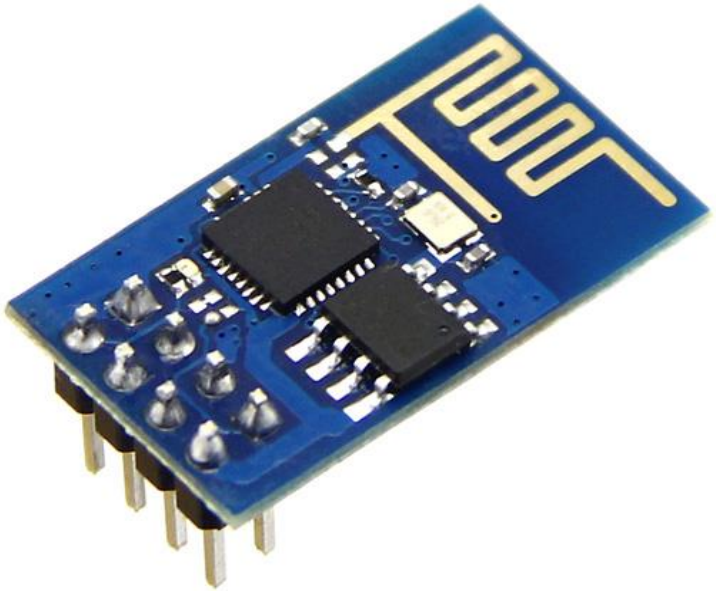
ESP8266 Sub $5 IOT Wifi



Hack Sonoma County
April 8, 2015

ESP8266 Hardware

- 80Mhz 32-bit SOC based on Tensilica Xtensa
- 3.3v at 225mA max, Standby <1mA, 12uA sleep.
- 802.11 b/g/n WIFI Station and/or Soft AP. Wifi direct.
- 16 GPIO, 3 PWM, ADC, UART, I2C, SPI
- 64K instruction RAM, 96K Data Ram.
- Modules Availability: Amazon($7), Ebay($4), China($2.5)

Current Modules

ESP8266

ESP-02

ESP-03

ESP-04

ESP-05

ESP-06

ESP-07

ESP-08

ESP-09

ESP-10

ESP-11

ESP-12

Programming Options

Current

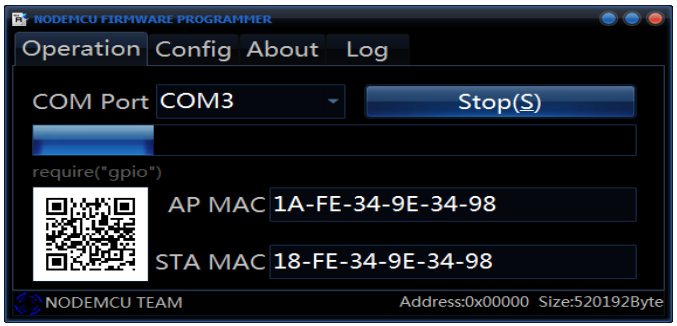
- AT Commands Via Serial Port
- C (Espressif ESP8266 SDK)
- Lua NodeMCU
- ESP8266 Arduino (C based)

In Development

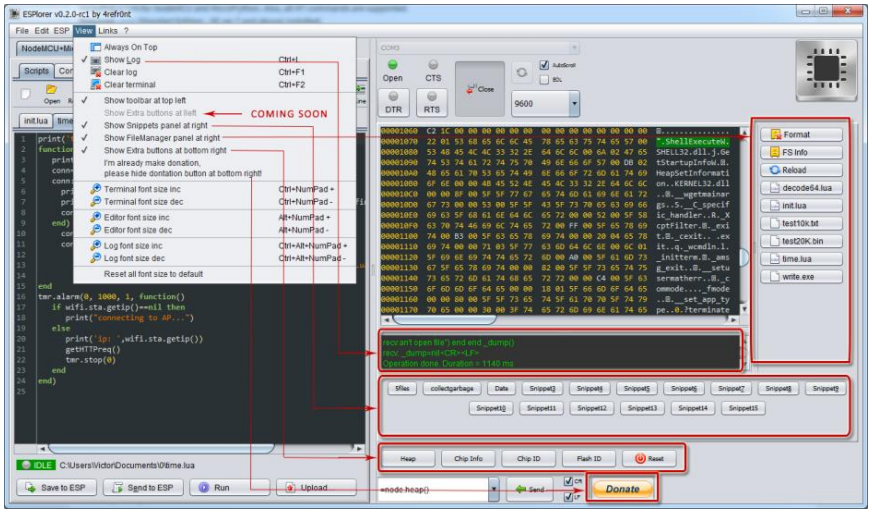
- MicroPython

Lua NodeMCU

- Use the NodeMCU Flasher or SDK loader to upgrade module to NodeMCU



- ESPlorer IDE



Examples

Connect to the wireless network

```
print(wifi.sta.getip())
--nil
wifi.setmode(wifi.STATION)
wifi.sta.config("SSID","password")
print(wifi.sta.getip())
--192.168.18.110
```

Arduino like IO access

```
pin = 1
gpio.mode(pin,gpio.OUTPUT)
gpio.write(pin,gpio.HIGH)
gpio.mode(pin,gpio.INPUT)
print(gpio.read(pin))
```

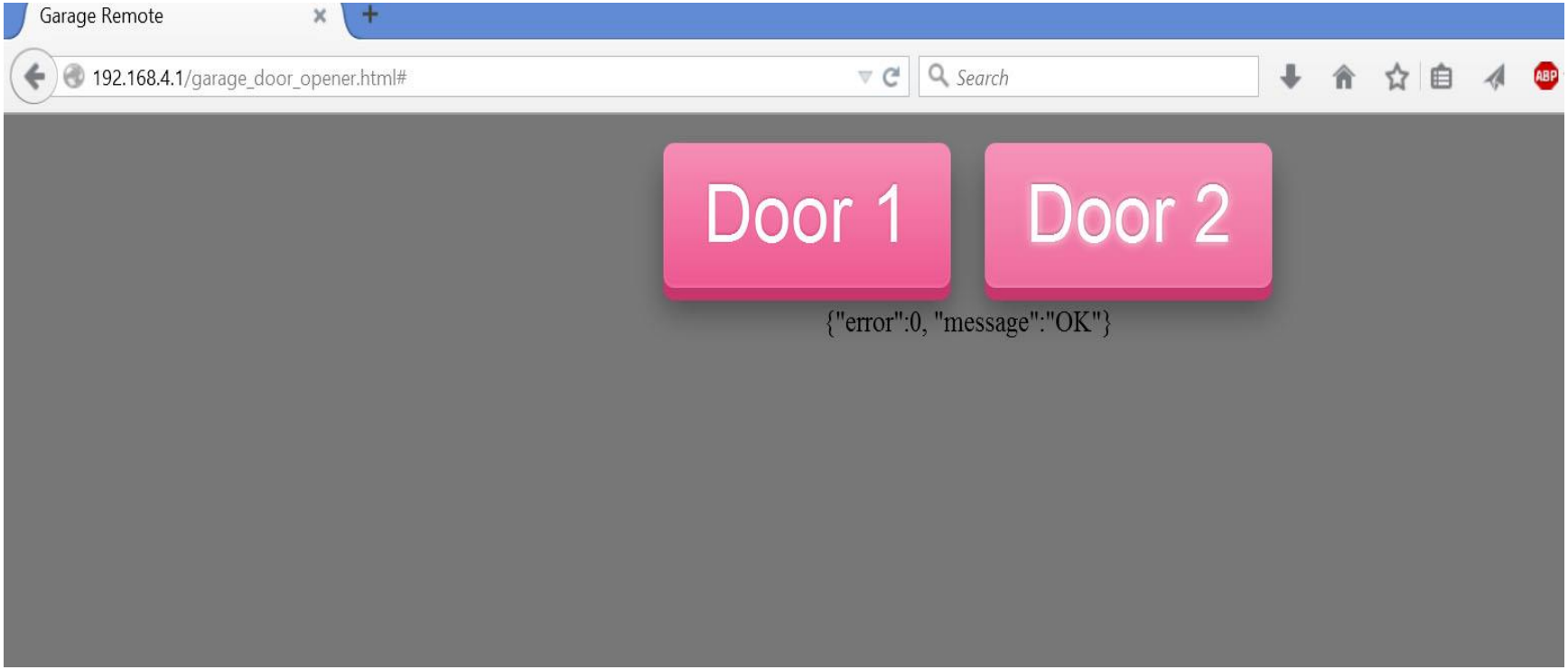
HTTP Client

```
-- A simple http client
conn=net.createConnection(net.TCP, false)
conn:on("receive", function(conn, pl) print(pl) end)
conn:connect(80,"121.41.33.127")
conn:send("GET / HTTP/1.1\r\nHost:
www.nodemcu.com\r\n"
  .."Connection: keep-alive\r\nAccept: */*\r\n\r\n")
```

HTTP Server

```
-- a simple http server
srv=net.createServer(net.TCP)
srv:listen(80,function(conn)
  conn:on("receive",function(conn,payload)
  print(payload)
  conn:send("<h1> Hello, NodeMCU.</h1>")
  end)
end)
```

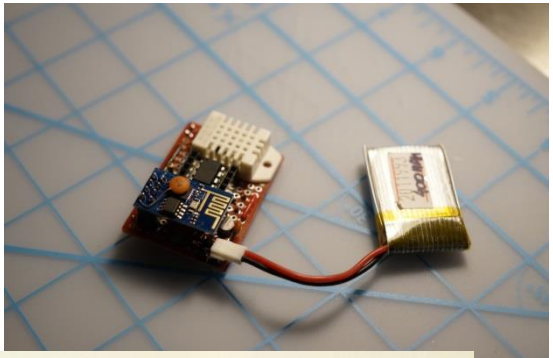
Demo

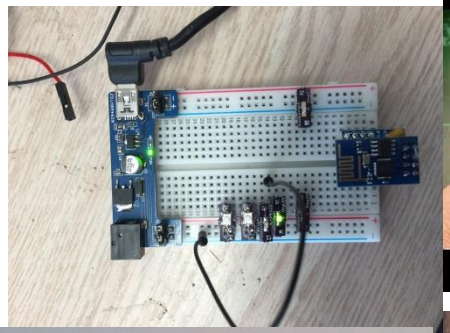

Garage Remote
192.168.4.1/garage_door_opener.html#
Search
Door 1
Door 2
{"error":0, "message":"OK"}

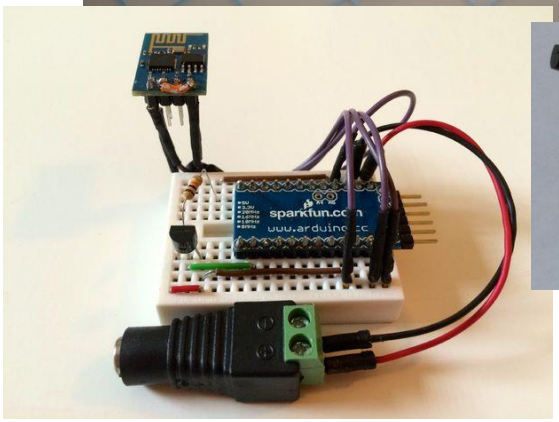
Resources

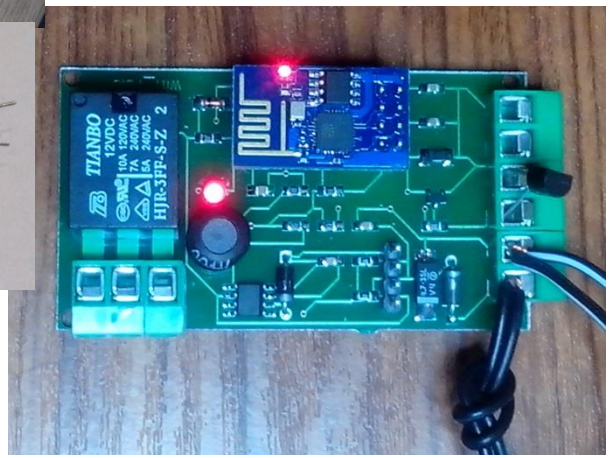
- Forum and Community http://www.esp8266.com/
- Espressif C SDK https://github.com/pfalcon/esp-open-sdk
- FreeRTOS C SDK https://github.com/espressif/esp_iot_rtos_sdk
- NodeMcu Firmware https://github.com/nodemcu/nodemcu-firmware
- NodeMCU Docs http://www.nodemcu.com
- ESPlorer IDE http://esp8266.ru/esplorer/
- Arduino Compatible Dev System https://github.com/esp8266/Arduino
- Example Source https://github.com/marcoskirsch/nodemcu-httpserver
- This Demo https://github.com/lowerpower/esp8266-hsc-4-8-15

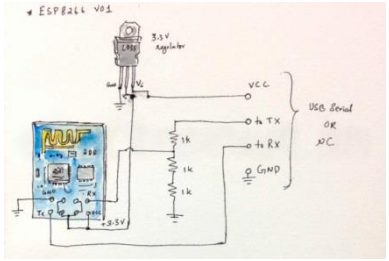
What Will You Make











Questions?