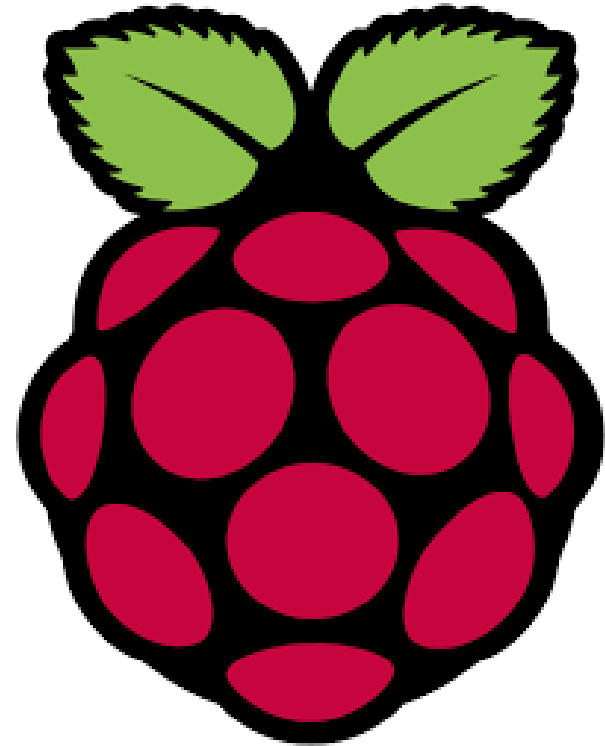
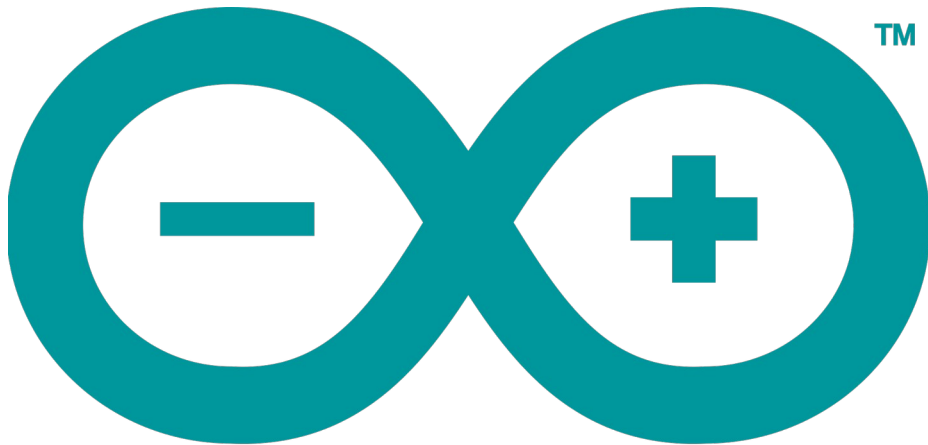


# Aplicacións de Arduino e Raspberry pi en domótica

Setembro 2020

Manuel Guimarey Vila  
Rocío Martínez Martínez



# Sonoff e Itead

- Sonoff é unha marca que se adica a automatización doméstica.
- Pertence o fabricante Itead, que se adica o deseño e fabricación hardware para DIY maiormente.
- Itead ofrece produtos finais: Dispositivo e plataforma de uso.
- Facilita o uso do produto a calquera usuario para o uso domótico e automatización do fogar.
- Tamén ofrece a posibilidade de hackear e modificar os dispositivos para usar a nosa plataforma ou sistema.
- Isto permite o seu uso polo momento maker.



# Sonoff

- O obxectivo de Sonoff é conseguir que os dispositivos e aplicacións do fogar traballen xuntos.
- Proporcionan o usuario o control do equipamento doméstico.
- Sonoff transmite información a nube a través do router WIFI.
- A través do móbil permite facer o control remoto dos dispositivos conectados a través da aplicación eWeLink.
- Esta aplicación traballa contra un servidor baseado nos servizos de Amazon AWS (a súa nube).
- Os seus produtos son moi económicos en relación a outros fabricantes.



# Sonoff

- Produtos:
  - Relés
  - Pulsadores
  - Enchufes
  - Monitores de ambiente (temperatura, humidade, luz, son)
  - Pontes entre WIFI e RF
- Son manexables mediante:
  - WIFI
  - RF
  - GSM/GPRS
- O seu produto estrela é o relé manexable sen fíos a través da wifi.



SONOFF

# Relé Dual Sonoff

## Características

- Tensión de entrada: 90~ 250V AC
- Max. corriente de entrada: 16A (2 disp), 10A (1 disp)
- Potencia Max: 3500W (2 disp)/2200W (1 disp)
- Control independiente dos relés en APP.
- Configuración rápida SSID e contraseña a través APP.
- Autoconexión o servidor, registro e estado a través APP.
- Permite o seguimiento e temporización a través APP.
- O relé está baseado no chip ESP8285.



# Relé Dual Sonoff

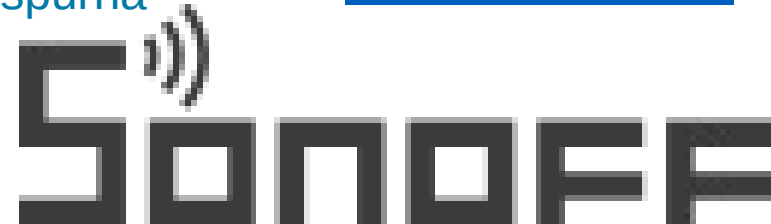
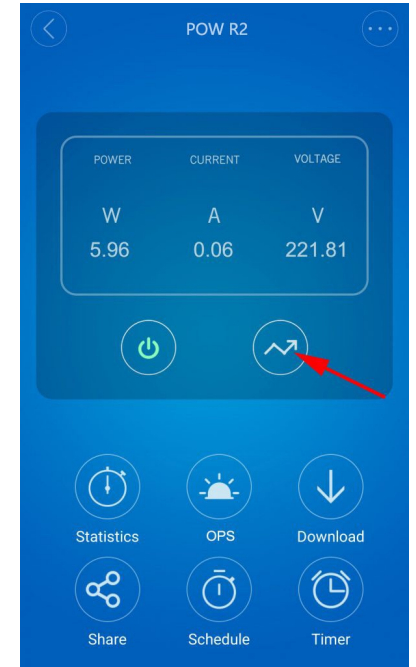
## Características



# Relé Dual Sonoff

## Firmware

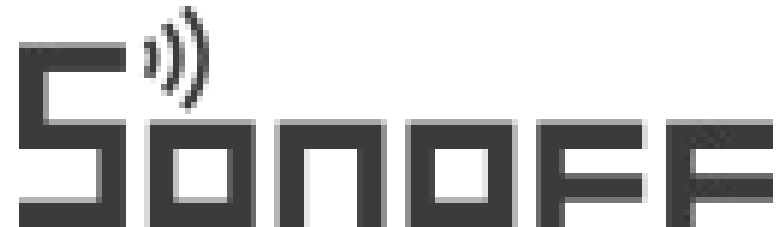
- Existen varias posibilidades:
- eWeLink é a APP que utiliza o firmware oficial, precisa do soporte da nube propia de Itead.
- ESPEasy o primeiro en desenvolverse como firmware alternativo open source.
- Tasmota ten un aspecto mais amigable que o anterior e un bo soporte da comunidade.
- Espurna o de desenvolvemento máis recente e cun interface mais agradable.
- Para saber máis:  
[artigo comparativo entre ESPEasy, Tasmota e Espurna](#)



# Firmware Espurna

## Características

- Soporta varias marcas e modelos de placas basadas en ESP8266.
- Opciones para o aforro de enerxía.
- Configuración a través de punto de acceso o AP
- Diferentes modos de control de interruptores/relés
- Compatibilidade con MQTT
- Programación automática de acendido e apagado de interruptores/relés
- Integración con Alexa
- Integración con Google Assistant
- Integración con InfluxDB
- Integración con ThingSpeak





# Firmware Espurna

## Características

- Soporte para diferentes sensores: DHT11, DHT22, BMP280, DS18B20, BH1750, etc...
- Soporte para medidores de consumo
- Compatible con con luces LED
- Integración con servicio REST API
- Actualización OTA (del inglés Over The Air)
- Control a través de pulsador integrado en la placa
- ESPurna é un software libre baixo licenza GNU GPL v3.0

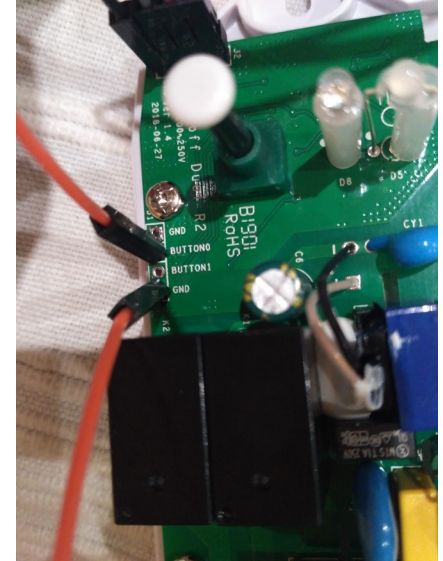
O máis importante é que nos vai permitir usalo sen programar nin unha liña de código.



# Firmware Espurna

## Instalación

- Para instalar o firmware precisamos instalar a aplicación esptool.
- Na consola de linux executamos o seguinte comando:  
`usuario@equipo:~$ sudo apt install esptool`
- Para poder facer as seguintes operacións de lectura, escritura, copia e borrado temos que entrar no modo programación.
- Para entrar no modo programación hai que conectar o GPIO 0 (Button0) a GND (como se mostra na foto).

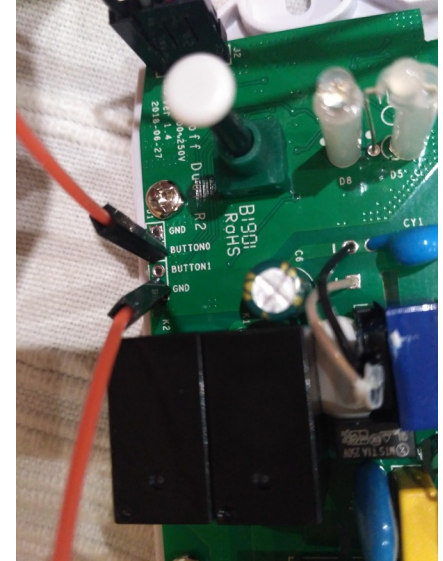


# Firmware Espurna

## Instalación

- O Sonoff ten dos modos de traballo (baseados no ESP8266):
  - UART
  - FLASH
- O modo por defecto sempre é FLASH, executando o programa que hai escrito na memoria flash.
- O modo UART é o modo que nos permite cargar o programa.

Modo	GPIO 0	GPIO 1
UART	LOW	HIGHT
FLASH	HIGHT	HIGHT

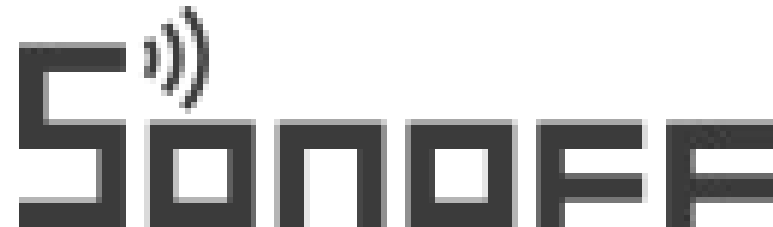
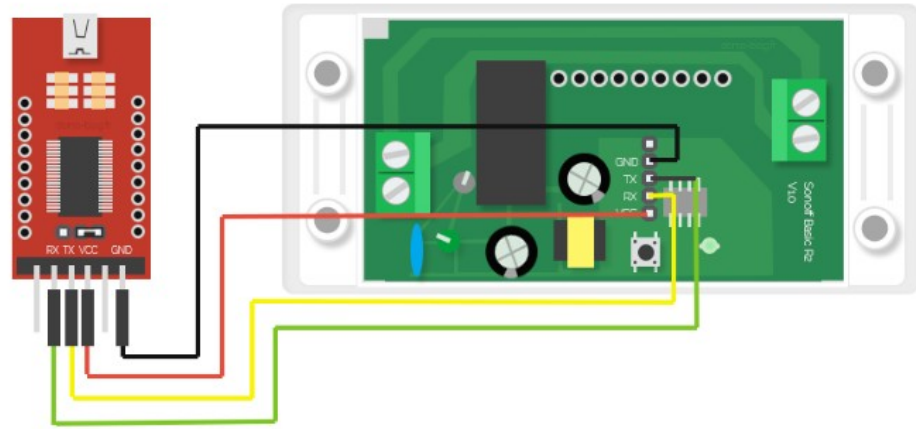


# Firmware Espurna

## Instalación

- Conectamos un convertedor USB a TTL

Adaptador serie	SonOff
3V3	3V3
TX	RX
RX	TX
GND	GND

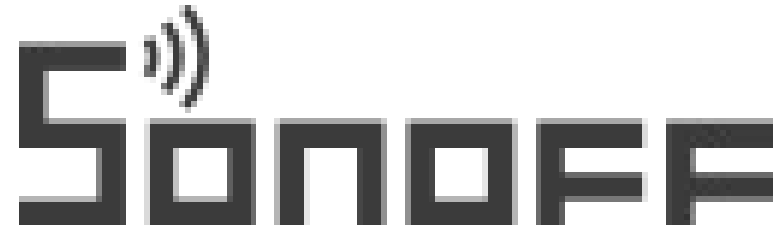


# Firmware Espurna

## Instalación

- Comprobar o dispositivo:  
usuariol@equipo:~\$ esptool.py flash\_id

```
manuel@lenovo: ~  
Ficheiro Editar Ver Buscar Terminal Axuda  
manuel@lenovo:~$ esptool.py flash_id  
esptool.py v2.6  
Found 1 serial ports  
Serial port /dev/ttyUSB0  
Connecting...  
Detecting chip type... ESP8266  
Chip is ESP8285  
Features: WiFi, Embedded Flash  
MAC: c4:4f:33:8c:72:b4  
Uploading stub...  
Running stub...  
Stub running...  
Manufacturer: 51  
Device: 4014  
Detected flash size: 1MB  
Hard resetting via RTS pin...  
manuel@lenovo:~$
```



# Firmware Espurna

## Instalación

- Facer copia seguridad do firmware:

```
usuario@equipo:~$ esptool.py --port /dev/ttyUSB0 read_flash 0x00000 0x100000  
sonoffDual-backup.bin
```

```
manuel@lenovo: ~  
Ficheiro Editar Ver Buscar Terminal Axuda  
manuel@lenovo:~$ esptool.py --port /dev/ttyUSB0 read_flash 0x00000 0x100000 sonoffDual-copiaSeg.bin  
esptool.py v2.6  
Serial port /dev/ttyUSB0  
Connecting...  
Detecting chip type... ESP8266  
Chip is ESP8285  
Features: WiFi, Embedded Flash  
MAC: c4:4f:33:8c:72:b4  
Uploading stub...  
Running stub...  
Stub running...  
1048576 (100 %)  
1048576 (100 %)  
Read 1048576 bytes at 0x0 in 98.0 seconds (85.6 kbit/s)...  
Hard resetting via RTS pin...  
manuel@lenovo:~$
```



# Firmware Espurna

## Instalación

- Borrar o firmware actual:  
usuario@equipo:~\$ esptool.py --port /dev/ttyUSB0 erase\_flash

```
manuel@lenovo: ~  
Ficheiro Editar Ver Buscar Terminal Axuda  
manuel@lenovo:~$ esptool.py --port /dev/ttyUSB0 erase_flash  
esptool.py v2.6  
Serial port /dev/ttyUSB0  
Connecting...  
Detecting chip type... ESP8266  
Chip is ESP8285  
Features: WiFi, Embedded Flash  
MAC: c4:4f:33:8c:72:b4  
Uploading stub...  
Running stub...  
Stub running...  
Erasing flash (this may take a while)...  
Chip erase completed successfully in 3.8s  
Hard resetting via RTS pin...  
manuel@lenovo:~$
```



# Firmware Espurna

## Instalación

- Existen varias imaxes precompiladas no repositorio de Espurna para distintos dispositivos.
- O repositorio é das imaxes preparadas é:  
<https://github.com/xoseperez/espurna/releases/>
- Descargar a imaxe do repositorio:  
<https://github.com/xoseperez/espurna/releases/espurna-x.xx.x-itead-sonoff-dual-r2.bin>  
Onde x.xx.x é a versión do ficheiro.





# Firmware Espurna

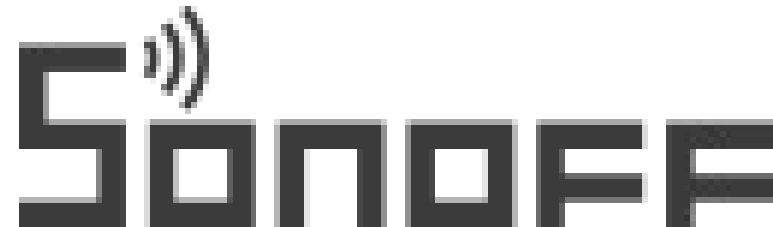
## Instalación

- Escribir a imaxe do firmware espurna:

```
manuel@lenovo:~$ esptool.py --port /dev/ttyUSB0 write_flash --flash_size 1MB --flash_mode dout 0x000000 ../Descargas/espurna-1.14.1-itead-sonoff-dual-r2.bin
```

```
manuel@lenovo: ~/Descargas
Ficheiro Editar Ver Buscar Terminal Axuda
manuel@lenovo:~/Descargas$ esptool.py --port /dev/ttyUSB0 write_flash --flash_size 1MB --flash_
mode dout 0x000000 espurna-1.13.5-itead-sonoff-dual-r2.bin
esptool.py v2.6
Serial port /dev/ttyUSB0
Connecting...
Detecting chip type... ESP8266
Chip is ESP8285
Features: WiFi, Embedded Flash
MAC: c4:4f:33:8c:72:b4
Uploading stub...
Running stub...
Stub running...
Configuring flash size...
Compressed 473776 bytes to 340012...
Wrote 473776 bytes (340012 compressed) at 0x00000000 in 30.2 seconds (effective 125.5 kbit/s)...
Hash of data verified.

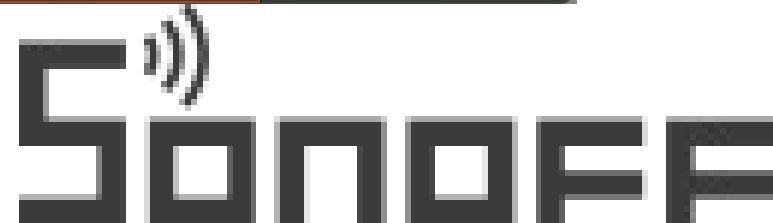
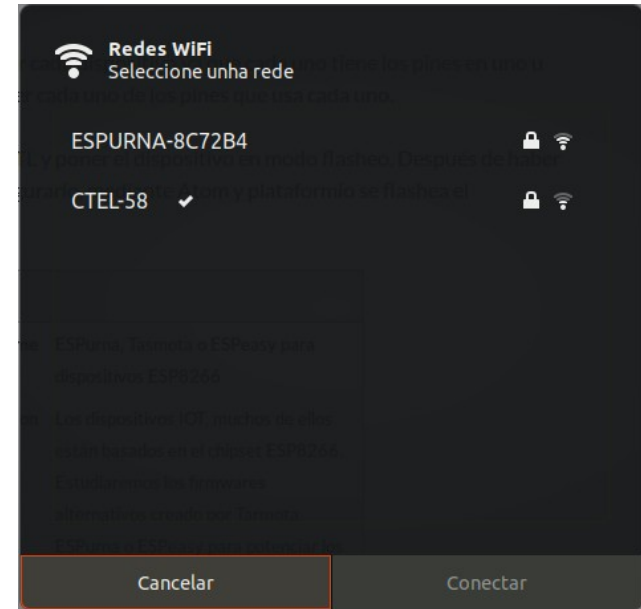
Leaving...
Hard resetting via RTS pin...
manuel@lenovo:~/Descargas$
```



# Firmware Espurna

## Configuración

- Cando se enchufa despois de escribir a imaxe do firmware espurna aparece unha nova rede WiFi co formato Espurna-XXXXXX (onde aparece en vez das X aparece parte da MAC do dispositivo).
- Conectándose a esa rede solicita un contrasinal para o acceso que é “fibonacci”.
- Unha vez nesa rede, introducindo a dirección IP 192.168.4.1, nos saira un formulario que pide usuario e contrasinal: “admin” e “fibonacci”.
- Posteriormente solicitará o cambio do contrasinal do usuario “admin”.



# Firmware Espurna

Actividades Navegador web Firefox Ven 23 de Ago, 19:37 ESPURNA-8C79CC - ESPURNA 1.13.5 - Mozilla Firefox

ESPURNA-8C79CC - ESPURNA 1.13.5

## STATUS

Current configuration

Switch #0  OFF  ON

Switch #1  OFF  ON

Manufacturer	ITEAD	Network	parrulo
Device	SONOFF_DUAL_R2	BSSID	00:02:CF:65:B9:BE
Chip ID	8C79CC	Channel	9
Wifi MAC	C4:4F:33:8C:79:CC	RSSI	-63
SDK version	1.5.3(aec24ac9)	IP	<a href="#">192.168.1.200 (telnet)</a>
Core version	2.3.0	Free heap	22096 bytes
Firmware name	ESPURNA	Load average	26%
Firmware version	1.13.5	VCC	3152mV
Firmware revision	83195fd	MQTT Status	CONNECTED
Firmware build date	2019-02-27 00:22:50	NTP Status	NOT SYNC'D
Firmware size	473776 bytes	Current time	
Free space	552960 bytes	Uptime	0d 01h 02m 40s
		Last update	17 seconds ago

Save

Reconnect

Reboot

© 2016-2019 Xose Pérez @xoseperez http://tinkerem.cat ESPurna @ GitHub GPLv3 license



# Firmware Espurna

Actividades Navegador web Firefox Ven 23 de Ago, 19:38

ESPURNA-BC79CC - ESPURNA 1.13.5 - Mozilla Firefox

192.168.1.200/#

## GENERAL

ESPURNA-BC79CC  
ESPURNA 1.13.5

STATUS

GENERAL

DOMOTICZ

HA55

MQTT

NTP

SCHEDULE

SWITCHES

THINGSPEAK

WIFI

ADMIN

DEBUG

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Aitor Perez  
@wooperez  
http://irrkerman.cat  
Espurna is GitHub  
GPLv3 license

Hostname   
This name will identify this device in your network (http://hostname-local).  
Hostnames may contain only the ASCII letters 'a' through 'z' (in a case-insensitive manner), the digits '0' through '9', and the hyphen ('-'). They can neither start or end with an hyphen.  
For this setting to take effect you should restart the web interface by clicking the "Reconnect" button.

Description   
Human friendly name for your device. Will be reported with the heartbeat.  
You can use this to specify the location or some other identification information.

Double click delay   
Delay in milliseconds to detect a double click (from 0 to 1000ms).  
The lower this number the faster the device will respond to button clicks but the harder it will be to get a double click. Increase this number if you are having trouble to double click the button. Set this value to 0 to disable double click. You won't be able to set the device in AP mode manually but your device will respond immediately to button clicks.  
You will have to **reboot the device** after updating for this setting to apply.

LED mode   
This setting defines the behaviour of the main LED in the board.  
When in "WIFI status" it will blink at 1Hz when trying to connect. If successfully connected it will briefly blink every 5 seconds if in STA mode or every second if in AP mode.  
When in "Relay status" mode the LED will be ON whenever any relay is ON, and OFF otherwise. This is global status notification.  
When in "MQTT managed" mode you will be able to set the LED state sending a message to "base,topic=led/state" with a payload of 0, 1 or 2 (to toggle it).  
When in "Frid me" mode the LED will be ON when all relays are OFF. This is meant to locate switches at night.  
When in "Relay & Wifi" mode it will follow the WIFI status but will stay mostly off when relays are OFF, and mostly ON when any of them is ON.  
When in "Frid me & Wifi" mode is the opposite of the "Relay & Wifi", it will follow the WIFI status but will stay mostly on when relays are OFF, and mostly OFF when any of them is ON. "Always ON" and "Always OFF" modes are self-explanatory.

Alexa integration



# Firmware Espurna

Actividades Navegador web Firefox Ven 23 de Ago, 19:39 ESPURNA-8C79CC - ESPURNA 1.13.5 - Mozilla Firefox

ESPURNA-8C79CC ESPURNA 1.13.5

## MQTT

Configure an MQTT broker in your network and you will be able to change the switch status via an MQTT message.

Enable MQTT  NO  YES

MQTT Broker

MQTT Port

MQTT User

You can use the following placeholders: {hostname}, {mac}

MQTT Password

MQTT Client ID

If left empty the firmware will generate a client ID based on the serial number of the chip. You can use the following placeholders: {hostname}, {mac}

MQTT QoS

MQTT Retain  NO  YES

MQTT Keep Alive

MQTT Root Topic

This is the root topic for this device. The {hostname} and {mac} placeholders will be replaced by the device hostname and MAC address.

- <root>/relay/#set Send a 0 or a 1 as a payload to this topic to switch it on or off. You can also send a 2 to toggle its current state. Replace # with the switch ID (starting from 0). If the board has only one switch it will be 0.
- <root>/status The device will report a 1 to this topic every few minutes. Upon MQTT disconnecting this will be set to 0.

Other values reported (depending on the build) are: firmware and version, hostname, IP, MAC, signal strength (RSSI), uptime (in seconds), free heap and power supply.

Use JSON payload  NO  YES

All messages (except the device status) will be included in a JSON payload along with the timestamp and hostname and sent under the <root>/data topic.  
Messages will be queued and sent after 100ms, so different messages could be merged into a single payload.  
Subscriptions will still be done to single topics.

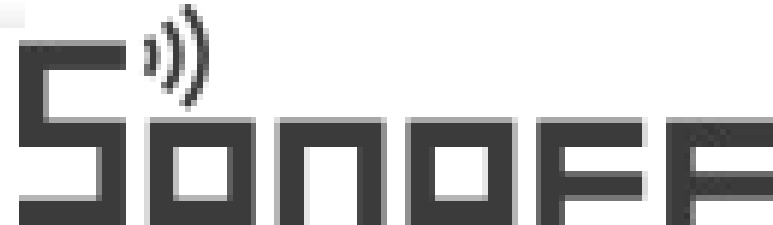
Save  
Reconnect  
Reboot

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Xose Pérez  
@xoseperez  
http://xoseman.com  
ESPurna @ GitHub  
GPLv3 license



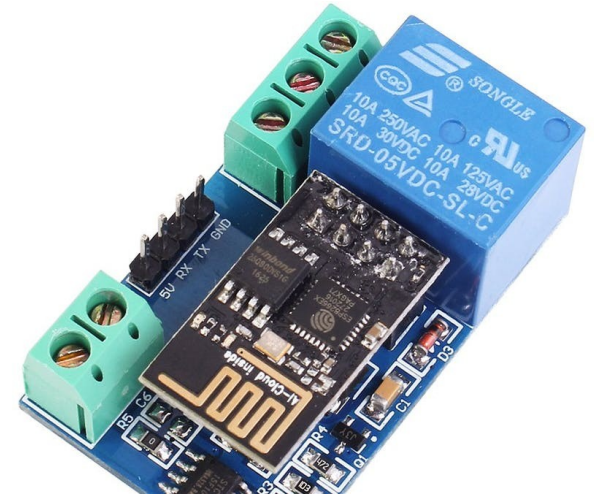
# Firmware Espurna

The screenshot shows the web interface for an ESPURNA device. The browser address bar shows '192.168.4.1/#'. The left sidebar contains a menu with options: STATUS, GENERAL, WIFI, MQTT, NTP, SWITCHES, SCHEDULE, DOMOTICZ, HASS, THINGSPEAK, and ADMIN. Below the menu are buttons for 'Save', 'Reconnect', and 'Reboot'. The main content area is titled 'General' and includes a 'Scan networks' toggle set to 'ON' and a 'Scan now' button. Below this is the 'Networks' section, which contains a table with columns for 'Network SSID', 'Password', 'Static IP', 'Gateway IP', 'Network Mask', and 'DNS IP'. The 'Network SSID' and 'Password' fields are highlighted with a red box. At the bottom of the 'Networks' section, there is a 'Delete network' button and an 'Add network' button, which is also highlighted with a red box.

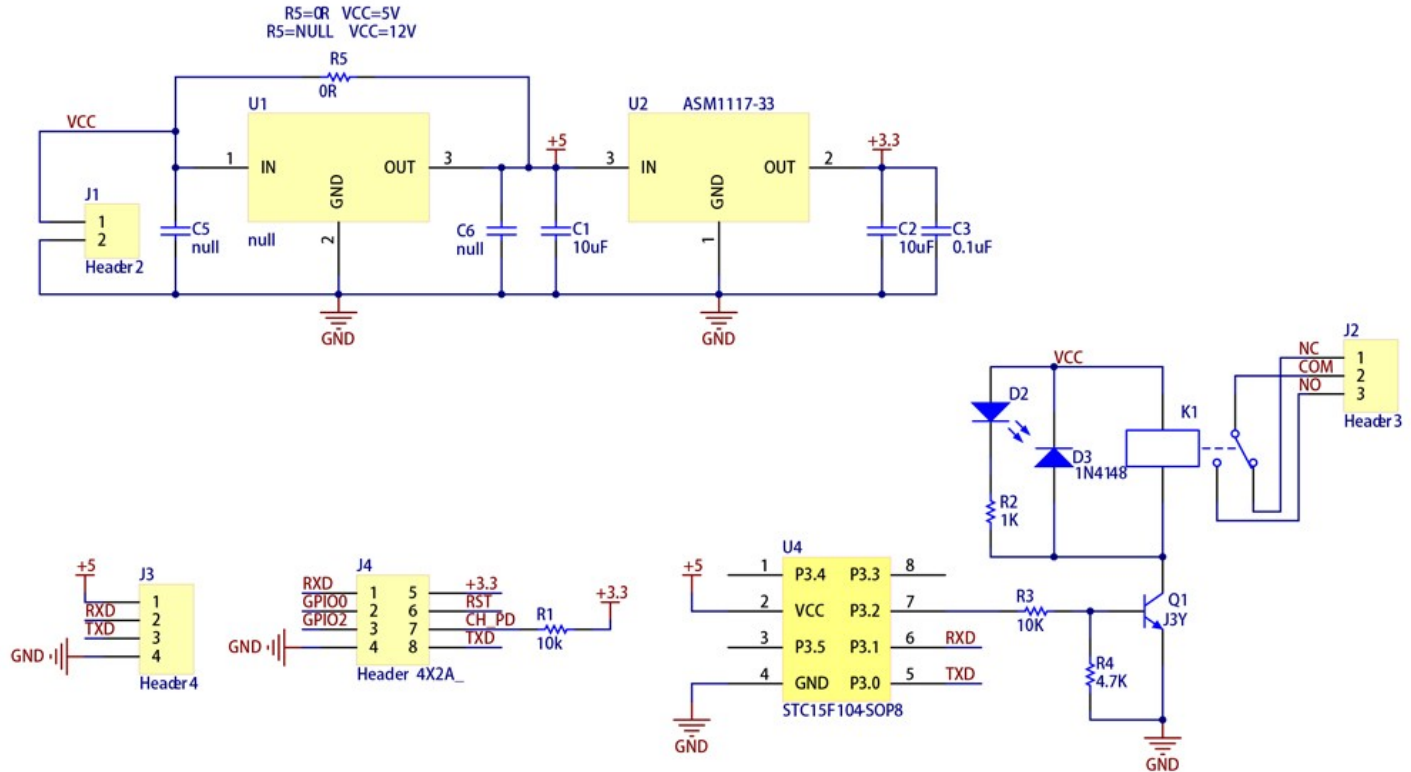


# Relé IcTech

- Relé 5v wifi dun canal.
- Controlado con un módulo ESP01.
- Pode ser accionado directamente, a través dun punto de acceso ou mediante USB (si se desconecta o módulo ESP01).
- El relé non é accionado a través dos pins Gpio0 ou Gpio2.
- O relé accionase escribindo un número (hex) polo canal serie:
  - A00101A2 para activar.
  - A00100A1 para desactivar.
- Utiliza o microcontrolador STC 15F104W como intermediario entre o ESP01 e o rele



# Relé IcTech





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