INDUSTRIAL TRAINING
INTERNET OF THINGS
IOT

shreeji
CHARAN ELEETRONICS

Presented by

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Electronics and Communication System

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IOT ESP Devices


ESP-01


ESP-02


ESP-03


ESP-04


ESP-05

ESP-06

ESP-07

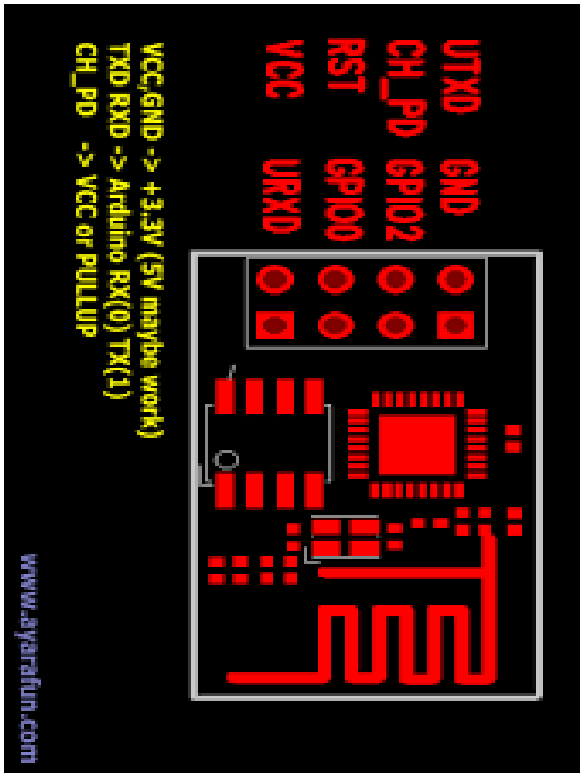
ESP-08

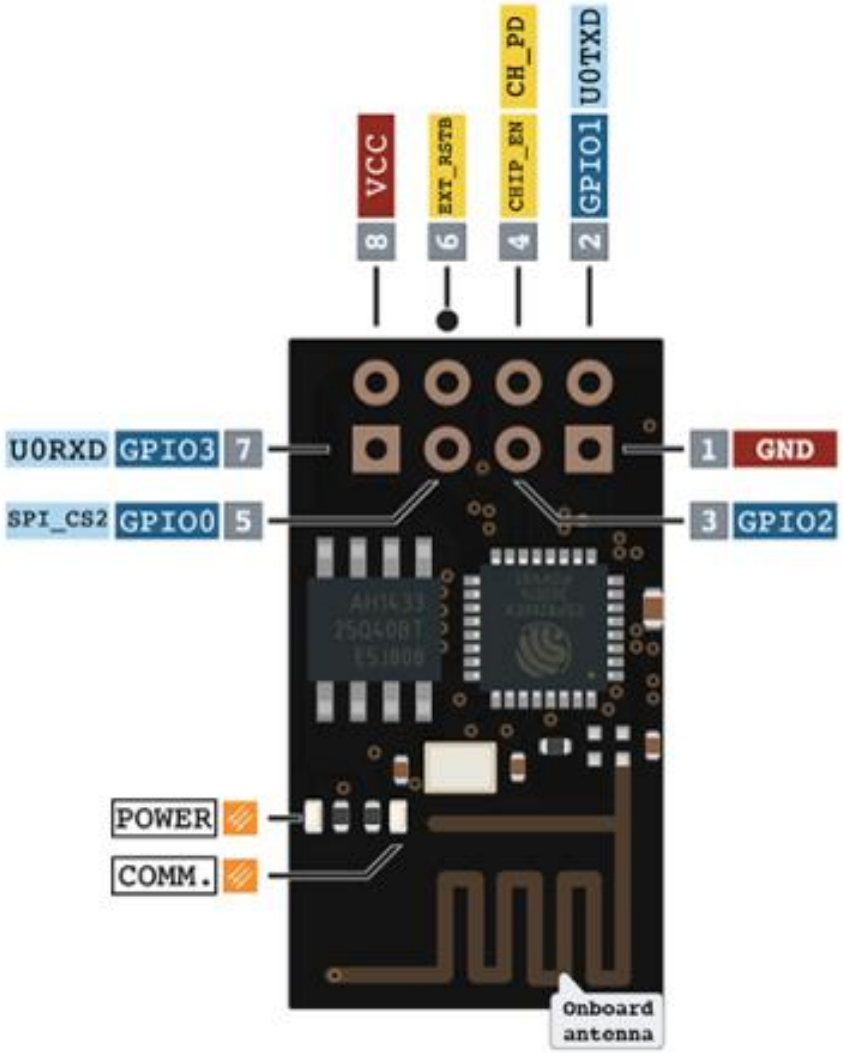

ESP-09


ESP-10

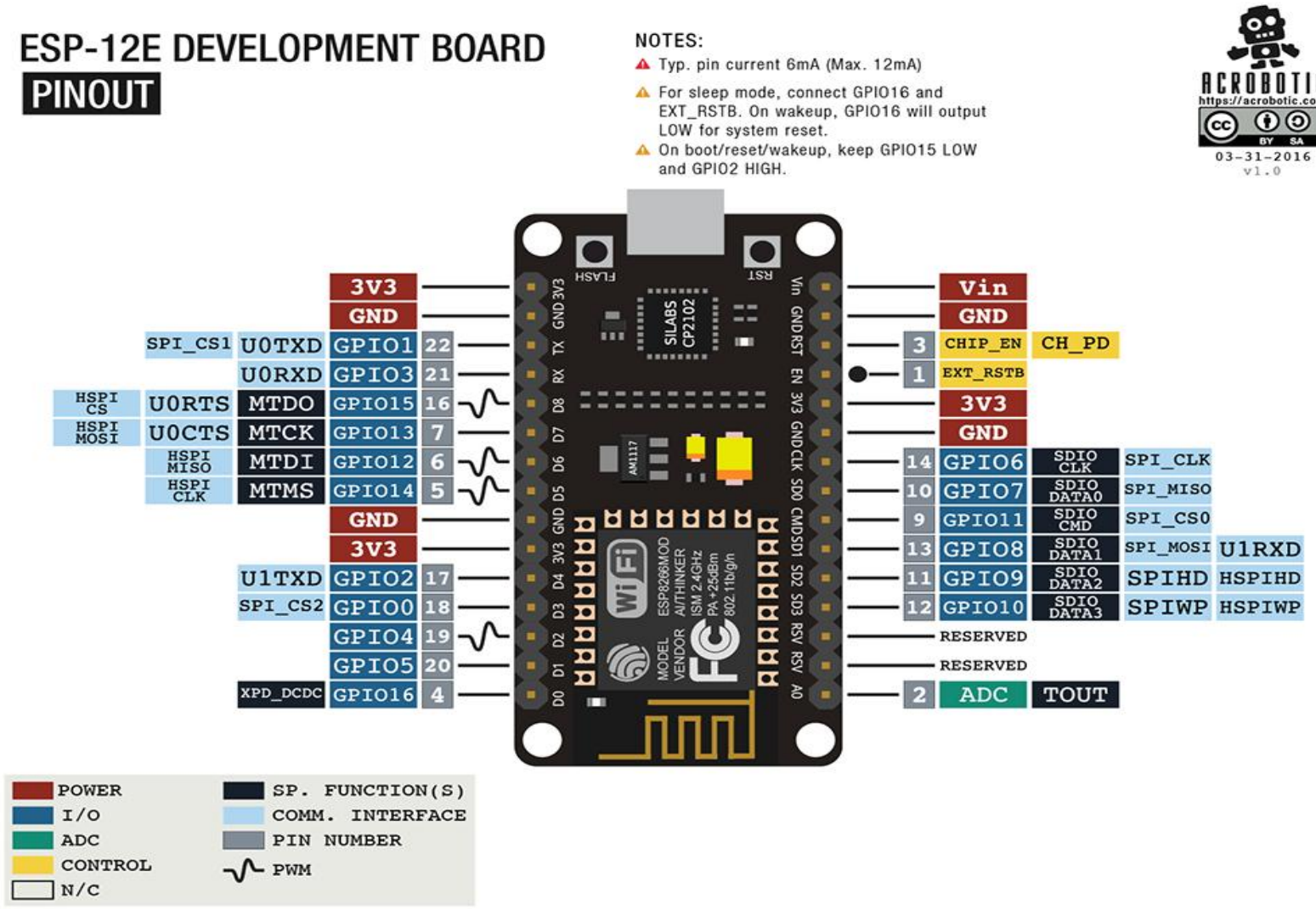

ESP-11

ESP - 01

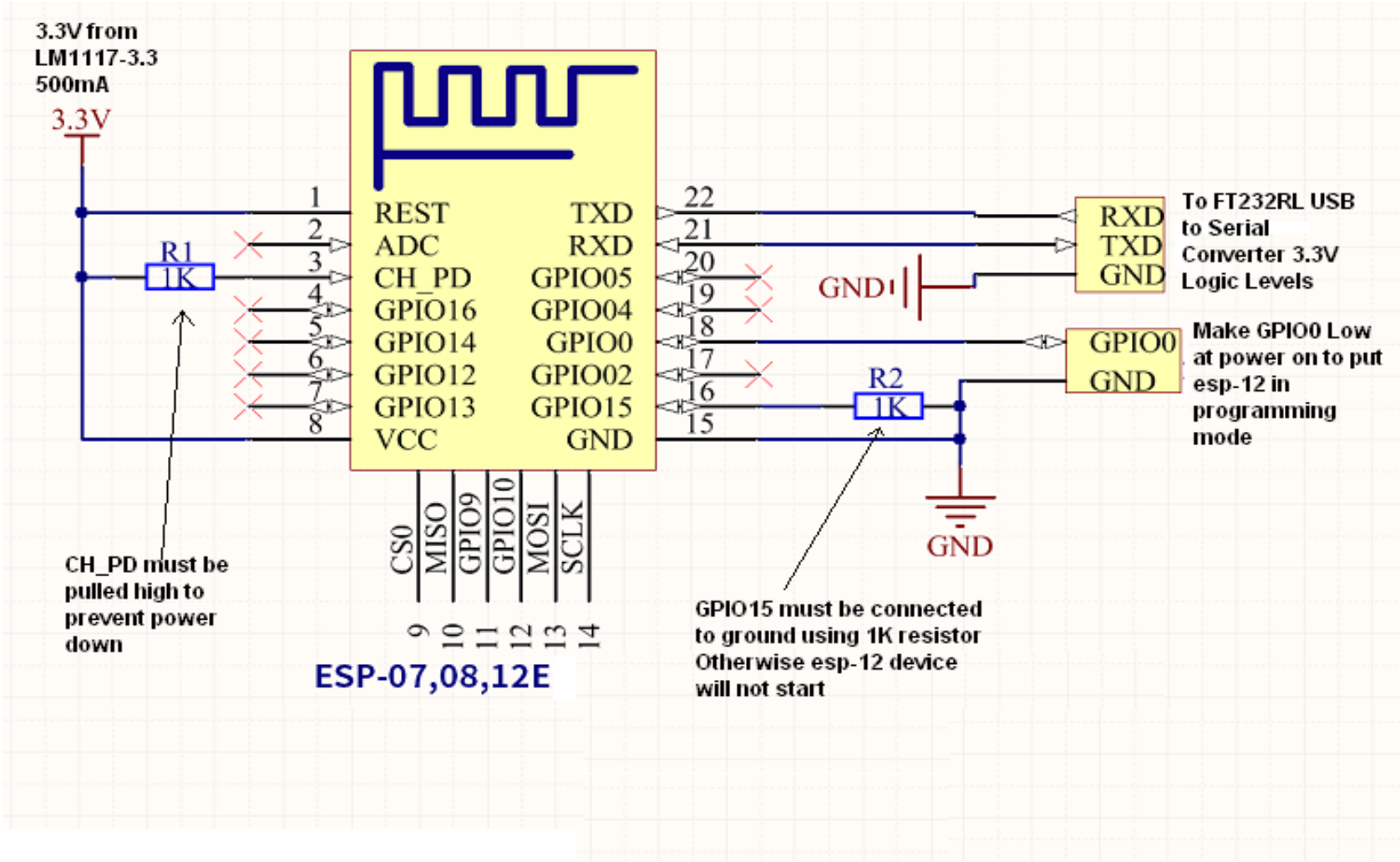

UTXD GND
CH_PD GPIO2
RST GPIO0
VCC URXD
VCC,GND -> +3.3V (5V maybe work)
TXD RXD -> Arduino RX(0) TX(1)
CH_PD -> VCC or PULLUP
www.ayarafun.com


VCC 8
EXT_RSTB 6
CHIP_EN 4
GPIO1 2
CH_PD
U0TXD
U0RXD GPIO3 7
SPI_CS2 GPIO0 5
1 GND
3 GPIO2
POWER
COMM.
Onboard antenna

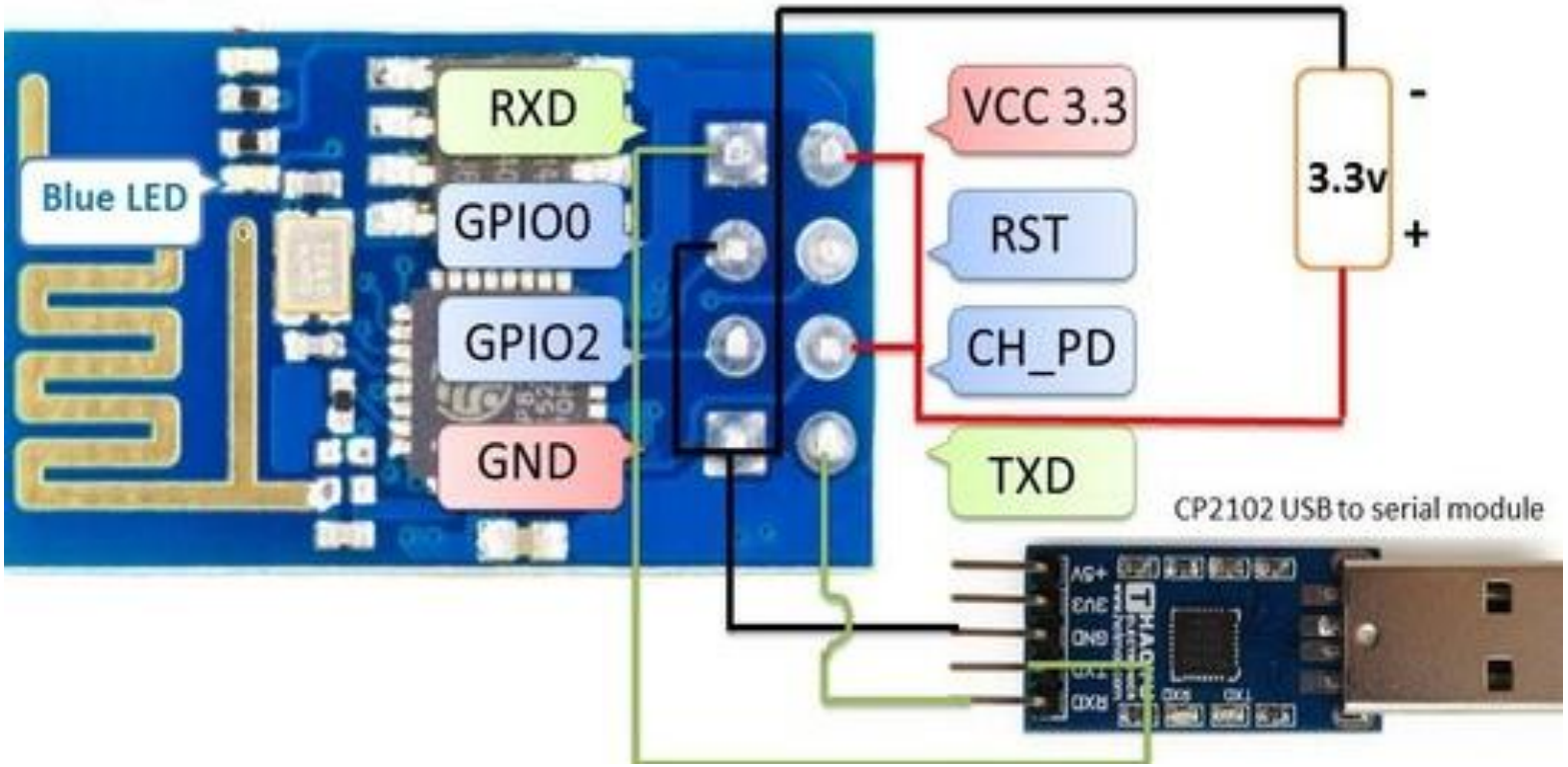
Node MCU


ESP-12E DEVELOPMENT BOARD
PINOUT
NOTES:
Typ. pin current 6mA (Max. 12mA)
For sleep mode, connect GPIO16 and EXT_RSTB. On wakeup, GPIO16 will output LOW for system reset.
On boot/reset/wakeup, keep GPIO15 LOW and GPIO2 HIGH.
ACROBOTIC
https://acrobotic.com
03-31-2016
v1.0
3V3
GND
SPI_CS1 U0TXD GPIO1 22
U0RXD GPIO3 21
HSPI CS U0RTS MTDO GPIO15 16
HSPI MOSI U0CTS MTCK GPIO13 7
HSPI MISO MTDI GPIO12 6
HSPI CLK MTMS GPIO14 5
GND
3V3
U1TXD GPIO2 17
SPI_CS2 GPIO0 18
GPIO4 19
GPIO5 20
XPD_DCDC GPIO16 4
Vin
GND
3 CHIP_EN CH_PD
1 EXT_RSTB
3V3
GND
14 GPIO6 SDIO CLK SPI_CLK
10 GPIO7 SDIO DATA0 SPI_MISO
9 GPIO11 SDIO CMD SPI_CS0
13 GPIO8 SDIO DATA1 SPI_MOSI U1RXD
11 GPIO9 SDIO DATA2 SPIHD HSPIHD
12 GPIO10 SDIO DATA3 SPIWP HSPIWP
RESERVED
RESERVED
2 ADC TOUT
FLASH
RST
SILABS CP2102
AM1117
ESP8266MOD
AI/THINKER
ISM 2.4GHz
PA +25dBm
802.11b/g/n
MODEL
VENDOR
POWER
I/O
ADC
CONTROL
N/C
SP. FUNCTION(S)
COMM. INTERFACE
PIN NUMBER
PWM

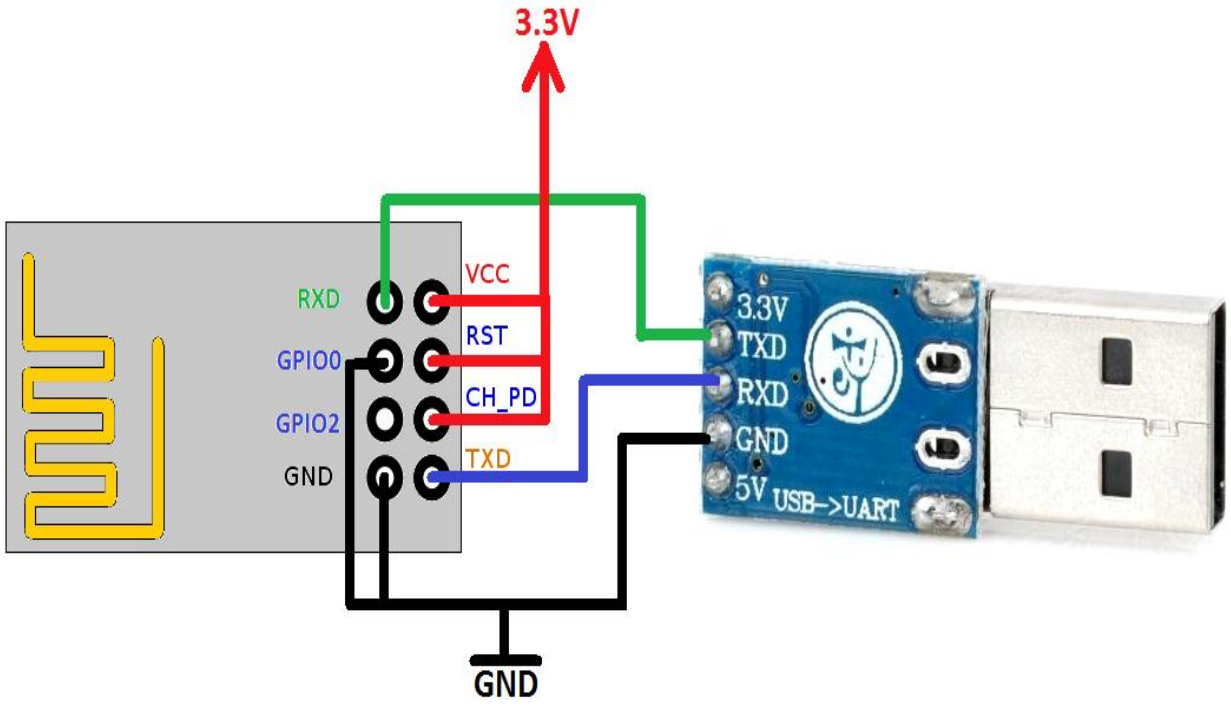
Node MCU Schematic Diagram



Firmware Flashing Mode



How to connect it to usb



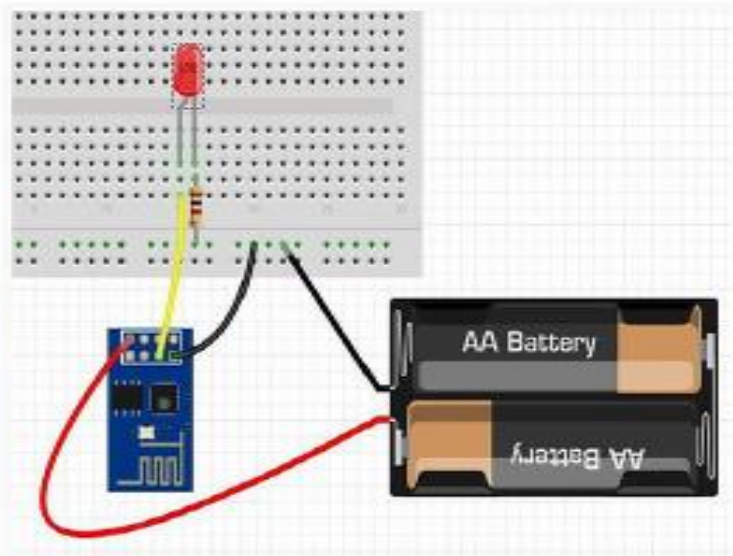
NodeMCU Interfacing

- LED interfacing
- Serial Communication
- ADC – analog to digital convertor
- LCD interfacing
- PWM

To interface LED using ESP01 and GPIO and Timer

```
/************************
 * Author: Shreejicharan
 * Title: To interface LED using ESP01 and GPIO and Timer.
 * Date: 27/05/2017
 * Time: 6:00
 * Email: shreejicharanelectronics@gmail.com
 ************************/

/*Using GPIO and Timer: Using inbuilt timer of ESP, blink LED at an interval of one second.
*/

#define LED 2
void setup()
{
  pinMode(LED,OUTPUT);
}

void loop()
{
  digitalWrite(LED,HIGH);
  delay(5000);
  digitalWrite(LED,LOW);
  delay(5000);
}
```

SIMULATION:



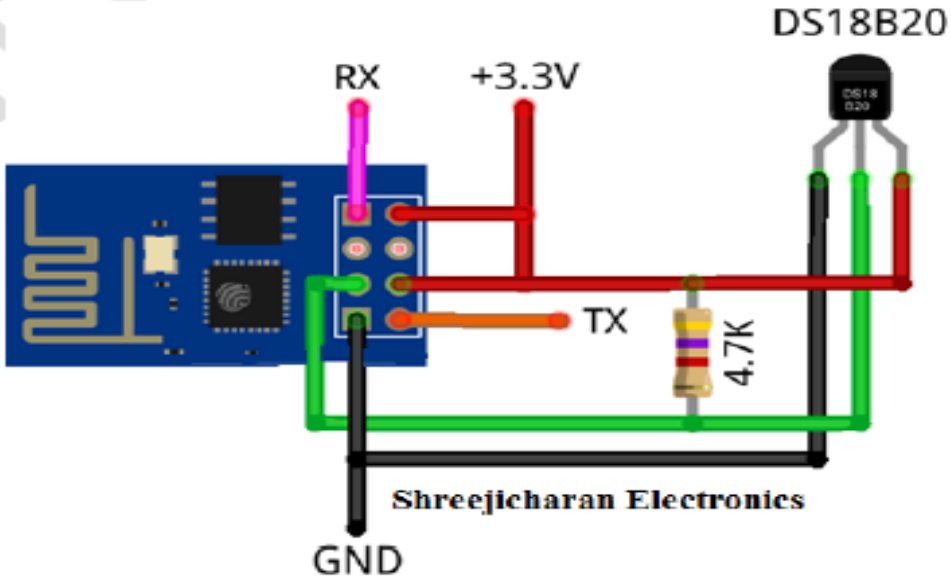
To print a statement on Serial Terminal USING ESP-01

```
/**********************
 * Author: Shreejicharan
 * Title: Print a statement on Serial Terminal.
 * Date: 27/05/2017
 * Time: 6:00
 * Email: shreejicharanelectronics@gmail.com
 **********************/

/*Using UART for Serial Print:Print a statement on Serial Terminal
 *
 */
void setup()
{
  Serial.begin(9600);
}

void loop()
{
  Serial.println("Hello ESP8266");
  delay(500);
}
```

Using ADC for analog sensing for ESP-01.

```
/**********************
 * Author: Shreejicharan
 * Title: Using ADC for analog sensing.
 * Date: 27/05/2017
 * Time: 6:00
 * Email: shreejicharanelectronics@gmail.com
 **********************/


/*Using ADC for analog sensing: Use POT as an analog input to ESP8266 and print its value
on serial terminal  *  */

#define SENSOR A0
void setup()
{
  Serial.begin(9600);
  pinMode(SENSOR,INPUT);
  delay(2000);
  Serial.println("ADC");
}

void loop()
{
  float value;
  value = analogRead(SENSOR);
  Serial.print("value is:" );
  Serial.println(value);
  delay(1000);
}
```

SIMULATION:



Use I2C pins for communication with LCD and display characters on it.

ARDUINO CODE:

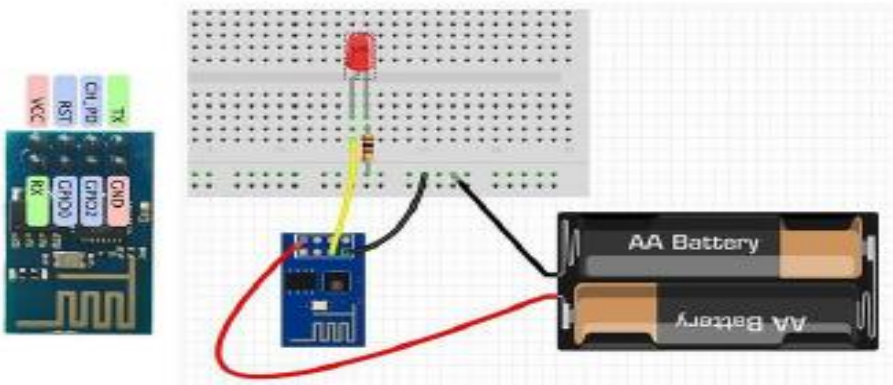
```
/************************
 * Author: Shreejicharan
 * Title: Use I2C pins for communication with LCD and display characters on it.
 * Date: 27/05/2017
 * Time: 6:00
 * Email: shreejicharanelectronics@gmail.com
 ************************/

/*Using I2C communication: Use I2C pins for communication with LCD and display
characters on it. */

#include <Wire.h>
#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x3F,16,2);
 // set the LCD address to 0x3F for a 16 chars and 2 line display

void setup()
{
  lcd.init();                      // initialize the lcd
  // Print a message to the LCD.
  lcd.backlight();
  lcd.print("Hello, world!");
}

void loop()
{
}
```

SIMULATION:

GPIO to change the brightness of LED using pulse width modulation

```
/************************
 * Author: Shreejicharan
 * Title: Use GPIO to change the brightness of LED using pulse width modulation.
 * Date: 28/05/2017
 * Time: 7:00
 * Email: shreejicharanelectronics@gmail.com
 ************************/

/*Using PWM:Use GPIO to change the brightness of LED using pulse width modulation *  */

#define LED 2
#define analogPin A0

void setup()
{
  pinMode(LED,OUTPUT);
  pinMode(analogPin, INPUT);
}

void loop()
{
  // Reverse Logic for the inbuilt LED
  for (int i=1023; i>600;i--){
   analogWrite(LED, i);
   delay(10);
  }
}
```

SIMULATION:



Questions?


Thank you!