

LAB REPORT:

* Aim:- The aim of this experiment is to build a stereo speaker employing LM386 integrated circuits as audio amplifiers. Low level stereo input is amplified to a sufficient level.

* Components:-

LM386 IC

$10\text{-}\Omega$ resistors

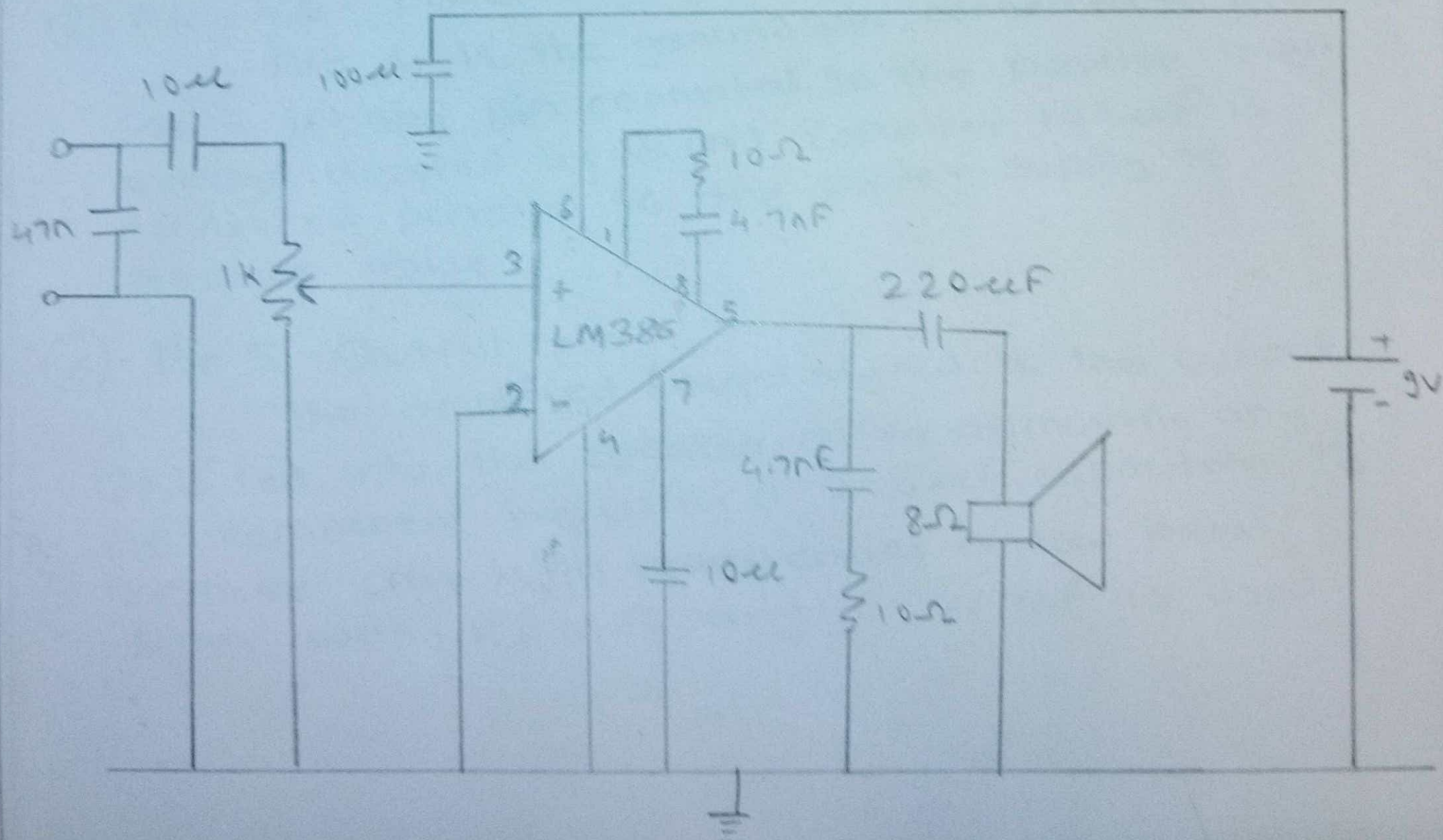
$220\text{ }\mu\text{F}$, $100\text{ }\mu\text{F}$, $10\text{ }\mu\text{F}$, 47 nF , 4.7 nF capacitors

3.5mm Audio Jack

$8\text{-}\Omega$ output speaker

$1\text{K}\text{-}\Omega$ potentiometer

* Experimental Setup:



Functions: LM386 is an IC that has the function of a low voltage audio amplifier with gain from 20 to 200. It takes an input supply voltage in the range 4-12 volts.

The functions of the 8 pins are:-

(a) Pins 1,8 - Gain controlling pins

The default is 20. The gain can be adjusted between 20-200 using a capacitors and resistors in series.

(b) Pins 2,3 - Input pins

Pin 2 is the negative terminal, connected to ground. Pin 3 is the positive terminal, connected to audio signal. So this is non-inverting op-AMP. The input audio is through an audio jack through a 1k potentiometer that acts as a volume controller. A 10 μ F capacitor is used with the potentiometer to remove the DC component of the input signal and only feed the AC signal into the LM386 IC.

(c) Pins 4,6 - power supply pins

Pin 4 is the ground pin, connected to ground. Pin 6 is the pin connected to the positive input voltage denoted by V_s (9V). Capacitor 100 μ F is connected parallel to the power supply to reduce noise.

(d) Pin 5 - Output pin

The amplified sound signal is the output. It is fed into the speaker after removing any DC component by using a 220 μ F capacitor. To remove any high frequencies a low pass filter with $R = 10\Omega$ and $C = 4.7nF$ is used.

e) Pin 7- Bypass terminal

The $10\mu\text{F}$ capacitor at pin 7 of the LM386 IC serves as a bypass, filtering out noise and fluctuations from power supply. This ensures stable operations by preventing unwanted electrical disturbances, ultimately enhancing the amplifiers performance.

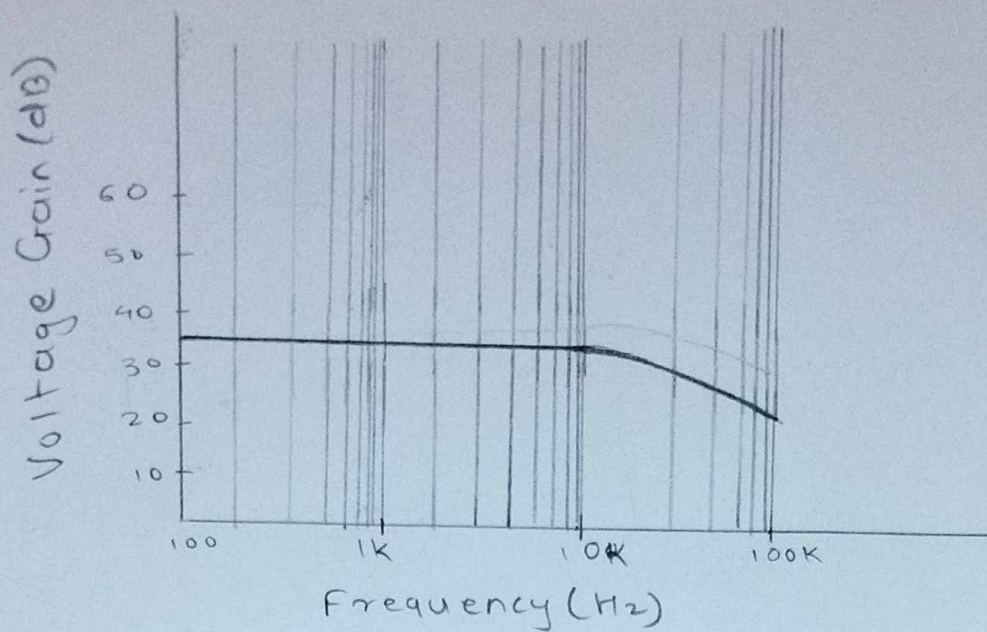
Potentiometer:- The potentiometer adjust speaker volume by acting as a voltage divider at pin 3 of LM386 IC. As resistance increases, more voltage is dropped across the potentiometer, reducing input to the LM386 and lowering output volume. Conversely, decreases resistance will lead to greater volume of the output audio.

We have also used the $10\mu\text{F}$ capacitor functions as a coupling capacitor, blocking DC voltage while allowing AC audio signal to pass through. This safeguards the speaker from potential damage. As the LM386 IC is designed to amplify AC signals only.

Observations:

Input frequency	V_{in} (at pin 3)	V_{out} (at pin 5)	Gain (dB) $= 20 \log \left(\frac{V_{out}}{V_{in}} \right)$
1 kHz	0.075	3.72	33.90
5 kHz	0.057	2.83	33.918

Graph:



Conclusion: We were successfully able to demonstrate the working of the stereo speaker system built using LM386 IC. The amplifier circuit can be modified to have gain between 20 and 200, by varying the connections between the pins 1 and 8. On average for frequencies in the range that human ear can hear, the input power was near to 0.45 watt.