



SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



190E204- IoT System Architecture

Node MCU

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NodeMCU

NodeMCU is an **open source firmware or development board with ESP8266 chip, which is a 32-bit controller with built-in WiFi transceiver**

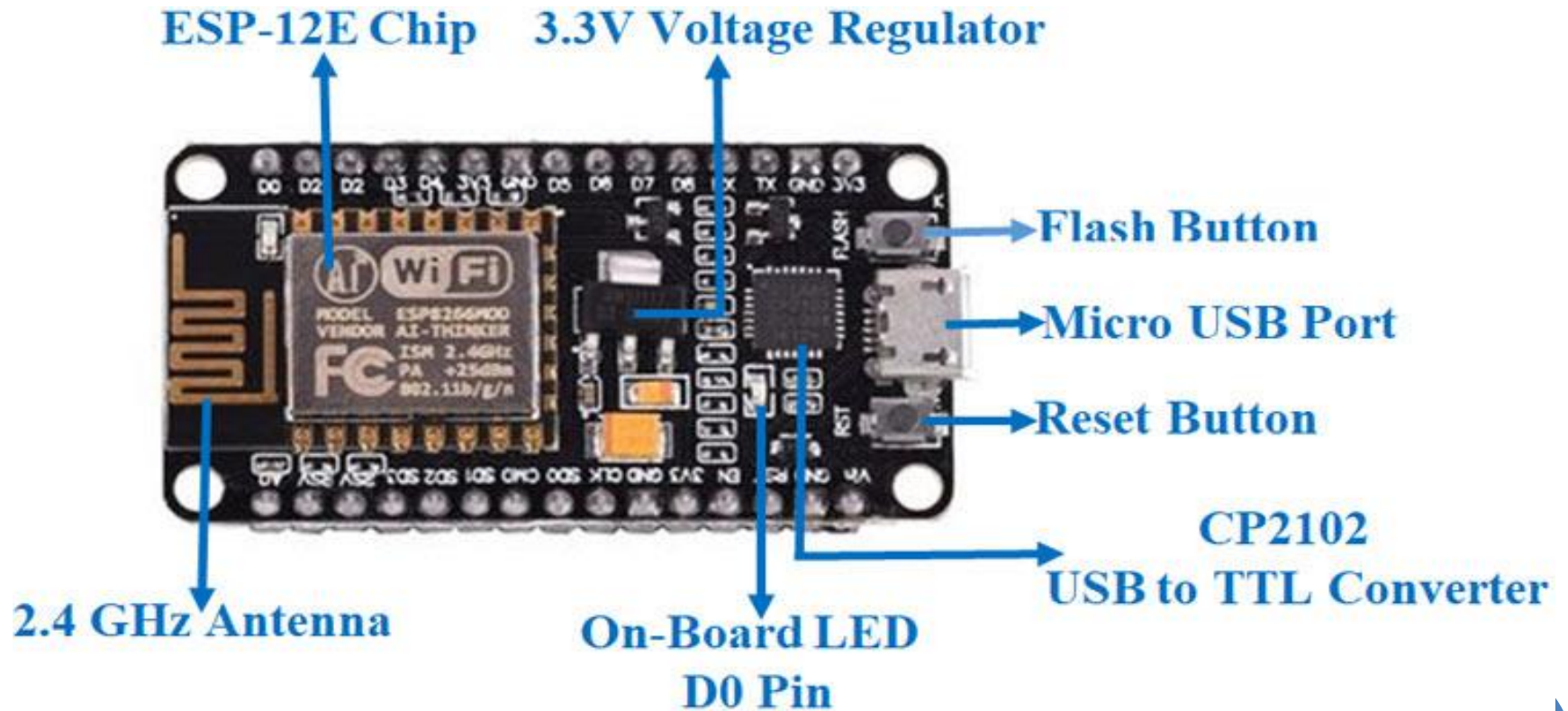
The name "NodeMCU" combines "node" and "MCU" (micro-controller unit)

This board is specially targeted for **IoT based Applications.**

NodeMCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IoT projects.



NodeMCU



NodeMCU - Specification

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz
- USB-TTL based on CP2102 is included onboard, Enabling Plug n Play
- PCB Antenna
- Small Sized module to fit smartly inside your IoT projects



NodeMCU

- **Low-cost:** you can get ESP8266 boards starting at \$3 (or less) depending on the model.
- **Low-power:** the ESP8266 consumes very little power when compared with other microcontrollers and can even go into [deep sleep](#) mode to consume less power;
- **Wi-Fi:** the ESP8266 can generate its own Wi-Fi network ([access point](#)) or connect to other Wi-Fi networks (station) to get access to the internet.
- **[Compatible with the Arduino “programming language”](#):** those that are already familiar with programming the Arduino board.
- **[Compatible with MicroPython](#):** you can program the ESP8266 with MicroPython



NodeMCU – Technical Data

- Processor: L106 32-bit RISC microprocessor core based on the Tensilica Diamond Standard 106Micro running at 80 or 160 MHz
- Memory:
 - 32 KiB instruction RAM
 - 32 KiB instruction cache RAM
 - 80 KiB user-data RAM
 - 16 KiB ETS system-data RAM
- External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)
- IEEE 802.11 b/g/n Wi-Fi
- Integrated TR switch, balun, LNA, power amplifier, and matching network
- WEP or WPA/WPA2 authentication, or open networks
- 17 GPIO pins
- Serial Peripheral Interface Bus (SPI)
- I²C (software implementation)
- I²S interfaces with DMA (sharing pins with GPIO)
- UART on dedicated pins, plus a transmit-only UART can be enabled on GPIO2
- 10-bit ADC (successive approximation ADC)



NodeMCU

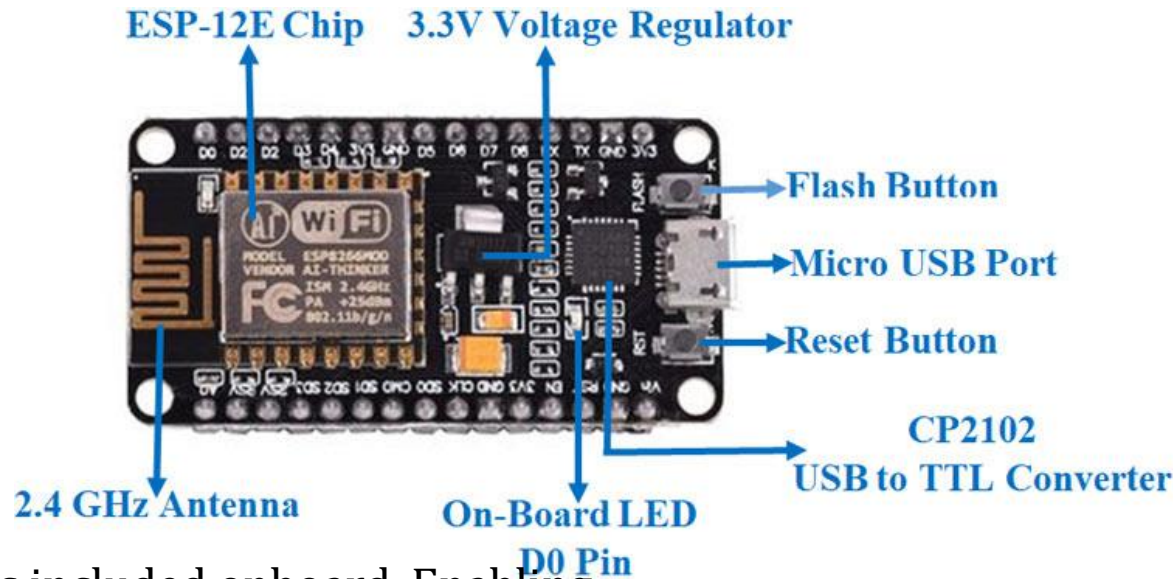
Difference Between ESP8266 (NodeMCU) and Arduino UNO

Specification	Arduino	ESP8266
RAM	4K Bytes	80 Kilobytes
FLASH memory	32 Kilo bytes	4 Mega Bytes
Speed	16MHz	80MHz
GPIOs	14	11
IO Voltage Level	5V	3.3V
ADC	6 (10-bit)	1 (10-Bit)
Serial	1	1
I2C	1	1
SPI	1	Used by Flash Chip
PWM IOs	6 (8-Bit Resolution)	All IO Pins with 10-Bit Resolution
WiFi	NO	YES 2 MBPS



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Thank you