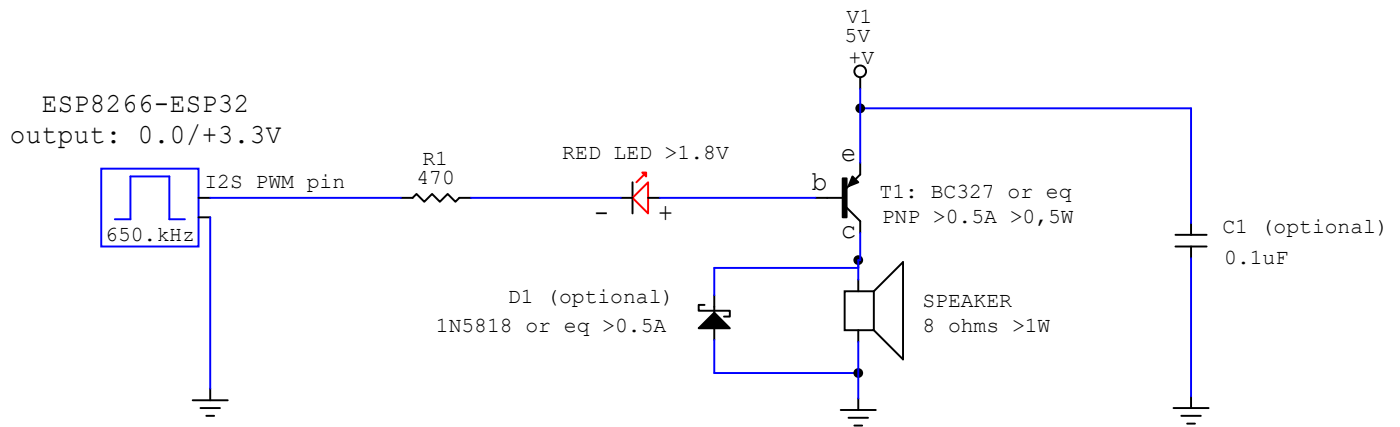


1 WATT LOUDSPEAKER AMPLIFIER FOR ESP8266AUDIO in mode I2SnoDAC

Material needed: 1 PNP transistor, 1 LED, and 1 resistor. Optional: 1 diode + 1 capacitor.

This amplifier can be directly connected to the ESP8266 I2S PWM pin (pin RX) and it is designed to minimize energy consumption: it is completely off (power=0) when ESP8266AUDIO is idle (when pin RX is high).



T1: PNP transistor BC327, BD138 or equivalent. It can be any PNP transistor with $h_{fe} > 100$, $i_{max} > 0.5A$, $V_{max} > 30V$, and power dissipation $> 0.5W$.

As it works in class D mode, power dissipation is very low, less than 0.5W.

LED: any LED with a voltage drop in range 1.5V - 2.5V, as most red LEDs have.

It shifts voltage between T1 base-emitter(+5V) and ESP8266-ESP32 GPIO V_{max} (+3.3V)
It also works as an indicator, as it turns on when the amplifier is working.

R1: any resistor between 330 and 680 ohms will work. If T1 heats too much, it can mean that its h_{fe} is < 100 and is not working in class D (mode on-off): try a lower value but not less than 220 ohms to avoid ESP8266-ESP32 GPIO pin overload.

C1 (optional): any polyester or ceramic capacitor between 47nF and 470 nF, to filter to the power supply the electric noise and power spikes produced by the amplifier.

D1 (optional but recommended): any fast diode $> 0.5A$, the best is a schottky diode 1N5818 or equivalent. A small rectifier diode as 1N1001-1N1004 is acceptable too. Connect cathode (strip-marked terminal) to T1 collector, and anode to 0V (ground). It improves audio quality and is needed for long-term operation to avoid the big voltage spikes $> 15V$ caused by loudspeaker inductance.

LOUDSPEAKER: any speaker with 8 ohms or more and power capacity > 1 watt will work. It must withstand a direct current of about 300 mA while working.