

IEI Students' Chapter
Department of Electronics & Communication

ASANSOL ENGINEERING COLLEGE

AUDIO AMPLIFIER

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Acknowledgement

This project is an attempt to provide a glimpse of how an audio amplifier works. Generally an audio amplifier is a circuit that amplifies low-power electronic audio signals, such as a signal from a radio receiver or an electric guitar pickup to a level that is high enough for driving loudspeakers or headphones. The basic circuit includes the use of LM386 IC which is generally used for low voltage audio amplifier circuits. The other major components required are 5K ohm Variable resistor which is used for controlling the gain, 100 ohm variable resistor for volume control, different values capacitor and resistors.

The main purpose of making this project is that: 1) It is cost efficient with a very less amount of basic components. 2) Here with a less effort we can reach upto 200dB gain. 3) We can apply this circuit in various advanced audio related projects.

We would like to thank our teacher Mr.Subhomoy Bhattacharya sir and our seniors for helping us as well as motivating us to make this project successful.

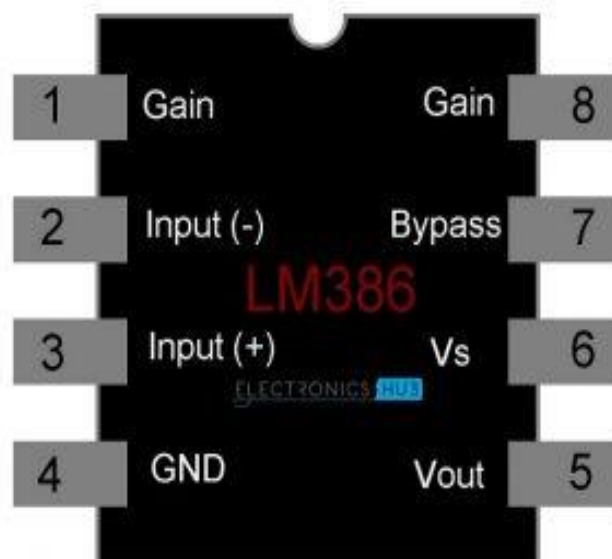
Components Used:

- 1- LM 386 semiconductor (IC)
- 2- 100 micro Farad capacitor
- 3- 220 micro Farad capacitor
- 4- 10 ohm resistor
- 5- 5 kilo ohm variable resistor
- 6- 100 ohm variable resistor
- 7- 0.01 capacitor
- 8- 0.047 capacitor
- 9- Wires
- 10- 9V Battery clip
- 11- 9V Battery
- 12- 3.5mm stereo jack male
- 13- 3.5mm stereo jack female
- 14- Project board or Breadboard

LM386 Audio Amplifier Circuit

The LM386 is an all – in – one Class AB Audio Amplifier IC that can be used in a variety of applications. LM386 IC has been in use for decades and is still being used as Amplifier in Computer speakers and Portable Stereos.

LM386 is a low voltage power amplifier with an inactive power draw of 24mW, which makes it suitable for battery controlled applications. The most common package for LM386 is an 8 – pin DIP. The following image shows the pinout diagram of the IC LM386



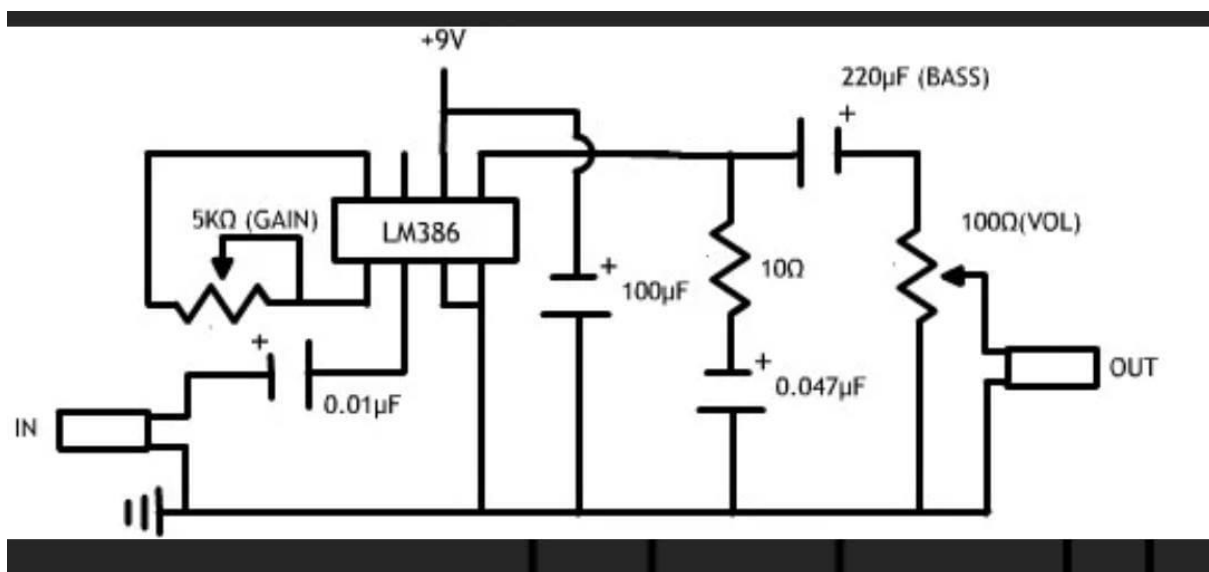
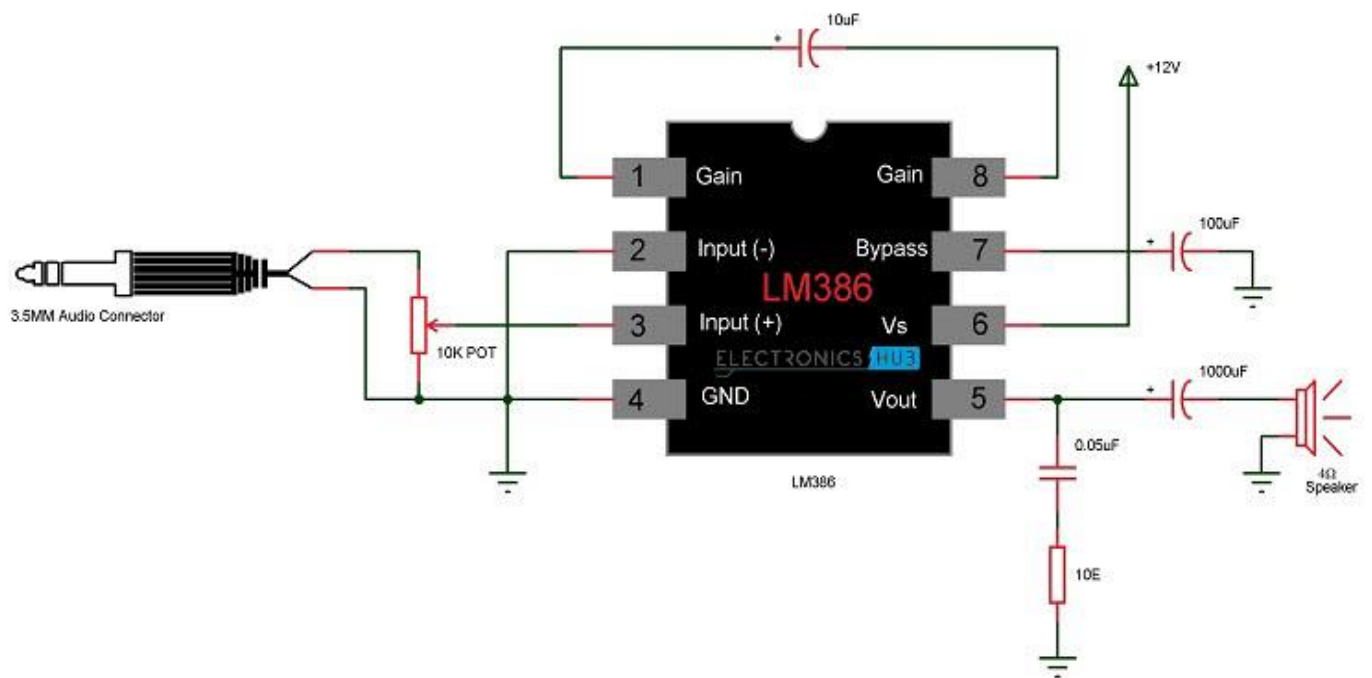
From the pin diagram, it is clear that LM386 is a simple Amplifier IC with possibly minimum external connections. The following table shows the functions of each pin in the LM386 Amplifier IC.

<i>Pin Number</i>	<i>Pin Name</i>	<i>Function</i>
1	Gain	Gain Setting Pin
2	Input –	Inverting Input
3	Input +	Non – Inverting Input
4	GND	Ground
5	Vout	Output
6	Vs	Power Supply Voltage
7	Bypass	Bypass decoupling path
8	Gain	Gain Setting Pin

Pins 1 and 8 are Gain Control Pins. By default, the Gain of the LM386 Amplifier is set to a factor of 20. When a capacitor is placed between pins 1 and 8, it bypasses the internal resistor (which is responsible for setting the gain to 20) and increases the gain to 200.

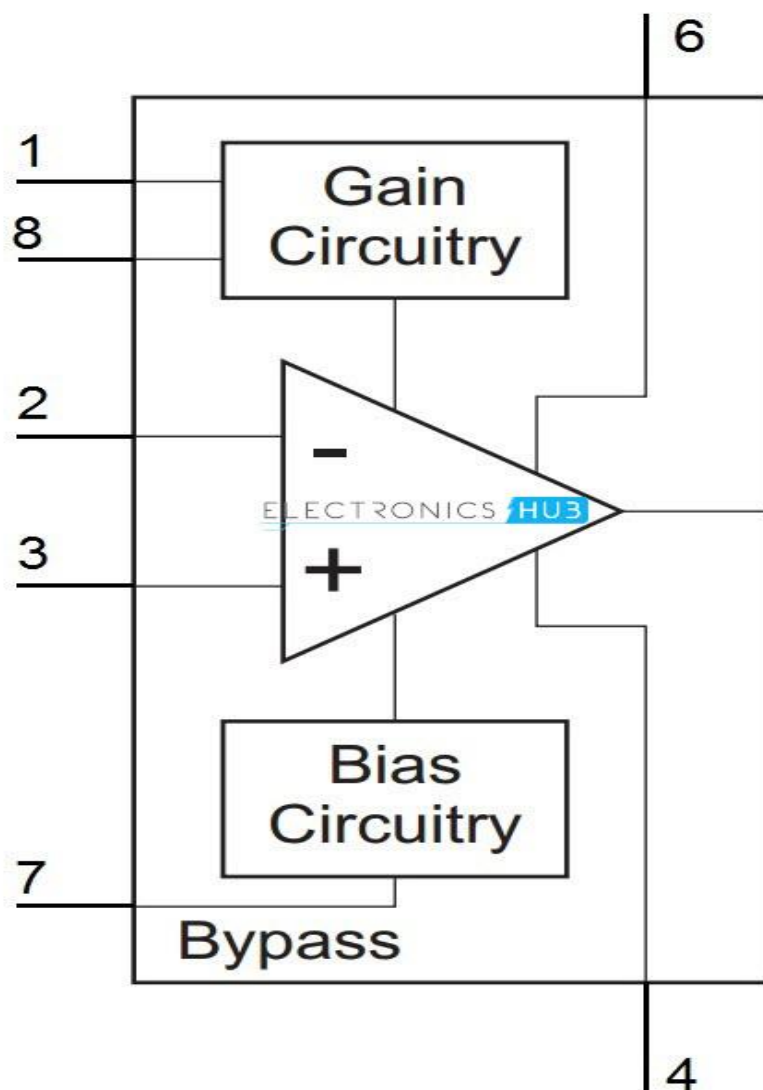
Pins 2 and 3 are the inverting and non – inverting inputs of the amplifier (internally, they are connected to an OP-AMP). Audio input from devices like microphone, mobile phones, laptops, etc. is given through these pin.

Circuit Diagram of LM386 Audio Amplifier



Functional Block Diagram of LM386

Functionally, the LM386 Audio Amplifier IC can be divided into Amplifier, Gain Control, Bypass, Power and Output. The following image shows the functional block diagram of LM386



Working of LM386 Audio Amplifier Circuit

A simple but efficient Audio Amplifier is designed using LM386 Audio Amplifier IC. The working of the circuit is very straight forward as all the work is done by the LM386 IC itself.

When the system is powered on and proper audio input is given at the input, the LM386 Amplifier the input signal by a factor of 200 and drives the output speaker.

One of the main problems with audio amplifiers like LM386 is the noise. Surprisingly, even though the circuit is built on a breadboard, there was very less noise from the speaker.

Applications

- LM386 is already one of the important IC in audio department and is featured commonly portable speakers and laptop speakers.
- The LM386 Audio Amplifier Circuit can be used for recording voice from microphone, building small speakers that are battery operated, in FM Radio Devices, etc.
- They can also be used in TV Sound Systems, Line Drivers, Servo Drivers, Ultrasonic Drivers, etc.