

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.

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.

The U2 module (ESP-12E) is the responsible 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 and R3 resistors.

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

Two digital outputs are used to control the relays through the Q1 and Q2 transistors (2N7002H).

The U3 and U4 optocouplers (PC817) isolate the outputs 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 diagram shows a circuit with a +12V power source. A green wire connects the +12V source to a resistor labeled R8 with a value of 2.2k. The other end of the resistor is connected to the anode of an LED labeled D3. The cathode of the LED is connected to a ground symbol labeled GND. A red arrow points from the LED towards the right, indicating light emission.

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

The R7 resistor limits the current through the LED.

The diagram illustrates the wiring for two lamps, LAMP1 and LAMP2, connected to a power source. Each lamp is connected to a switch (SWITCH1 for LAMP1, SWITCH2 for LAMP2) and a common ground (GND). The connections are as follows:

- LAMP1:** The lamp is connected to J2. J2 has three pins: 1 (connected to LAMP1), 2 (connected to SWITCH1), and 3 (connected to GND).
- LAMP2:** The lamp is connected to J3. J3 has three pins: 1 (connected to LAMP2), 2 (connected to SWITCH2), and 3 (connected to GND).

The J2 and J3 connectors are the interface connectors for the lamps and the external switches.

The image contains two circuit diagrams. The left diagram shows a J3 connector with pins 1 through 6. Pins 1, 2, and 3 are connected to a +3.3V supply. Pins 4 and 5 are connected to a TX/RX module. Pin 6 is connected to GND. The right diagram shows a J4 connector with pins 1 through 3. Pins 1 and 2 are connected to a +3.3V supply. Pin 3 is connected to a FLASH module. Both diagrams show a GND connection.

The J3 connector provides access to the WiFi module serial bus.

The J4 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 used to run the code.