

Preamp -- Overview

Audio Signal Amplification Using LM741



OBJECTIVES

After performing this lab exercise, learner will be able to:

- Understand the working of a basic audio amplifier
- Design an audio amplifier circuit using LM741 IC
- Convert the audio signal to electrical energy using MIC
- Measure MEAN & RMS amplitude of the captured signal using inbuilt functions of the scope.

EQUIPMENT

To carry out this experiment, you will need:

- TBS1KB - Digital Oscilloscope from Tektronix
- LM741 Op-amp, Condensor MIC, resistors, capacitors
- Voltage probe (provided with oscilloscope) / BNC cables
- Breadboard and connecting wires

THEORY

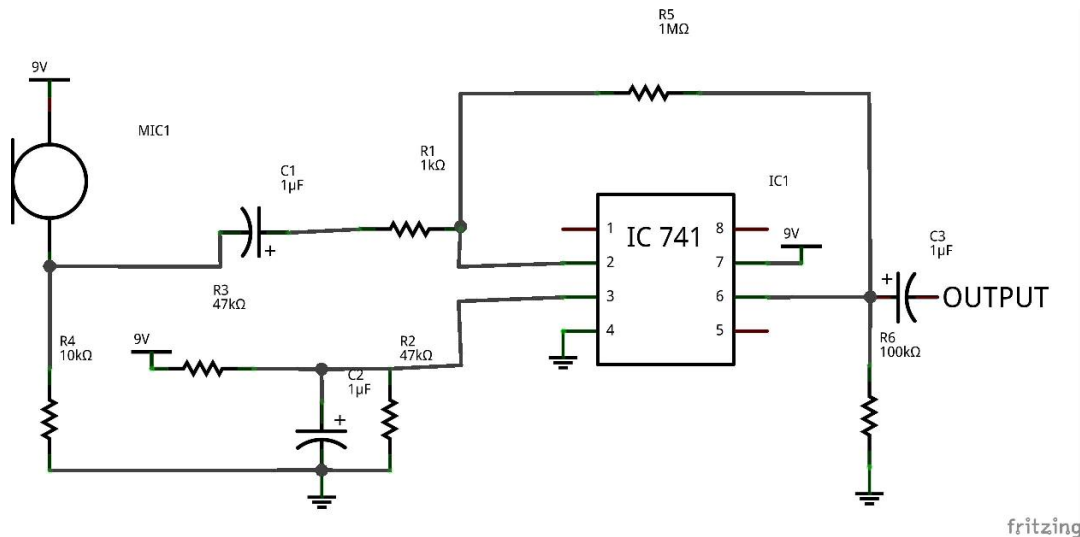
- A preamplifier (preamp) is an electronic amplifier that prepares a small electrical signal for further amplification or processing.
- A preamplifier is often placed close to the sensor to reduce the effects of noise and interference.
- Microphone detects the audio and converts them to electrical signals. Before sending the signal to amplifier, the signals are passed through the filters. Filtered signal is given to Op-Amp for amplification.

Preamp -- Procedures

Step 1

DUT / SOURCE / CIRCUIT SET UP

- Rig up the circuit as shown in figure



Step 2

MEASUREMENT / SCOPE SETUP

- Power ON the oscilloscope
- Connect the Channel 1 probe of the oscilloscope to pin number 2 and Channel 2 probe to pin # 6 of LM741 IC
- Acquire the signal(s) from circuit on oscilloscope

Step 3

- Do the Autoset on the scope to efficiently capture and view the signal
- If AUTOSSET feature is not enabled, then manually set the horizontal and vertical scale, and trigger condition to view 3-4 cycles of waveform without any clipping.

Step 4

- From the measurement menu, configure MEAN and RMS measurement on acquired channels - Ch1 and Ch2

Step 5

- Measure the initial MEAN and RMS value at Pin 2 (MIC output) and Pin 6 (Amplified signal) of LM741

Step 6

- Make some near mic and measure MEAN and RMS value at Pin 2 (MIC output) and Pin 6 (Amplified signal) of LM741
- Check if the amplification happens as expected or not.

Step 7

WAVEFORM

The output waveform would look like below,

