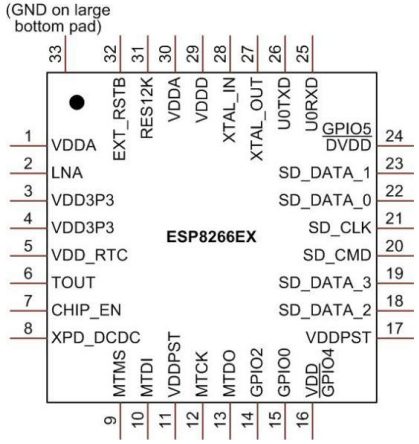
KimchiC0n Badge

ESP8266

- 저가 wifi 칩 – very low price ($1-$2) - **WiFi SOC**
- Full TCP/IP stack + MCU (32-bit RISC: Tensilica Xtensa L 106 at 80 MHz) - AP/STA dual mode 지원 – wifi 게이트웨이로 동작 가능함
- Produced by Shanghai-based Chinese manufacturer, Espressif Systems
- 16 GPIO/SPI/I2C/UART/ADC/etc…

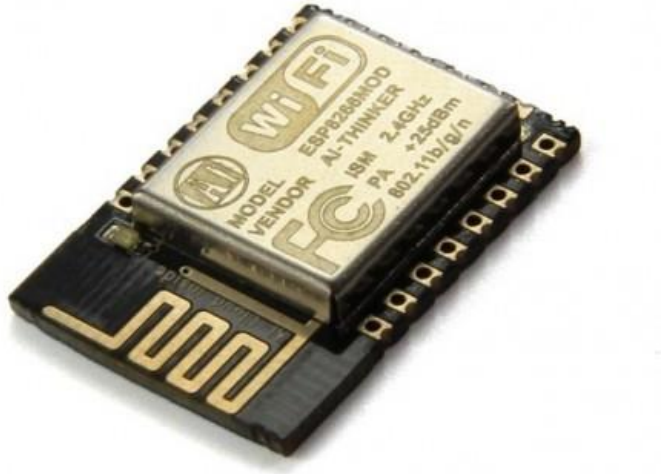


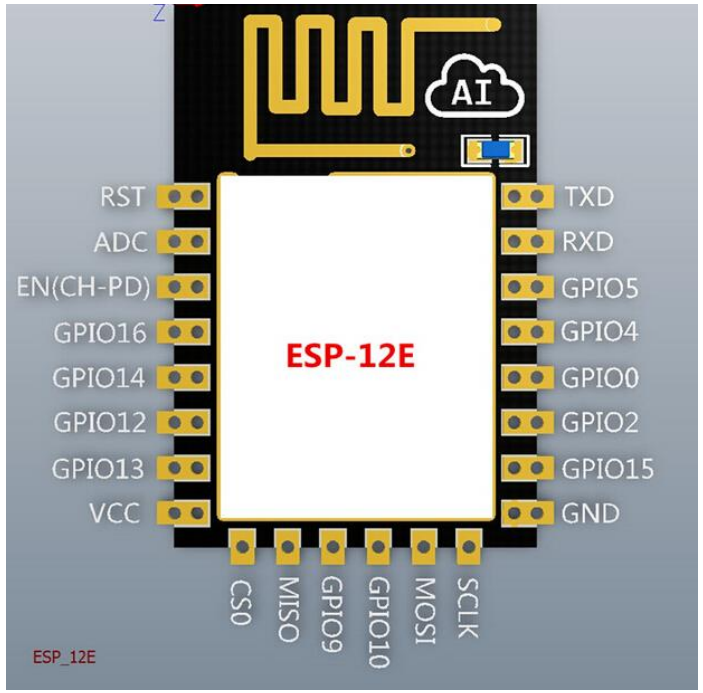
SDKs

- **NodeMCU – a Lua-based firmware**
- **Arduino – C++ based firmware – ESP8266 Arduino Core**
- MicroPython
- ESP8266 BASIC
- Zbasic for ESP8266
- Espruino
- Mongoose Firmware
- ESP-Open-SDK
- ESP-Open-RTOS

AI-Thinker modules

- AI-Thinker: 3rd party manufacturer
- ESP-01 ~ ESP-14



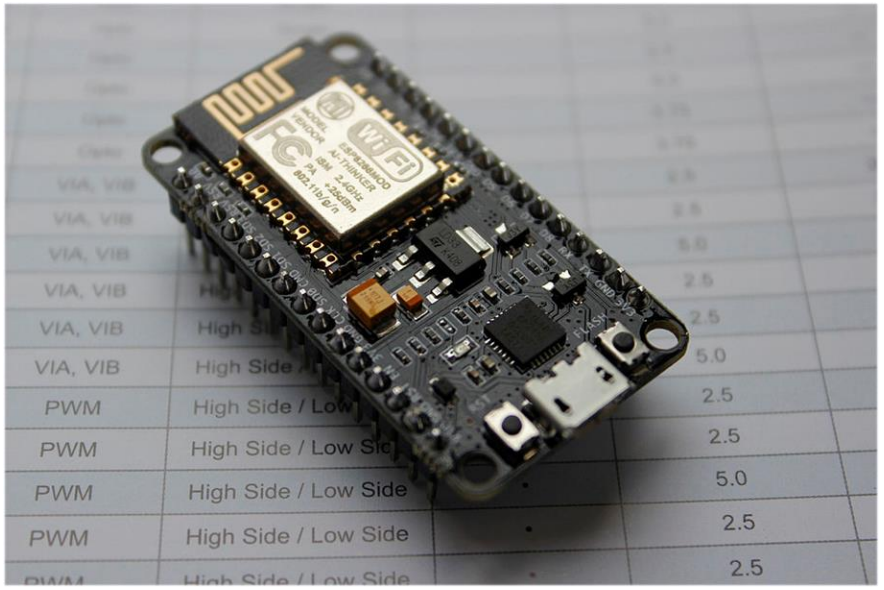


Boards – 더 복잡한 보드들

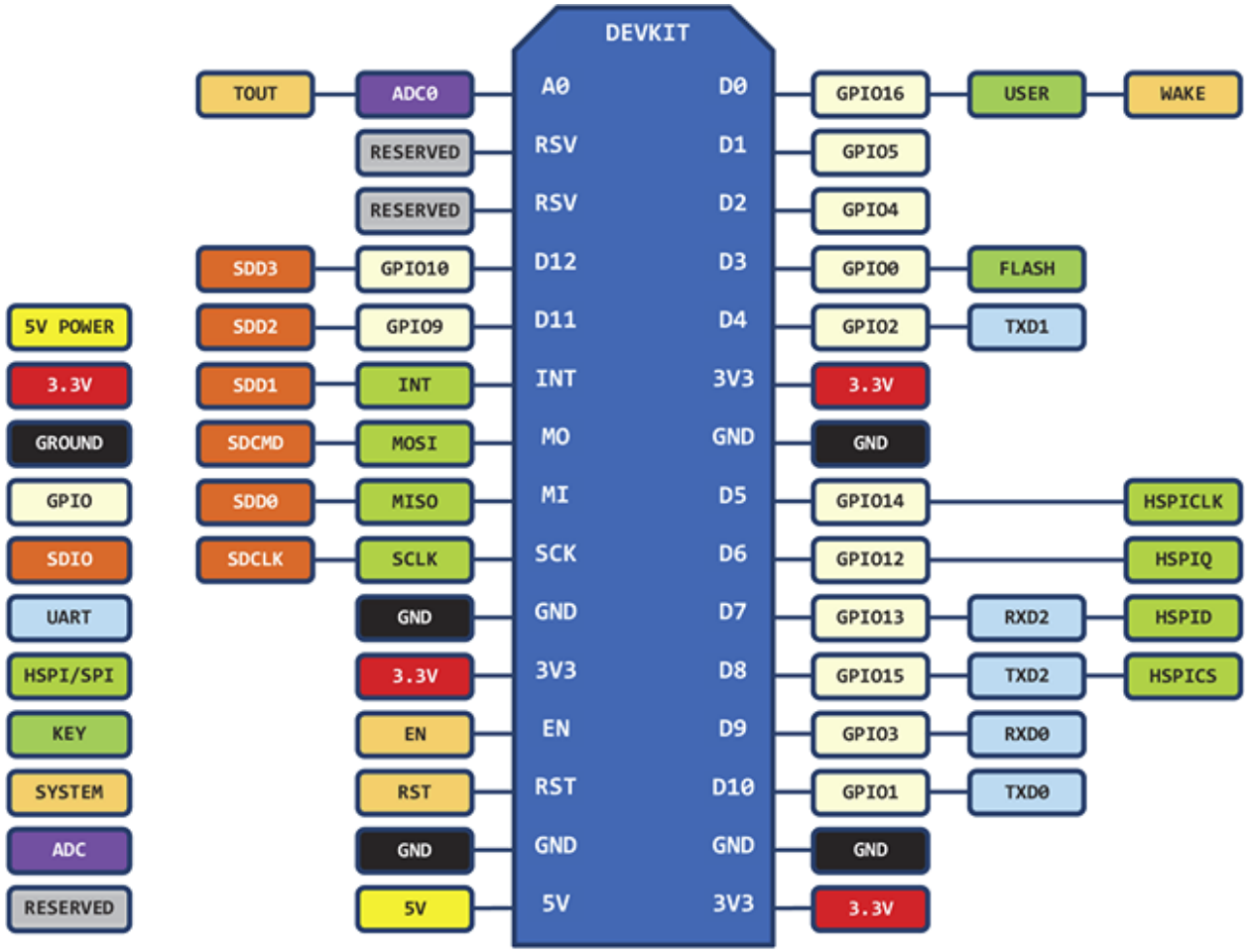
- ESP8266 + USB-to-UART + Micro-USB + 3.3 volt regulator
- 개발을 위한 최적의 환경 – 자잘한 칩/보드의 사양에 신경 쓰지 않아도 됨
- ESP-12E 모듈에 기반해서 만들어진 경우가 많음
- Bolt IoT, Olimex, **NodeMCU DEVKIT**, Adafruit Huzzah ESP8266 breakout, SparkFun ESP8266 Thing, KNEWRON Technologies smartWIFI, WeMos D1, WeMos D1 R2, WeMos D1 mini, WeMos D1 mini Lite, WeMos D1 mini Pro, ESPert ESPresso Lite, ESPert ESPresso Lite V2.0, In-Circuit ESP-ADC, Watterott ESP-WROOM02-Breakout, Geek wave solution IOT_WROOM-02 based WIFI development board

NodeMCU

- NodeMCU == SDK & firmware (https://github.com/nodemcu/nodemcu-firmware)
  - lua based interactive firmware for mcu like esp8266
  - http://nodemcu.com/
- NodeMCU Dev Kits == open source board name (https://github.com/nodemcu/nodemcu-devkit-v1.0)



NodeMCU dev kit v3 pin map –



D0(GPIO16) can only be used as gpio read/write, no interrupt supported, no pwm/i2c/ow supported.

NodeMCU Firmware

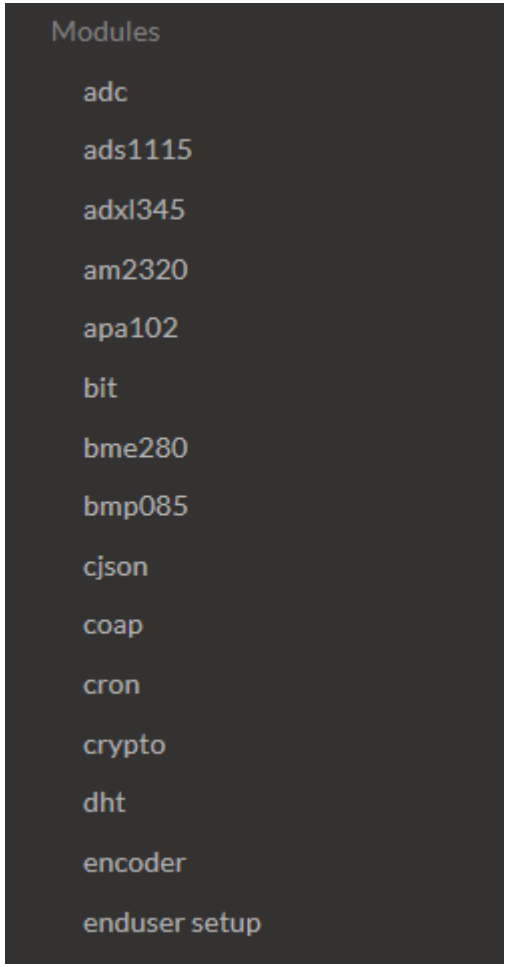
- Firmware code/builds
  - Source code - https://github.com/nodemcu/nodemcu-firmware
  - Custom builds – http://Nodemcu-build.com
- Firmware flasher (ESP-general)
  - Esptool – Official flasher from Espressif - https://github.com/espressif/esptool
  - NodeMCU Flasher – GUI tool - https://github.com/nodemcu/nodemcu-flasher
  - NodeMCU pyFlasher – Python-based + GUI - https://github.com/marcelstoer/nodemcu-pyflasher

Development Environment

- Arduino IDE
- Esplorer - https://esp8266.ru/esplorer/ - Lua/MicroPython
- SDk Documentation - https://nodemcu.readthedocs.io/en/master/

Firmware 선택하기

- 어떠한 기능을 사용할지에 대한 결정 – SDK documentation 의 modules 참조
- Module을 사용하기 위해서는 firmware build에 포함 되어 있어야 함.
  - ex) http://Nodemcu-build.com
- Flash – use flash tools
  - ex) NodeMCU pyFlasher – Python-based + GUI - https://github.com/marcelstoer/nodemcu-pyflasher



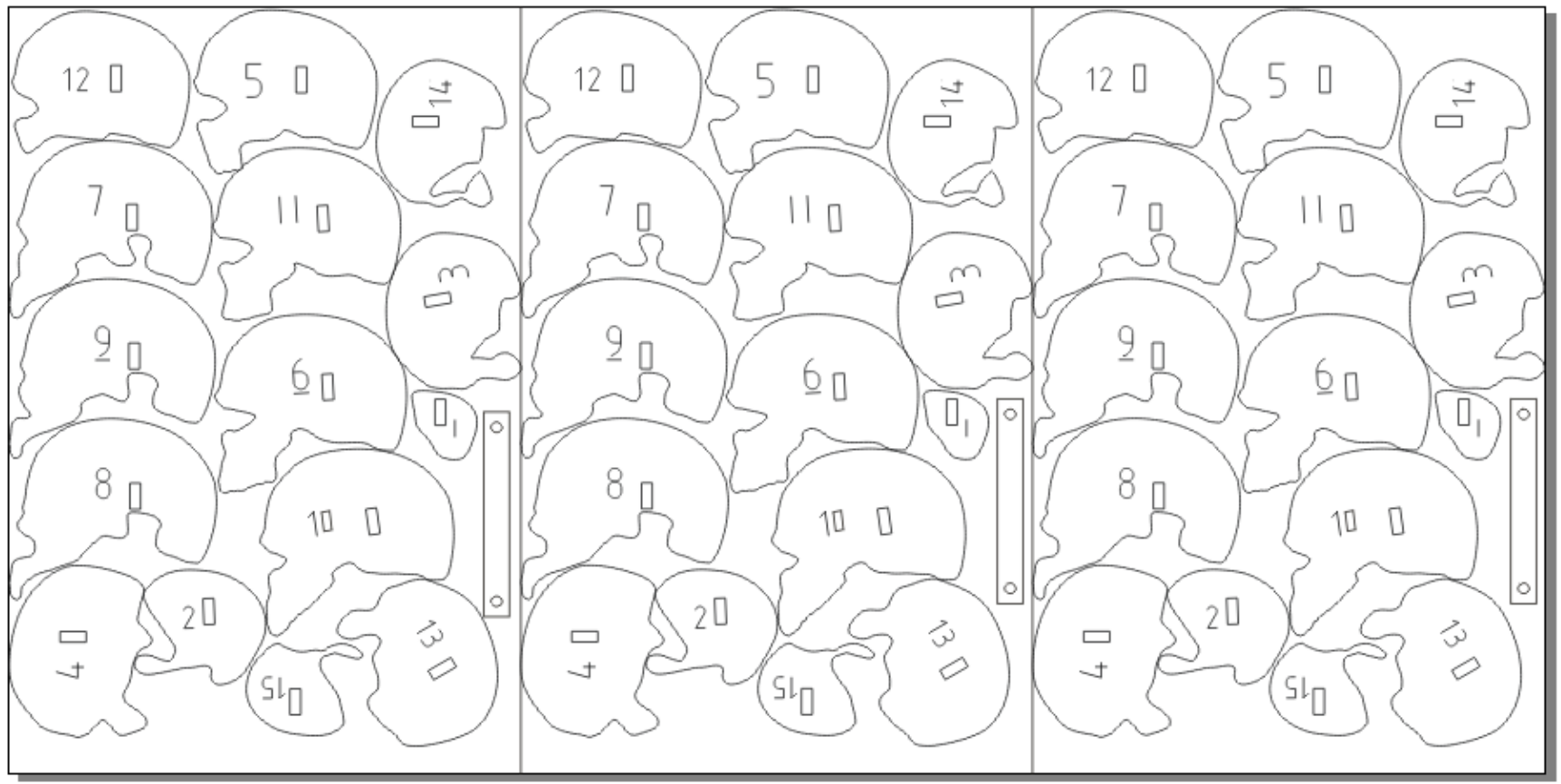
KimchiC0n Badge 보드/개발

- Board: NodeMCU v3
- Firmware: file, gpio, http, i2c, net, node, spi, tmr, u8g, uart, websocket, wifi, ws2812
- NodeMCU pyFlasher – Python-based + GUI - https://github.com/marcelstoer/nodemcu-pyflasher
  - Prerequisites: wxPython/PySerial
- Esplorer - https://esp8266.ru/esplorer/ - Lua/MicroPython
  - Prerequisites: JRE

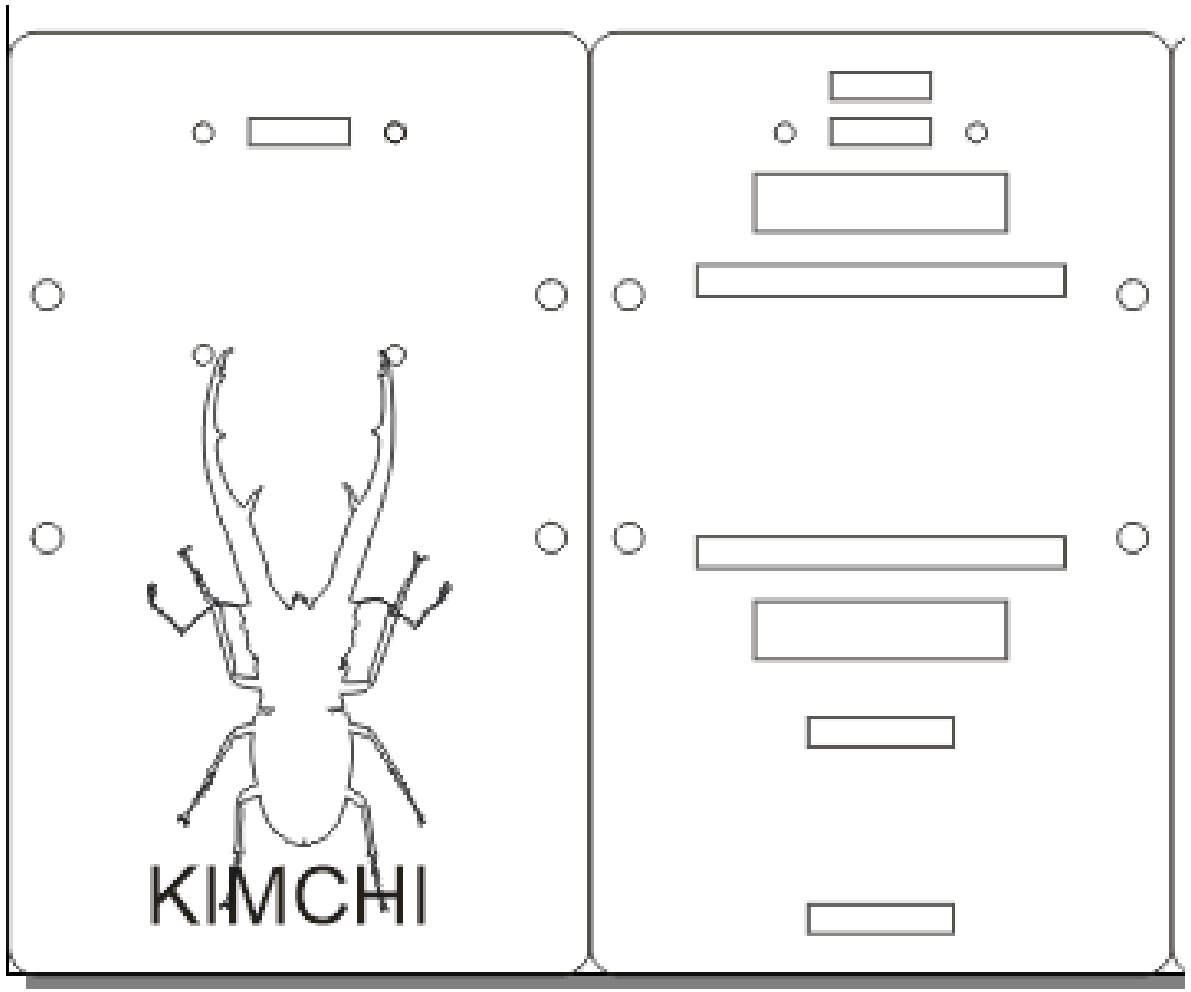
개발 패키지 묶음

- https://www.dropbox.com/s/0ka9hyoab2hdcau/KimchiC0n.zip?dl=0
  - NodeMCU-PyFlasher-1.0.1.exe 실행
  - NodeMCU를 USB 포트에 연결후 COM 포트 확인
  - 다음 펌웨어 선택후 플래싱
    - nodemcu-master-13-modules-2017-06-29-01-41-27-float.bin
  - 개발 환경 – ESPlorer 실행

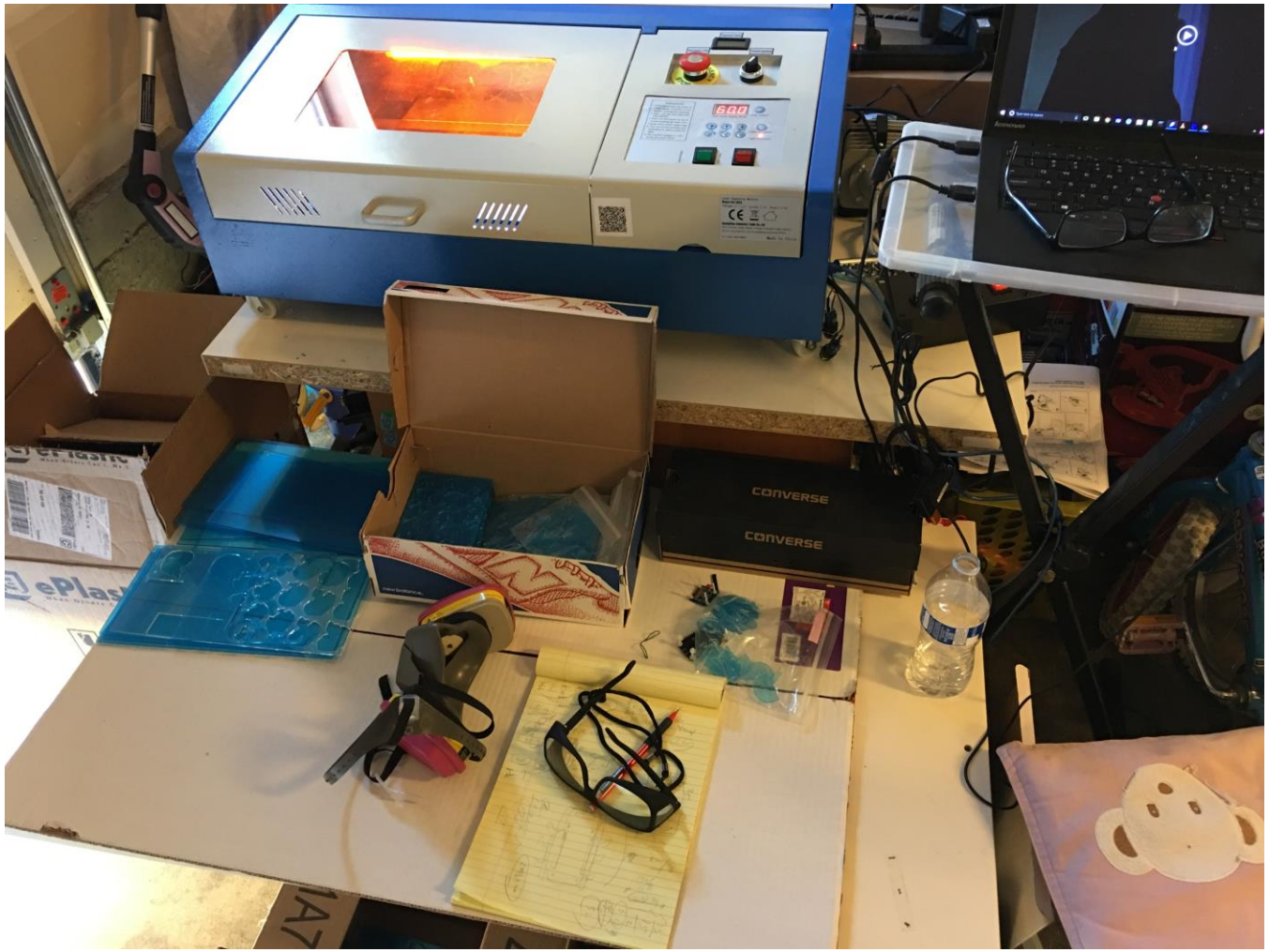
해골



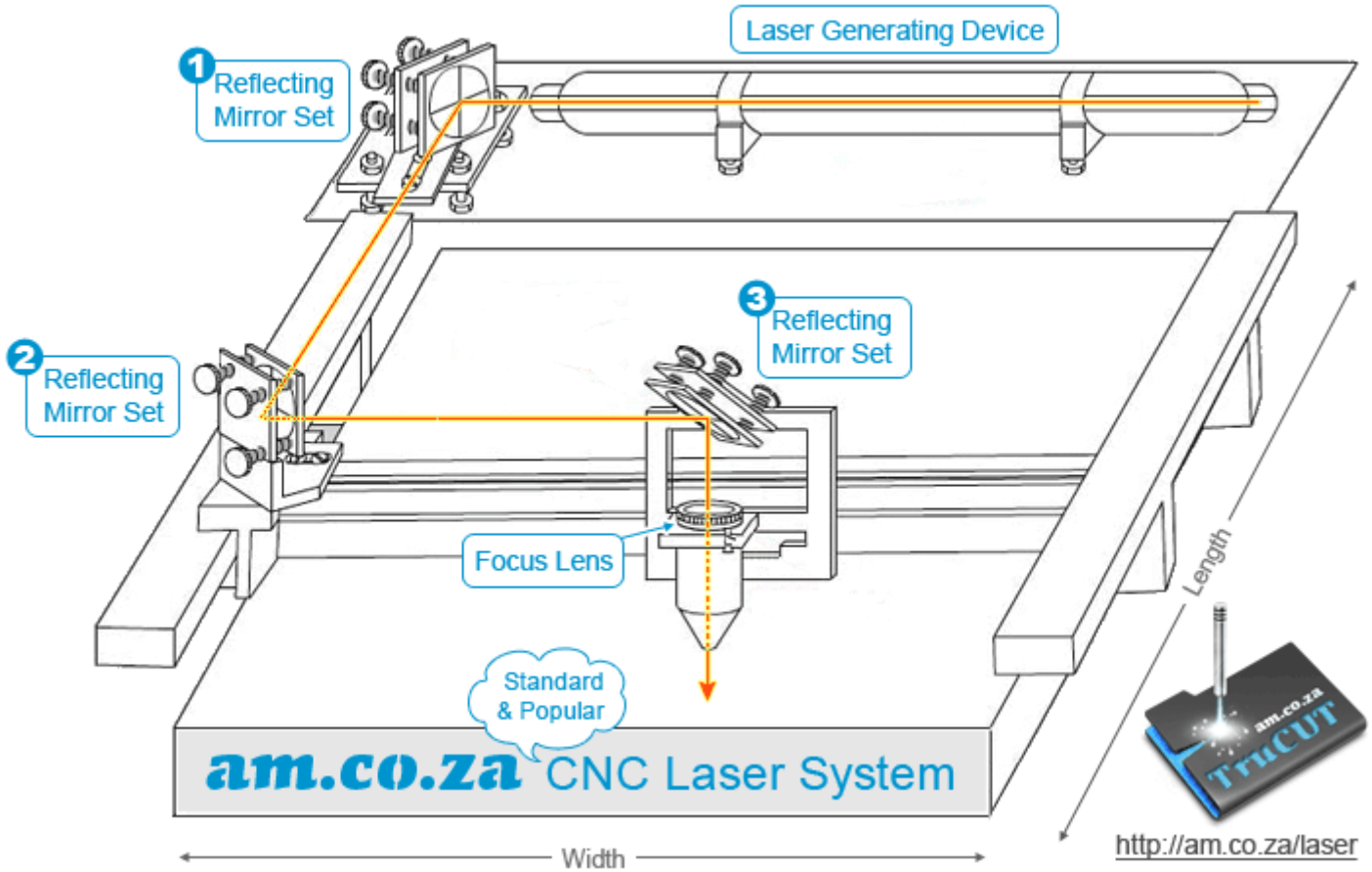
케이스



레이저 커팅 – CO2 laser cutter – ebay $400



Laser Cutter Concept



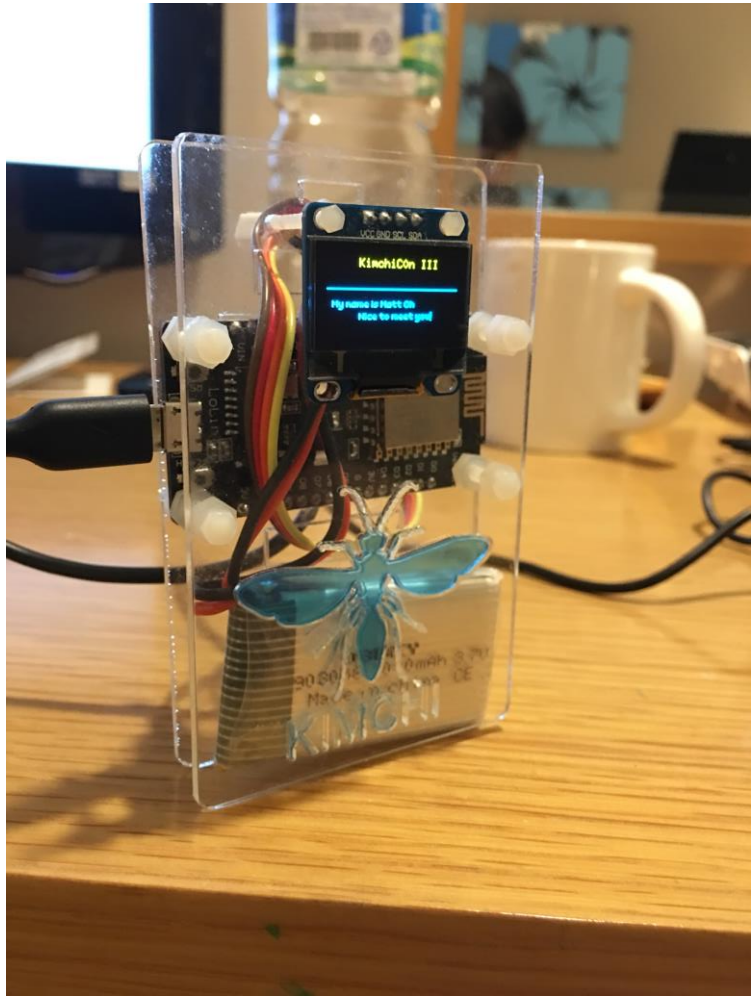
레이저 커팅 – Laser Tube

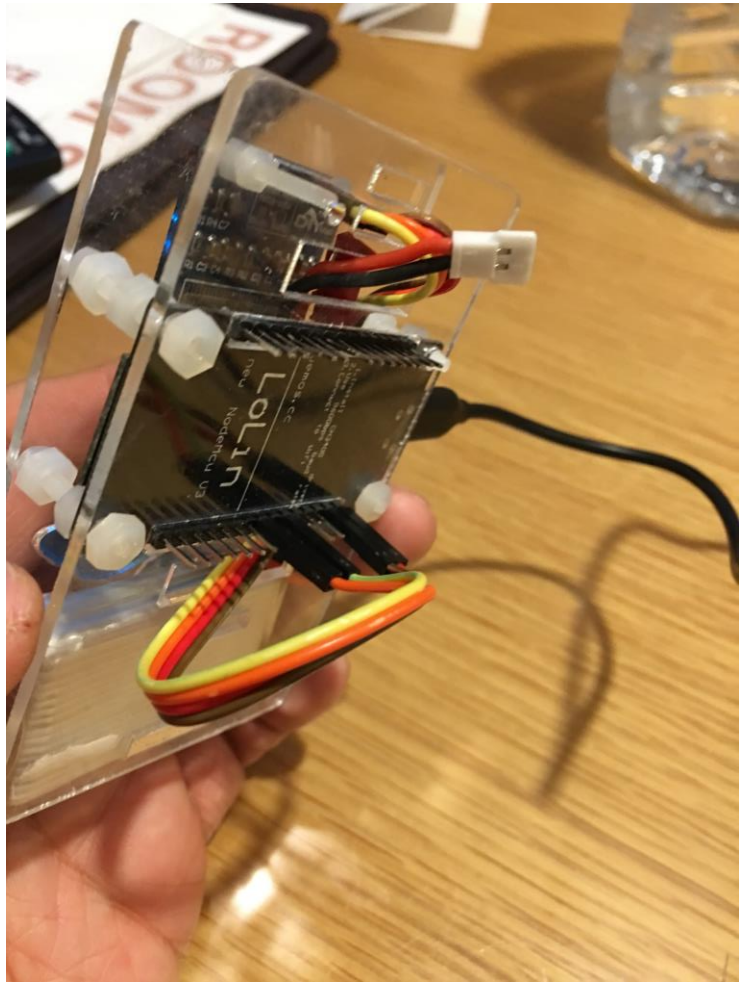
레이저 커팅

뱃지 조립하기

- 앞판 + 뒷판 + NodeMCU: 큰 bolts x 4 /nuts x 12
- 앞판 + OLED: 작은 bolts x 2 /nuts x 4
- 해골: 작은 bolts x 2 /nuts x 4

KimchiC0n 3 - DIY



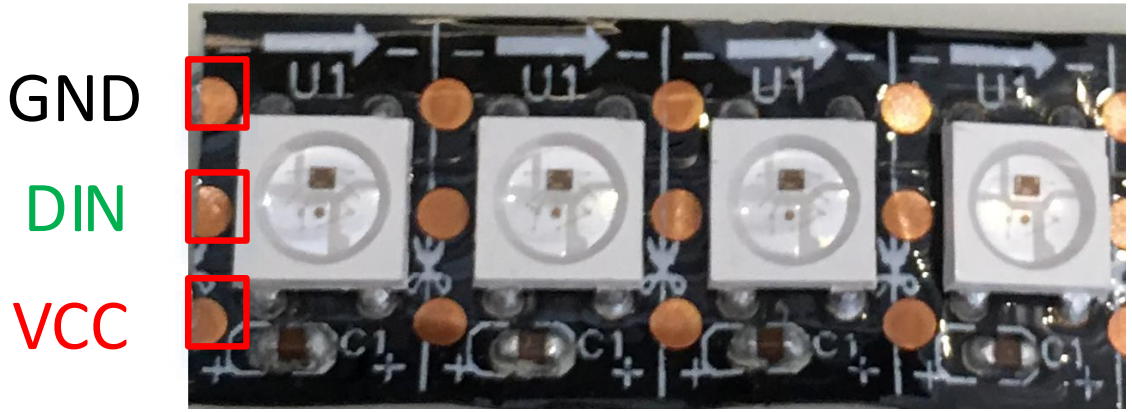


Badge Pinmap - OLED

NodeMCU	OLED
3V	VCC
G	GND
D5	SCL
D7	SDA

Badge Pinmap – LED strip

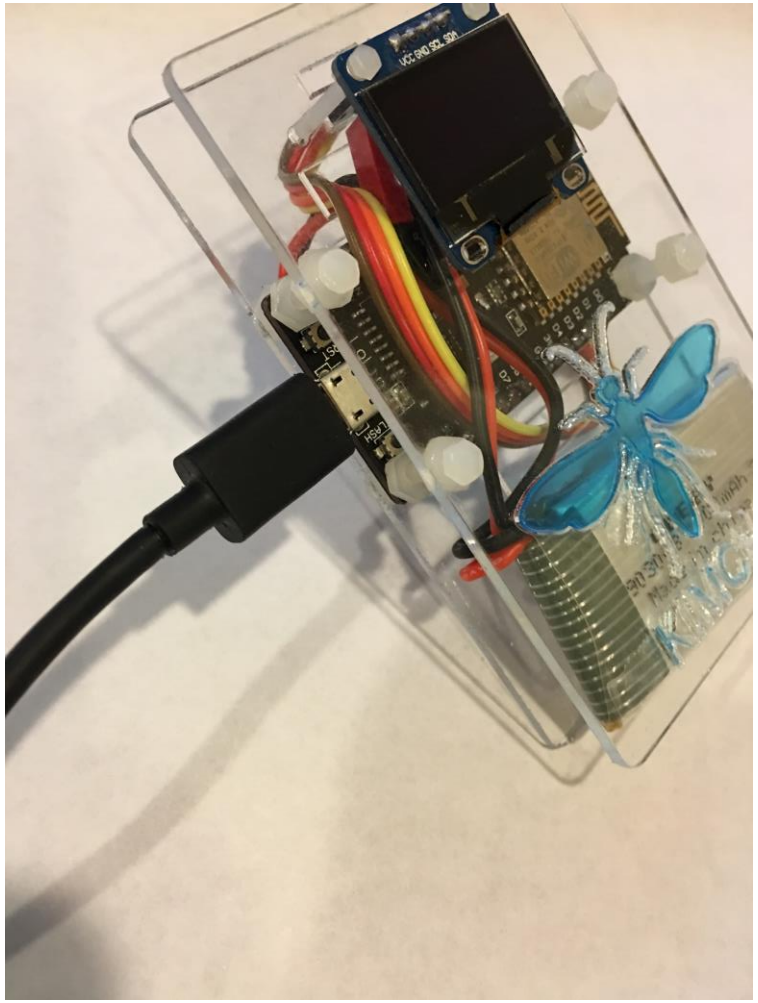
NodeMCU	LED Strip
GND	GND
D4	DIN
3V	VCC

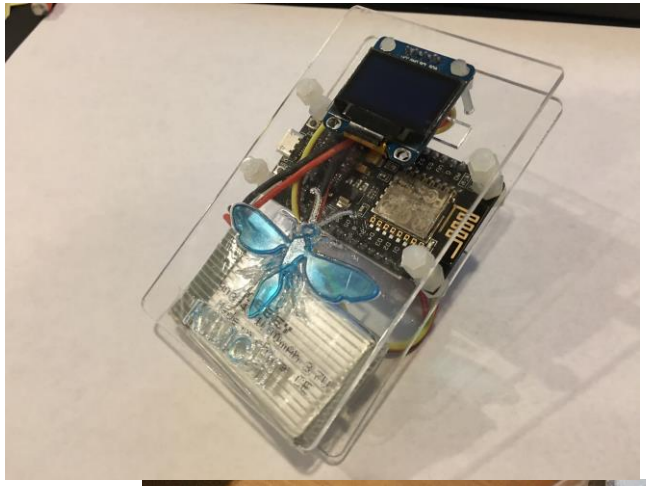


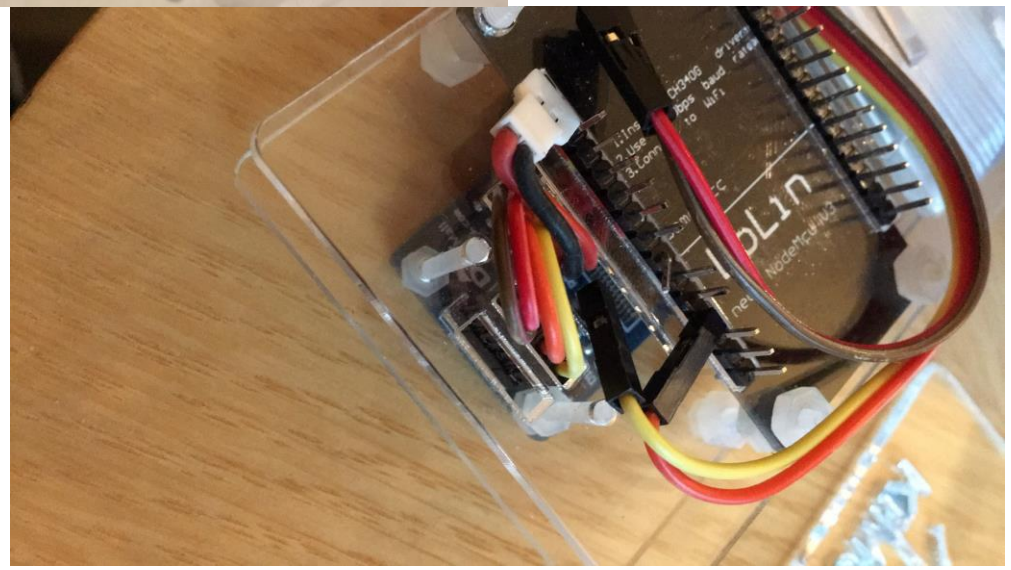
Badge Pinmap - Power

NodeMCU	Battery
3V	VCC - Red
G	GND - Black

KimchiC0n 3 - DIY







KimchiC0n - DIY

- https://github.com/kimchicon/Badge2017
  - Basic – 이름 보여주고, LED 빨/파/노 전환하기
    - https://github.com/kimchicon/Badge2017/blob/master/Basic/init.lua
  - 오늘/내일 새로운 코드를 짜서 pull request 해주시길

OLED - 이름 표시 - i2c/u8g 모듈 사용

```
function init_i2c_display()
    i2c.setup(0, 7, 5, i2c.SLOW)
    disp = u8g.ssd1306_128x64_i2c(0x3c)
end

function draw()
  disp:setFont(u8g.font_6x10)
  disp:drawStr( 30, 10, "KimchiC0n 3")
  disp:drawLine(0, 25, 128, 25);
  disp:setFont(u8g.font_chikita)
  disp:drawStr( 5, 40, "My name is Matt Oh")
end
```

i2c module - https://nodemcu.readthedocs.io/en/master/en/modules/i2c/

u8g module - https://nodemcu.readthedocs.io/en/master/en/modules/u8g/

LED Strip 제어 – ws2812 모듈

```
tmr.alarm(0, 200, 1, function()
  if i%3==0 then
    ws2812.write(string.char(255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0))
  end
  if i%3==1 then
    ws2812.write(string.char(0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0))
  end
  if i%3==2 then
    ws2812.write(string.char(0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255, 0, 0, 255))
  end
  i = i + 1
end)
```

→ https://nodemcu.readthedocs.io/en/master/en/modules/ws2812/

Badge + LED strip