NODEMCU – ESP8266

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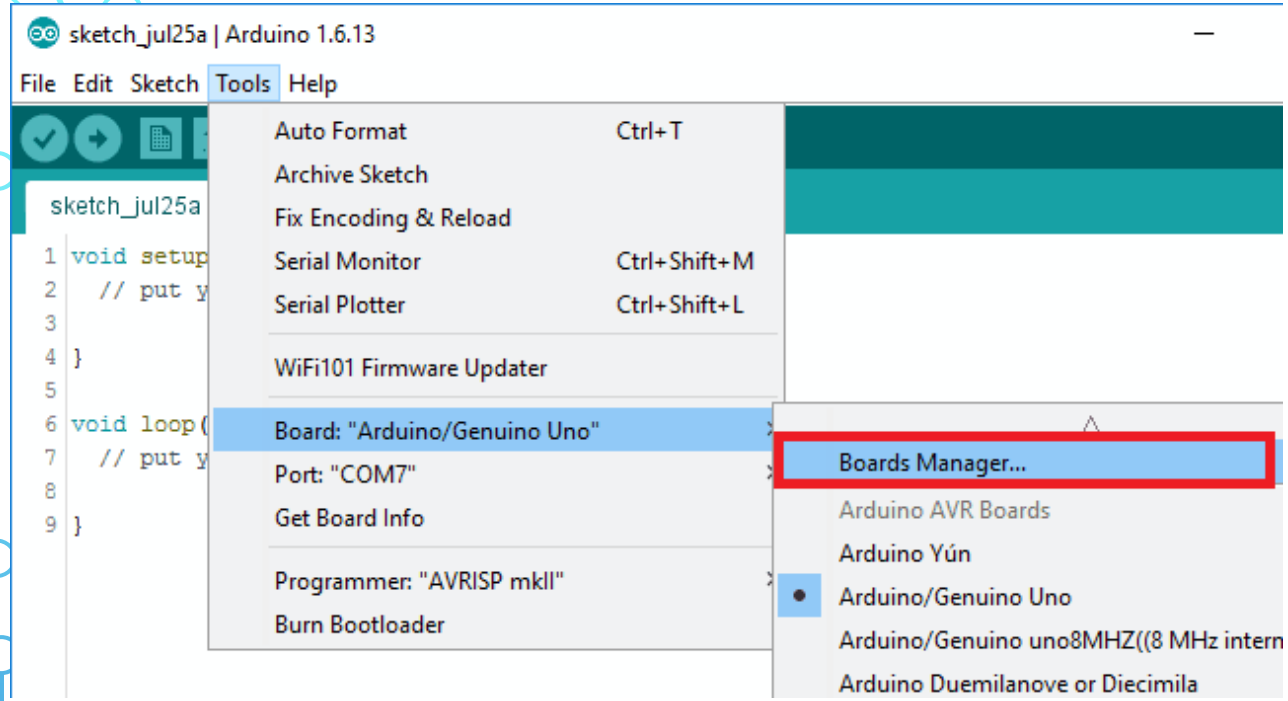
NODEMCU USING ARDUINO IDE

- File > preferences

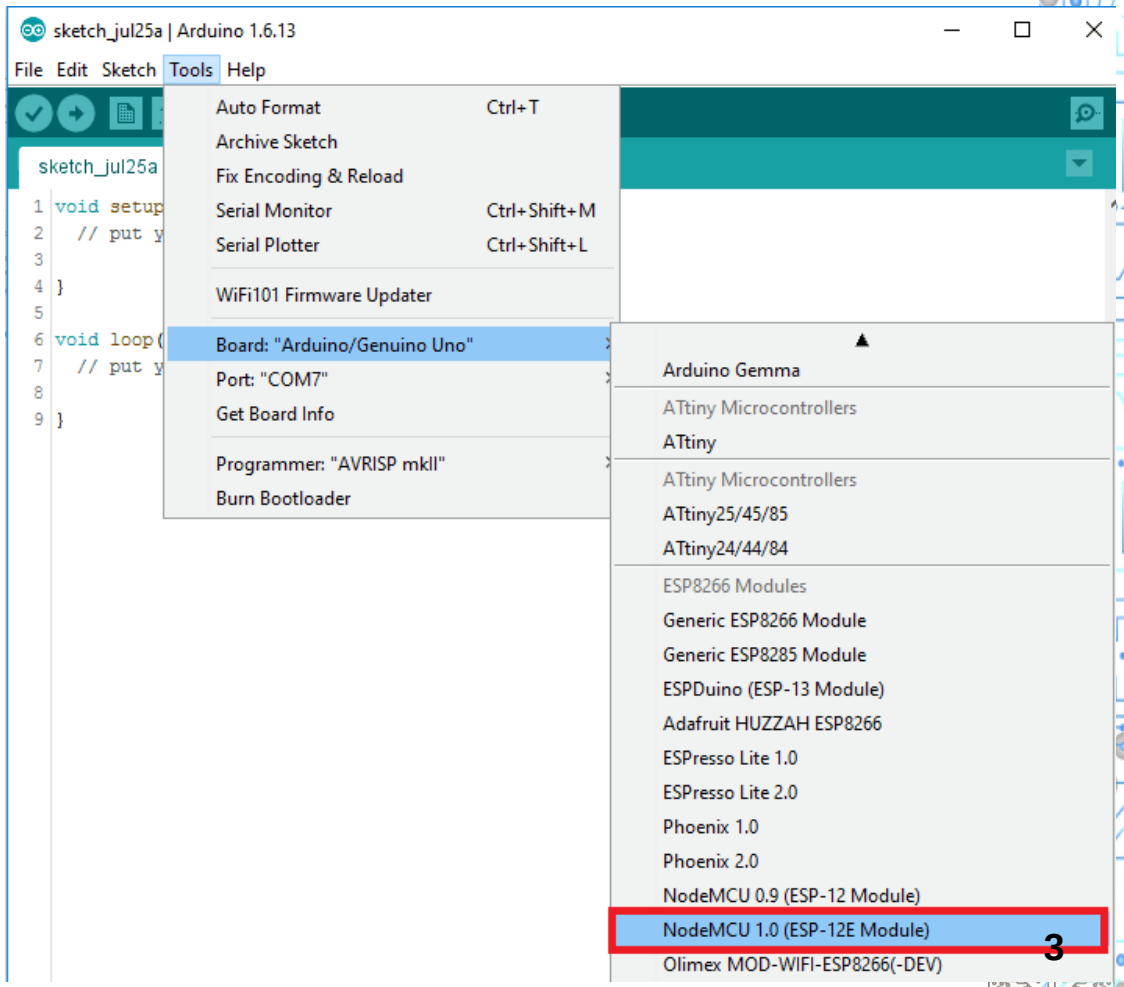
http://arduino.esp8266.com/stable/package_esp8266com_index.json

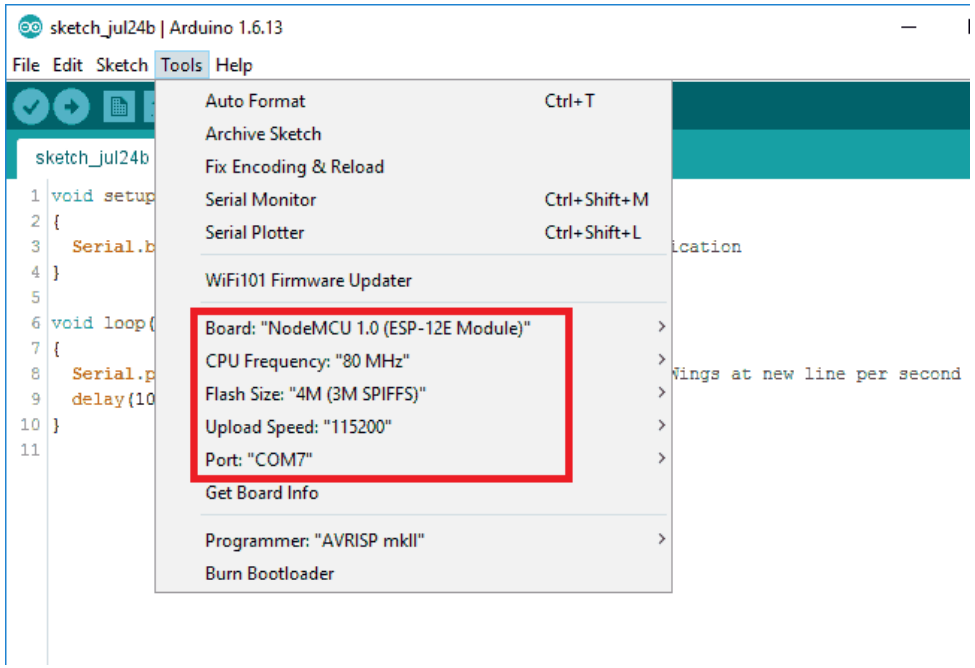
- Now close Preference window and **go to Tools -> Board -> Boards Manager**

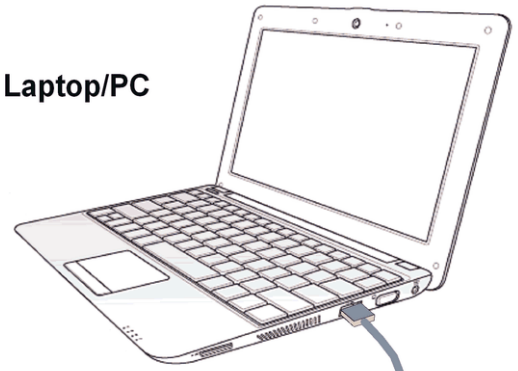
- **Installing NodeMCU board setting**

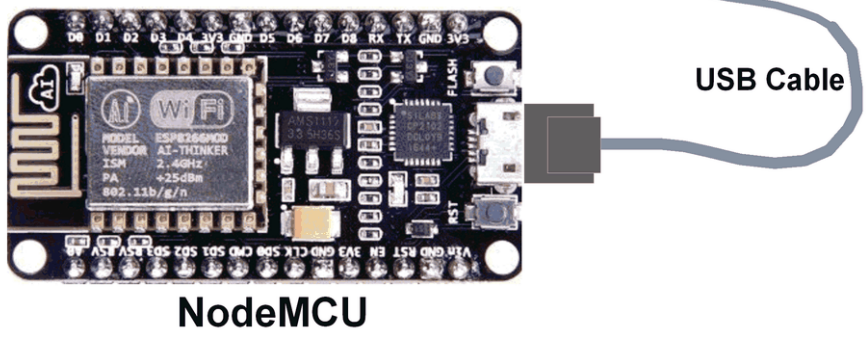


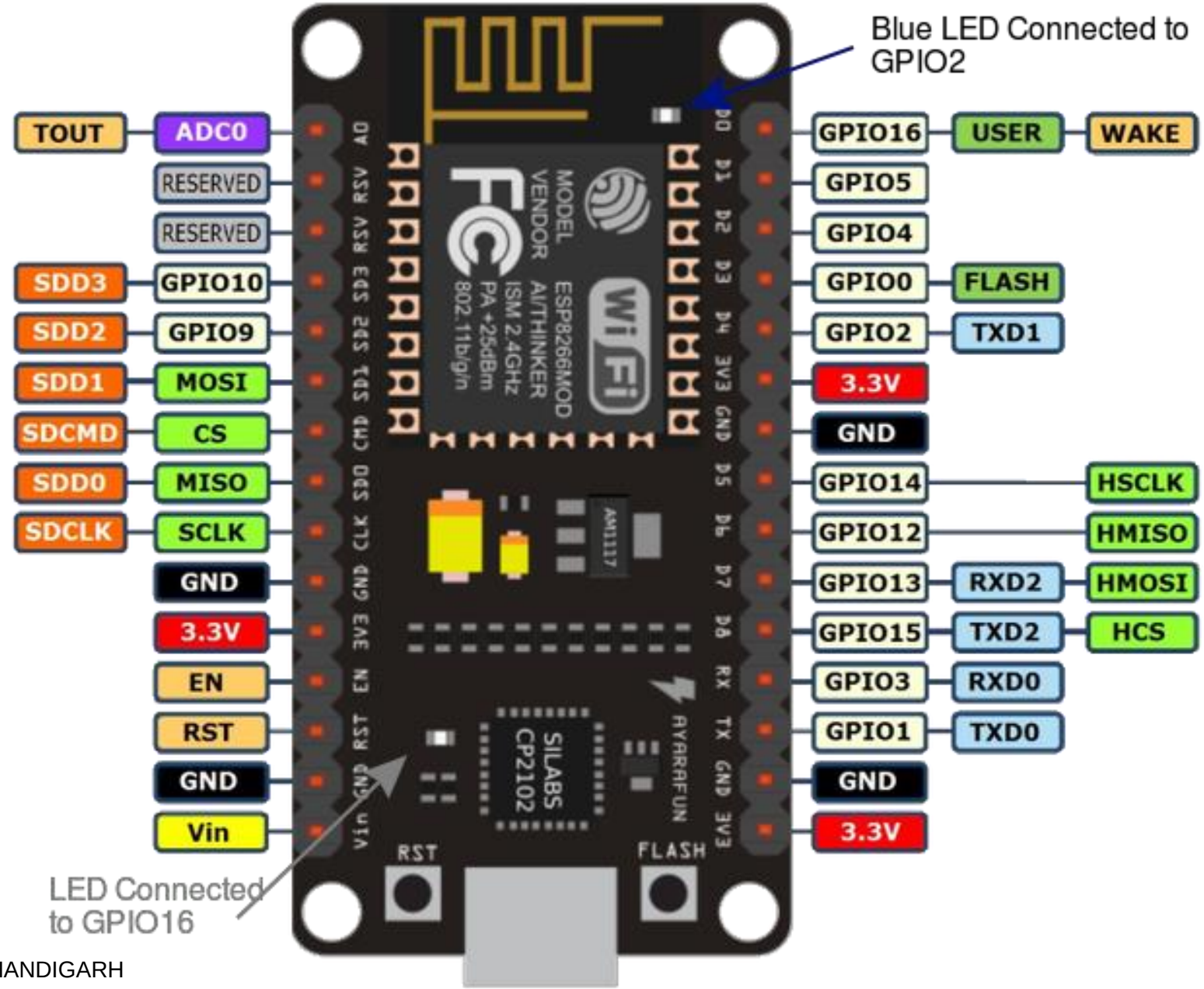
- **Tools->Board->and select NodeMCU 1.0(ESP-12E Module).**




sketch_jul24b | Arduino 1.6.13
File Edit Sketch Tools Help
sketch_jul24b
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 Firmware Updater
Board: "NodeMCU 1.0 (ESP-12E Module)"
CPU Frequency: "80 MHz"
Flash Size: "4M (3M SPIFFS)"
Upload Speed: "115200"
Port: "COM7"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader

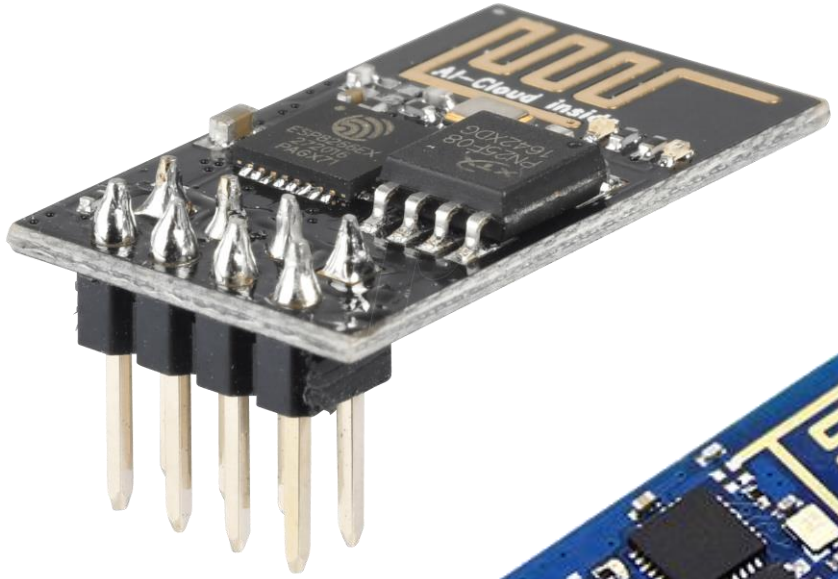

Laptop/PC

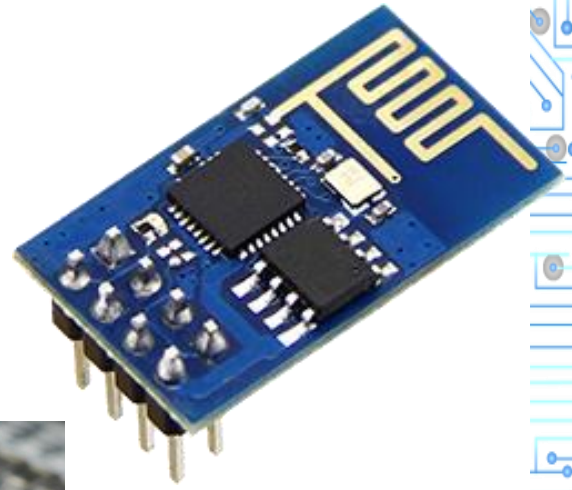

USB Cable
NodeMCU

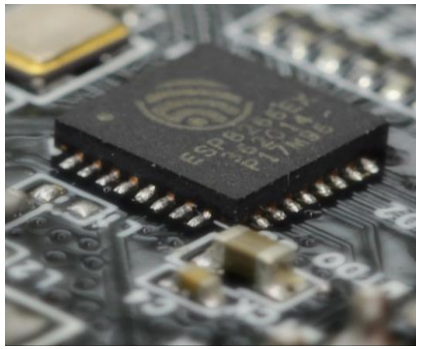

Blue LED Connected to GPIO2
TOUT
ADC0
RESERVED
RESERVED
SDD3
GPIO10
SDD2
GPIO9
SDD1
MOSI
SDCMD
CS
SDD0
MISO
SDCLK
SCLK
GND
3.3V
EN
RST
GND
Vin
GPIO16
USER
WAKE
GPIO5
GPIO4
GPIO0
FLASH
GPIO2
TXD1
3.3V
GND
GPIO14
HSCLK
GPIO12
HMISO
GPIO13
RXD2
HMOSI
GPIO15
TXD2
HCS
GPIO3
RXD0
GPIO1
TXD0
GND
3.3V
LED Connected to GPIO16
RST
FLASH
SILABS CP2102
AYARAFUN
ESP8266MOD
AITHINKER
ISM 2.4GHz
PA +25dBm
802.11b/g/n
AM1117

ESP 8266

- System on Chip (SoC)
- Low cost
- Full TCP/IP stack (!!!!)
- Can be flashed with different firmwares
- Can also be programmed with Arduino IDE
- Many models







FEATURES

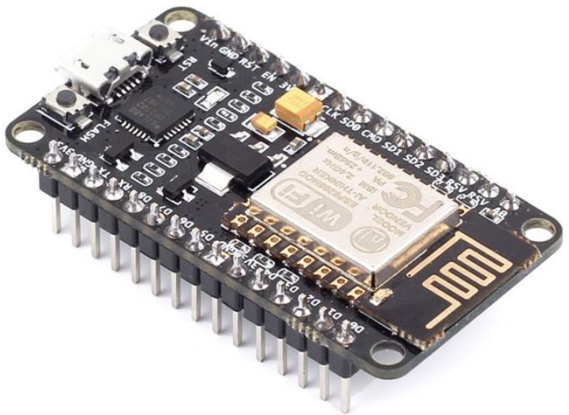
- Serial UART Interface
- It run LWIP
- 802.11 bgn
- WIFI Direct (P2P),SOFT-AP
- Built-in TCP/IP
- The AT command is perfect,efficient,concise
- Support three modes: AP, STA and AP+STA coexistence mode
- Onboard PCB Antenna

SPECIFICATIONS

- WIFI Direct (P2P), SOFT-AP
- Controlled via UART interface at 115200 baud with a simple set of AT commands
- Only 2 microcontroller pins needed for communication (RXD/TXD)
- Support three modes: AP, STA and AP+STA coexistence mode the TCP/IP protocol suit
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- +19.5dBm output power in 802.11b mode
- Power down leakage current of <10uA
- Integrated low power 32-bit CPU could be used as application processor
- SDIO 1.1/2.0, SPI, UART
- STBC, 1×1 MIMO, 2×1 MIMO
- A-MPDU & A-MSDU aggregation & 0.4ms guard interval
- Wake up and transmit packets in < 2ms
- Standby power consumption of < 1.0mW (DTIM3)
- ESP-01 PCB Antenna , after matching the distance to achieve open 400Meters.

ESP8266 TYPES

- NodeMCU



ESP01

ESP02

ESP03

ESP04

ESP05

ESP06

ESP07

ESP08

ESP09

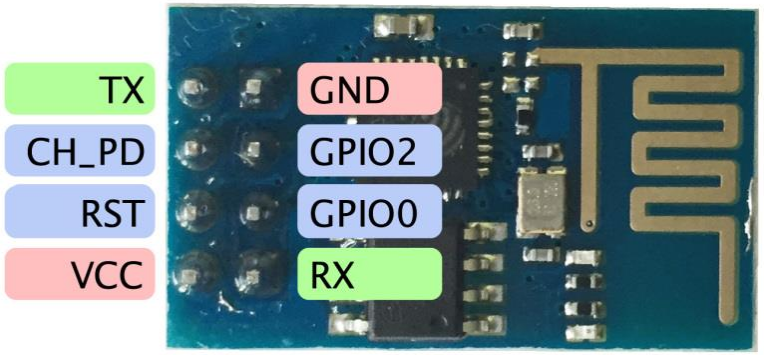
ESP10

ESP11

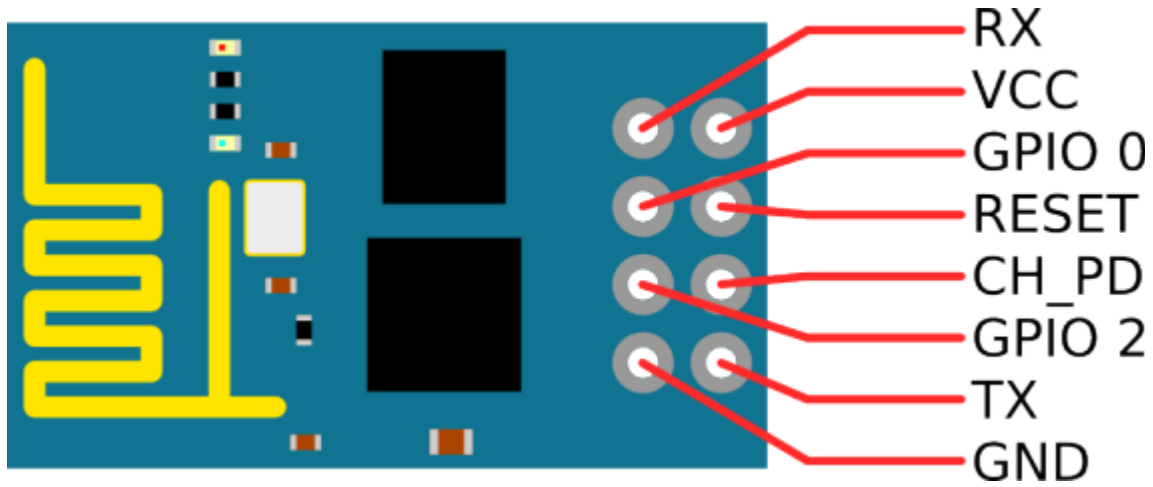
ESP12

ESP 8266 PINOUT

- **ESP8266 is 3.3v device & cannot tolerate 5v levels**



Name	Type	Description
VCC	-	Voltage DC input (3.3 V)
RST	-	Reset
CH-PD	Chip Enable	High: On, chip works properly Low: Off, small current
TXD	Output	Serial Port Transmit Data (TTL level)
GND	-	Ground
GPIO 2		UART Tx during flash progamming
GPIO 0		SPICS2
RXD	Input	Serial Port Receive Data (TTL level)



ESP8266-01

- 802.11 b/g/n
- Input power: 3.3V
- I/O voltage tolerance: 3.6V Max
- Regular operation current draw: ~70mA
- Peak operating current draw: ~300mA

HIGHLY INTEGRATED

- ESP8266EX is among the most integrated WiFi chips in the industry with the size of 5mm x 5mm
  - it integrates the antenna switches,
  - RF balun, power amplifier,
  - low noise receive amplifier, filters,
  - power management modules while requires minimal external circuitry.

32-BIT MCU

- ESP8266EX integrates Tensilica L106 32-bit micro controller (MCU) which features extra low power consumption and 16-bit RSIC.
- The CPU clock speed is 80 MHz.
- It can also reach a maximum value of 160 MHz.
- Real Time Operation System (RTOS) is enabled.
- Currently, only 20% of MIPS has been occupied by the Wi-Fi stack, the rest can all be used for user application programming and development.

LOW POWER

- ESP8266EX has been designed for mobile, wearable electronics and Internet of Things applications with the aim of achieving the lowest power consumption with a combination of several proprietary technologies.
- The power saving architecture operates in 3 modes:
  - active mode,
  - sleep mode and
  - deep sleep mode.

ROBUSTNESS

- By integrating more components on-chip, we have made the solution to be the most robust and manufacturable.
- Our solutions also feature the widest operating temperature range, from -40°C to +125°C.