AUDIO AMPLIFIER

EW-2 PROJECT

TANMAY PATHAK - 2018102023
ADITYA GUPTA - 2018102010
GROUP 11

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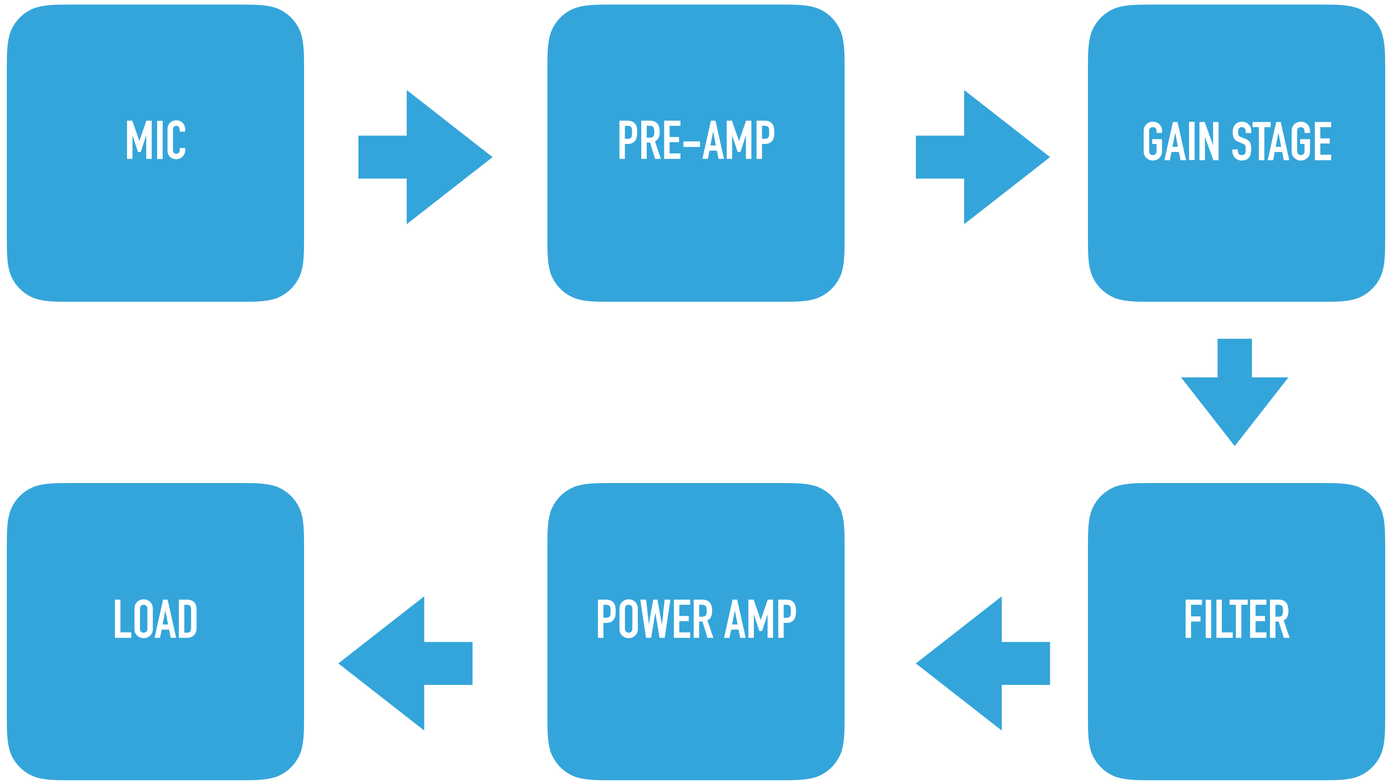
OBJECTIVE AND INTRODUCTION

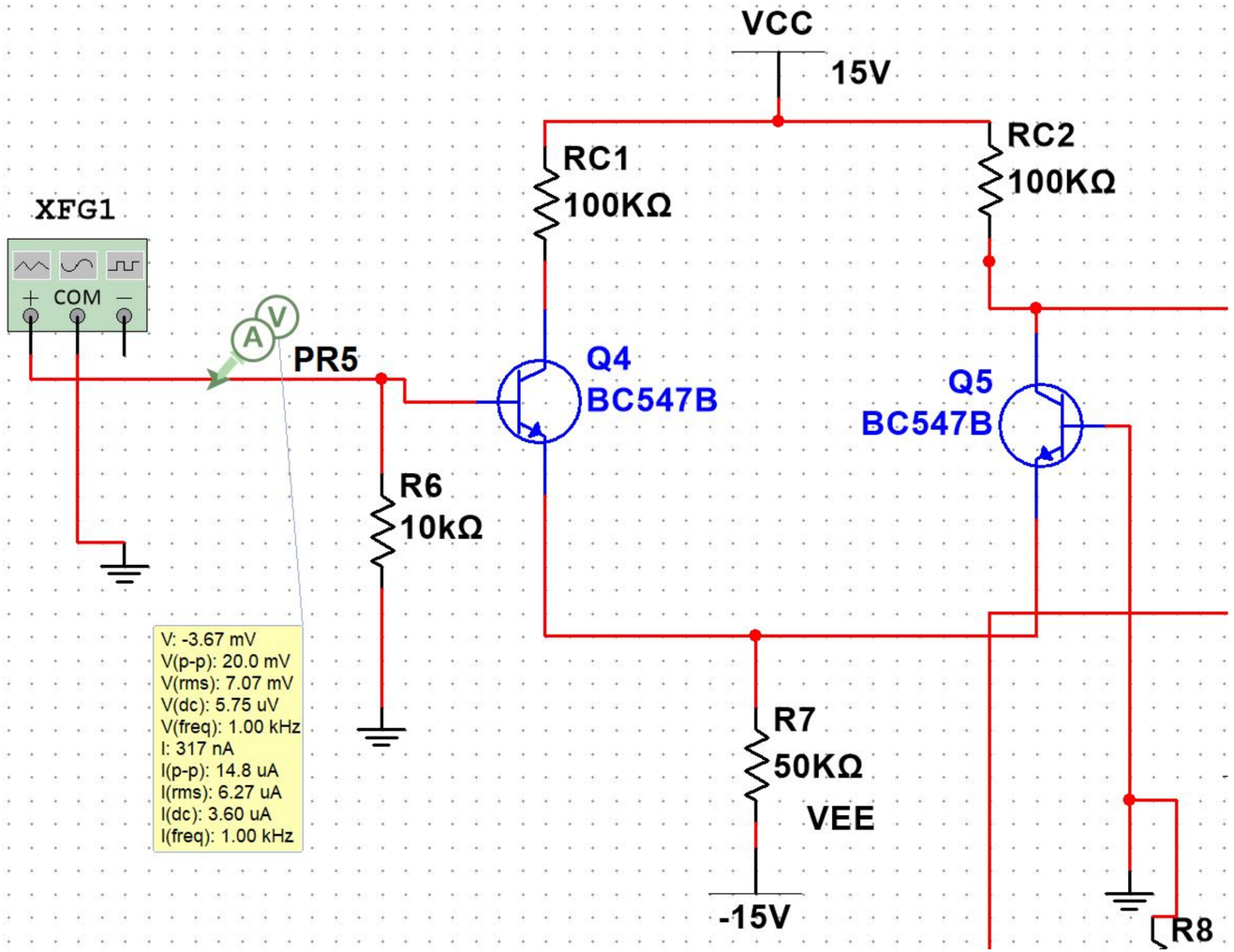
In this project, we attempt to successfully make an audio amplifier without using specialised ICs. The aim of the project is to construct an Audio Amplifier capable of amplifying sound signals by a factor of 500 while minimising noise picked up by the microphone.

BLOCK DIAGRAM



PRE-AMPLIFIER

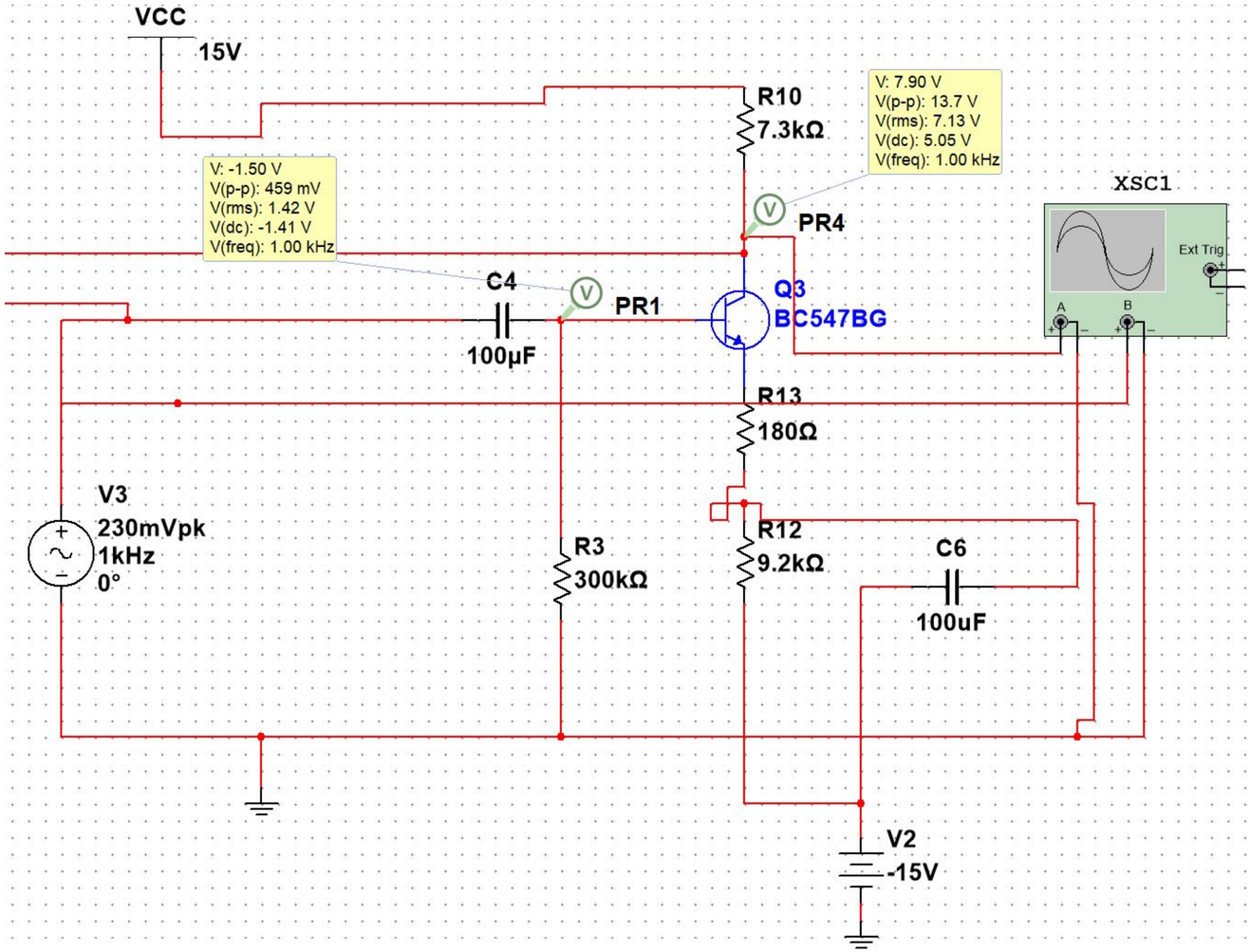
- An audio preamplifier is designed in a way to amplify very weak signals before feeding them to further gain stages and to cancel the irrelevant noise.
- To achieve this, we will be using BJT based differential amplifiers as it can be used to cancel the common noise which is coming, as well as it can amplify the weak signals a bit so that it can be sent to next stage for getting a better gain.



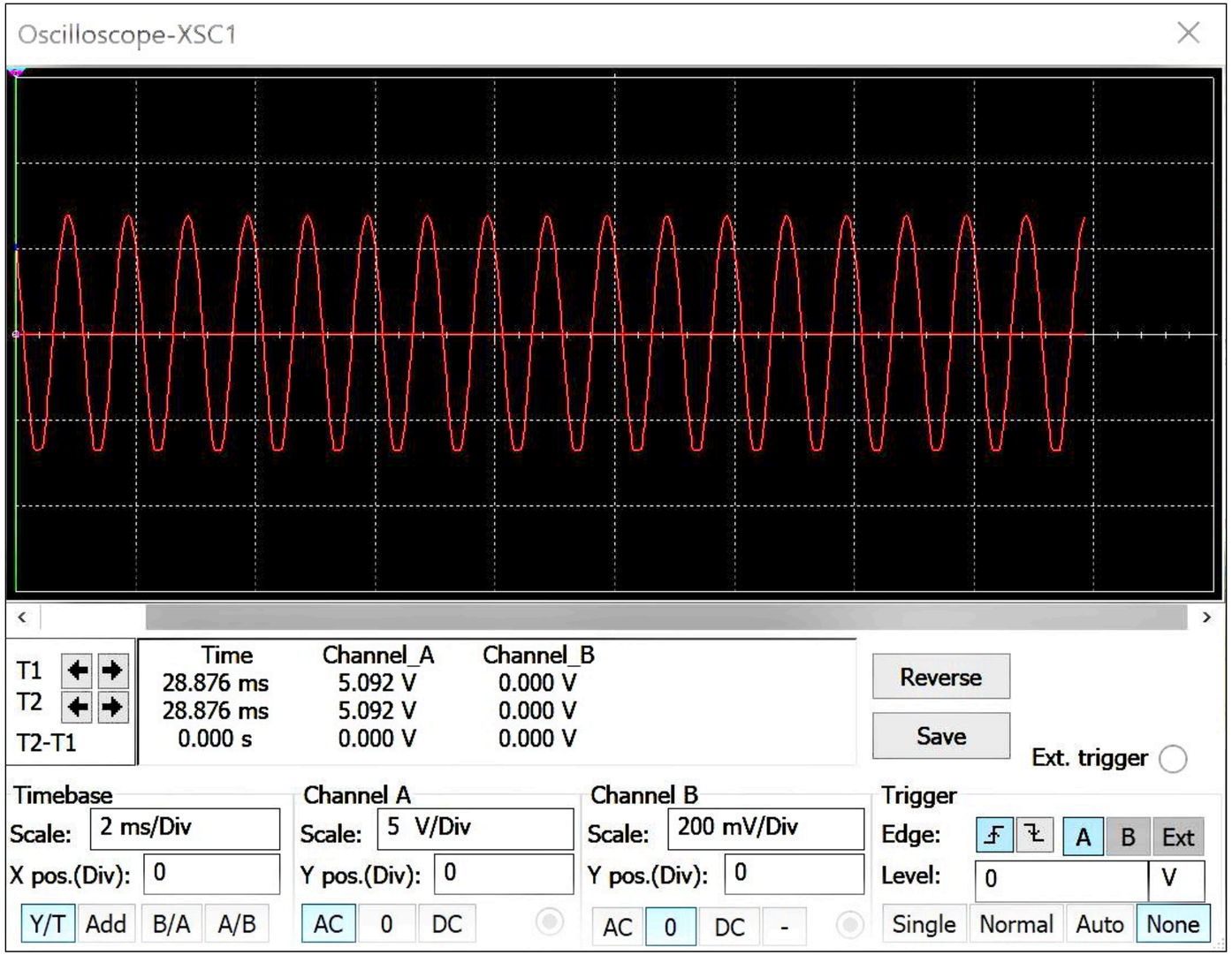
Pre-Amplifier

GAIN STAGE

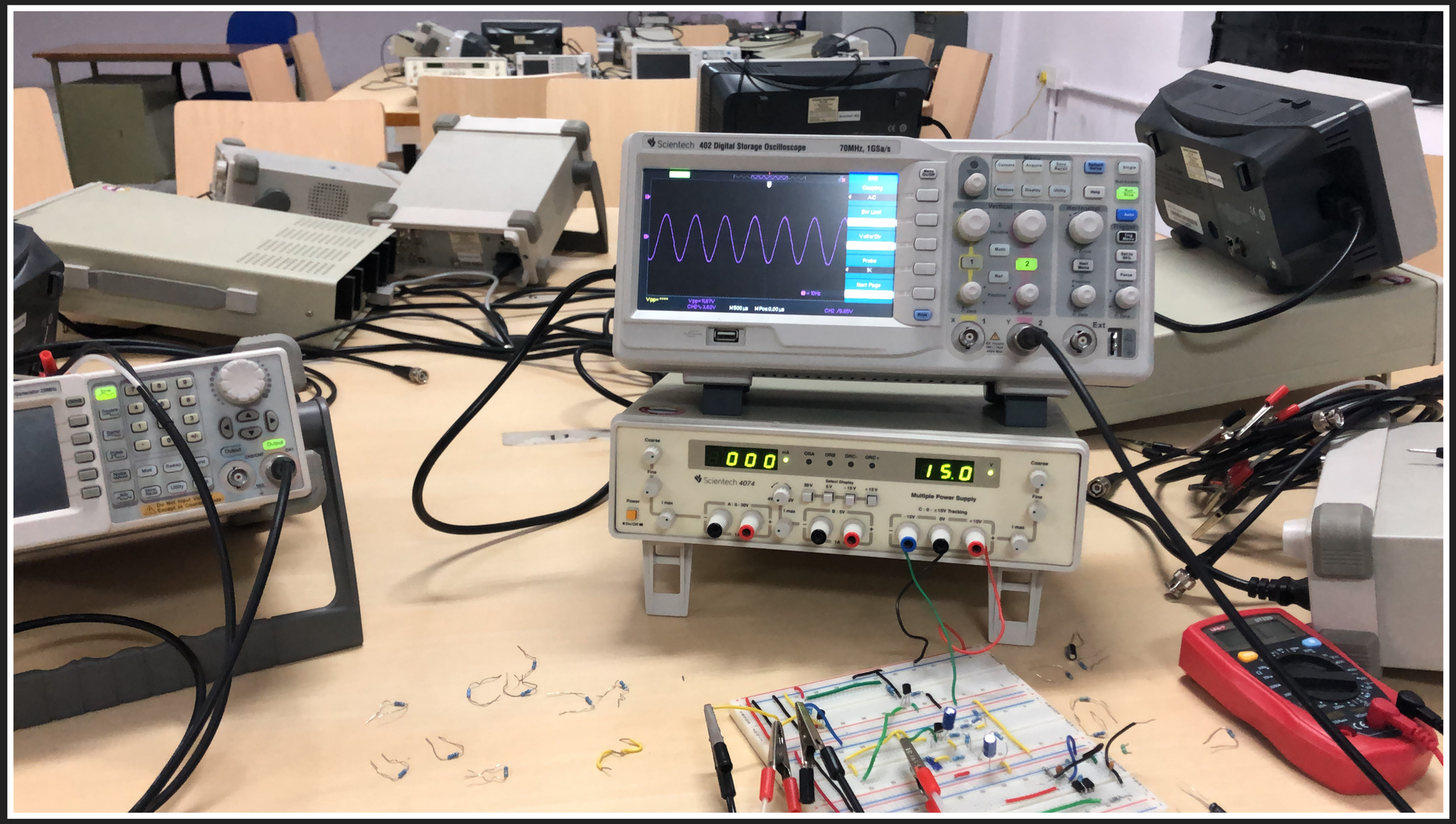
- In this stage our motive will be to get as much voltage gain as possible.
- We will then amplify the weak signals by a considerable amount to get a large gain (approx. 500), so that it becomes a strong signal which may not attenuate easily
- So we use common emitter amplifier here which can amplify the weak signals with a huge gain.


VCC
15V
R10
7.3kΩ
V: 7.90 V
V(p-p): 13.7 V
V(rms): 7.13 V
V(dc): 5.05 V
V(freq): 1.00 kHz
XSC1
Ext Trig
A
B
V: -1.50 V
V(p-p): 459 mV
V(rms): 1.42 V
V(dc): -1.41 V
V(freq): 1.00 kHz
PR4
C4
100µF
PR1
Q3
BC547BG
R13
180Ω
V3
230mVpk
1kHz
0°
R3
300kΩ
R12
9.2kΩ
C6
100uF
V2
-15V

Gain Stage



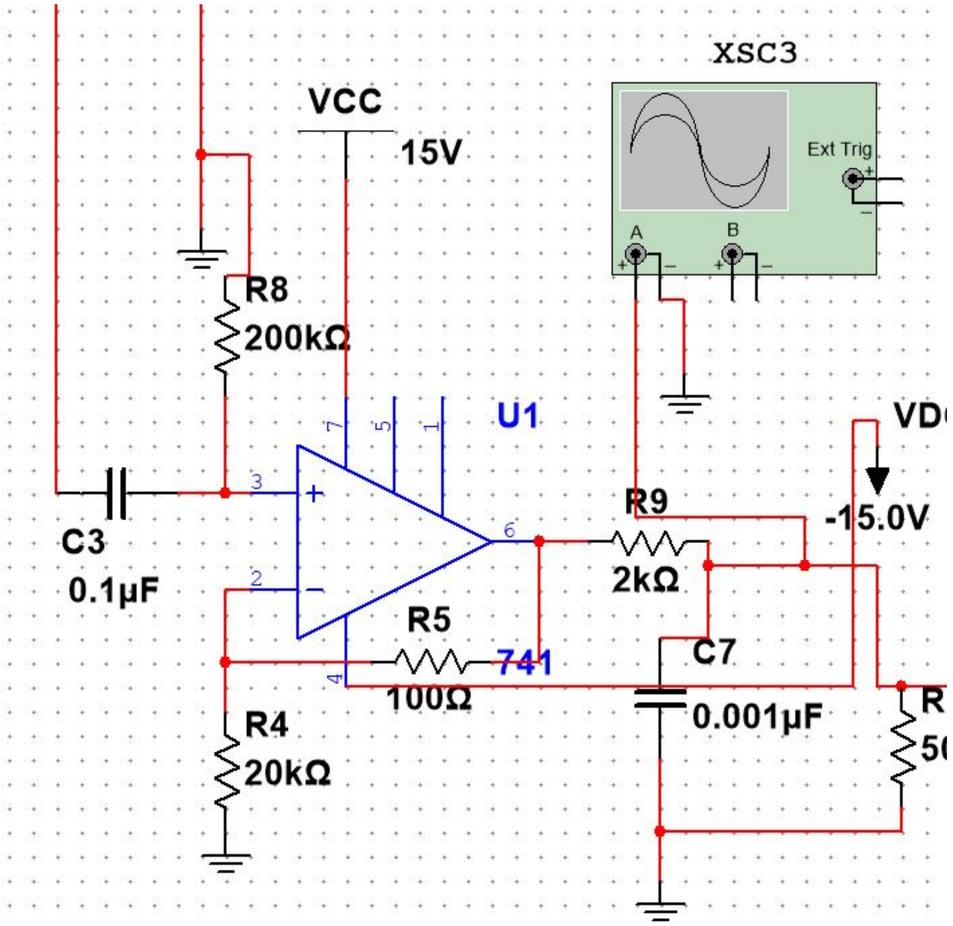
Output across Gain Stage



Output across Gain Stage

FILTER

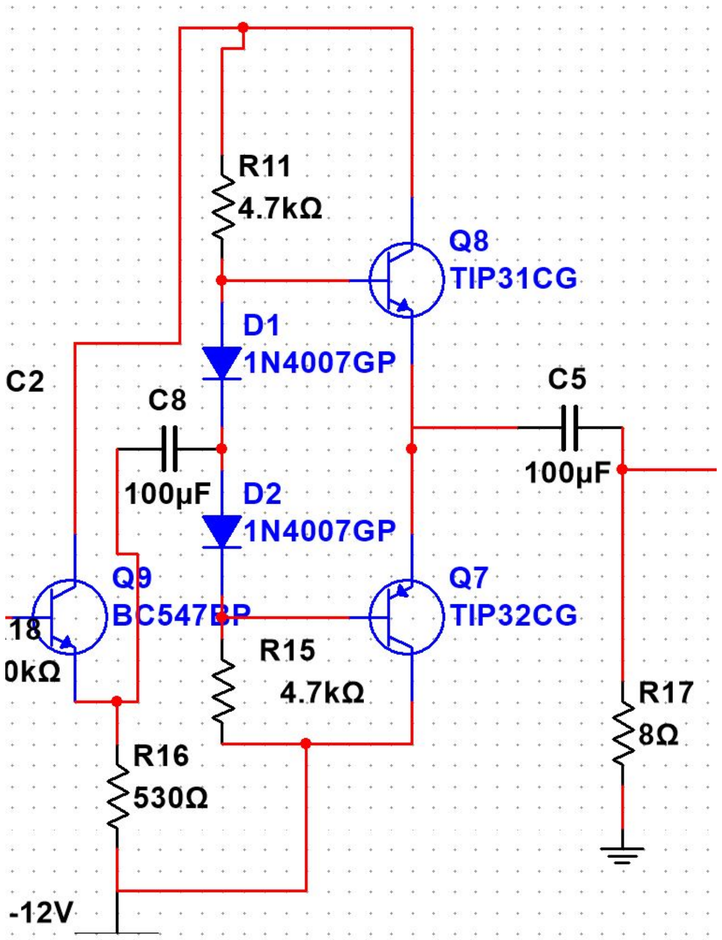
- An audio filter circuit consists of a bandpass filter for the audio frequency band, and it filters the unwanted noise signals.
- We use an active filter instead of a passive filter because an active amplifier has a high input impedance due to which our signal can not be destroyed.
- Using an active amplifier gives us the flexibility of choosing different values for gain and other specifications using different op-amps.
- Also passive filters consume the energy of the signal without giving any power gain, but in the case of active filters, we get a power gain.
- We can use a high pass filter in combination with a low pass filter to make a bandpass filter.



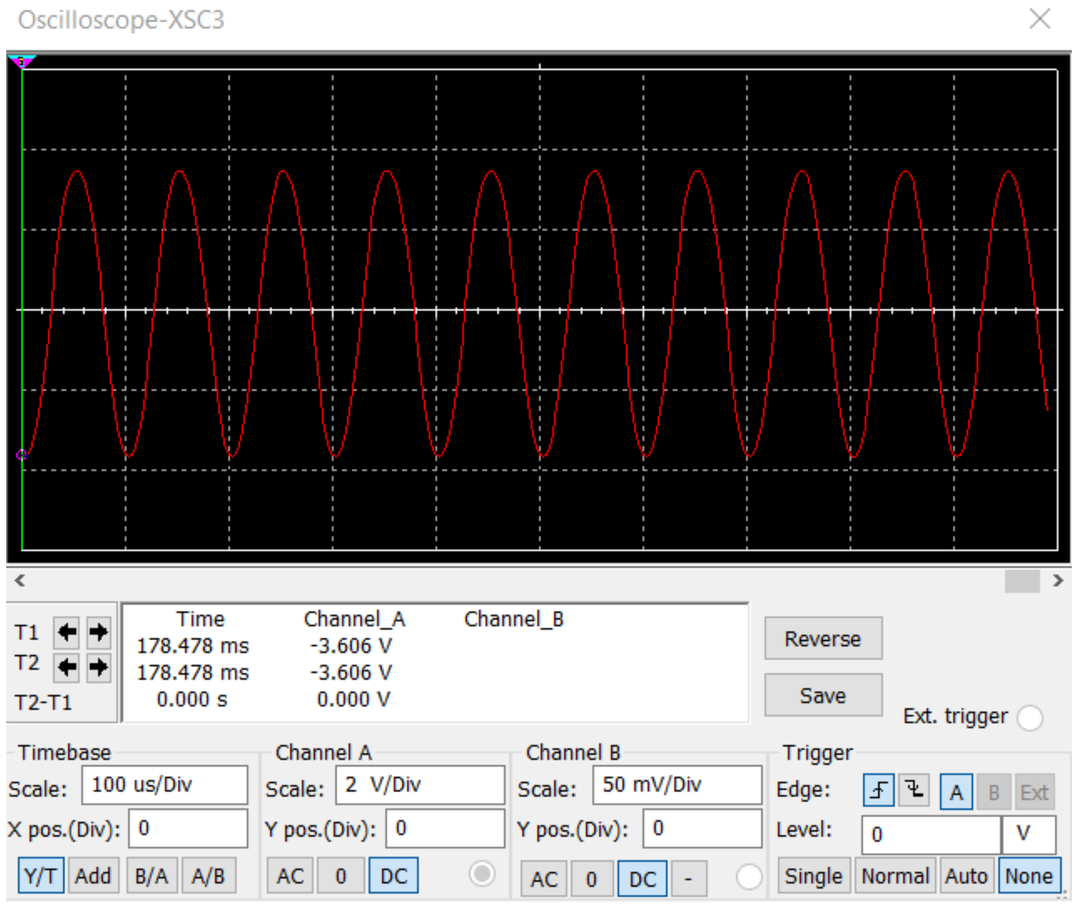
Bandpass Filter : 20Hz - 20kHz

POWER AMPLIFIER

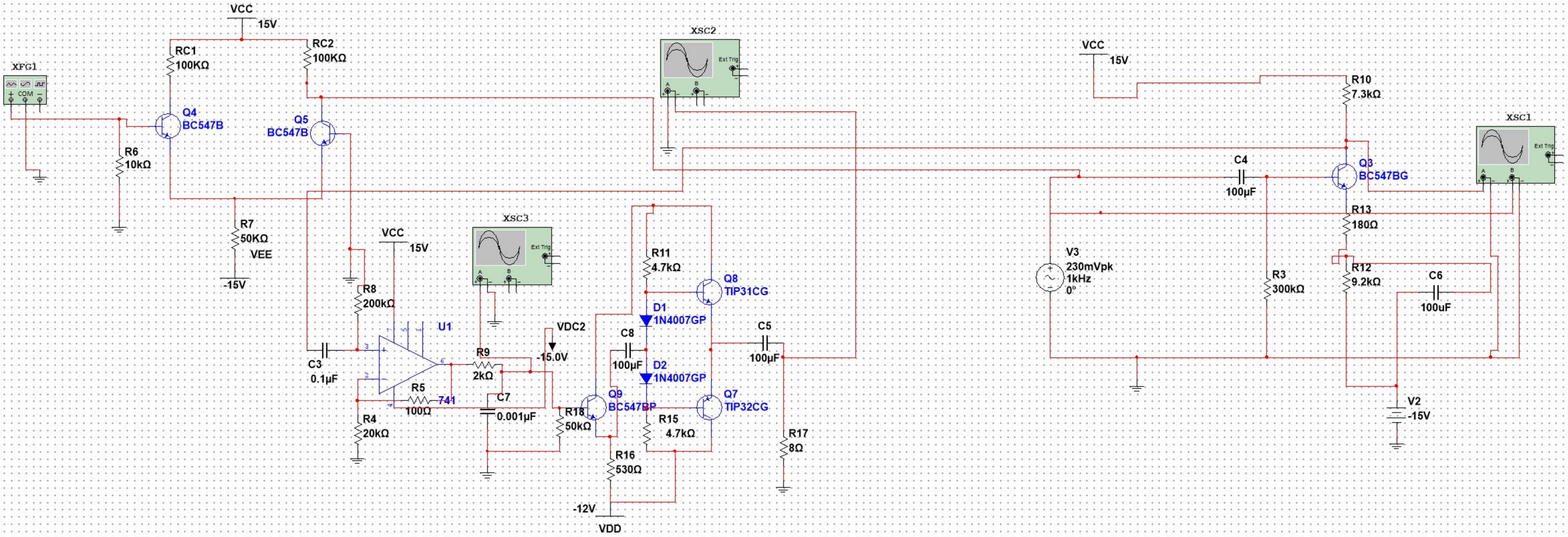
- A power amplifier is designed to increase the power of a signal which should be sufficient enough to drive loads.
- We are using AB type power amplifier to get distortion free as A type and high efficiency as B type . Also we use BJT instead of resistor to reduce power and for temperature ineffective.



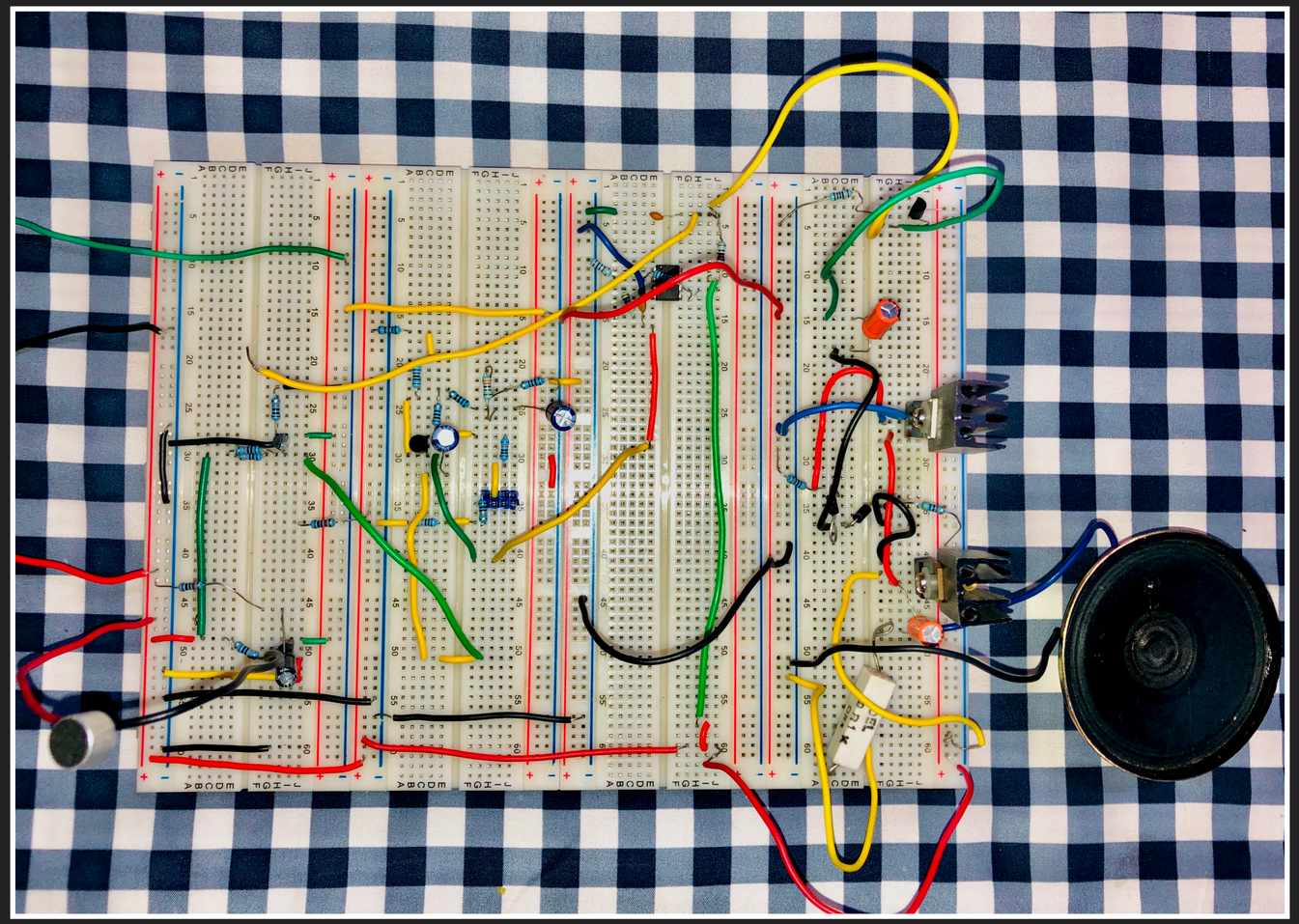
Class AB Power Amplifier



Output across the Power Amplifier



Complete Audio Amplifier



Complete Audio Amplifier

THANK YOU