

Audio Amplifier

Aim: To design an Audio Amplifier.

The Audio Amplifier circuit consists of Condenser MIC circuit, Op-Amp circuit and Push-Pull Power Amplifier circuit as shown in Figs. 5.1 – 5.3.

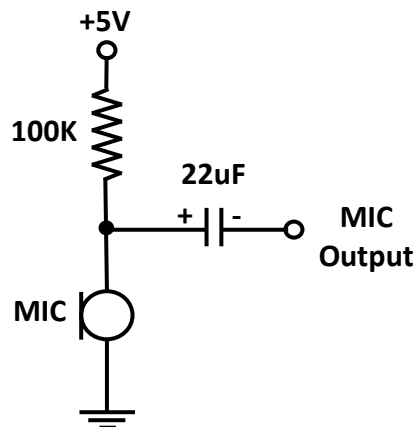


Fig. 5.1: Condenser MIC circuit

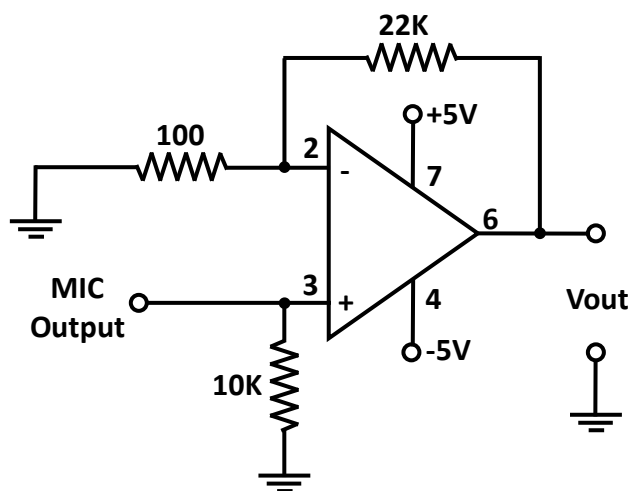


Fig. 5.2: Non-Inverting Op-Amp with fixed Gain

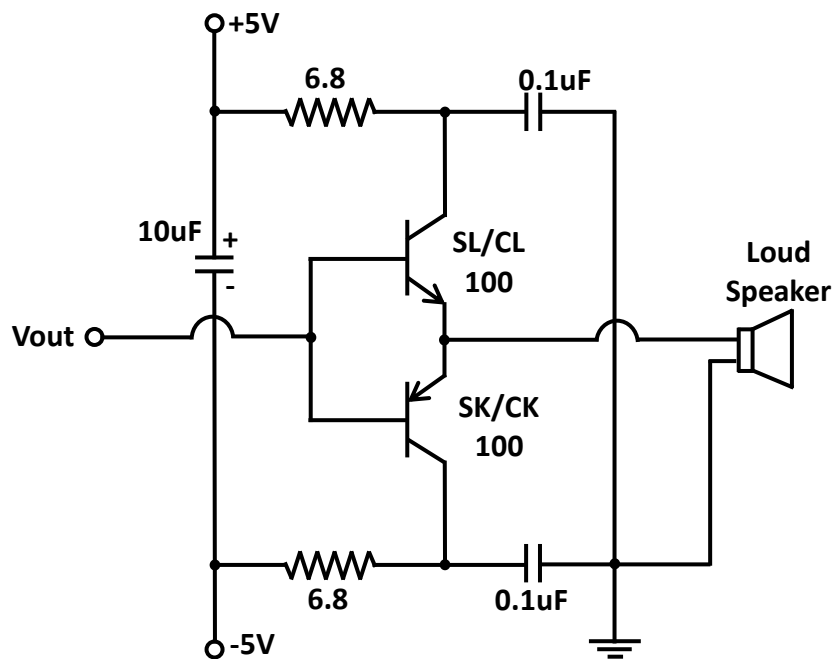


Fig. 5.3: Push – Pull Power Amplifier

The Condenser MIC circuit converts audio signal into equivalent voltage signal which is given as input to the Non-Inverting Op-Amp circuit whose gain is fixed. The output of the Op-Amp is given as the input to the Push-Pull amplifier connected to Loud Speaker. Such Amplifier configuration has high voltage gain. The complementary-symmetry Power Amplifier consists of a pair of complementary transistors (one NPN and one PNP Transistor with matched characteristics). A $10\mu\text{F}$ **electrolytic** capacitor is connected across the +5V and –5V DC power supply to reduce the "current ripple" created by the power supply voltages. A $0.1\mu\text{F}$ ceramic capacitor is connected across the collector to ground of each Transistor to suppress **high-frequency oscillations**. Such oscillations, which occur very often in high-gain amplifiers, can lead to **overheating** of the circuit elements and even cause them to burn. Enough care must be taken to avoid overheating, in case of overheating, **switch off the DC power supply** immediately.

Precautions:

1. Set the DC Power Supply to 5V before Connecting the Circuit. Do not exceed the power supply voltage to 5V after connecting to the circuit.
2. If resistors are overheated immediately switch off the DC power supply.

Procedure:

1. Connect the MIC circuit as shown in Fig. 5.1.
2. Connect the Op-Amp circuit as shown in Fig. 5.2.
3. Connect the Push-Pull complementary Amplifier circuit as shown in Fig. 5.3.
4. Connect the Op-Amp output to the base terminal of the Push-Pull Amplifier configuration.
5. Set the FG for a sinusoidal signal with *amplitude of 20 mV* and a frequency of 200 Hz with *40 dB attenuation*. Ensure that the measured value of the microphone output voltage is actually in the set frequency range of 200 Hz. Measure the magnitude of output voltage in CRO.
6. Now remove the 200 Hz signal from the FG, and connect the output of the condenser MIC circuit to the input of Op-Amp circuit.
7. Speak in the MIC and observe in loud speaker.