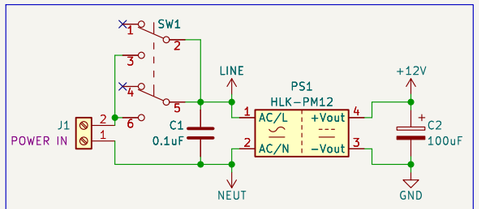
AC POWER INPUT

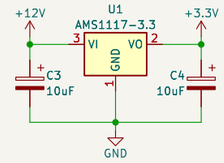


The J1 connector receives the AC input voltage.

PS1 (HLK-PM12) is an encapsulated power supply, which converts the AC input voltage to 12V DC.
The power supply maximum power is 3W.

The SW1 switch turns the circuit ON and OFF.
The C1 and C2 capacitors are filtering capacitors.

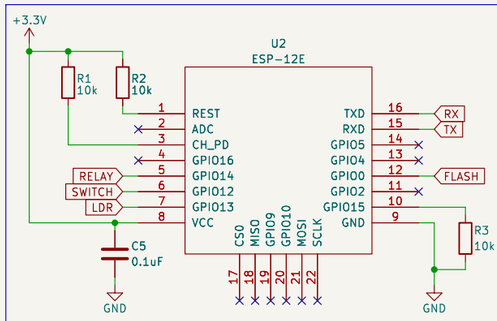
12V TO 3.3V REGULATION



The U1 voltage regulator (AMS1117-3.3) steps the 12V voltage down to 3,3V, with maximum output current of 1A.

The C3 and C4 capacitors are filtering capacitors.

WIFI MODULE

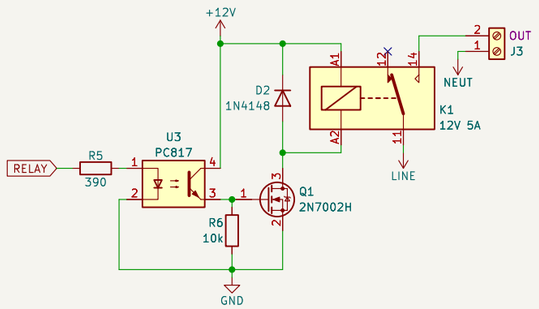


The U2 module (ESP-12E) is the responsable for receiving the commands over WiFi or switch and controlling the relay accordingly.

Some of its pins must be pulled up or down. This is done through the R1, R2, R3 and R4 resistors.

The C5 capacitor is a filtering capacitor for the power input.

RELAY OUTPUT



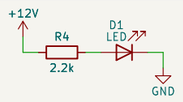
A digital output is used to control the relay through the Q1 transistor (2N7002H).

The U3 optocoupler (PC817) isolate the output from the power circuit.

When the output's logic level is LOW, the transistor is not conducting and the relay coil is de-energized.
When the output's logic level is HIGH, the transistor is conducting and the relay coil is energized.

The R5 resistor limit the optocoupler input current. The R6 resistor pull the transistor gate down.
The D1 diode act as a flyback diode. The J5 connector goes to the load.

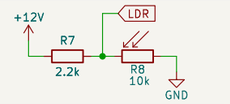
POWER LED



The D2 LED indicates when the 12V bus is powered.

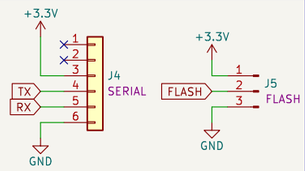
The R7 resistor limits the current through the LED.

LDR INPUT



R8 is a LDR, which is exposed to the external environment.
The microcontroller input receives the resulting voltage from that voltage divider.

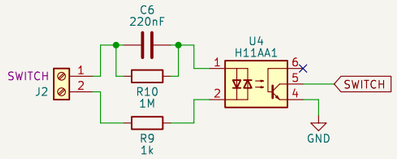
PROGRAMMING CONNECTORS



The J2 connector provides access to the WiFi module serial bus.

The J3 connector needs a jumper to connect the microcontroller FLASH pin to 3V3 or GND.
GPIO0 connected to GND is used to program the microcontroller.
GPIO0 connected to 3V3 is uded to run the code.

SWITCH INPUT



The connector J4 receives 220V AC from the wall switch. This voltage is dropped on the C6 capacitor.
U4 (H11AA1) connects the microcontroller input to GND when there is a voltage input present.

Alan Carvalho

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Title: ON-OFF Module X1

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