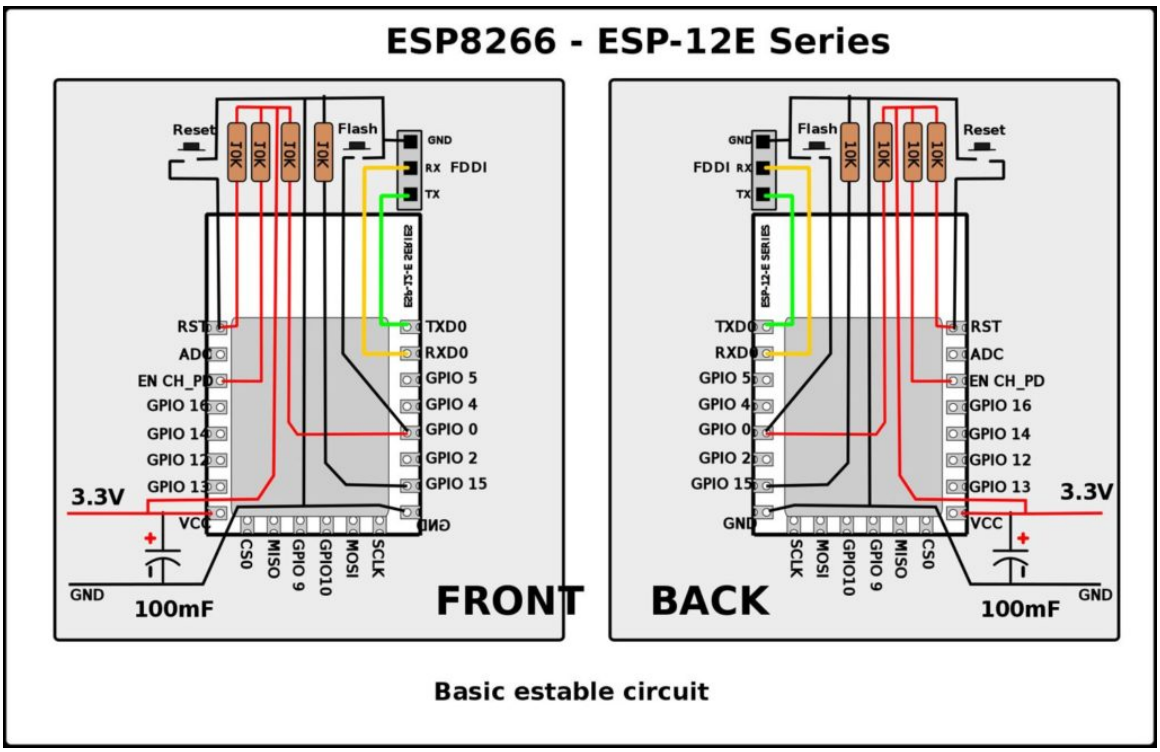
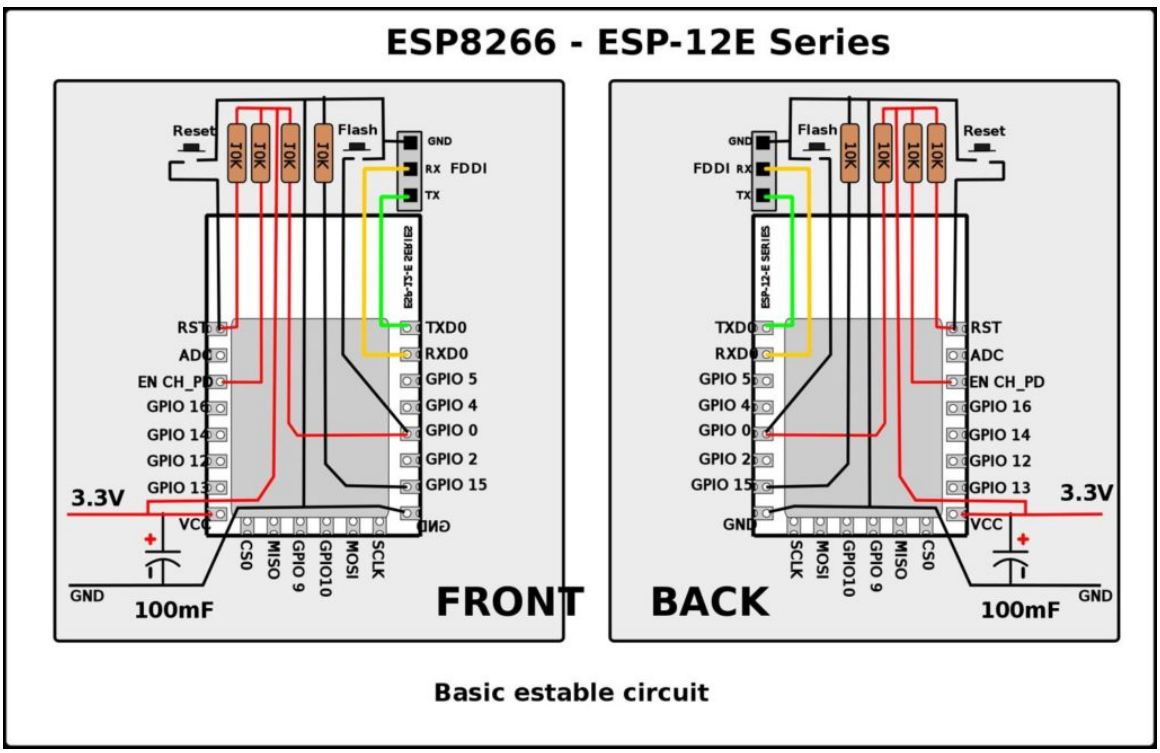


ESP8266 12e Pinout Schematic Circuit Diagram

Posted By: Omar Asghar on: November 26, 2018 In: pinouts No Comments

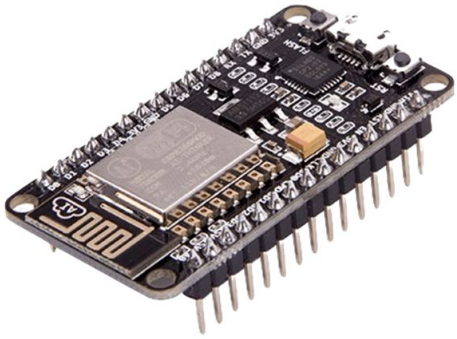
Today, we will talk about ESP8266 pinout (pinning), or in other words, NodeMCU. Personally, I really like this component, as it already comes with USB input. But it is important to explain that the NodeMCU is formed by an ESP12E, which still has an ESP8266EX inside it. Thus, we'll learn the correct pin identification by doing the following: looking at the NodeMCU datasheet, knowing which of these pins work with digitalWrite, digitalRead, analogWrite, and analogRead, and understanding the boot more thoroughly.

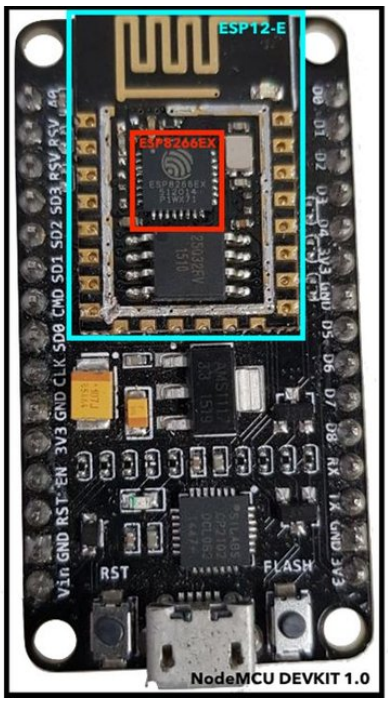


As I program more with Arduino IDE, I practically see the NodeMCU as an Arduino. However, I must emphasize these devices have differences, especially concerning the pinning. If you watched the ESP32 video entitled "Internal Details and Pinout," you've learned there are pins that can't be used, or that are reserved for certain things. So I want to do

something useful here related to this, but this time with ESP8266.

Step 1: NodeMCU Devkit 1.0





The term NodeMCU usually refers to the firmware, while the board is called Devkit. NodeMCU Devkit 1.0 consists of an ESP-12E on a board, which facilitates its use. It also has a voltage regulator, a USB interface.

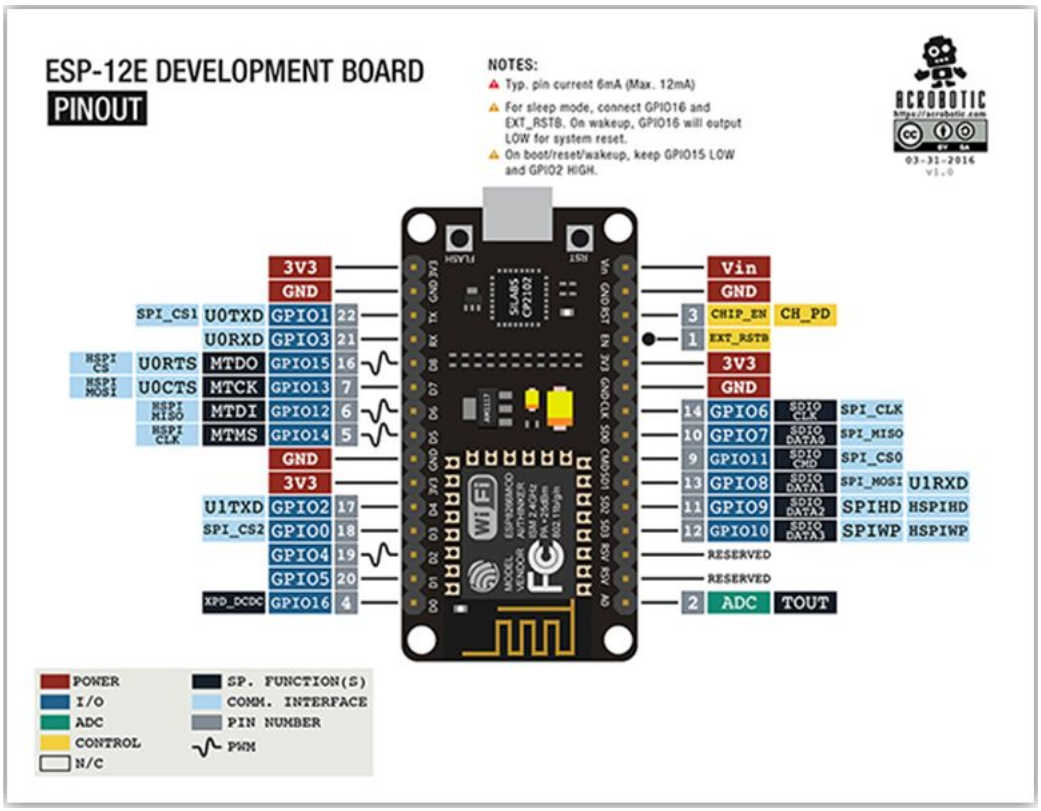
Step 2: ESP-12E

The ESP-12E is a board created by AI-THINKER, which consists of an ESP8266EX inside the metal cover.

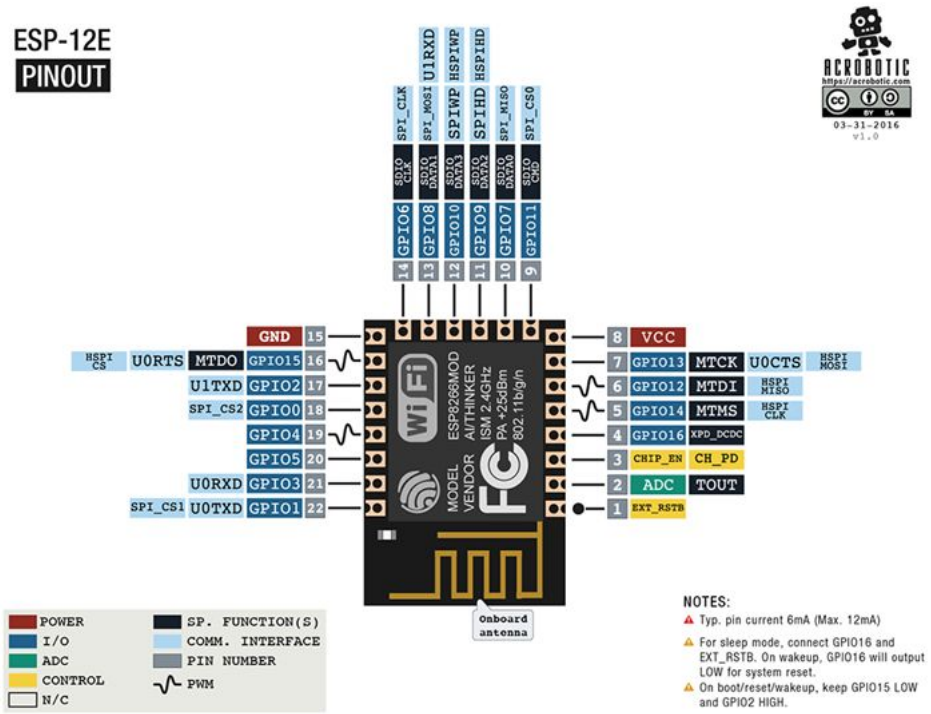
Step 3: ESP8266EX

Made by Espressif, this microchip has integrated WiFi and low-power consumption. Processor RISC Tensilica L 106 32bit with a maximum clock of 160 MHz.

Step 4: NodeMCU 1.0 ESP-12E Pinout

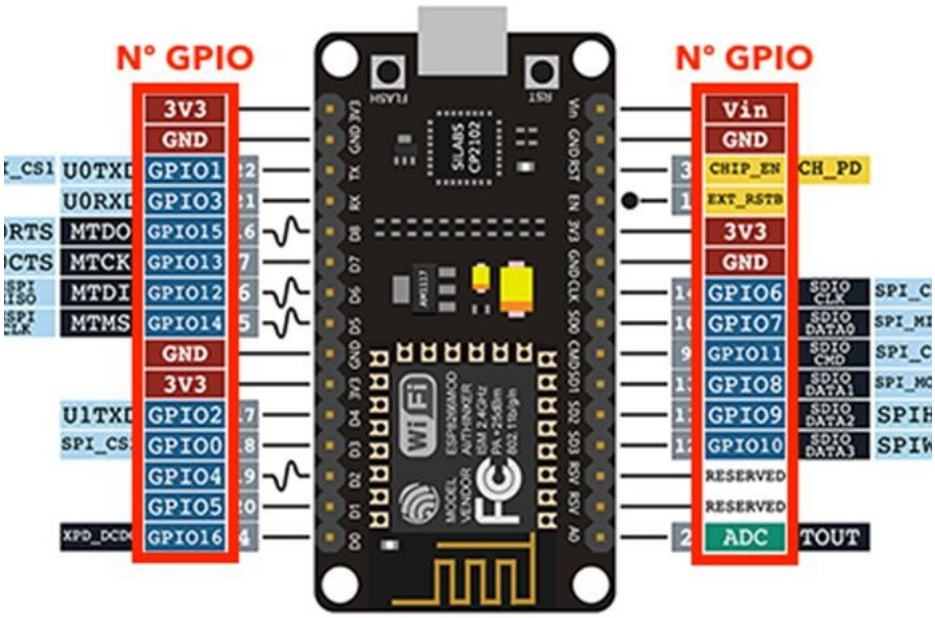


Step 5: ESP-12E Pinout



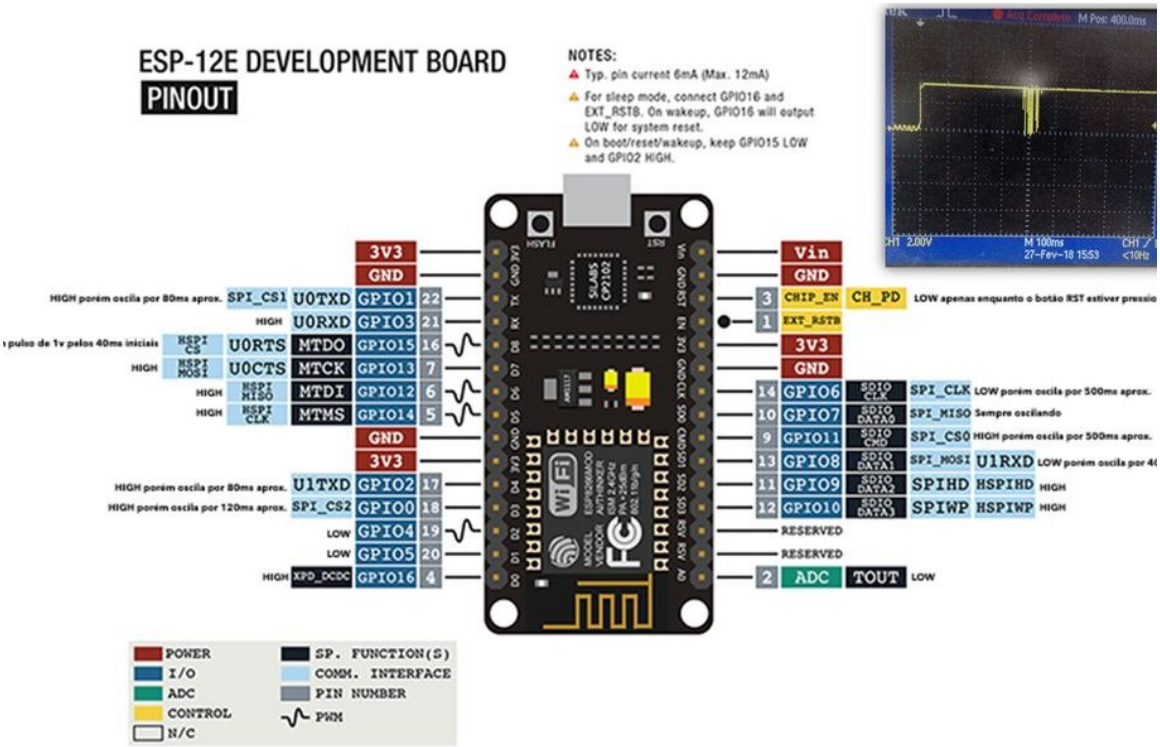
I want to emphasize that NodeMCU and ESP-12E are not the same things. In the case of the ESP-12E, the recording uses the serial, the UART. In NodeMCU, this is performed by the USB.

Step 6: And After All This, What's the Number to Put When Programming?



Use the number that is in front of the GPIO or the constants A0, D0, D1, D2, D3, D4, D5, D6, D7, and D8.

Step 7: Boot

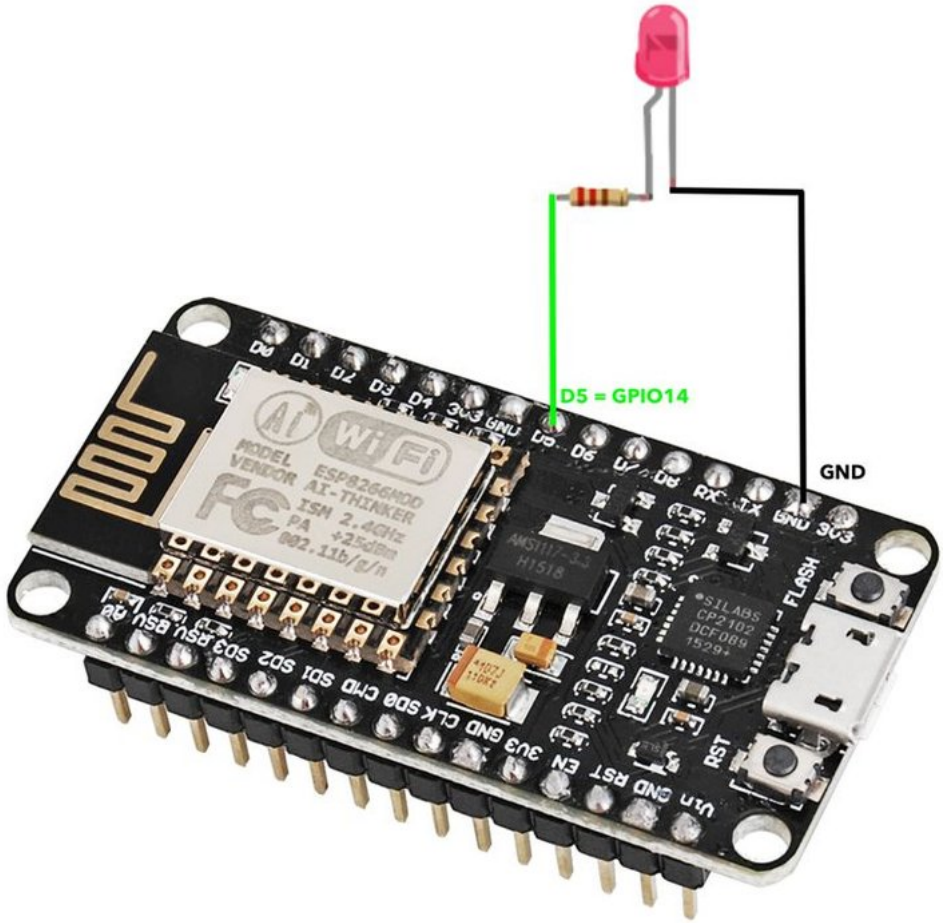


We put the oscilloscope at the tip of each pin. This allows us to find, for example, that when we turn on the NodeMCU, its pins are not all the same. Some are up and others down, by default. See the comments on the behavior of each post after the boot in the image below.

Step 8: Constants That Are Already Predefined

Constante	Valor
D0	16
D1	5
D2	4
D3	0
D4	2
D5	14
D6	12
D7	13
D8	15
A0	17

Step 9: Blink Example



In this example, we connected an LED on port D5, which is GPIO14. So the options are as follows:

```
//O led está no GPIO14
#define LED 6

//ou usar a constante D5 que já está definida

//#define LED D5

void setup() {

pinMode(LED, FUNCTION_3);

}

void loop() {

digitalWrite(LED, HIGH);

delay(1000);

digitalWrite(LED, LOW);

delay(1000);

}
```

Step 10: INPUT / OUTPUT

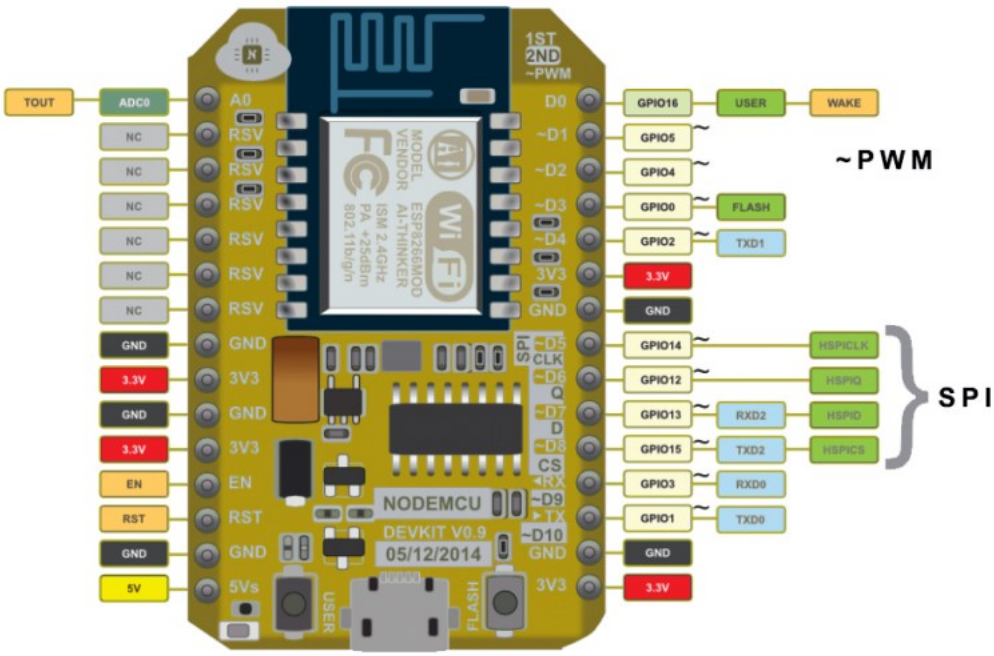
When performing INPUT and OUTPUT tests on the pins, we obtained the following results:

- digitalWrite did NOT work with GPIOs 6, 7, 8, 11, and ADC (A0)
- digitalRead did NOT work with GPIOs 1, 3, 6, 7, 8, 11, and the ADC (A0)
- analogWrite did NOT work with GPIOs 6, 7, 8, 11, and ADC (A0) (GPIOs 4, 12, 14, 15 have hardware PWM, and the others are by software)
- analogRead worked only with the ADC (A0)
- 6, 7, 8, 11 do NOT work for the above four commands

NodeMCU Pinout Reference

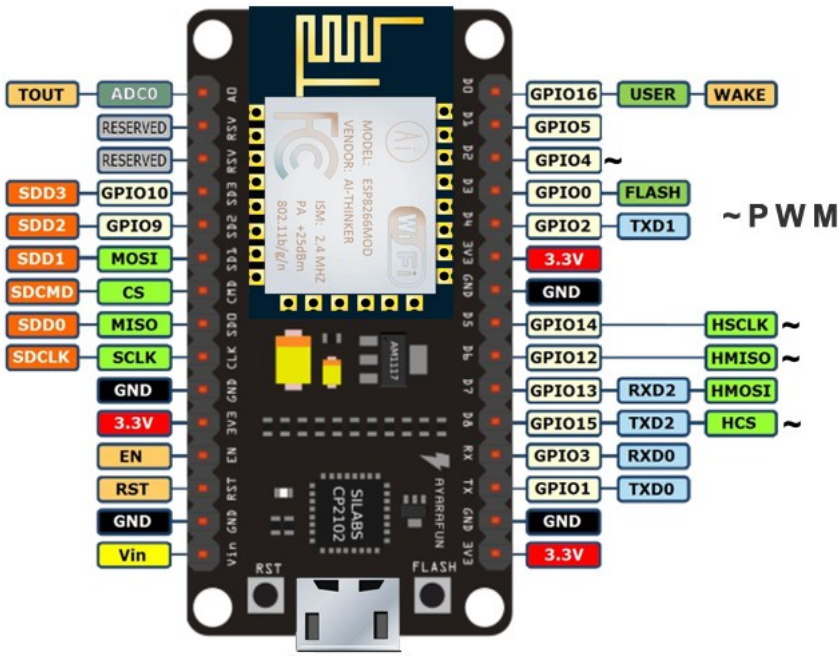
The NodeMCU is an Arduino-compatible board that features the ESP8266 at its core. It became popular because it is a WiFi-ready microcontroller by itself – no need for an Arduino.

NodeMCU V0.9



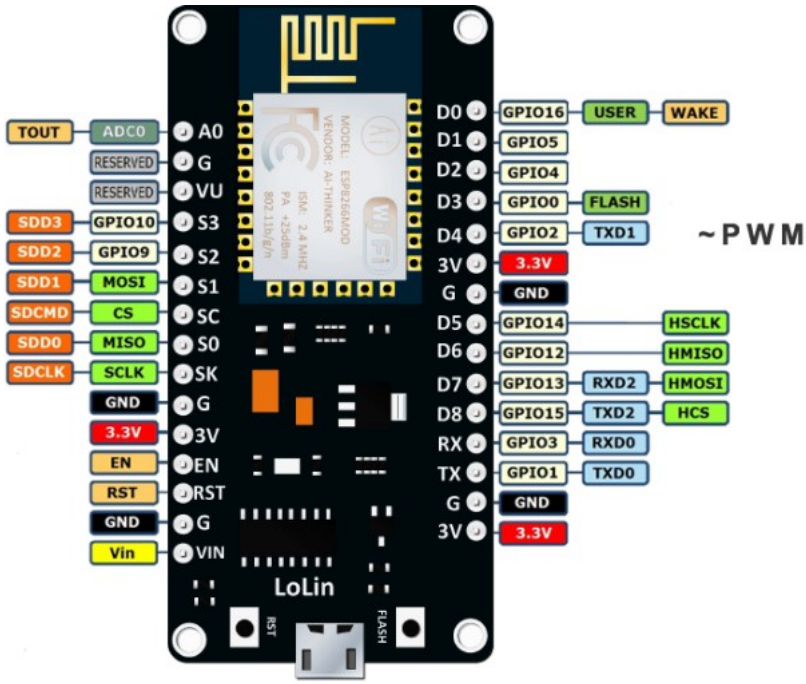
This is the first version of the NodeMCU board featuring the ESP-12. The V0.9 board has since been outdated primarily because of its width that isn't breadboard friendly. The number of Not Connected (NC) pins is also a reason.

NodeMCU V1.0



The second generation of the NodeMCU is arguably the most popular one. Amica (the company that created both V0.9 and V1.0) made this board narrower to fit a breadboard. Moreover, the ESP8266 has also been upgraded from ESP-12 to ESP-12E (a few extra pins).

NodeMCU V3



This is a version invented by Lolin with a CH340G USB-TTL chip instead of the Silabs CP2102 from V1.0. As shown, it has the same pinout structure with V1.0. But this board is slightly larger than the V1.0