

Stereo Speaker

Raktim Gautam Goswami and Abhishek Bairagi

CONTENTS

1	Components	1
2	Circuit Diagram for converting 230V AC to 12V DC	1
3	Connections	1
4	Functioning	1
4.1	Ripple Filter	1
4.2	Voltage Regulator	2
5	Circuit for audio amplification	2

Abstract—In this manual we will be making a stereo speaker which will take input from a device and then 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 μ F	1
Capacitor	220 μ 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

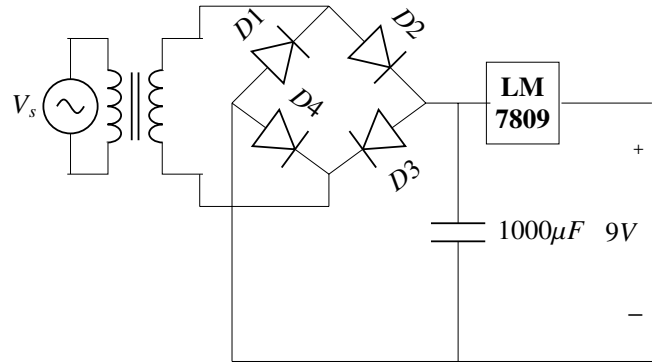


Fig. 2.0: AC-DC circuit diagram

2 CIRCUIT DIAGRAM FOR CONVERTING 230V AC TO 12V DC

The circuit diagram is shown in 2.0

Problem 2.1. 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.

3 CONNECTIONS

Problem 3.1. Connect the 230V AC supply to the input of the step-down transformer.

Problem 3.2. Connect the 4 diodes in bridge as shown in fig 2.0 .

Problem 3.3. Connect the 12V and GND wires of the transformer to the to the junction of diodes D1, D2 and D3 , D4 .

Problem 3.4. The observed output of the Bridge Rectifier between junctions of D1,D4 and D2,D3 on oscilloscope is as shown in Fig. 3.4.

4 FUNCTIONING

4.1 Ripple Filter

Problem 4.1. The output of the diode bridge is a DC consisting of ripples also called as pulsating DC.

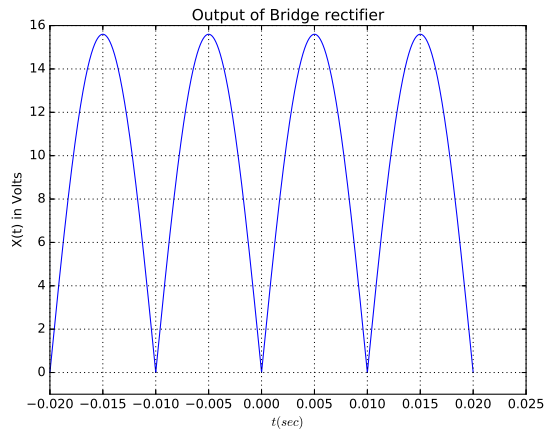


Fig. 3.4: Rectified Wave

This pulsating DC can be filtered using capacitor filter. Connect a capacitor across the bridge as shown in figure 2.0.

Problem 4.2. The observed output of the capacitor filter is as shown in Fig.4.2.

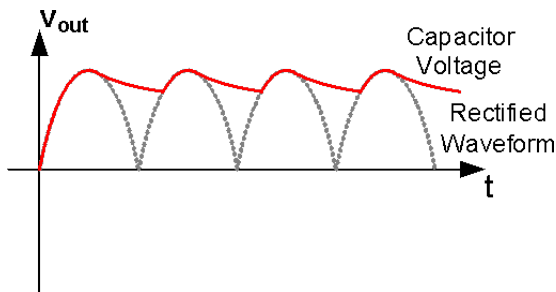


Fig. 4.2: Rectified Wave with Capacitive filter

4.2 Voltage Regulator

The pin description of LM7809 is shown in Fig. 4.2

Problem 4.3. Connect pin 1 and pin 2 of LM7809 to positive and Ground terminals of 220 μ F capacitor and pin 3 to the positive of another 220 μ F capacitor. Connect other end of capacitor to ground. The circuit is as shown in Fig. 4.3

Problem 4.4. Measure the Voltage across pin 3 and Ground of LM7805. What do you observe?

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

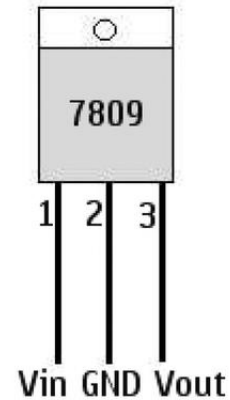


Fig. 4.2: LM7809

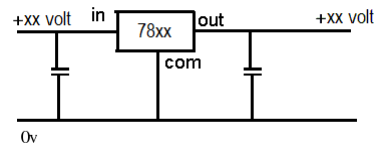


Fig. 4.3: LM 7809 connections

5 CIRCUIT FOR AUDIO AMPLIFICATION

Problem 5.1. Connect the 9V obtained from the previous circuit to pin 6 and ground to pin 2 and 4 of LM386 IC.

Problem 5.2. Connection points for the audio jack are as shown in Fig.5.2

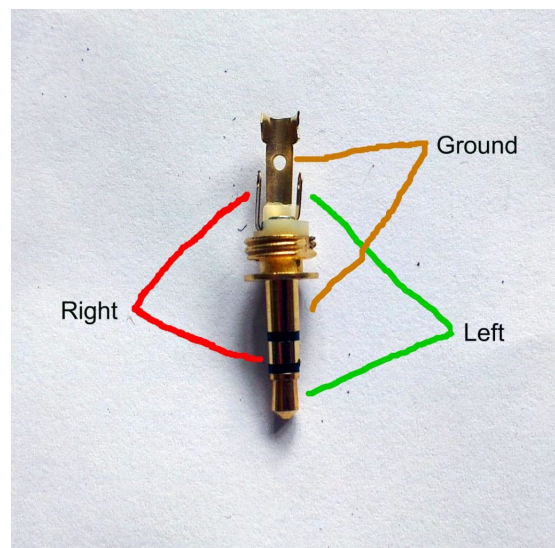


Fig. 5.2: Audio Jack connection points

Problem 5.3. 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. 5.3 for reference

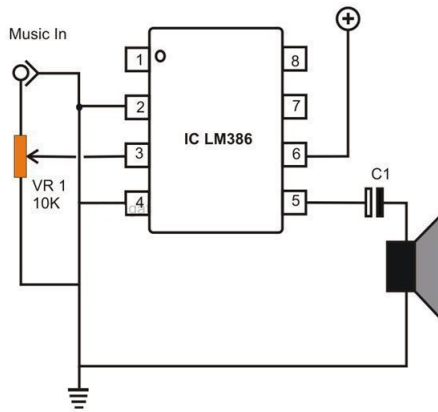


Fig. 5.3: LM386

Problem 5.4. Connect one wire of speaker to pin 5 of LM386 through a 220 uf (C1) capacitor and other to ground.

Problem 5.5. 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 5.6. Now connect audio jack to an input device and turn on power supply. Try changing volume by potentiometer.