
LM386 AUDIO AMPLIFIER

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Components

- 1 X Lm386D IC
- 4 X Capacitor (100nF, 100uF, 100uF, 1000uF)
- 1 X Resistor (10k Ω)
- 9v DC battery, battery cap
- IC Base
- Speaker 4 Ω , 10W
- Soldering rod
- PCB board
- Multimeter
- Headphone jack

Description

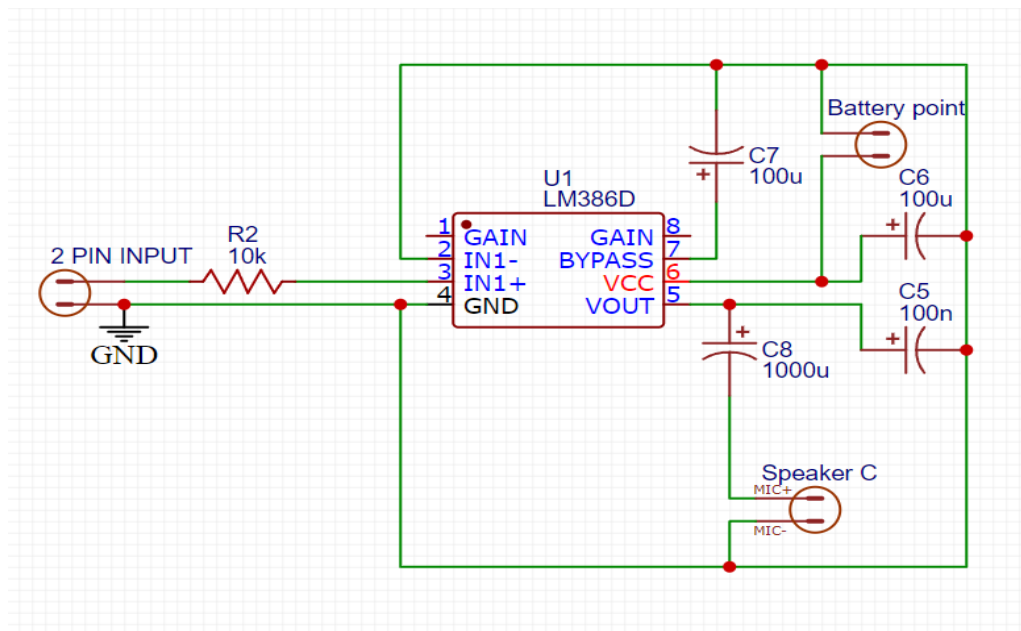
The LM386 is an **operational amplifier** than has been specifically designed for use in audio applications. which means its performance is based on the assumption that it will be **driving speakers**. At least at some point. However, it can, like most other basic audio amplifier chips, be used as a regular op-amp as well. It has a default **gain** of 20x - meaning it will multiply the voltage it receives on the input by 20 times, passing this through to the output. The gain value can be adjusted if needed. Building a basic functional circuit for the LM386 is dead easy. The schematic is a mono amplifier, so if we wanted to amplify a stereo signal, we'd need two of these circuits (one for each channel and each speaker). The procedure we have followed is –

1. We need to supply an audio signal to the +Input of the amplifier (pin 3). The audio signal also needs its own path to GND. In addition, a high value resistor between the signal input and GND (10K Ω in the schematic) acts as a pull-down resistor that drives the input to ground when a source isn't connected. Without this resistor, you'll get a loud buzz/hum if your music player isn't hooked up.
2. Pins 1 and 8 have been left open, as we're using the default gain of 20x.
3. A 100uf capacitor is placed between the bypass pin (7) and GND, in order to prevent some power supply noise from being amplified.
4. The -Input and GND pins (2, 4) are connected to GND

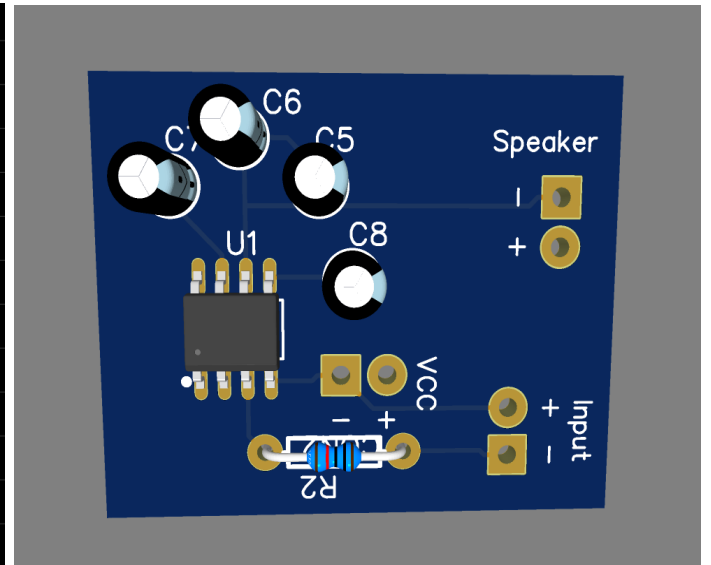
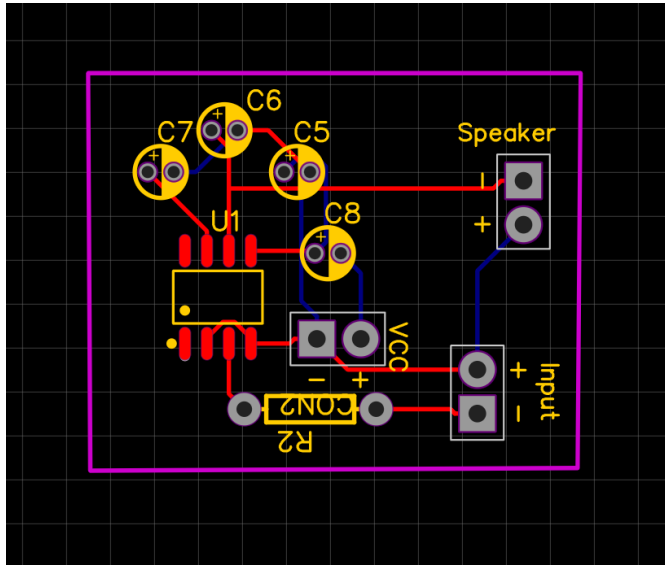
5. The power source is fed into pin 6, along with a 100uf decoupling capacitor in parallel to GND to filter out low-frequency noise
6. Finally, the output from pin 5 is fed into the speaker, with two more capacitors paralleled to GND: a 0.1uf (100nf) cap to filter out high frequency noise, and a 1000uf supply capacitor for filtering and smoothing.

Schematic and PCB

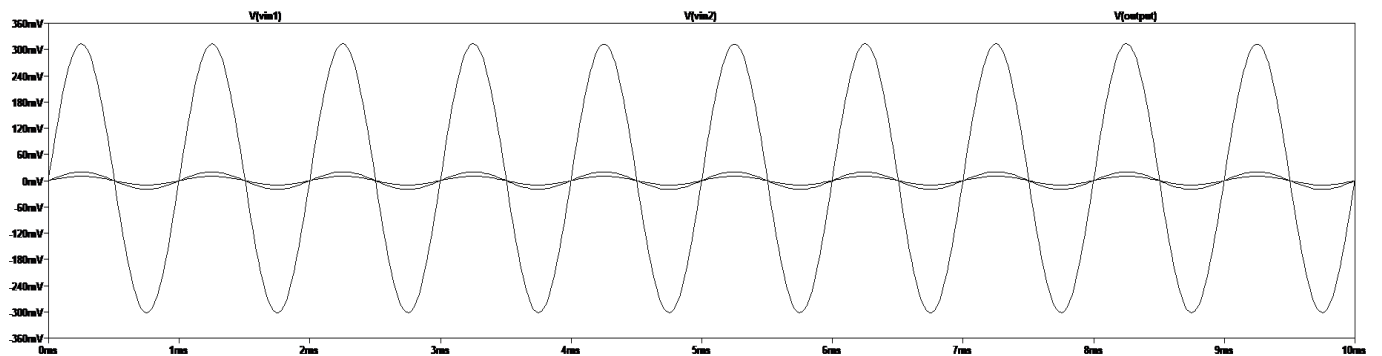
We have used [EasyEDA](#) for the schematic and PCB design. Below the schematic and PCB design is given --



Also the PCB for this schematic is –



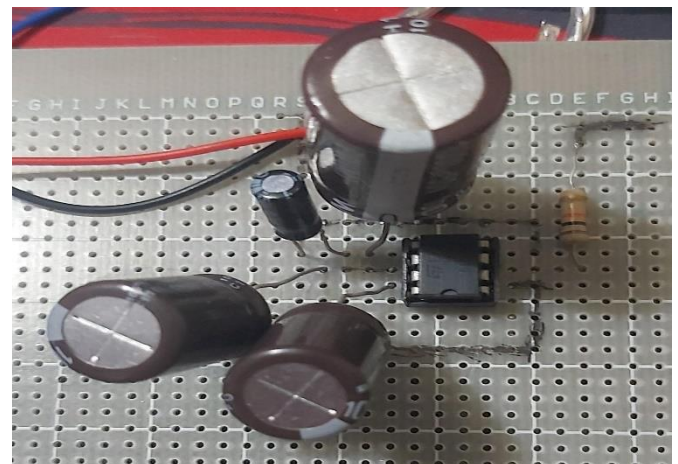
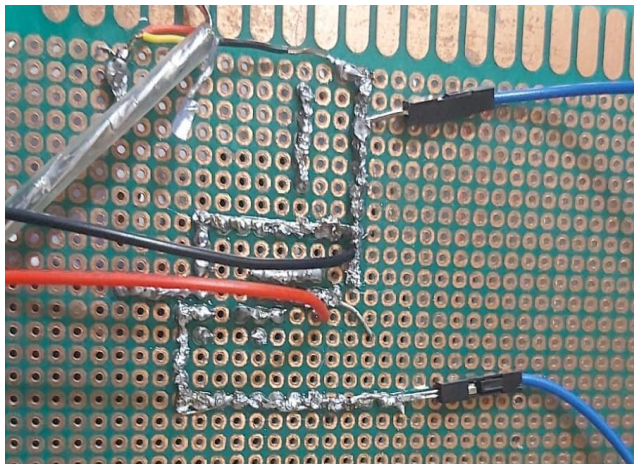
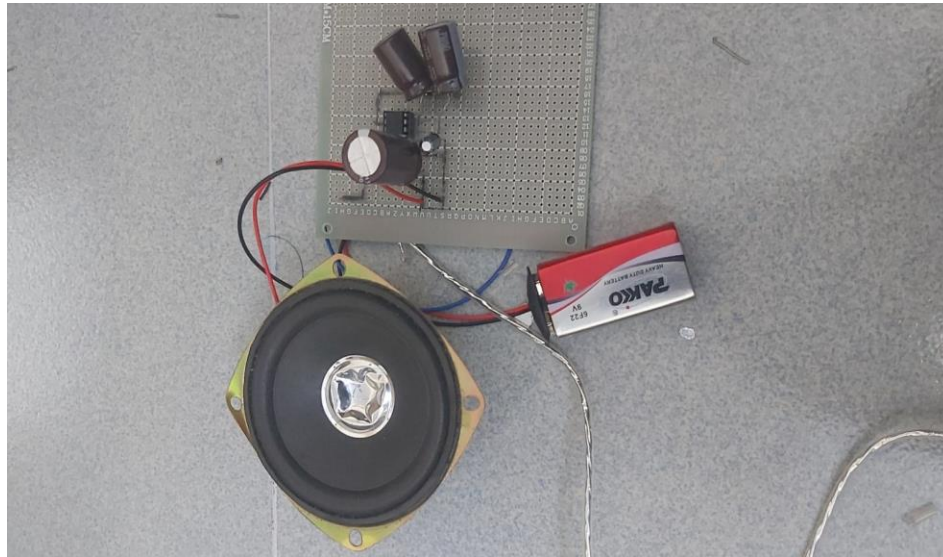
We have tried to simulate our result with [LtSpice](#). Which is given below –



Implementation

For the simplicity and lack of required components we have made some changes on the real design. Which is almost similar with our PCB design. Also as we don't have oscilloscope so we could not able to compare the implemented result with the simulation. Below our circuit is given

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Troubleshoot

Our amplifier does create a little bit noise when we increase the volume. Due to our components and soldering we have this kind of problem also we used IC base so that our IC didn't get burn. To reduce noise we could try to find better components as well as try to improve our soldering as much as possible.

Reference

1. <https://www.instructables.com/Tales-From-the-Chip-LM386-Audio-Amplifier>