Audio Amplifier

.Aim

To design and implement a simple audio amplifier circuit capable of amplifying audio signal

.Components used

(i) LM 386 IC

(ii) Capacitors (220μF, 100μF, 10μF, 4.7nF, 104)

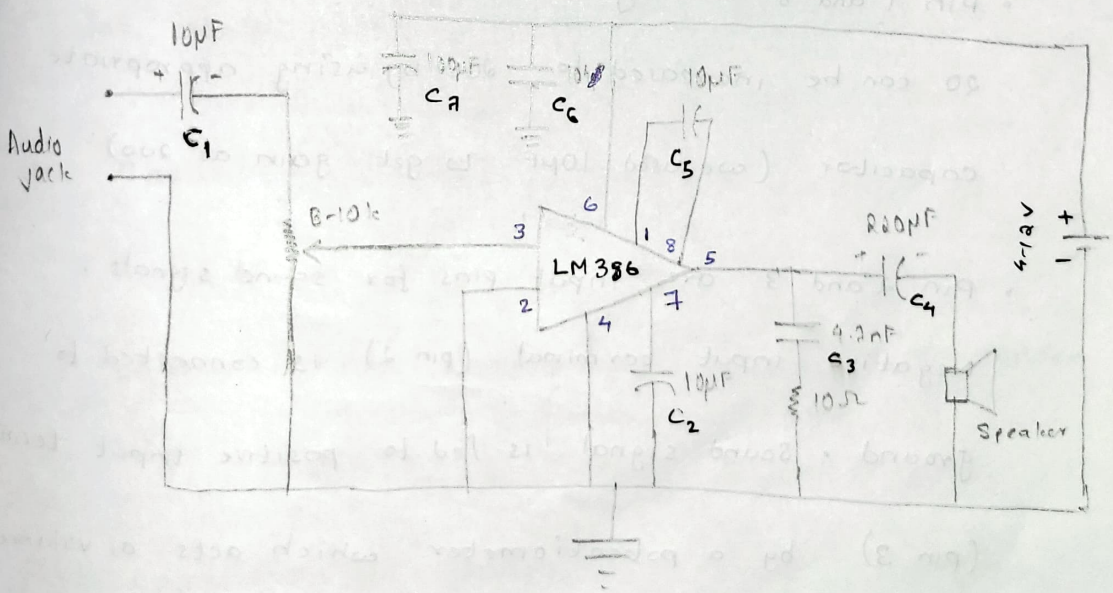
(iii) Resistors (10Ω)

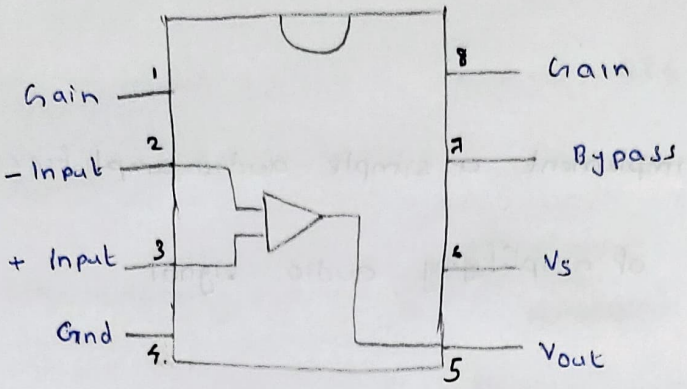
(iv) B-10 k potentiometer

(v) Audio jack

(vi) Speaker

.Circuit Diagram





LM386 pin diagram

- Functions of various components (Theory)

(i) LM386

It is a low voltage audio amplifier used in music devices like radio, guitar etc.

- Its gain range is 20-200
- It has wide supply voltage range of 4-12V

Pins:

- Pin 1 and 8 are gain control pins. The default gain 20 can be increased to 200 by using appropriate capacitor (we used 10μf to get gain as 200)
- Pin 2 and 3 are input pins for sound signals. Negative input terminal (pin 2) is connected to ground. Sound signal is fed to positive input terminal (pin 3) by a potentiometer which acts as volume control knob.

- Pin 4 and 6 are power supply pins, where pin 4 is connected to ground while pin 6 is connected to $+V_{cc}$.
- Pin 5 is the output pin from which we get the amplified sound signal.
- Pin 7 is a bypass terminal which is grounded using a capacitor for stability.

(ii) Capacitor C_1

It is used to remove the DC component of input signal allowing only AC component to be fed into LM386.

(iii) Capacitor C_2

It is connected to bypass terminal of the IC for stability of circuit.

(iv) Capacitor C_3 and Resistor (10Ω)

They collectively act as a filter circuit called 'Zobel network' used to remove sudden high frequency oscillations/noise.

(v) Capacitor C_4

It is used to remove DC component of output

signal allowing only AC component to be fed into speaker.

(vi) Capacitor C_5

It is used to adjust the gain to its max value.

(vii) Capacitors C_6 and C_7

They're used to reduce the noise of output sound.

(viii) Potentiometer

Act as volume control knob by adjusting the resistance.

. Procedure

- Connect the circuit in circuit diagram on a breadboard
- Connect source voltage between pin 6 of IC and ground of the circuit.
- Connect aeldio jack to mobile phone / laptop.

. Observation

- Amplified music/sound is obtained from the speaker.
- On adjusting the value of potentiometer, the loudness and noise from speaker can be adjusted.

. Conclusion

The designed audio amplifier effectively amplifies the given audio signals . It achieves desired amplification with adjustable volume control . This project demonstrate basic yet effective approach to audio amplification.

. Precaution

- Make sure all the components are connected properly, especially polarised capacitors .
- Make sure that the input voltage is in the specified range (4-12V)