Audio Amplifier

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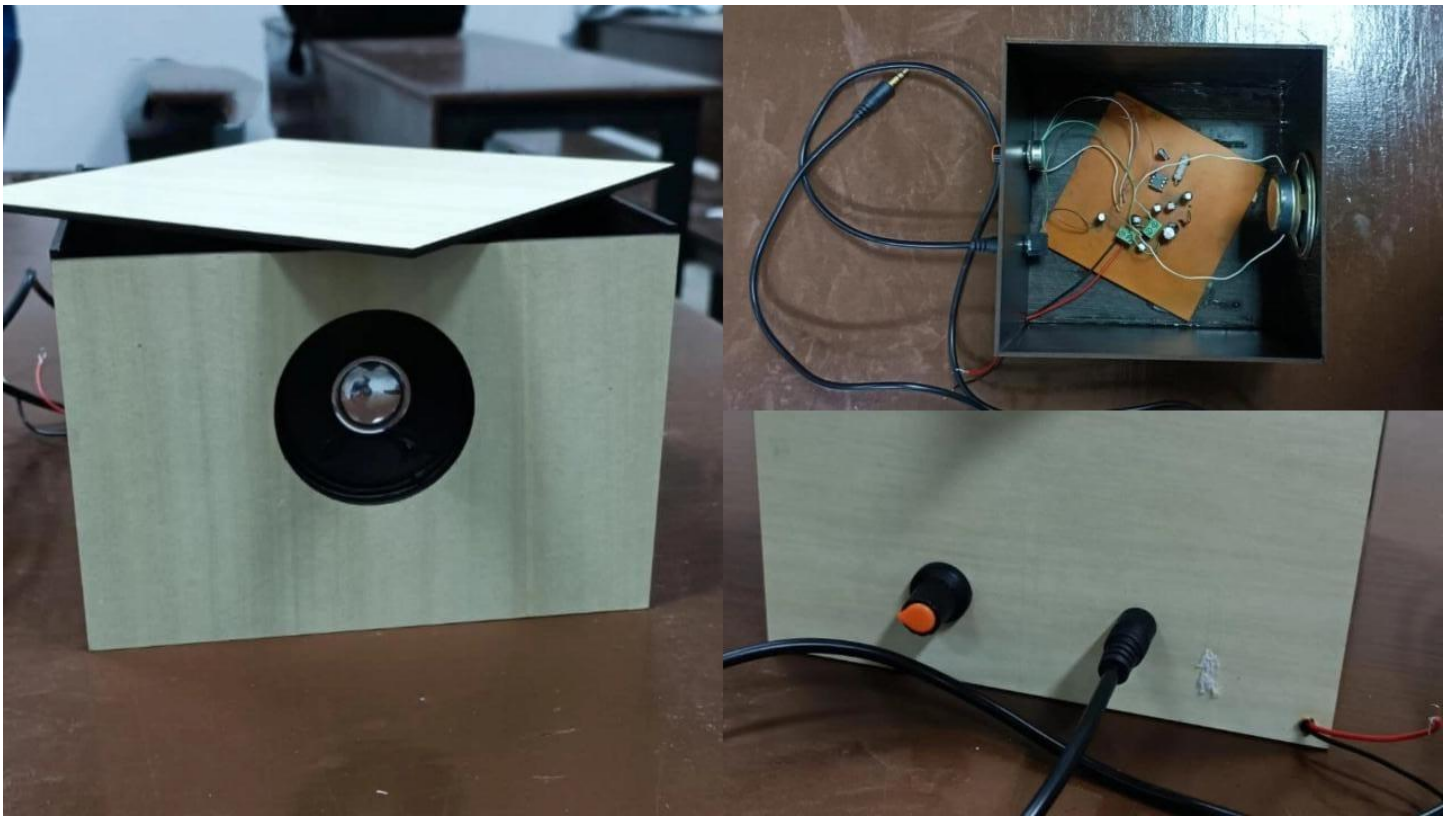
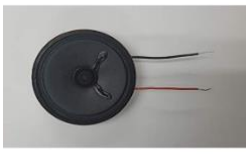


The **Audio amplifier** is an electronic circuit that amplifies audio signals. The amplification a microphone or a speaker produces is usually very low, but an audio amplifier can be used to boost the audio output of low-quality microphones and speakers. Audio amplifiers use both active and passive components. An active device is one that consumes some power from the input signal and produces extra power. A passive device does not consume power from its input signal, but it does require some external components such as resistors, capacitors and diodes for the output stage of the amplifier.

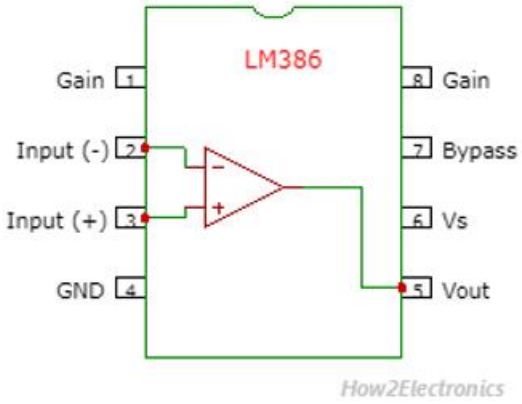
COMPONENTS:

	**POTENTIOMETER: 10KOHM**	Variable resistor that adjusts the volume.
	**RESISTORS**: - 10 KOHM, 10W - 470 OHM, 10W	**Resistors** can: A) Lower the voltage B) Block the current until it is pushed harder: - Will make the current go another way I if there is an easier way . - The current always go to the path with l less resistance.
	electrolytic **CAPACITORS**: - 1UF -10UF -220UF	**Capacitors** : temporarily hold a charge and discharge continually. In our circuit, they are used to reduce audio noise to keep a clean audio signal. They prevent interference or “bad mood” between signals that could create audio noise. Metaphorically, they act like springs or suspensions by absorbing the shock caused by the bumps on the roads, keeping the ride smooth. Caps smooth out the current.
	**LM386 IC AMP**	The brain of the circuit. Amplifies the incoming low audio signal up to a 1W speaker level.
	**SPEAKER**	Outputs sound

About LM386 :

LM386 IC is an audio power amplifier integrated circuit designed for use in low voltage consumer applications. It is suitable for battery-powered devices such as radios, doorbells, telephones, guitars amplifiers, and hobby electronic projects. It is mostly used as an amplifier in computer speakers and small portable stereos.

The **LM386** IC is available in 8 pins dual in-line package. The voltage gain of the amplifier can be adjusted to 20 and it will be enhanced to 200 by adding external components like resistor and capacitor among the pin 1 and 8. The LM386 IC amplifier consists of 8 pins where pin 1 and pin 8 are gain control pins. This allows a customer to control the volume. Depending on the model, using a 9-volt power supply, an amplifier can deliver the output power in the range of 0.25W to 1W.

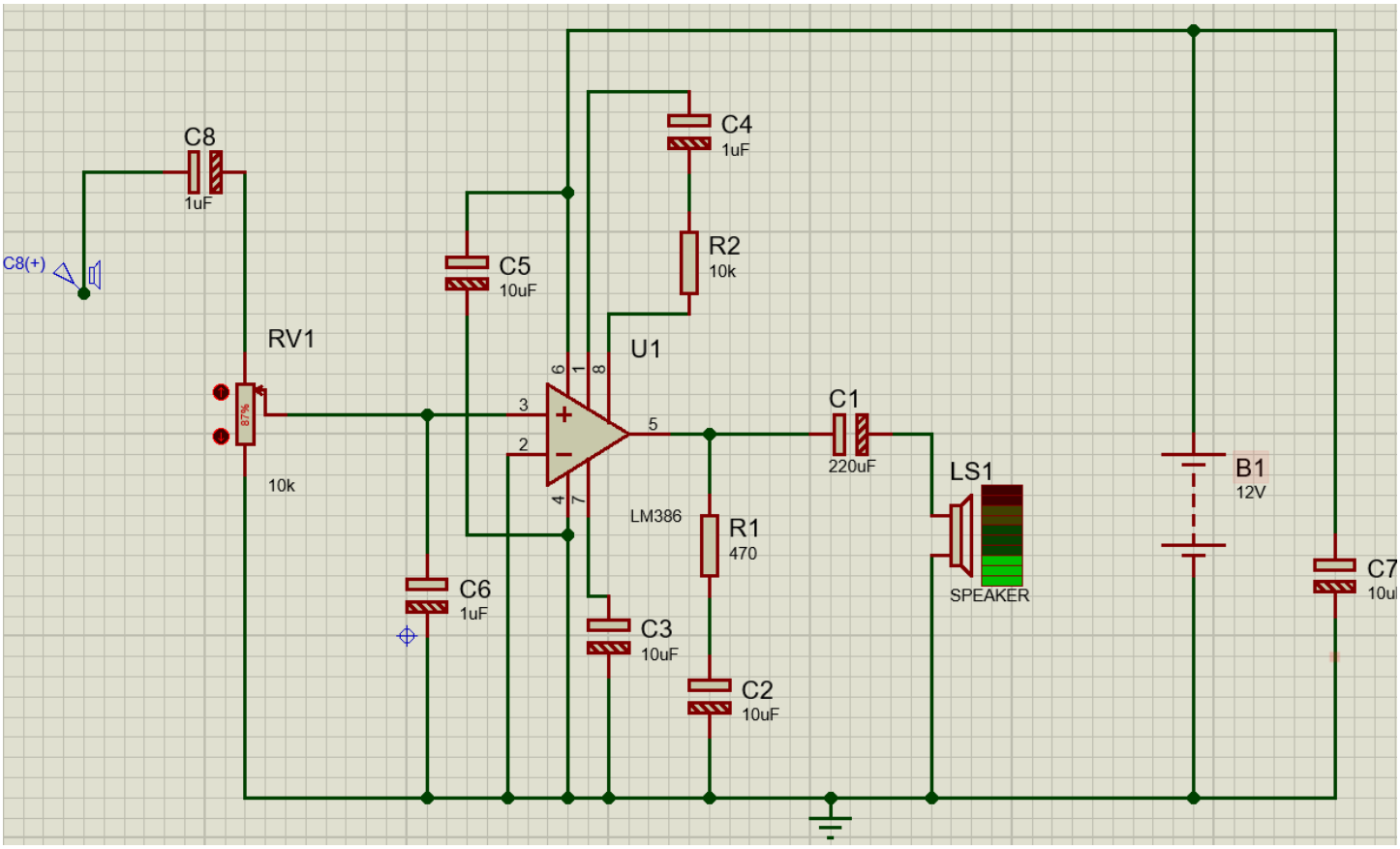


Pin Description

- **Pin1 (Gain)**: It is a gain pin used to adjust the amplifier gain by connecting this IC to an external component capacitor.
- **Pin 2 (Input -)**: It is inverting input terminal used to provide the audio signal.
- **Pin 3 (Input +)**: It is non-inverting input terminal used to provide the audio signal.
- **Pin 4 (GND)**: It is a ground pin connected to the ground terminal of the system
- **Pin 5 (Vout)**: It is the output pin used to provide amplified output audio, and is allied to the speaker.
- **Pin 6 (Vs)**: It is connected to the power and receives the positive DC voltage.
- **Pin 7 (Bypass)**: It is a bypass pin used to connect a decoupling capacitor.
- **Pin 8 (Gain)**: It is a gain setting pin used to control the gain of the amplifier.

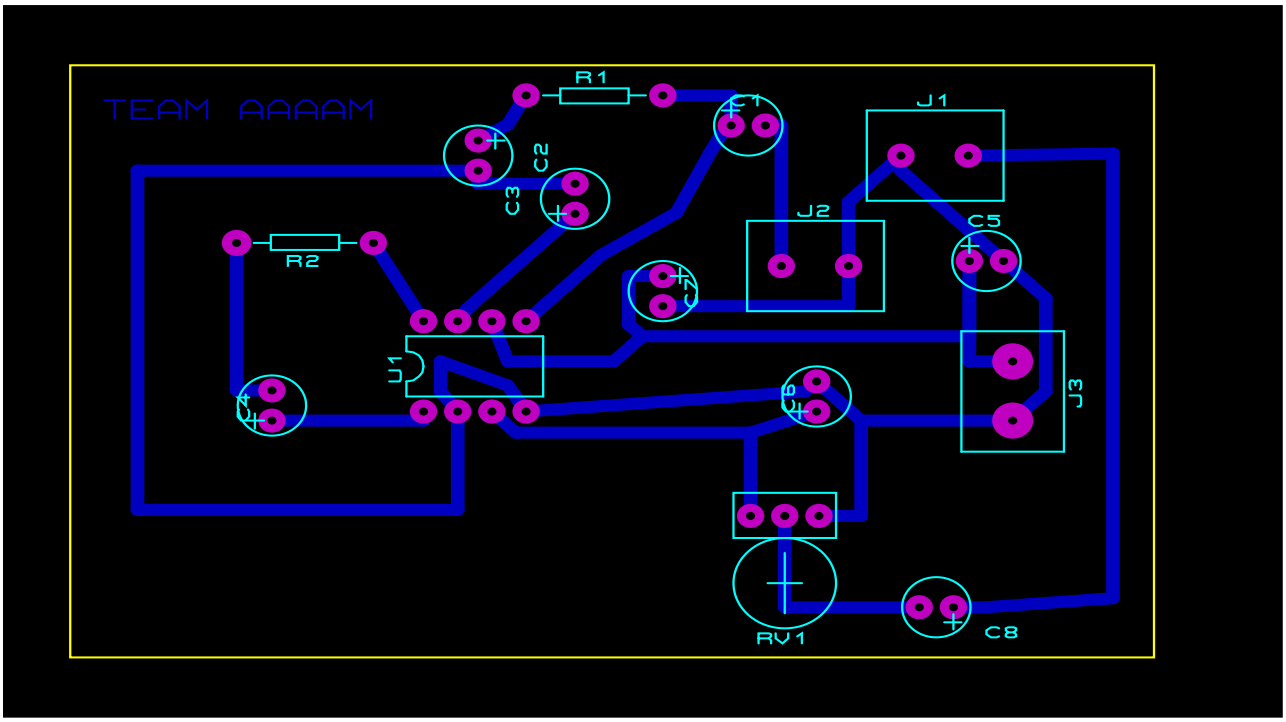
THE AUDIO AMPLIFIER CIRCUIT

1. SCHEMATIC:



An amplifier takes an input signal from a source, such as a laptop, turntable or CD player, and creates a larger copy of the original signal before it's sent to the speakers. It gets the power to do this from your mains electricity, which is sent directly to the power supply within the amplifie. How does an amplifier change sound? The amplifier converts low voltage electrical signals produced from the source equipment by increasing its strength significantly so that it can effectively drive a pair of speakers to produce sound. The voltage gain of the amplifier can be adjusted to 20 and it will be enhanced to 200 by adding external components like resistor and capacitor among the pin 1 and 8.Capacitors are used to reduce audio noise to keep a clean audio signal.

2. Layout:



Dimensions:

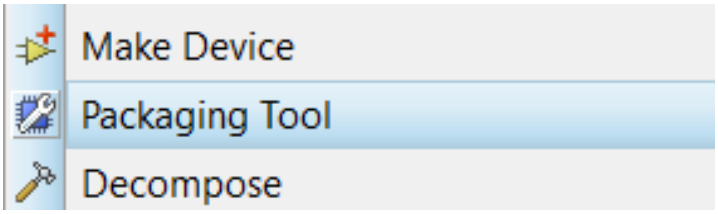
Board	50 mm* 80mm
Trace	1 mm
Pad	Outer radius: 2mm Inner radius: 0.75mm

Clearance:

Trace- Trace	0.25 mm
Pad-Pad	0.25 mm
Pad-Trace	0.25 mm
Edge	0.375 mm

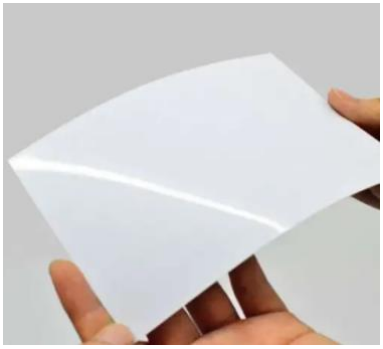
Package:

Usually every component has his package but if there is no package we can make it to the component by packaging tool



And then changing the package type to another component that is in our library.

Print:

We use glossy paper to print the layout form on it by laser printer 

Then we cut the empty part of the paper then fix it on PCB and iron this paper on PCB for 5:10 minutes and leave it in water for 5 minutes

Then remark the faded tracks by duco pen before acidification.

Acidification process:

By use of Ferric Chloride Anhydrous (FeCl3) we can acidify the PCB for 5 minutes 

Then we can start to perforate PCB.

Warning: FeCl3 is toxic acid.

Perforation and Welding:

We use drill machine of 1mm to perforate PCB next we put all components one by one and weld it using tin wire and caustic.