easily interfaced with Laptop or Mobile phones with Bluetooth
- Supported baud rate: 9600,19200,38400,57600,115200,230400,460800.
- Default Bluetooth Name: "HC-05"
- Default Password: 1234 or 0000
- Default Communication: Slave
- Default Mode: Data Mode
- Data Mode Baud Rate: 9600, 8, N, 1

Name of the APP Development Software: MIT App Inventor 2 (Open Source)

- **MIT App Inventor** is a web application integrated development environment originally provided by Google, and is now maintained by the Massachusetts Institute of Technology (MIT). It allows beginners and up wards users to computer programming to create application software(apps) for Mobile systems, it is free and open-source platform.
- It uses a graphical user interface (GUI) very similar to the programming languages Scratch (programming language) and the Star Logo, which allows users to drag and drop visual objects to create an application that can run on android devices.
- App Inventor also supports the use of cloud data via an experimental Firebase #Firebase Realtime Database component.

How to use (Pin Diagram): Comparison of Pin Diagram Between Barola's Microcontroller and Arduino Uno Microcontroller

Barola Technologies ®



Embedded C Language is a case sensitive Language

```
#define led 13
#define pump 7

void setup()
{
    Serial.begin(9600);
    pinMode(led, OUTPUT);
    pinMode(pump, OUTPUT);
}

void loop()
{
    if (Serial.available())
    {
        char k = Serial.read();
        if (k == '3')
        {
            digitalWrite(led, HIGH);
        }
        if (k == '4')
        {
            digitalWrite(led, LOW);
        }

        if (k == '1')
        {
            digitalWrite(pump, HIGH);
        }

        if (k == '2')
        {
            digitalWrite(pump, LOW);
        }

        delay(50);
    }
}
```

Areas of Usage:

Agriculture pesticide spraying

Covid Antimicrobial disinfectant spraying

Fire Extinguisher Application

Tear gas spraying

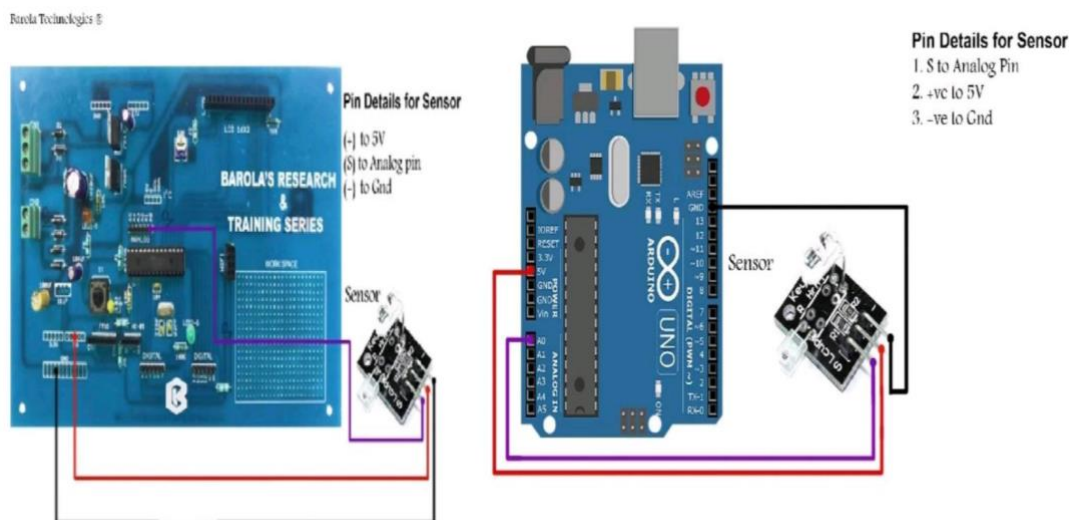
Building Cleaning and painting Applications.

Name of the sensor: KY-039 Finger Heartbeat Detection Sensor Module

Technical specifications:

- This KY-039 Finger Detection Heartbeat Measuring Sensor Module uses bright infrared (IR) LED and a phototransistor to detect the pulse of the finger, a red LED flashes with each pulse.
- Working Voltage: 6 to 12 v DC
- Working Frequency: 50/60Hz• Temperature (deg. celcius): 0 to 55 Degree Celsius
- IP Rating: IP 65

How to use (Pin Diagram): Comparison of Pin Diagram Between Barola's Microcontroller and Arduino Uno Microcontroller



Areas of Usage:

Portable Sensing Device in Drone Ambulance

Sports & Adventure

Hospitals & Medical Clinics

Home and office(s)

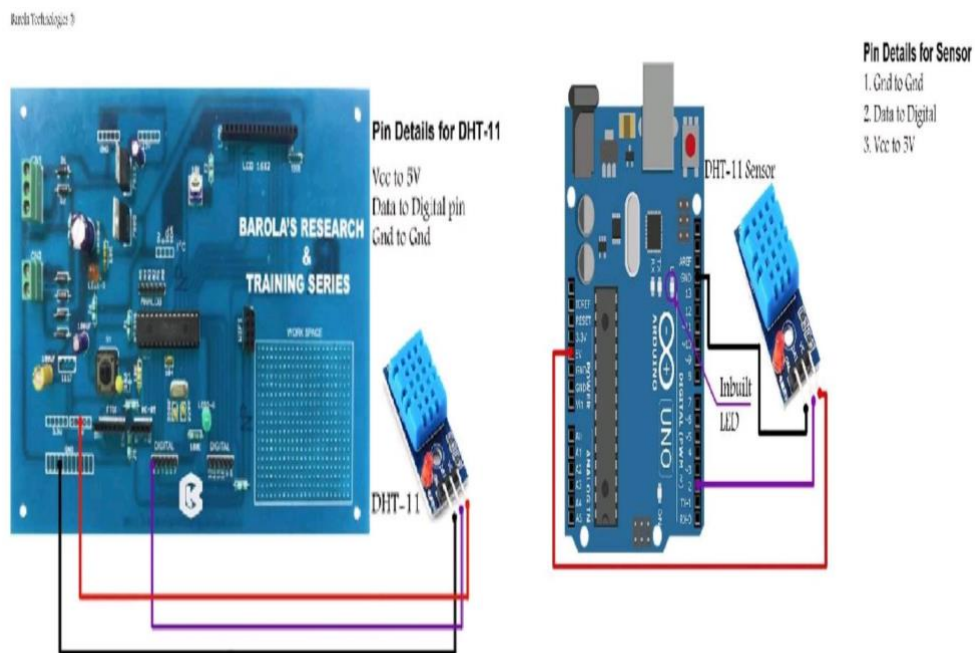
Name of the sensor: DHT 11 Sensor

The DHT11 is a commonly used Temperature and humidity sensor. The sensor comes with a dedicated NTC to measure temperature and an 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor is also factory calibrated and hence easy to interface with other microcontrollers.

Technical specifications:

- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Output: Serial data
- Temperature Range: 0°C to 50°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy: $\pm 1^\circ\text{C}$ and $\pm 1\%$

How to use (Pin Diagram): Comparison of Pin Diagram Between Microcontroller and Arduino Uno Microcontroller.



Embedded C Language is a case sensitive Language

```
#include "DHT.h"

#define DHTPIN 2
#define led 13

#define DHTTYPE DHT11

DHT dht(DHTPIN, DHTTYPE);

void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  pinMode(led, OUTPUT);
  dht.begin();
}

void loop() {
  // put your main code here, to run repeatedly:
  float h = dht.readHumidity();
  float t = dht.readTemperature();

  if (isnan(h) || isnan(t) ) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  Serial.print("Humidity: ");
  Serial.print(h);
  Serial.print(" %\t");
  Serial.print("Temperature: ");
  Serial.print(t);
  Serial.println(" °C");
  if (t>30){
    digitalWrite(led, HIGH);
  }
  else{
    digitalWrite(led, LOW);
  }
  delay(400);
}
```

Areas of Usage:

Weather Prediction

Air conditioning systems

Green houses

Museums and Industries for measuring humidity values as a safety measure.

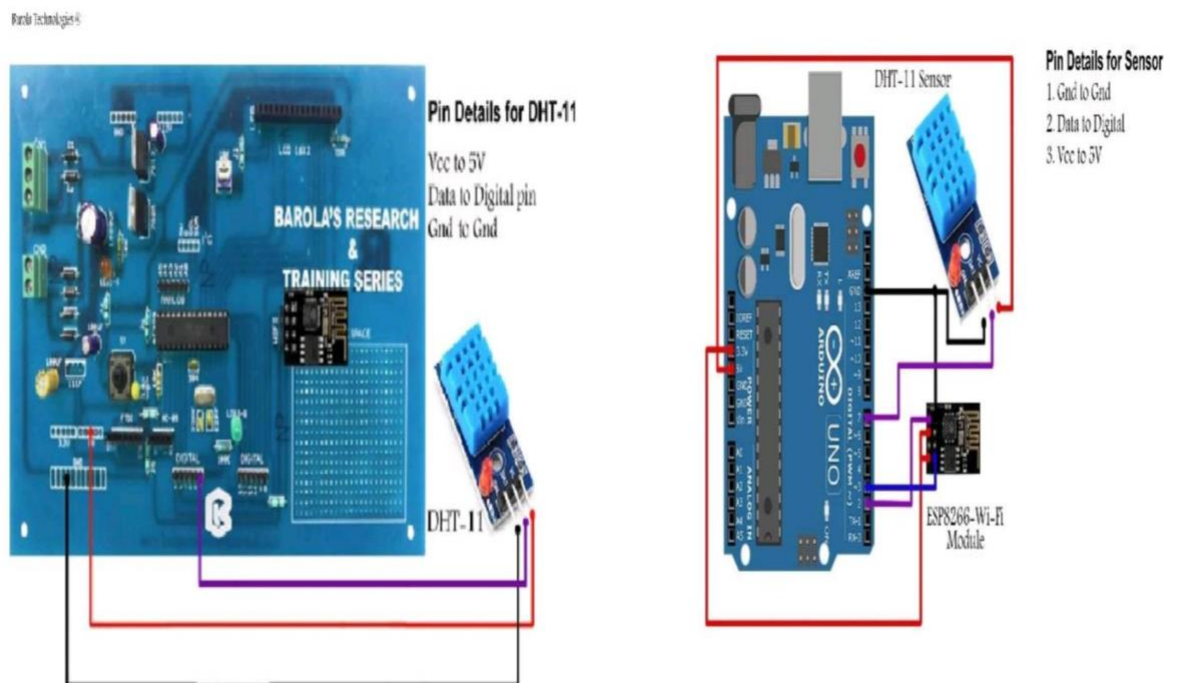
Name of the Module: Esp8266 v1

Technical specifications:

Wi-Fi Module

- Operating Frequency 2.4ghz
- Operating voltage 3.3v
- 8Mbit external QSPI flash memory (1MByte)
- 32-bit Tensilica Xtensa LX106 CPU running 80MHz
- 3.3V supply (current can spike 300mA+, depending on mode)
- PCB-trace antenna
- 2 x 4 dual-in-line pinout
- Wi-Fi b/g/n support

How to use (Pin Diagram): Comparison of Pin Diagram Between Barola's Microcontroller and Arduino Uno Microcontroller



Embedded C Language is a case sensitive Language

```
void setupEsp8266()
{
    esp.println(F("AT+RST"));
    delay(3000);
    if (esp.find("OK"))
    {
        Serial.println("Device Found");
        Serial.println("Changing to espmode");
        delay(2000);
        changingMode();
        delay(5000);
        connectToWiFi();
        delay(2000);
    }
    else
    {
        Serial.println("Device not found");
    }
}

//-----
// Following function sets esp8266 to station mode
//-----
bool changingMode()
{
    esp.println(F("AT+CWMODE=1"));
    if (esp.find("OK"))
    {
        Serial.println("Mode changed");
        return true;
    }
    else if (esp.find("NO CHANGE")) {

        Serial.println("Already in mode 1");

        return true;
    }
    else
    {
        Serial.println("Error while changing mode");
    }
}

//-----
// Following function connects esp8266 to wifi access point
//-----
bool connectToWiFi()
{
    Serial.println("Trying To connect with Wifi");

    String cmd = F("AT+CWJAP=\"");
```

Page 1 of 2

```
void setupEsp8266()
{
    esp.println(F("AT+RST"));
    delay(3000);
    if (esp.find("OK"))
    {
        Serial.println("Device Found");
        Serial.println("Changing to espmode");
        delay(2000);
        changingMode();
        delay(5000);
        connectToWiFi();
        delay(2000);
    }
    else
    {
        Serial.println("Device not found");
    }
}

//-----
// Following function sets esp8266 to station mode
//-----
bool changingMode()
{
    esp.println(F("AT+CWMODE=1"));
    if (esp.find("OK"))
    {
        Serial.println("Mode changed");
        return true;
    }
    else if (esp.find("NO CHANGE")) {

        Serial.println("Already in mode 1");

        return true;
    }
    else
    {
        Serial.println("Error while changing mode");
    }
}

//-----
// Following function connects esp8266 to wifi access point
//-----
bool connectToWiFi()
{
    Serial.println("Trying To connect with Wifi");

    String cmd = F("AT+CWJAP=\"");
```

```

cmd += network;
cmd += F("\",\");
cmd += password;
cmd += F("\");
esp.println(cmd);

Serial.println(esp.readString());
delay(4000);
if (esp.find("OK"))
{
    Serial.println("Connected to Network");
    return true;
}
else
{
    Serial.println("Couldn't connect to Network");
    connectToWiFi();
}
}

void updateServer(String f1,String f2)
{
    String cmd = "AT+CIPSTART=\"TCP\", \"";
    cmd += IP;
    cmd += "\",80";
    esp.println(cmd);
    delay(5000);
    if (esp.find("Error")) {

        Serial.println("ERROR while SENDING");

        return;
    }
    cmd = GET + "&field1=" + f1 + "&field2=" + f2 + "\r\n";
    esp.print("AT+CIPSEND=");
    esp.println(cmd.length());
    delay(7000);
    if (esp.find(">"))
    {
        esp.print(cmd);

        Serial.println("Data sent");
    } else
    {
        esp.println("AT+CIPCLOSE");

        Serial.println("Connection closed");
    }
}
}

```

Area of Usage:

- Long Range Communication
- Sensor Logging Application

Name of the Module: FTDI

Technical Specifications:

<i>IC CHIP</i>	<i>FT232RL</i>
<i>PITCH</i>	<i>2.54MM</i>
<i>INTERFACE TYPE</i>	<i>MINI USB</i>
<i>LENGTH(MM)</i>	<i>36</i>
<i>WIDTH(MM)</i>	<i>18</i>
<i>WEIGHT(GM)</i>	<i>4</i>

How to use:



Areas of Usage & Features:

- Standard interface layout, compatible with a variety of Microcontrollers
- Original FTDI FT232 chip, stable performance
- USB power has current protection, using 500MA self-restore fuse
- RXD/TXD transceiver communication indicator
- With power, sending, receiving indicator, working status LED indicators
- With 3.3V and 5V TTL Level supply options
- USB to serial TTL module, download STC SCM
- Mini USB Port Connection
- Support 3.3V, 5V

CONCLUSION

- Fabrication and assembling of Barola's patent applied non powered glider model using locally available low-cost materials.
- Fabrication and assembling of Multi-rotor non powered glider model using locally available low-cost materials.
- An IR flame sensor is a device that detects fire/flame present in the atmosphere, attaching an alert system completes the project, this distinct sound exits to allow the notification to be heard, the fire detection with auto alert system constructed by this project work is reliable at low cost.
- This system is cost effective and helpful for pesticide spraying process using drone, helpful for the remote locations, where there are no network availability, farmers can use their mobile phones to control the pump for pesticide spraying using Bluetooth.
- This paper focuses on the heartrate monitoring which is able to monitor the heart beat rate condition of patient/Person. This device could be connected to drone as it is portable, cost effective and very efficient system, it provides great flexibility and serves as a great improvement over other conventional monitoring system.
- We can determine the weather based on the air temperature and humidity read by a DHT11 sensor which could be connected to drone. This weather monitoring system will provide farmers, pharmacists, event planners and others with accurate information to guide them to take appropriate action.
- The work was successful in building a monitoring device which works as a thermometer for measuring temperature and humidity inside a building; it is capable of measuring humidity and temperature outdoors as well. Compared to expensive sensor, the Barola's Microcontroller-based monitoring system successfully reduces the power consumption, cost and complexity of the process, which was connected to the IoT platform to monitor the data from any part of the globe.