



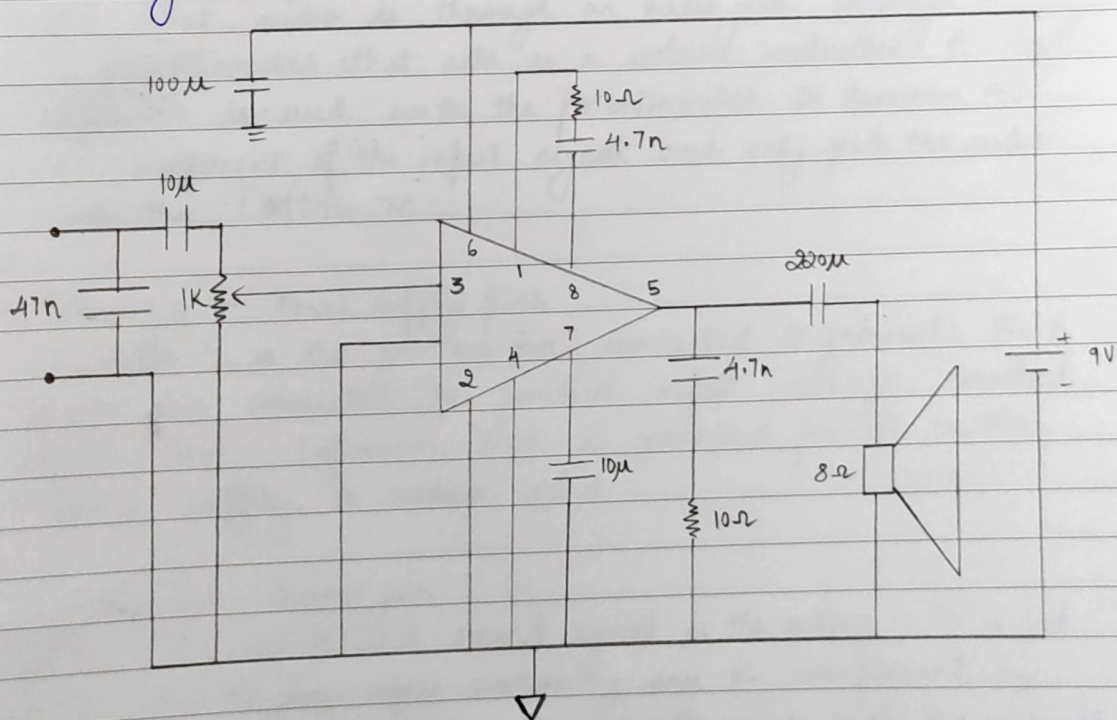
Report on

LM386 AUDIO AMPLIFIER

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

Components: LM386, $2 \times 10\mu$ - $2 \times 4.7n$ - $1 \times 100\mu$ - $1 \times 220\mu$ - $47n$ capacitors, $2 \times 10\Omega$ resistors, 3.5mm audio jack, 8Ω output speakers

Circuit Diagram:



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) Pin 1, 8 - Gain controlling pins

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

b) Pin 2, 3 - Input pins

Pin 2 is the negative terminal, connected to ground. Pin 3 is the positive terminal, connected to audio signal. 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 audio into the LM386 IC.

c) Pin 4, 6 - Power supply pins

Pin 4 is the ground pin, connected to ground. Pin 6 is the pin connected to 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 $C=47nF$ is used.

c) Pin 7 - Bypass terminal

The $10\mu\text{F}$ capacitor at pin 7 of the LM386 IC works as a bypass, filtering out noise and fluctuations from power supply.

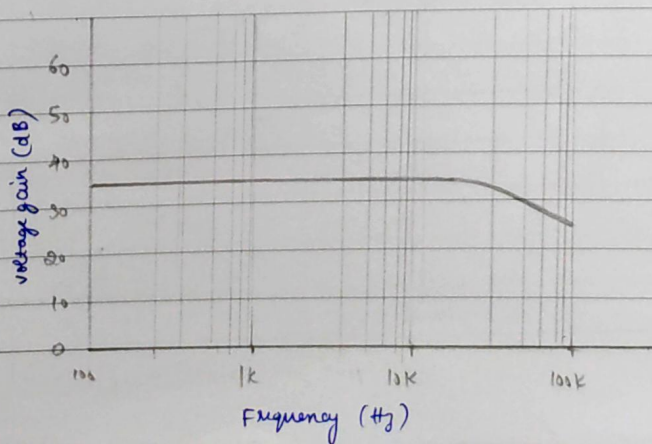
Potentiometer: The potentiometer adjusts speaker volume by acting as a voltage divider at pin 3 of LM386. As resistance increases more voltage is dropped across the potentiometer and hence reducing the volume and similarly vice versa.

We have also used the $10\mu\text{F}$ capacitor which functions as a coupling capacitor, blocking DC voltage while allowing AC audio signal to pass through.

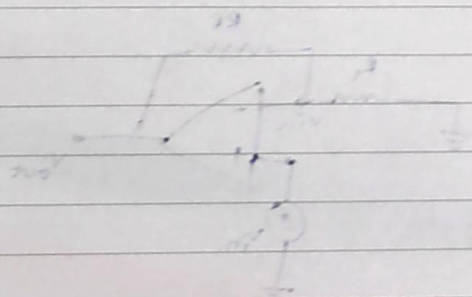
Observations:

Input frequency	V_{in} (at pin 3)	V_{out} (at pin 5)	Gain (dB) $= 20 \log \frac{V_{out}}{V_{in}}$
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 LM326 IC. The amplifier circuit can be modified to have a 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 observed was near to 0.45 Watt.



= 500mW

$$P = \frac{V_{in}^2}{R} = \frac{(1V)^2}{2\Omega} = 0.5W$$

$$\frac{2.5V}{2\Omega} = \left(\frac{1}{10} + \frac{1}{2} \right) 1V \quad \text{is}$$