# AC/DC Converter: Stereo Speaker

Raktim Gautam Goswami and Abhishek Bairagi

## Contents



***Abstract*—In this manual we will be making a stereo speaker which will take audio input, amplify it and give output through speaker.**

## 1 Components

| Component | Value | Quantity |
|---|---|---|
| Step Down Transformer | 230V AC - 12V AC - 750 mA | 1 |
| Diode | | 4 |
| Capacitor | 1000 $\mu$F | 1 |
| Capacitor | 220 $\mu$F | 4 |
| Voltage Regulator | LM7809 | 1 |
| Jumper Wires | M-M | 20 |
| Audio Amplifier ICs | LM386 | 2 |
| Speakers | | 2 |
| Audio Jack | | 1 |
| Potentiometer | 10k OHM | 2 |
| PCB | | 1 |

TABLE I

## 2 Connections

**Problem 2.1.** Connect the 230V AC supply to the input of the step-down transformer as shown in Fig 2.1.

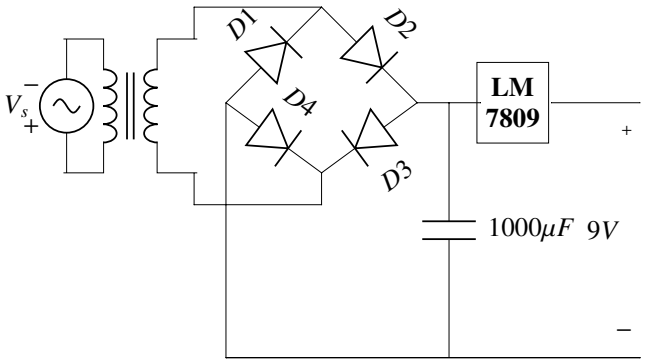


Fig. 2.1: AC-DC circuit diagram

**Problem 2.2.** Verify that the output of the transformer is 12 V AC. What is the frequency?

**Problem 2.3.** Connect the 4 diodes in bridge.

**Problem 2.4.** Connect the output of the transformer to the to the juction of diodes D1, D2 and D3 , D4 .

**Problem 2.5.** Measure the voltage and frequency at the input and output of transformer.

**Solution:** The input voltage is 230V @ 50 Hz and output of transformer is approximately 20V @ 50 Hz.

**Problem 2.6.** The observed output of the Bridge Rectifier between junctions of D1,D4 and D2,D3 on oscilloscope is as shown in Fig. 2.6.

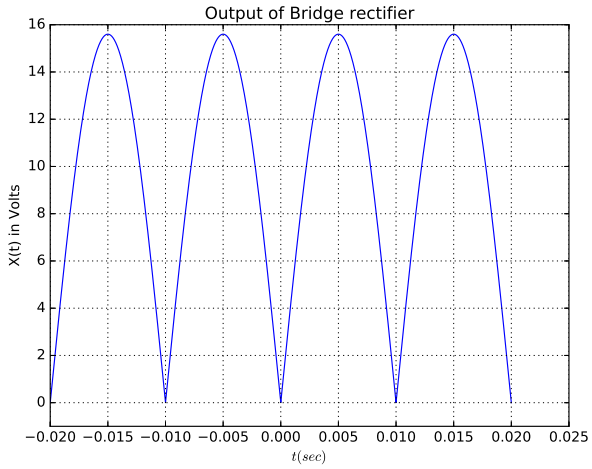


Fig. 2.6: Rectified Wave

## 3 Regulator

### *3.1 Ripple Filter*

**Problem 3.1.** The capacitor in Fig. 2.1 acts as a ripple filter. Sketch its output.

**Solution:** See Fig. 3.1.

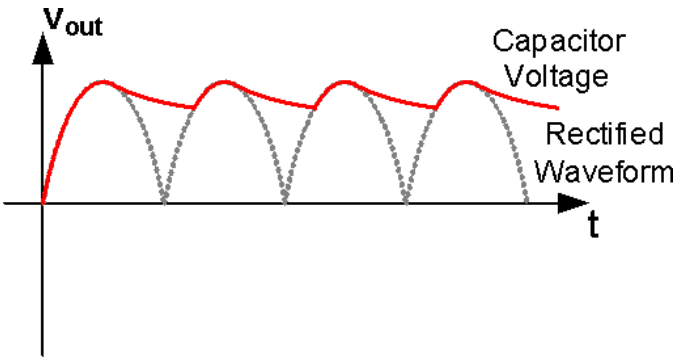


Fig. 3.1: Rectified Wave with Capacitive filter

### *3.2 Voltage Regulator*

**Problem 3.2.** Connect pin 1 and pin 2 of LM7809 to positive and Ground terminals of 220 uF capacitor and pin 3 to the positive of another 220 uF capacitor. Connect other end of capacitor to ground. See Figs. 3.2 and 3.3

**Problem 3.3.** Measure the Voltage across pin 3 and Ground of LM7809. What do you observe?

**Solution:** The output voltage is observed to be 9V.

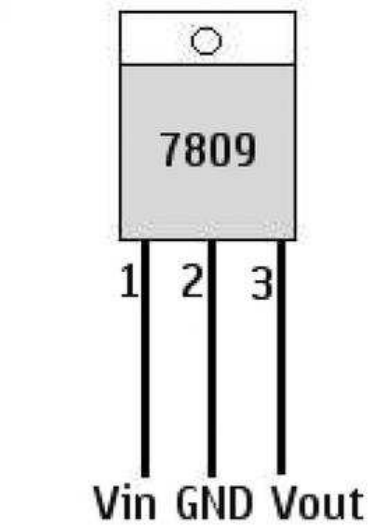


Fig. 3.2: LM7809

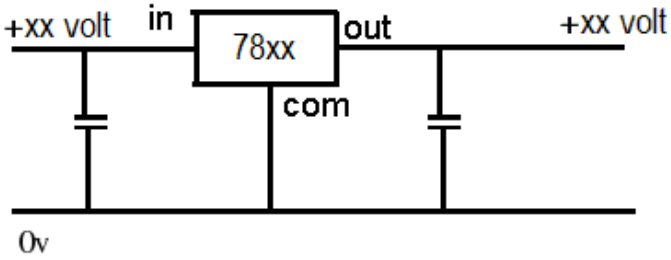


Fig. 3.3: LM 7809 connections

## 4 Audio amplification

**Problem 4.1.** Connect the 9V obtained from the previous circuit to pin 6 and ground to pin 2 and 4 of LM386 IC.

**Problem 4.2.** Connection points for the audio jack are as shown in Fig. 4.2

**Problem 4.3.** Connect one input from audio jack to pin 3 of LM386 IC with a variable resistor in series (you can use potentiometer instead of variable resistor). See Fig. 4.3.

**Problem 4.4.** Connect one wire of speaker to pin 5 of LM386 through a 220 uf (C1) capacitor and other to ground.

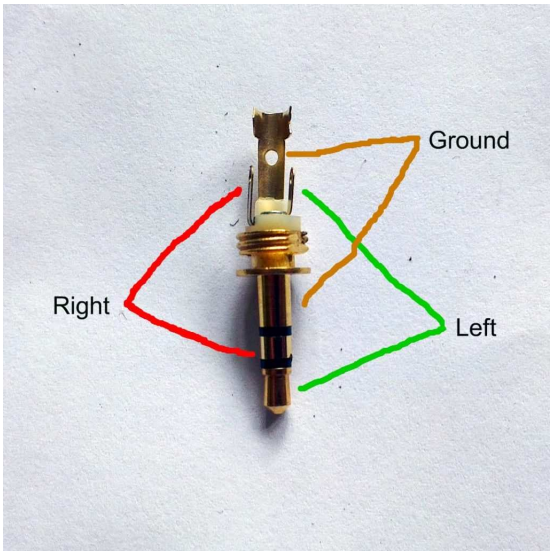


Fig. 4.2: Audio Jack connection points

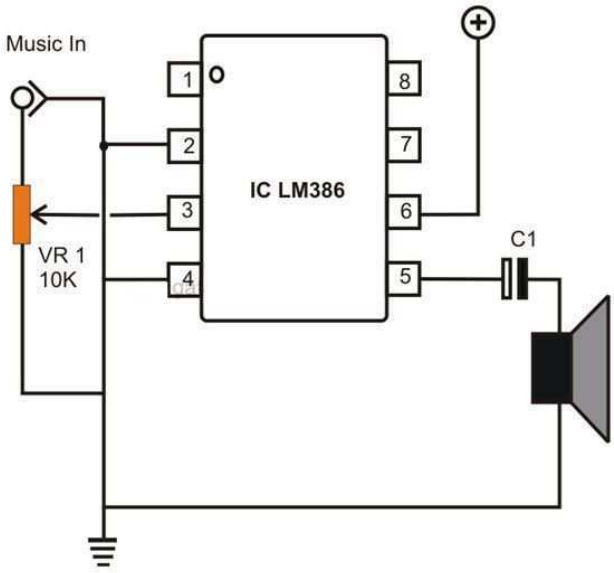


Fig. 4.3: LM386

**Problem 4.5.** Make the same circuit with another LM386 IC(This time use the other input of audio jack and connect remaining wire of audio jack to ground).

**Problem 4.6.** Now connect audio jack to an input device and turn on power supply. Try changing volume by potentiometer.